TOM PHILLIPS ASSOCIATES
PLANNING FOR THE FUTURE

JULY 2023

RECEIVED: 18/07/2023

ENVIRONMENTAL IMPACT ASSESSMENT REPORT VOLUME 1 – MAIN BODY

KILDARE INNOVATION CAMPUS AT BARNHALL ROAD, LEIXLIP, COUNTY KILDARE.



PREPARED FOR:

THE DAVY PLATFORM ICAV FOR AND ON BEHALF OF THE LIFFEY SUB-FUND
DAVY HOUSE
49 DAWSON STREET
D02 PY05

PREPARED BY:

TOM PHILLIPS + ASSOCIATES
80 HARCOURT STREET
DUBLIN 2
D02 F449

RECEIVED: 18/07/2023

Table of Contents

1.0 INTRODUCTION
2.0 DESCRIPTION OF THE PROJECT
3.0 PLANNING AND DEVELOPMENT CONTEXT
4.0 EXAMINATION OF ALTERNATIVES
5.0 POPULATION AND HUMAN HEALTH
6.0 BIODIVERSITY
7.0 LAND, SOILS, GEOLOGY & HYDROGEOLOGY
8.0 HYDROLOGY
9.0 AIR QUALITY
10.0 CLIMATE
11.0 NOISE & VIBRATION
12.0 MATERIAL ASSETS – WASTE MANAGEMENT
13.0 MATERIAL ASSETS: TRAFFIC AND TRANSPORTATION
14.0 MATERIAL ASSETS: SITE SERVICES
15.0 ARCHAEOLOGY AND CULTURAL HERITAGE
16.0 LANDSCAPE AND VISUAL IMPACT ASSESSMENT
17.0 MAJOR ACCIDENTS AND DISASTERS
18.0 INTERACTIONS AND CUMULATIVE EFFECTS
19.0 MITIGATION AND MONITORING

RECEIVED: 19/07/2023

1.0 INTRODUCTION

1.1 Outline Details

This Environmental Impact Assessment Report (EIAR) relates to a project and planning application by The Davy Platform ICAV for and on behalf of the Liffey Sub Fund, (referred to as the Applicant throughout) for development that includes for the phased expansion of the existing Kildare Innovation Campus, allowing for a mix of Deep Tech, ICT and Innovation uses. This is referred to as the KIC Masterplan and includes all works subject to the application for consent, described on the public notices and included within the 'redline' boundary on the Site Layout Plan. The KIC Masterplan (i.e. the proposed development), the subject of the planning application, will include for the demolition of some of the existing buildings on site and construction of new buildings, an energy centre and replacement substation, significant public infrastructure including a new signalised intersection on Celbridge Road (R404), a new Public Link Road through the campus (between Barnhall Road and the new signalised intersection), a pedestrian/cycle overpass of the M4, pedestrian and cycle links through the site and along the designated protected view corridor, and supporting infrastructure. The project to which this EIAR relates also includes facilitation works which comprise uprating of existing 110kV power lines to the site and enhancement of the local gas network and connection to the site. The facilitation works which are described and assessed as part of the project in accordance with the requirement of the EIA Directive, do not form part of the development for which planning consent is sought. Future consents for the facilitation works will be required through EirGrid and GNI. A detailed description of the project is outlined in Chapter 2 of this EIAR.

The development site which is subject to the application for consent measures c. 72.23 ha and is principally bounded by: the M4 Motorway and Barnhall Meadows to the north; Cellbridge Road to the east; Barnhall Rugby Football Club to the south; and by grounds associated with Castletown House to the west.

The site comprises the existing Kildare Innovation Campus, which was formerly the Hewlett Packard Campus originally permitted in 1995 under KCC Reg. Ref 95923. The development site also encompasses lands within the ownership of Kildare County Council (KCC). A letter of consent from KCC for the application to be made is included with eth application documents.

Refer to Chapter 2 for a more detailed description of the site's location and context.

A Non-Technical Summary of the EIAR has also been submitted with this application.

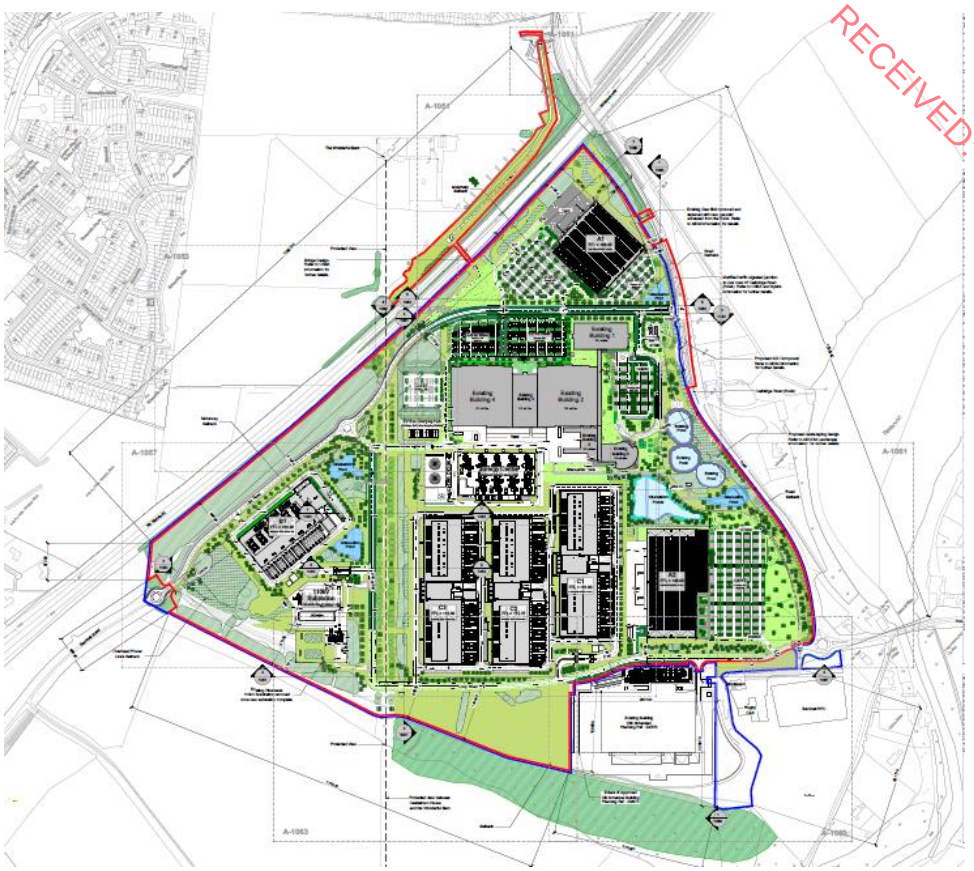


Figure 1.1: Site Layout Plan. Note that the 'Project' for the purposes of this EIA and EIAR contains 'facilitation' works outside the redline site boundary for which this planning application does not seek development consent. See Chapter 2 for full breakdown of the 'Project' works. (Source: RKD Site Location Plan, Drawing No. KIC-RKD-ZZ-ZZ-DR-A-1030)

1.2 EIA Process

The requirement for an environmental impact assessment (EIA) derives from, and is governed by, Directive 2011/92/EU of the European Parliament and Council of the 13th December 2011 on the assessment of the effects of certain public and private projects on the environment as amended by Directive 2014/52/EU of the European Parliament and Council of the 16th April 2014 (EIA Directive). The primary objective of the EIA Directive is to ensure that certain public and private projects that are likely to have significant effects on the environment by virtue of their nature, size or location are subjected to an assessment of their likely impacts prior to development consent being given.

Where a proposed project is of a type identified in the EIA Directive an EIA forms part of the planning consent process and is carried out by the planning authority. An EIAR is prepared by / on behalf of a Developer in respect of a project seeking planning consent. The EIAR thus becomes an integral informing element in the planning authority's EIA. Directive 2014/52/EU introduced strict requirements in respect of the competency of experts responsible for the preparation of the EIAR (see Section 1. below for details on the experts involved in the preparation of this document).

The EIA Directive was transposed into national legislation through the European Union (Planning and Development) (Environmental Impact Assessment) Regulations, 2018. These

RECEIVED: 18/07/2023

Regulations amended the Planning and Development Act, 2000 with the insertion of a new part, Part X, into the Act, and the Planning and Development Regulations 2001 with the insertion of a new part, Part 10.

Section 171A of the Planning and Development Act, 2000, as amended, defines an EIA as follows:

'environmental impact assessment' means a process—

(a) consisting of—

(i) the preparation of an environmental impact assessment report by the applicant in accordance with this Act and regulations made thereunder,

(ii) the carrying out of consultations in accordance with this Act and regulations made thereunder,

(iii) the examination by the planning authority or the Board, as the case may be, of—

(I) the information contained in the environmental impact assessment report,

(II) any supplementary information provided, where necessary, by the applicant in accordance with section 172(1D) and (1E), and

(III) any relevant information received through the consultations carried out pursuant to subparagraph (ii),

(iv) the reasoned conclusion by the planning authority or the Board, as the case may be, on the significant effects on the environment of the proposed development, taking into account the results of the examination carried out pursuant to subparagraph (iii) and, where appropriate, its own supplementary examination, and

(v) the integration of the reasoned conclusion of the planning authority or the Board, as the case may be, into the decision on the proposed development, and

(b) which includes—

(i) an examination, analysis and evaluation, carried out by the planning authority or the Board, as the case may be, in accordance with this Part and regulations made thereunder, that identifies, describes and assesses, in an appropriate manner, in the light of each individual case, the direct and indirect significant effects of the proposed development on the following:

(I) population and human health;

(II) biodiversity, with particular attention to species and habitats protected under the Habitats Directive and the Birds Directive;

(III) land, soil, water, air and climate;

(IV) material assets, cultural heritage and the landscape;

(V) the interaction between the factors mentioned in clauses (I) to (IV),

and

(ii) as regards the factors mentioned in subparagraph (i)(I) to (V), such examination, analysis and evaluation of the expected direct and indirect significant effects on the environment derived from the vulnerability of the proposed development to risks of major accidents or disasters, or both major accidents and disasters, that are relevant to that development;

RECEIVED: 18/07/2023

The EIA process involves a number of steps and as per the methodology that is contained in the 2022 EPA EIAR Guidelines may be summarised as follows:

1. Screening – Is an EIA required?

2. Scoping – If an EIA is required, what aspects of the environment are likely to be significantly affected and should therefore be considered?

3. Preparation of an EIAR.

4. EIAR informs the EIA (as part of the consent process).

RECEIVED: 18/07/2023

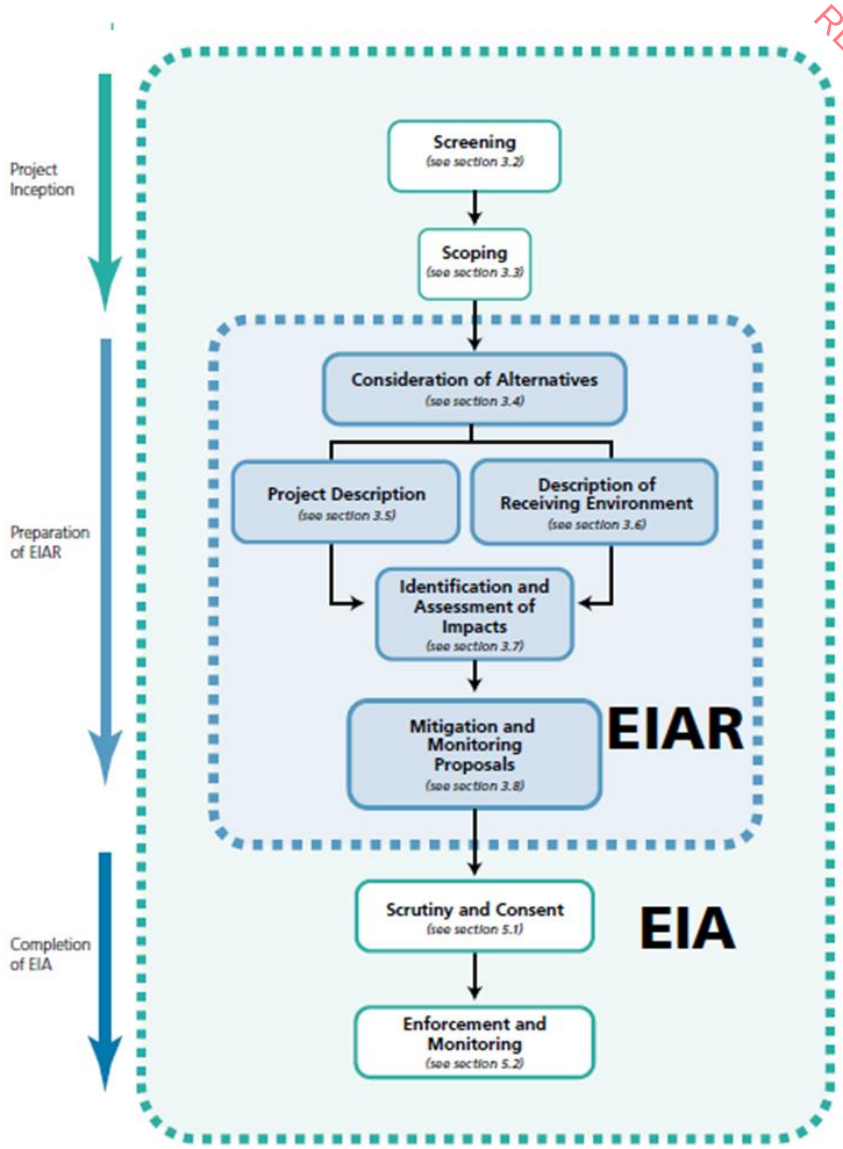


Figure 1.2: Flow chart illustrating the EIA Process. (Source: *Guidelines on the information to be contained in Environmental Impact Assessment Reports*, 2022, EPA; Figure 2.1.)

1.3 Need for EIAR

The EIA Directives list those projects for which an EIA is mandatory (Annex I) and those projects for which member states must provide a process to determine if it is likely to have significant effects on the environment (Annex II). This process may involve a case-by-case examination, the establishment of objective thresholds or other criteria, or a combination of these.

Annex I projects are listed in Part 1 of Schedule 5 of the *Planning and Development Regulations 2001* (as amended) ("the Regulations").

The project, the subject of this EIA, is not of a type listed within Part 1 of Schedule 5 of the Regulations and therefore a mandatory EIA is not required in this instance.

RECEIVED: 18/07/2023

Annex II projects are set out in Part 2 of Schedule 5, together with specified thresholds above which a project must be subject to an EIA. The following class of project listed in Part 2 of Schedule 5 is relevant to the present project [OR Project]:

Class 10(b)(iv):

> *"Urban development which would involve an area greater than 2 hectares in the case of a business district, 10 hectares in the case of other parts of a built-up area and **20 hectares elsewhere**."*
>
> [Our emphasis.]

Having regard to the overall site area of the Project which is in excess of 73.95 ha, an EIA of the Project is therefore required.

1.4 Purpose and content of the Environmental Impact Assessment Report

An EIAR's purpose is to predict and assess likely significant effects (direct and indirect), if any, that the proposed project, if carried out, would have on the environment, on its own and in combination with other existing and /or approved projects. It is used during the consent process to inform EIA.

Article 5(1) and Annex IV of the EIA Directive, specifies the information to be provided in an EIAR. These requirements have been transposed into Irish law through Article 94 and Schedule 6 of the Planning and Development Regulations, 2001 (as amended).

Article 94 states:

> *"An EIAR shall take into account the available results of other relevant assessments under European Union or national legislation with a view to avoiding duplication of assessments and shall contain —*
>
> *(a) the information specified in paragraph 1 of Schedule 6,*
>
> *(b) any additional information specified in paragraph 2 of Schedule 6 relevant to the specific characteristics of the development or type of development concerned and to the environmental features likely to be affected, and methods of assessment,*
>
> *(c) a summary in non-technical language of the information required under paragraphs (a) and (b),*
>
> *(d) a reference list detailing the sources used for the descriptions and assessments included in the report, and*
>
> *(e) a list of the experts who contributed to the preparation of the report, identifying for each such expert— (i) the part or parts of the report which he or she is responsible for or to which he or she contributed, (ii) his or her competence and experience, including relevant qualifications, if any, in relation to such parts, and (iii) such additional information in relation to his or her expertise that the person or persons preparing the EIAR consider demonstrates the expert's competence in the preparation of the report and ensures its completeness and quality."*

Schedule 6, Information to be contained in EIAR, provides as follows:

RECEIVED: 18/07/2023

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

RECEIVED: 18/07/2023

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, short term, 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.

RECEIVED: 19/07/2023

This EIAR has been prepared in accordance with the requirements of Article 5(1) and Annex IV of the EIA Directive as implemented in Ireland through Article 94 and Schedule 6 of the Planning and Development Regulations, 2001 (as amended).

The preparation of this *Environmental Impact Assessment Report* has been co-ordinated by Tom Phillips + Associates, Town Planning Consultants[1], in association with other members of the Project Team as identified in Table 1.1 below. Details in respect of the competence of the various experts is set out in section 1.8.

1.5 Methodology adopted to identify, assess and describe potential significant effects.

The Environmental Protection Agency (EPA) 'Guidelines on the information to be contained in Environmental Impact Assessment Reports' (2022) (hereafter referred to as 'the EPA Guidelines') have the primary objective of improving the quality of EIARs with a view to facilitating compliance with the Directive. The environmental assessments for this project have evaluated the effects of the proposed project, and the likelihood, extent, magnitude, duration, reversibility and significance of any likely potential impacts of the proposed Project versus the current baseline.

Specific criteria for each technical discipline have been utilised, giving due regard to the following criteria from the EPA Guidelines:

- The magnitude and spatial extent of the impact (for example geographical area and size of the population likely to be affected);
- The nature of the impact;
- The transboundary nature of the impact;
- The intensity and complexity of the impact;
- The probability of the impact;
- The expected onset, duration, frequency and reversibility of the impact;
- The accumulation of the impact with the impact of other existing and/or approved projects; and
- The possibility of effectively reducing the impact.

In order to provide a consistent approach across the different technical disciplines addressed within the EIA, the following terminology will be used throughout the EIAR. This terminology has been adopted from the EPA Guidelines. Where individual environmental topics use different terminology due to specific guidance or legislative requirements, this will be described further in that section.

To define residual effects (i.e. the effect after the application of any required additional mitigation measures), the following terminology will be used:

[1] Tom Phillips + Associates, Town Planning Consultants, 80 Harcourt Street, Dublin 2, D02 F449

RECEIVED: 19/07/2023

- Positive Effects – A change which improves the quality of the environment (for example, by increasing species diversity; or improving the reproductive capacity of an ecosystem, or by removing nuisances or improving amenities).
- Negative/Adverse Effects – A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem; or damaging health or property or by causing nuisance).
- Neutral Effects – No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.

When addressing the duration of an effect, the following terminology will be used:

- Momentary Effects – Effects lasting from seconds to minutes
- Brief Effects – Effects lasting less than a day
- Temporary Effects – Effects lasting less than a year
- Short-term Effects – Effects lasting one to seven years
- Medium-term Effects – Effects lasting seven to fifteen years
- Long-term Effects – Effects lasting fifteen to sixty years
- Permanent Effects – Effects lasting over sixty years
- Reversible Effects – Effects that can be undone, for example through remediation or restoration
- Frequency of Effects – Describe how often the effect will occur (once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annually)

The extent and context of an effect will also be described as this can affect the perception of significance. These terms are defined as:

- Extent – Describe the size of the area, the number of sites, and the proportion of a population affected by an effect.
- Context – Describe whether the extent, duration, or frequency will conform or contrast with established (baseline) conditions (is it the biggest, longest effect ever?)

Where adverse or beneficial effects are identified, these will be assessed against the following scale:

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

Finally, the probability of an effect should be defined to establish how likely it is to occur.

- Likely Effects – The effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented.
- Unlikely Effects – The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.

RECEIVED: 18/07/2023

1.6 Significance Criteria

For each technical EIAR chapter, the classification and significance of effects will be evaluated with reference to definitive standards, accepted criteria and legislation where available. Where it has not been possible to quantify effects, qualitative assessments will be carried out, based on professional opinion and professional judgement. Where uncertainty exists, this will be noted in the relevant EIAR chapter.

For each topic, the technical assessment will consider the magnitude of impacts and the sensitivity of the resources / receptors that could be affected in order to classify the effect. Each environmental factor and technical discipline will have its own method based on various standards and approaches, which will be detailed in a transparent and understandable way within the EIAR chapter.

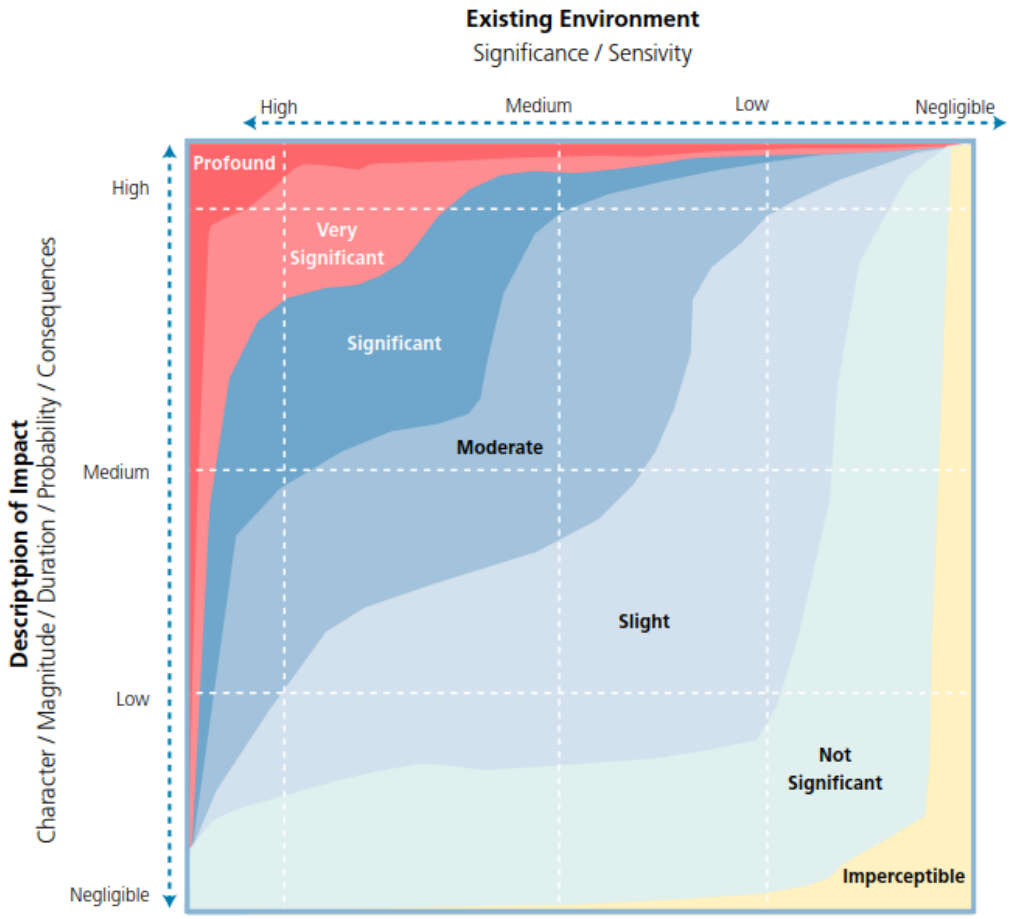


Figure 1.3: Determination of the Significance of an Effect (EPA, 2022)

In general, residual effects found to be 'significant', 'very significant' or 'profound' are deemed to be 'significant effects'. Effects found to be 'moderate' and 'slight' are considered to not be

RECEIVED: 18/07/2023

significant effects 'Not significant' and 'imperceptible' effects are considered to not be significant.

1.7 Scoping of the Environmental Impact Assessment

All environmental factors outlined in the EIA Directive and the EPA *Guidelines on the information to be contained in Environmental Impact Assessment Reports*, May 2022 have been scoped into this Environmental Impact Assessment Report.

1.8 Consultation

To date and during the course of preparing the planning application which seeks consent for the principal works the Project Team has had strategic engagement with Kildare County Council, IDA Ireland, Eirgrid, Gas Networks Ireland, Kildare Chamber of Commerce, Barnhall Rugby Club, Salmon Leap Canoe Club, Weston Airport, Glenveagh, Office of Public Works (Castletown Estate), the 3rd Party Landowner of adjoining lands within Castletown estate and Transport Infrastructure Ireland (TII). Further to this, during the preparation of this EIAR, the EIAR project team have undertaken desktop scoping exercises through consulting the websites and published material of various statutory bodies including Kildare County Council (various internal departments including planning, environment, roads, drainage and conservation), Geological Survey of Ireland, National Parks and Wildlife Service, Inland Fisheries Ireland, National Heritage Office, National Monument Section (DOEHLG), Environmental Protection Agency (EPA), Commission for Regulation of Utilities (CRU), Transport Infrastructure Ireland (TII) and National Transport Authority (NTA).

It is noted that the name of the former HP site, then called Liffey Valley Business Park was re-branded in early April 2022 and its name changed to Kildare Innovation Campus (KIC) to coincide with a visit by the then Tánaiste and Minister for Trade, Enterprise & Employment Leo Varadkar, TD, for an IDA Ireland announcement of new jobs for the Campus.

In line with the requirements of the EIA Directive, as stated in Article 1(2)(ii) *"the carrying out of consultations as referred to in Article 6 and, where relevant, Article 7"* following *"the preparation of an environmental impact assessment report by the developer"*.

As such, as required by the Planning and Development Act 2000 (as amended), the information contained within the planning application and the EIAR will be available to the public and the public will be given an opportunity to express their opinion on said information for a period of five weeks, which is in excess of the 30 days stipulated in Article 6(7) of the 2014 Directive.

In addition, the EIAR has been registered with the Department of Housing, Local Government and Heritage's EIA Portal.

RECEIVED: 18/07/2023

1.9 EIAR Methodology and Format

In addition to the 2014 Directive, the subject EIAR has been informed by:

- Guidelines on the Information to be contained in Environmental Impact Statements (EPA, 2022);
- Advice Notes on Current Practice in the Preparation of Environmental Impact Statements (EPA, 2003);
- Draft Guidelines On The Information To Be Contained In Environmental Impact Assessment Reports (EPA, draft August 2017);
- Draft Advice Notes for Preparing Environmental Impact Statements, Draft, (EPA draft September 2015a);
- Draft Revised Guidelines on the Information to be Contained in Environmental Impact Statements (EPA draft September 2015b);
- Environmental Impact Assessment of Projects: Guidance on Screening (European Commission, 2017);
- Environmental Impact Assessment of Projects: Guidance on Scoping (European Commission, 2017);
- Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (European Commission, 2017);
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment, (August 2018);
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports, May 2022;
- Guidance of Integrating Climate Change and Biodiversity into Environmental Impact Assessment (European Commission, 2013);
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Environment, Community and Local Government 2013);
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Government of Ireland, 2018);
- Key Issues Consultation Paper on the Transposition of 2014 EIA Directive (2014/52/EU) in the Land Use Planning and EPA Licencing Systems (Department of Housing, Planning, Community and Local Government 2017);
- Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions (European Commission, 1999);
- Implementation of Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment (European Commission, 2003);
- Circular PL 05/2018 -Transposition into Planning Law of Directive 2014/52/EU amending Directive 2011/92/EU on the effects of certain public and private projects on the environment (the EIA Directive) And Revised Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Planning and Local Government, 2018)

The above is not a fully exhaustive list. The EIAR contributors have referred to heading-specific legislation, policy, and/or guidelines within each in individual EIAR Chapter.

EIARs require 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. To allow

RECEIVED: 18/07/2023

for ease of presentation, and consistency when considering the various environmental factors considered, a systematic structure is used for the main body of the Report. The structure of the EIAR Chapters is outlined below.

1.9.1 Introduction and Project Description

The chapters of this EIAR introduce and describe the proposed development in sufficient detail to allow for a full assessment of the potential environmental effects.

1.9.2 Methodology

This section of each chapter outlines the methods used to describe the baseline environmental conditions and to predict the likely impacts on the environment of the proposed development during both the construction phase and the operational phase. The data and survey requirements for each chapter vary depending on the environmental topic and have been chosen by the particular specialist based on relevant legislation, best practice guidance, policy requirements, and professional judgement. Similarly, the study area is also defined for each environmental topic based on best practice guidelines, professional judgement, and experience.

All environmental topics require desk-based reviews of all relevant data at a minimum. These desk-based studies were then supplemented by field studies and consultations with relevant stakeholders, for example, interested parties, statutory bodies, and local authorities, as required for each environmental topic.

1.9.3 Baseline Scenario/Receiving Environment Analysis

This section provides a description of the current state of the environment related to the subject site, and a description of its likely evolution in the event that the Project is not implemented.

1.9.4 Likely Impact of the Project

This section allows for a description of the direct and indirect impacts that the project is likely to have on aspects of the environment affected. This section provides a list of the environmental topics affected by the Project. This is done with reference to both the *Project Description* and *Receiving Environment* sections, while also referring to the magnitude, duration, consequences (including use of natural resources) and significance of any impact.

1.9.5 Mitigation Measures and Monitoring of Impacts

This section provides a description of the measures envisaged to prevent, reduce and (where possible) offset any significant adverse impacts on the environment (for both construction and operational stages) that are practicable or reasonable, having regard to the potential impacts.

RECEIVED: 18/07/2023

This section also outlines monitoring measures, where appropriate, in cases where significant adverse impacts have been identified.

1.9.6 Likely Cumulative and Interaction Impacts of the Project

This section allows for a description of the cumulative and interaction impacts that the project is likely to have on aspects of the environment affected. This is done with reference to both the *Project Description* and *Receiving Environment* sections, while also referring to the magnitude, duration, consequences (including use of natural resources) and significance of any impact.

For cumulative impacts of future developments in the surrounding area, Tom Phillips + Associates (TPA) have provided each Chapter consultant with a list of future developments in the surrounding area. The list was created by TPA's GIS specialist who filtered the Local Authorities' planning permission data sets to those within 5 km of the subject site.

That list was then filtered further – using professional town planning judgment – to eliminate applications such as extensions to dwellings or other minor developments unlikely to combine with the project to significantly impact the environment. The final list provided to each consultant is included as Appendix 1.1.

1.9.7 Mitigation Measures and Monitoring of Cumulative and Interaction Impacts

This section provides a description of the measures envisaged to prevent, reduce and (where possible) offset any significant adverse impacts on the environment (for both construction and operational stages) that are practicable or reasonable, having regard to the potential cumulative and interaction impacts.

This section also outlines monitoring measures, where appropriate, in cases where significant adverse cumulative and interaction impacts have been identified.

1.9.8 Major Accidents and/or Disasters

This section assesses the impacts from Major Accidents and/or Disasters. The EPA Guidelines, 2022, state that:

> *"To address unforeseen or unplanned effects the Directive further requires that the EIAR takes account of the vulnerability of the project to risk of major accidents and /or disasters relevant to the project concerned and that the EIAR therefore explicitly addresses this issue. The extent to which the effects of major accidents and / or disasters are examined in the EIAR should be guided by an assessment of the likelihood of their occurrence (risk). This may be supported by general risk assessment methods or by systematic risk assessments required under other legislation e.g. a COMAH (Control of Major Accident Hazards involving Dangerous Substances) assessment.*
>
> *The potential for a project to cause risks to human health, cultural heritage or the environment due to its vulnerability to external accidents or disasters is considered where such risks are significant, e.g. the potential effects of floods on sites with*

sensitive facilities. Where such risks are significant then the specific assessment of those risks in the form of a Seveso Assessment (where relevant) or Flood Risk Assessment may be required."

RECEIVED: 18/01/2024

The 2014 EIA Directive and associated EPA EIAR Guidelines requires that the vulnerability of the project to major accidents, and/or natural disasters (such as earthquakes, landslides, flooding, sea level rise etc.) is considered in the EIA Report. The site has been assessed in relation to the following external natural disasters; landslides, seismic activity and volcanic activity and sea level rise/flooding as outlined below. The potential for major accidents to occur at the facility has also been considered with reference to Seveso/COMAH. The results are presented in the relevant EIAR chapters and the overall impact is concluded as imperceptible.

1.9.9 Mitigation Measures and Proposed Response to such Emergencies

This section provides a description of the measures envisaged to prevent, reduce and (where possible) offset any significant adverse impacts on the environment (for both construction and operational stages) that are practicable or reasonable, having regard to the potential major accidents and/or disasters impacts.

This section also outlines the proposed response to such emergencies.

1.9.10 Residual Impacts

This section assesses the residual impacts of the project, which are the final predicted or intended impacts that occur after the proposed mitigation measures have been implemented. It will not always be possible or practical to mitigate all adverse effects.

Each Chapter of this EIAR clearly describes (in accordance with the standardised terminology set out in the EPA Guidelines, 2022) the residual impacts of the Project.

1.10 EIAR Study Team and Guarantee of Competency and Independence

1.10.1 EIAR Study Team – Roles and Responsibilities

This Environmental Impact Assessment Report was completed by a project team led by Tom Phillips + Associates, who also prepared a number of the chapters.

In accordance with EIA Directive 2014/52/EU, we confirm that the experts involved in the preparation of this EIAR are fully qualified and competent in their respective fields. Each has extensive proven expertise in the relevant field concerned, thus ensuring that the information provided herein is complete and of high quality.

RECEIVED: 18/07/2023

Chapter	Aspects of the Environment Considered	Contributor	Person Responsible
Chapter 1	Introduction and Methodology	Tom Phillips + Associates (TPA)	Brian Minogue
Chapter 2	Site Location and Context	TPA	Brian Minogue
Chapter 3	Description of the Proposed Development	TPA	Brian Minogue
Chapter 4	Key Alternatives Considered	TPA	Brian Minogue
Chapter 5	Population and Human Health	TPA	Gavin Lawlor
Chapter 6	Biodiversity	Ecology Ireland	Gavin Fennessy Maire Kearns
Chapter 7	Land, Soils and Ground Water & Hydrogeology	AWN	Teri Hayes Alan Wilson
Chapter 8	Hydrology	AWN	Teri Hayes Alan Wilson
Chapter 9	Air	AWN	Dr. Edward Porter
Chapter 10	Climate	AWN	Dr. Edward Porter
Chapter 11	Noise and Vibration	AWN	Mike Simms
Chapter 12	Material Assets – Waste (Construction and Demolition)	AWN	Chonaill Bradley
Chapter 13	Material Assets –Traffic and Transportation	SYSTRA	Sheelagh McGuinness
Chapter 14	Material Assets – Site Services incl Energy Demand	TPA, CSEA, MDM Engineering, Ethos Engineering & H&MV Engineering	Brian Minogue
Chapter 15	Archaeology, Architecture & Cultural Heritage	Shanarc Archaeology & Mesh Architecture	Sean Shanahan / Tom McGimsey
Chapter 16	Heritage, Townscape, Landscape Visual Impact Assessment	AECOM	Joerg Schulze
Chapter 17	Major Accidents & Disasters	AWN	Matthew Michie
Chapter 18	Interactions and Cumulative Impacts	TPA	Brian Minogue
Chapter 19	Mitigation	TPA	Brian Minogue

	Non – Technical Summary	All Contributors outlined above - compiled by TPA	All Contributors outlined above - compiled by TPA

Table 1.2: EIAR Chapter Headings and Contributors

RECEIVED: 18/07/2023

1.10.2 EIAR Team - Qualifications

Brian Minogue, (*TPA Town Planning Consultants)*
Qualifications: BSc in Spatial Planning.

Gavin Lawlor, (*TPA Town Planning Consultants)*
Qualifications: Master of Regional and Urban Planning – University College Dublin

Gavin Fennessy, *(Ecology Ireland Wildlife Consultants Ltd.)*
Qualifications: (BSc PhD MCIEEM)

Marie Kearns, *(Ecology Ireland Wildlife Consultants Ltd.)*
Qualifications: (BSc MSc)

Dr. Edward Porter, *(AWN Consulting Limited)*
Qualifications: BSc from the University of Sussex (Chemistry), and a PhD in Environmental Chemistry (Air Quality) in UCD

Mike Simms, *(AWN Consulting Limited)*
Qualifications: BE MEngSc MIOA MIET

Teri Hayes, *(AWN Consulting Limited)*
Qualifications: BSc MSc PGeol EurGeol

Chonaill Bradley, *(AWN Consulting Limited)*
Qualifications: BSc

Sheelagh McGuinness, *(SYSTRA Ltd.)*
Qualifications: B.Eng (hons) MBA

Grace Fegan, (Shanarc Archaeology Ltd)
Qualifications: B.A. Archaeology, M.A. Museum Studies

Tom McGimsey, *(Mesh Architecture)*
Qualifications: BArch, MSc Historic Preservation, RIAI Conservation Grade 1

Joerg Schulze, *(AECOM)*
Qualifications: MChem and a MSc (Physical Chemistry)

Matthew Michie, *(AWN Consulting Limited)*
Qualifications: MChem and a MSc (Physical Chemistry)

RECEIVED: 18/07/2023

1.12 Additional Assessments Required

This section addressed the additional approvals and assessments required under other EU Directives and legislation.

- EPA Greenhouse Gas (GHG) Emissions Permit – the proposed development will require a permit under the Greenhouse Gas Emissions Directive (2003/87/EC).
- Appropriate Assessment Screening Report – a screening report has been completed for the proposed development, as required under the Habitats and Birds Directive (92/43/EEC and 79/409/EEC), the results of which are presented in Chapter 6 (Biodiversity).
- Flood Risk Assessment - A Flood Risk Assessment for the site has been undertaken for the facility and is appended to Chapter 8 Hydrology and Hydrogeology.
- Industrial Emissions Directive (IED) licence – as the thermal input of the facility as a whole will exceed 50MW, it is anticipated that the development will require an IED licence in accordance with the Industrial Emissions Directive (20120/75/EU). An application to the EPA will be submitted post planning.

1.13 The Developer

The development is proposed by The Davy Platform ICAV for and on behalf of the Liffey Sub Fund.

RECEIVED: 18/07/2023

2.0 DESCRIPTION OF THE PROJECT

2.1 Introduction

This chapter of the *Environmental Impact Assessment Report* has been prepared by Brian Minogue (BSc in Spatial Planning), Tom Phillips + Associates in conjunction with the project team. In accordance with Directive 2011/92/EU of the European Parliament and Council of the 13th December 2011 on the assessment of the effects of certain public and private projects on the environment as amended by Directive 2014/52/EU of the European Parliament and Council of the 16th April 2014 (EIA Directive), it provides a detailed description of the project, together with details of the existing environment surrounding the site.

The detail required in describing the project is elaborated on in ANNEX IV of the EIA Directive as transposed in the Planning and Development Regulations 2001 to 2022 in Schedule 6 thereof where at paragraph 2(a) it states:

(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;

The following chapter presents a description of the project as required by the relevant planning legislation and guidance below:

- EIA Directive (2011/92/EU), as amended by the 2014 EIA Directive (2014/52/EU) (herein referred to as the EIA Directive)
- The Planning and Development Regulations 2001 to 2022 (as amended);
- European Commission *'Environmental Impact Assessment of Projects – Guidance on the preparation of Environmental Impact Assessment Report'* (2017)
- EPA *'Guidelines on the Information to be Contained in Environmental Impact Assessment Reports'* (2022), and
- EPA Draft *'Advice Notes for Preparing Environmental Impact Statements'* (2015).

2.2 Characteristics of the Project

The project, subject to this EIAR includes two separate but interrelated streams of proposed works:

A. The 'principal' works subject to the development consent being sought from Kildare County Council, i.e. the proposed development; and

B. 'Facilitation works' required to support the development which do not form part of the development consent being sought from Kildare County Council. The facilitation works include a mix of works that will be required to be undertaken for or on behalf of statutory undertakers such as Gas Networks Ireland and EirGrid.

RECEIVED: 18/07/2023

The principal works include the proposed expansion of the existing innovation campus and all those works included within the redline boundary and described on the statutory notices accompanying the application. The facilitation works are those known works that are required to facilitate the proposed development over the life of the permission being sought.

2.3 Location of the Project Site

2.3.1 Principal Works Site (Works within Planning Application Red Line Boundary)

The development site is located in County Kildare close to the border with County Dublin and measures approximately 72.23 ha, inclusive of 1.83 ha of lands within the ownership of Kildare County Council (KCC).

The campus is principally bounded by: the M4 Motorway (and Barnhall Meadows and Wonderful Barn lands) to the north; Cellbridge Road to the east; Barnhall Rugby Football Club and recently completed DB Schenker logistics facility to the south; and by grounds associated with Castletown House to the west.

The site comprises the existing Kildare Innovation Campus, which was formerly the Hewlett Packard Campus originally permitted in 1995 under KCC Reg. Ref 95923.

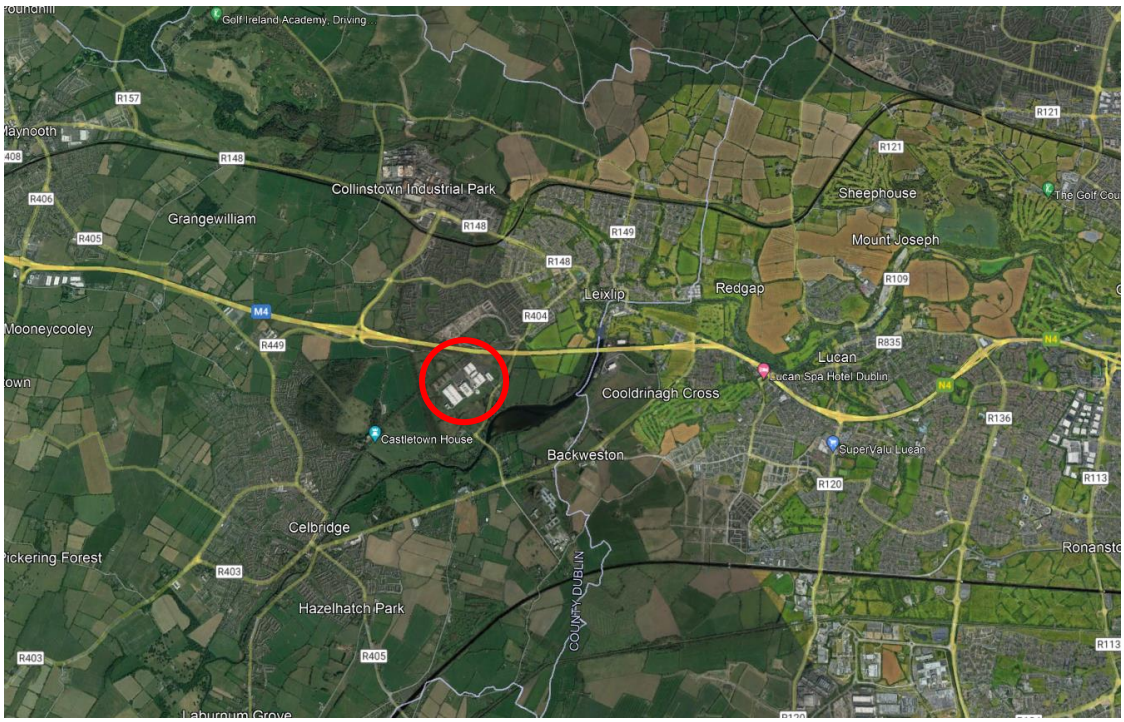


Figure 2.1: Site Location. (Source: Google Earth; annotated by TPA.)



RECEIVED: 18/07/2023

Figure 2.2: Site Context. (Source: RKD Architects.)

The surrounding uses are chiefly enterprise and employment, infrastructural/transport, agricultural, cultural, recreational, and residential.

The nearest sensitive receptors are new housing estates c. 150m across the M4 Motorway to the north of the campus including Barnhall Meadows, which has been constructed in phases between 2019 and 2022. There are also a number of private residences on the opposite side of Celbridge Road to the west.

The site is currently accessed from Barnhall Road to the west and Celbridge Road (R404) to the east and has proximate connections to the M4, accessed through Barnhall Road. A third access point to the campus is provided off the Roundabout on Celbridge Road and currently provides access to DB Schenker principally.

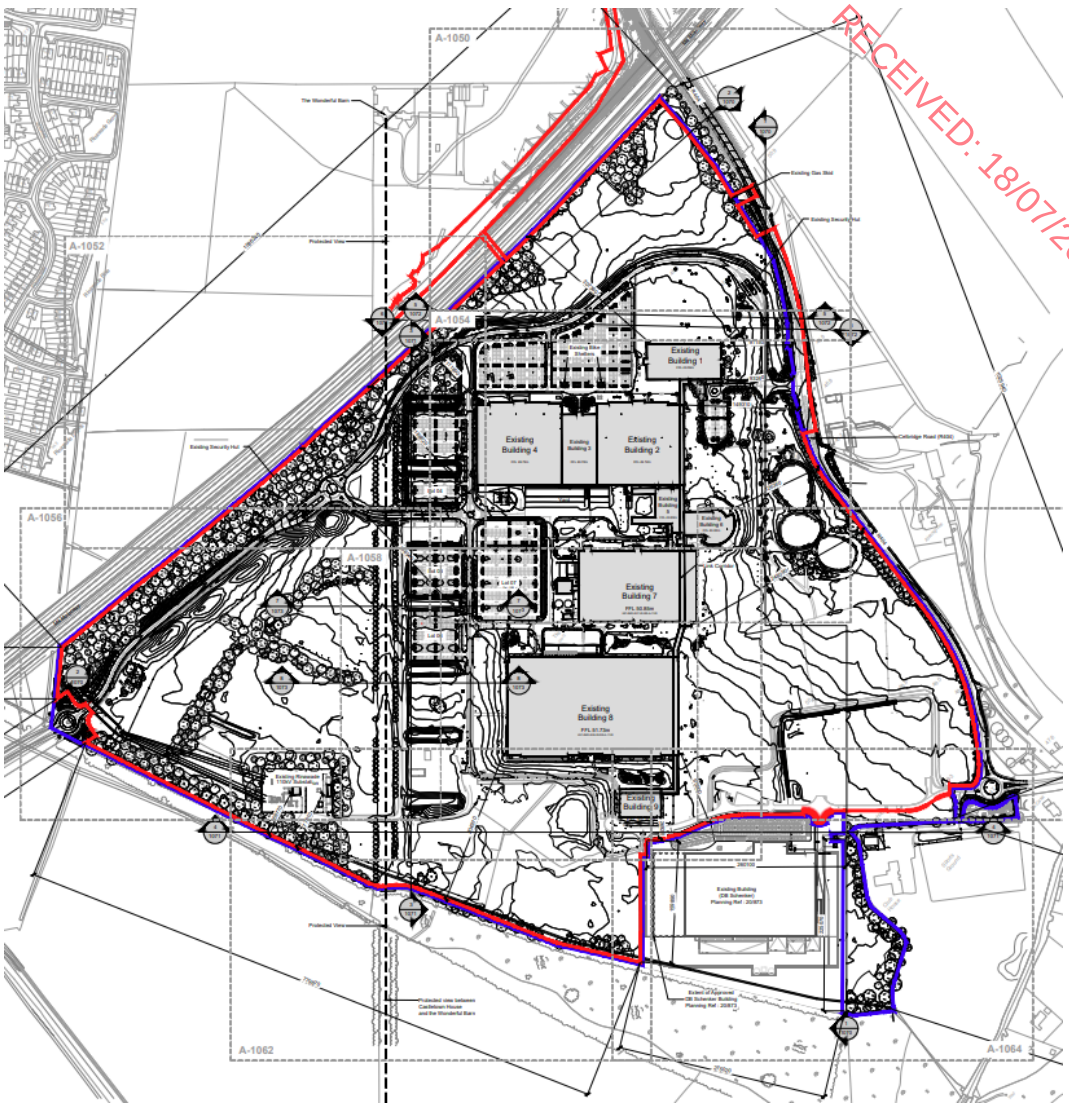


Figure 2.3: Existing Site Location Plan (the Principal Works Site is the red line boundary). (Source: RKD.)

2.3.2 Facilitation Works Site (Works outside Planning Application Red Line Boundary)

'Facilitation works' have been identified as being required to support the development consent being sought from Kildare County Council. The planning application to KCC does not encompass a request for development consent in relation to the facilitation works.

The facilitation works include a mix of works that will be required to be undertaken for or on behalf of statutory undertakers such as Gas Networks Ireland and EirGrid. The location of the facilitation works are described as follows:

2.3.3 GNI Gas Upgrades

RECEIVED: 18/01/2024

The GNI upgrades will be delivered through a local upgrade of the gas network over a length of approximately 1.5km through predominantly residential areas and are required to facilitate Phase 1 of the project. The route of the upgrades will be along Ryevale Lawns along Station Road, Old Hill and Celbridge Road (R404) up to the entrance of Barnhall Meadows (Figure 2.4). The pipe will run under the existing road pavement. The route will run along Celbridge Road to Station Road running adjacent to entrances to Barnhall Meadows, Leixlip Park, Eton Ct., Sycamore Avenue, Forest Park, Castletown, Wogansfield, Highfield Park, Knockaulin, Ryevale lawns and Cedar Park residential areas. Celbridge road also serves Barnhall Shopping Centre, Maxol garage, Colaiste Chiarain school and Scoil Chearbhaill Uí Dhálaigh. It will also run under Station Road which serves Leixlip Garda station. At the entrance to Barnhall Meadows, the pipe will run underground through the Barnhall Meadows lands (adjacent to the existing haul road, east of the Wonderful Barn allotments) and will then cross the M4 Motorway through Horizontal Directional Drilling and enter the Kildare Innovation Campus then connecting to the proposed Gas Skid. The route will not pass through any environmental features. The nearest watercourse to the route is the river Liffey which runs parallel to the route approx. 860m to the east and joins Leixlip Reservoir which is located approx. 320m to the south of the pipeline.

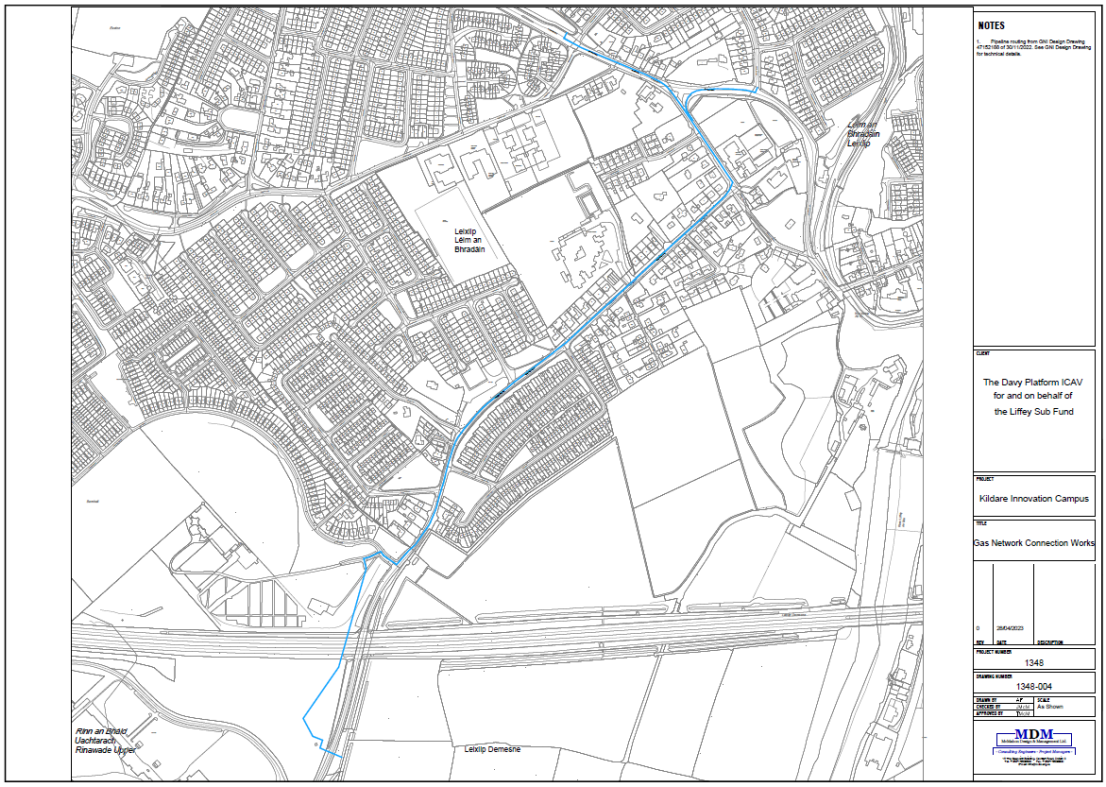


Figure 2.4: Indicative Route for Upgraded Gas Connection. Source: MDM Engineering Drawing No. 1348-004 (Refer to Appendix 2.1).

EirGrid Uprating

To facilitate Phase 3 of the proposed development uprating of existing overhead lines (OHLs) from the replacement 110kV Rinawade substation[1] to Derryiron/Maynooth and Dunfirth/Kinnegad will be required to facilitate commencement of Phase 3 of the KIC

[1] For the avoidance of doubt it is noted that the replacement substation is part of the development for which consent is sought and not part of the facilitation works

RECEIVED: 18/07/2023

Masterplan. The uprating will be carried out to existing lines along established wayleaves primarily traversing agricultural lands. A more detailed description of the locations associated with each stage of the Upgrades is included below:

This uprating would occur in four stages identified as follows:

Stage	Line to be Uprated	Identified Works	Line Replacements
Stage 1	Maynooth to Rinawade	7.1km Power lines 100% DC tower review, conductor replacements	mixture of 200 mm², 300mm² and 430mm²
Stage 2	Dunfirth/Kinnegad to Rinawade	50km of Power line Poleset, Angle towers and 5km DC tower review, conductor replacements	mixture of 200 mm², 300mm² and 430mm²
Stage 3	Statcom	150 MVAr STATCOM at Rinawade	
Stage 4	Derryiron to Maynooth	43km of Power lines – Poleset and Angle Tower reviews	430mm² (Station equipment to be upgraded)
Stage 5	Derryiron – Kinnegad	15.1km - Poleset and Angle Tower reviews	mixture of 200 mm², 300mm² and 430mm² (TBC)

Table 2.1: Identified Line Uprating

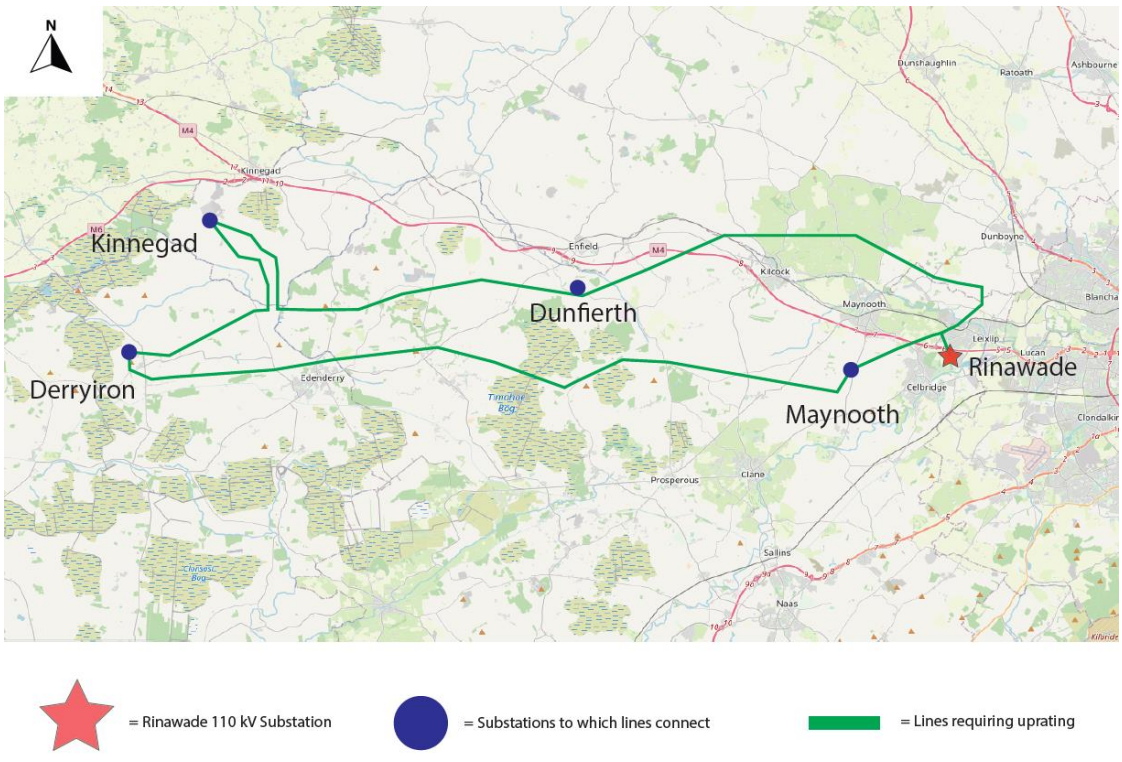


Figure 2.5 - Map of Existing 110KV OHL routes requiring uprate to facilitate the KIC development.

Stage 1 – Maynooth to Rinawade

In terms of the stage 1 uprate the works would occur along the existing line beginning at the Rinawade substation to the west of the existing Kildare Innovation Campus heading north across the M4 and traversing suburban residential areas in Kilmacredock and Easton

RECEIVED: 18/01/2023

Meadows. The route of the existing line then moves west across the R449 and veers south westerly towards the Maynooth substation, again traversing the M4 and the R405 south of this. Lands are largely agricultural with various other uses along the route including Celbridge Community School, light industrial and commercial buildings at the M4 Business Park and Corbally stud. The Myplan.ie mapping service indicates 2 National Monuments located approximately midway between Corbally Stud and the M4 Business Park, as well as a cluster just north of the M4 along the route. The route does not appear to traverse any designated European Sites or Flood Zones.

Stage 2 – Kinnegad to Rinawade

Uprate works would again occur along this existing route beginning at the Rinawade substation adjacent to the KIC. The route carries in a north easterly direction, crossing the main Dublin – Sligo rail line and traversing the Collinstown Industrial Estate (Intel Campus) on the western outskirts of Leixlip. Just north of the Collinstown Estate the line traverses the Rye Water Valley/ Carton Special Area of Conservation (SAC) after which it moves into largely agricultural lands and crosses into Co. Meath. The route then moves in a west north westerly direction and passes along the south of the R&R Golf Course and the village of Kilcloon for a distance of approx. 7km. The route of the existing line then shifts due west for a further 7km where it re-directs in a south westerly direction and traverses the Royal Canal. The line continues for a 9km stretch crossing the R148, M4 and local roads before connecting into Dunfierth 110Kv substation.

Stage 4 – Derryiron to Maynooth

This 43 km phase of uprate works will occur in a corridor stretching in a largely east – west direction between the Derryiron power station and Maynooth substation. Notable features along the route include the Timahoe Bog, a cluster of National Monuments at Carbury Hill near Edenderry, the town of Edenderry, Co. Offaly, the village of Rhode. A section of the line between Edenderry and Rhode carries parallel to the north of the Grand Canal.

Stage 5 – Derryiron to Kinnegad

Includes for uprating of existing lines along a 15km stretch incorporating predominantly agricultural lands and crossing between Co's Offaly and Meath, terminating at the Kinnegad substation located within the Breedon Cement Works compound.

2.4 Existing Site Description

2.4.1 Principal Works Site

The campus comprises 9 No. Buildings. Development of those buildings first commenced in c. 1995, by Hewlett Packard Ltd, comprising a facility to produce inkjet cartridges for use in computer printers. Prior to the site being an ink jet manufacturing facility, the site was used by Irish Meat Packers as a meat plant, but that use had long been abandoned by the time Hewlett Packard acquired the site.

Over time Hewlett Packard transitioned most of their operations out of the facility with new tenants introduced.

RECEIVED: 18/07/2023

The site now chiefly comprises a business/innovation campus, which employs c.1,100 No. people in industries including manufacturing, office, distribution, welfare and utilities.



Figure 2.6: View of the Campus from the Wonderful Barn to the North. (Source: Innovision.)

The buildings are on average c. 10-21 m in height and with a total existing gross floor area of 127,700 sq. m.

The buildings are accessed via an internal road network, which itself has access to the public road network from Barnhall Road to the west and Celbridge Road to the east. (There is a recently permitted (Reg. Ref. 20/873) and built access point to the south, which provides access to *inter alia* the DB Schenker logistics facility located external to the site boundary.)



Figure 2.7: View of the Campus (and DB Schenker (left of image)) from the R404. (Source: Innovision.)

There are 8 No. car parks providing parking for the buildings. In total, there is c. 86,029 sq. m of hardstanding within the campus.

There is soft landscaping around the buildings and hardstanding areas. Further out around the buildings, the campus comprises a series of hedgerows and tree lines within and around the site boundary.

In addition, there is a protected view that passes through the site, which consists of two rows of trees planted as part of the previous Hewlett Packard (HP) development of the site. The view corridor provides views to the Wonderful Barn to the north (located outside the site boundary), which is a protected structure (RPS. No. B11-15).



Figure 2.8: View from the protected view corridor on site showing the Wonderful Barn in the distance. (Source: Innovision.)

There are no known protected structures on site, nor is the site located within an architectural conservation area; however, the lands have, to date, produced prehistoric evidence in the form of a polished-stone axe, a flint blade, and a fulacht fiadh (recorded monument KD011-062----), with each recorded as part of the development of the Hewlett Packard Campus.

The topography of the site falls moderately in a northwest to east direction (59.25AOD – 45.00AOD). Two existing surface water retention ponds are located on the eastern site boundary. An additional fire water retention pond is also located there. Additional bunded storage is provided in the surrounding landscaped area in the event of an overflow occurring. The normal capacity of the retention ponds is 5000m3, with an additional 25,000m3 being able to be accommodated in the bunded overflow area. The discharge to the outfall is controlled to ensure an appropriate volume of water is retained at all times. These ponds serve the existing site as attenuation during extreme storm events as well as to provide the firefighting network with water when required. The site ultimately discharges its surface water runoff directly via an outfall drain to the Leixlip Reservoir, following confirmation of water quality through electronic monitoring mechanisms inclusive of shut off valves, upstream of the existing Retention Ponds near the existing site entrance off the Celbridge Road (Refer to CSEA Drawing No. DR-C-2100).

The site has an existing 110 kV substation (Rinawade Substation), which provides electricity to the campus via connecting overhead lines traversing the site in a north-to-south direction. The transmission lines connect to both the Dunfirth/Kinnegad 110kV substation and Maynooth 220kV substation.

The proposed works site also includes two portions of land in the ownership of KCC[2], the first being a section of existing road on the R404, which will be developed with new replacement signalised intersection, and the second being the lands along the M4 and to the north of the M4 which will provide a landing site for a new pedestrian and cycle overpass.

[2] A letter of consent from KCC for the application to be made has been submitted with the application

RECEIVED: 18/07/2023

The lands to the north are part of the Wonderful Barn domain (in the ownership of KCC) and currently include the Wonderful Barn allotments and an existing Haul Road which is currently being used to complete the development of a residential estate known as Barnhall Meadows.

2.4.2 Facilitation Works Site

GNI Gas Upgrades

The KIC Masterplan will be supported through enhancement of the existing distribution network connection and the upgrade of the existing gas skid on site to power the proposed energy centre.

The proposed upgrade of the existing gas skid is included in the application for development consent and is identified on the relevant drawings submitted with the application. The proposed enhancement works are to be carried out by GNI and will subject to a separate consent process.

The GNI upgrades will be delivered through a local upgrade of the gas network over a length of approximately 1.5km through predominantly residential areas. The route of the upgrades will be along Ryevale Lawns along Station Road, Old Hill and Celbridge Road for a distance of approximately 1.5km up to the entrance of Barnhall Meadows (Figure 2.4). The pipe will run under the existing road pavement. At the entrance to Barnhall Meadows, the pipe will run underground through the Barnhall Meadows lands (adjacent to the existing haul road) and will then cross the M4 Motorway through Horizontal Directional Drilling and enter the Kildare Innovation Campus then connecting to the proposed Gas Skid.

For the proposed GNI upgrade route, c. 1.18 km of the route will be installed within public roads under existing blacktop, with c. 0.14m of the route installed within the lands north of the M4 comprising a haul road. From the lands north of the M4, the route will cross beneath the M4 south into the campus via Horizontal Directional Drilling (HDD) process (c. 0.18km), connecting to a new gas skid installed at the existing gas skid location. The existing gas skid will be decommissioned and removed. The proposed HDD process will avoid tree removal, with all works to occur outside Root Protection Areas (RPA). The proposed HDD route will be below the RPA of any trees within the north lands and within the campus (minimum 1m depth). The launch pit for the HDD will be adjacent to the haul road which currently comprises a brownfield site. The exit pit will be directly adjacent to the temporary site compound within the campus.

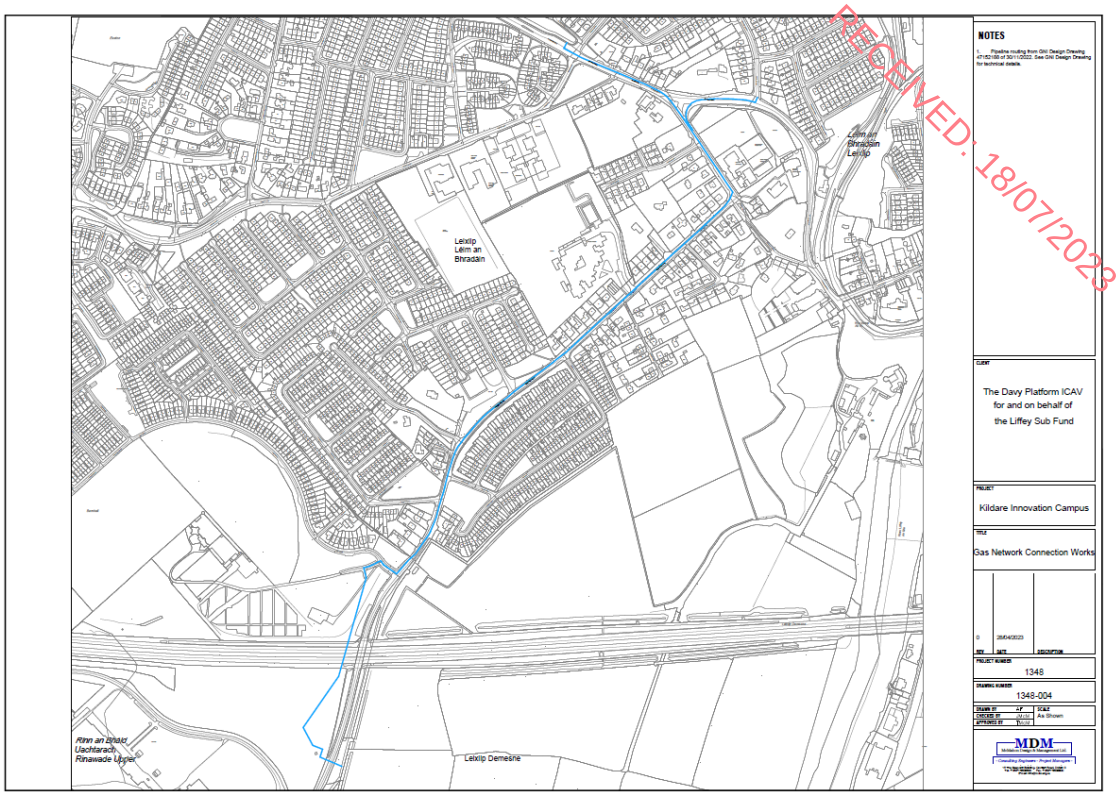


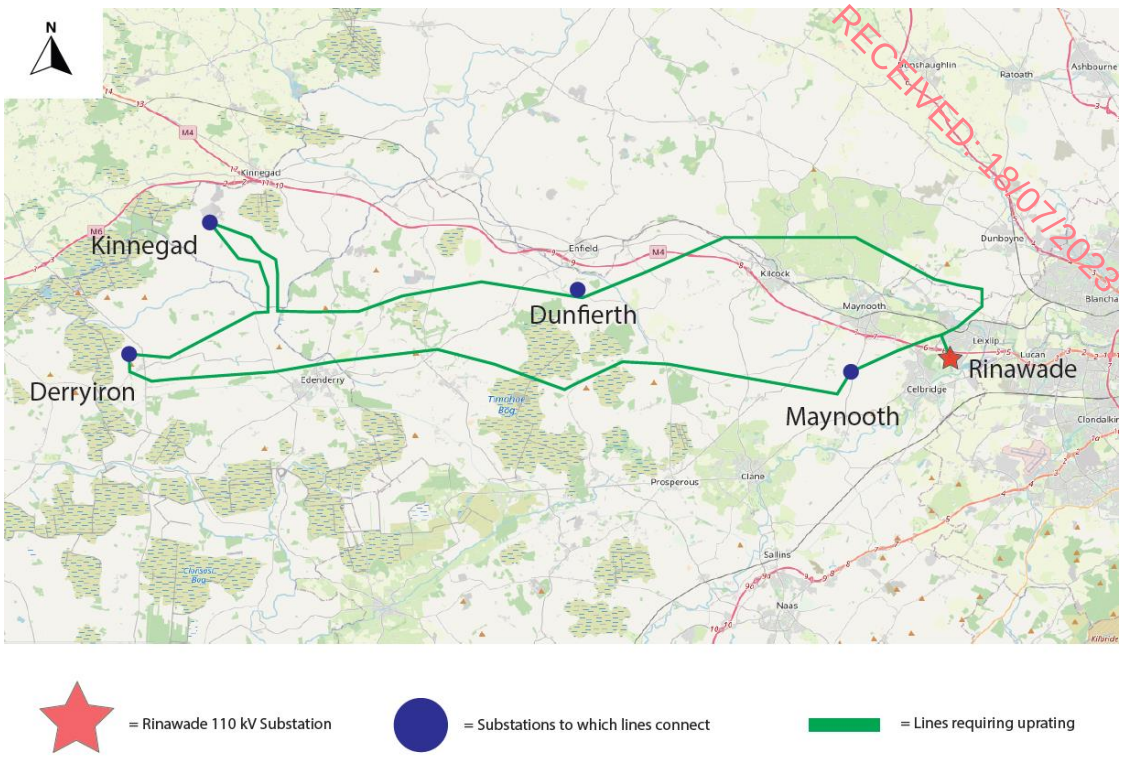
Figure 2.9: Indicative Route for Upgraded Gas Connection. Source: MDM Engineering Drawing No. 1348-004 (Refer to Appendix 2.1).

EirGrid Uprating

Upon completion of Phase 1 of the KIC Masterplan, including the development of the proposed replacement 110kV Substation, uprating of existing overhead lines from the replacement 110kV Rinawade substation to Derryiron/Maynooth and Dunfirth/Kinnegad will be required to facilitate commencement of Phase 3 of the KIC Masterplan.

The proposed replacement substation is included in the application for development consent and is identified on the relevant drawings submitted with the application. The proposed uprating works will be carried out by Eirgrid and will subject to a separate consent process.

The Eirgrid uprating will be delivered through two separate overhead line (OHL) uprates a local upgrade. This uprating would occur in four stages identified in Table 2.1 above.



RECEIVED: 18/07/2023

Figure 2.10 - Map of Existing 110KV routes requiring upgrade to facilitate the KIC development.

Stage 1 – Maynooth to Rinawade

In terms of the stage 1 upgrades the works would occur along the existing line beginning at the Rinawade substation to the west of the existing Liffey Business Park heading north across the M4 and traversing suburban residential areas in Kilmacredock and Easton Meadows. The route of the existing line then moves west across the R449 and veers south westerly towards the Maynooth substation, again traversing the M4 and the R405 south of this. Lands are largely agricultural with various other uses along the route including Celbridge Community School, light industrial and commercial buildings at the M4 Business Park and Corbally stud. The Myplan.ie mapping service indicates 2 National Monuments located approximately midway between Corbally Stud and the M4 Business Park, as well as a cluster just north of the M4 along the route. The route does not appear to traverse any designated European Sites or Flood Zones.

Stage 2 – Kinnegad to Rinawade

Upgrade works would again occur along this existing route beginning at the Rinawade substation adjacent to the KIC. The route carries in a north easterly direction, crossing the main Dublin – Sligo rail line and traversing the Collinstown Industrial Estate (Intel Campus) on the western outskirts of Leixlip. Just north of the Collinstown Estate the line traverses the Rye Water Valley/ Carton Special Area of Conservation (SAC) after which it moves into largely agricultural lands and crosses into Co. Meath. The route then moves in a west north westerly direction and passes along the south of the R&R Golf Course and the village of Kilcloon for a distance of approx. 7km. The route of the existing line then shifts due west for a further 7km where it re-directs in a south westerly direction and traverses the Royal Canal. The line

RECEIVED: 18/07/2023

continues for a 9km stretch crossing the R148, M4 and local roads before connecting into Dunfierth 110Kv substation.

Stage 4 – Derryiron to Maynooth

This 43 km phase of upgrade works will occur in a corridor stretching in a largely east – west direction between the Derryiron power station and Maynooth substation. Notable features along the route include the Timahoe Bog, a cluster of National Monuments at Carbury Hill near Edenderry, the town of Edenderry, Co. Offaly, the village of Rhode. A section of the line between Edenderry and Rhode carries parallel to the north of the Grand Canal.

Stage 5 – Derryiron to Kinnegad

Includes for uprating of existing lines along a 15km stretch incorporating predominantly agricultural lands and crossing between Co's Offaly and Meath, terminating at the Kinnegad substation located within the Breedon Cement Works compound.

2.5 Description of the Physical & Operational Characteristics comprising the Project

2.5.1 The works subject to this Development Consent (the principal works)

The proposed development (the principal works) is for the expansion of the existing Kildare Innovation Campus (KIC) and is described in the statutory notices as follows:

- Demolition of existing Buildings No's 7, 8 and 9 (total gfa c. 84,838sqm).
- Existing Buildings No's 1 – 6 will be retained for deep tech and innovation related uses (total gfa c. 42,862sqm)
- Construction of 2 no. new deep tech buildings and 4 no. new data centre buildings, all including ancillary office spaces. The deep tech buildings will have an overall maximum height of c.16m and vary in size from 30,945sqm – 41,190sqm with a combined total gfa of c. 72,135 sqm. The data centres will be c.15 m in height to parapet and c.16.5m in height to top of roof plant screening. The data centres will vary in size from 13,225 sqm – 21,000 sqm with a combined total gfa of c. 76,225sqm. All buildings will be provided with Solar PV panels at roof level and green walls along selected elevations.
- The new deep tech buildings (A1 & A2) will be provided with service yard areas, loading docks, car parking, access roads, security fencing/gates and landscaping. The deep tech buildings will include rainwater harvesting tanks and green roofs over office areas.
- Each data centre (B1, C1, C2 & C3) will include data halls, admin blocks (comprising offices, breakroom, loading dock, storage, and ancillary areas) and a variety of mechanical and electrical plant areas/structures including battery storage rooms and mechanical rooms. Car parking, access roads, security fencing/gates, gate houses and landscaping will also be provided.
- B1 will include 14 no. fuel oil generators, MV rooms and associated mechanical flues. C1 – C3 will each include 22 no. fuel oil generators, MV rooms and associated mechanical flues (each c.18.6m high). Car parking, access roads, security fencing/gates, gate houses and landscaping will also be provided.
- 2 no. district heating pump house areas and inground piping for district heating system.
- Construction of a Replacement 110kV Gas Insulated Switchgear (GIS) Substation adjacent to the existing 110kV Rinawade Substation. The current Air Insulated Switchgear (AIS) substation known as the Rinawade 110kV sub is fed by 2 x 110kV Overhead lines. The new

substation will connect to these overhead lines via short runs of underground cable. The replacement 110kV substation will include 6 No. transformers, with client control building and a 2 storey GIS substation building within a 2.4m high fenced compound.

- Decommissioning and removal of the existing 110kV Rinawade substation.
- Construction of an on-site energy centre to provide dispatchable power to the national electrical grid. The Energy Centre will include 9 no. gas powered combustion turbine generators (CTG's) and 9no. flues with a maximum height of c.15 metres. The turbines will be enclosed by a screen wall c.14m in height. The energy compound will include all required infrastructure including 2no. back-up fuel oil (HVO) tanks, an administration building, pump house, fire water tank, access roads, 14no. parking bays, security fencing etc.
- Provision of a Gas Networks Ireland (GNI) gas skid surrounded by a 2.4m high fence and access from Celbridge Road (R404). The GNI skid will replace the existing gas skid along Celbridge Road.
- Provision of a GNI AGI (Above Ground Installation) including 1no. kiosk building, c3.2m high, surrounded by a 2.4m high fence.
- Closure of the existing main entrance to the campus on Celbridge Road and reinstatement of the boundary.
- Construction of a new signalised entrance/exit on Celbridge Road c. 80metres north of the existing main entrance.
- Use of the existing secondary entrance/exit off Barnhall Road Roundabout in the south-east as a principal entry/exit.
- Construction of internal access roads, footpaths and cycle paths including a publicly accessible link road between Celbridge Road (R404) to the east and Barnhall Road (R449) to the west.
- Construction of a new pedestrian and cycle overpass across the M4 motorway and pedestrian/cycle path adjacent to lands known as the Wonderful Barn Allotments; the overpass will link the new publicly accessible link road within Kildare Innovation Campus to the entrance of Barnhall Meadows estate.
- Undergrounding and diversion of the existing overhead 10 Kv/20kv overhead line adjacent to the M4 motorway.
- The pedestrian and cycle route within the Kildare Innovation Campus will provide a link from the new public link road, along the protected view corridor (between Castletown Estate & Wonderful Barn) to the north-eastern boundary of Castletown Estate.
- The provision of a net increase of 678 new car spaces, resulting in a total of 2291 car spaces across the site (including a total of 244 EV car spaces).
- The provision of a new private EV Bus charging hub with parking for 10no. electric buses.
- The provision of a net increase of 310 new bicycle spaces, resulting in a total of 350 bicycle spaces across the site.
- The diversion of the c. 500 m stretch of an existing 1.5 m culvert, located to the north of the site along the existing loop road, southwest by c. 60 m; the diverted culvert will be located along the proposed link road.
- All associated site development works, drainage and services provision, landscaping, boundary treatments (including security fencing), and associated works.

2.5.2 Data Centres

A data centre is a centralised computer server system designed to provide information storage, management and distribution functions to individuals' businesses and organisations. With ever increasing levels of online activity and ever larger volumes of data, the global

RECEIVED: 18/07/2023

RECEIVED: 18/09/2023

demand for data storage is increasing rapidly. The proposed facility will enable the data centre tenant to meet this demand.

The proposed data centre development will allow the data centre tenant store their information at a secure and reliable facility. Data Centres are typically constructed on a relatively large scale compared to other forms of industry which results in significant benefits in terms of economies of scale.

The Primary advantages are:

- much higher reliability with built in redundancy systems;
- 24/7 monitoring of the facility and its systems by staff;
- Higher security and data protection;
- Flexibility – ability to increase or decrease storage requirements at short notice in line with specific business needs;
- lower network latency and higher bandwidth at lower cost;
- Specialist network and facilities engineers typically not viably employed by individuals, businesses or organisations.

Ireland's climatic conditions are well suited to data centre operation because data centres are conditioned primarily utilising outside air, via roof mounted air handling units. Conditions in Ireland are conducive to this free cooling strategy, which essentially moves outside air across the servers to cool and then exhaust the higher temperature air to atmosphere. This reduces the need for less sustainable forms of cooling often required in warmer climate countries. There are other small areas in the Data Centre buildings which require additional cooling, but the majority of the buildings are serviced by outside air cooling.

During the warmest periods of the year (at temperatures exceeding 24 degrees Celsius) evaporative cooling systems (integrated into the Air Handling Units) have been incorporated into the design. These systems will be required very infrequently and when used will use primarily recycled rainwater.

Data Centre Building B1 will require a total of 32MW power once fully developed and fully utilised, Data Centre Buildings C1, C2 and C3 will require a combined total of 138MW once fully developed and fully utilised. Each Data Centre building is supported by a dedicated electrical plant room, which provides the necessary power to ensure the Data Centre Building operate optimally at all times.

The associated demands on energy, water and other natural resources are discussed in greater detail under section 2.5.9 below.

The gfa of B1 is c.12,925 sqm and C1 – C3 each have a gfa of 19,000sqm. The building's will be single storey and have an overall height of 13.6m. The internal area of the building includes a series of rooms as required by the end user. An admin area will be provided within each building.

The buildings will be finished with a mix of insulated metal cladding (mixed tones) and living/green walls. The office component will be fully integrated in terms or circulation and design and will be finished with a glazed curtain wall and external feature metal sunshades. The office will include an open plan office as well as a reception area, kitchenette/break room and changing room/showers.

RECEIVED: 18/07/2023

Car Parking areas will be provided adjacent to B1, C1, C2 and C3 and provide a total of 200 car spaces. Vehicle access will be provided via a gated access from the internal campus road. An emergency fire tender access will be provided via the link road for Building B1 and via the campus road for Building C1, C2 and C3.

Each data centre will include a data hall, admin building with loading dock area and generator yard consisting of a total of 80 no. generators across the 4no. data centres. Fuel oil for the generators will be stored within the respective belly tanks of each generator. In the event that there is a loss of utility power to the site through the 110kV Substation, back-up generators are provided for the data centre buildings (B1, C1, C2 & C3) to maintain power at critical loads. The generators are designed to automatically activate and provide power pending restoration of the primary power supply to the site. It should be noted that that the proposed Energy Centre (Refer Section 2.5.5), due to specific power ramping profile requirements, is not designed to provide power direct to the data centres on site. Rather the energy centre provides dispatchable power directly to the national grid as required by the grid operator. An uninterruptible power source or UPS system with battery energy storage is also provided with the data centre compounds for the short-term transition from mains power to generator power.

The data centre operator, similar to the energy centre, is committed to using Hydrotreated Vegetable Oil (HVO) (where available) as the back -up fuel supply for the generators. As such, significant environmental benefits will be achieved through the use of HVO as referenced above.

Building B1 will have 14 critical back-up generators, Buildings C1, C2 and C3 will each have 22 critical back-up generators. Bulk HVO where available will be stored for use in double-skinned belly tanks associated with each of the generators. Each tank has the capacity to store 15.5 m*3* of diesel; therefore, a total of 1,240 m*3* across all Data Centres (or 1066 tonnes at a density of 0.86 tonnes / m*3*). Whilst the data centre operator is committed to utilising HVO the generator supplier has advised that the standard generator emissions data sheets have not been updated to reflect the use of HVO over standard diesel, as such the EIAR has modelled Air Quality using standard diesel (Refer to Chapter 9 – Air and Chapter 10 – Climate).

The data centre operator estimates based on experience that the standby generators will be rarely used. They will be tested periodically to maintain operational readiness. The assessment of these emissions is presented in Chapter's 9 (Air) and 10 (Climate).

As part of Phase 1 of the development building B1 will only utilise c.16MW of electricity from the new replacement 110kV Substation. It is noted that this power supply will take a number of years to ramp up. In Phase 3 of the development the B1 data centre will ramp up to 32MW usage overtime. Data Centres C1, C2 and C3 will be developed out in Phase 3 of the project and will bring the overall power demand of all the data centres to 170MW once fully developed and utilised.

Once commissioning is complete, each data centre will "go live", following the phasing outlined in section 2.6, and serve data customers on an ongoing basis. The server systems and the supporting infrastructure will be monitored by site staff and faults identified and remedied, as required.

Staff will primarily be required onsite for security, ongoing monitoring, and maintenance of plant and equipment. Once operational, approximately 445 No. full time employees will be

present on site daily, in total, for all data centre buildings, including external staff, maintenance contractors and visitors, as required. The number of external staff, maintenance contractors and visitors will typically be approximately 135 No. staff per day. Staff will present on a shift basis, so numbers will vary throughout the day with up to approximately 63 No. staff on night shifts each day. It is anticipated the operational phase of the data centre development will generate a range of non-hazardous wastes. An Operational Waste Management Plan (OWMP) will be developed prior to commencement. The plan will seek to ensure the facility contributes to the targets outlined in the EMR Waste Management Plan 2015 – 2021. Refer to Chapter 12 (Waste) for further detail.

RECEIVED: 18/07/2023

During times of activity, there is the potential for noise to be generated from equipment associated with the data centre buildings as outlined in Chapter 11 (Noise & Vibration). This has been anticipated and has been mitigated within the design of the Masterplan by locating noise generating equipment away from sensitive interfaces, furthermore acoustic louvres' have been incorporated into façade design and acoustic screens provided at rooftop locations. Refer to Chapter 11 for further detail. Predicted Air emissions from the data centres have been assessed in Chapter 9 (Air) and Chapter 10 (Climate).

Refer to RKD Architectural Drawings *KIC-RKD-B1-00-DR-A-1100 to KIC-RKD-B1-ZZ-DR-A-1300, KIC-RKD-C1-00-DR-A-1100 to KIC-RKD-C1-ZZ-DR-A-1300, KIC-RKD-C2-00-DR-A-1100 to KIC-RKD-C2-ZZ-DR-A-1300 and KIC-RKD-C3-00-DR-A-1100 to KIC-RKD-C3-ZZ-DR-A-1300* for further detail.

2.5.3 Deep Tech Buildings

The ultimate tenant for the proposed Deep Tech buildings is not yet agreed. Buildings A1 and A2 have been designed to be flexible to accommodate a range of potential end user requirements.

Deep Tech companies are generally understood to be founded on a scientific discovery or meaningful engineering innovation. A deep tech business typically starts with and focuses on real innovative technology. It's deployed to solve almost intractable problems in the real-world. Deep tech startups are likely to be based on artificial intelligence or machine learning, or other innovative applications to new or existing emerging technologies. Examples include block-chain, computer imaging, and Virtual Reality. Examples of deep tech might include Artificial Intelligence applied to predict natural disasters or molecular imaging technologies that identify disease or predisposition to disease far before any other existing test possible could.

The European Institute of Innovation and Technology (EIT)[3], a body created by the EU in 2008 to strengthen Europe's ability to innovate, describe deep technology or deep tech as '*a classification of an institution, an organisation or a start-up company, with the expressed objective of providing advanced and emerging technology solutions to deep societal challenges. They present scientific or engineering challenges requiring lengthy research and development, and large capital investment before successful commercialization.'*

The EIT identifies a list of deep tech fields include:

[3] https://www.eitdeeptechtalent.eu/

RECEIVED: 18/07/2023

- advanced materials and manufacturing;
- aerospace, including drones;
- artificial intelligence and machine learning;
- biotechnology;
- blockchain;
- Web 3.0;
- electronics;
- photonics;
- quantum computing;
- robotics;
- semiconductors (microchips);
- sustainable green energy and clean technologies.

Whilst the KIC campus will focus towards deep tech (high-tech innovation in engineering and significant scientific advances), ultimate end users may specialise in health, agriculture, medicine, and pharmaceutical and food science industries. The proposed new Deep Tech building designs include large manufacturing floor spaces which will be flexible for end users needs. Integrated office spaces area also provided. The deep tech buildings are not expected to have water or energy demands beyond a typical manufacturing and office space. The associated demands on energy, water and other natural resources are discussed in greater detail under section 2.5.9 below.

The design of the Deep Tech buildings incorporates a range of spaces to provide the facilities to expand various activities. Staff numbers for deep tech buildings will include employees involved in *inter alia* research and development as well as staff for security, ongoing monitoring and maintenance of plant and equipment. The total number of staff to be generated from deep tech is estimated to be approximately 1,875 No. employees. Waste is expected to be minimal and will be managed by an Operational Waste Management Plan to be prepared and submitted by the final operator. Noise and Vibration is not expected to be significant with modern deeptech not requiring the same level of cooling equipment as might be required by Pharma or traditional manufacturing. Refer to Chapters 9 (Air), 10 (Climate) and 11 (Noise) for further detail.

The EIAR has assessed the likely end use using assumptions based on typical R&D uses. Should a future end user seek to utilise the proposed spaces with different requirements then the environmental impacts will need to be identified and assessed at that time.

Building A1 is a Deep Tech development with a gfa of c.30,510 sqm and Building A2 is a Deep Tech development with a gfa of c.40,540 sqm. Both buildings will be two storeys (with three storey office) and have an overall height of 16m. Loading/unloading for each building will be via a series of loading docks along the rear of the building. The loading docks will provide access to the adjacent service yard. The internal area of the building is typical of a deep tech (manufacturing/office) layout and includes access to an office space.

RECEIVED: 18/07/2023

The buildings will be finished with a mix of insulated metal cladding (mixed tones) and living/green walls. The office component will be fully integrated in terms or circulation and design and will be finished with a glazed curtain wall and external feature metal sunshades. The office will include an open plan office as well as a reception area, kitchenette/break room and changing room/showers.

Car Parking areas will be provided adjacent to A1 and A2 and provide a total of 1,183 car spaces. Vehicle access will be provided via the link road for building A1 and the internal campus road for building A2. A separate service access will also be provided for each building. 86 no. Bicycle Spaces will be provided for both buildings.

Refer to RKD Architectural Drawings *KIC-RKD-A1-00-DR-A-1100 to KIC-RKD-A1-ZZ-DR-A-1300 and KIC-RKD-A2-00-DR-A-1100 to KIC-RKD-A2-ZZ-DR-A-1300* for further detail.

2.5.4 110kV Substation

The development will be fully powered by connection to the national grid. Through engagement with Eirgrid on the first phase of the masterplan (16MW) a connection agreement has been reached[3], this agreement includes the provision of a new 110kV substation to replace the existing substation which is nearing end of life. The connection agreement for the first phase of development will utilise power already allocated to the site through the existing 110kV Rinawade Substation. In line with *EirGrid's Data Centre Connection Offer Process and Policy* further connection agreements with EirGrid for the full development can only be reached once planning consent is in place.

The proposed 110kV Replacement GIS substation is located directly to the east of the existing 110kV Rinawade AIS substation on site. The current Air Insulated Switchgear (AIS) substation known as the Rinawade 110kV sub is fed by 2 x 110kV overhead lines. The new substation will connect to these overhead lines via short runs of underground cable.

The replacement 110kV substation will include 6 No. transformers, with client control building and a 2 storey GIS substation building lighting masts, carparking and access roads within a 2.4m high fenced compound.

The two storey GIS substation building will accommodate a cable room, control room, mess room, generator room, battery room and workshop at ground floor level, with a storeroom and substation room at first floor level. The single storey Client Control Building will accommodate 4 number electrical switch rooms and a control room. Both buildings are rectilinear in form and finished in metal cladding

The proposed 110kV replacement substation will be accessed via the proposed campus roads. A main access gateway into the substation compound will be provided on the eastern side of the substation compound.

The 110 kV substation, once commissioned, will operate 24/7, 365 days per year and will provide c. 16 MW of electricity to the existing campus, in Phase 1. Phase 2 of the campus will be powered by the same connection from Adamstown that provides power to DB Schenker. To accommodate Phase 3, uprating/line replacements of the existing overhead lines into the site will be required to accommodate the complete build out of the KIC Masterplan. The works will allow the substation to provide 170 MW of electricity to the Campus.

RECEIVED: 18/07/2023

The existing Rinawade substation will be decommissioned and removed, and lands reinstated following the complete build out of the KIC proposal.

Refer to RKD Architectural Drawings *KIC-RKD-RIN-ZZ-DR-A-1100 to KIC-RKD-RIN-ZZ-DR-A-1201* for further detail.

2.5.5 Energy Centre

The proposed development will include its own energy centre to be built out over the life of the permission and will provide for 100% dispatchable power. The provision of dispatchable power generation is a requirement of the *CRU [CRU21124-CRU-Direction-to-the-System-Operators-related-to-Data-Centre-grid-connection-.pdf (divio-media.com)]*, which requires a data centre applicant to bring onsite dispatchable generation (and/or storage) equivalent to or greater than their demand. The proposed development will not be connected to the energy centre nor will it rely on it for power.

The energy centre will be located to the centre of the campus and to the rear of the existing Building Nos 2, 3, 4 & 5. It will be accessed via an internal campus road which also provides access to the service yards of the existing buildings on site. The energy centre will include a two-storey services building, loop access road, electrical infrastructure, fire water tank, fuel oil and ammonia pump house, ammonia storage, 2no. fuel oil[4] storage tanks with a volume of c.3440 tonnes and height of c.14m from ground level and carparking for staff and services. The energy centre will be surrounded by a c.3m high security fence with security gates. Within the compound there will also be 9no. combustion turbine generator's (CTG's). Each CTG will have associated infrastructure including stacks to a height of c.15m. The CTG's will be enclosed by a c.14m high architecturally treated acoustic enclosure. Refer to RKD Architectural Drawings *KIC-RKD-ZZ-ZZ-DR-A-1055, KIC-RKD-EC-ZZ-DR-A-1100 to KIC-RKD-EC-ZZ-DR-A-1401* for further detail.

The energy centre will be supplied by GNI's enhancement of the existing supply to the site to support the proposal (identified above under 'Facilitation Works'). The Energy Centre will include 9no. CTG's to ensure equal power can be replaced within the grid to alleviate any potential constraints of the data centre usage. Further to this, the CTG's will also provide reinforcement to grid if and when required.

The initial phase of the energy centre will include one CTG, a natural gas fuel supply system, a Hydrotreated Vegetable Oil (HVO) fuel storage and supply system (c.3440 tonnes), a fire protection system, low and medium voltage electrical systems with transformers, a service building and warehouse, and other miscellaneous equipment. The final phase of the energy centre will include an additional eight CTG's with selective catalytic reduction (SCRs) and supporting equipment.

The CTGs will be primarily fuelled by natural gas/bio-gas supplied by Gas Networks Ireland (GNI) via their existing high-pressure network that runs close to the site (subject to upgrade). It is envisaged that the energy centre will aim to use as much renewable gas as is commercially available in the market and through negotiated contracts. This will be provided via Corporate Power Purchase agreements for renewable energy projects will include bio-gas and/or hydrogen as well as other available renewables which the applicant intends to enter into

[4]HVO

RECEIVED: 18/07/2023

before the proposed development first becomes operational[5]. The facility will also include a 5-day supply of HVO as a backup fuel should the natural gas system be unavailable in an emergency situation. With equipment modification, the CTGs are capable of operating on at least a mix of hydrogen should this be available in the future.

HVO is a low-carbon biofuel that operates as a direct replacement for conventional diesel. It is made from renewable, sustainable raw materials which do not release any new CO2 into the atmosphere. HVO is made from 100% renewable plant-waste matter and meets bio content requirements with no FAME (Fatty Acid Methyl Ester) included. This ensures that it avoids the instability and operability issues seen by many low blend diesel fuels and high blend biofuels. Unlike conventional biodiesel, hydrogen is used as a catalyst instead of methanol, which makes HVO cleaner burning and ensures a longer shelf life.

The HVO to be used as back-fuel source for the energy compound will be produced and accredited to meet the international fuel standard BS EN 15940, the specification for paraffinic diesel, and the Fuel Quality Directive 2009/30/EC Annex II. The CTG Turbine supplier has advised that the standard generator emissions data sheets have not been updated to reflect the use of HVO over standard diesel, as such the EIAR has modelled Air Quality using standard diesel (Refer to Chapter 9 – Air and Chapter 10 – Climate). Notwithstanding this, HVO is considered to have substantially lower emissions[6] than traditional fossil fuels. It is noted that burning renewable diesel results in CO2 emissions, however emissions from renewable diesels are significantly less than fossil fuel as growing the biomass feedstocks for production of renewable diesel may offset the CO2 produced in the burning of HVO. For comparison, fossil fuel derived diesel has a total lifecycle emissions of c. 94 gCO2e/MJ while renewable diesel using waste cooking oil as feedstock can be as low as 5.6 gCO2e/MJ.

The CTGs and certain auxiliary equipment will be housed in purpose-built enclosures to reduce noise to acceptable near-field levels for personnel safety and to assist in meeting far-field noise levels. Furthermore, the entire power block of CTGs will be surrounded by a 14m high acoustic barrier. Refer to Chapter 11 – Noise & Vibration for further detail.

It is noted that the Energy Centre is not proposed as the primary power supply for the proposed development. It will not be connected to the proposed data centres or deeptech buildings. The energy centre will operate as dispatchable power in line with CRU and EirGrid requirements. In this regard it is noted that EirGrid's Policy Data Centre Offer Policy Information Note (eirgridgroup.com) states *"EirGrid will provide firm capacity where a data centre provides new on-site dispatchable generation that meets the annual availability requirements…… and is capable of continuous running for extended periods, e.g. its running is not limited by fuel reserves, environmental licencing or regulatory obligations."* The Eirgrid outline includes an example which requires the dispatchable generation to be available 330 days per year. In summary, the worst-case scenario would be that the energy centre operates for 330 days per year, however, based on experience of the operation of similar demand management projects where EirGrid have requested large energy users to curtail demand during crunch periods, particular during winter, it is expected that energy centre will operate significantly less than 333 days per year/ 24-hours per day and more likely to be no more than c.1,500 hours per year. Notwithstanding this, to meet the relevant EirGrid requirements, the energy centre cannot be limited in terms of its operation and as such using the precautionary

[5] Refer to Response to Principles for Sustainable Data Centre Development Report by TPA + Others
[6] https://www.eia.gov/energyexplained/biofuels/biofuels-and-the-environment.php

RECEIVED: 18/07/2023

principle, the worst-case scenario has been assessed in this EIAR where the energy centre is required to operate 333 days per year.

Stormwater will be directed to the stormwater system. Stormwater which is contained in bunded areas, such as around the fuel oil tanks, fuel oil unloading areas, and the transformers, will be inspected through the use of electronic monitoring systems prior to discharge. Any stormwater with potential amounts of oil will first pass through an oil/water separator prior to discharge. Sanitary wastewater will be discharged to the foul sewer.

The facility will have fire detection and fire suppression systems installed to meet current NFPA and Irish and EU codes. The fire water system will include a fire water storage tank with a 2-hour storage volume (757 m3), an electric main fire pump, a diesel engine backup fire pump, a foam system and other required hydrants and hose stations. An aerosol-based fire suppression system will be provided for the CTGs.

The energy centre is entirely air-cooled. The CTG will employ air-cooling for the generator, the lube oil, and the enclosures. The Energy Centre will require 5 No. full-time employees to operate. Regarding emissions, the Energy Centre, during times of activity there is the potential to generate emissions as outline in Chapters 9 (Air) and 10 (Climate). During times of activity, there is the potential for noise to be generated from equipment associated with the energy centre as outlined in Chapter 11 (Noise & Vibration). This has been anticipated and has been mitigated within the design of the Masterplan by locating the energy centre to the centre of the site and away from sensitive interfaces, furthermore an acoustic wall is proposed around the perimeter of the energy center providing a suitable noise buffer for when the energy center is required to operate. Furthermore, acoustic treatment at source has been factored into the design to ensure noise emissions from the proposed plant are in accordance with required standards. Refer to Chapter 11 for further detail.

It is noted that the current power supply to the campus via the existing 110kV Substation is not supplemented with dispatchable power. This will change as a result of the proposed KIC development, as the replacement 110kV Substation will be provided with equal dispatchable power, meaning that the proposal will provide a net improvement to grid reinforcement for the benefit of all users.

It is noted that the Energy Efficiency Directive requires EU countries to ensure a cost-benefit assessment is undertaken on the potential of using co-generation when it is proposed to build an industrial installation generating waste heat with a total thermal input exceeding 20MW. When in use the proposed energy centre would exceed this threshold, however given the facility is proposed only to operate as a dispatchable power plant and only to operate during very high levels of demand and is expected to operate less than 1500 hours per year over a five-year period then the proposed energy centre is exempt from cogeneration cost benefit analysis. Should the energy centre be required to operate in excess of 1500 hours per year over a five-year period then a cogeneration cost benefit analysis will need to be undertaken. Further to this, it is noted that the quantum and availability of recycled heat generated from the energy centre would be unstable given the unknown nature of when Eirgrid would require dispatchable power to be provided to the grid. As such, the overall campus design has implemented a much more stable waste heat proposal as discussed below in section 2.7.

2.5.6 M4 Overpass

RECEIVED: 18/07/2023

The proposed M4 Overpass is proposed to be sited perpendicular to and over the M4. The structure will serve as a pedestrian and cycle overbridge crossing the existing M4 motorway and include allowance for any future expansion of the motorway. The structure has been designed as a single span steel arch truss bridge, with a 57m clear span. The structure will have a minimum headroom of 5.7m above the M4 including integration of services within the structure.

There is an overhead gantry structure spanning the westbound carriageway, approximately halfway between the historic viewing corridor (direct line of sight between Castletown House and the Wonderful Barn) and the R404 overbridge. As per TII design standards, *gantries shall not be located less than two times their maximum height clear of any overbridge unless the interaction with wind is considered.* Therefore, an allowance of 39m between the existing gantry and the proposed structure has been provided. It is noted that separate proposals are being developed by TII to widen the M4 carriageways. These proposals have been accounted for in the design of the overpass.

To accommodate the proposed M4 Pedestrian and Cycle Overbridge design diversion of the existing 10 kV/20kV overhead power line, south of Barnhall Meadows will be required. North of Barnhall Meadows, a diversion of the 38Kv and higher overhead powerline is not anticipated, but the hazard zone will need to be accounted for during construction. Refer to Refer to Chapter 13 (Traffic) and '*M4 Pedestrian and Cycle Overbridge Preliminary Design Report*' by CSEA for further detail and CSE drawings *21_048A CSE HGN XX DR C 2000 - 21_048A CSE HGN XX DR C 6404* for further detail.

2.5.7 Pedestrian/Cycle Path

A proposed M4 Overpass will accommodate a new pedestrian and cycle link between the entrance to the Barnhall Meadows Estate and the Kildare Innovation Campus. The pedestrian and cycle path will facilitate connection to the R404 (Celbridge Road) at the entrance of the Barnhall Meadows estate and will run along the existing haul road (to be resurfaced) within KCC lands north of the M4. Upon crossing the M4 the pedestrian and cycle path will connect into the proposed Link Road. At this point cyclists and pedestrians will have the option to travel westwards towards the M4, eastwards towards the relocated signalised intersection or into the campus via a new pedestrian and cycle path along the designated view corridor. Through the designated view corridor the pathway is proposed to be a self-bound gravel in buff colour or similar (or as required by KCC). The pedestrian and cycle path will be brought to the boundary with Castletown Estate providing opportunity for a future link into Castletown Estate. The pedestrian and cycle path will continue along the campus road up to the entry of the campus at Barnhall Roundabout. Refer to CSE drawings *21_048A CSE HGN XX DR C 2000 - 21_048A CSE HGN XX DR C 6404* and the Kildare Innovation Campus, *Landscape Architectural Master Plan Design Report* by AECOM for further detail.

2.5.8 The works required to facilitate the project (facilitation works)

The 'facilitation works' are those known works that are expected to be required to facilitate the proposed development over the life of the permission being sought but are not part of the development for which consent is sought. Indicative timing for these works has been included at this stage, however the works will be progressed by the relevant statutory undertakers when required. These elements of the project have been identified as forming an integral part of the overall project.

RECEIVED: 18/07/2023

This EIAR includes an evaluation of the proposed facilitation works. However, it should be noted that although the likely significant effects of the facilitation works are identified, analysed and evaluated in this EIAR, the planning application to KCC does not encompass a request for development consent in relation to the facilitation works. Where reference is made to both the principal works (proposed development for which consent is being sought) and the facilitation works together in this EIAR, the term 'project' will be used.

This EIAR has assessed the cumulative effects of the facilitation works in compliance with the Environmental Impact Assessment Directive.

The facilitation works are as follows:

GNI Gas Upgrades

The first phase of the KIC Masterplan will be supported through enhancement of the existing distribution network connection and the upgrade of the existing gas skid on site. The proposed enhancement works are to be carried out by GNI and will subject to a separate consent process. The GNI upgrades will be delivered through a local upgrade of the gas network.

The existing GNI gas distribution network in the vicinity of KIC will be upgraded to provide enhanced energy capacity to the KIC site under Phase 1 of the project. The enhancement works will comprise the installation of approximately 1.5km of pipework to connect to the campus as well as network reinforcement works of approximately 150m of pipework. A new gas skid will also be installed at the KIC site and an existing skid decommissioned and removed.

The upgrade works will comprise;

- Connecting to the existing Gas Pipelines at Ryevale Lawns;
- Upgrading the existing gas pipeline between Ryevale Lawns along Station Road, Old Hill and Celbridge Road for approximately 1.5km; and
- Laying a new gas pipeline within the Barnhall Meadows Lands, underneath the M4 and into the Kildare Innovation Campus.

The pipeline installation activities will generally comprise the following;

- The distribution pipework installation activities for the overall route comprise approximately:
    - 140m trenching in fields (adjacent to haul road),
    - 180m pipeline installation by Horizontal Directional Drill (HDD) for crossing of the M4 motorway,
    - 1.18km trenching in roads.

- The network reinforcement pipe installation activities comprise approximately:
    - 150m trenching in roads.

Any consents required for the GNI Gas Upgrades will be sought by GNI and the requisite detailed assessment of the consent application will be undertaken at that time by the Planning Authority. Refer to *MDM Engineering Drawing No. 1348-004* (Appendix 2.1) for further detail.

EirGrid Uprating

RECEIVED: 18/07/2023

Upon completion of Phase 1 of the KIC Masterplan, including the development of the proposed replacement 110kV Substation, uprating of existing overhead lines from the replacement 110kV Rinawade substation to Derryiron/Maynooth and Dunfirth/Kinnegad will be required to facilitate commencement of Phase 3 of the KIC Masterplan.

Uprating of existing transmission lines result in an increased capacity and strengthening electrical resilience in the electricity system. Uprating involves the replacement of the overhead line/conductor with more efficient conductor of the same voltage and usually involves the replacement of support structures as the new conductor may be heavier. Further typical detail of uprating works is available within Eirgrids *'Ecology Guidelines for Electricity Transmission Projects'*[7].

This uprating would occur in four stages identified in Table 2.1 above.

2.5.9 Proposed Site Infrastructure & Secondary Facilities

Surface Water Drainage

The proposed surface water drainage network has been designed in accordance with Greater Dublin Strategic Drainage Study (GDSDS)[8] and Greater Dublin Regional Code of Practice. The proposed surface water network flows in a north westly direction and is attenuated before discharging to the Liffey Stream. The allowable discharge from the site is 144.45 l/s and the total attenuation storage volume provided is 23806 m3 in 2 No. attenuation basins, 2 No. attenuation ponds, 1 No. infiltration basin, 3 No. permeable paving with stone storage and 1 No. StormTechTM systems by Cubic M3 or similar is being proposed. A number of petrol interceptors are provided throughout the network to manage water quality and permeable paving has been provided in car parking areas in order to minimise surface water runoff.

Refer to the submitted *Engineering Services Report Drainage and Water Services Report* by CSEA and CSEA Drawing No's *21_048-CSE-00-XX-DR-C-2111 to 21_048-CSE-00-XX-DR-C-2118* for further detail.

Humidification / Cooling Water Discharge

The Data Centres within the campus are designed to use humidifiers and air conditioning systems to maintain the relative humidity and temperature in the internal building space during high temperature days. However, when weather conditions are acceptable for the internal building, fresh air will be directly supplied to reduce both energy and water consumption.

If the relative humidity in the building drops below the minimum required for the electrical equipment, humidifiers will provide moisture to the makeup air. Potable water will be used to supply the humidifiers and is recycled at least 3 times. Any water remaining within the humidifiers will drain to an attenuation tray and then to the surface water system. The

[7] https://www.eirgridgroup.com/site-files/library/EirGrid/Ecology-Guidelines-for-Electricity-Transmission-Projects.pdf

[8] https://www.sdcc.ie/en/download-it/publications/gdsds-new-development.pdf

RECEIVED: 18/01/2023

humidification process is non-contact and chemical-free, thus the water discharged is free of contamination and organics.

ARUP has conducted an assimilative capacity has been conducted by ARUP and included in Appendix F of the separately circulated CSEA Engineering Services Report. The conclusion from the assimilative capacity report shows the evaporative cooling water discharge from the data centres will not have a discernible impact of the River Liffey for any of the water quality parameters analysed.

When ambient temperature exceeds the allowable internal space temperature, air conditioning systems in the admin area will mechanically reject heat from the space. During this process, condensed water can collect in the air conditioning systems and will drain to the surface network. There are no significant contaminants in the air conditioning condensate, as this is purely condensed moisture. The cooling system process does not use any water and will not produce condensation discharge during normal operation.

Foul Drainage

The proposed foul water drainage network has been designed in accordance with the requirements of Appendix B of the Irish Water Code of Practice for Wastewater Infrastructure (IW-CDS-5030-03). The domestic and industrial foul sewer flows in an easterly direction towards two proposed pumping station which pumps to a discharge manhole adjacent to the existing Irish Water 450mmø foul sewer in the Celbridge road to the east of the site.

Further detail in relation the proposed foul water drainage network is identified in the *Engineering Services Report Drainage and Water Services Report* by CSEA and CSEA Drawing No's Drawing No 21_048-CSE-ZZ-ZZ-DR-C-2200 to Drawing No 21_048-CSE-ZZ-ZZ-DR-C-2218. Furthermore, information in relation to wastewater emissions is presented in Chapter 8 Hydrology & Hydrogeology and Chapter 13 Material Assets of this EIAR.

Water Supply

The proposed Water Supply Network will comprise of a 150mmø which will be connected to the Irish Water supply network in the Celbridge Road. The water main will serve the proposed buildings, water treatment plant, sprinkler tanks, deep tech buildings and proposed substation. A separate fire hydrant main will be provided to serve the fire hydrants which will be feed from the sprinkler tanks. For further detail refer to *Engineering Services Report Drainage and Water Services Report* by CSEA and CSEA drawings *(Drawing No 21_048-CSE-ZZ-ZZ-DR-C-2300 and Drawing's No 21_048-CSE-ZZ-ZZ-DR-C-2310 – 2318).*

Water supply is required for cooling equipment, cleaning, general potable supply for drinking and sanitary facilities. The proposed development will have an average domestic water demand of 1.74 l/s for drinking water, meals preparation etc with a peak demand of 10.9 l/s.

The Deep Tech, Energy Centre and Substation will not have an industrial water demand. To reduce both energy and water use in its data centre facilities, the data centre operator utilises direct evaporative cooling systems, which predominately utilise outside air to cool servers. Thanks to this innovative cooling solution, the proposed data centre buildings are projected to demand as little as 0.75 l/s of water on average for each of the three C buildings and 0.50 l/s for the B building.

RECEIVED: 18/07/2023

The Data Centres will use the water supplied by Irish Water for domestic and evaporative cooling. The design philosophy will be to limit the evaporative cooling process to peak summer months only. The water used during these peak summer months will be supplied by on-site industrial water storage only. The industrial storage will be filled during the winter months (Dec - Jan - Feb). Using historic weather data it is estimated that evaporative cooling utilizing process water will only commence during peak summer temperatures. For all temperatures below the peak summer days, the cooling system will operate on direct air only and thus the process water usage will be zero (0 l/s). To confirm, no water demand is required during the winter period.

Each of the C1, C2 and C3 Data Centres have an annual expected potable water demand of 1643.8m3 with the B Data Centre having an annual expected potable water demand of 1166.1m3. Resulting in an annual water demand of 6097.5m3 in the peak summer months only.

This water will be storage on-site such that no water is required from Irish Water during the peak summer months. In order to facilitate the tanks, the development will be required to fill-up these tanks during the months of December, January and February over a two-week period. This duration is an estimate, the exact duration of filling will be determined by Irish water Operations Team subject to supply constraints. The peak industrial water demand for the proposed data centre element of the development is estimated at 5.05 l/s per the submitted PCE (CDS23003038).

The proposed buildings are designed to harvest a significant portion of the annual cooling water requirements through rainwater harvesting, reducing the water used from the local supply from the first year of operation.

The data storage rooms are supplied with fresh air which is sufficient to cool the space for the majority of the annual running hours. For a small number of hours during the peak cooling season, adiabatic cooling is required. Adiabatic cooling uses rainwater as primarily supply and mains water utility as a back-up at ambient temperature conditions to provide cooling on peak cooling days.

The system does not require chillers/compressors which minimises the use of electrical power to maintain the data storage room environmental conditions. The rainwater harvesting will be utilised from the data centre roof throughout the year for the water to be available during those hottest periods during summer months when adiabatic cooling may be needed.

On site storage will be required for firefighting purposes. The volume of storage required will be 450 m3 for the Data Centre Buildings. The fire water tank will be filled over a 24-hour period at a flow rate of 5 l/s during off-peak periods as required.

A separate fire water tank is required for the Gas Power Generation Plant which will have 757 m3. This fire tank will fill over 8 hours at a flow rate of 28 l/s during off-peak periods as required.

For the other buildings (Deep Technology and Substation) on-site fire hydrants will be required to be served from the public supply. Fire flow rate of 35 l/s will be required as per UK National Guidance document on the provision of water supply for firefighting and Kildare County Council Fire Service Requirements.

RECEIVED: 18/07/2023

The above water demand calculations are set out in Irish Water PCE CDS23003038 and the *Engineering Services Report Drainage and Water Services Report* by CSEA.

Electricity

The power requirements for the data centre element of the proposed KIC Masterplan will be provided from the 110kV replacement substation that will be provided on site. The Deep Tech buildings and general infrastructure power will seek to connect into the existing MV supply from Adamstown which currently services the existing DB Schenker development. Further details on power supply, energy efficiency and sustainability are provided in the *Energy and Sustainability Statement* prepared by Ethos and provided with the planning application material.

The new replacement substation will connect to the existing overhead lines via short runs of underground cable. The replacement 110kV substation will include 6 No. transformers , with client control building and a 2 storey GIS substation building within a 2.4 m high fenced compound. The existing Rinawade substation will be decommissioned and removed.

The existing Maynooth – Rinawade 110kV overhead circuit which enters the site in the north-west corner will be retained and diverted to the new replacement substation. The existing Rinawade-Dunfirth/Kinnegad overhead circuit that enters the site in the north-west corner will be retained and diverted to the new replacement substation. Upon completion of the replacement substation, the existing Rinawade AIS substation will be decommissioned and removed.

The proposed substation will replace the existing Rinawade 110kV substation and will utilise the existing grid connection into the site. On completion of the 110kV replacement substation sufficient power will be available to power the initial Data Centre B1 (16MW). The initial Deep Tech Building A1 will be provide sufficient power through existing site connections that also provide power to the DBS building. The substation will also be sufficient to cater for the entire build out of the data centre elements of the KIC Masterplan. To accommodate the full build out of the KIC Masterplan and its power requirements, uprating/line replacements of the existing overhead lines into the site will be required to accommodate the complete build out of the data centre buildings and their peak operational power demand of 170MW

Telecommunications

An existing fibre optic cable is located on campus. The overall networks will be expanded as part of the proposed development. There is sufficient capacity within the network to facilitate the development.

Fire Water System

A fire water ring main will be installed to facilitate the KIC proposed development. The existing firewater pond will be retained to service the existing buildings 1-6 and buildings 7-9 until they are demolished.

Security and Lighting

RECEIVED: 18/01/2023

Traffic accessing the campus will enter the campus from three potential entries. The main traffic is expected to access the campus from the M4 and Barnhall Rd via the existing campus entry. This security control at this entry will be removed and the campus road will be transferred to KCC as a public road. The existing main campus entry along Celbridge Road will be closed and relocated further north, with a new signalised intersection provided on Celbridge Road. The existing signalised intersection on Celbridge Road will be removed and road reinstated as per KCC requirements. The new entrance and road, described as the link road, will be a public entrance and public road, all taken in charge by KCC.

A third entry to the campus will be provided through the existing access of Barnhall Roundabout. This access is existing and currently provides vehicle access to DB Schenker. This access will be security controlled, and access and road will remain in the ownership of the landowner.

Internal to the campus there are a number of security barriers to restrict public traffic to solely the Link Road. Individual access points to carparks and lands associated with each of the proposed buildings (A1, A2, B1, C1, C2 & C3) and existing buildings to be retained (Building No's. 1 – 6) will be controlled by either remote controlled boom gates or sally port entries for the proposed data centre buildings. An emergency fire tender access is also provided to Building B1 from the public link road. Access to the proposed 110kV Substation, Energy Centre and AGI facility will be highly restricted with access provided to required personnel only. Access to the upgraded Gas Skid will be from Celbridge Road and will be for maintenance works only.

Access to the campus will be controlled by campus security. Access to each individual site within the campus will be controlled by the building users. A record will be maintained of all personnel visiting the campus (including deliveries etc.). All visitors to the individual sites within the campus will be required to report to be monitored and supervised at all times.

A 2m high security fence will be constructed around the proposed data centre buildings. Similarly 2.4 - 3m high security fences will be constructed around the perimeter of the 110kv Substation, the Energy Compound, the AGI and Gas Skid. The perimeter of the proposed A1 & A2 buildings will not include security fencing, nor will the perimeter of the existing buildings to be retained. The boundary treatment of these perimeters will include a mix of landscape berms and planting. Further berms and planting will be provided in proximity to the aforementioned security fences to reduce the potential visual impact.

Pedestrian and cycle access to site will be possible via the three above referenced vehicle access points (2x Link Road entrances & Barnhall Roundabout entrance). Pedestrian and cycle access to the campus will also be possible via the M4 overpass which integrates with the proposed Link Road. Pedestrian and cycle access will be allowed through the centre spine of the campus along the designated view corridor. The proposed development will provide and access point up to the boundary with Castletown Estate enabling a future connection through the Castletown grounds. The pedestrian and cycle access will join the Link Road in the north of the site to the Barnhall Roundabout entrance in the south-east via the designated view corridor. An additional pedestrian and cycle access will be located along the eastern boundary of the site providing a second link between the new Link Road and the Barnhall Road Roundabout entrance.

CCTV cameras will be installed at strategic locations around the campus to ensure that the site surrounds are appropriately monitored. The lighting design (both security and environmental)

RECEIVED: 18/07/2023

has been assessed and optimised for the site, to ensure no obtrusive glare, light spillage or other light nuisance on neighbouring residential receptors or campus users. A lighting report was prepared by Ethos and is included within the planning application documentation.

Site Roads and Parking

Three vehicular access points are proposed into the site:

- The main entrance to the site will continue to be Barnhall Road accessed via the M4 Junction 6 Roundabout.
- The secondary entrance onto the R404 will be redesigned to accommodate a new link road from the main entrance (referred to as the R404/Site North Access Junction).
- The third access point onto the R404 via the existing roundabout.

The new Link Road will connect Access Points 1 and 2. This will be constructed to National Road standards to facilitate through traffic. This has been designed to meet objective MT3.12 of the LLAP 2020-2026 which seeks a *"new link road from the Celbridge Road (R404) to the south of the M4 connecting to the M4 Leixlip/Celbridge Interchange".*

A Design Manual for Urban Roads and Streets (DMURS) compliant statement accompanies the application. Refer to RKD Drawing *KIC-RKD-ZZ-ZZ-DR-A-1030* for further detail on proposed access and road layouts. Access arrangements and potential traffic safety impacts are considered in Chapter 13 (Traffic).

New carparking is provided in the form of 2,291 no. spaces across the entire campus (including existing parking to be retained). 196 of these are to be allocated to the combined new data centre units and 1,163 allocated to the deep tech use element. The balance will service the existing uses, energy centre, substation and other infrastructure on site.

A total of 246 (10.7%) of the total car parking numbers will be equipped with electric vehicle charging points and marked for EV vehicles only. A car parking hub, which will be accessible by the public, is proposed within car park identified as Car Park 1 which is adjacent to the exiting building 1 / main campus entrance.

The development proposals also include plans for 119 dedicated mobility impaired parking spaces that will be dispersed throughout the campus close to each of the building access points. This represents 5% of the total number of planned parking spaces. Refer to the submitted *Transport Assessment* by Systra and Chapter 13 (Traffic) for further detail.

Electric Bus Charging Hub

A new Electric Bus Charging Hub is proposed to be provided adjacent to the existing Building No.4. The Electric Bus Charing Hub will contain parking and charging for 10no. Electric Buses. The Buses charged on site will be associated with a privately operated bus provider. Buses charged at the depot would be related to an existing service provider rather than the introduction of new route.

The Charging Hub will be used as a charging facility for the buses. It will not be a stop on the network or publicly accessible, rather buses will return to the site upon completion of their transfers to re-charge and then leave to commence a new route. The traffic impacts associated with the bus movements are minor and account for c.40 bus movements departing/returning

RECEIVED: 18/07/2023

to the campus with the 24hr period. Bus movements will be spread across the 24hr period and will align with the ultimate operator's timetable. The landowner is in discussions with a number of potential operators with the final operator yet to be determined. Refer to Chapter 13 (Traffic) for further detail.

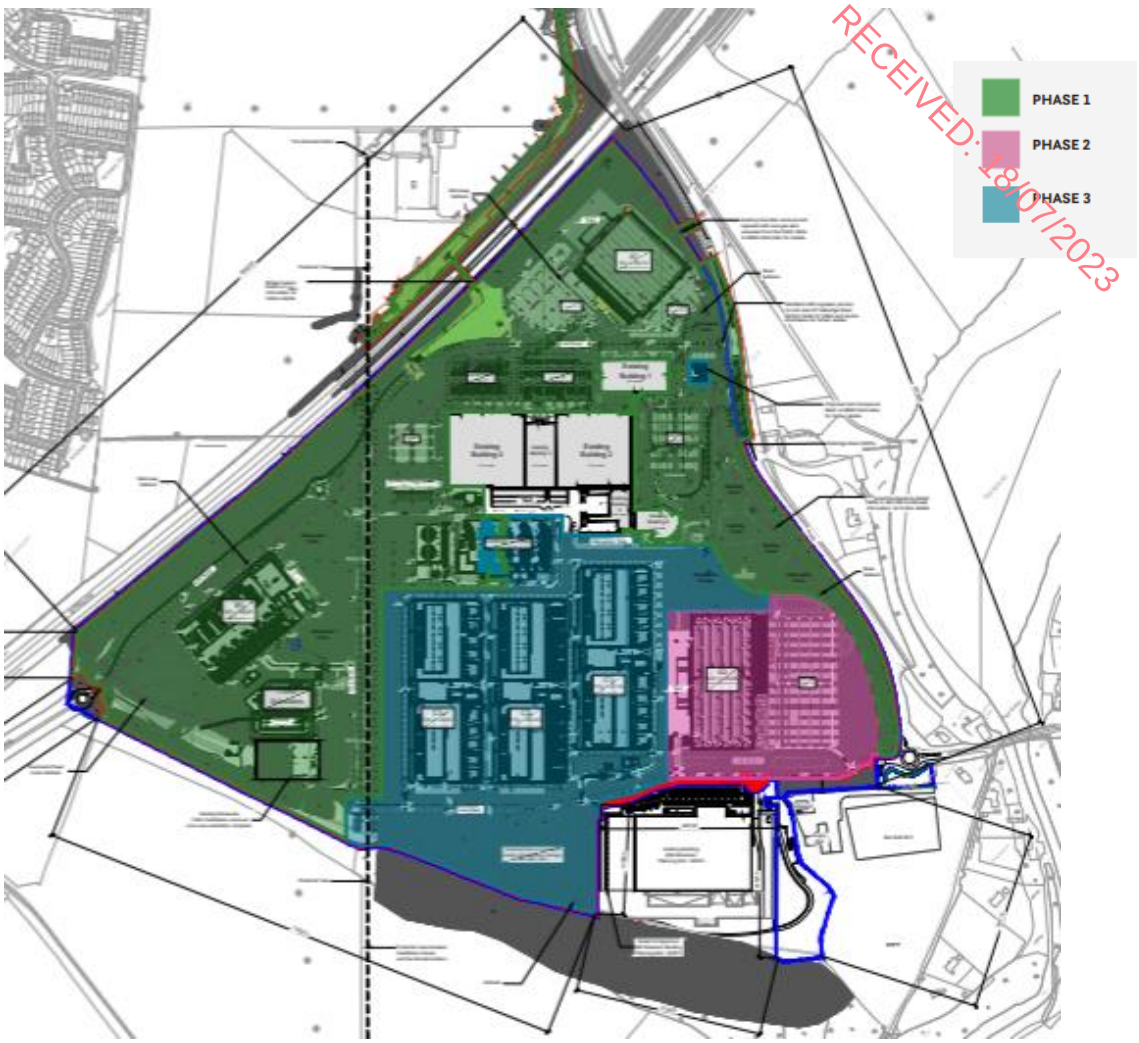
2.6 Phases of the Project

The below section sets out all aspects of the lifecycle of the project under the following headings:

- Proposed Phasing of the Principal Works
- Description of Construction
- Description of Commissioning
- Operation of the Project
- Changes to the Project; and
- Description of Other Related Projects.

2.6.1 Proposed Phasing of the Principal Works

The proposed development will be delivered through a three-stage phasing plan. The rationale behind the phasing is to ensure that each 'phase' can be properly completed and can stand alone, while forming part of the larger campus masterplan and to ensure that subsequent phases can be implemented without negatively impacting on previously completed development. The phasing approach is based on the worst likely case to assess the environmental impact of the proposal. The development phasing will be used to inform the assessment of cumulative impact through the EIAR.



RECEIVED: 18/07/2023

Figure 2.11: Kildare Innovation Campus Phasing Plan. Source: RKD Architectural Design Statement and Drawing A-1041.

Phase 1 (c.2024 - 2027)

1. Building A1 (Deep Tech) with associated carparking, landscaping, services yard etc. The existing buildings Nos 1-9 will be retained and operated as currently. No works are proposed to these buildings.
2. Building B1 (Data Centre) will be constructed fully in Phase 1 but will only utilise 16MW power. Power to the building will ramp up to a c. max of 32MW during Phase 3 of the development.
3. The new replacement 110kV Substation will be developed adjacent to the existing 110kV Substation. Once the new replacement substation becomes energised, the existing 110kV substation will be decommissioned. Associated grid diversion to the new substation will also be included in Phase 1.
4. The energy centre will be delivered in phases to align with power demand for the site and dispatchable energy requirements of the grid. The initial phase of the masterplan will include the provision of 1no. CTG powered by the enhanced gas line to the site. Supporting infrastructure within the energy compound will also be provided.

RECEIVED: 18/07/2023

5. Public Link Road connecting the R449 Barnhall Road to the R404 Celbridge Road with a new signalised intersection at the R404 will be constructed. The existing signalised intersection will be removed, and road and access reinstated.
6. The M4 Pedestrian and Cycle Overpass including links to the entrance of Barnhall Meadows estate and the connections along the protected view line will be developed.
7. The Electric Bus Charging Hub will be constructed providing parking and charging for 10no. privately operated buses.
8. Modifications to the existing parking lots 1 and 2 to increase the parking provide and include EV and accessible stalls.
9. Hard and soft landscaping will be provided throughout the Phase 1 area as well as the required earthworks, drainage, services, utilities and new gas skid.

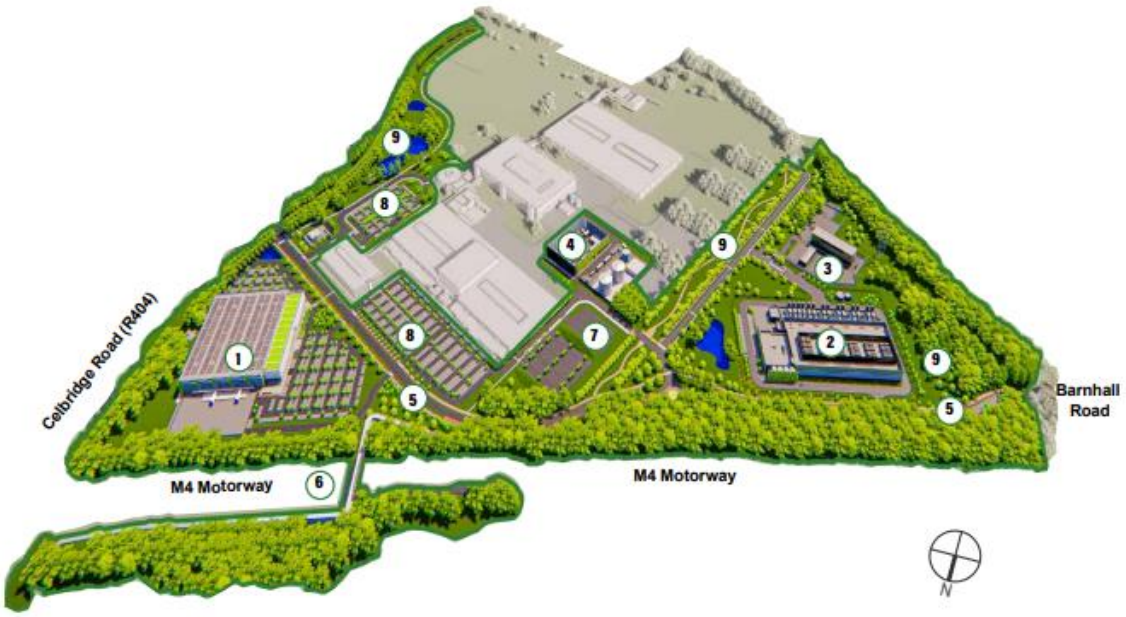


Figure 2.12: Kildare Innovation Campus Phase 1 Plan (Green Outline). Source: RKD Architectural Design Statement

Phase 2 (c.2026 - 2028)

1. Building A2 (Deep Tech) with associated carparking, landscaping, services yard etc.
2. Hard and soft landscaping will be provided throughout the Phase 2 area, including the required drainage and services.

RECEIVED: 18/07/2023

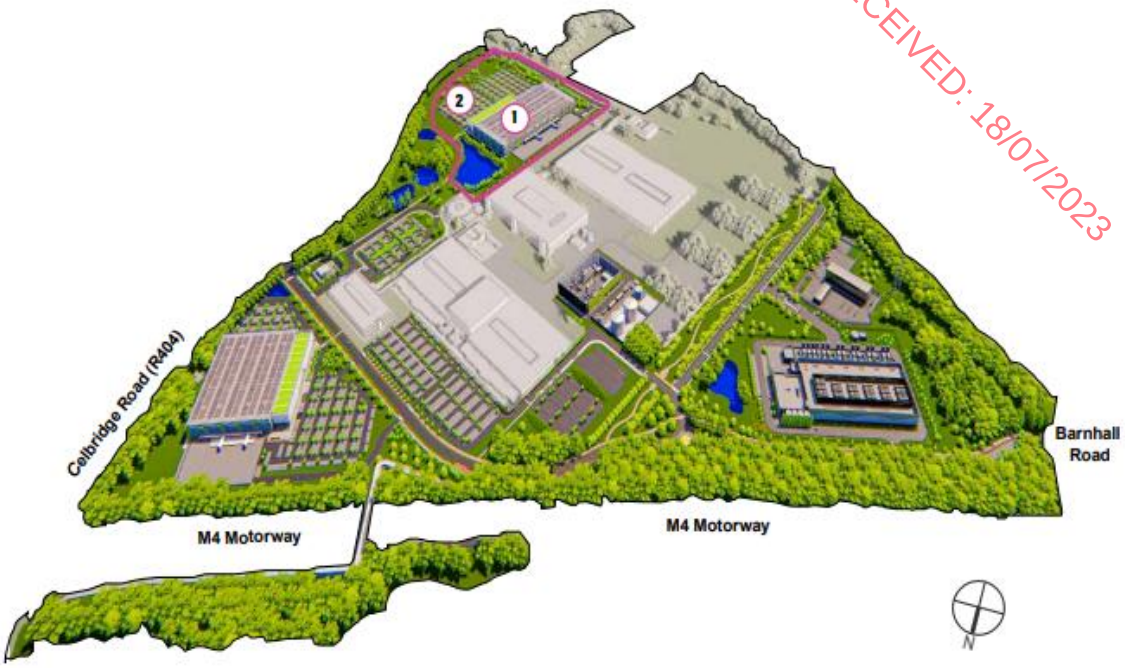


Figure 2.13: Kildare Innovation Campus Phase 2 Plan (Purple Outline). Source: RKD Architectural Design Statement

Phase 3 (c.2028 – 2035)

1. Demolition of Existing Buildings No. 7, 8 and 9. Provision of new Data Centre Buildings C1, C2 & C3 with associated parking, landscaping, building services, etc.
2. The Energy Centre final phase will align with power demand for the balance of the site and dispatchable energy requirements of the grid. The third phase of the masterplan will include the provision of 8no. turbines powered by a local extension of the gas transmission network by GNI. The turbines will be capable of operating off biogas as well as natural gas and will be located within 14m high enclosed area.
3. The existing campus road which provides entrance from the Celbridge Road roundabout and access to DB Schenker will be extended and linked up with the internal campus road adjacent to the view corridor. All associated cycle paths and footpaths will be linked up infrastructure will be demolished to make way for the build out of Phase 3.
4. Hard and soft landscaping will be provided throughout the Phase 3 area, including the required drainage and services.

RECEIVED: 18/07/2023

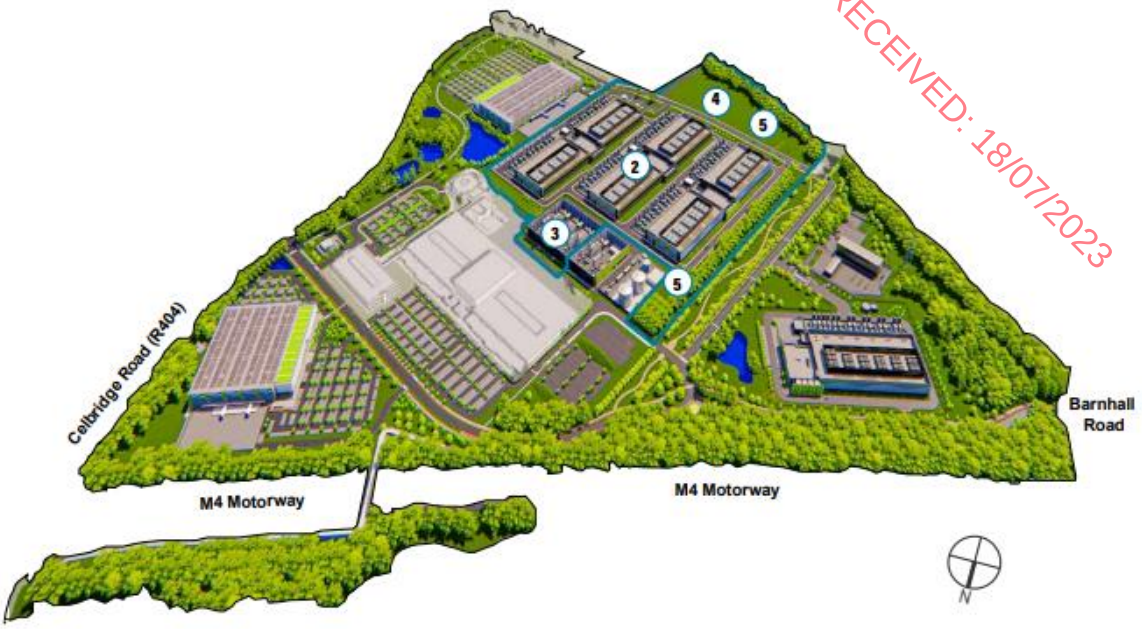


Figure 2.14: Kildare Innovation Campus Phase 3 Plan (Blue Outline). Source: RKD Architectural Design Statement

2.6.2 Description of Construction (Principal Works)

Introduction

It is estimated that the construction programme for the works associated with the proposed development will span over an 11-year period from the date of commencement. This estimation is based on the landowner's approach to providing a long-term phasing approach to the site, the availability of electricity supply, the lead in time for materials. In the event that the phases are not developed as per the above approach (due to unforeseen circumstances) the construction period may extend, having regard to the nature of the project and the need for flexibility, contractor pricing etc. It is important to note that the mitigation measures outlined in the EIAR will ensure that an extension to the construction period will not have a negative impact on the receiving environment. A Construction Management Plan has been prepared by CSEA and is included with the application, which includes further detail on timing and phasing. The CEMP will be refined by the construction contractor and submitted to Kildare County Council prior to commencement of development and will include the mitigation measures set out in this EIAR.

This EIAR presents measures to mitigate against any potentially 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.

Construction of the development the subject of this application for approval involves the following principal elements per development phase:

RECEIVED: 18/07/2023

- Demolition of existing structures (where applicable), site strip & associated earthworks.
- Construction of new buildings and structures.
- Construction of ancillary on-site infrastructure including attenuation ponds, and attenuation tanks.
- Buried site services installation.
- Construction of roads, footpaths & hard/soft landscaping.
- Internal Fit Out.
- Connection to public services.

Existing Ground Conditions

Ground works will be required to clear the site and to facilitate construction of building foundations, access roads, the installation of utilities and landscaping. The Land, Soils, Geology & Hydrogeology Chapter of the EIAR (Chapter 7) details the existing ground conditions at the site and provides a summary of the anticipated stratigraphy of the soil beneath the site.

There will be an increase in overall hardstand as a result of the proposed development of c. 171,641.88 m*2*. The existing site has a total hardstanding of c. 86,029.00 m*2*. The proposed development will have a total hardstanding of c. 257, 670.88 m*2*.

It is predicted that 115,117m3 of the cut material generated during site preparation/levelling (365,750 m3) will be reused to facilitate construction of the proposed roads, carparks, buildings and landscaping berms. It is estimated c.250,634m3 will be exported off the site and disposed of in accordance with relevant requirements. No fill will be required to be imported to the site to accommodate the development.

The surplus material that requires removal from site for offsite reuse, recovery and/or disposal and any potentially contaminated material (in the unlikely event that it is encountered), should be segregated, tested and classified as either non-hazardous or hazardous in accordance with the EPA publication entitled 'Waste Classification: List of Waste & Determining if Waste is Hazardous or Non-Hazardous' using the HazWasteOnline application (or similar approved classification method). If the material is to be disposed of to landfill, it will then need to be classified as clean, inert, non-hazardous, or hazardous in accordance with the EC Council Decision 2003/33/EC and landfill-specific criteria. This legislation sets limit values on landfills for acceptance of waste material based on properties of the waste including potential pollutant concentrations and leachability.

The surplus soils and stones may be suitable for acceptance at either inert or non-hazardous soil recovery facilities/landfills in Ireland or, in the event of hazardous material being encountered, be transported for treatment/recovery or exported abroad for disposal in suitable facilities.

Demolition & Site Preparation

Demolition works will be spread across the relevant development phases. During phase 1 & 2, demolition will be confined to the demolition of the existing campus access road, the existing haul road in the KCC lands and hard surface areas within the phase 1 & 2 works areas. Phase 3 of the development will include the demolition of existing Buildings No. 7, 8 and 9 including associated infrastructure. Demolition works have been assessed in the relevant chapters of the EIAR.

RECEIVED: 18/07/2023

It is proposed that the accesses and haul roads for vehicles, the contractors' compound and fencing will be established for the proposed development utilising the existing entrance from Barnhall Road as the primary construction entrance for this development. The primary activities that will be required during the site preparation phase for the development will be site clearance, excavations and levelling of the site to the necessary base level for construction, demolishing existing buildings and roads, surveying and setting out for structures and any rerouting of services/connections to future locations. A combination of excavators, trucks and other soil shifting plant will commence the main site clearance, demolitions, and levelling aspects on a phase by phase basis.

Construction of new buildings and structures.

Foundations & Structure

Following the completion of site clearance, demolition and levelling, all structures will require foundations to the structural engineers' specifications. Building structures will comprise of standard structural steel frames. It is anticipated that foundations will require moderate scale excavations. Local minor dewatering may be required during excavation works and groundworks.

Levelling/Cut and Fill

It is predicted that 115,117m3 of the cut material generated during site preparation/levelling (365,750 m3) will be reused to facilitate construction of the proposed roads, carparks, buildings and landscaping berms. It is assumed that the majority (but not all) of the topsoil/cut material will be re-used on site. Contractors will be required to submit and adhere to a method statement (including the necessary risk assessments) and indicating the extent of the areas likely to be affected and demonstrating that this is the minimum disturbance necessary to achieve the required works. Any temporary storage of spoil required will be managed to prevent the accidental release of dust and uncontrolled surface water run-off which may contain sediment etc.

Roads, Servicing and Landscaping

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, district heating network and infrastructure that will allow for the use of recycled heat for the existing campus buildings and proposed A1 & A2 development and building utility systems. This will be carried out on a phased basis and principally follow the proposed road network.
The new internal road network will be initially composed of hard-core material, rolled and compacted to support initial construction including civil/structural sub grade works. Excavations will be required for site levelling and preparation and the installation of services. The impact of these excavations and volumes of excavated material generated from them has been taken into account throughout this EIAR. Refer to Chapter 12 (Material Assets – Waste) for further detail.

Hard & soft landscaping will be undertaken and completed during the commissioning of the relevant project phases.

Building Envelopes and Finishes

RECEIVED: 18/07/2023

The outer finishing of the building envelopes are to be of high quality as set out within the Architectural Design Statement. The proposed M4 Overpass will be a high quality and similar in design and appearance as the Waterford Greenway crossing of the N25 at Kilmacthomas.

Site Accommodation & Site Parking

The site office and welfare facilities will be situated on site at an agreed location within the site boundary. It is anticipated that the site office and welfare facilities will relocate as each phase is completed to the next phase. This will allow the developer to utilise the completed phase. All of the sub-contractors as well as the main contractor and project managers will occupy offices in the same area. The site parking for staff, contractors and visitors will also be located in this area. It is proposed to provide 400 spaces on site for parking. Allowing for a car occupancy of 1.5 average this provides parking for 600 workers.

Refer to CEMP prepared by CSEA and submitted with the application for further detail.

Hours of Working

Each Phase of the development will have varying construction periods. Majority of works are to be done off-road within the site boundary, with the exception of the removal and provision of the new existing signalised intersection, the works to lift the new M4 Overpass into place and service connections.

During the off-road section of works, construction staffing personnel will arrive prior to 07.00am to mitigate against traffic peak. Site development and building works shall be carried only out between the hours of 08.00 to 19.00 Mondays to Fridays inclusive, between 08.00 to 14.00 on Saturdays.

Deviation from these times will only be allowed in exceptional circumstances (such as the M4 bridge lift and works to the signalised intersection) where prior written approval has been received from Kildare County Council. Such approval may be given subject to conditions pertaining to the circumstances being set by Kildare County Council.

Deliveries of material to site will be planned to avoid high volume periods. There may be occasions where it is necessary to make certain deliveries outside these times, for example, where large loads are limited to road usage outside peak times. There may be occasions where it is necessary to have deliveries within these times. The Contractor will develop, agree and submit a detailed Construction Traffic Management Plan, to KCC, for the project prior to commencement. The CTMP will implement the relevant mitigation measures contained in the EIAR.

Cranes

Fixed cranes will not be required on site. Mobile cranes may be used for some activities. All materials being lifted by crane will be controlled by guide ropes and will only be carried out under the strict supervision of appropriately qualified and experienced banksmen. The Contractor will engage with Weston Airport to undertake a preliminary screening assessment to confirm the associated mobile cranes that may be utilised during the construction, would have no impact on instrument flight procedures at Weston Airport prior to commencement. Refer to CEMP prepared by CSEA and submitted with the application for further detail.

RECEIVED: 18/07/2023

Hoarding and Site Segregation

The new works will be hoarded off or fenced off from the public at all times and existing parts of the campus. Heras type fencing will be used on short term site boundaries where appropriate to suit the works. The fencing alignment and specification are to be confirmed by the Contractor prior to commencement. Controlled access points to the site, in the form of gates or doors/turnstiles, will be kept locked for any time that these areas are not monitored (e.g. outside working hours). During working hours, a gateman will control traffic movements and deliveries at any active site access to ensure safe access and egress to & from site onto the public roads. All personnel working on site must have a valid Safe Pass card and be inducted by the Main Contractor with regard to site specific information.

Noise and Dust Management

The main contractor will be required to be accredited with ISO14001 Environmental Management Systems. The main contractor will be required to mitigate the impact of the construction works and the mitigation measures set out in this EIAR and CEMP.

Construction Traffic Management

During construction of the proposed development, construction traffic will travel to and from the site via the construction site access located on the east section of the site. It is expected that the origins and destinations of construction traffic will continue to match the distribution of traffic currently using the surrounding road network with the majority of construction traffic via the M4 Road.

A total of 400 car parking spaces will be provided on-site. The following measures will be put in place during the construction works:

- The contractor will be required to provide wheel cleaning facilities, and regular cleaning of the main access road;
- Temporary car parking facilities for the construction workforce will be provided within the site and the surface of the car park will be prepared and finished to a standard sufficient to avoid mud spillage onto adjoining roads;
- Monitoring and control of construction traffic will be ongoing during construction works. Construction Traffic Management will minimise movements during peak hours.
- Construction Traffic routes minimising traffic impact on surrounding residential development will be used by construction vehicles.
- Material deliveries and collections from site will be planned, scheduled and staggered to avoid any unnecessary build-up of construction works related traffic.

Reinstatement / Road Cleaning

Prior to the works commencing, detailed photographic surveys (condition schedules) of adjoining walls, roads, footpaths, fences etc. is to be prepared. Copies of the relevant parts are to be made available to adjoining owners and KCC. This record will form the basis of assessing repairs to adjoining areas in the future should a dispute arise as to their cause. Roadways are to be kept clean of muck and other debris. A road sweeping truck is to be provided as necessary, to ensure that this is so.

Reinstatement at completion of the works will involve:

RECEIVED: 19/07/2023

- Testing and cleaning of all watermains in the development to the requirements of the IW / KCC prior to connection to the public watermain. This will reduce the risk of contamination to the public water supply when the new network is connected to the system.
- Repair of any damage to any adjacent public roadways, kerbs, grass verges etc. in accordance with KCC requirements.
- Reinstatement of all excavations to the requirements of KCC.
- Leaving the area in a neat and clean condition, removing all deleterious materials that may have been deposited during construction works.

2.6.3 Description of Construction (Facilitation Works)

GNI Facilitation Works

GNI Installation Activities

Typical trench cross sections for works in roads and fields are shown in Figure 2.14 below. The required trench will have a nominal depth of 1,080mm and width of 480mm in roads. The required trench will have a nominal depth of 930mm and width of 480mm in fields (Barnhall Meadows and KIC Lands).

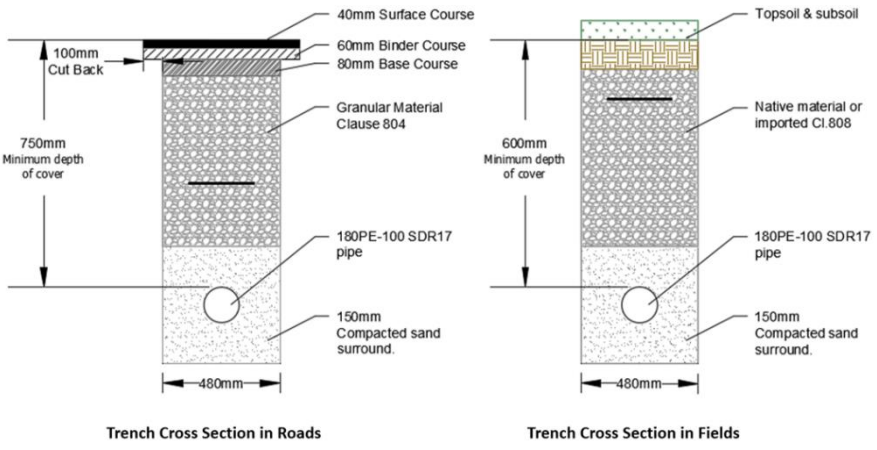


Figure 2.15: Typical GNI Trench Cross-Sections in Roads and Fields. Source: MDM Engineering

The 140m pipeline trenching and installation in lands adjacent to the Haul Road within Barnhall Meadows and within KIC lands will be undertaken by clearing the site area, stripping of top-soil which will be stored and reused. The works access will seek to utilise the existing Haul Road within this area. The pipe will be welded together alongside the trench and laid in the trench. The trench will then be reinstated using existing material and a small quantum of imported material if required.

Within the existing road area's the works will be carried out in discrete areas at distances of c.20m to minimise traffic impacts. Appropriate traffic management will be put in place

RECEIVED: 18/07/2023

through a GNI Traffic Management Plan. The road surface will be broken out and material removed from site for recycling and/or disposal. The trench will be excavated and prepared in accordance with configuration shown in Figure 2.15 above. Excavated material will be removed from site for recycling and/or disposal. The pipe string will be welded together alongside the trench and laid in the trench. The trench and the road will be reinstated to match the existing structure and in accordance with the road authorities requirements.

The 180m crossing of the M4 Motorway by HDD will be undertaken with entry from the disturbed Barnhall Meadows lands adjacent to the existing Haul Road and exit within the Campus lands in proximity to the proposed A1 building. A drill entry site of 30m x 40m and a drill exit site of 20m x 30m are required. Drill entry and exit pits will be excavated and lined with geotextile and polyethylene sheet to avoid seepage of drilling fluids into the surrounding soils. The HDD will avoid tree removal. All works to occur outside Root Protection Areas (RPA's). HDD will be significantly below the Root Protection Area's of the trees on both sides of the M4.

The pipe string will be fabricated by welding together pipe sections and strung out in one single length from the HDD exit point. The pilot bore is completed by adding drilling rods to the rig as the drill head is driven forward along the desired drill profile. Drilling fluid is pumped through the hollow drill rods throughout the process. The fluid supports the bore wall, lubricates the drill head and drill pipe, and flushes cuttings back to the drill entry pit for removal and disposal. The drill profile is followed by monitoring the position of the drill head and is directed along the desired drill profile. The drill head's real-time position is recorded throughout the drilling process. General tolerances for the drill profile are less than 3m of the desired centre line for the entire length of the bore. The pilot bore is complete when it punches out at the drill exit site. Once the pilot bore is completed, the bore will be enlarged by reaming to the required size to pull in the pipe string. After the drill punches out at the exit pit the drill head is removed and a reamer attached. The drill bore is widened by successive reaming passes. A final cleaning pass of the bore confirms the condition of the bore and its readiness for pipe installation. Following the completion of the drill bore the pipe string will be attached to the drill pipe following the final pass of the reamer and pulled back through the drill bore to the drill entry pit. Once the pipe has been installed it will be pigged through its entire length and capped for later joining to the other pipe sections. On completion of the works all equipment will be demobilised and removed from the sites and the site areas will be restored to their original condition.

Dewatering

Dewatering will generally be one of three options depending on the local authority requirements and engagement with relevant stakeholders such as inland fisheries etc. These options would be (1) Temporary Bund used for filtering and settlement, test and leave into the watercourse, (2) utilise storm drain if available (3) pump and export for treatment/disposal.

Future Consents & Timing

A Section 39A consent under the Gas Act of 1976 will be required to construct the pipeline. This consent will be obtained from the CRU. An Environmental Impact Assessment and Appropriate Assessment Screening will be required to be undertaken as part of the consent process.

RECEIVED: 18/07/2023

The future gas pipeline construction will take c.10-12 months, with pipe-laying scheduled to occur between the months of March and October with full reinstatement the following summer.

Eirgrid Uprating Facilitation Works

Power Lines and Polesets

Generally, Over Head Lines (OHL) are built as a mixture of 200mm², 300mm² and 430mm² depending on the requirements at the time OHL was built.

- When ESB upgrade the OHL they generally replace the conductor with a 430mm² ACRS Bison which will require Poleset replacements, cross-arms and insulators due to the additional weight that has to be supported by the line. Refer to Appendix 2.1 for typical Poleset.
- Equipment used in OHL upgrades will include both mobile cranes and Mobile Elevated Work Platforms (MEWP).
- Where poleset replacement occurs, existing foundations and structures will be utilised.
- There are no changes foreseen as being required in the transmission line with circuits built with 430mm ² conductors, the limiting factor would be within station boundaries.

Angle Towers and DC Towers

In general, there are no requirements to replace towers when conductors are uprated to 430mm² but some designs have to be done and insulators/steel works may be replaced. Typical equipment used in upgrades would include Excavators, Concrete trucks, Cranes and MEWPs.

Conductor Replacements
OHLs are built as a mixture of 200mm², 300mm² and 430mm² depending on the requirements at the time OHL was built. To uprate to 430mm², the following typical works would be required:

- the utility would have to disconnect the old conductor and pull the new one utilising a four drum puller
- the puller has 4 spools of rope which run up to sheaves (pulleys) on the pole, and then over to wires on the other pole
- Ropes are tied to wires on the other pole. Puller pulls the ropes and wire from pole to pole.
- No changes are expected when uprating circuits built with 430mm² Conductors in powerlines (tower).
- Typical equipment used in upgrades would include Cranes, MEWPs, Conductor Puller, Ropes and tractors.

Substation equipment also has to be assessed by ESB/Eirgrid to ensure compliance. Transformers, switchgears, cables and protection systems are usually the limiting components on substations and may require replacement.

2.6.4 Description of Commissioning

RECEIVED: 18/07/2023

It is envisaged that the project will follow the phasing outlined in section 2.6, above. Dates are dependent on planning being granted and funding and all permits being in place.

Once the buildings are constructed, the likely fit out works for all buildings will include *inter alia* partitions, mechanics, electrics, sprinklers, joinery, ceilings, flooring, furniture and fixtures.

Specialist contractors will be mobilised to complete the commissioning of the deep tech buildings and data centres, which will include installation of bespoke equipment.

The Energy Centre will, for Phase 1, be able to operate using gas supplied from GNI via the existing gas pipelines on site; however, Phase 3 will require the facilitation GNI upgrade pipeline to be constructed and connected to the principal site.

The 110 kV substation will be constructed in Phase 1 and will connect to existing lines on site currently providing power to the existing 110 kV Rinawade substation. It will have the capabilities to provide electricity to the existing campus and Phase 1 and Phase 2. Upon completion of Phase 1 of the KIC Masterplan, including the development of the 110kV substation, uprating of existing overhead lines from the replacement 110kV Rinawade substation to Derryiron/Maynooth and Dunfirth/Kinnegad will be required to facilitate commencement of Phase 3 of the Masterplan.

The facilitation works will have to receive planning consent, including assessment by the competent authorities of their environmental impacts, prior to development.

2.6.5 Operation of the Project

The operation of the project and expected employee numbers etc are discussed in the above section 2.5 above. Noise, vibration and air emissions and climate impacts associated with the operation of the project are set out and assessed in Chapter's 9 – 11 of this EIAR. Waste and Traffic associated with the operation of the project is set out and assessed in Chapter's 12 and 13. Demand on site services and energy is set out and assessed in Chapter 14.

2.6.6 Changes to/Decommissioning of the Project

It is not intended that the development associated with the project will be decommissioned. The lifespan of the proposed development is not defined but is anticipated to be approximately 15 – 25 years for the deep tech buildings and data centres and c. 25 years for the Energy Centre without significant modification or upgrades. It is likely that regular maintenance and periodic upgrading of the facility over time will enable it to continue to meet future demands.

The lifespan 110kv substation is anticipated to be approximately c. 30+ years with upgrades and routine maintenance as required.

Upon closure, all buildings, plant, equipment, drainage networks etc. at the site will be fully decommissioned in accordance with prevailing best practice. The buildings once rendered environmentally safe will more than likely be retained and sold on for future use following closure.

The facilitation works have a life expectancy of c.30+ years and would be replaced/repaired as required to provide greater capacity or stability to the energy infrastructure.

At present, there are no planned changes to the final built out of the project over its expected lifetime.

RECEIVED: 18/07/2023

2.6.7 Description of Other Projects to be considered as part of the cumulative assessment.

A list of other developments in the vicinity of the Proposed Development is provided in Chapter 3 (Planning and Development Context) of this EIA Report.

2.7 Sustainability Energy Efficiency & Resource Use

The planning documents include an *Energy and Sustainability Statement* prepared by Ethos which outlines how the energy performance, and the sustainability of construction meets or exceed legislative and planning requirements. In addition, the Statement outlines how the proposed development meets the objectives set out in the Kildare development plan. The following is a summary of the measures included in the proposed design:

Building and Plant Design

The development is designed to achieve (as a minimum) Building Regulations (Part L) compliance and a BER of A rating building:

- Passive Solar Design to minimise solar gain to reduce cooling energy requirements
- The building fabric of the new development will be designed and constructed to limit heat loss and where appropriate, limit heat gains through the fabric of the building.
- Full mechanical Heating, Ventilation and Air Conditioning (HVAC) systems will be utilised in the data centre, energy centre and Deep Tech buildings due to the high occupancy levels and deep floor plates which means that a natural ventilation strategy is not feasible. However, the mechanical HVAC strategy is to minimise energy associated with space conditioning through the use of high efficiency systems, heat recovery and the efficient control of both ventilation rates and of heating and / or cooling supply.
- High Efficiency Electrical Systems including low energy lighting solutions and power factor correction.
- Sustainable Energy Initiatives including recycled heat recovery
- Data Processing Area Electrical Design Elements (transformers, emergency back up generators, high efficiency external and internal lighting.
- Data Processing Area Mechanical Design Elements (Water demand reduction and rainwater harvesting, data storage room environmental design, use of direct evaporative Air Handling Units (AHUs) and use of an electronic building management system for air handling,
- Offices & ancillary Areas Mechanical & Electrical design elements including high efficiency air conditioning, energy efficient heat recovery units for air ventilation systems, efficient low energy LED lighting and control systems, PV panels, electric vehicle charging infrastructure).

Energy Security

RECEIVED: 18/07/2023

A connection agreement has been reached with Eirgrid for the first phase of the proposed development. Additionally, it is noted that the current power supply to the campus via the existing 110kV Substation is not supplemented with dispatchable power. This will change as a result of the proposed KIC development, as the existing power demand through the Rinawade 110kV substation will, once the initial data centre becomes operational, be met with equal or greater dispatchable power, meaning that the proposal will provide a net improvement to grid reinforcement for the benefit of all users.

The Commission for Regulation of Utilities (CRU) has advised that the power system is facing potential capacity margin shortfalls over the next few years – effectively meaning there is a likelihood that projected generation supply may not be enough to meet forecast demand at peak demand periods.

The proposed development will include its own energy centre to be built out over the life of the masterplan. The energy centre will be supplied by GNI's enhancement of the existing supply to the campus. The Energy Centre will include natural gas fired turbines, supplemented by bio-gas, to relieve generation constraints cause by renewable intermittency. Further to this, the energy centre could also be capable of providing reinforcement to grid if and when required. In addition to the energy centre providing support, it will also provide additional inertia to the grid which results in increased frequency stability.

Decarbonisation

KIC is committed to a future of carbon neutrality for the entire campus through a range of mechanisms. The developer and data centre end user are committed to continued renewables additionality nationally and investment in new generation, repowering or otherwise increasing in-country renewable energy capacity. In this regard the proposed development will have a Maximum Import Capacity (MIC) of 170MW once fully developed (c.2035). The development will be delivered in phases over a 10-year period, as such the data centre energy demand will ramp up over a significant period of time. It is proposed to proportionally match the impact of the forecasted energy demand through a mix of renewables on site and CPPA's.

On site commitments include:

- Provision of significant Solar PV installations with c.8,560 panels being proposed across the 4no. data centre buildings and the 2no. Deeptech buildings.
- Use of Hydrotreated Vegetable Oil (HVO) as back-up fuel source for the Energy Centre upon full build out rather than diesel.
- Implement District Heating system, which will use recaptured heat produced from the data centres to provide recycled heat the existing campus buildings being retained as well as the new buildings A1 and A2. Further to this, the district heating system has been designed to provide export heat to surrounding community uses.

The future data centre end user will commit to entering into arrangements which are capable of underpinning new renewable energy generation calculated to offset the energy consumed by the proposed data centre development from the electricity grid. It is proposed that these arrangements would ramp up overtime in line with the operation of the data centre use and would be secured in the in the form of CPPAs and provide for the establishment of new renewable energy generation projects by the data centre end user which demonstrates that the energy consumed by the data centre development on site is offset with renewable energy generation.

RECEIVED: 18/07/2023

The agreements may be on a phased basis and shall confirm:

- That the new renewable will not be supported by government or consumer subsidies.
- The new renewable projects will be located in Ireland.
- The new renewable energy projects will be provided by the data centre end user.
- The new renewable energy generation shall relate to energy that is not being generated at the date of which the proposal is permitted.
- The power ramping schedule for each CPPA to align with Data Centre power consumption.

The CPPA's will align with the ramping up of energy use by the proposed data centre development. In this regard, Phase 1 of the proposed data centre development is to be provided with c.16MW through an existing Eirgrid connection agreement. Phase 3 will include the balance of the proposed power capacity (c.154MW). The final signed CPPAs shall align with the proposed ramping schedule for each data centre building.

Further to the above CPPA's, Kildare Innovation Campus will commit to similar CPPA's for the offset of any non-renewables used by the proposed energy centre. CPPA's for renewable energy projects will include bio-gas and/or hydrogen as well as other available renewables. Final evidence of signed CPPAs shall include the proposed ramping schedule for the energy centre building and may be agreed in phases prior to occupation of the relevant phase of the energy centre.

The agreements for the energy centre may be on a phased basis and shall confirm:

- That the new renewable will not be supported by government or consumer subsidies.
- The new renewable projects will be located in Ireland.
- The new renewable energy projects will be provided by Kildare Innovation Campus.
- The new renewable energy generation shall relate to energy that is not being generated at the date of which the proposal is permitted
- The power ramping schedule for each CPPA to align with Energy Centre phase power consumption.

Refer to the *KIC – Response to the Principles for Sustainable Data Centre Development* submitted with the application and Chapter 10 (Climate) of the EIAR which assesses the climate impact of the proposed development.

Flood Management

Climate change has the potential to alter weather patterns and increase the frequency of rainfall in future years. As a result of this there is the potential for flooding related impacts on site in future years. A site-specific flood risk assessment has been undertaken as part of this planning application and adequate attenuation and drainage design have been provided for to account for increased rainfall in future years. The proposed development will have no measurable impact on flooding within or outside of the site boundary.

Water Management and Cooling

RECEIVED: 18/07/2023

To reduce both energy and water use in its data centre facilities, the Operator utilises direct evaporative cooling systems, which predominately utilise outside air to cool servers. Thanks to this innovative cooling solution, the proposed data centre buildings are projected to demand as little as 0.75 l/s of water on average for each of the three C buildings and 0.50 l/s for the B building. The proposed buildings are designed to harvest a significant portion of the annual cooling water requirements through rainwater harvesting, reducing the water used from the local supply from the first year of operation.
The data storage rooms are supplied with fresh air which is sufficient to cool the space for the majority of the annual running hours. For a small number of hours during the peak cooling season, adiabatic cooling is required. Adiabatic cooling uses rainwater as primarily supply and mains water utility as a back-up at ambient temperature conditions to provide cooling on peak cooling days. The system does not require chillers/compressors which minimises the use of electrical power to maintain the data storage room environmental conditions. The rainwater harvesting will be utilised from the data centre roof throughout the year for the water to be available during those hottest periods during summer months when adiabatic cooling may be needed. The proposal is to also harvest rainwater from Deep Tech buildings to provide all irrigation for green walls across the site. The harvested rainwater will be utilised to offset the demand from Irish Water. Subject to yield studies, this has the potential to reduce the demand on the Irish Water network significantly.

2.8 Major Accidents and Disasters

The 2014 EIA Directive and associated EPA EIA Guidelines requires that the vulnerability of the project to major accidents, and/or natural disasters (such as earthquakes, landslides, flooding, sea level rise etc.) is considered in the EIA Report. The site has been assessed in relation to the following external natural disasters; landslides, seismic activity and volcanic activity and sea level rise/flooding as outlined below. The potential for major accidents to occur at the facility has also been considered with reference to Seveso/COMAH. Refer to Chapter 17 (Major Accidents and Disasters) for further detail.

2.8.1 Landslides, Seismic Activity and Volcanic Activity

There is a negligible risk of landslides occurring at the site and in the immediate vicinity due to the topography and soil profile of the site and surrounding areas. There is no history of seismic activity in the vicinity of the site. There are no active volcanoes in Ireland so there is no risk of volcanic activity. Further detail is provided in Chapter 7 (Land & Soils) and Chapter 8 (Hydrology & Hydrogeology).

2.8.2 Flooding/Sea Level Rise

The potential risk of flooding on the site was also assessed. A Stage 1 Flood Risk Assessment was carried out and it was concluded that the development is not at risk of flooding. Furthermore, it is not expected that the proposed development would adversely impact on flood risk for other neighbouring properties. Further detail is provided in Chapter 8 (Hydrology & Hydrogeology) and the *Site Specific Flood Risk Assessment* prepared by CSEA and submitted with the application for development.

2.8.3 Seveso/COMAH

As detailed in Section 1.10, the facility will not be a Seveso/COMAH facility. The only substance stored on site controlled under Seveso/COMAH will be diesel for generators (although there will be a preference for HVO) and the amounts proposed do not exceed the relevant thresholds of the Seveso directive. It is noted that the proposed energy centre will have a significant amount of back-up fuel stored on site, however this fuel will be HVO, a fuel not listed on the hazardous substances under the Seveso Directive therefore the Seveso/COMAH Directive does not apply to the site.

RECEIVED: 18/07/2023

2.8.4 Minor Accidents/Leaks

There is a potential impact on the receiving environment as a result of minor accidents/leaks of fuel/oils during the construction and operational phases. However, the implementation of the mitigation measures set out in Chapters 7 and 8 will ensure the risk of a minor/accident is low and that the residual effect on the environment is imperceptible.

RECEIVED: 18/07/2023

3.0 PLANNING AND DEVELOPMENT CONTEXT

3.1 Introduction

This chapter of the Environmental Impact Assessment Report has been prepared by Brian Minogue (BSc in Spatial Planning), Tom Phillips + Associates (TPA). In accordance with Directive 2014/52/EU, this chapter addresses the Planning Policy Context of the Project and the plans and projects which have the potential to act in cumulation with the project.

3.2 Project Site and Surrounding Land Zoning Objective

Principal Works Site

The Principal Works site is zoned 'H' - Industry and Warehousing – in the Leixlip LAP and, accordingly, the County Development Plan. The provision of employment generating uses on land zoned for development and within an existing business campus is strongly supported by the County Development Plan and the LAP.

The Proposal adheres to the land use zoning objectives identified in the LAP, including *inter alia* protecting views, and introducing link roads and pedestrian connections from Leixlip to Celbridge.

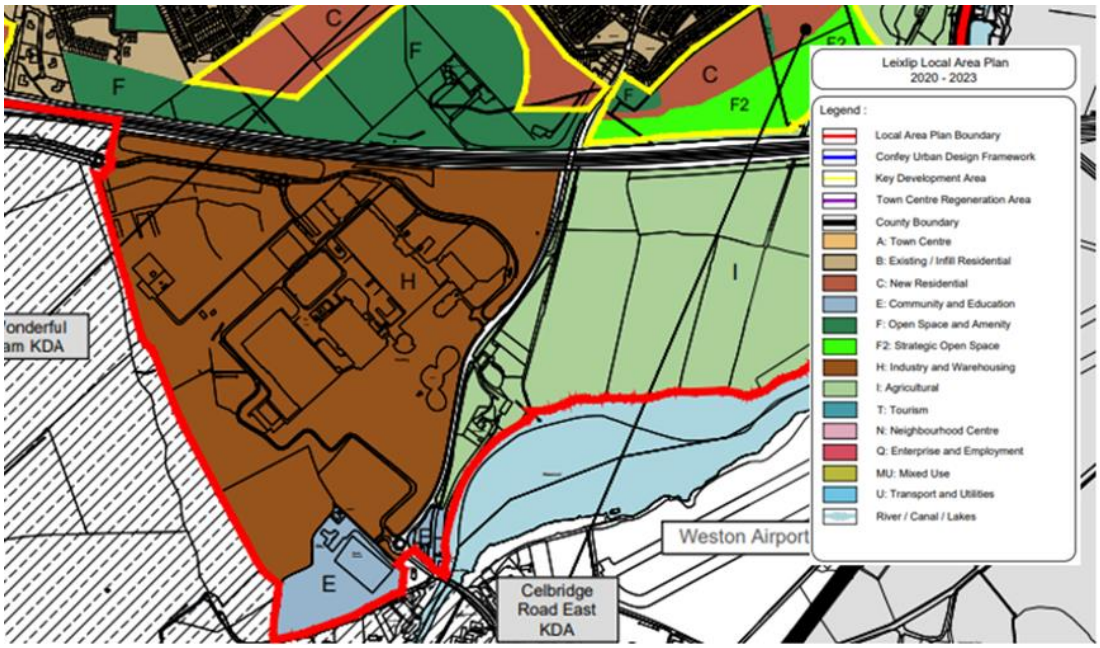


Figure 3.1: Extract Map Ref 4 Land Use Zoning Objectives Map, Leixlip LAP.

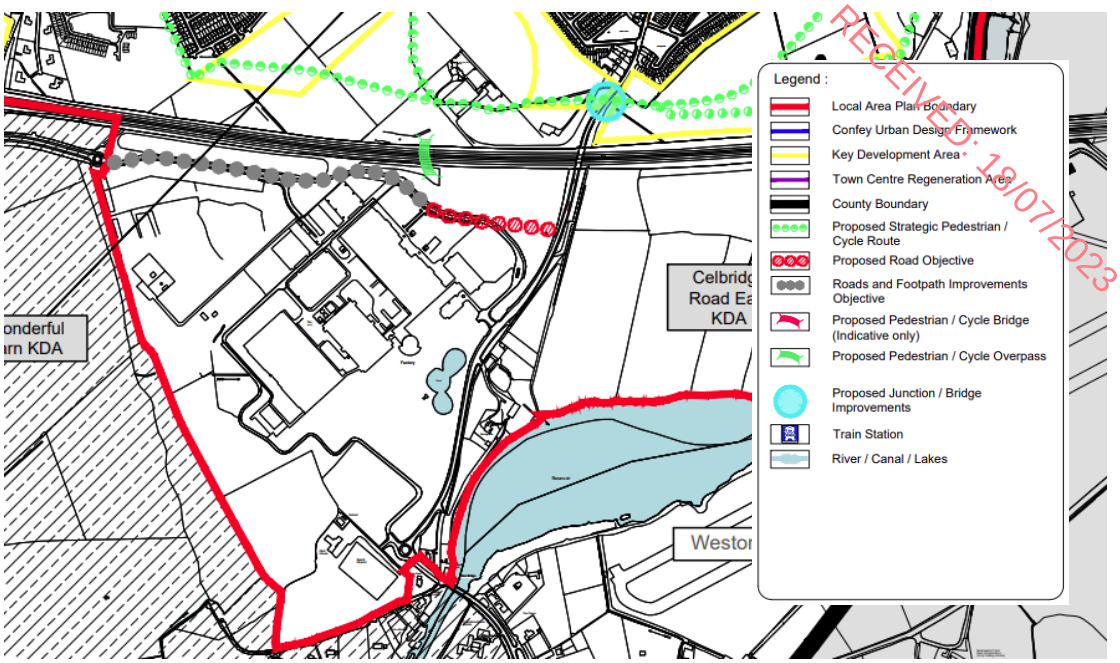


Figure 3.2: Extract Map Ref 4 Land Use Zoning Objectives Map, Leixlip LAP.

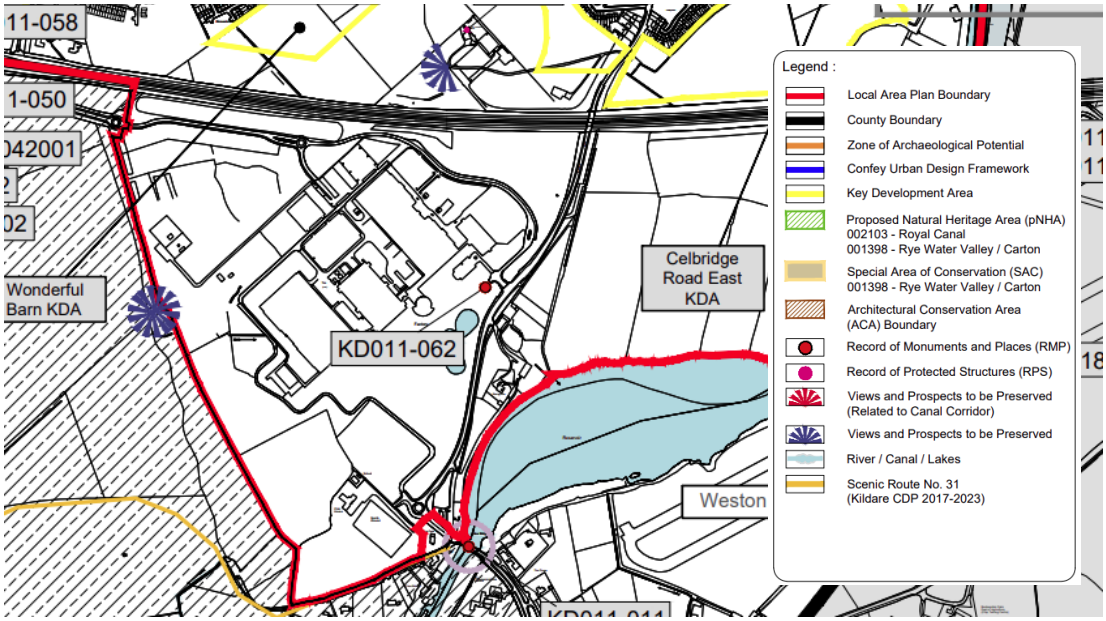


Figure 3.3: Extract Map Ref 4 Land Use Zoning Objectives Map, Leixlip LAP.

Facilitation Works Site

GNI Gas Upgrades

The pipeline works are all located within the Kildare County Council administrative area, the works will be within lands covered by the Leixlip LAP. The majority of the works will be under road and the lands are unzoned.

Prior to the pipeline entering the principal site, the works will enter the Barnhall Meadows Lands which are zoned 'F: Open Space and Amenity' under the Leixlip LAP which has the land-use zoning objective "*to protect and provide for open space, amenity and recreation*

RECEIVED: 18/07/2023

provision". The gas upgrade works would not contravene the applicable land use zoning objective as while they constitute works, they have no effect of changing the current or any future potential land use. Furthermore, 'utility structures' are 'open for consideration' within the above zoning.

EirGrid Uprating

The works will primarily occur within unzoned – 'default agricultural' – land.g The works will involve uprating of existing lines, which will mean that any prospective land use objective – if within the path of the works – will unlikely be impinged by its operation.

3.2.1 Relevant Objectives & Policies

National Planning Framework (NPF)

The *National Planning Framework 2040 - Our Plan (2018)*, classifies County Kildare as being in the 'Mid-East' and it states within that region that there must be:

> *"a greater focus on addressing employment creation, local infrastructure needs".*

A number of the National Policy Objectives relate to employment development. These include, inter alia:

National Policy Objective 10b:

> *"Regional and Local Authorities to identify and quantify locations for strategic employment development, where suitable, in urban and rural areas generally."*

National Policy Objective 11:

> *"In meeting urban development requirements, there will be a presumption in favour of development that can encourage more people and generate more jobs and activity within existing cities, towns and villages, subject to development meeting appropriate planning standards and achieving targeted growth."*

The aims and objectives of the NPF with regard to the Eastern and Midland region are clear in their focus on the importance of sustainable employment provision.

Regional Spatial & Economic Strategy (RSES)

The *Regional Spatial & Economic Strategy (RSES)* for the Eastern and Midland Region outlines the Strategic Vision for the region which is:

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

RECEIVED: 18/07/2023

County Kildare falls under the sub-catchment of "Eastern Region" and the strategic catchment area surrounding Dublin known as the "Core Region":

> *"The Core Region contains a strong network of county and market towns that have a good level of local employment, services and amenities, which serve not just their resident populations but a wider catchment area."*

Section 4.2 of the *RSES* lists the subject site within the Metropolitan area of Dublin, the vision statement of which is to

> *"build on our strengths to become a smart, climate resilient and global city region, expanding access to social and economic opportunities and improved housing choice, travel options and quality of life for people who live, work, study in or visit the metropolitan area."*

Table 5.1 specifically mentions the subject site (former Hewlett Packard Site) as a strategic development area to *"strengthen employment base for North Kildare"*.

The role of Leixlip in terms of strategic employment development is noted in Table 5.2 of the RSES 2019-2031. It identifies the employment lands in Leixlip and their potential as follows:

> ***"Large scale former Hewlett Packard site*** *and Collinstown site* ***for regional enterprise to strengthen employment base for North Kildare."***
>
> [Our emphasis.]

Further, section 6.3 of the RSES 2019-2031 deals with Economic Strategy. Its *'Guiding Principles to Identify Locations for Strategic Employment Development'* are stated on page 130 of that document and include locations such as Liffey Business Campus where synergies can be created between existing uses and in proximity to public transport corridors.

Kildare County Development Plan 2023-2029

At a county and local level, the lands are governed by the Kildare County Development Plan 2023-2029, complemented by the Leixlip LAP 2020-2023 (extended to 2026).

The subject Hewlett Packard site is identified as a "Strategic Development Area", identified as an important area specifically zoned for knowledge-based economy focusing on high tech/biotechnology, research and development, ICT and manufacturing.

RECEIVED: 18/07/2023

Hierarchy	Description	Locations	Sectoral Opportunities
	High Quality transport links and the capacity to act as regional drivers to complement the Regional Growth Centres.	Maynooth	Re-intensification of industrial lands in the northeast of the town. Exploit historic and amenity assets, regeneration of town centre to provide significant retail and commercial functions. Maynooth – knowledge-based employment focusing on ICT and manufacturing through the development of a research and technology campus. Further development of Maynooth University as a leading third level research and educational facility – potential synergies to large new and established employers. Development of St Patrick's College Campus for a mix of uses.
Strategic Development Areas in the MASP[1]	Leixlip – Former Hewlett Packard site and Collinstown site to Strengthen employment base for North Kildare. Maynooth - New Research & Technology Park adjoining Maynooth University.	North-West Corridor (Maynooth/ Dunboyne commuter line /DART)	Business Parks comprising knowledge- based economy focusing on high tech/biotechnology, research and development, ICT and manufacturing. Research and Technology
Self-Sustaining Growth Towns	Moderate level of jobs and services.	Newbridge Leixlip Kildare Town Athy	Biotechnology, ICT, professional services, High-tech manufacturing and research. Bloodstock, tourism, manufacturing, logistics, food and beverage products.

Figure 3.4: Economic Development Hierarchy Table. (Source: Table 4.1 Extract of Kildare County Development Plan 2023-2029.)

Chapter 4 of the Kildare County Development Plan 2023-2029 deals with the County's Economic Development. Section 4.4.1 states that:

> *"The MASP is a key policy driver which sets out an integrated land use and transportation strategy for the sequential development of the Dublin Metropolitan Area.*
>
> *The Dublin Metropolitan Area includes the highly urbanised settlements of Maynooth,* ***Leixlip****, Celbridge and Kilcock which have strong connections to Dublin City and County. A Metropolitan Area Strategic Plan is included in the RSES.* ***Strategic Development Areas have been identified at key nodes along high-quality public transport corridors in tandem with the delivery of infrastructure and enabling services.*** *Maynooth,* ***Leixlip****, Celbridge and Kilcock are located along the North-West corridor. In Maynooth, a new research & technology park adjoining Maynooth University has been identified for strategic economic development. I****n Leixlip, the former Hewlett***

RECEIVED 18/07/2023

Packard site and Collinstown site have been identified as strategic employment areas.

The focus is on achieving critical mass in the Metropolitan Area Strategic Plan (MASP) area (Maynooth, Leixlip, Celbridge and Kilcock)."

[Our emphasis.]

Section 4.4.5 further notes Leixlip as a Self-Sustaining Growth Town and states:

*"Newbridge, **Leixlip**, Kildare and Athy are designated as **Self-Sustaining Growth Towns in the County's Economic Development Hierarchy**. The RSES defines these towns as those with a moderate level of jobs and services, which **adequately cater for the people of its service catchment with good transport links and capacity for continued commensurate growth**."*

[Our emphasis.]

Section 4.10 discusses Foreign Direct Investment (FDI):

*"Kildare has a proven track record as an outstanding area to establish and develop a multinational business. The new gains will come from **expansions of the existing base of foreign companies and new arrivals.** Kildare is already an established base location for global brands seeking guaranteed and unfettered access to the EU single market, the largest market globally with 500 million.*

*The Council has a solid corporate base with Kerry Foods, Intel, **Hewlett Packard**, Pfizer and Green Isle all based in Co. Kildare however it is **still committed to facilitating the County to be more attractive to further inward investors (FDI and indigenous) by working to ensure needs-based services and infrastructure around the County and a renewed focus on our skilled talent pool**."*

[Our emphasis.]

The Kildare County Development Plan 2023-2029 contains several polices regarding the County's economic development. These include:

*"RE O26 Continue to **support and develop the Self-Sustaining Growth Towns of** Newbridge and **Leixlip as an attractor but not limited to Biotechnology, ICT, professional services, High-tech manufacturing and research employment**. Kildare County Council will work with Irish Water and other agencies to ensure the delivery of key infrastructure to facilitate future development."*

*"RE O30 Co-ordinate the delivery of strategic infrastructure including **pedestrian and cycle linkages within Leixlip and between Leixlip and the Greenway, Intel, Celbridge** and Lucan in a manner which supports future development and population growth."*

RECEIVED: 18/07/2023

"RE O54 ***Support existing FDI large industrial companies in sustaining and expanding their businesses at appropriate locations****"*

[Our emphasis.]

The Kildare County Development Plan 2017-2023 states that it is an Objective (RE014) to:

"Work with EirGrid and ESB Networks to support the provision of a resilient electricity supply and distribution system ***to accommodate the future economic growth of the county and to facilitate the transition of heat and transport from fossil fuels to electricity****."*

[Our emphasis.]

Refer to the TPA Planning Report submitted with the Planning Application for a more detailed outline of applicable policies and objectives.

Leixlip LAP (extended to 2026)

The Leixlip LAP came into effect on 5th February 2020 and sets out an overall strategy for the proper planning and sustainable development of Leixlip in the context of the Kildare County Development Plan 2017-2023 (now the 2023-2029 Plan).

The LAP includes the subject site and the wider Liffey Business Campus. The LAP includes numerous broad policy objectives of relevance in regard to the subject site and the wider environs with the following of particular relevance:

"Policy S3 To promote, support and enable sustainable economic development and employment generation in Leixlip consistent with its role in the hierarchy of employment set out in the Kildare County Development Plan 2017-2023 and optimising its strategic location along a key public transport corridor as identified in the Metropolitan Area Strategic Plan".

Support for employment generating uses on land zoned within the Campus is strongly promoted by the County Development Plan and subsequently the LAP.

Section 6.2.1 of the LAP relates to the 'Supporting Employment Growth' within the plan area and has identified that the Kildare innovation Campus (the subject campus) is currently underutilised with a significant level of vacancy.

The Plan notes that:

"given the size and scale of the ***former HP campus it is an objective of the Council to work with local and national agencies to ensure the site can be redeveloped in an appropriate manner and remain a key employment hub for Leixlip and the Dublin Metropolitan Area****".*

RECEIVED 18/07/2023

[Our emphasis.]

Section 8.3 of the LAP relates to 'Road and Street Network'. The LAP identifies the opportunity to create enhanced connectivity in the vicinity of the LBC and includes the following relevant policy objective:

> *"Policy MT3.12 To investigate the feasibility of a new link road from the Celbridge Road (R404) to the south of the M4 connecting to the M4 Leixlip/Celbridge Interchange in consultation with TII, NTA and other stakeholders."*

The proposed development has been designed with a public link road along the northern side of the site in direct response to this policy objective. The new link road will enable public access from Celbridge Road in the east to the M4 Leixlip/Celbridge Interchange in the west, significantly reducing trip times and potential traffic congestion in the surrounding area. The new link road will be delivered in phase 1 of the development and will be a significant public benefit.

The LAP identifies the historical link between Castletown House and the Wonderful Barn. In this regard the LAP includes the following policy objectives and Actions to enhance the connection between the both:

> ***"Policy EDT3.8** To support development of linkages between historical demesne lands within and around the town to promote amenity linkage."*
>
> *Actions*
>
> - *To liaise with relevant landowners and stakeholders to investigate the potential for linkages between the historical demesnes within Leixlip and surrounding area.*
>
> ***Policy MT1.11** To support the delivery of a pedestrian and cycle overpass of the M4 to link The Wonderful Barn at Leixlip to Castletown Demesne in Celbridge in consultation with Transport Infrastructure Ireland (TII)."*

In this regard the proposed development has been appropriately designed to take account of the LAP's aspirations as well as enabling future connection to Castletown Demesne.

[Our emphasis.]

Meath County Development Plan 2021-2027

The EirGrid uprating outlined as forming part of the facilitation works will in part include existing overhead lines that connect back to the Kinnegad and Dunfirth Substations in County Meath. The MCC Development Plan recognises the importance of the electricity network in supporting high-end enterprise and notes at Section 6.15.4.1 of the CDP that:

> *"**the strengthening of the national grid is important for a number of reasons including improving security of supply for** the domestic, residential and **enterprise***

RECEIVED: 18/07/2023

> ***market aswell as attracting high end enterprise*** *which often require significant energy capacity and reliability."*
>
> [Our emphasis.]

Offaly County Development Plan 2021-2027

The EirGrid uprating outlined as forming part of the facilitation works will in part include existing overhead lines that connect back to the Derryiron Substation in County Offaly. The OCC Development Plan recognises the importance of an improved electricity network and notes at Section 3.3.1 of the CDP that:

> *"**The Council recognises that essential future upgrades are required to the electricity grid** in the midlands as outlined in Eirgrids Tomorrow's Energy Scenarios 2019 System Needs Assessment **and will support Eirgrid in future Programmes identifying grid solutions, in both infrastructural and technological terms**, in order to facilitate the electricity targets, set out in the Government's Climate Action Plan 2019 and the National Energy and Climate Plan 2021-2030."*
>
> [Our emphasis.]

Government Strategy on the Role of Data Centres in Ireland's Enterprise Strategy" (July 2022)

The statement, prepared by the Department of Business, Enterprise and Innovation outlines the role data centres play in Ireland's ambition to be a digital economy hot-spot in Europe. It states that:

> *Data centres directly contribute to job creation and they also generate significant added economic benefit by providing a range of services to other firms that undertake production, research and development, marketing, sales, service, and support activities in locations with no physical/geographic connection to the data centre.*

The document acknowledges that, as large consumers of electricity, data centres also pose particular challenges to the future planning and operation of a sustainable power system. The Government recognises these challenges and will take steps to mitigate them through a plan-led approach.

3.2.2 Development Proposals Alignment with the relevant Objectives and Polices

As set out in the Planning Report prepared by TPA, it is considered that the proposed development for which consent is being sought accords with the land zoning objectives and vison for the lands as set out within the Kildare County development Plan and Leixlip Local Area Plan. Relevant Objectives and Policies are set out in individual Chapters of this EIAR.

RECEIVED: 18/07/2023

3.3 Projects for Cumulative Assessment

Cumulative effects consider the impacts of other undeveloped permitted or planned projects within the vicinity and context of the project. This will include other projects planned by the developer, and any known permitted or planned projects by third parties. The following section details the process followed to identify those plans or projects with the potential to result in significant cumulative effects when considered in combination with the proposed Project.

The cumulative impact of the planned projects on site, the project and the potential future development of the surrounding environment has been considered in Chapter 18 (Interactions & Cumulative Impact), to the extent possible having regard to the nature of the relevant plans and projects.

TPA have used Geographic Information System (GIS) planning application data to obtain a list of all projects within 5 km[1] of the site that have been granted planning permission in the last 10 years[2] and which either are unbuilt and have extant permission or are under construction. The list has been filtered down to exclude minor projects[3] that are unlikely to interact with the Project to any level of significance. The final list provided to each consultant is included as Appendix 1.1.

The intent of including the appendix is to provide the Planning Authority with context by outlining the relevant existing or permitted plans or planned projects that could give rise to likely cumulative effects in combination with the project. As per the EPA guidance, a principal purpose of cumulative assessment is to consider whether minor effects of projects can cumulate to significance. The guidance states the following:

> *Cumulative Effects: The addition of many minor or insignificant effects, including effects of other projects, to create larger, more significant effects. While a single activity may itself result in a minor impact, it may, when combined with other impacts (minor or insignificant), result in a cumulative impact that is collectively significant. For example, effects on traffic due to an individual industrial project may be acceptable; however, it may be necessary to assess the cumulative effects taking account of traffic generated by other permitted or planned projects*

Appendix 1.1 has been used in the consideration of cumulative effects of the project and the planned / approved land uses in the vicinity of the site. The following 5 no. related projects have been identified to be the most likely to act in cumulation with the project and to be considered as part of the cumulative assessment:

1. Permitted development of 4 No. substations at the Kildare Innovation Campus.

[1] The chosen radius of 5km was considered to be a conservative estimate of the area within which other permitted or planned projects could potentially result in cumulative effects, given the nature and scale of the proposed development.
[2] Standard planning permission is valid for a period of 5 years. Applicants may seek a 10-year permission or may extend the life of a standard permission up to 10 years.
[3] Planning applications for minor alterations or extensions to existing private dwellings.

RECEIVED: 18/07/2023

2. Permitted redesign of the Barnhall Rugby Club entrance.
3. Planned regeneration of the Wonderful Barn lands by Kildare County Council.
4. Proposed Glenveagh development at Celbridge East. (Kildare Planning Ref. 23/513)
5. Potential Future District Heating Network

These projects have been considered within the assessment of each environmental factor's cumulative impacts along with those projects identified in Appendix 1.1.

Development of 4 No. substations at the Kildare Innovation Campus

The developer received permission (Reg. Ref. 22/1096) for development of 4 No. 20 kV ESB double substations at four sites of c. 591 sq m in total (Site 1, c. 138 sqm adjacent to Building 4; Site 2, c. 138 sq m adjacent to Building 2 and Building 5; Site 3, c. 138 sq m adjacent to Building 5; and Site 4, c. 177 sq m partially within Building 9) at the Kildare Innovation Campus (principal works site).

The development will consist of: the construction of 3 No. standalone ESB double substations and associated LV switch rooms (Substations No. 1-3) of c. 3 m in height, c. 4.8 m in depth, and c. 17.8 m in width, with an individual gross floor area of 57.5 sq m; and all associated works above and below ground.

Substation No. 4 (gross floor area of 57.5 sq m) will include: internal alterations to the existing Campus Building No. 9; associated LV switch rooms; the removal of existing louvre and replacement with substation access doors on the southeast elevation; access path; and all associated works above and below ground.

The cumulative gross floor area of the development will be 230 sq m. The development of the four number substations is required for the existing campus buildings regardless of the project subject to this EIAR and is in the early stages of progressing post planning permission being granted.

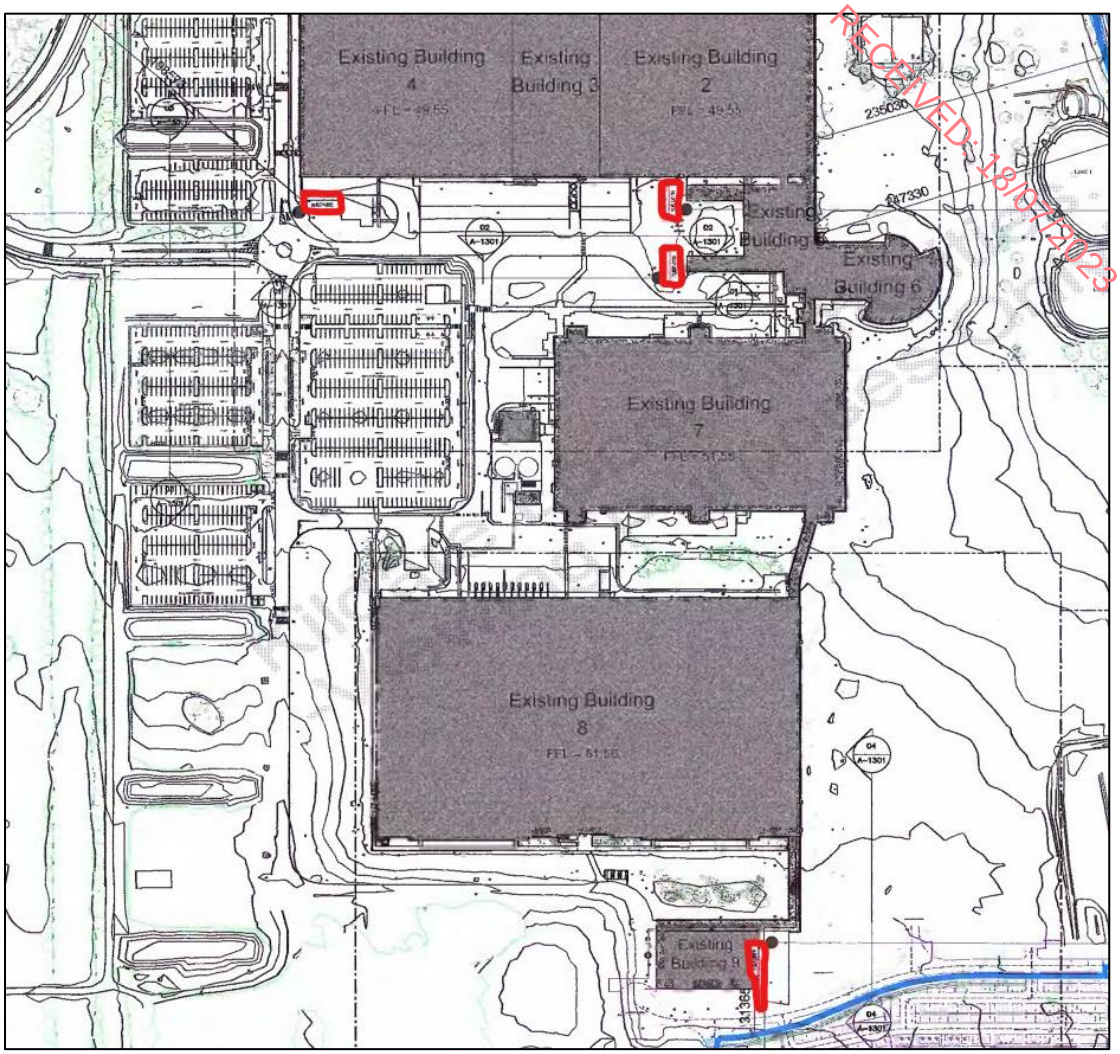


Figure 3.5: 4 No. 20 kV substations Site Layout Plan. (Source: RKD.)

We note that Building 9 is proposed to be demolished in the Project associated with this EIAR, which would house permitted substation No. 4 described above. Consequently substation no. 4 would no longer be required after that time as it was intended to serve buildings 7, 8 and 9. The other substations would remain as proposed within Reg. Ref. 22/1096 as they are required for Buildings No.1-6. No significant impacts are likely to arise between this and the subject project as the suitability of the permitted substations has already been assessed.

Redesign of the Barnhall Rugby Club entrance

Barnhall Rugby Football Club received permission (Red. Ref. 21/730) for development of the construction of a new vehicle access to the rugby club inclusive of associated pedestrian footpaths; modification to the rugby club's existing vehicle access to replace it with a shared pedestrian and cycle access and the provision of a raised pedestrian/cycle crossing on Barnhall Road; the expansion of the existing car park for the rugby club to accommodate 38 No. surface car parking spaces as well as hard and soft landscaping and all ancillary works including boundary treatments, site excavation and development works above and below ground.

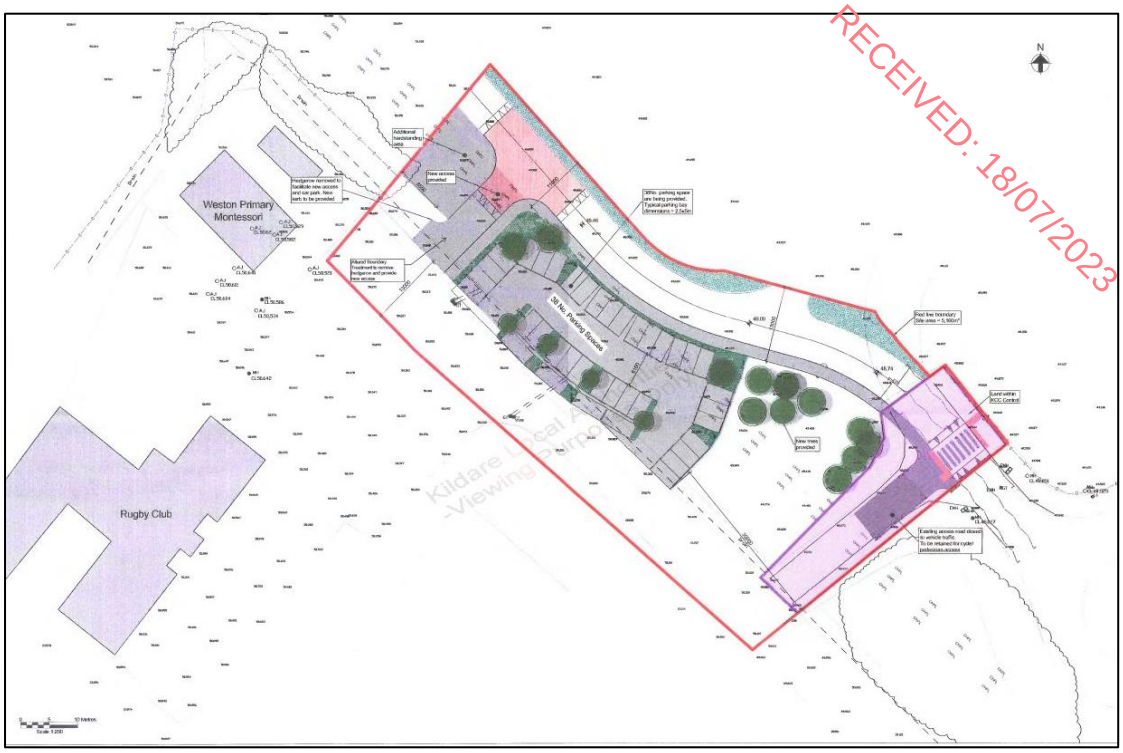


Figure 3.6: Barnhall Rugby Club entrance Site Layout Plan. (Source: ARUP.)

That proposal has been incorporated into the design of the subject project where the red lines overlap. Interactions between both projects are not likely to result in significant impacts.

Regeneration of the Wonderful Barn lands by Kildare County Council

The regeneration of the Wonderful Barn lands by Kildare County Council is a reasonably foreseeable project that may have cumulative effects in combination with the project associated with this EIAR.

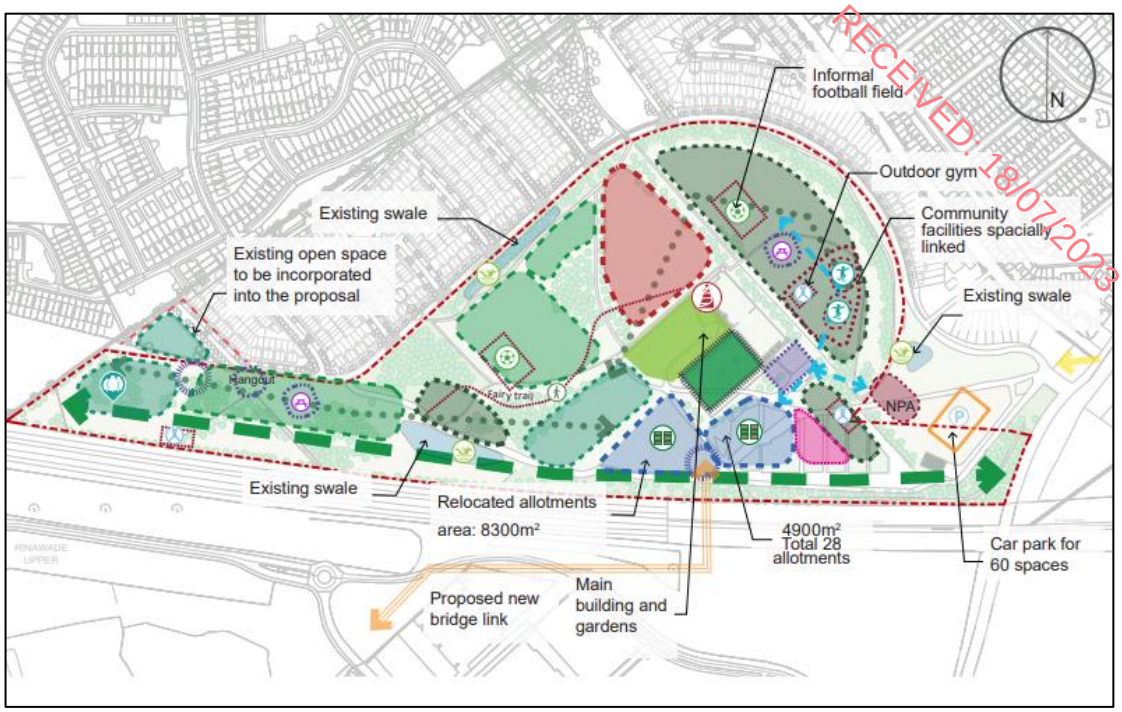
It is at an early stage in the design process with preliminary design options being considered.



Figure 3.7: Wonderful Barn lands redesign option 1. (Source: Aecom.)



Figure 3.8: Wonderful Barn lands redesign option 2. (Source: Aecom.)



RECEIVED: 18/07/2023

Figure 3.9: Wonderful Barn lands redesign option 3. (Source: Aecom.)

This project is likely to interact with the project as it relates to lands which are connected to the pedestrian and cyclist link over the M4 motorway to the north of the principal site.

The KCC public consultation homepage, which includes preliminary design reports, can be found at the following link:

https://kildarecoco.ie/AllServices/Planning/PublicRealm/TheWonderfulBarn/

That project and the subject project are likely to interact positively with the M4 overpass link bridge identified in all 3 options above (and within the Leixlip LAP), likely resulting in an overall significant positive impact on the connectivity and amenities of the area. The Wonderful Barn project in combination with the M4 overpass will contribute to the creation of a network of open spaces in the area by facilitating future connectivity to the Castletown Estate.

Glenveagh Development at Celbridge Road East KDA

The Celbridge East KDA is located diagonally north-east of the Kildare Innovation Campus and opposite the entrance to the Barnhall Meadows estate and the commencement of the pedestrian pathway and cycleway as proposed as part of this project.

The Leixlip LAP has identified the Celbridge Road East KDA as including *'New Residential/Open Space and Amenity lands connecting Leixlip Demesne and Main Street located to the east of Celbridge Road'*. Furthermore, the LAP notes *'This KDA measures approximately 12.8ha in area and provides for 8ha of 'Residential' zoned lands alongside a new community park and amenity walk'.*

RECEIVED: 18/07/2023

The KIC masterplan has been designed to be cognisant to the future development of the Celbridge KDA lands and provides opportunity for future pedestrian, cycling and district heating connections.

A planning application has recently been submitted to KCC for the development of these lands and has been included in the cumulative assessment set out within this EIAR (Kildare County Council Planning Reg. Ref: 23/513). A decision on the application is due on 8th August 2023.

If permitted there is potential for positive interactions with the KIC proposed development through the provision of energy efficient district heating and connectivity to promote active travel among future residents of the area.

Future District Heating Network

Whilst the proposed project is not dependent on the future development of a district heating network beyond KIC, it will facilitate its future development by providing for the in-ground infrastructure within the campus lands up to the boundary or in close proximity to the Celbridge East KDA lands, Castletown Estate. Future projects in the area that wish to avail of district heating will therefore benefit from the proposed development, the cumulative effect of which will be more efficient, cost effective and environmentally friendly heating solutions in future local developments.

RECEIVED: 18/07/2023

4.0 EXAMINATION OF ALTERNATIVES

4.1 Introduction

This chapter of the *Environmental Impact Assessment Report* was prepared by Gavin Lawlor and Brian Minogue of Tom Phillips & Associates and examines the alternative development options that were considered for the subject site during the design development process.

Gavin Lawlor is a Director of Tom Phillips + Associates. He holds a BA (Social Science) from University College Dublin, where he graduated in 1995 with a Masters in Regional and Urban Planning (MRUP) Degree and is a Full Member of the Irish Planning Institute (IPI) with 25 years' experience. Brian Minogue is a Member of the Irish Planning Institute and has been practicing as a town planner for over 15 years. Brian holds an undergraduate degree in Spatial Planning (Hons), (2007) DIT.

The requirement to consider alternatives within an EIAR is set out in Annex IV (2) of the EIA Directive (2014/52/EU) and in Schedule 6(1)(d) of the *Regulations,* which require the following information to be included:

> "*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 options chosen, taking into account the effects of the proposed development on the environment*".
>
> [Our emphasis.]

Reasonable alternatives may relate to project design, technology, location, size and scale which were studied in the preparation of the EIAR relevant to the proposed development and its particular characteristics, together with an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.

The EU Commission guidance *Environmental Impact Assessment of Projects – Guidance on the Preparation of the Environmental Impact Assessment Report* (EU Commission, 2017) considers that for alternatives to be reasonable they must be *"…able to accomplish the objectives of the Project in a satisfactory manner, and should also be feasible in terms of technical, economic, political and other relevant criteria."*[1] The guidance then goes on to set out some key reasons why an alternative may not be considered reasonable:

- *There are technological obstacles: high costs of a required technology may prevent it from being considered to be a viable option, or the lack of technological development may preclude certain options from consideration;*
- *There are budget obstacles: adequate resources are required to implement Project Alternatives;*
- *There are stakeholder obstacles: stakeholders opposed to a Project Alternative may make a particular option unattractive;*

[1] *Environmental Impact Assessment of Projects – Guidance on the Preparation of the Environmental Impact Assessment Report* (EU Commission, 2017) at page 52

RECEIVED: 18/07/2023

- *There are legal or regulatory obstacles: regulatory instruments may be in place that limit/prohibit the development of a specific Alternative.*[2]

The *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment* of August 2018 provide further guidance on this matter as follows:

> "*The types 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*".

The *EPA Guidelines on the information to be contained in Environmental Impact Assessment Reports (EIAR)* of March 2020 provide further guidance on this matter as follows:

> *"The presentation and consideration of the various **reasonable alternatives** investigated by the developer is an important requirement of the EIA process".*

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

4.2 Rationale for the Proposed Development

The primary rationale for the proposed development is to provide for the redevelopment/regeneration of an underutilised business and innovation campus to encourage Foreign Direct Investment and maximise economic value in line with the landowners area of expertise in ICT and Deep Tech Innovation. This is fully supported in national, regional and local planning policy. In this regard, the *National Planning Framework 2040 - Our Plan (2018)*, classifies County Kildare as being in the 'Mid-East' and it states within that region that there must be:

> *"a greater focus on addressing employment creation, local infrastructure needs".*

A number of the National Policy Objectives relate to employment development. These include, inter alia:

National Policy Objective 10b:

> *"Regional and Local Authorities to identify and quantify locations for strategic employment development, where suitable, in urban and rural areas generally."*

National Policy Objective 11:

> *"In meeting urban development requirements, there will be a presumption in favour of development that can encourage more people and generate more jobs and activity*

[2] *Ibid.*

RECEIVED: 18/07/2023

> *within existing cities, towns and villages, subject to development meeting appropriate planning standards and achieving targeted growth."*

The aims and objectives of the NPF with regard to the Eastern and Midland region are clear in their focus on the importance of sustainable employment provision.

Furthermore, identification of Leixlip with a lower ratio of jobs:resident workers provide overarching support for the generation of employment within the Leixlip area. In that regard, the development proposed will further develop an existing business campus, that is zoned for development and currently underutilised. This will further enhance the provision of employment in a location that is already the focus of similar employment generating uses.

The subject land is zoned and well serviced, ensuring positive compliance with the overarching themes of the NPF.

The Strategic Vision of the Regional Spatial & Economic Strategy (RSES) for the Eastern and Midland Region is:

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

County Kildare falls under the sub-catchment of "Eastern Region" and the strategic catchment area surrounding Dublin known as the "Core Region":

> *"The Core Region contains a strong network of county and market towns that have a good level of local employment, services and amenities, which serve not just their resident populations but a wider catchment area."*

Section 4.2 of the RSES lists the subject site within the Metropolitan area of Dublin, the vision statement of which is to:

> *"build on our strengths to become a smart, climate resilient and global city region, expanding access to social and economic opportunities and improved housing choice, travel options and quality of life for people who live, work, study in or visit the metropolitan area."*

Table 5.1 specifically mentions the subject site (former Hewlett Packard Site) as a strategic development area to "strengthen employment base for North Kildare".

The role of Leixlip in terms of strategic employment development is noted in Table 5.2 of the RSES 2019-2031. It identifies the employment lands in Leixlip and their potential as follows:

> *"Large scale former **Hewlett Packard site** and Collinstown site for **regional enterprise to strengthen employment base for North Kildare**."*

[Our emphasis.]

Specific to Kildare and the Hewlett Packard site, section 4.10 of the Kildare County Development Plan 2023-2029 discusses Foreign Direct Investment (FDI):

RECEIVED: 19/07/2023

"Kildare has a proven track record as an outstanding area to establish and develop a multinational business. The new gains will come from ***expansions of the existing base of foreign companies and new arrivals.*** *Kildare is already an established base location for global brands seeking guaranteed and unfettered access to the EU single market, the largest market globally with 500 million.*

The Council has a solid corporate base with Kerry Foods, Intel, ***Hewlett Packard****, Pfizer and Green Isle all based in Co. Kildare however it is* ***still committed to facilitating the County to be more attractive to further inward investors (FDI and indigenous) by working to ensure needs-based services and infrastructure around the County and a renewed focus on our skilled talent pool****."*

[Our emphasis.]

Additional to encouraging Foreign Direct Investment, the development seeks to provide for a connected innovation hub for global leaders in science and technology and to connect those global leaders with third level institutions, in particular Maynooth University which offers graduates and a knowledge base to prospective employers in Kildare. Objective RE O20 of the Kildare County Development Plan 2023-2029 seeks the creation of:

"Further ***key linkages and partnerships with Maynooth University (MU)*** *including the branding of the area as a centre of excellence in the knowledge-based economy."*

[Our emphasis.]

The development further seeks to improve the physical connectivity of the site with the surrounding lands to improve mobility for sustainable modes of transport from Leixlip to Celbridge. The Leixlip Local Area Plan (LAP) states that:

*"****It is the policy of the Council to promote enhanced permeability for pedestrians and cyclists*** *within the urban environment in order to improve access to the town centre, local schools, recreational facilities, shops, public transport services and other amenities. This includes providing improved connectivity across the River Rye, Royal Canal and railway line, and* ***enhanced links with*** *Maynooth,* ***Celbridge*** *and Dublin."*

[Our emphasis.]

4.3 Alternatives Studied

EIA legislation and prevailing guidelines and best practice require that Environmental Impact Assessment Reports consider the following aspects for EIA projects with regard to their environmental effects;

- Do Nothing alternative;
- Alternative project locations;
- Alternative designs/layouts;
- Alternative processes;
- Alternative mitigation measures.

RECEIVED: 18/07/2023

The reasonable alternatives studied during the development of the project comprise alternative site layouts and design solutions (as well as processes) for the redevelopment of the former HP lands to provide *inter alia* employment development on the site, in accordance with national, regional and local planning policy.

4.3.1 "Do-Nothing" Alternative

In the "Do-Nothing" scenario, the former HP lands would continue to operate as an innovation campus and the potential to maximise development opportunities for the site to provide for *inter alia* a strengthened employment base for North Kildare, in accordance with national, regional and local planning policy, would not be realised. The "Do-Noting" alternative would not meet the projects objective to provide for the redevelopment/regeneration of an underutilised business and innovation campus to encourage Foreign Direct Investment and employment generation in Ireland and Kildare, was not considered a reasonable alternative and was not therefore considered further. The impact of the Do-Nothing scenario has been considered in each chapter of the EIA Report.

4.3.2 Alternative Site Location

The developers are primarily property investors who invested in KIC for its existing portfolio of tenants and to improve and expand the potential of the site, encourage investment and the maximisation of the economic return.

Prior to the purchase of the site by the current landowners a wide variety of general environmental and economic criteria were considered, the key criteria for the location of the proposed development were;

- Availability of a high-quality telecommunications fibre network;
- Accessibility to the natural gas network (to provide dispatchable energy in line with government policy);
- Availability of a high-quality and existing electricity network (to provide direct connection to the national grid and mix of renewables);
- Availability of a suitably large site with suitable development zoning;
- A site in proximity to existing high density of US and global tech companies;
- Existing campus development with potential to expand with high-tech and ICT uses;
- Low natural disaster risk particularly in relation to flooding.

Given the project comprises the redevelopment of the former HP lands and an existing campus, which national, regional and local planning policy specifically promotes as being ripe for redevelopment, the further consideration of alternative locations for employment generating uses is not considered relevant in this instance.

The site has a history of redevelopment including when, in 1995, planning permission was granted for a semi-derelict meat packing facility to be redeveloped as an ink-cartridge manufacturing plant for Hewlett Packard.

RECEIVED: 18/09/2023

That Hewlett Packard facility – which has been expanded over the years – has now itself become surplus to requirements and has received new tenants (HP Enterprise has retained some occupancy but no HP manufacturing activities are involved).

The site is not being used to its full potential and, according to *inter alia* the National Planning Framework, development should be prioritised on vacant or underutilised brownfield sites instead of on undeveloped greenfield sites that encourage sprawled development.

Furthermore, as the developer has purchased a site earmarked for redevelopment, there are no other alternatives sites that the developer can realistically consider.

4.3.3 Alternative Site Layout and Land Use

Prior to the purchase of the site by the existing landowner, the then project team commenced a master planning process, so that the future development of the campus could be delivered in an integrated manner. The master planning process has been one that has evolved over several years and one that has involved numerous meetings and discussions with relevant stakeholders including the local planning authority.

As noted in section 1.6, the Project Team has had strategic engagement with a number of stakeholders including Kildare County Council, IDA Ireland and Kildare Chamber of Commerce.

Over the last several years, various development options have been explored and environmental factors have been considered.

At the outset, the project architects undertook an extensive site appraisal, which was aimed at determining the appropriate scale, mass and layout of this scheme.

The initial analysis included an assessment of:

- Existing Buildings: 9 No. Existing Linked Buildings ranging up to 21 m in height, containing manufacturing, office, distribution, welfare and utilities, c. 1,570 parking spaces and clad externally in a system of modular insulted metal panels and glazing.

- Site Access: Primary access via M4 Junction 6 and the R449 (Barnhall Road), secondary access via 2 No. entrances from the R404 (Celbridge Road), and existing security huts at entrances.

- Connections: Currently there is an access-controlled route through the site connecting the R449 Barnhall Road to the R404 Celbridge Road. The Leixlip LAP contains a stated objective to provide a future link road between the R449 and the R404. There is also an important visual connection through the site by way of a protected view corridor lined with trees giving views from Castletown House to the west and the Wonderful Barn to the north.

- Site Profile: Extensive frontage to the M4 and the Celbridge Rd provides potential public profile, but the boundaries are currently heavily planted and screened.

- Site Levels: Site is generally flat, however, there is a slight fall from northwest to east.

RECEIVED: 18/07/2023

- Adjoining Lands/Uses: Castletown Demesne is to the West, separated by dense woodland. Barnhall Rugby Club is to the South including a small primary Montessori school. There is a small number of existing residences on the other side of Celbridge Rd. To the east of the site.

The proposed masterplan[3] for the site has been informed by national, regional and local planning policies, in particular the Leixlip LAP 2020-2023. A number of design options were thereafter developed for the site and are depicted below.

'2019 Plan'

The '2019 Plan' was developed by the previous landowner, with principally the same project team. The objectives of the landowner, at the time, sought to establish what uses would be acceptable for the site.

The over-riding issues identified during the design phase related to the uses proposed, particularly the need for 'employment generating uses', phasing and the provision of a roads objective and a pedestrian bridge required by the Leixlip LAP.

Design of the development progressed to provide 13 No. new buildings on site in addition to the existing buildings already on the campus. This included the DB Schenker logistics facility, which would later form a separate planning application.

The 2019 plan also provided for a road, which would run through the View Corridor from Castletown House in Celbridge. The 2019 plan primally consisted of 12 No. buildings in seven different typologies. All buildings were single storey with an overall maximum height of 16.9 m. The buildings were generally located around a proposed 'loop road', which circumnavigated the campus. The view corridor from Castletown House towards the Wonderful Barn was to be retained as is and a link road would be located west of the corridor of trees.

[3] The masterplan refers to all works subject to the application for consent, described on the public notices and included within the 'redline' boundary on the Site Layout Plan

RECEIVED: 18/07/2023

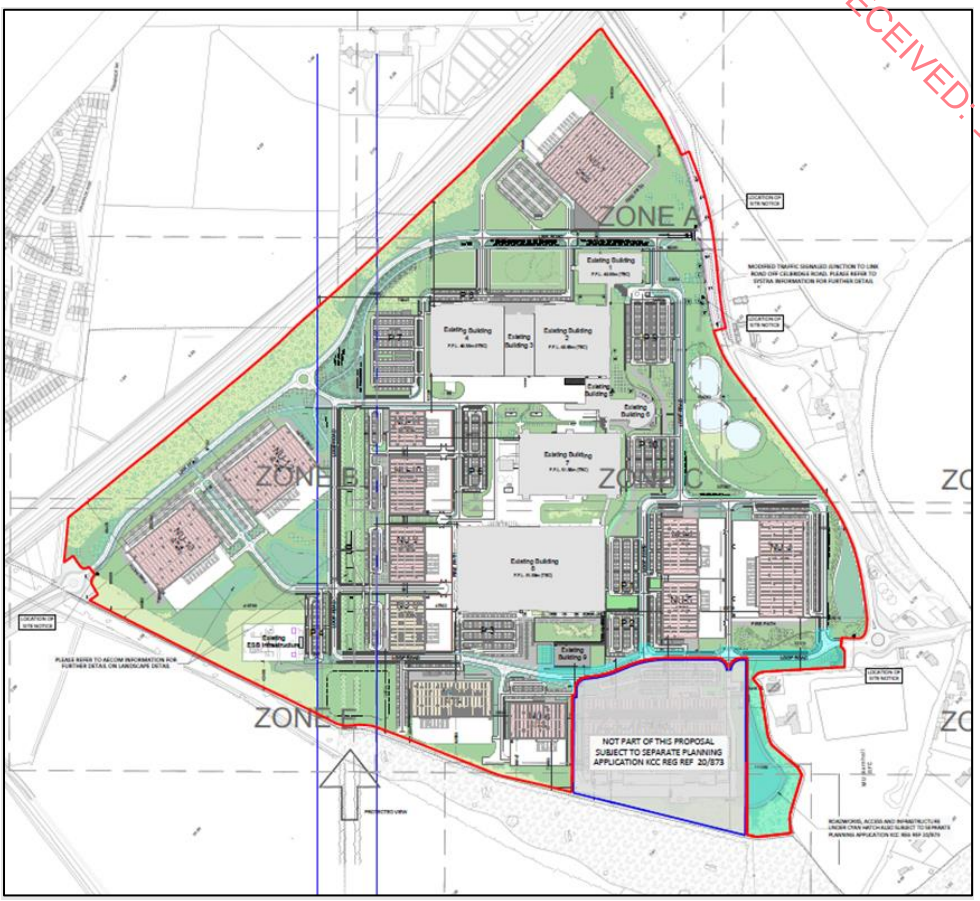


Figure 4.1: '2019 Masterplan'. (Source: RKD Architects.)

'2021 - 2023 Masterplan'

With the '2019 Masterplan' prepared (and indicatively submitted as part of the DB Schenker application (Reg. Ref. 20/873), the campus changed ownership; however, the principal project team was retained.

After further review by the new landowner, high end uses were established to align with the objectives of the LAP and to maximise the potential of the site, encourage investment and economic return, focusing on *inter alia* employment generating, deep tech, high-tech, ICT, and research-based uses.

The project design team under the direction of the landowner in conjunction with the project planning consultants (TPA) undertook a comprehensive assessment of the previously prepared 2019 masterplan and sitelayout to maximise its use in terms of both the spatial distribution of the various aspects within the site and the optimal use of the site area.

A number of iterations of site layouts were considered to arrive at the proposed arrangement of buildings, access and site infrastructure. The proposed layout was determined based on the following fundamentals;

- All buildings were to be set back from the M4 motorway and Celbridge Road to align with KCC requirements for building setbacks and maintain the general openness to the campus;

RECEIVED: 18/07/2023

- All buildings to be set back from the designated view corridor to protect the amenity value of the visual link between Castletown Estate and the Wonderful Barn which comprise various national monument and protected structure designations (Refer to Chapter 15 of this EIAR). The visual link will be protected, formalised and enhanced under this application);
- Principal access to the site was to be via the existing Barnhall road entry which provides direct access to the M4. This entrance has been in use for over 20 years and is the most direct route to enter the site. Secondary access to be via the two access points onto Celbridge Road;
- New buildings and roof infrastructure to be no higher than the existing tallest building on site (Building No.7) and to be generally limited to c.18m so to not interfere with the existing historic tree line when viewed from Castletown Estate.
- The proposed energy centre to be located to ensure maximum mitigation of air and noise emissions to off-site receptors;
- The provision of a public access road to be taken in charge by KCC along the northern part of the site with site distribution off the principal public road.
- The location of the buildings at these various locations was considered preferential in terms of minimising the amount of excavation required across the site.

The previous 2019 scheme was reviewed with these principals in mind and a number of iterations were prepared.

Iteration No.1 - Life Science, Data Centre Uses with existing buildings retained

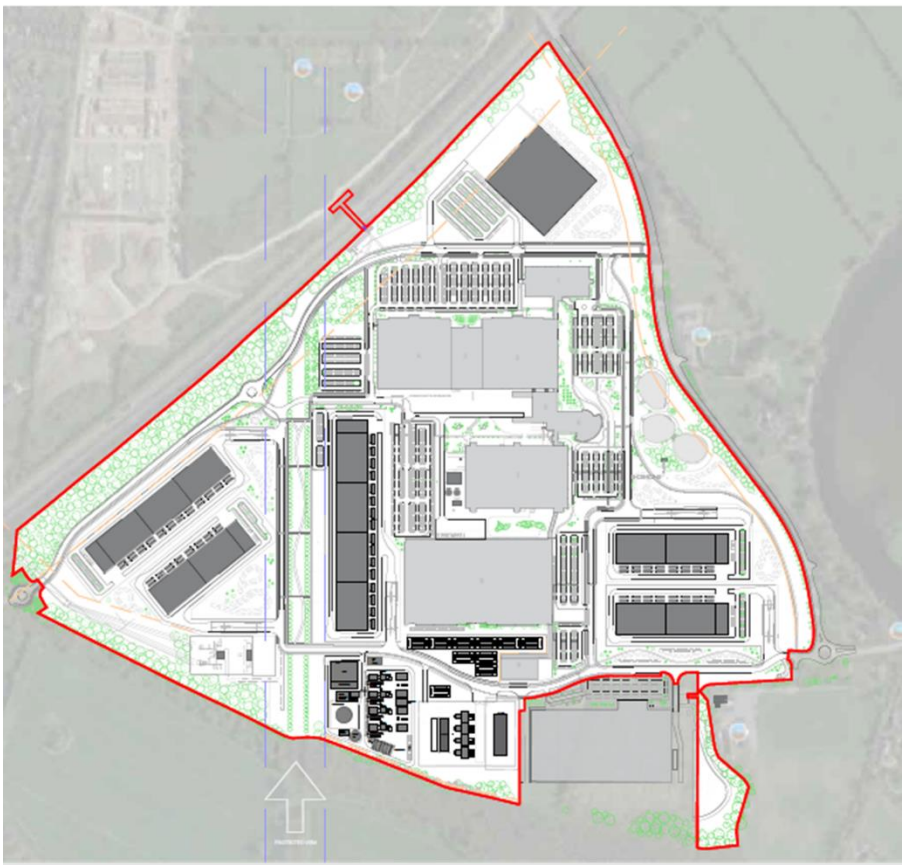


Figure 4.2: 2021-2023 masterplan Iteration No.1 (Source RKD Architects)

RECEIVED: 18/07/2023

The initial iteration of the proposed masterplan included the retention of all existing buildings on site and conversion to life science and technology uses. One new life science building was proposed in the northern corner of the site. A pedestrian/cycle overpass of the M4 was introduced. 5no. New data centres were proposed as well as a new 220kV Substation, battery storage area and energy centre within the southern part of the campus. The proposed public road, site access and circulation remained principally unchanged.

This iteration of the masterplan proposed significant energy infrastructure along the southern boundary of the site. Upon initial review of this proposal, it was determined that it would be difficult to mitigate against the potential for noise impacts to surrounding land uses. In other respects, the potential environmental effects of this iteration would have been largely similar to the current proposal.

RECEIVED: 18/07/2023

Iteration No.2 - Enhanced Life Science, Data Centre Uses with some existing buildings demolished

As part of the design process and further review of the existing vacant buildings on site (Building 7 & 8), it was determined that in achieving the long term vison for the campus buildings no. 7 & 8 would reach the end of their useful life expectancy and would require significant investment and upgrades to be maintained on site and repurposed. As such it was determined that the demolition of Buildings 7, 8 & 9 (energy centre for Buildings 7 & 8) should be demolished in the life of the masterplan. This change created additional space for distribution of proposed uses on site. The iteration also introduced a replacement 110kV Substation adjacent to the existing 110kV Rinawade Substation as the existing substation on site was determined as being close to reaching end of life. A new life science building was proposed in proximity to the Celbridge Road interface and the data centre buildings were re-orientated. All other site infrastructure was generally retained as per the previous iteration with the exception of the internal road network which was altered slightly.

The potential environmental effects of the second iteration of the proposal would have been largely similar to the current project given a similar mix of uses and layouts were included. One specific area of concern, related to the impact on protected view lines of the wonderful Barn, particularly owing to the proposed C3 building. This potential effect was deemed to be significant and this iteration of the masterplan was ruled out.

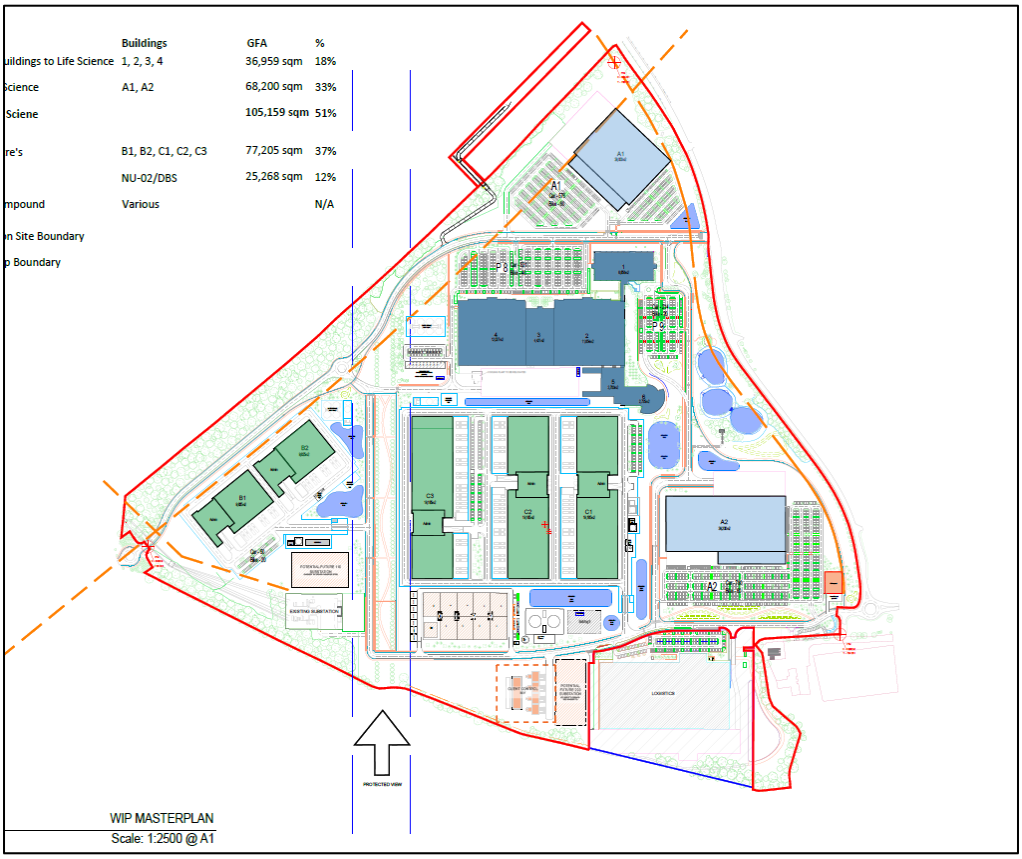


Figure 4.3: 2021-2023 masterplan Iteration No.2 (Source RKD Architects)

Iteration No.3 - Revised Energy Centre location, Substation Requirements and Building Orientation

RECEIVED: 18/07/2023

The Energy Centre, located plan south of the 'C' Buildings in Figure 4.3, was altered to be relocated plan north of the 'C' buildings as seen in Figure 4.4. The location of the energy centre to the centre of the site was considered favourable as it located the energy centre further away from noise sensitive receptors. An acoustic perimeter screen wall was also introduced to provide suitable mitigation.

The configurations of the data centres themselves were also altered to provide greater setback from the protected view corridor and also to meet the relevant design criteria of the data centre end user. Further to this, the end use for the A – Buildings was confirmed by the landowner to be Deep Tech focused rather than Life Sciences. The change of land use is considered to better align with the overall vision for the KIC as it allows for high technology and innovation uses rather than traditional life sciences. The variation required minimal change to the building footprints.

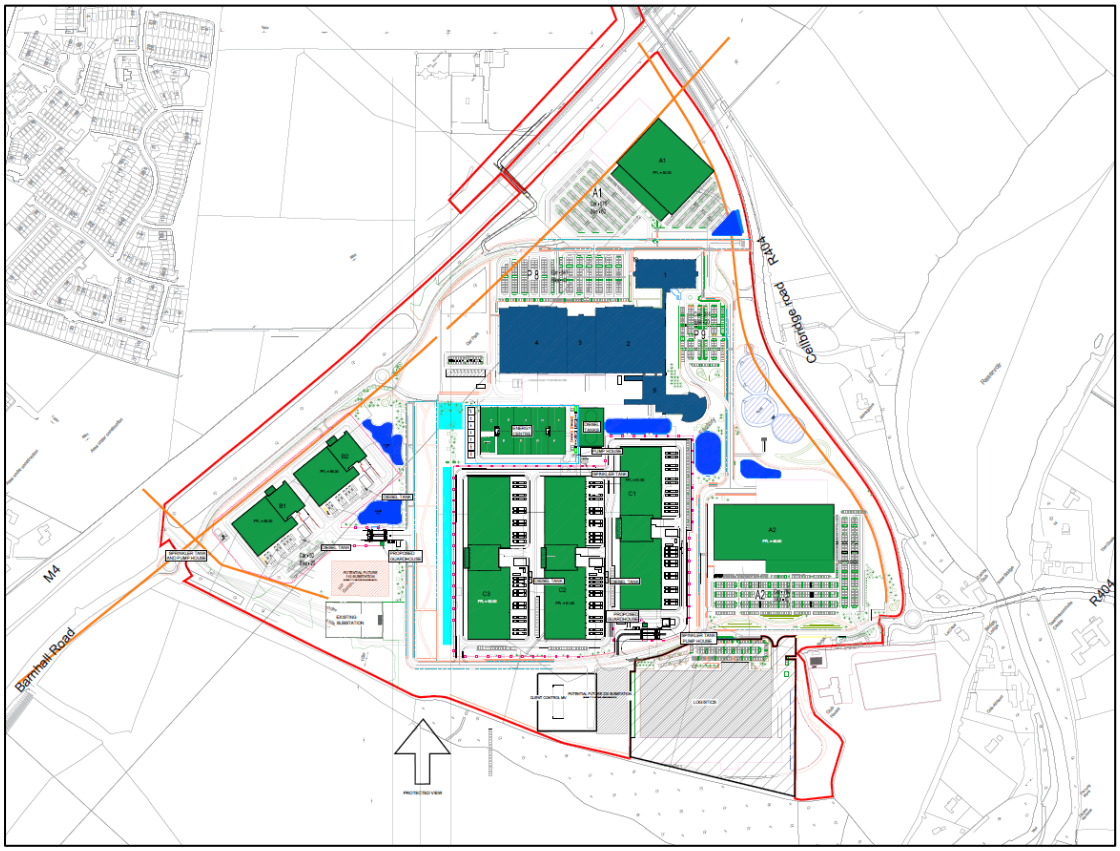


Figure 4.4: 2021-2023 masterplan Iteration No.3 (Source RKD Architects)

The design layout was further altered (Figure 4.5) to reconfigure Building A2 to be positioned fully along the internal loop road and to be positioned further away from Celbridge Road so to provide a more appropriate design response to the campus entry.

Around the same time, the previously proposed 220 kV substation, plan south of the 'C' buildings, was omitted as it became clear that the proposed replacement 110kV substation adjacent to the existing Rinawade substation would have the capability, along with future uprating of EirGrid infrastructure and new gas mains to the site (the facilitation works), to provide sufficient power from the grid and fuel inputs to service the full development. No new grid connections would be required to facilitate the development, rather uprating and

RECEIVED: 18/07/2023

reinforcement of the existing infrastructure would provide sufficient power supply to the campus. As such the 220kV Substation was removed from the masterplan (Refer to TNEI and H&MV Reports – separately circulated and Planning Report by Tom Phillips + Associates).

Iteration No.4- Merging of B Buildings and improvements to tree retention

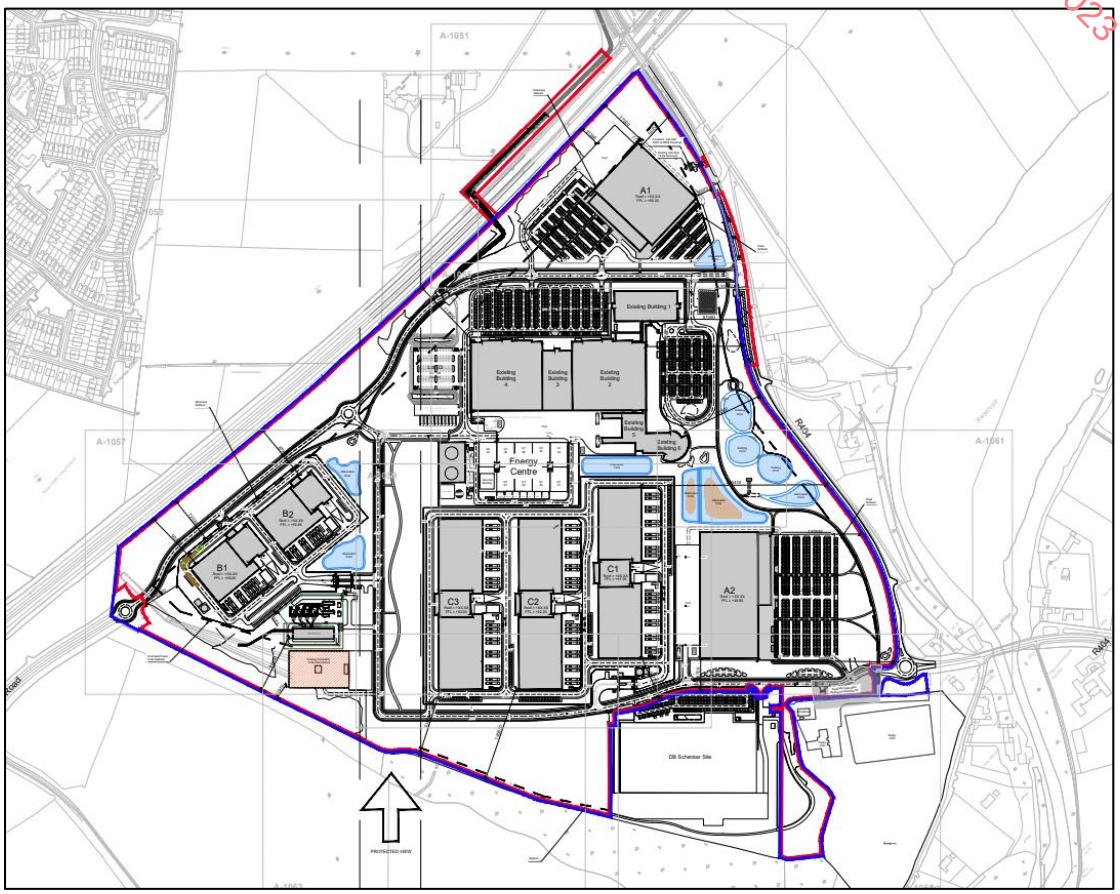


Figure 4.5: 2021-2023 Masterplan Iteration No.4 (Source RKD Architects)

The last significant alteration to the masterplan came with the merging of buildings B1 and B2 into one single building as a result of the revised approach to grid connection and ability to consolidate to B Buildings. This layout was also modified where possible in order to preserve trees assessed as being of 'Moderate' to 'High' ecological value which has resulted in the retention of 8 no. trees, including 4 no. Oak, 2 no. Lime, 1 no. Beech and 1 no. Sycamore the majority being located in proximity to the proposed B Building and adjacent to the proposed main carpark along Celbridge Road. This layout is as per the final submitted proposal.

RECEIVED: 18/07/2023

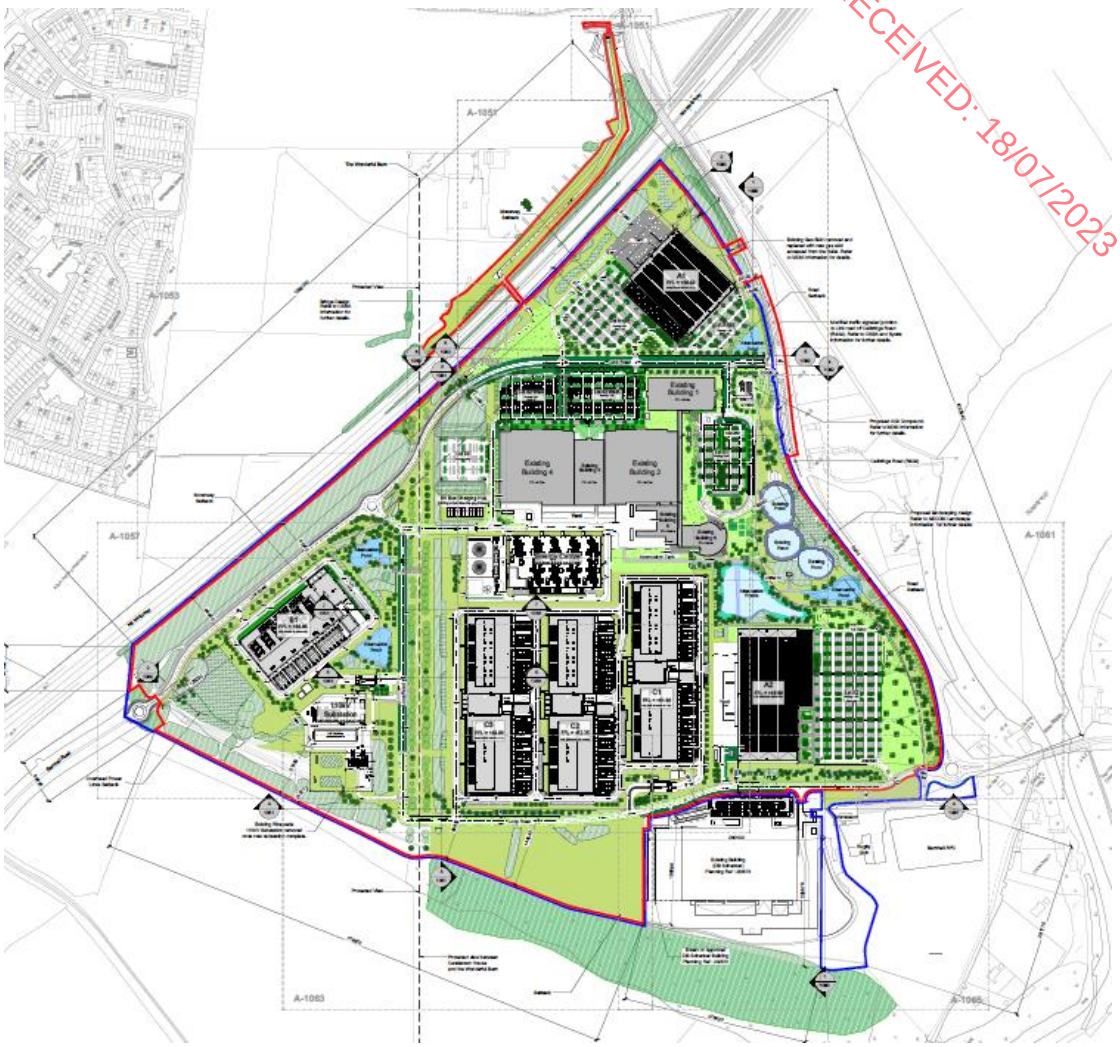


Figure 4.6: Final Site Layout Plan (Masterplan). (Source: RKD Architects.)

Overall, the environmental impacts of the proposed layout and design are considered to be similar in nature to the '2019 Masterplan' and subsequent iterations identified above, with similar amounts of excavation and similar construction activities proposed, as well as similar building scales, heights and overall similar visual impact on the surroundings.

Regarding land uses, the level of employment generation is also considered to be similar to the '2019 Masterplan' and subsequent iterations, with c. 2,000 additional jobs estimated to be created.

Whilst the mix of ICT /data centre and Deep Tech uses have different environmental impacts to the '2019 Masterplan' such as increased power demands and associated emissions, the proposed uses also have reduced direct impacts from traffic generation compared to the previous logistics/warehouse focused scheme. The energy centre associated with the current project is located internally within the campus and so does not present the same issues as the first iteration of the masterplan in terms of noise impacts to surrounding lands. In addition, the current proposal has been designed to minimise visual impact through protection of key historic views through the site.

RECEIVED: 18/07/2023

The final site layout was brought forward as the preferred layout for a number of reasons, as outlined in the previous sections, due to it having the least environmental impact from a noise, air and visual perspective.

Table 4.1 – Comparison matrix of environmental considerations on various iterations of the proposal

	Traffic Generation	Accessibility	Potential Impact (Energy Centre location)	Heritage (Views to Wonderful Barn)	Infrastructure upgrades (Requirement for 220 KV substation)	Ecology (Protection of existing mature trees)
2019 Masterplan						
Iteration 1						
Iteration 2						
Iteration 3						
Iteration 4 (Current)						

Less Favourable	
More Favourable	

4.3.4 Alternative Designs

In addition to the above iterative process for site layout design, alternative building designs were considered by the project team through the evolution of the masterplan. These building designs are identified in figures 4.8 - 4.10 below.



Figure 4.8: '2019 Masterplan'. (Source: RKD Architects.)

RECEIVED: 18/07/2023



Figure 4.7: Facade Design Iteration No. 1



Figure 4.8: Facade Design Iteration No. 2

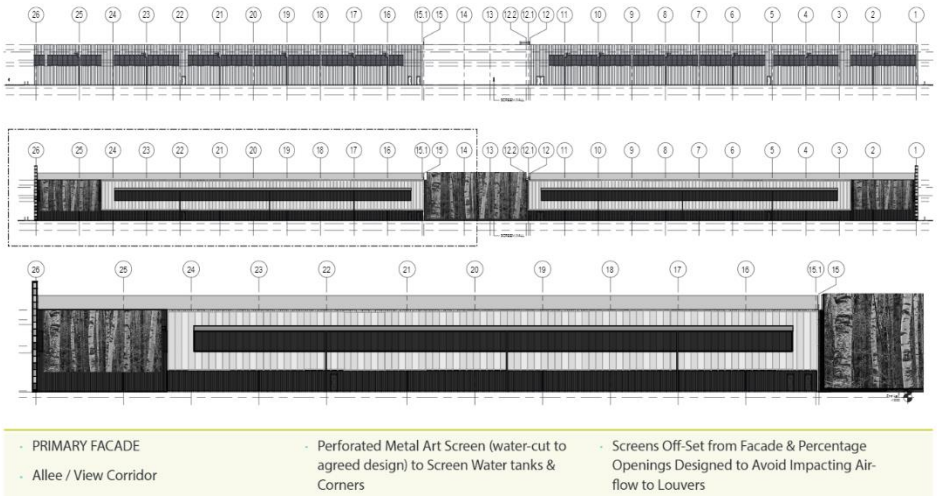


Figure 4.9: Facade Design Iteration No. 3

RECEIVED: 18/07/2023

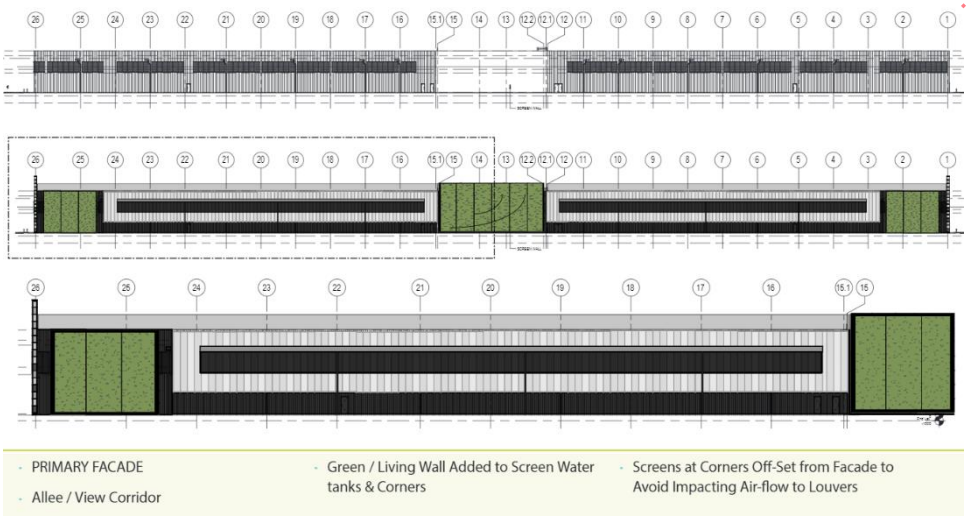


Figure 4.10: Facade Design Final

The final building designs were advanced by the design team for a number of reasons including being considered the most visually sensitive to the new public road as well as the protected view corridor that traverses the campus. In addition, the siting and location of the energy compound required reconsideration due to potential for noise related impacts.

In addition to main building facade designs, alternative options for screening of the energy centre were reviewed, with the final perimeter screen including green walls advanced as it represented an environmentally conscious design and was reflective of the wider sustainability principles for the campus.

Alternative designs were reviewed for the proposed energy compound. Initial iterations included a screening structure with cladded exterior. The final design advanced by the design team incorporates elements of green vegetation walls as a more visually sensitive design response as well as one which aligns with the wider sustainability principles of the campus.

4.3.5 Alternative Processes

The primary processes of significance that the proposed development will comprise are:

Data Centre Operation/Technologies

The future data centre operator is committed to continually assessing and improving the technology used, particularly with respect to minimising power and water consumption, in accordance with the goals of Irelands Framework for Sustainable Development *'Our Sustainable Future' DOELG 2012.*

RECEIVED: 18/07/2023

The future data centre operator is a signatory of the Climate Neutral Data Centre Pact. The Pact was launched in January 2021. The associations and companies (in excess of 100) that form part of the pact are committed to ensuring the design and operation of data centres across Europe meet ambitious sustainability criteria. The Pact establishes a Self-Regulatory initiative which has been developed in cooperation with the European Commission. The Pact also supports the European Green Deal, which has the aim of making Europe the world's first climate neutral continent by 2050.

The Climate Neutral Data Centre Pact sets goals that will facilitate Europe's essential transition to a greener economy. It commits signatories to ensuring their data centres are climate neutral by setting ambitious measurable targets for 2025 and 2030 within the following areas:

- Proving energy efficiency with measurable targets
- Purchasing 100% carbon-free energy
- Prioritise water conservation
- Reuse and repair servers
- Investigate opportunities to recycle heat

The data centre operator's designs are constantly evolving, and hardware is chosen with energy efficiency key to decision making. The Energy & Sustainability Statement, prepared by Ethos and submitted with the application sets out the chosen design and its sustainability principles.

Hardware

The data centres require specific hardware to fulfil their purpose as centralised computer sever systems on a large scale. The proposed development will employ data server technology used by the prospective operator at their other facilities in Ireland and around the world and will represent state-of-the-art technology as set out in the Energy and Sustainability Statement prepared by Ethos and submitted with the application. Alternative technologies will be considered on an ongoing basis and as new advances are made in attempt to improve *inter alia* reliability, energy efficiency and environmental impact.

Cooling Systems

The data storage rooms need to be supplied with fresh air to maintain optimum environmental conditions. The proposal cooling system is state-of-the-art and is being implemented to comply with European standards for high energy efficiency of data centres (refer to the Energy and Sustainability Statement prepared by Ethos). Alternative technologies are considered on an ongoing basis in attempt to improve *inter alia* reliability and environmental impact.

Deep Tech Operation/Technologies

The ultimate Deep Tech end users are not yet known; however the proposed building design has been advanced based on best practice standards as set out in the Energy and Sustainability Statement prepared by Ethos. Alternative technologies will be considered on an ongoing basis in attempt to improve *inter alia* reliability and environmental impact.

RECEIVED: 18/07/2023

Power Supply

The proposed development requires power to operate. Below are the options/alternatives that have been explored:

Island mode

The landowner explored the option of operating the data centre portion of the development as an electrical island with no connection to the EirGrid transmission system (except for the existing buildings and A1 and A2 Buildings) with the proposed Energy Centre being the primary energy source for the site.

Island mode as an option was dismissed due to there being the need for 24/7 gas generation, which would not be aligned with the sustainability principles of the end users and would have an increased impact in terms of air and climate emissions compared to the chosen mode of connection.

Electricity supplied from the Grid

There is an existing 110 kV substation (Rinawade) located on site, which provides electricity to the existing campus. That substation has the potential to provide Phase 1 & 2 of the development with its power demands but is not capable to provide for Phase 3 due to equipment needing replacement as well as eirgrid infrastructure requiring uprating. As such, it was determined that a new replacement substation would be required on site to facilitate the full masterplan development.

The developers commissioned a study of the proposed impact of a proposed new 220 kV connection to Kellystown on the existing network through H&MV/TNEI. Extensive N-1 and N-1-1 contingency analysis was undertaken which suggested, based on the set of assumptions made, that a proposed data centre connection for Phase 3 (Buildings B2, C1, C2 and C3) via two underground cables at Kellystown 220 kV substation would be feasible without having a material impact on overloads in the Dublin area.

Following discussions with EirGrid, it was confirmed that the existing Rinawade 110 kV substation is at the end of its life and must be replaced with a new 110 kV substation. A letter of offer was presented on this basis (Ref: D14C-HF-OL).

The option to supply power to the campus through both a replacement 110 kV and new 220 kV substation was explored; however, through further analysis by H&MV, it was confirmed that a new replacement 110 kV substation, along with uprating of existing overhead lines into the campus, could provide enough electricity to power the entire campus. This meant that neither the new 220 kV substation or new grid connection would be required, and that the future reinforcement of the existing connection would provide both sufficient power to the site and greater stability to the electricity network. Refer to H&MV/TNEI study submitted with the application.

Electricity generated from gas power turbines on site

RECEIVED: 18/01/2024

Data centre operators in the greater Dublin region are required by the CRU to have the ability to reduce consumption at the request of EirGrid in times of system constraint through the use of dispatchable on-site generation and/or storage, which meets appropriate availability and other technical requirements as may be specified by EirGrid. This is a regulatory constraint and therefore it is not permissible to operate in the absence of installing dispatchable on-site generation or storage in accordance with the system requirements set by EirGrid. It is proposed that that power will be provided via natural gas-fired turbines, which is the most sustainable of all the fossil fuels. An option to provide on-site battery storage and a hybrid approach with the gas turbines supplemented by battery storage was considered in the design process, however in this regard it is noted that EirGrid's Policy Data Centre Offer Policy Information Note (eirgridgroup.com) states *"EirGrid will provide firm capacity where a data centre provides new on-site dispatchable generation that meets the annual availability requirements…… and is capable of continuous running for extended periods, e.g. its running is not limited by fuel reserves, environmental licencing or regulatory obligations."* The Eirgrid outline includes an example which requires the dispatchable generation to be available 330 days per year. The site would not be large enough to accommodate the extent of batteries required to meet the above policy given the overall power demand as such battery storage was ruled out.

Although the most sustainable of the fossil fuels, alternative non-fossil fuels have been explored. As such, the Energy Centre has been designed as both BioGas and Hydrogen[4] ready so that when an alternative more sustainable source of energy becomes available the site can transition to a fully decarbonised energy supply.

An alternative that was explored was to have a direct supply of bio methane to the site; however, the level of bio methane required in conjunction with the unknown nature of the Grid requirements would make the Energy Centre unreliable in times of need. Furthermore, regular pumping of bio methane at the site would result in a relatively large quantity of truck deliveries. Further analysis of a potential bio-methane injection point on the site is on-going.

Regarding the supply of natural gas to the Energy Centre, Phase 1 requirements of the proposed development can be supplied via the existing gas pipelines on site. As discussed in Chapter 2 and 3, the GNI upgrades for Phase 3 will be delivered through a local extension upgrade of the gas transmission network over a length of approximately 7km from the R136 roundabout at Lucan. It is understood that the local extension upgrade would be from the existing Nangor AGI.

From here the pipeline would run underground likely via the existing rail corridor to Hillcrest Bridge at Tubber Ln Road. At this point the pipeline would likely travel east and north under Tubber Lane Rd and Stacummy Lane and then the R404 to the entrance of the site. The route has been assessed as part of the EIAR.

[4] Please see The development of an integrated hydrogen strategy for Ireland is to be prioritised, in line with the Climate Action Plan. (Consultation on Developing a Hydrogen Strategy for Ireland) (July 2022).

RECEIVED: 18/04/2023

Other sources of power

Regarding backup fuel sources, diesel and bio diesel were explored for the Energy Centre; it was ultimately decided that renewable diesel, specifically Hydrotreated Vegetable Oil (HVO), would be the most sustainable option due to it being made from plant waste and renewable materials. For data centres, diesel and biodiesel have also been explored and diesel was chosen.

The prospective operator of the data centres has shown commitment to the use of renewable energy throughout its global business operations and is committed to investment in renewable energy in Ireland.

Furthermore, the proposed development includes an alternative source of power through the provision of roof mounted solar PV panels on all proposed new buildings, which will contribute c. 3 MW of power to the campus.

Providing Solar PV panels above all parking spaces was also explored; however, due to the level of construction required (not simply placing panels on roofs of buildings), the cost-benefit ratio was too high in favour of cost. The provision of a battery park on site to capture renewable power at times of high yield and low demand was also explored as part of iteration no. 1. This was ruled out as it was considered space intensive resulting in inefficient use of zoned land and unable to provide sustained power supply.

Wind turbines on site were considered but ruled out due to the proximity of Castletown Estate and protected views.

The provision of scalable on-site renewables to offset energy demand is limited due to the size of the campus and Kildare County Council's zoning of protected views; however, KIC is committed to carbon neutrality for the entire campus through the use of Power Purchase Agreements, provision of district heating, HVO and solar PV on campus. Furthermore, the provision of extensive biodiversity planting and green walls provide a substantial benefit and carbon capture mechanism on site.

Water Supply

The campus operations will require water to be supplied from the Irish Water network. A PCE has been submitted to Irish Water. No network upgrades are expected. The Data Centres will use the water supplied by Irish Water for domestic and evaporative cooling. The design philosophy will be to limit the evaporative cooling process to peak summer months only. The water used during these peak summer months will be supplied by on-site industrial water storage only. The industrial storage will be filled during the winter months. An alternative would be to utilise an Irish Water connection all year round which would result in additional strain on the network during peak summer months.

The Deep Tech, Energy Centre and Substation will not have an industrial water demand. To reduce both energy and water use in its data centre facilities, the data centre operator utilises direct evaporative cooling systems, which predominately utilise outside air to cool servers. Thanks to this innovative cooling solution, the proposed data centre buildings are projected to demand as little as 0.75 l/s of water on average for each of the three C buildings and 0.50 l/s for the B building.

RECEIVED: 18/07/2023

The proposed buildings are designed to harvest a significant portion of the annual cooling water requirements and irrigation requirements through rainwater harvesting, reducing the water used from the local supply from the first year of operation.

Heat Supply

The existing campus operates off centralised heating from the campus boiler room within Building No.6, which operates from the existing gas network. As the activities of the data centres generate a significant amount of excess heat, the concept of heat recapture and district heating was explored as an alternative to traditional heating systems being provided for the campus.

Through studies by Ethos Engineering, it has been estimated that c. 18 MW of energy could be provided to the campus, community, and surrounding area through recaptured heat and the implementation of district heating.

It is proposed to include district heating as part of Phase 1 to supply the deep tech buildings on site, the existing campus buildings to be retained as well potential to supply Barnhall RFC, Salmon Leap Canoe Club, Castletown Estate as well as the future residential zoned lands known as Celbridge East KDA.

Phase 3, which is the balance of the data centres, could further provide for additional community buildings and schools in Leixlip.

An alternative design to include for the above referenced connections from the campus to the potential end users were explored but not included as part of the project as agreements have yet to be put in place between the potential end users and the landowner. It is envisioned that these discussions will continue with the aim of formulating an agreement for future waste heat use and may form part of a future planning application (Refer to Section 3.6.15 of this EIAR).

The alternative of heat recapture and district heating will have significant economic and environmental benefits to the campus, community, and surrounding area, over centralised heating or allowing for fugitive excess heat.

The project team also explored waste heat capture from the Energy Centre; however, the intermitted nature of the Energy Centre operations meant it would be too unreliable as a source of heat.

Transportation of people and goods

Government guidelines indicate a hierarchy of travel modes with walking being the highest and most sustainable form of travel.

Walking will not reduce long distance trips but encouraging walking as part of an integrated public transport journey or replacing short distance vehicle trips is an important component of mobility management, providing linkages to public transport and as an added benefit, improving health and fitness and employee wellbeing.

RECEIVED: 18/07/2023

The aim of the internal road layout and access strategy is the creation of a workplace that is connected and provides a walkable and cyclable network, which facilitates and encourages both sustainable travel to the site and permeability within site.

The existing facility is 'closed off' and has limited connectivity regarding walking and cycling and, as such, 'opening up' the campus, and integration into the proposal of walking and cycling connections *inter alia* via the new M4 overpass bridge, was favoured over the existing 'do nothing' alternative.

In total, 320 cycle parking spaces will be provided for the new development; this will represent 15.1% of all planned parking on site. It is recognised that, overall, there is a deficit in the number of required cycle spaces for the development. However, the campus design ensures it will be easy to add capacity to cycle parking when required. Cycle parking will be then consistently monitored to ensure that there is enough supply to meet demand.

It is believed that the provision of 320 cycle parking spaces represents a more than suitable starting point given only 50 spaces are currently provided on site without a capacity issue. The 320 cycle spaces provide for more than 10% of the proposed total staff on site following the development. This is in line with government targets for 10% of travel to work by cycle mode.

Under the NTA's proposed Bus Connects programme, the hourly L58 links the Business Park with the 24hr C3 bus route direct to Dublin (via the C Spine), as well as Celbridge Hazelhatch Station, which offers daily commuter and intercity services to Dublin Heuston and Grand Canal Dock. The X32 serves as a commuter service for the park via the C corridor of bus priority measures. This off-site/cumulative development is expected to positively impact on the campus in regard to sustainable transport, over the existing alternative.

In addition, the project proposes a 'Electric Bus Charging Hub' on site, which will allow for future bus routes to enter the site. The overall scheme can adapt to future bus routes internally within the site and has been fully auto tracked by the project engineers for such sized vehicles. The project team has engaged with a potential bus operator/provider.

It is anticipated that these enhanced bus services (Bus Connects and potential separate direct connection to the campus) will provide sufficient additional capacity to meet the demands of those wishing to access the site via public transport, particularly when it is considered that the proposed L58 Bus Connects service will link the development to Leixlip-Confey Train Station on the Western Suburban Rail Corridor (Maynooth Line). Services along this line are to be significantly enhanced and capacity is scheduled to increase steadily over the next 15 years.

Providing a direct rail connection was not considered to be a reasonable alternative due to the financial cost that would be imposed on the applicant.

The site provides a gym, canteen and amenity walking areas. This will reduce the need for journeys throughout the working day away from the site over a campus that provides no synergistic uses for workers.

The proposed development includes dedicated parking for electric vehicles with associated charging points (244 EV car charging points. Again, the demand will be monitored, and

RECEIVED: 18/07/2023

additional parking and charging will be made available if indicated by demand. Car sharing will be promoted as an alternative to individual car commuting.

As the site is an innovation campus, transport in and out of the site will naturally include heavy goods vehicles for business operations. This cannot be avoided; however, the impacts can be reduced through campus policy and initiatives, including:

- Require that third party HGV operators provide their drivers with Safe Urban Driving and education courses to include cycle awareness training, reinforcing driver awareness of cyclists and pedestrians within and around the site.

- Encourage occupants to carry out Green Fleet reviews to evaluate how sustainable their fleet operation is and identify opportunities to reduce emissions, fuel costs and expenditure. The reviews could include:

    - Vehicle choice
    - Fuel economy
    - Mileage reduction strategies

- Encourage occupants to provide eco driving training to drivers to improve the sustainability and carbon emissions of their journeys.

- Encourage occupants to consider alternative, sustainable fuel types for their fleets.

- Encourage occupants to review their grey fleet management, policies, and operation.

- For non-HGV business travel, consider pool transport options (e.g., car club, pool bicycles) on a campus-wide basis.

- Encourage occupants to provide pool bikes (including electric bikes) and cycle mileage to their staff for business travel.

- Encourage occupants to provide Leap pay-as-you-go smartcard tickets to their staff for business travel.

- Reduce the need to travel by providing high quality IT infrastructure to allow employees to benefit from high quality telecommunications for the likes of teleconferencing and remote working.

Overall, all reasonable alternatives for transport in and out of the site have been considered. It is considered that the chosen development includes a practical approach to sustainable transport and has mitigated – through anticipation within the project design – likely negative significant environmental impacts. A Mobility Manager will be appointed by the applicant/developer to co-ordinate the delivery of the initial stages of the Mobility Management Plan prepared by Systra.

RECEIVED: 18/07/2023

Drainage

Surface water

The existing development pre-dates current surface water design standards and SuDS guidance.

This proposal must align with objectives as outlined in the Kildare County Council Development Plan 2023-2029, Leixlip LAP 2020-2023, and the applicable requirements of Kildare County Council Water Services Department draft guidance on Drainage and SuDS Strategy for SHD and LRD's.

Initial drainage proposals prepared by the project team and discussed with KCC included an alternative design with the provision of on-site attenuation tanks for rainwater harvesting at two locations. Swales, permeable surfaces and attenuation basins were also identified. Following preplanning discussions with KCC's Water Services Department, the extent of on-site attenuation tanks were reduced in favour of nature-based systems. Furthermore, increased provision of blue/green roofs, bio-retention swales and tree pits have been incorporated into the final design. Refer to the Stormwater Management Report by CSEA submitted with the planning application for further detail.

Nature-based SuDS components have been provided to control runoff frequency, flow rates, volumes and, reduce concentrations of contaminants to acceptable levels. The proposed treatment train approach assures that both runoff quantity and quality are addressed through the overall techniques of pollution prevention, source control and regional control. Bioretention ponds with sediment forebay have been proposed in this framework as in integral element to the overall site attenuation system.

As a result, the proposed development will result in a reduction of surface water discharge from the development site compared to the existing process on site (the 'Do Nothing' alternative). When compared to the initially proposed SuDS measures, the revised proposals will also serve to enhance local biodiversity through the implementation of green roofs and increased tree planting. The overall surface water drainage approach will have a net positive result on the downstream surrounding areas as the potential for flooding is reduced and the overall discharged runoff will have an improved water quality.

Foul

The proposed foul water drainage network has been designed in accordance with the requirements of Appendix B of the Irish Water Code of Practice for Wastewater Infrastructure (IW-CDS-5030-03). As such, no alternative, other than a foul drainage scheme incorporating the requirements of Irish Water, has been considered.

The domestic and industrial foul sewer flows in an easterly direction towards two proposed pumping station which pumps to a discharge manhole adjacent to the existing Irish Water 450mmø foul sewer in the Celbridge road to the east of the site.

RECEIVED: 18/07/2023

4.3.5 Alternative Mitigation Measures

For each aspect of the environment, each specialist (Table 1.2, Chapter 1) has considered the feasible measures to identify the most suitable measure appropriate to the environmental setting and the project design. In making a decision on the most suitable mitigation measure, the specialist has considered relevant guidance and legislation.

In each case, the specialist has reviewed the mitigation measures available and considered the use of the mitigation in terms of the likely residual impact on the environment. The four established strategies for mitigation of effects have been considered: avoidance, prevention, reduction, and offsetting. Mitigation measures have also been considered based on the effect on quality, duration of impact, probability and significance of effects.

For example, alternative noise attenuation options for were considered at the design stage of the proposed development. The two main options considered were air handling units (AHUs) with reduced noise rating or the use of screening around the AHUs. Noise modelling showed that both options afforded similar level of noise attenuation and so the decision to use screens was made on the basis of operation/maintenance grounds and not environmental grounds.

The selected mitigation measures is set out in each of the EIAR Chapters 5 – 17.

4.3.7 Conclusion

Having examined various reasonable alternative designs, layouts, uses, and processes, it is considered that the project is the preferred option in terms of the sustainable development of the subject site.

RECEIVED: 18/07/2023

5.0 POPULATION AND HUMAN HEALTH

5.1 Introduction

This chapter of the Environmental Impact Assessment Report has been prepared by Gavin Lawlor of Tom Phillips + Associates and examines the likely impacts of the proposed development on population and human health.

Gavin Lawlor is a Director of Tom Phillips + Associates. He holds a BA (Social Science) from University College Dublin, where he graduated in 1995 with a Masters in Regional and Urban Planning (MRUP) Degree and is a Full Member of the Irish Planning Institute (IPI) with 25 years' experience.

The scope of the work includes an evaluation of the likely direct and indirect effects on population and human health (the impacts on human health has been assessed, by proxy, through the other chapters of this EIAR that are likely to impact on human health).

5.2 Project Description

The proposal will include for the demolition of some of the existing buildings on site and construction of new buildings, an energy centre and replacement substation. The proposal will include significant public infrastructure including a new signalised intersection on Celbridge Road (R404), a new Public Link Road through the campus (between Barnhall Road and the new signalised intersection), a pedestrian/cycle overpass of the M4, pedestrian and cycle links through the site and along the designated protected view corridor and supporting infrastructure. The project to which this EIAR relates also includes facilitation works which comprise uprating of existing 110kV power lines to the site and the provision of a gas transmission line to the site. The facilitation works which are included in the project do not form part of the development for which planning consent is sought. Future consents for the facilitation works will be required through EirGrid and GNI.

A detailed description of the project is outlined in Chapter 2 of this EIAR.

5.3 Methodology

The legislation, policy, and guidance outlined in Chapter 1 has informed the preparation of this chapter.

The preparation of this chapter has also been informed by desktop studies of relevant data sources including:

- Census 2011
- Census 2016
- Census 2022 (preliminary results)
- CSO Live Register
- The Economic and Social Research Institute's (ESRI) Quarterly Economic Commentary (Winter 2023)
- The Department of Health's latest policy report *Health in Ireland: Key Trends 2023*

- Grant Thornton Economic Impact Assessment (2023) (accompanies this EIAR)
- Homes & Communities Agency, UK Government Agency (2015), Employment Density Guide (3rd Edition)
- All other data used within other Chapters of this EIAR relating to human health.

RECEIVED: 18/07/2023

5.3.1 Scoping and Heading/Topic Identification

The EPA Guidelines, 2022, state that:

> *"each* [environmental] *factor is typically explored by examining a series of headings and/or topics relevant to that factor".*
>
> [and]
>
> *"The relevant topics for any given EIAR should be established during scoping".*

5.3.1.1 Population

The method employed for scoping and identification of the relevant environmental topics for this Chapter has been based off our professional town planning and sociological knowledge/expertise.

The headings and/or topics scoped into this Chapter's population assessment are:

1. Economy
    a. National economy
    b. Local economy

2. Employment
    a. Jobs
    b. Commuter patterns

3. Housing
    a. Current housing stock
    b. Future housing stock

4. Social infrastructure and amenities

The above headings were chosen because they represent the aspects of the environment likely to have possible significant impacts caused by the project: the Economy is likely to be impacted inter alia by the increased FDI and the increased demand for products and services from third party local suppliers once the scheme is operational; employment is likely to be impacted inter alia by the construction and the establishment of multinational companies, which will require employees to run operations; housing is likely to be impacted inter alia by the increased number of employees in the area; and social infrastructure and amenities are likely to be positively impacted inter alia by the provision of a pedestrian and cyclist overpass over the M4 connecting Leixlip to the campus and its internal amenities and providing a pedestrian and cyclist route to Celbridge.

RECEIVED: 19/07/2023

5.3.1.2 Human Health

The EPA Guidelines, 2022, state 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..**"*
>
> [Our emphasis.]

As such, the scoping of headings/topics is based off other environmental factors impacts on human health addressed in this EIAR.

Therefore, the headings and/or topics scoped into this Chapter's human health assessment are:

1. Air
2. Climate
3. Noise and Vibration
4. Land and Soils
5. Water
6. Traffic
7. Visual Impact
8. Major accidents and/or disasters

For gathering a baseline for human health in Ireland, we used the headings of life expectancy, mortality, and perceived health status; for baselines of the above headings, please see each individual Chapter, respectively.

5.3.2 Baseline Scenario/Likely Future Receiving Environment Analysis Methodology

The EPA Guidelines on the Preparation of an EIAR (EPA, May 2022) state that:

> *"It is important to demonstrate that correct methodologies and experts have been used. It is also important that the methodology used in establishing the baseline scenario is documented to permit replicable future monitoring so that the later results can be properly compared (where required). Standard recognised methods should be applied where available and appropriate."*

The baseline/future receiving environment analysis for this Chapter has been undertaken in accordance with the EPA Guidelines on the Preparation of an EIAR (EPA, May 2022) and all other documents outlined above.

5.3.2.1 Baseline Scenario Analysis Methodology

Population

In order to assess the likely significant impacts of the proposed development on population, for both the principal works and facilitation works, an analysis of the baseline

RECEIVED 18/07/2023

(the current state of the environment) was first performed. Data relating to the economic, demographic and social characteristics of the Local Authority (LA) area, within which the subject sites are located, were examined.

We note that 2 No. study areas were used in the demographic analysis in order to assess the impacts of the proposed development on the surrounding population, as shown in Figures 5.1 and 5.2.

The first study area (shown in Figure 5.1) provides information with respect to the local electoral district (ED) context, and includes 4 No. EDs which adjoin the subject sites within a c. 1 km radius – 'Celbridge' and 'Leixlip' EDs to which the site belongs; 'Lucan-St. Helen's' ED; and 'Donaghcumper' ED.



Figure 5.1: Extent of Local Electoral Division Study Area, comprised of EDs adjoining subject site (shown in blue) within c. 1km radius of the subject site (indicated by red dash). (Source: CSO.)

The second study area (shown in Figure 5.2) provides information with respect to the wider LA context of Kildare in terms of economic and social impacts.



RECEIVED: 18/07/2023

Figure 5.2: Extent of Local Authority Study Area of Kildare, shown in lilac. Indicative location of subject site including a c. 1km radius from site provided in red. (Source: CSO.)

We have also examined certain national population trends. In addition we have conducted a review of the Kildare Cunty Council Development Plan 2023-2029 as well as the Leixlip Local Area Plan 2020-2023 (extended to 2026).

Human Health

The baseline for human health was gathered from a review of the Department of Health's latest policy report *Health in Ireland: Key Trends 2022* provides statistical analysis on health in Ireland over the last 10 years and deals specifically with issues such as life expectancy, mortality, and perceived health status within the country. For baselines of the headings outlined in section 5.3.1.2, please see each individual Chapter, respectively. Census figures were also gathered to provide a breakdown of the 'general health' of the local population.

5.3.2.2 Likely Future Receiving Environment Analysis Methodology

Population

The EIA Directive requires *"an outline of the likely evolution thereof without implementation of the project as far as natural changes from the baseline scenario*" (the 'Do Nothing' Scenario).

RECEIVED: 18/07/2023

According to the EPA Guidelines, 2022, Strategic Environmental Assessments "can reduce the number of cumulative effects that need to be considered in an EIAR".

As such, to understand the likely evolution of the population if the proposed project was not implemented, we have inter alia reviewed the Strategic Environmental Assessment prepared for the Kildare County Development Plan 2023-2029 (including a review of the Development Plan itself).

We have also utilised the list of planning permissions/applications within a 5 km radius (listed in the appendices of Chapter 1), identified using Geospatial Analysis, and reasonably foreseeable projects with the site and adjacent surrounding area, and have assessed whether those developments, in combination with the project, are likely to have significant impacts on the population.

Human Health

The impacts in a 'Do Nothing' scenario on specific health proxy measures such as air, climate, noise etc. are recorded within other Chapters of this EIAR associated with Human Health, for both the principal works and facilitation works, and have been collated within this Chapter. The methodologies for those individual environmental factor assessments can be found in each relevant Chapter of this EIAR.

5.3.3 Impact Assessment Methodology

5.3.3.1 Population

The analysis of the predicted impacts of the proposed development on population during construction and operation are presented in this Chapter. The assessment considered population features, identified in Section 5.3.1, above, within the project site and the surrounding vicinity in accordance with the methodology outlined above and below, to determine the significance of the impacts. Where likely significant impacts are highlighted, mitigation and monitoring are proposed, and any residual impacts are assessed.

The impact assessment for this Chapter has been undertaken in accordance with the *EPA Guidelines on the Preparation of an EIAR* (EPA, May 2022) and all other documents outlined above. Assessment methods quantify and predict the magnitude and significance of impacts.

To predict the impact of the proposed development on the baseline environmental headings/topics, we have *inter alia*: reviewed the Grant Thornton *Economic Impact Assessment*, dated April 2023 (prepared in association with this EIAR) to determine the overall economic impact of the project; calculated the number of jobs likely to be generated by the project using the Homes & Communities Agency's (UK Government Agency) (2015) *Employment Density Guide (3rd Edition)*; calculated the housing demand likely to be generated from the permanent employment increase; and identified the social infrastructure and amenities provided or impinged by the project. In addition, we have used our professional town planning and sociological knowledge/expertise and inductive reasoning to assess/evaluate the significance of those predicted impacts.

RECEIVED: 18/07/2023

Regarding the cumulative impacts resulting from other developments in the surrounding area, we have reviewed the Strategic Environmental Assessment prepared for the *Kildare County Development Plan 2023-2029* (including a review of the Development Plan itself). According to the EPA Guidelines, 2022, this can reduce the number of cumulative effects that need to be considered in an EIAR.

We have also utilised the list of planning permissions/applications within a 5 km radius (listed in the appendices of Chapter 1), identified using Geospatial Analysis, and have assessed whether those developments, in combination with the project, are likely to have significant impacts on the population.

5.3.3.2 Human Health

The impacts recorded within other Chapters of this EIAR associated with Human Health, for both the principal works and facilitation works, and have been collated within this Chapter.

The methodologies for those individual environmental factor impact assessments can be found in each relevant Chapter of this EIAR.

5.4 Baseline Scenario/Future Receiving Environment Analysis

5.4.1 Baseline Scenario (Current State of the Environment)

The EIA Directive requires the following to be described relating to the baseline scenario:

> *"A description of the relevant aspects of the current state of the environment (baseline scenario)".*

The following sections provide an overview of the baseline scenario.

5.4.1.1 Population

Economy

The Economic and Social Research Institute's (ESRI) Quarterly Economic Commentary (Spring 2023) suggests that "*The pace of growth in the domestic and international economies is set to be stronger in 2023 than had previously been expected.*". The Commentary states that *"The economy has performed particularly well during the pandemic and appears to have weathered the energy crisis emanating from the war in Ukraine."*.

The Commentary further states that *"Despite the ongoing resilience of the Irish economy, concentration risks in the ICT sector, a tighter monetary policy environment, ongoing uncertainties in the international economy and persistently high price levels pose major challenges to the economy."*.

With respect to the socio-economic status of local residents, the Pobal Deprivation Index utilises CSO statistics[1] to analyse areas with high levels of affluence or disadvantage throughout the country. Both the 'Leixlip' and 'Celbridge' Electoral Districts (to which the subject site belong were identified as being a 'marginally above average' area in 2011 at 5.00 and 5.49 respectively and in 2016 at 5.11 and 6.11 respectively by Pobal, values which are higher than the figures recorded for the wider county. We note that the 'Donaghcumper' ED identified to the south of the subject site had a significantly higher rating on the index and was recorded as being 'affluent' at 10.00 in 2016.

RECEIVED: 18/07/2023

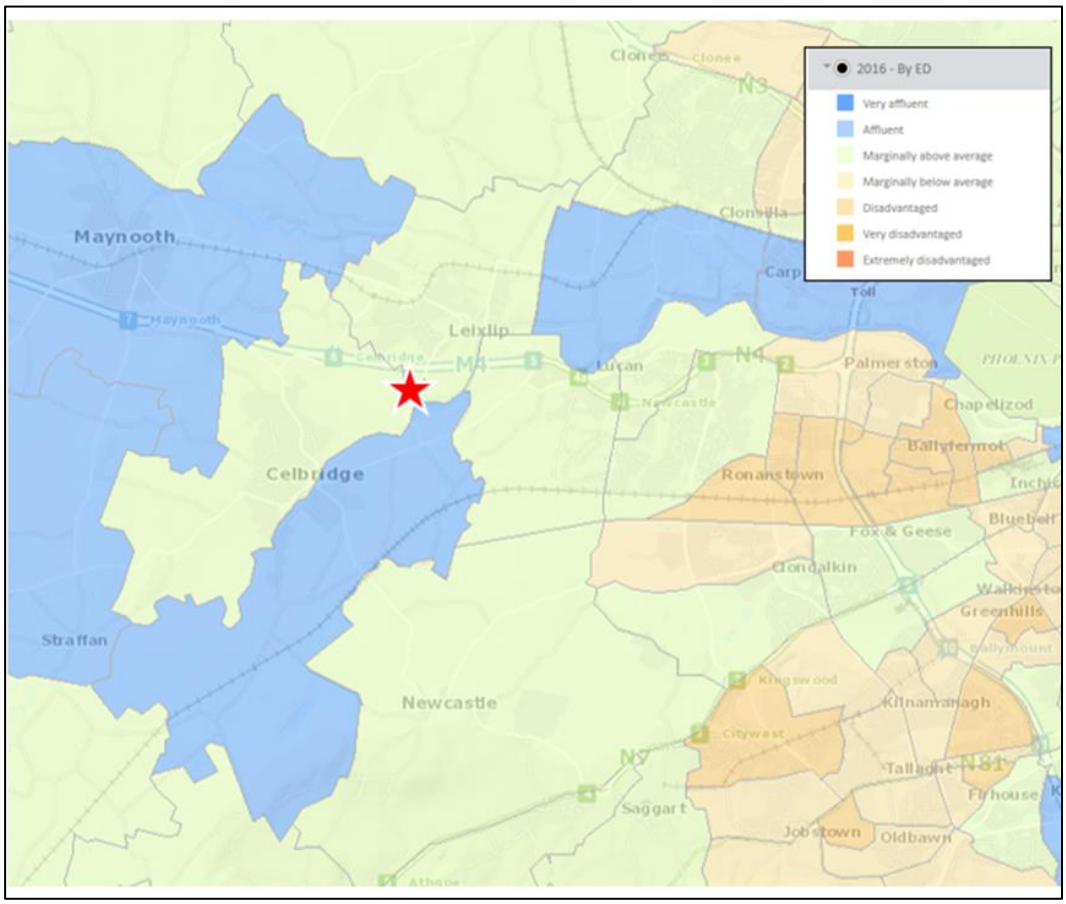


Figure 5.3: Extract of 'Deprivation Indices' Map showing 2016 deprivation index rates by Electoral District – Location of Subject Site indicated by red star. (Source: Pobal 2019, based on CSO 2016).

Area Definition	2011	2016
Leixlip ED	5.00 - marginally above average	5.11 - marginally above average
Celbridge ED	5.49 - marginally above average	6.11 - marginally above average
Donaghcumper ED	9.99 - marginally above average	10.0 - affluent
Lucan-St. Helen's ED	6.19 - marginally above average	7.41 - marginally above average
Co. Kildare	2.34 - marginally above average	3.18 - marginally above average

Table 5.1: Deprivation Indices (Source: Pobal 2023, based on CSO 2011 and 2016)

[1] Census 2022 full results have yet to be released at the time of compiling this chapter.

RECEIVED: 18/07/2023

Employment

The most recent ESRI Quarterly Economic Commentary (Spring 2023) states that "The first few months of 2023 have been marked by continued resilience and buoyancy in the labour market; the unemployment rate was 4.3 per cent in February 2023".

ESRI "modified domestic demand (MDD) will grow by 3.8 per cent in 2023, with our preliminary forecast for 2024 indicating a growth rate of 3.9 per cent in MDD. The stronger pace of growth in 2024 reflects the expected continued slowing of inflationary pressures and the resulting tempering of monetary policy tightening by central banks".

At the local level, unemployed persons comprised c. 5% of the working population (aged 15+ years) within the ED Study Area in 2016, compared to c. 6% of Co. Kildare.

Economic Status	ED Study Area	% Total	County Kildare	% Total
At work	22,261	60%	95,947	57%
Looking for first regular job	253	<1%	1,395	<1%
Unemployed	1,938	5%	10,902	6%
Student	4,321	12%	20,559	12%
Looking after home/family	2,711	7%	14,478	9%
Retired	4,290	12%	18,890	11%
Unable to Work	1,168	3%	6,255	4%
Other	77	<1%	518	<1%
Total	**37,019**	-	**168,944**	-

Table 5.2: Socio-Economic Status of Population Aged 15+ (Source: CSO 2016).

The Live Register is a monthly measurement of the numbers of people (with some exceptions) registering for Jobseekers Benefit (JB) or Jobseekers Allowance (JA) or for various other statutory entitlements at local offices of the Department of Employment Affairs and Social Protection (DEASP). This data source, whilst not an unemployment register, can provide a general indication of recent employment trends and economic activity in the local area and wider nation.

Area Definition	2022.11	2022.12	2023.01	2023.02	1-mo. trend	3-mo. trend
DEASP Office Kildare Co.	6,390	6,458	6,362	6,352	+0.01%	+0.06%
Ireland – Unadjusted	180,884	184,642	184,736	183,401	-0.02%	+1.3%
Ireland – Seas. Adjusted	184,700	185,700	184,700	182,500	-1.1%	-1.1%

Table 5.3: Persons on Live Register by Month and Area, 2022/2023 (Source: CSO).

Live Register figures are available at a national, county or local level, with respect to the jurisdiction of DEASP welfare offices.

[1] *ESRI (Winter 2023) Quarterly Economic Commentary*

Regarding commuter patterns, a total of 15,986 No. commuters were recorded as resident within the ED Study Area in 2016, in contrast to 10,559 No. commuters which enter the area for work, school or college each day. This net outflow points to the nature of the area as a feeder site for employment hubs in Newcastle to the south and others accessible via the M4 within Dublin City to the east.

RECEIVED: 18/07/2023

Local Electoral Divisions	Commuters resident in ED	Commuters traveling to ED	Net Flow into ED
Leixlip ED	5,041	4,864	-177
Celbridge ED	5,010	3,200	-1,810
Donaghcumper ED	2,315	775	-1,540
Lucan-St. Helen's ED	3,620	1,720	-1,900
Cumulative ED Study Area	**15,986**	**10,559**	**-5,427**

Table 5.4: Commuting Patterns of Local Residents, 2016. (Source: CSO 2016).

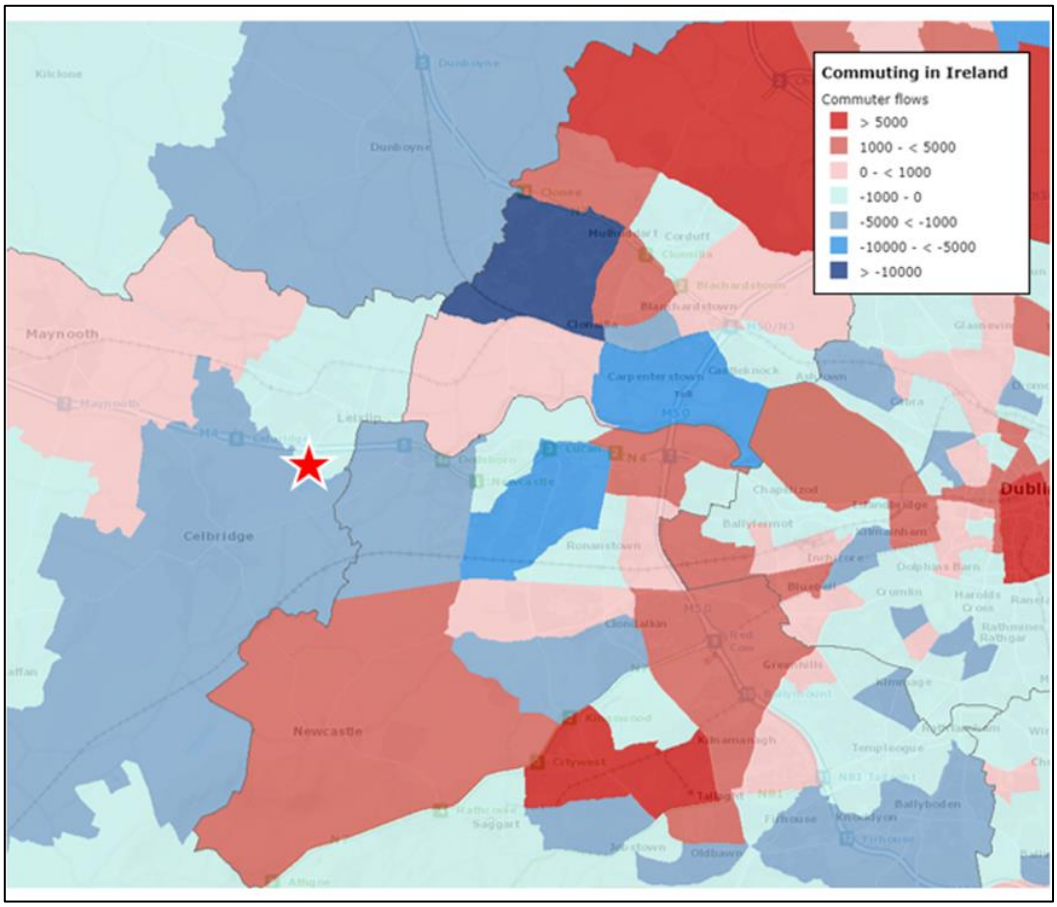


Figure 5.4: Extract of 'Commuting in Ireland' Map showing commuter flows by ED. Location of subject site indicated by red star. (Source: CSO, 2016).

Within the Electoral District Study Area, the majority of residents travel to work by private car (42%), followed closely by pedestrians (15%) and passengers in private cars (14%). Figures for Kildare County are similar, with a slightly higher percentage reported of passengers in private cars (19%).

Transport Mode	ED Study Area		County Kildare	
	No. of Persons	% Mode Share	No. of Persons	% Mode Share
On foot	4,930	15%	20,814	14%
Bicycle	927	3%	2,405	2%
Bus, minibus or coach	4,648	14%	14,365	10%
Train, DART or LUAS	1,464	4%	6,076	4%
Motorcycle or scooter	177	<1%	424	<1%
Car driver	14,132	42%	64,152	42%
Car passenger	4,746	14%	28,077	19%
Van	1,060	3%	6,007	4%
Other (incl. lorry)	45	<1%	562	<1%
Work mainly at or from home	577	2%	3,842	3%
Not stated	978	3%	4,645	3%
Total	**33,684**	-	**151,369**	-

Table 5.5: Means of Travel for Population Aged 5+ Years (Source: CSO 2016).

RECEIVED: 18/07/2023

Housing

According to the preliminary Census 2022 results, there were increases in the housing stock in all counties. As can be seen in Figure 5.5 the largest increases were concentrated in the east.

RECEIVED: 18/07/2023

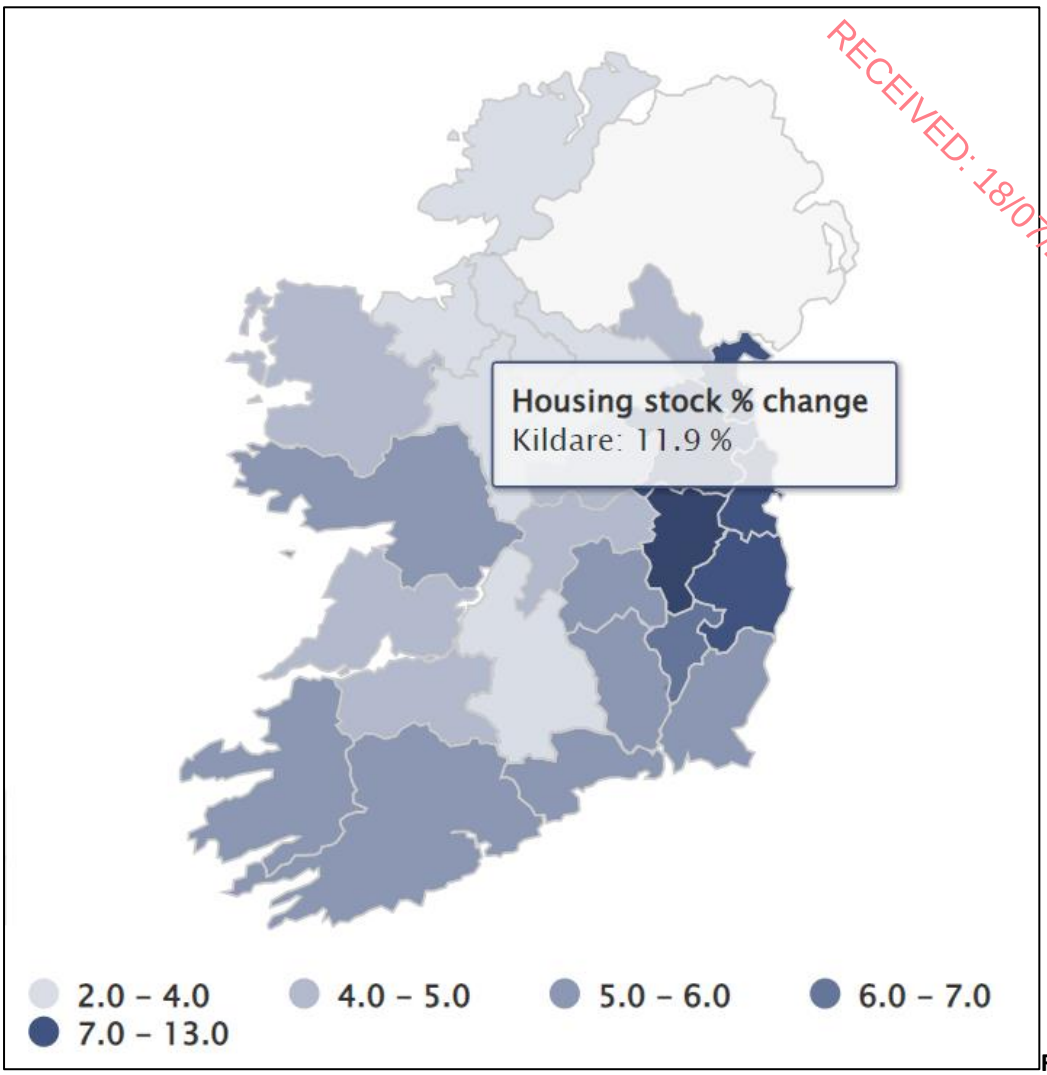
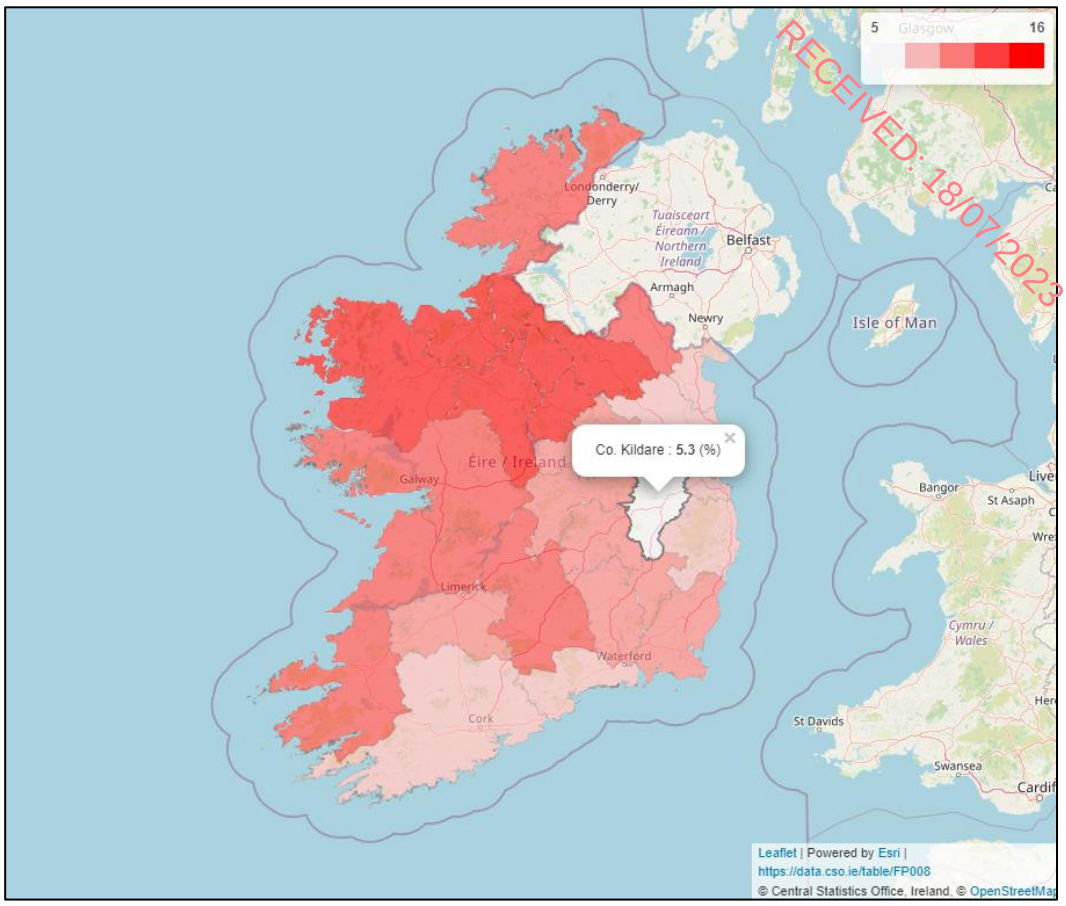


Figure 5.5: Housing stock by county, 2016 – 2022. (CSO.ie)

In Kildare and Meath, the stock of habitable dwellings went up by 12%, Wicklow was up 9% and in Louth and Dublin the housing stock rose by 7%. In these areas, the number of dwellings that were occupied went up at a similar rate. These are all areas with some of the lowest levels of vacancy in the State.

In contrast, nationally there were more modest increases of 3% in the housing stock in counties Tipperary, Leitrim, Roscommon, Cavan and Donegal.



RECEIVED: 18/07/2023

Figure 5.6: Census Vacancy rates by county, 2022. (CSO.ie)

At a State level, the Census vacancy rate has fallen to less than 8% in 2022, down from over 9% in 2016 and 12% in 2011. Kildare has the lowest vacancy rate in Ireland at 5.3%; Dublin is the next closest at 5.5%.

Rental properties accounted for over 20% (35,380 dwellings) of the vacant residential units identified in the 2022 census. This figure included short term lettings and properties that were between lets but may not have been advertised. A further almost 18,000 properties (11%) were for sale. This included dwellings that were sale agreed or recently sold.

Regarding the national future housing stock, according to the two separate reports by Property Industry Ireland (IBEC) and MyHome.ie, housing completions in 2022 and 2023, respectively, are expected to be approximately 25,000-29,000 No. homes. This is considerably short of the 33,000 No. homes per year projected to be required, as stated in the Government's 2021 *Housing for All* Policy Plan, by 2030 to meet Ireland's housing demand.

Social Infrastructure and Amenities

The Leixlip Local Area Plan 2020-2023 (extended to 2026) contains an audit of the social infrastructure and amenities in Leixlip.

The audit was structured as follows:

RECEIVED: 18/07/2023

1. Assessing the Existing Situation;

2. Future Demand Analysis; and

3. Social Infrastructure Recommendations.

Table 7-1 (Figure 5.7, below) of the Leixlip LAP provides a breakdown of the requirements under relevant themes which provide for the future needs of the projected population. Figure 7-1 also outlines an indicative location for each of the themes detailed in Table 7-1.

Table 7-1 Social Infrastructure Needs

Theme	Zoning	Use	Potential Location	Area (HA) where applicable	Checklist	Delivery Mechanism
Education						
Primary school	E	Education	Leixlip West – Option of Zonings within Zoning Matrix	1.6	√	Dept. of Education
Primary school	E	Education	Confey – UDF – CE lands CH1	1.6	√	Dept. of Education
Secondary school	E	Education	Confey UDF – CE lands CH2	4.5	√	Dept. of Education
Childcare						
20 child places per 75 new residential units	Refer to zoning matrix	Childcare	Refer to Zoning Matrix – Provision in tandem with new residential development.	N/A	Case by case basis	Private developer-led alongside new development
Health						
1 no. primary care centre	E, TC, (A), MU, T, Q	Community Health	Options: Town Centre, Community Education, Confey Mixed Use Development, Collinstown Business Campus	c. 1ha	√	Developer / Council / Other
Social/Community						
2 no. community Services	E	Community Use	Confey UDF Community Hub Character Area, Town Centre or other CE lands.	c. 2.9ha Within Confey UDF	√	Developer / Council / Other
Arts/Culture						
New community Facility	E	Community Use	Confey UDF Community Hub Character Area, Town Centre or other CE lands.	c. 2.9ha Within Confey UDF	√	Developer / Council / Other
Faith						
Expansion of existing cemetery (short term), New Cemetery (long term)	E I	Cemetery	Confey UDF 0.4ha additional space at existing Cemetery and car parking provision within CH1. Long term provision within agricultural lands.	0.4	√	Council / Other Funding Mechanism
Outdoor Sports						
7ha of outdoor sports	F1	Open Space and Amenity	Confey New GAA facilities + 4.34 (total new 7.22ha)	c. 7.22	√	Private Developer-led alongside new development

Equipped/Designated Play Spaces						
Local areas for play	F1, F2, B, C	Open Space and Amenity, Existing Residential, New Residential	In accordance with section 17.4.7 of the Kildare County Development Plan open space shall be provided within greenfield sites at a rate of 15% of the site area. The Local Area Plan proposes to zone c. 67.8ha of strictly new residential lands within Key Development Areas and within the Confey UDF lands. The provision of local areas for play i.e. open space areas will generally equate to 15% of this overall area.	c. 10.2ha	√	Private Developer-led alongside new development
Local equipped play areas	F1, F2, B, C, E, T	Junior and Senior play space	Confey UDF, Character Area 1 Lough Na Mona OS lands Linear Parklands Celbridge Road East Linear Parklands Leixlip Amenities (Existing) The Wonderful Barn KDA Riverforest Park Open Space Area Cluster St. Catherine's Park	Range 0.25ha – 0.5ha for each equipped play space	√	Private Developer-led alongside new development with the exception of Lough Na Mona Lands and the Riverforest Park Open Space Cluster.
Neighbourhood equipped play areas	F1, F2		Confey UDF, Zone F Parklands (North-east) Lough Na Mona OS lands Linear Parklands Celbridge Road East Linear Parklands Leixlip Amenities The Wonderful Barn KDA Riverforest Park Open Space Area Cluster St. Catherine's Park	Range 0.25ha – 0.5 for each equipped play space	√	Private Developer-led alongside new development with the exception of Lough Na Mona Lands and the Riverforest Park open space cluster.
Multi-use games areas	F1, F2		Confey UDF, Zone F Parklands (North-east) Wonderful Barn KDA Leixlip Amenities Riverforest Park Open Space Area Cluster St. Catherine's Park	Range 0.3ha – 0.6 for each equipped play space	√	Private Developer-led alongside new development with the exception of the Riverforest Park open space cluster.

RECEIVED: 18/07/2023

Figure 5.7: Table 7-1 of the Leixlip LAP.

5.4.1.2 Human Health

The Department of Health's latest policy report *Health in Ireland: Key Trends 2022* provides statistical analysis on health in Ireland over the last 10 years and deals specifically with issues such as life expectancy, mortality and other health indicators within the country.

Life Expectancy

Health in Ireland: Key Trends 2022 states that:

"Life expectancy is continuing to increase, currently standing at 84 years for women and 81 years for men. Life expectancy for women is higher than for men, as in most countries. However, this gap has narrowed in the past decade and male life expectancy in 2020 was 3.6 years below female life expectancy compared to 5.2 years in 2000."

RECEIVED: 18/07/2023

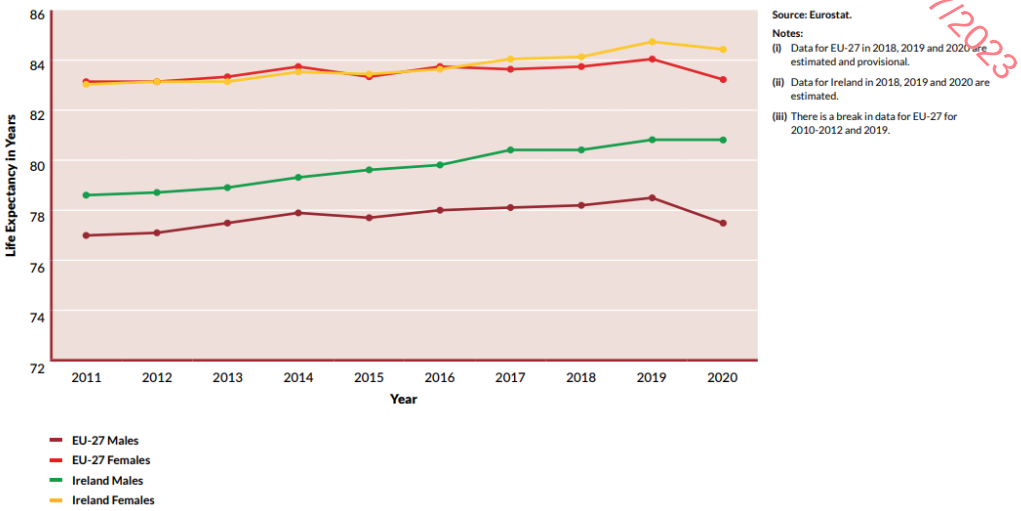


Figure 5.8: Extract from Health in Ireland: Key Trends 2022, Figure 1.5 showing Life Expectancy at Birth by Gender. Source: Department of Health, 2022**.**

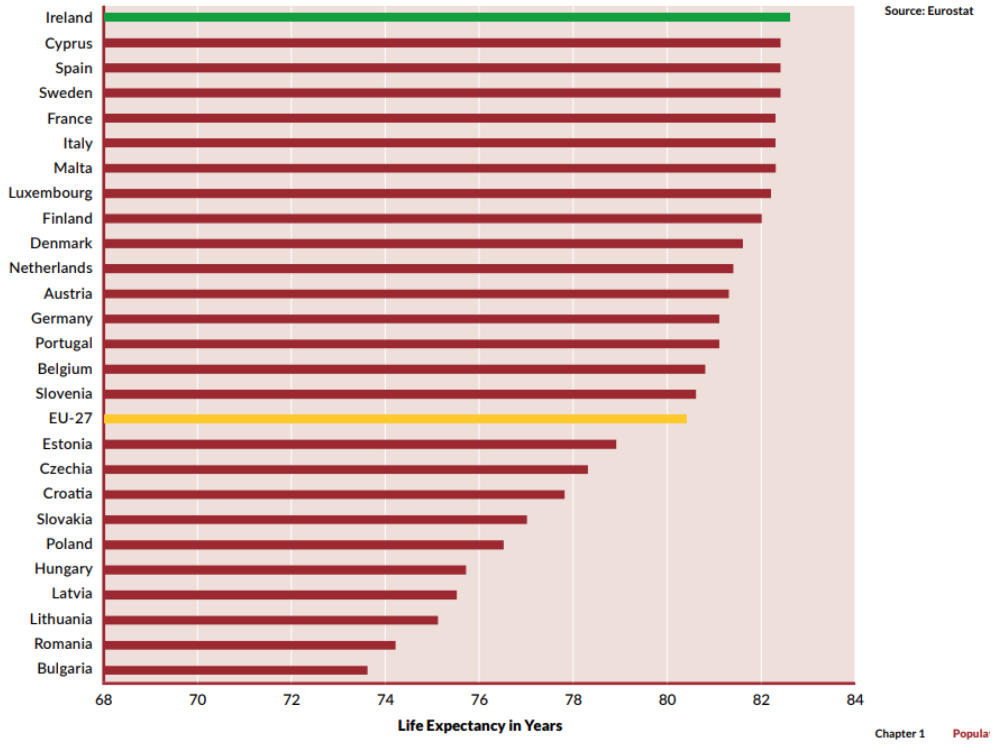


Figure 5.9: Extract from Health in Ireland: Key Trends 2022, Figure 1.6 showing Life Expectancy at Birth for EU27 Countries, 2020. Source: Department of Health, 2022.

Mortality

Health in Ireland: Key Trends 2022 states that:

RECEIVED: 18/07/2023

"The greatest gains in life expectancy have been achieved in the older age groups reflecting decreasing mortality rates from major diseases."

Furthermore:

"age-standardised mortality rates have declined for all causes over the past decade by 15.8%. This decrease is particularly strong for mortality rates from suicide (-32.6%), Transport accidents (-54.7%), pneumonia (-59.1%) and stroke (-47.8%). Infant mortality, measured as deaths per 1,000 live births, has also decreased by 14.3% since 2011 and remains below the EU average."

Principal Causes of Death: Numbers and Age-Standardised Death Rates per 100,000 Population, 2012-2021

		2012	2016	2020	2021(p)	% change 2012-2021	% change 2020-2021
All Causes	Number	29,186	30,667	32,856	33,055	13.3	0.6
	Rate	1048.5	994.3	905.5	882.5	-15.8	-2.5
Diseases of the circulatory system							
All Circulatory System Diseases:	Number	9,480	9,237	8,835	8,753	-7.7	-0.9
	Rate	360.5	313.6	250.1	238.4	-33.9	-4.7
Ischaemic Heart Disease:	Number	4,758	4,449	4,207	4,121	-13.4	-2.0
	Rate	178.2	148.0	117.7	111.2	-37.6	-5.5
Stroke:	Number	1,935	1,830	1,548	1,423	-26.5	-8.1
	Rate	75.2	63.2	44.2	39.2	-47.8	-11.1
Cancer							
All Malignant Neoplasms:	Number	8,571	9,171	9,648	9,436	10.1	-2.2
	Rate	290.1	279.7	258.7	245.8	-15.3	-5.0
Cancer of the Trachea, Bronchus and Lung:	Number	1,801	1,976	2,041	1,985	10.2	-2.7
	Rate	60.6	59.5	54.3	51.2	-15.5	-5.7
Cancer of the Female Breast:	Number	689	755	771	686	-0.4	-11.0
	Rate	40.2	40.7	37	32.1	-20.0	-13.1
Diseases of the Respiratory system*							
All Respiratory System Diseases:	Number	3,497	3,935	3721	3,011	-13.9	-7.9
	Rate	137.6	135.8	93.4	83.0	-39.7	-11.1
Chronic Lower Respiratory Disease:	Number	1,587	1,712	1,541	1,443	-9.1	-6.4
	Rate	59.8	57.3	43.7	39.8	-33.6	-9.1
Pneumonia:	Number	1,086	1,086	759	677	-37.7	-10.8
	Rate	45.8	39.9	22	18.7	-59.1	-14.9
External causes of injury and poisoning							
All Deaths from External Causes:	Number	1,577	1,323	1,692	1,428	-9.4	-15.6
	Rate	40.9	33.0	38.7	32.4	-20.9	-16.4
Transport Accidents:	Number	162	145	114	82	-49.4	-28.2
	Rate	3.9	3.5	2.5	1.8	-54.7	-29.7
Suicide:	Number	541	437	465	399	-26.2	-14.2
	Rate	12.1	9.5	9.6	8.2	-32.6	-15.2

Source: Central Statistics Office, Public Health Information System (PHIS) - Department of Health.

Notes:

(i) (p) The figures for 2021 are provisional. They should be treated with caution as they refer to deaths registered in these years and may be incomplete.

(ii) The rates provided in the table are age-standardised to the European standard population and are presented as rates per 100,000 population.

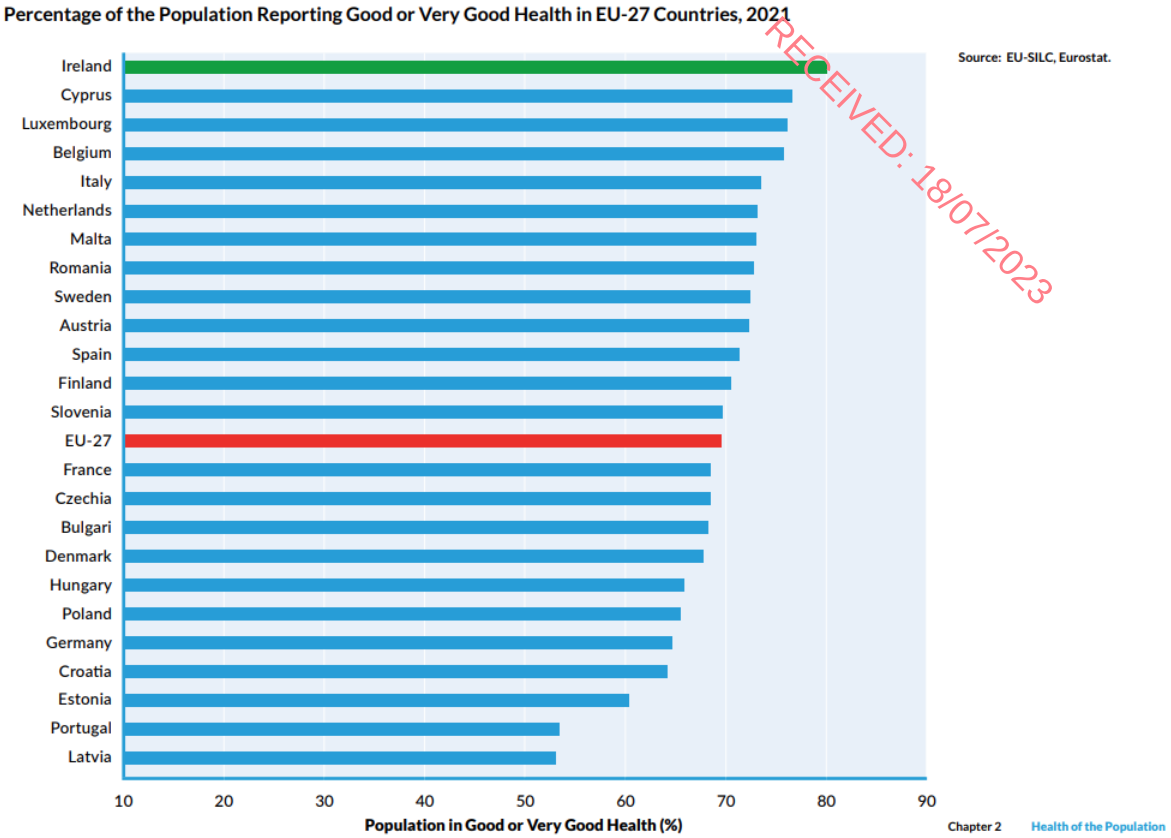
(iii) *Excludes cancer of the trachea, bronchus and lung.

Figure 5.10: Extract from Health in Ireland: Key Trends 2021, Table 2.4 showing Principal Causes of Death and Infant Mortality Rate: Numbers and Age Standardised Death Rates Per 100,000 Population 2012 to 2021. Source: Department of Health, 2022.

Perceived Health Status

At the national level, the Health in Ireland report identifies that:

"Ireland has the highest self-perceived health status in the EU, with 82.1% of people rating their health as good or very good. The number of people reporting a chronic illness or health problem is also better than the EU average, at around 29% of the population. However, as shown in Figure 2.1, health status reflects income inequality, with fewer low-income earners reporting good health both in Ireland and across the EU."



RECEIVED: 18/07/2023

Figure 5.11: Extract from Health in Ireland: Key Trends 2022, Figure 2.2 showing Percentage of the Population Reporting Good or Very Good Health in EU-27 Countries, 2021. Source: Department of Health, 2022.

At the local level, 89.5% of people living in Kildare reported their health to be 'Good' or 'Very Good' accounting for c. 199,141 No. people within the Local Authority. These figures are mirrored within the ED Study Areas, which reported an average c. 87.5% of the population as having 'Good' or 'Very Good' health in 2016. Only an average of 1.5% of the population in each area perceived themselves as having 'Bad' or 'Very bad' health at the time of the Census.

General Health	ED – Leixlip		ED - Celbridge		Donaghcumper ED		Lucan-St. Helens ED	
	No. Person	% Total	No. Person	% Total	No. Person	% Total	No. Person	% Total
Very good	430	63	371	58	115	46.5	529	55.5
Good	179	26	189	30	95	38.5	308	32.5
Fair	58	8	52	8	28	11	63	6.5
Bad	6	1	8	1.5	2	1	9	1
Very bad	0	0	3	0.5	1	0.5	5	0.5
Not stated	12	2	12	2	7	2.5	35	4
Total	**685**	**100**	**635**	**100**	**248**	**100**	**949**	**100**

Table 5.6: Population by General Health Status – Self Reported (Source: CSO, 2016).

RECEIVED: 18/07/2023

Over 91 per cent stated that their health was very good or good in the top 5 towns in Ireland, Malahide (92.5%), Carrigaline (92.4%), Maynooth (91.8%), Greystones (91.4%) and Celbridge (91.2%). Maynooth and Celbridge, two of the EDs within our study are, are both within the top 5.

Kildare is within the top 5 healthiest counties in Ireland alongside Meath, Dun Laoghaire-Rathdown, Cork and Wicklow.

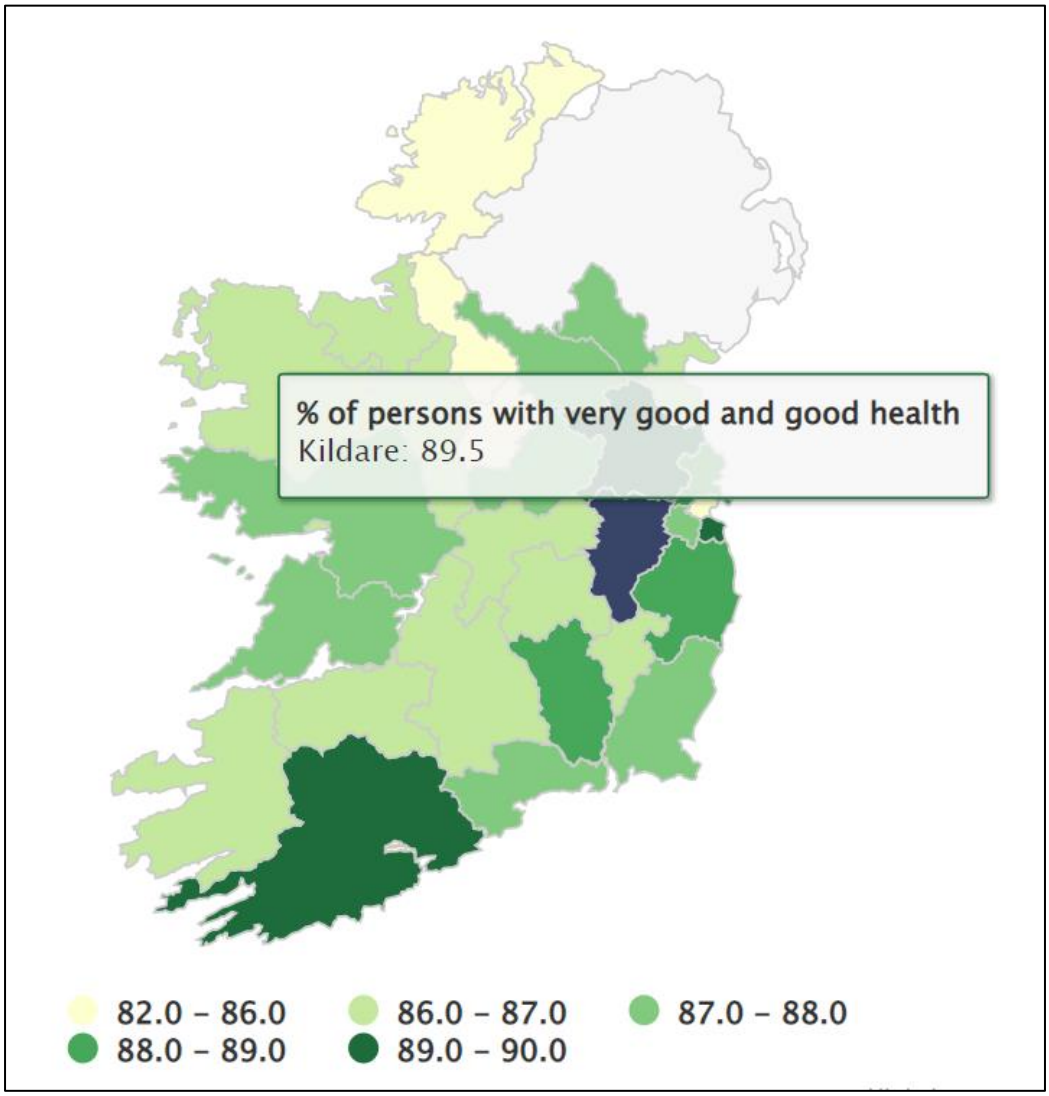


Figure 5.12: Percentage of persons with very good and good health, 2016. (Source: CSO.ie.)

5.4.1.3 Significance and Sensitivity of the Population and Human Health

Population

The significance of the local population is like that of most of Ireland; however, all local populations and communities are unique to varying degrees.

Kildare is strategically located in the centre of Ireland, with good transport links to Dublin, the capital city, and other parts of the country. This makes it an important transportation hub and an attractive location for businesses and industries.

RECEIVED: 18/07/2023

Kildare has a diverse economy, with significant sectors including agriculture, manufacturing, technology, and services. The county is home to many major international companies, including Intel, Pfizer, and Kerry Group, which contribute to the local economy and provide employment opportunities.

Kildare has a rich history and cultural heritage, with many historic sites and landmarks. The county is also known for its horse racing heritage, with the famous Curragh racecourse located in the heart of the county.

Overall, the population of County Kildare contributes to the county's significance and importance as a major economic, social, and cultural hub in Ireland

Regarding sensitivity, the population of Kildare is dependent on certain key industries, including manufacturing, technology, and services. Changes or disruptions in these sectors, such as job losses or factory closures, can have a significant impact on the local economy and the population's livelihoods.

Housing affordability is an issue in Kildare, like the whole of Ireland, particularly in the urban areas where the population is concentrated. The high cost of housing can make it difficult for people to find suitable accommodation and may lead to overcrowding or homelessness.

The population of Kildare is also dependent on a range of infrastructure, including transportation networks, healthcare facilities, and social services. Disruptions or deficiencies in these systems can impact the population.

Overall, the sensitivity of the population of Kildare highlights the need for proactive planning and management to address the vulnerabilities and ensure the resilience of the population and the wider community.

Human Health

The significance of human health is indisputably high. Good health is an important factor in the overall quality of life. A healthy population is more likely to enjoy a high standard of living, be more productive, and contribute more to society.

Health is also often seen as a key aspect of national identity. A healthy population can contribute to a positive image of a country and help to promote tourism and other industries.

Overall, the health of the Irish population is important for a range of reasons, including its impact on quality of life, the economy, public health, social cohesion, and national identity.

Regarding sensitivity, Ireland has made significant progress in improving health outcomes in recent decades, with improvements in life expectancy and reductions in mortality rates for many diseases. However, there are still significant health challenges facing the population, including high rates of obesity, alcohol consumption, and smoking.

RECEIVED 18/07/2023

In addition, the COVID-19 pandemic has highlighted the sensitivity of the Irish population's health to factors such as infectious diseases and access to healthcare resources. The pandemic has had a significant impact on the Irish healthcare system, leading to disruptions in healthcare services and significant pressure on hospitals and healthcare workers.

Like many locations around the world, Kildare is vulnerable to the impacts of climate change, including flooding, extreme weather events, and changes in temperature and rainfall patterns. These can have impacts on the local environment, economy, and the health and well-being of the population.

Overall, while Ireland has made progress in improving health outcomes, there are still significant challenges facing the population, and the sensitivity of the population's health to a range of factors highlights the need for ongoing investment in healthcare, public health, and social determinants of health.

5.4.2 Likely Future Receiving Environment ('Do Nothing' Scenario)

The EIA Directive requires the following to be described relating to the future receiving environment (the 'Do Nothing' scenario):

> *"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".*

5.4.2.1 Population

Economy

In the event of a 'Do Nothing' scenario, the site would remain in operation as an existing ICT campus. It would mean that the national and local economy would not benefit from the estimated €5 Billion economic output of the KIC proposal (see accompanying Grant Thornton *Economic Impact Assessment*), meaning that the nation and local area would fail to capitalise on a significant opportunity for inward investment in an increasingly competitive global market.

However, as the campus is earmarked for redevelopment, the likely future scenario regardless of this specific development is that the economy would receive FDI through an alternative development if funding could be sourced; however, it is difficult to put a figure on the economic impact of an alternative likely future scheme as alternative schemes have different economic impacts depending on factors such as proposed uses and scale.

Employment

Employment at the campus and surrounding area would generally remain the same or potentially increase or decrease depending on future investment into the existing campus; the campus would remain supported for employment generation in the Kildare

Development Plan 2023-2029 and Leixlip Local Area Plan 2020-2023. Commuter Patterns would likely remain the same and the surrounding area would not benefit from the linkage of Leixlip to Celbridge through the site.

RECEIVED: 18/07/2023

If expansion never progressed, the Kildare would not receive an increase c. 4,000 direct and c. 1,100 indirect full time employment jobs (see accompanying Grant Thornton *Economic Impact Assessment*), which would mean that the local area, county and nation would miss out on a significant opportunity for increased employment generation in an increasingly competitive global market.

Housing

Nationally, housing supply would continue to experience serious supply issues. The National Planning Framework (NPF) (2018) states that to meet projected population and economic growth, as well as increased household formation, annual housing output will need to increase to 30,000 to 35,000 homes per annum in the years to 2027 and will be subject to monitoring and review. The NPF further states that from now until 2040, an average output of at least 25,000 new homes will need to be provided in Ireland every year to meet people's needs.

The 2021 Housing for All policy plan document states a higher figure of 33,000 No. homes is needed per year until 2030. The future housing stock is currently being projected at 25,000-29,000 No. homes per year according to Property Industry Ireland and MyHome.ie.

Locally, the Kildare County Development Plan 2023-2029, through a housing needs and demand assessment, concluded the need for a housing supply target of approximately 9,144 No. housing units for the county to the end of 2028.

According to 2022 CSO data on dwelling completions, there were approximately 3,100 No. dwellings built in Kildare in 2022. If that trend continued until 2028, approximately 15,500 No. homes would be built in Kildare in that period, well exceeding the County Development Plan target of 9,144 No. housing units. As such, an alternative likely future expansion scheme would likely be able to be sufficiently housed in Kildare and or surrounding counties.

Social Infrastructure and Amenities

The existing social infrastructure and amenities at the subject site are limited to the existing campus and car parking, which provide low levels of social services to the local area. The site forms part of a designated protected view between Castletown House and the Wonderful Barn.

Whilst the protected view is currently framed by planting, it is largely inaccessible to the wider public as the campus is restricted access only. Should the project not progress, the campus would remain in operation; however, the opportunity for the provision of new access through the site and overall permeability would be lost.

If the campus did proceed with a likely alternative development or alternative developer, it is uncertain whether such infrastructure would be provided.

RECEIVED: 18/07/2023

Cumulative Impacts

The Strategic Environmental Assessment prepared for the Kildare County Development Plan 2023-2029 has assessed the likely evolution of the County during the course of the Development Plan and the likely impacts. We have reviewed that assessment and conclude that it has reasonably assessed the likely evolution of the County through the implementation of the Development Plan. That assessment has *inter alia* considered predicted results from development of zoned land (including the subject principal site, which is zoned for redevelopment regardless of the project going ahead) in the county.

Regarding Population (and human health), the Strategic Environmental Assessment prepared for the Kildare County Development Plan 2023-2029 states that:

> *"The delivery of the Settlement Strategy in County Kildare is likely to result in an overall positive effect on population and human health through the accommodation of an additional 25,146 people. The stipulation in the Core Strategy that development be delivered in a sustainable and compact way is likely to result in a neutral environmental effect as development will be focused within the existing built-up footprint on suitably zoned, previously developed land insofar as possible. This discourages urban sprawl, reduces traffic movements, enhances the public realm and encourages more sustainable transport methods.*
>
> *The successful implementation of the policies and objectives relating to a resilient economy and job creation are likely to result in a general, overall positive effect on population and human health through the provision of job opportunities, educational opportunities, tourism opportunities and subsequent economic growth in the County.*
>
> *Similarly, the provision of high-quality transport systems and sustainable transport in County Kildare is likely to result in a positive effect on population and human health through the facilitation of movement through the county and increased opportunities for movement and exercise. However, the development of new transport infrastructure has the potential to result in negative environmental effects."*

Regarding the facilitation works site, the lands are likely to remain as is, with no impacts predicted.

5.4.2.2 Human Health

The impacts on health in a 'Do Nothing' scenario have been assessed using the proxy measures assessed in the other chapters of the EIAR such as air, climate, noise etc. for both the principal works and facilitation works and have been collated below.

Air

Under the Do Nothing Scenario no construction works will take place and the previously identified impacts of fugitive dust and particulate matter emissions and emissions from equipment and machinery will not occur. The ambient air quality at the site will remain as per the baseline and will change in accordance with trends within the wider area, changes

in road traffic, etc. Therefore, this scenario can be considered ***neutral*** in terms of air quality.

RECEIVED: 18/07/2023

Under the Do Nothing Scenario no operational emissions will take place. The ambient air quality at the site will remain as per the baseline and will change in accordance with trends within the wider area, changes in road traffic, etc. Therefore, this scenario can be considered ***neutral*** in terms of air quality.

Climate

Under the Do Nothing Scenario no construction works will take place and the previously identified impacts of GHG emissions and emissions from equipment and machinery will not occur. The climate at the site will remain as per the baseline and will change in accordance with trends within the wider area, changes in road traffic, etc. Therefore, this scenario can be considered ***neutral*** in terms of climate.

Under the Do Nothing Scenario no operational emissions will take place. The climate at the site will remain as per the baseline and will change in accordance with trends within the wider area, changes in road traffic, etc. Therefore, this scenario can be considered ***neutral*** in terms of climate.

Noise and Vibration

In the event of a 'Do Nothing' scenario, the site would remain in operation as an existing ICT campus.

It would mean the noise environment at the nearest noise sensitive locations and within the development site will remain largely unchanged resulting in a neutral and local impact in the long-term.

Waste

If the proposed development was not to go ahead (i.e. in the Do-Nothing scenario) there would be no demolition, excavation or construction at this site. Current or operational waste would continue to be generated at the same levels.

The site is zoned for development, and it is likely that in the absence of this subject proposal that a development of a similar nature would be progressed on the site that accords with national and regional policies and therefore the likely significant effects would be similar to this proposal.

Traffic

The proposed development site is part of the former Hewlett Packard campus. There are an existing ten buildings on site totalling a footprint of 130,064sqm of manufacturing, warehouse plus ancillary office, with staff facilities including cafeteria and gym. The entire footprint consists of 136,066sqm when including plant rooms and link corridors.

The occupancy of the site, at the time of the traffic counts was circa 800 staff compared to the full occupancy capacity under Hewlett Packard of circa 3,000 staff. Kildare County Council's Local Area Plan (LAP) 2020-2026 recognises that, given the size and scale of the

site, it is important to work with all stakeholders to ensure the site can be redeveloped and remain a key employment hub, both for Leixlip, and for the wider Dublin Metropolitan Area. The site is currently zoned for category H: Industry and Warehousing.

RECEIVED: 18/07/2023

It is possible that the site be reoccupied to full capacity of circa 3,000 staff with associated traffic generation, without any planning process. The effects of the do nothing scenario are therefore considered to be neutral.

Land and Soils

It is likely that the land use will change over time even if this development does not go ahead. The associated impact of any such development will be similar to the proposed development for the underlying land soils and hydrogeological regime.

In the event of a 'Do Nothing' scenario, the subject site would remain in operation as an existing ICT campus and so potential effects are considered to be neutral.

Visual Impact

In the 'Do Nothing' scenario the lands and surroundings would be subject to incremental changes over time due to land use changes, vegetation growth and other factors.

Cumulative Impacts

Regarding human health (and population), the Strategic Environmental Assessment prepared for the Kildare County Development Plan 2023-2029 states that:

> *"The delivery of the Settlement Strategy in County Kildare is likely to result in an overall positive effect on population and human health through the accommodation of an additional 25,146 people. The stipulation in the Core Strategy that development be delivered in a sustainable and compact way is likely to result in a neutral environmental effect as development will be focused within the existing built-up footprint on suitably zoned, previously developed land insofar as possible. This discourages urban sprawl, reduces traffic movements, enhances the public realm and encourages more sustainable transport methods.*
>
> ***The successful implementation of the policies and objectives relating to a resilient economy and job creation are likely to result in a general, overall positive effect on population and human health through the provision of job opportunities, educational opportunities, tourism opportunities and subsequent economic growth in the County.***
>
> *Similarly, the provision of high-quality transport systems and sustainable transport in County Kildare is likely to result in a positive effect on population and human health through the facilitation of movement through the county and increased opportunities for movement and exercise. However, the development of new transport infrastructure has the potential to result in negative environmental effects."*

[Our emphasis.]

Regarding the facilitation works, the lands are likely to remain as is, with no impacts predicted. However, it is possible that the facilitation works, or similar, are implemented at some point in the future to facilitate alternative redevelopment on the site or on other lands in the surrounding area.

RECEIVED: 18/07/2023

5.5 Likely Impacts of the Project

5.5.1 Construction Phase

5.5.1.1 Population

Economy

Construction is expected to be completed within a period of c. 11 years. It is predicted that the investment turnover on completion of construction will be c. €2.5 Billion. This will result in a medium-long term significant positive, indirect and direct impact on the local and national economy.

Table 4.4 Proposal Benefits: Economic Output (€ billion)

Proposal Benefits: Investment Turnover(€ billion)			
Type of activity	**Investment**	**GVA²**	**Total**
Construction	2.5	0.8	3.3
Operating¹	0.3	1.4	1.7
Total	**2.81**	**2.19**	**5.00**

¹ Estimated using operating costs based on IDA Econ. Impact of €12.4 million/year per data centre on average from existing data centres surveyed. Current proposal estimates a lifespan c.25 years
² Estimated using CSO 2020 total turnover as a ratio of its total GVA for Computer programming, consultancy and Information service activities (62,63) and Construction (41 to 43)

Figure 5.13: Table 4.4 Proposal Benefits: Economic Output (€ billion). (Source: Economic Impact Assessment prepared by Grant Thornton, dated April 2023.)

It is predicted that there will be a medium term slight positive, indirect and direct impact on local business activity during the construction phase with the increased presence of an average of 600 No. construction workers regularly using local facilities.

Table 4.2 Proposal benefits: Wages (€ Thousand)

Proposal Benefits: Wages (€ Thousand)			
Type of activity	**Direct¹**	**Indirect²**	**Total**
Construction	20,108	11,703	31,811
Operating	192,227	42,867	235,094
Total	**212,335**	**54,570**	**266,905**

¹ Estimated using total direct jobs benefited and CSO 2012-2020 average annual wages and salaries per employee in the ICT and Construction sectors respectively
² Estimated using CSO output multiplier for Computer programming, consultancy and Information service activities (62, 63) and Construction (41 to 43)

Figure 5.14: Table 4.2 Proposal benefits: Wages (€ Thousand). (Source: Economic Impact Assessment prepared by Grant Thornton, dated April 2023.)

Employment

RECEIVED: 18/07/2023

It is anticipated that the proposed development will have a moderate positive, indirect and direct impact on employment in terms of construction, material manufacture, maintenance contracts, equipment supply, landscaping etc.

Housing

There are no likely significant negative impacts on housing predicted during construction.

Social Infrastructure and Amenities

As the campus is currently 'closed' to the public, there are no significant negative impacts on social infrastructure and amenities predicted during construction within the campus.

Construction of the M4 Overpass Bridge, although a significant piece of social infrastructure in and of itself and in the absence of standard mitigation, the construction could result in temporary slight negative effects to local amenities. However, it is not predicted to significantly impact on the existing amenities of the wonderful barn lands or the surrounding area as a construction and environmental management plan has been prepared by CSEA and submitted as part of this application.

That plan will be adhered to during construction, as well as the mitigation measures proposed within this EIAR, meaning that there are no likely significant impacts predicted on the social infrastructure as a result of human error or unintended accidental damage caused during the construction process.

5.5.1.2 Human Health

Air

A full outline of potential impacts to Air Quality is contained in chapter 9 of the EIAR. The findings can be summarised as follows:

Construction dust has the potential to cause local impact through dust nuisance at the nearest sensitive receptors. Construction activities such as excavation, earth moving and backfilling may generate quantities of dust, particularly in dry and windy weather conditions. While dust from construction activities tends to be deposited within 200m of a construction site, the majority of the deposition occurs within the first 50m. The extent of any dust generation depends on the nature of the dust (soils, peat, sands, gravels, silts etc.) and the nature of the construction activity. In addition, the potential for dust dispersion and deposition depends on local meteorological factors such as rainfall, wind speed and wind direction. Vehicles transporting material to and from the site also have the potential to cause dust generation along the selected haul routes from the construction areas.

The proposed development will comprise construction of an energy centre and associated ancillary development. The key civil engineering works which will have a potential impact on air quality during construction are summarised below:

During construction, an amount of soil will be generated as part of the site preparation works and during excavation for installation of foundations, drainage services and ancillary infrastructure;

RECEIVED: 28/07/2023

- Following completion of the building shell, commissioning of the mechanical and electrical equipment is undertaken;
- Infilling and landscaping will be undertaken. Spoil generated during site preparation will be re-used where possible;
- Temporary storage of construction materials and fuels; and
- Construction traffic accessing the site will emit air pollutants during transport.

As outlined in Section 9.6, dust mitigation measures will be implemented for the construction phase of the proposed development to ensure no dust nuisance occurs at nearby sensitive receptors.

Appendix 8 of the "*Guidelines for the treatment of Air Quality During the Planning & Construction of National Road Schemes*"[31] discusses construction phase impacts. Table 9.4 shows the potential distance for dust soiling from source ranges from 25m to 100m and for the potential significant impact to PM_{10}, the distance ranges from 10m to 25m depending on the scale of the construction activity. Given that the façade of the nearest residence is greater than 100m from the nearest boundary, the guidance above would indicate that there is negligible potential for impacts from soiling, PM_{10} and to vegetation and therefore, no significant impacts are expected. The impact due to construction dust at sensitive receptors is predicted to be **long-term**, **reversible**, and **imperceptible**.

Initial commissioning activities will involve testing of the back-up generators on site for 4 hours at 90% load, i.e. the first testing sequence will be commissioning of the back-up generators. The operational modelling has considered load testing of the generators four time per year at 90% load and and this does not result in a significant impact to air quality. Therefore, it is predicted that the initial commissioning tests for the back-up generators will result in an ***imperceptibly negative*** impact to air quality in the ***short-term*** and thus have a ***not significant*** impact.

Climate

The proposed development will comprise demolition of several existing buildings and construction of Deep Tech buildings, data centres, an energy centre, a substation and associated ancillary development and facilitation works. The key civil engineering works which will have a potential impact on climate during construction are summarised below:

During demolition of Buildings No's 7, 8 and 9 there will be the potential for GHG emissions associated with the generation and movement of the waste material associated with the demolition. A combination of excavators, trucks and other soil shifting plant will undertake the main site clearance, demolitions, and levelling aspects on a phase by phase basis.

- During demolition and construction, GHG emissions from machinery will occur as part of the site preparation works and during excavation for installation of foundations, drainage services and ancillary infrastructure;
- Following completion of the building shell, commissioning of the mechanical and

RECEIVED: 18/07/2023

electrical equipment is undertaken;

- Infilling and landscaping will be undertaken. Spoil generated during site preparation will be re-used where possible thus reducing GHG emissions from transport; and

- Construction traffic accessing the site will emit air pollutants during transport.

In relation to the facilitation works, the main work with the potential for GHG emissions is the laying of a new gas pipeline within the Barnhall Meadows Lands, underneath the M4 and into the Kildare Innovation Campus. However, the GHG emissions associated with these works will not be significant.

Noise and Vibration

The largest noise and vibration impact of the proposed development will occur during the construction phase due to the operation of various plant machinery and HGV movement to, from and around the site. In this instance, the construction phase can be classed as a mid-term phase (approximately ten years in duration on a phased basis as described in Chapter 2 Section 2.6). The nearest noise-sensitive location to the proposed development is the childcare facility to the south of the proposed development at a distance of 40 m from the boundary and a distance of 100 m from the nearest proposed building.

Based on the results of the baseline noise surveys undertaken, the ambient daytime noise level at these properties was found to be between 56 and 63 dB LAeq,15min.

Thresholds for significant noise from construction can be determined by referring to and the baseline ambient noise levels, as outlined in the assessment criteria section. The daytime significance threshold for construction noise at the site is set at 65 dB LAeq,1hr. A night-time threshold is not included as construction work will not be taking place at night.

The effect of construction noise is considered negative, not significant to moderate and medium-term.

Potential for vibration impacts during the construction phase programme are likely to be limited given the ground breaking, piling and excavations required. There is potential for piling to be used for building and basement foundations for office and apartment buildings.

In this instance, taking account of the distance to the nearest sensitive off-site buildings, vibration levels at the closest neighbouring buildings are expected to be orders of magnitude below the limits. Vibration levels are also expected to be below a level that would cause disturbance to building occupants. The potential vibration impact during the construction phase if of neutral, imperceptible and medium-term impact.

Water

Increased Run-off and Sediment Loading

Surface water run-off from site preparation, levelling and excavations during the construction phase may contain increased silt levels or become polluted from construction

activities. Run-off containing large amounts of silt can cause damage to surface water systems and receiving watercourses. Silt water can arise from excavations, exposed ground, stockpiles, and access roads.

RECEIVED: 19/07/2023

During the construction phase at this site there is potential for a slight increase in run-off due to the introduction of impermeable surfaces, increase in hardstanding (171,641.88 m^2) and the compaction of soils. This will reduce the infiltration capacity and increase the rate and volume of direct surface run-off. The potential impact of this is a possible increase in surface water run-off and sediment loading which could potentially impact local drainage. In particular through the excavation works required to facilitate the local extension upgrades of the gas transmission network over a length of approximately 7km from the R136 roundabout at Lucan.

Excavation for foundations, services, and landscaping

The proposed development will require site preparation, excavations and levelling for foundations, the installation of services and landscaping. The GNI upgrades will be delivered through a local upgrade of the gas network over a length of approximately 1.5km Ryevale Lawns along Station Road, Old Hill and Celbridge Road for a distance of approximately 1.5km up to the entrance of Barnhall Meadows. The pipe will run under the existing road pavement. At the entrance to Barnhall Meadows, the pipe will run underground through the Barnhall Meadows lands (adjacent to the existing haul road) and will then cross the M4 Motorway through Horizontal Directional Drilling and enter the Kildare Innovation Campus then connecting to the proposed Gas Skid.

Some removal of perched rainwater from the excavation may be required. Volumes will be quite low, and all pumped water will be subject to onsite settlement before release to the Leixlip Reservoir.

Contamination of Local Water Courses

During the construction phase, there is a risk of accidental pollution incidences from the following sources:

- Localised spillage or leakage of fuels (and oils) stored on site for construction.
- Spillage or leakage of fuels (and oils) from construction machinery or site vehicles.
- Spillage of oil or fuel from refuelling machinery on site.
- Alkaline run-off due to use of concrete and cement.

Machinery activities on site during the construction phase may result in contamination of runoff/surface water. Potential impacts could arise from accidental spillage of fuels, oils, paints etc. which could impact surface water if allowed to infiltrate to runoff to surface water systems and/or receiving watercourses. However, implementation of the mitigation measures detailed in Sections 8.6.1 will ensure that this does not occur.

The magnitude of the impact for the construction phase (outlined above) without mitigation and design measures is Temporary in duration with Slight effect rating to the hydrological environment present.

RECEIVED: 18/07/2023

Traffic

The proposed development will be constructed over three phases with the proposed Link Road delivered in phase one. For the traffic and transport assessment it has been anticipated that the full development will be occupied by 2035. Phase one and phase two will be from 2024 to 2028 while phase three is planned to start in 2028. Phase three includes the demolition of some existing buildings on site.

A Construction Traffic Management Plan accompanies this application. Estimates of traffic generation associated with the construction phase has been provided by the design team engineers, at this stage of development proposals it is anticipated that 76 vehicular movements per new unit will be generated per hour during the working day. The proposed route of construction vehicles will be to and from the M4 along Barnhall Road.

As the application progresses it will be possible to make a more informed assumption of staff traffic during construction periods. This will be agreed with the road section of Kildare County Council.

Temporary car and cycle parking facilities for construction vehicles and staff will be provided within the site boundary.

Construction traffic associated with the known facilitation works will be managed by GNI and ESB / Eirgrid, through traffic management plans.

Land and Soils

- There was no evidence of waste deposited on-site during Site investigation works carried out by IGSL in 2019. Therefore the risk of contaminated soils being present onsite is low and this was confirmed by onsite soil sampling and analysis. Nonetheless material, which is exported from site, if not correctly managed or handled, could impact negatively on human beings (onsite and offsite) as well as water and soil environments.
- Excavation of soil will be required for levelling of the site to render it suitable for building the proposed development. Excavation of soil, tarmac and hardcore will be required for both the principal works and some of the facilitation works. The GNI upgrades will be delivered through a local upgrade of the gas network over a length of approximately 1.5km Ryevale Lawns along Station Road, Old Hill and Celbridge Road for a distance of approximately 1.5km up to the entrance of Barnhall Meadows. The pipe will run under the existing road pavement. At the entrance to Barnhall Meadows, the pipe will run underground through the Barnhall Meadows lands (adjacent to the existing haul road) and will then cross the M4 Motorway through Horizontal Directional Drilling and enter the Kildare Innovation Campus then connecting to the proposed Gas Skid.
- Local removal and reinstatement (including infilling) of the 'protective' topsoil and subsoil cover across the development area at the site will not change the overall vulnerability category for the site which is already 'high to extreme'. Capping of the energy centre, data centre, deep tech buildings and the overall substation footprint of the site by hardstand/ building following construction and installation of drainage which will minimise the potential for contamination of the aquifer beneath the site: The Locally Important Bedrock Aquifer (Ll) which is moderately productive in local zones only. Site investigation and laboratory analysis has not

identified any existing contamination with hazardous substances. Although, there is no soil quality data obtained along the route of the 110kV transmission line upgrades. No treatment of any water will be required during construction works.

- The proposed development will require site preparation, excavations and levelling for foundations, the installation of services and landscaping. It is assumed that the material removed along the roadways for the GNI pipeline upgrades is expected to be contaminated. This material will be required to be removed and disposed by a licenced contractor to an appropriate waste facility.
- As with all construction projects there is potential for water (rainfall and/or groundwater) to become contaminated with pollutants associated with construction activity. Contaminated water which arises from construction sites can pose a significant short-term risk to groundwater quality for the duration of the construction if contaminated water is allowed percolate to the aquifer. The potential main contaminants include:
- Suspended solids (muddy water with increased turbidity (measure of the degree to which the water loses its transparency due to the presence of suspended particulates)) – arising from excavation and ground disturbance;
    - Cement/concrete (increase turbidity and pH) – arising from construction materials;
    - Hydrocarbons (ecotoxic) – accidental spillages from construction plant or onsite storage;
    - Wastewater (nutrient and microbial rich) – arising from poor on-site toilets and washrooms.

Visual Impact

The Proposed Development is located within the Northern Lowlands Landscape Character Area, which has a low sensitivity according to the current Kildare County Landscape Character Assessment. The subject site and adjacent area are situated within a generally flat to gently undulating landscape. Leixlip is situated to the north and northeast, and Celbridge is located to the southwest. The site is immediately bound by the M4 motorway to the north, Castletown House and surrounding demesne to the southwest, and the R404 to the east. Beyond the R404, the River Liffey corridor extends in a southwest to northeast alignment, swelling to form the Leixlip Reservoir. Areas to the north include the infrastructure corridor of the M4 motorway. The Wonderful Barn and its surrounding area include allotments and remnants of a formerly designed landscape, which is bound by the M4 to the south and southwest and suburban housing estates to the east, north and west. The Royal Canal is situated to the north of the study area, largely defining the footprint of residential buildings to the north of Leixlip. Castletown House and demesne forms a significant and highly sensitive open green space within the study area, which contains a historically designed landscape which includes areas of open landscape with clusters of trees and axial views defined by tree lined avenues.

In addition, the surrounding landscape within the study area is characterised by agricultural fields enclosed by hedgerows, residential and commercial premises located along the local road network and the western fringes of Lucan, located within South County Dublin lands. Notable larger scale commercial developments within the study area include Backweston Airport and Backweston Laboratory Complex to the southeast, and Intel Ireland's Leixlip Campus to the north. The Proposed Development site contains areas of mature tree vegetation and open grassland. Three drainage ponds are located within the site along the south-eastern boundary.

RECEIVED: 18/07/2023

RECEIVED 18/07/2023

The Proposed Development will result in localised changes to landform to accommodate the bridge and other buildings. Construction plant, including boring equipment and lifting machinery, will be introduced, and typical construction features such as fencing, access tracks and construction compounds will be laid out. The presence and activity of construction machinery and associated features will degrade the condition of this landscape character area locally. The introduction of these features relating to construction will be temporary, medium term and reversible. The magnitude of landscape effects will be medium. Combined with a low sensitivity, the significance / quality of effects will be moderate / adverse during construction.

Adjoining landscape character areas such as the River Liffey landscape character area will remain unaffected during the construction phase apart from construction traffic crossing the river bridges. The magnitude of landscape effects will be negligible. Combined with a special sensitivity, the significance / quality of effects will be low / adverse during construction and temporary.

Landscape Character Areas located within the wider study area in South Dublin, namely Liffey Valley, Urban, and Newcastle Lowlands will not be altered by the proposed construction works. While construction traffic will pass temporarily along existing transport corridors within these landscape character areas, the landscape character will not be affected resulting in no landscape effects.

Visual Effects at Construction

Areas experiencing visual effects during the construction stage will vary depending on the active construction phase. All groundworks, demolishing, refurbishment or the construction of the buildings, road network, bridge and landscape architecture will be mainly experienced locally from within the boundary of the Proposed Development site. Views outside the development boundary and within the study area include the M4 and associated over-bridges, The Wonderful Barn and adjoining allotments, residences of Barnhall Meadows housing estate facing towards the proposed development. Intervening building structures, topography and vegetation will quickly screen the site in distances of approximately 400m from the development boundary and beyond.

Construction effects will result in:

- Potential effects to the visual amenity within the locality as a result of the visibility of construction activities such as demolitions works, the construction / refurbishment of buildings, associated scaffolding and tall equipment such as cranes and containers; and
- Effects of temporary site infrastructure such as site traffic and construction compounds especially those located in areas adjacent to sensitive visual receptors.

Photomontages 1-17 supplementing this assessment illustrate the landscape and visual effects at operational stage only. The proposed phasing of the construction works does not allow for a meaningful illustration in photomontages as these can only show one particular snapshot in time, which will not capture the dynamic and complex nature of construction works comprehensively.

Visual effects will be highest within the site, from areas immediately adjacent to the site boundary, and within a principal visual zone of approximately 400m radius from the

boundary of the Proposed Development site. Construction works of the proposed bridge will be visible along the M4 and the overbridges (R404 & Junction 6) for approximately 1.6km to the west and approximately 1km to the east although the existing bridge of the R404 will be more prominent on approach from the east. The visibility of construction works within the wider study area will be mainly limited to open areas where there are available views towards the site, that are unscreened by vegetation and intervening buildings.
Visual effects and their significance at construction stage will be temporary, adverse and range from Minor-Negligible (in the wider study area) to Major (within up to approximately 400m radius from the boundary of the Proposed Development site depending on the type of construction activities).

RECEIVED: 18/07/2023

Major accidents and/or disasters

The following scenarios have been identified that could impact the construction phase of the project:

Extreme heat or cold weather resulting in result structural damage and/or pollution to soils, groundwater or surface waters.
Storm events resulting in structural damage and/or pollution to groundwater and surface waters.
Flooding
Pollution to soils / groundwater / surface water

The impact and likelihood of these scenarios is assessed in Table 17. 5. There are no likely impacts on the project or to off-site receptors during the construction phase in relation to major accidents and disasters.

5.5.2 Operational Phase

5.5.2.1 Population

Economy

Table 4.4 Proposal Benefits: Economic Output (€ billion)

Proposal Benefits: Investment Turnover(€ billion)			
Type of activity	**Investment**	**GVA²**	**Total**
Construction	2.5	0.8	3.3
Operating¹	0.3	1.4	1.7
Total	**2.81**	**2.19**	**5.00**

¹ Estimated using operating costs based on IDA Econ. Impact of €12.4 million/year per data centre on average from existing data centres surveyed. Current proposal estimates a lifespan c.25 years
² Estimated using CSO 2020 total turnover as a ratio of its total GVA for Computer programming, consultancy and Information service activities (62,63) and Construction (41 to 43)

Figure 5.15: Table 4.4 Proposal Benefits: Economic Output (€ billion). (Source: Economic Impact Assessment prepared by Grant Thornton, dated April 2023.)

The facilities are designed to the best international standards and will assist in attracting and retaining large businesses and workers to the area of the LGA and more particularly within a part of the county where targeted increased employment opportunities are encouraged. This represents a long-term, positive economic impact on the local economy.

RECEIVED: 19/07/2023

The increased population will also generate additional spending within the area, which will positively contribute to local economic activity over time.

The operation of the facilitation works will facilitate the operation of a large employment generating campus that is predicted to generate a significant amount of jobs and Foreign Direct Investment. As such, the facilitation works are predicted to have a significant, positive, long-term indirect impact on the population.

There are predicted to be no significant negative impacts on the economy or on any of the other population headings/topics resulting from the operation of the facilitation works.

Employment

As found in the Economic Impact Assessment prepared by Grant Thornton, taking the proposed 195,000 sqm Gross Floor Space (GFS) and converting it into a Net Internal Area (NIA) following the 15% of the GFS recommended by the UK Employment Density Guide (3rd Edition, 2015), results in a predicted benefit to Kildare and the Mid-East region of 3,989 No. Direct jobs (FTE/year).

For the indirect jobs, estimated direct jobs were informed by the CSO output multiplier factor (2015, last review 2019) for "Computer programming, consultancy and Information service activities (62, 63)" of 1.22, which includes "Data Centre", and "Construction (41 to 43)"of 1.58 respectively. A further 1,105 jobs will be supported via indirect benefits.

Netting off existing jobs, when compared to the current headcount of 898 jobs/year, the net job benefits from the KIC is 4,196 FTE per year considering direct and indirect jobs, mostly ongoing and high skilled as one of the characteristics of Deep Tech and Data Centres.

Table 4.2 Proposal benefits: Wages (€ Thousand)

Proposal Benefits: Wages (€ Thousand)			
Type of activity	**Direct[1]**	**Indirect[2]**	**Total**
Construction	20,108	11,703	31,811
Operating	192,227	42,867	235,094
Total	**212,335**	**54,570**	**266,905**

[1] Estimated using total direct jobs benefited and CSO 2012-2020 average annual wages and salaries per employee in the ICT and Construction sectors respectively
[2] Estimated using CSO output multiplier for Computer programming, consultancy and Information service activities (62, 63) and Construction (41 to 43)

Figure 5.16: Table 4.2 Proposal benefits: Wages (€ Thousand). (Source: Economic Impact Assessment prepared by Grant Thornton, dated April 2023.)

Total direct jobs of 3,989 FTE/year operating will support €212 million in wages and salaries per annum (based on CSO 2012-2020 average annual wages and salaries per employee in the ICT and Construction sectors respectively). After applying the corresponding multiplier per sector, total direct and indirect operating wages supported by the proposal is €266 million.

Netting off the estimate of current wages supported via the companies in existing facilities (i.e. the wages from 898 existing jobs of €61m), the net operational wages benefit from the KIC is €206 million.

RECEIVED: 28/07/2023

Housing

The impact of a large ICT campus redevelopment on existing housing supply can be complex and depend on a variety of factors. The provision of additional jobs within the LGA will increase demand for housing in the area. Assuming that this demand can be addressed through the number of existing housing developments and future developments housing prices and rents are unlikely to be significantly impacted. However, if the demand can't be addressed, this could raise prices and rents. Considering that the current national and local housing supply is strained, it is likely that proposed development will have a slight negative impact on current housing supply in the form of increased prices and rents.

The development is likely to have indirect impacts on future housing supply. The campus will create jobs and attract businesses to the area, which is likely to increase demand for housing. This is likely to lead to the construction of new housing developments in the area, increasing the overall housing supply.

If demand for housing exceeds supply, it could lead to an increase in housing prices and rents. In response to this, developers may increase construction to meet demand, and the local and national government may implement policies such as zoning changes or tax incentives to encourage new housing development. Whether housing supply catches up with demand depends on a variety of factors; however, over time it is likely that the market will adjust to changing conditions resulting in no significant impacts on future housing supply meeting future demand.

Social infrastructure and amenities

The proposed development will have a direct positive impact on social infrastructure and amenities in the area. The project includes the provision of a pedestrian and cyclist link through the site improving connectivity of Leixlip to Celbridge, which previously only consisted of a pedestrian unfriendly connection via roadways. The connection also includes a new M4 overpass bridge that connects to the Wonderful Barn lands considered to be a high local cultural significance.

Furthermore, the existing campus is currently 'closed' to the public. The project proposes to 'open' the campus up to the public providing the local and wider population with access to landscape views, trails, and overall improved feeling of synergy between the Campus and the local communities.

The proposed development is also likely to indirectly drive the development of new infrastructure and amenities in the area, such as improved transportation networks and community facilities. This can make an area more attractive to residents, which can increase demand for housing and spur new development.

Overall, the project will have a long-term positive impact on the social infrastructure and amenities of the area.

5.5.2.2 Human Health

RECEIVED: 18/07/2023

Air

Air emissions during the operational phase of a project need to take into account the ambient air quality standards and ensure that air emissions remain in compliance with the ambient air quality standards. In relation to the proposed development, as outlined in Section 9.6, an iterative stack height determination was undertaken as part of the air dispersion modelling study to ensure that an adequate release height was selected for all emission points to aid dispersion of the plume and ensure compliance with the ambient air quality limit values at all locations beyond the site boundary.

Climate

The key works which will have a potential impact on climate during operation of the proposed development are summarised below. The facilitation works and the data halls and deep tech buildings will not be significant sources of GHG emissions:

i) The operation of the CTGs in the energy centre and the scheduled testing of the back-up generators in the data storage facilities will release GHG emission. For the purposed of this assessment, a worst-case assumption of the operation of the CTGs for 330 days per year although it is more likely that they will not operate for more than 1,500 hours per year.

ii) Indirect GHG emissions from electricity from the national grid which will power the proposed development;

iii) The infrequent emergency operation of the back-up generators for the data centres in the event of a loss of power from the National Grid due to a power outage would release GHG emissions. It has been assumed that the back-up generators will operate for 250 hours per year as a worse-case. A review of operational data from similar operational data centres in Ireland indicates that it is highly unlikely that the back-up generators would be used for emergency operations for more than 24 - 48 hours per year. This is an over-estimation of the actual usage;

iv) Road traffic accessing the site will emit GHG emissions. However, the operational phase of the proposed development will not contribute a significant volume of additional traffic on the local road network (see Chapter 13). Therefore, no local GHG emissions assessment of the traffic impact is required for this development.

The combustion turbine generators (CTG's) will be primarily fuelled by natural gas/biogas supplied by Gas Networks Ireland (GNI) via their existing high-pressure network (subject to upgrade). It is likely that the fraction of biogas in the network will increase substantially in future years. The facility will also include a 5-day supply of HVO as a backup fuel should the natural gas system be unavailable in an emergency situation. Hydrotreated Vegetable Oil (HVO) is a low-carbon biofuel that operates as a direct replacement for conventional diesel. It is made from renewable, sustainable raw materials which do not release any new CO_2 into the atmosphere. HVO is made from 100% renewable plant-waste matter and meets bio content requirements with no FAME (Fatty Acid Methyl Ester). HVO is considered to have substantially lower emissions[3] than traditional fossil fuels. It is noted that burning renewable diesel results in CO_2 emissions, however emissions from renewable diesels are significantly less than fossil fuel as growing the biomass feedstocks

for production of renewable diesel may offset the CO_2 produced in the burning of HVO. For comparison, fossil fuel derived diesel has a total lifecycle emissions of c. 94 gCO_2e/MJ while renewable diesel using waste cooking oil as feedstock can be as low as 5.6 gCO_2e/MJ.

RECEIVED: 18/07/2023

The data centre operator, similar to the energy centre, is committed to using HVO as the back -up fuel supply for the back-up generators where available. As such, significant environmental benefits will be achieved through the use of HVO as referenced above.

The determination of The Impact of the Operational Phase on Climate the operational phase impact of the Proposed Development, prior to mitigation, based on the EPA EIAR Guidelines (EPA, 2022), is considered long-term, negative and moderate.

Noise and Vibration

The primary sources of outward noise from the proposed development in the operational context are deemed long term and will involve:

1. fixed plant at data centres and energy centre;
2. emergency site operations, and;
3. a new public link road;
4. additional vehicular traffic on public roads, and
5. a pedestrian and cycle overpass.

Reference to Table 11.11 shows that the noise levels at Location E, which is a similar distance from the M4 Motorway as NSL13, were measured at 62-67 dB L_{Aeq} for daytime periods. In this context noise from the new public link road at this location is imperceptible. The environmental noise effects are neutral, imperceptible and long-term.

The predicted increase in traffic flows associated with the development in the year 2043 will result in an increase less than 3 dB along all roads receiving traffic from the proposed development; reference to Table 11.9 shows that noise from additional traffic flow will have a negligible effect. The effect is therefore neutral, imperceptible and long-term.

These issues are assessed in detailed in Chapter 11. The overall environmental noise effects are negative, not significant to moderate and long-term.

Water

The following risks have been considered in relation to the operational phase of the development:

Surface Water

There is a direct connection to the Leixlip Reservoir east of the site which falls part of the River Liffey. The site discharges its surface water runoff directly into the Leixlip Reservoir following confirmation of water quality through electronic monitoring mechanisms inclusive of shut off valves, upstream of the existing retention ponds near the existing site entrance off the Celbridge Road. The Kilmacredock_Upper watercourse is mapped on the

EPA as flowing in a south-easterly direction through the site. This watercourse has been diverted beneath the site via a 1.5m culvert and outfalls into the Leixlip Reservoir east of the Celbridge Road. The existing and proposed development does not discharge to the Kilmacredock_Upper watercourse. The SuDs features have been designed to accommodate surface water drainage from the proposed development. Attenuation measures include bio retention areas, attenuation ponds, swales, filter drains, permeable paving and hydrocarbon interceptors. Proposed discharge rates for the Proposed Development and the overall landholding are addressed in CSEA's *Engineering Services Report Drainage and Water Services.*

RECEIVED: 18/07/2023

Wastewater

The existing foul/wastewater inflows were pumped to the public sewerage system at the northeast corner of the site. Two pumping stations are located on the site with 200mm dia. pumping mains with provision included for future development. The existing foul pumping stations with the 200mm dia. pump rising mains shall be retained and upgraded where necessary to accommodate the new developments on the site. Upgrading shall include consideration of the pumps and automated pumping controls upgrade/updating/replacement etc. Underground 24-hour storage tanks shall be provided at each of the existing stations.

The route of the existing pumping mains from the stations shall be realigned to facilitate the new development, as shown on CSEA Drawing No's . 21_048-CSE-ZZ-ZZ-DR-C-2200, 21_048-CSE-ZZ-ZZ-DR-C-2210 - 1_048-CSE-ZZ-ZZ-DR-C-2218 submitted as part of the planning application.

A new, additional pumping facility shall be provided to service areas of development outside the catchments of the existing stations. There are no new requirements for new foul connections outside of the overall landholding. The wastewater discharged from the site will ultimately discharge to the Waste Water Treatment Plant at Leixlip. There are no proposed process water emissions. The proposed foul network will be designed in accordance with the Uisce Éireann Code of Practice for Wastewater.

It is not proposed to discharge any trade effluent to the foul sewer.

Refer to CSEA's *Engineering Services Report Drainage and Water Services.* for further design information.

A pre-connection enquiry (PCE) form was submitted to Uisce Éireann which addressed water and wastewater demand for the development. A response to the Pre-Connection Enquiry is awaited. Any upgrade works to the surrounding area will be identified within the Confirmation of Feasibility.

Refer to CSEA's *Engineering Services Report Drainage and Water Services* for further information.

Fuel and Other Accidental Spills

There is a potential for leaks and spillages from the proposed fuel oil generators to occur on site. In addition to this there is a potential for leaks and spillages from vehicles along

RECEIVED: 18/07/2023

access roads, loading bays and in parking areas. Any accidental emissions of oil, petrol or diesel could cause contamination if the emissions enter the water environment unmitigated.

In the event of a fire at the facility, firewater will also need to be contained or it may contaminate receiving waters.

The fuel for the generators will be stored in individual, double-skinned storage tanks. Each tank has the capacity to store 15.5 m^3 of diesel; Each tank has the capacity to store 15.5 m*3* of diesel; therefore, a total of 1,240 m*3* across all Data Centres (or 1066 tonnes at a density of 0.86 tonnes / m*3*). The energy centre will have its own HVO bulk storage of c.3440 tonnes.

As there is full containment for bulk fuel oil, use of interceptors as part of the SuDS approach, additional dilution within the attenuation ponds and no direct pathway to surface water from this site there is no likely potential impact on offsite watercourses.

Increase in Hardstanding

There will be an increase in overall hardstand as a result of the proposed development of c. 171,641.88 m^2. The existing site has a total hardstanding of c. 86029.00 m^2. The proposed development will have a total hardstanding of c. 257, 670.88 m^2. This may increase the run-off rates from the proposed development site into receiving surface waterbodies (Leixlip Reservoir, River Liffey). However, the proposed development will follow the SuDS and surface water management strategy; utilising an innovative natural based SuDS components to provide the necessary processes to control runoff frequency, flow rates and volumes. Attenuation measures include bio retention areas, attenuation ponds, swales, filter drains, permeable paving and hydrocarbon interceptors. This will have a net positive result on the downstream surrounding areas as the potential for flooding will be reduced and the overall discharged runoff will have an improved water quality due to the proposed SuDS upgrades.

Proposed discharge rates for the Proposed Development and the overall landholding are addressed in CSEA's *Engineering Services Report Drainage and Water Services.*

In the absence of mitigation measures, the operational phase of the proposed development will likely have a Neutral, Long-Term and Slight impact.

Traffic

To assess the traffic and transportation impacts of the proposed development vehicular trip generations has been developed based on first principles for the data centre element and using TRICS database for the deep tech. It is anticipated that the energy centre will not generates traffic during the peak periods.

Trip distribution and assignment of trips is based on existing movements from the current site occupants to assess the likely percentage to route east and west from the site. The internal road layout, car park positioning and access and land use positioning within the campus was then used to formulate the distribution of traffic from the development onto

the road network. All HGVs are routed west of the site towards the M4 interchange allowing access to the strategic road network.

RECEIVED: 18/07/2023

The proposed development traffic distributed onto the network is then assessed using a microsimulation software package, VISSIM. This allows an assessment of the traffic impact on the surrounding road network overall.

The results demonstrate that during the operation phase, aside from the access roads, the proposed development will contribute up to a maximum of 7.3% on the M4 on slip westbound from the interchange junction.
As per the rating off effects in traffic contribution in Table 13.7, which is based on a conservative interpretation of the EPA Guidelines and IEMA Guidelines, the proposed development is expected to result in a 'slight' or less effect on the majority of the local roads.

It is noted that a 36.6% and 16.3% impact is predicted on the access roads from the west and east of the site respectively, however this is to be expected as they comprise the two access roads, Barnhall Road and the R404, into the proposed development The base flow on these junctions is low with counts taken in 2022 at a time that the campus was not fully operational with the impact percentage therefore representing a higher-level change than if the current campus was fully operational.

Full details of potential operational impacts from traffic are outlined in chapter 13 of the EIAR.

Land and Soils

The potential effects arising from the operational phase of the development are outlined in section 7.6.2 of the EIAR. The following risks have been considered in relation to the operational phase of the development:

- There will be an increase in overall hardstand as a result of the development of c 171,641.88 m^2.
- The SuDs design has been provided to control runoff frequency, flow rates, volumes and, reduce concentrations of contaminants to acceptable levels. The proposed treatment train approach assures that both runoff quantity and quality are addressed through the overall techniques of pollution prevention, source control and regional control. Bioretention ponds with sediment forebay have been proposed in this framework as in integral element to the overall site attenuation system. The proposals provide an integrated and innovative surface water drainage design solution which manages water quality and quantity in accordance with Kildare County Council objectives.
- There is a potential for leaks and spillages from vehicles along access roads and in parking areas. Any accidental emissions of oil, petrol or diesel associated with fuel storage tanks for the energy centre and belly tanks for the data centres could cause soil/groundwater contamination if the emissions are unmitigated.
- In the event of a fire, firewater could become contaminated and in the absence of mitigation may contaminate soil and groundwater.
- Groundwater abstraction does not form part of the proposed development. There will be no impact on local or regional groundwater resources (abstraction) as a result of the proposed development.

- These potential impacts are not anticipated to occur following the implementation of mitigation measures outlined in Section 7.6.

RECEIVED: 18/07/2023

The residual cumulative impact on land, soils, geology and hydrogeology for the construction and operation phases is anticipated to be Long-Term, Neutral in terms of quality and Not Significant, once appropriate mitigation measures are implemented in accordance with the CEMP and in compliance with the legislative requirements for each development.

Visual Impact

The Proposed Development is located in a generally gently undulating landscape and therefore even relatively low vegetation or intervening buildings will provide screening to receptors. The highest visual impacts tend to occur where there is no or little intervening vegetation between the viewer and the Proposed Development within the Proposed Development site, along its periphery (sections of the R404), or where the viewer is at an elevated position (refer to Photomontage 15 – top of Wonderful Barn). The majority of significant visual effects will occur from locations within the Proposed Development site or in close proximity to it (up to approximately 300m) as dense bands of woodland along the boundaries of the M4 (refer to Photomontage 8), the grounds of Castletown Demesne (refer to Photomontages 10 – 12), within the area around The Wonderful Barn, and publicly accessible locations along the River Liffey (refer to Photomontage 1) will screen the Proposed Development fully.
Views of the upper sections of the proposed Building A1 and the pedestrian / cycle bridge across the M4 can be experienced from the R404 road bridge crossing the M4 (refer to Photomontage 7), where the upper sections of additional building structures will become visible to already visible existing structures.
Open views of sections of the Proposed Development will be possible from the R404 / Celbridge Road. While roadside vegetation will screen considerable parts of the Proposed Development, views will be available at the vehicle entrance areas and where there are gaps in the roadside vegetation (refer to Photomontages 2, 3, 4, 6). View of the proposed pedestrian / bridge will be possible along the M4 (refer to Photomontages 7 & 8) as well as from the grounds of The Wonderful Barn (refer to Photomontages 14 – 17).
The existing protected viewing axis between Castletown House and The Wonderful Barn will not be altered and remain unaffected by the proposed development (refer to Photomontages 12 – 15).

In total, 17 photomontages have been prepared illustrating the nature of visibility of the proposals at key viewpoint locations. The detailed assessment of each view below should be viewed in conjunction with the photomontage booklet contained in Appendix 16.1, which also contain detailed viewpoint location information including the distance of each viewpoint to the Proposed Development.

Major accidents and/or disasters

The potential hazards associated with substances stored and process at for the proposed Principal works which have the potential to cause a major accident are summarised in the following section. All hazards identified require a loss of containment to occur, such as, catastrophic damage or failure of pipework and/or storage tanks.

RECEIVED: 18/07/2023

Fire:

- Flash Fire: A flash fire can occur following a loss of containment of natural gas from the natural gas pipeline, which results in a flame which passes through the mixture at less than sonic velocity such that explosion overpressures are negligible. A flash fire may be caused by releases at high or low pressure into an open, unconfined area which contacts an active source of ignition.
- Jet Fire: A jet fire can occur following a loss of containment of natural gas from the natural gas pipeline, via a source such as a leak or failure of flanged pipework joints, pipework or another asset which contacts an active source of ignition.

Explosion:

- Vapour Cloud Explosion (VCE): A loss of containment of natural gas, within a turbine enclosure, which does not ignite immediately may form a cloud of flammable material depending on the conditions of the release. If this cloud contacts an active source of ignition, a VCE can result and generate potentially harmful overpressures.

Major Accident to the Environment (MATTE):

- A loss of containment of liquids, such as fuel oils, which are accidentally released to water, land and/ or groundwater in significant quantities can cause harm to the environment.

The impact and likelihood of these scenarios is assessed in Table 17. 4. In keeping with EIA guidance these results are a summary of the Land Use Planning Assessment (report reference: MM.237501.0007RR01). There are no likely impacts to off-site receptors, as a result of the proposed Principal works, during the operational phase in relation to major accidents and disasters. The level of risk on-site is acceptable.

The Land Use Planning assessment has determined the risk zones for the proposed Principal works. Section 8.0 of the assessment illustrates the Land Use Planning risk contours for the proposed Principal works. The assessment concluded that the risk contours do not extend off-site; therefore, there are no impacts to off-site receptors.

The potential hazards associated with substances stored and process at for the proposed Facilitation works which have the potential to cause a major accident are summarised in the following section. All hazards identified require a loss of containment to occur, such as, catastrophic damage or failure of pipework.

Fire:

- Flash Fire: A flash fire can occur following a loss of containment of natural gas from the natural gas pipeline, which results in a flame which passes through the mixture at less than sonic velocity such that explosion overpressures are negligible. A flash fire may be caused by releases at high or low pressure into an open, unconfined area which contacts an active source of ignition.
- Jet Fire: A jet fire can occur following a loss of containment of natural gas from the natural gas pipeline, via a source such as a leak or failure of flanged pipework joints, pipework or another asset which contacts an active source of ignition.

The impact and likelihood of these scenarios is assessed in Table 17. 4. There are no likely impacts on the project or to off-site receptors during the operation phase in relation to major accidents and disasters associated with the Facilitation works.

RECEIVED: 18/07/2023

5.6 Mitigation Measures and Monitoring of Impacts

5.6.1 Construction Phase

Population

No negative significant impacts on the population have been identified in relation to the construction of the proposed works.

A construction and environmental management plan has been prepared by CSEA and submitted as part of this application.

That plan will be adhered to during construction, as well as the mitigation measures proposed within this EIAR.

As such, no further mitigation measures are required.

Human Health

In the absence of appropriate mitigation, there is potential for significant impacts on human health during the construction phase of the project.

These potential impacts on human health, as outlined above have been identified and assessed in the various chapters of the EIAR as prepared by the various Design consultants. Appropriate mitigation measures have been proposed in relation to Air, Noise and Vibration, Climate, Hydrology, Major Accidents etc.

Mitigation measures are outlined in each respective chapter as well as in Chapter 19 of the EIAR. Effects to Human Health arising from the construction phase are expected to be neutral provided mitigation measures referred to above are adhered to.

5.6.2 Operational Phase

Population

No negative significant impacts on the population have been identified in relation to the operation of the proposed works and, as such, no mitigation measures are required.

Human Health

In the absence of appropriate mitigation, there is potential for significant impacts on human health during the Operational phase of the project.

The potential impacts on human health, as outlined above have been identified and assessed in the various chapters of the EIAR as prepared by the various Design consultants. Appropriate mitigation measures have been proposed in relation to Air, Noise and Vibration, Climate, Hydrology, Major Accidents etc.

Mitigation measures are outlined in each respective chapter as well as in Chapter 19 of the EIAR. Effects to Human Health from the operation of the proposal are expected to be neutral provided mitigation measures referred to above are adhered to.

RECEIVED: 18/07/2023

5.7 Likely Cumulative and Interaction Impacts of the Project

5.7.1 Cumulative Impacts

As discussed earlier in the Chapter, the Strategic Environmental Assessment prepared for the Kildare County Development Plan 2023-2029 has assessed the likely evolution of the County during the course of the Development Plan and the likely impacts. We have reviewed that assessment and conclude that it has reasonably assessed the likely evolution of the County through the implementation of the Development Plan. That assessment has *inter alia* considered predicted results from development of zoned land in the county and the in-combination impacts of development on those zoned lands.

Regarding Population (and human health), the Strategic Environmental Assessment prepared for the Kildare County Development Plan 2023-2029 states that:

> *"The delivery of the Settlement Strategy in County Kildare is likely to result in an overall positive effect on population and human health through the accommodation of an additional 25,146 people. The stipulation in the Core Strategy that development be delivered in a sustainable and compact way is likely to result in a neutral environmental effect as development will be focused within the existing built-up footprint on suitably zoned, previously developed land insofar as possible. This discourages urban sprawl, reduces traffic movements, enhances the public realm and encourages more sustainable transport methods.*
>
> *The successful implementation of the policies and objectives relating to a resilient economy and job creation are likely to result in a general, overall positive effect on population and human health through the provision of job opportunities, educational opportunities, tourism opportunities and subsequent economic growth in the County.*
>
> *Similarly, the provision of high-quality transport systems and sustainable transport in County Kildare is likely to result in a positive effect on population and human health through the facilitation of movement through the county and increased opportunities for movement and exercise. However, the development of new transport infrastructure has the potential to result in negative environmental effects."*

Regarding the principal works, it is predicted that the cumulative impacts of the project on other surrounding projects on the economy and employment will be long-term, positive and significant due to the impacts likely to result from the synergy between the campus and developments such as Intel and Maynooth University. Surrounding residential developments will also positively combine to provide housing for workers in the surrounding area as well as planned infrastructure projects such as Dart+ Southwest and Bus Connects.

Regarding the facilitation works site, no impacts in combination with the impacts of other surrounding projects are predicted on population.

RECEIVED: 18/07/2023

5.7.2 Interaction Impacts

The potential for interaction of impacts between various factors of the development and the population and human health of the area have been identified in various chapters throughout the EIAR. Among the main sources of These potential interactions would be Air and Climate, Nose and Vibration, Traffic and Transportation, Waste generation and Landscape and Visual Impact.

Full details in relation to potential interactions of various impacts associated with the project and an assessment of the extent of these impacts are outlined in Chapter 18 of the EIAR. No significant negative interactions have been identified in this regard.

5.8 Mitigation Measures and Monitoring of Cumulative and Interaction Impacts

5.8.1 Construction Phase

There are no mitigation measures proposed for the likely cumulative impacts as none are considered negative and significant.

5.8.2 Operational Phase

There are no mitigation measures proposed for the likely cumulative impacts as none are negative and significant.

5.9 Major Accidents and/or Disasters

The EPA Guidelines, 2022, state that:

> *"To address unforeseen or unplanned effects the Directive further requires that the EIAR takes account of the vulnerability of the project to risk of major accidents and /or disasters relevant to the project concerned and that the EIAR therefore explicitly addresses this issue. The extent to which the effects of major accidents and / or disasters are examined in the EIAR should be guided by an assessment of the likelihood of their occurrence (risk). This may be supported by general risk assessment methods or by systematic risk assessments required under other legislation e.g. a COMAH (Control of Major Accident Hazards involving Dangerous Substances) assessment.*
>
> *The potential for a project to cause risks to human health, cultural heritage or the environment due to its vulnerability to external accidents or disasters is considered where such risks are significant, e.g. the potential effects of floods on sites with sensitive facilities. Where such risks are significant then the specific assessment of those risks in the form of a Seveso Assessment (where relevant) or Flood Risk Assessment may be required."*

As discussed above, the impact and likelihood of these scenarios is assessed in Table 17. 4. In keeping with EIA guidance these results are a summary of the Land Use Planning Assessment (report reference: MM.237501.0007RR01). There are no likely impacts to off-site receptors, as a result of the proposed development, during the operational phase in relation to major accidents and disasters.

The Land Use Planning assessment has determined the risk zones for the proposed development. Section 8.0 of the assessment illustrates the Land Use Planning risk contours for the proposed development. The assessment concluded that the risk contours do not extend off-site; therefore, there are no impacts to off-site receptors.

RECEIVED: 18/07/2023

5.9.1 Mitigation Measures and Proposed Response to such Emergencies

The proposed development has been designed in line with good industry practice, and, as such, mitigation against the risk of major accidents and/or disasters is embedded through the design and in accordance with planning and legislative requirements.

5.10 Residual Impacts

The residual effects are the final predicted or intended effects which occur after the proposed mitigation measures have been implemented. It will not always be possible or practical to mitigate all adverse effects.

The overall likely residual impacts on population and human health during the construction phase of the project have been predicted to be s***hort-term, negative and imperceptible***.

The overall likely residual impacts on population and human health during the operational phase of the project have been predicted to be ***long-term, positive and significant***.

In terms of residual impacts on population and human health, the project is assessed under the headings **of *Air*, c*limate, noise and vibration, Water, Traffic, Land and Soils, Visual Impact, Major Accidents and Disasters***.

Air

Modelled emissions associated with the facility will lead to ambient concentrations which are within the relevant ambient air quality standards for all pollutants modelled. There are no significant residual impacts on air quality due the proposed development associated with the operation of the facility.

Climate

Once the mitigation measures outlined in Section 10.6 are implemented, the residual impacts on climate from the construction of the Proposed Development will be ***short-term*** and ***imperceptibly negative.***

Once the mitigation measures outlined in Section 10.6 are implemented, the residual impacts on climate from the operational phase of the Proposed Development will be **indirect, *long-term, negative*** and ***minor adverse.*** Thus, in terms of climate, both the construction phase and operational phase of the Proposed Development will be ***not significant.***

Noise and Vibration

RECEIVED: 18/07/2023

The construction noise assessment has shown that in accordance with the 'significance' thresholds presented in the BS 5228-1 there is not a significant impact at noise-sensitive locations in terms of ambient noise levels subject to appropriate management of the issues on the site as presented in Section 11.6.1.

The robust operational noise assessment of fixed plant associated with the proposed development has shown that there will be a negative, not significant to moderate, long-term effect at the NSLs identified on Figure 11.1. The predicted change in background noise level due to current application is between 1 to 4dB during night-time periods as shown in Table 11.19. Ambient noise levels are and will continue to be dictated by road traffic noise in the area while a low level of plant noise is expected to be audible during lulls in other sources (e.g. distant traffic noise).

The operational noise assessment of vehicle movements associated with the site has shown that in accordance with the scale in the EPA EIA Report Guidelines 2022 there will be an imperceptible impact off site noise sensitive locations considering existing traffic volumes on the local road network.

Water

In the case of the Proposed development, there will be no significant residual impacts; the potential impact on surface water during operation and closure will be l***ong term, imperceptible*** and ***neutral*** i.e. an impact capable of measurement but without noticeable consequences.

Traffic

The effect of the construction phase in terms of traffic and transport will be ***imperceptible and short-term*** in nature. The measures outlined in the CEMP, will help alleviate the effect of the additional traffic and limit the effect to outside the busier peak hours. The measures, including wheel washing and dust mitigation, will also ensure the standard of the public road network is maintained in terms of dust and dirt from construction traffic.

With the mitigation measures in place, the effect of the proposed development on traffic and transport is envisaged to be slight, likely in probability and long-term. The proposed development is located within an area with well-integrated walking infrastructure to encourage sustainable travel choices to and through the proposed development. The Mobility Management Plan initiatives are likely to result in lower volumes of car traffic than that assumed in the modelling assessment.

Land and Soils

Following the implementation of mitigation measures detailed in chapter 5, the predicted impact on the geological and hydrogeological environment during the construction phase is ***neutral, imperceptible*** and ***short-term,*** the magnitude of impact is considered ***negligible***.

Following the implementation of mitigation measures detailed in Section 5.6.2 above, the predicted impact on the geological and hydrogeological environment during the construction phase is ***neutral, imperceptible*** and ***long-term,*** the magnitude of impact is considered ***negligible***.

RECEIVED: 18/07/2023

Visual Impact

Long term residual landscape effects will arise locally where the proposed extension to the existing Kildare Innovation Campus and the proposed pedestrian / cycle bridge will be physically located. The alteration and transformation of the existing campus will intensify the inherent light industrial landscape character within the site, leading to an increase and densification of the light industrial buildings replacing sections of existing open green space and lead to the addition of infrastructural elements in the curtilage of The Wonderful Barn area. The magnitude of landscape change is considered medium and the resulting significance / quality is moderate / beneficial. The alteration and redesign of the open space, and the proposed screen planting will improve biodiversity and the overall strength of the landscape layout as the vegetation matures, which will reduce the significance of landscape effects to minor / neutral.

Residual visual effects will concentrate along the adjacent road network to the east and south (R404) and in available views from the area around The Wonderful Barn where the proposed pedestrian / cycle bridge will be visible, as well as from the elevated viewing location at the top of The Wonderful Barn. The proposed landscape mitigation measures will integrate the Proposed Development into its setting reducing the significance of residual visual effects. This includes the view from the top of The Wonderful Barn where the proposed extensive new planting within the Kildare Business Park will reduce views of sections of buildings as the planting matures. The overall character of the view from the top of The Wonderful Barn will remain similar.

Major accidents and/or disasters

This assessment has identified the potential for major accident hazards to occur. These scenarios can have significant consequences; however, the likelihood of these events occurring is low due to engineering and operational safeguards that will be implemented at the development. The Land Use Planning Assessment concluded that the risk contours do not extend off-site; therefore, there are no impacts to off-site receptors. Refer to the Land Use Planning Assessment prepared by AWN and submitted with the application for further detail.

Notwithstanding this the major accident hazards for the proposed development are presented in Table 17. 4 and the natural disaster hazards are presented in Table 17. 5. The approach to identifying and quantifying risks associated with the proposed development by means of a sites specific risk assessment is derived from the EPA Guidelines on information to be contained in EIAR (EPA, 2022). The likelihood and consequence ratings for all identified major accidents or natural disasters are combined to form a risk score for risk evaluation.

Among the identified potential major accidents are fires, explosions from vapour cloud explosions (VCE) and Major Accidents to the Environment (MATTE) caused by unplanned release of diesel or other substances stored on site. In terms of Natural Disasters, chapter 17 includes an assessment of the risk from extreme weather or flooding.

When mitigation is accounted for the risk score associated with all identified potential major accidents or natural disasters are within the 1-6 range and are thus considered low level risks.

RECEIVED: 18/07/2023

5.12 Difficulties Encountered

There were no difficulties encountered when preparing this chapter.

5.13 References

- Census 2011
- Census 2016
- Census 2022 (preliminary results)
- CSO Live Register
- The Economic and Social Research Institute's (ESRI) Quarterly Economic Commentary (Winter 2023)
- The Department of Health's latest policy report *Health in Ireland: Key Trends 2023*
- Grant Thornton Economic Impact Assessment (2023) (accompanies this EIAR)
- Homes & Communities Agency, UK Government Agency (2015), Employment Density Guide (3rd Edition)

6.0 BIODIVERSITY

RECEIVED: 28/07/2023

6.1 Introduction

This chapter of the Environmental Impact Assessment Report (EIAR) has been prepared by Ecology Ireland Wildlife Consultants Ltd (Ecology Ireland). It describes the habitats, flora and fauna present in the receiving environment and presents an assessment of potential impacts arising from the project, with consideration given to appropriate mitigation measures to minimise and/or avoid potential negative impacts. In this chapter, impacts arising from the project are assessed. The project comprises both the proposed development which is subject to the development consent being sought from Kildare County Council, and the proposed facilitation works *i.e.,* the uprating of existing Eirgrid transmission lines and the GNI upgrade works. Refer to **Chapter 2** for a more detailed description of the proposed development and the proposed facilitation works.

This Biodiversity Chapter has been prepared using 'Guidelines on the Information to be contained in Environmental Impact Assessment Report (EIAR)' (EPA 2022).

The main objectives of this Biodiversity Chapter were to:

- Undertake a detailed desktop review of available ecological data of the study area, including a review of designated nature conservation sites in the wider hinterland.
- Complete ecological field surveys in order to obtain information on the baseline ecology of the study area.
- Evaluate the ecological importance of the ecological resources of the study area.
- Assess potential impacts on the existing ecology that could arise from the proposed development.
- Develop avoidance and mitigation measures, to eliminate or reduce potential negative impact(s) on the ecology of the receiving environment arising from the proposed development.

6.1.1 Statement of Authority

Dr. Gavin Fennessy is a highly experienced ecologist with 25 years of experience in consultancy. He is Principal Ecologist and Managing Director of Ecology Ireland Wildlife Consultants Ltd. He is a member of the Irish Policy Group of the CIEEM and is a guest lecturer at University College Cork. He and his team have prepared numerous ecological impact assessments, for all types of projects and plans throughout Ireland. Gavin is an expert in ornithology and terrestrial mammals. He has provided input into Oral Hearings as a specialist ecologist for almost 20 years. He is the retained expert on management of wildlife hazard at Dublin Airport and had spoken at a number of international conferences in relation to bird collision risk.

John Deasy is an ecological consultant with experience across a range of disciplines including botanical and habitat surveys, bird surveys, mammal surveys and protected invertebrate surveys. He has nearly 10 years of experience as a professional ecologist and has undertaken a range of botanical and habitat surveys including baseline surveys for renewable energy projects, shared-use greenways and domestic and commercial properties. These surveys have included non-native invasive species surveys, rare species surveys and evaluations of habitats listed on Annex I of the EU Habitats Directive. John holds an MSc. in Ecological Assessment

RECEIVED: 18/07/2023

and a BSc. in Earth and Environmental Science from University College Cork. He is a member of the Botanical Society of Britain and Ireland.

Marie Kearns (BSc MSc) has almost 5 years of professional experience in ecological surveying, ecological impact assessment and the appropriate assessment process. She has worked on projects related to renewable energy, infrastructure, housing, quarries and various other development projects. She is an experienced field ecologist with a diverse ecological survey profile, including habitats and flora, marine and terrestrial mammals, and birds. She has held NPWS Licenses for photographing wild animals. Marie is also experienced in producing maps and visualising biological datasets using QGIS.

Athena Michaelides (BSc Zoology & Animal Biology) has over five years of experience as a professional ecological consultant. She is a former secretary of the Irish Wildlife Trust with particular experience in field surveys and reporting as part of Ecological Impact Assessments. Athena formerly was employed by Ryan Hanley Consulting Engineers and now works as an independent ecologist.

Seán Dundon graduated with a BSc in Wildlife Biology from ITTralee. He has over five years of experience as a wildlife and environmental ranger for a large industrial facility. Seán is an accomplished field ecologist, skilled in both bird surveys and mammal surveys. He was the principal author of a large-scale 5-year Biodiversity Management Plan (BMP). He has directly managed a number of diverse protected habitats and liaised with governing bodies such as the NPWS.

Fiona May Aylward (BSc Ecology & Conservation) has two years of experience as a consultant ecologist. She has developed a range of field identification skills over nearly a decade of volunteer work and field courses. Fiona is a professional horticulturist and has run community-based projects on organic food production. Fiona worked as part of the field team carrying out ground-based assessments of trees for their bat roost potential and assisted in the bat emergence surveys at the site in 2023.

6.1.2 Site Description and Context

The proposed development site is located within the townlands of Parsonstown, Rinawade Lower, Rinawade Lower, and Barnhall in Co. Kildare. The *c.* 72.2ha site primarily encompasses lands within the existing Kildare Innovation Campus, which was formerly named the Hewlett Packard Campus, originally permitted in 1995 under KCC Reg. Ref 95923 (See Figure 6-1). Leixlip town is located directly north/northeast and Celbridge town located *c.* 1km to the southwest.

The campus is bordered by Celbridge Road (R404), a portion of which is within the proposed development site boundary, to the east and bordered by the M4 motorway to the north. Castletown House and associated grounds are located to the west and includes areas of woodland habitat, a band of which borders the western boundary of the campus. Barnhall Rugby Football Club and the recently completed DB Schenker logistics facility are located to the south of the campus. The proposed development site also includes lands located north the campus. These lands to the north are within the Wonderful Barn Demesne, situated between the M4 motorway to the south and the Wonderful Barn allotments and Barnhall Meadows, an existing residential housing development, to the north.

Kildare Innovation Campus is made up of an existing group of 9 no. industrial buildings, car parking areas, and access roads that are used by *c.* 1100 staff in industries including manufacturing, office, distribution, welfare and utilities. An existing 110 kV substation

RECEIVED: 18/07/2023

(Rinawade Substation), which provides electricity to the campus is located in the northwest of the campus site. Highly managed areas of amenity grassland, parkland, and ornamental planting immediately surround the campus. Areas of young broadleaved woodland and managed treelines mark the boundary of the campus site and provide screening. The campus site also contains areas of semi-natural habitat that are subject to low intensity management including meadow and wet grassland areas, mature treelines and hedgerows, and developing scrub habitat.

The proposed GNI upgrade works will be carried out along a total distance of *c*. 1.5km. The route will start on Station Road, turning south and continuing down Old Hill Road/Celbridge Road before turning west into the north lands, within the proposed development site boundary, to the north of the M4. The route will cross the M4 south into the campus, connecting to a new gas skid installed at the existing gas skid location. The existing gas skid will be decommissioned and removed.

The proposed Eirgrid uprating works, as outlined in **Chapter 2– Description of the Project**, will require the replacement of overhead transmission lines and pole sets and review/upgrade of the double circuit towers and angle towers connecting Maynooth to Rinawade (Stage 1), Dunfirth/Kinnegad to Rinawade (Stage 2), Statcom (Stage 3), Derryiron to Maynooth (Stage 4), Derryiron – Kinnegad (Stage 5).

Both the proposed development site and the proposed GNI upgrade route are located within the Liffey and Dublin Bay catchment in Hydrometric Area 09 (sub-catchment: Liffey_SC_080). The Kilmacredock Stream which originally flowed through Kildare Innovation Campus has been diverted to flow around the main part of the campus and is completely culverted within the proposed development site boundary (See Engineering Services Report Drainage and Water Services report, CSEA (2023a)). The Kilmacredock Upper Stream flows through the 1.5m culvert into the Leixlip Reservoir, to the southeast of the proposed development site, which is located *c*. 60m from the proposed development site boundary at its nearest point. Two attenuation ponds (with an additional fire water retention pond) are located in proximity to the southeast boundary of the campus site surrounded by a mix of bankside vegetation and scrub. The ponds attenuate water from the campus and release runoff into the adjacent Leixlip Reservoir via an underground culvert crossing the Celbridge road to the east of the proposed development site. The existing foul water drainage network servicing Kildare Innovation Campus connects to the local municipal sewerage network where wastewater streams drain by gravity to the Kildare County Council sewer and is treated within Leixlip Wastewater Treatment Plant (WWTP) where the primary emission point is located in the River Liffey upstream of Leixlip Reservoir and the proposed development site. The River Liffey flows northwest through the Leixlip Reservoir, discharging from the Leixlip Dam before continuing west and ultimately flowing out to Dublin Bay. Under the Water Frameworks Directive (WFD), the reaches of the River Liffey flowing into and out from the Leixlip Reservoir are considered to be of "Good" status with a risk status currently "Under Review", while the Leixlip Reservoir is of "Poor status"[1]. The proposed GNI upgrade route does not cross any watercourses.

6.2 Project Description

Refer to **Chapter 2 – Description of the Project** for a more detailed project description and the Construction and Environmental Management Plan (CEMP) for a description of site preparation and construction works.

[1] https://gis.epa.ie/EPAMaps/

RECEIVED: 18/07/2023

The project, subject to this EIAR includes two separate but interrelated streams of proposed works:

A. The 'principal' works subject to the development consent being sought from Kildare County Council, i.e. the proposed development; and
B. 'Facilitation works' required to support the development which do not form part of the development consent being sought from Kildare County Council. The facilitation works include a mix of works that will be required to be undertaken for or on behalf of statutory undertakers such as Gas Networks Ireland and EirGrid.

The proposed development will include for the demolition of some of the existing buildings on site and construction of new buildings, an energy centre and replacement substation. The proposed development will include significant public infrastructure including a new signalised intersection on Celbridge Road (R404), a new Public Link Road through the campus (between Barnhall Road and the new signalised intersection), a pedestrian/cycle overpass of the M4, pedestrian and cycle links through the site and along the designated protected view corridor and supporting infrastructure.

The project will be developed across three phases, which is displayed in the Phasing Layout in Section 2.6. Further details including the phasing programme and detailed demolition and construction works can be found in **Chapter 2** and within the Construction and Environmental Management Plan (CSEA (2023b) which is submitted as part of the planning application.

Phase 1 will comprise the development of Building A1 (Deep Tech) with associated carparking, landscaping, services yard etc. The existing buildings Nos 1-6 will be retained and operated as currently. No works are proposed to these buildings. Building B1 (Data Centre) will be constructed fully in Phase 1 but will only utilise 16MW power. Power to the building will ramp up to a c. max of 32MW during Phase 3 of the development. The new replacement 110kV Substation will be developed adjacent to the existing 110kV Substation. Once the new replacement substation becomes energised, the existing 110kV substation will be decommissioned. Associated grid diversion to the new substation will also be included in Phase 1. The energy centre will be delivered in phases to align with power demand for the site and dispatchable energy requirements of the grid. The initial phase of the masterplan will include the provision of 1 no. CTG powered by the enhanced gas line to the site. Supporting infrastructure within the energy compound will also be provided. A Public Link Road connecting the R449 Barnhall Road to the R404 Celbridge Road with a new signalised intersection at the R404 will be constructed. The existing signalised intersection will be removed, and road and access reinstated. The M4 Pedestrian and Cycle Overpass including links to the entrance of Barnhall Meadows estate and the connections along the protected view line will be developed. An Electric Bus Charging Hub will be constructed providing parking and charging for 10no. privately operated buses. Modifications to the existing parking lots 1 and 2 to increase the parking provide and include EV and accessible stalls. Hard and soft landscaping will be provided throughout the Phase 1 area as well as the required earthworks, drainage, services, utilities and new gas skid. Phase 1 is expected to take *c.* 2.5-3 years between 2024 and 2027.

Phase 2 will comprise the development of Building A2 (Deep Tech) with associated carparking, landscaping, services yard etc. Hard and soft landscaping will be provided throughout the

RECEIVED: 18/07/2023

Phase 2 area, including the required drainage and services. Phase 2 is expected to take *c*. 1.5-2 years between 2026 and 2028.

Phase 3 will comprise thedemolition of Existing Buildings No. 7, 8 and 9 including associated Data Centre Buildings C1, C2 & C3 with associated parking, landscaping, building services, *etc*. The Energy Centre final phase will align with power demand for the balance of the site and dispatchable energy requirements of the grid. The third phase of the masterplan will include the provision of 8no. turbines powered by a local extension of the gas transmission network by GNI. The turbines will be capable of operating off biogas as well as natural gas and will be located within 14m high enclosed area.

The existing campus road which provides entrance from the Celbridge Road roundabout and access to DB Schenker will be extended and linked up with the internal campus road adjacent to the view corridor. All associated cycle paths and footpaths will be linked up infrastructure will be demolished to make way for the build out of Phase 3. Hard and soft landscaping will be provided throughout the Phase 3 area, including the required drainage and services.
Phase 3 is expected to take *c*. 6-7 years between 2028 and 2035.

In addition, the proposed development will have 9 combustion turbine generators (CTGs) and 80 back-up generators. The back-up generators will provide power in the event of an interruption to the supply of power from the National Grid. The fuel for the generators will be stored in individual, double-skinned storage tanks. The proposed development is committed to the use of HVO as a back -up fuel supply for the generators over diesel. The energy centre will have its own HVO bulk storage of c. 3440 tonnes.

The project to which this EIAR relates also includes 'facilitation works' which comprise uprating of existing 110kV power lines to the site and the proposed upgrade of a GNI gas transmission line to the site.

Upon completion of Phase 1 of the KIC Masterplan, including the development of the proposed replacement 110kV Substation, uprating of existing overhead lines from the replacement 110kV Rinawade substation to Derryiron/Maynooth and Dunfirth/Kinnegad will be required to facilitate build out of Phase 3 of the KIC Masterplan. The proposed uprating will be carried out to existing lines along established wayleaves, utilising existing infrastructure (existing access roads/tracks, existing poleset/tower foundations, etc.).

For the proposed GNI upgrade route, *c*. 1.18km of the route will be installed within public roads under existing blacktop, with *c*. 0.14m of the route installed within the lands north of the M4 comprising a haul road that is under construction at the time of this report, and meadow grassland. From the lands north of the M4, the route will cross beneath the M4 south into the campus via Horizontal Directional Drilling (HDD) process (*c*. 0.18km). The proposed HDD process will avoid tree removal, with all works to occur outside Root Protection Areas (RPA). The proposed HDD route will be below the RPA of any trees within the north lands and within the campus (minimum 1m depth). The launch pit for the HDD will be adjacent to the haul road which currently comprises a brownfield site. The exit pit will be directly adjacent to the temporary site compound within the campus. The preferred route for the proposed GNI upgrade works is shown in Figure 6-2. The proposed upgrading works will follow the methodologies and environmental requirements set out in the GNI Construction Environmental Management Plan, an example of which can be seen in Appendix 6.1. This will include measures for the protection of water quality including:

RECEIVED: 18/07/2023

- The site compound shall be supplied with temporary toilet facilities and there will be welfare facilities at designated onsite. There shall be no discharges to water from these facilities.
- Concrete pours will be avoided during extreme heavy rainfall events. Washout of concrete lorries will not be permitted.
- Spoil from excavations will be removed from site on a regular basis, to prevent build-up of material and reduce the potential for silt run off.
- All spillages will be cleaned up immediately and associated wastes disposed of accordingly. Spill containment material/equipment shall be stored at all work areas for use in the event of an emergency. There will be an abundance of absorbent material available for use in the event of an environmental emergency (sand & soil).
- Water will not be extracted or pumped from local water sources (rivers, streams, etc). There will be no discharges to local surface waters.
- Environmental inspections shall carry out shall include visual inspection of works near watercourses, culverts, dry ditches etc. as well as water discharges from any work areas. Significant environmental findings shall be communicated to the Environmental Officer for corrective and preventive action.

As outlined in **Chapter 2 – Description of the Project,** the facilitation works which are included in the project do not form part of the development for which consent is sought. Future consents for the facilitation works will be required through EirGrid and GNI.

6.2.1 Surface-Water Drainage Network

As outlined in Section 6.1.2 above, **Chapter 8 - Hydrology**, and the Engineering Services Report Drainage and Water Services (CSEA, 2023a), the existing surface-water drainage network servicing Kildare Innovation Campus flows into the existing attenuation ponds before discharging to the Leixlip Reservoir and the River Liffey. There are no uncovered watercourses within the proposed development site. The Kilmacredock Stream flows beneath the site along a diverted path through a 1.5m culvert before entering Leixlip Reservoir. The existing surface-water drainage network discharges to the ponds and does not discharge directly to the culverted Kilmacredock Stream. Discharge from the ponds is released following confirmation of water quality through electronic monitoring mechanisms inclusive of shut-off valves, upstream of the existing attenuation ponds near the existing site entrance off the Celbridge Road. The culverted Kilmacredock Stream and surface-water run-off from the attenuation ponds discharge from the proposed development site at the same point in the surface-water run-off system, just prior to exiting the site to the east, before ultimately discharging to the Leixlip Reservoir (See Drawing 21_048 - CSE - ZZ - ZZ - DR - C – 2100).

For the proposed development, the surface-water drainage network will be re-designed in order to accommodate the increase (*c.* 171,641.88 m^2) in hardstanding area (See Drawing 21_048 - CSE - ZZ - ZZ - DR - C – 2110). For the proposed surface-water drainage system, the proposed development site has been divided into five catchment areas where the surface-water run-off from each catchment is attenuated within its own pond and/or wetland area. This will require the installation of 2 No. attenuation basins (2,993.3m^3), 2 No. attenuation ponds (13, 347.7m^3) and 1 No infiltration basin (1093.8 m^3), as well as the retention of the 2 no. existing attenuation ponds & 1 no. firewater pond. Each catchment will release water to the two existing attenuation ponds, and the surface-water drainage network for the proposed development will continue to discharge from these ponds to Leixlip Reservoir and the River Liffey. Refer to CSEA's Engineering Services Report Drainage and Water Services (CSEA, 2023a) for more information.

Along with the redesign of the surface-water run-off management system to service the proposed development site during the operational phase, it is proposed to redesign the culvert as part of the proposed scheme. The proposed culvert will then be fully constructed except for the tie-in locations to the existing culvert. Once the proposed culvert is constructed, cleaned, and inspected the tie-in locations to the existing culvert will be completed. This will ensure minimal operational disturbance to the existing infrastructure. Once the existing water course has been diverted through the new route, the existing culvert will be removed. The proposed diverted culvert will be *c*. 360m in length, located c. 90 south-west of the existing culvert. The work will be achieved over 8 weeks. The proposed design of the culvert will ensure that there is no reduction in the hydraulic capacity of the culvert and no resultant increase in flood risk. As outlined in the CEMP (CSEA, 2023b), the proposed culvert will be constructed prior to the decommissioning of the existing culvert, ensuring minimal operational disturbance of the existing infrastructure.

RECEIVED: 18/07/2023

6.2.2 Foul Water Drainage Network

The existing foul water drainage network connects to the municipal sewerage network and is ultimately treated at Leixlip WWTP (Lower Liffey Valley Regional Sewerage Scheme – D0004) (See **Chapter 8 – Hydrology**, for more information). As part of the proposed development, the existing foul pumping stations will be retained and upgraded where necessary, with underground 24-hour storage tanks to be provided at each of the existing stations. The existing foul water drainage network will be realigned to accommodate the proposed development and will collect domestic foul water from the administration block of the proposed Data Storage Facilities, the Deep Technology Buildings, Energy Centre and the 110kV substation (21_048 - CSE - ZZ - ZZ - DR - C – 2210). There are no new requirements for new foul connections outside of the overall landholding. There are no proposed process water emissions as part of the operational phase of the proposed development. Leixlip WWTP discharges treated wastewater at the primary emission point into the River Liffey, upstream of the proposed development site and Leixlip Reservoir. Therefore, there is a hydrological link between the proposed development and the aquatic environment downstream of Leixlip WWTP primary emissions point.

6.2.3 Landscaping

Throughout the three phases, hard and soft landscaping is to be provided throughout the proposed development site. A Landscape Architectural Master Plan has been produced for the proposed development site (AECOM, 2023). As part of the landscaping plan, the All-Ireland Pollinator Plan (2015-2020) and the National Biodiversity Action Plan (2021-2025) were consulted as part of the development of the planting scheme for the development site.

In order to facilitate the proposed development, over 1900m of hedgerow/treeline and 9,200m^2 of woodland will be permanently removed. Replacement planting for the hedgerows will include native whips and feathered mix comprising species such as Blackthorn (*Prunus spinosa*), Hawthorn (*Crataegus monogyna*), Whitebeam (Sorbus aria), Hazel (*Corylus avellana*) and Holly (Ilex a*quifolium*). Woodland planting will include additional species such as Oak (*Quercus* sp.), Rowan (*Sorbus aucuparia*), and Birch (*Betula pendula*) with specimen trees such as Oak, Scot's Pine (*Pinus sylvestris*), Willow (*Salix* sp.), and Alder (*Alnus glutinosa*) proposed to be planted in their semi-mature form throughout the proposed development site via transplant. 155,300m^2 of grassland within the proposed development site will comprise of pollinator friendly habitat, seeded with the All-Ireland Pollinator Plan Wildflower Mixture (GF03) or an approved alternative mix. Existing hedgerows and treelines that are being retained as part of the proposed development will be bolstered where necessary with native tree species such as Hawthorn, Blackthorn, Alder and Willow. Retained tree and hedgerow

protection measures will be in place as laid out in the arborist's report (Charles McCorkell, 2023).

RECEIVED: 18/07/2023

As outlined in the Engineering Services Report Drainage and Water Services (CSEA, 2023a) the surface-water management system will include the installation of 2 No. attenuation basins, 2 No. attenuation ponds, and 1 No infiltration basin within the proposed development site. As part of the landscaping plan, the ponds will be seeded with marginal pond planting. The basin areas and the areas surrounding the ponds will also be seeded with wetland wildflower mix.

See Drawing KIC-ACM-XX-XX-DR-LA-1000, for the detailed list of planting species.

RECEIVED: 18/07/2023

Figure 6-1 Site location Map.



RECEIVED: 18/07/2023

Figure 6-2 Map of the preferred route for the proposed GNI upgrade works



6.3 Methodology

RECEIVED: 18/07/2023

This ecological assessment has been prepared for the project following detailed multi-season ecological surveys of the study area (*i.e.,* the existing campus and lands to the north). A thorough desktop review of available ecological information for the study area, the proposed GNI upgrade route and the wider environment was also completed. The proposed GNI route was surveyed for invasive species. The proposed Eirgrid uprate works were primarily assessed by a desktop review of aerial mapping and available sources of ecological data, with no dedicated ecological field surveys undertaken. The survey schedule is summarised in Table 6-1.

Date	Time	Weather	Ecologist	Task
28.04.2022	10:00-16:00	Wind F2-F3, Dry, Visibility Good	Dr. Gavin Fennessy	Deployment of passive detectors and cameras, bird transect survey, mammal survey. Inspection of Buildings 7, 8 and 9 for bat roost suitability
08.06.2022	10:00-16:00	Wind F3-F4, Dry, Visibility Good	Dr. Gavin Fennessy	Deployment of passive detectors, bird transect survey, mammal survey.
09.06.2022	10:00-16:00	Wind F2-F3, Light showers, Visibility Good	Dr. Gavin Fennessy	Deployment of passive detectors, mammal survey.
14.06.2022	07:00-08:00	Wind F3, Overcast, Dry, Visibility good	Dr. Gavin Fennessy	Ecological site walkover, mammal survey.
16.06.2022	11.15 - 19.30	Overcast, Dry, Wind F2/3 SE, Visibility Good	John Deasy	Baseline ecological survey for habitats and botanical species.
27.06.2022	12:00-16:00	Wind F4, Infrequent showers, Visibility Good	Dr. Gavin Fennessy	Collecting passive detectors and cameras, mammal survey.
10.08.2022	12:00-16:00	Bright, Wind F2-F3, Dry, Good Visibility	Dr. Gavin Fennessy	Collecting passive detectors, mammal survey.
30.11.2022	12:00-16:00	Wind F2-F3, Dry, Good Visibility	Dr. Gavin Fennessy	Bird transect survey
01.02.2023	10:00-16:00	Strong breeze, Wind F4, Dry, Good Visibility	Dr. Gavin Fennessy	Bird transect survey, ecological site walkover of the north lands (Wonderful Barn)
28.03.2023	10:30-16:00, 20:45-21:15	Overcast, Cloud 8/8, Wind F2, Occasional Light Showers, Visibility Good	Dr. Gavin Fennessy, Marie Kearns, Fiona May-Aylward	Preliminary ground level roost assessment - trees, bat activity survey, deployment of passive detectors
29.03.2023	10:00-13:00, 19:35-21:15	Bright and Breezy, Dry, Cloud 6/8, Wind F3/F4, Visibility Good	Dr. Gavin Fennessy, Marie Kearns, Fiona May-Aylward	Preliminary ground level roost assessment - trees, dusk emergence survey, deployment of passive detectors

Date	Time	Weather	Ecologist	Task
30.03.2023	12:00-16:00	Warm and Bright, Cloud 6/8, Wind F2/F3, Occasional showers	Dr. Gavin Fennessy, Marie Kearns, Fiona May-Aylward	Preliminary ground level roost assessment - trees, deployment of passive detectors
13.04.2023	11:00-12:00	Wind F4-F5, Bright, Dry, Good Visibility	Dr. Gavin Fennessy	Site walkover as part of the KIC pre-planning meeting
19.05.2023	1600-17:00	Dry, Cloud 6/8, Wind F3, Good Visibility	Dr. Gavin Fennessy	Ecological survey of the proposed GNI upgrade route – check for invasive plant species.

RECEIVED 18/07/2023

Table 6-1 Baseline field assessment details.

The methodology employed in the carrying out of this ecological assessment is outlined below.

6.3.1 Desktop Review

A desktop review of relevant data available for the study area, the proposed GNI upgrade route and the Eirgrid uprating route was undertaken for the assessment and published data on designated and/or ecologically sensitive sites, habitats and species of interest in the vicinity of the study area proposed GNI upgrade route were consulted. The following datasets and ecological resources were consulted:

- National Parks and Wildlife Service (NPWS) online mapping and datasets;
- Heritage Maps online mapping;
- National Biodiversity Data Centre (NBDC) online mapping and datasets;
- Environmental Protection Agency (EPA) online mapping and datasets;
- Botanical Society of Britain and Ireland (BSBI) online mapping;
- Kildare County Development Plan 2023 – 2029;
- Leixlip Local Area Plan 2020-2023;
- Celbridge Biodiversity Action Plan 2021 – 2025;
- National Biodiversity Action Plan 2017 - 2021;
- National Biodiversity Action Plan 2023 – 2027 (Draft for Public Consultation);
- Invasive Species Ireland;
- Other information sources and reports footnoted or referenced.

The study area lies within the 10km grid square, N93, and the 2km grid square, N93X. The majority of the proposed GNI upgrade route lies within the 2km grid square N93X, but also partially overlaps with the 2km grid squares N93Y, O03C and O03D. The proposed Eirgrid uprating route crosses the following 10km grid squares: N53, N63, N73, N83, O03, N93 and N54, N84, N94. Species records for these grid squares were downloaded from the NBDC database and outlined below in the relevant sections. Online aerial mapping and satellite imagery was used in conjunction with publicly available GIS files to generate mapping, which together, helped inform the desktop review.

Ecological reports commissioned by EFIV Irish Property ICAV for the development of the DB Schenker site, a logistics warehouse with ancillary office accommodation development, were consulted for information regarding previous habitat, botanical and faunal surveys. The DB Schenker site is located directly southwest of the study area. Reports consulted included the **Appropriate** Assessment Screening report (Environmental Resources Management Ltd, 2020a), the Ecological Impact Assessment Report (Environmental Resources Management

Ltd, 2020b), the Botany Survey report (Envirico, 2020), and the Pre-Construction Ecological Advice & Monitoring report (Ecology Ireland, 2022).

RECEIVED: 18/07/2023

6.3.2 Designated Conservation Sites

Designated nature conservation sites within the wider hinterland of the project site were identified through a desktop review and by GIS analysis. Nature Reserves and Refuges for Fauna are protected under the Irish Wildlife Acts (1976-2010). Designated conservation sites include national sites, Natural Heritage Areas (NHAs) and Proposed Natural Heritage Areas (pNHAs). While NHAs are legally protected by the Irish Wildlife Acts (1976 - 2010), pNHAs are not.

SACs and SPAs are European designated nature conservation sites that have been designated under the EU Habitats Directive (92/43/EEC) and the EU Birds Directive (2009/147/EC) respectively. SACs and SPAs, along with candidate sites of Community importance, sites of Community importance, candidate SPAs and candidate SACs, are collectively known as Natura 2000 sites and are legally protected by Irish law. Nature Reserves and Refuges for Fauna are protected under the Irish Wildlife Acts (1976 - 2012). Many designated conservation sites overlap, for example an area can be designated as both an NHA and as a SAC and/or SPA or both.

In the subsequent analysis of designated sites, particular attention was made on sites where a potential receptor zone of influence exists with the project site. In other words, designated sites that may have a link to the project site (*e.g.* through hydrological link, overlapping, proximity) were focused on in this assessment.

A screening assessment in support of the Appropriate Assessment process has been prepared and submitted as part of this planning application.

6.3.3 Habitat and Botanical Assessment

A desktop review of botanical data available for the study area, the proposed GNI upgrade route and the proposed Eirgrid uprating route was undertaken. The National Biodiversity Data Centre (NBDC), Botanical Society of Britain and Ireland (BSBI) and National Parks and Wildlife Service (NPWS) online databases and mapping services were consulted to identify any rare or protected botanical species located within the relevant national 10km and 2km grid squares surrounding the project site.

The habitat and botanical assessment was carried out with due regard to best practice guidance (Smith *et al.* 2011). The survey involved a walkover of the study area where the habitats present were classified to level three using the classification scheme presented in *A Guide to Habitats of Ireland* (Fossitt, 2000). The extent of habitats was recorded on a field map along with notes of species present and their relative abundance described using the DAFOR scale. In addition, any other observations of interest (*e.g.* invasive plant species, *etc.*) were recorded using a Garmin eTrex10 GPS handheld unit. Evaluation of the habitats present in terms of their ecological value was assessed using the Biodiversity Evaluation Scheme presented in Appendix 6.2 (amended National Roads Authority 2009 scheme to include watercourse/aquatic evaluation elements from Nairn and Fossitt, 2004).

The conservation status of habitats and botanical species was also considered. The conservation status of habitats and botanical species within Ireland and Europe is indicated

by inclusion in one or more of the following: Irish Red Data Book for Vascular Plants (Wyse Jackson *et al.* 2016); Flora (Protection) Order 2022 and the EU Habitats Directive (92/43/EEC).

RECEIVED: 19/07/2023

6.3.4 Fauna Assessment

The NPWS and NBDC online databases were consulted to identify any rare or protected faunal species historically recorded within the relevant national 10km and 2km grid squares overlapping the project site. In addition to records of rare/protected fauna, the NBDC website also hosts the Model of Bat Landscapes for Ireland, which has assessed the relative importance of landscape and habitat associations for bat species across Ireland (see Lundy *et al.* 2011). The landscape resource value for bats surrounding the study area, the proposed GNI upgrade route and the proposed Eirgrid uprating route was therefore assessed.

6.3.4.1 Non-Volant Mammals

Mammal surveys within the study area were undertaken by Dr. Gavin Fennessy (See Table 6-1 above). Surveys included a walkover of the proposed development site, identifying mammal species or signs of mammal activity seen (*e.g.*, droppings, tracks, burrows *etc.*) and recording observations using field notes and/or a handheld GPS unit. Techniques used to identify mammal activity followed recognised guidelines (*e.g.*, Clark 1988, Sutherland 1996, Bang & Dahlstrom 2004 and JNCC 2004).

In addition, digital trail cameras (Camera-traps) which take photographs and/or video when triggered by heat or motion, were also deployed to record mammal activity within the study area. In total, six trail cameras were erected throughout the study area, between April and June 2022 (See Table 6-2 below). The locations of equipment deployed is shown in Figure 6-3.

The conservation status of mammal species was considered. The conservation status of mammals within Ireland and Europe is indicated by inclusion in one or more of the following: Irish Wildlife Acts (1976 - 2010); Red List of Terrestrial Mammals (Marnell *et al.* 2019); EU Habitats Directive.

Camera Name	Start Recording	End Recording	Recording Days	Location (ITM)
Cam1	28/04/2022	08/06/2022	41	698750 734954
Cam2	28/04/2022	04/06/2022	37	699133 734577
Cam3	28/04/2022	08/06/2022	41	699125 734583
Cam4	28/04/2022	08/06/2022	41	699025 734615
Cam5	28/04/2022	06/06/2022	39	699138 734574
Cam6	28/04/2022	12/05/2022	14	699171 734556

Table 6-2. Trial Camera Deployment Detail

6.3.4.2 Bats

Bat surveys were completed at the study area between April 2022 and March 2023. The following surveys were completed:

- Passive Detector Surveys

- Building Inspections
- Ground Level Roost Assessments – Trees
- Active & Emergence Surveys

RECEIVED: 28/07/2023

Due regard was taken of best practice guidelines outlined in Collins 2016 and Kelleher & Marnell 2006. Passive detector surveys were completed by deploying Wildlife Acoustics SMMini and SM4BAT detectors with the data from these detectors subsequently analysed using Kaleidoscope Pro (v. 5.4.9) software. Active and dusk emergence bat survey monitoring was carried out using the following bat detectors: Pettersson D240x outputting to Roland Edirol R01 Digital Recorder, Wildlife Acoustics SM4BAT, and a Magenta Bat4 bat detector. Calls recorded by the Pettersson D240x and SM4BAT detectors were analysed in Kaleidoscope Pro. Calls picked up by the Magenta Bat4 were identified and the species recorded during the surveys. The deployment location of the passive detectors and the monitoring locations for the active and dusk emergence surveys are shown in Figure 6-4 and Figure 6-5.

In total, 14 passive bat detectors were deployed throughout the study area between April 2022 and March 2023, see Table 6-3 for the complete deployment detail. Eight of the detectors (BD1 – BD8) were deployed around the study area in April 2022 and June 2022. They were deployed in locations likely to attract bat activity such as along treelines, hedgerows and in the vicinity of the ponds. Bats forage and commute using hedgerow corridors and woodland and the ponds are likely to attract foraging bats. Three of the detectors (BD9 – BD11) were deployed within the buildings proposed to be demolished (7, 8 & 9) for three nights in March 2023 in order to record potential roosting activity. A further three detectors (BD12 – BD14) were deployed on trees assessed as having roosting potential for bats in March 2023 in order to support the active and emergence surveys.

Inspections of the buildings proposed to be demolished (7, 8 & 9) were carried out on the 28th of April 2022. These inspections involved a visual assessment the interior and exterior of each building in order to check for locations with roosting potential and access points that would allow for the movement of bats in and out of the buildings. These buildings were also inspected for signs of bat activity including droppings, scratch marks, fur or urine staining, invertebrate prey remains, bat corpses, audible daytime bat chattering, as well as direct observations of bats themselves.

A preliminary ground-level roost assessment survey of trees scheduled for removal was carried out on the 28th, 29th and 30th of March 2023. Prior to the survey, the tree felling schedule and map prepared by the arborist was consulted in order to determine the characteristics of the trees marked for removal, such as the species, maturity and location of the trees (See Tree Schedule, Charles McCorkell (2023) submitted with the planning application). The survey involved a visual inspection of the tree from ground-level to assess the presence of potential roost features (PRFs), or lack thereof, as well as evaluating any direct evidence of the presence of bats. The assessment survey was carried out during daylight hours, with binoculars used to inspect tall trees where PRFs could be present at a height, and where it was not possible to get close to trees due to barriers (*i.e.,* scrub, fencing).

An active bat survey was undertaken on the 28th of March 2023 between 20:35 – 21:20. This involved two ecologists monitoring areas of the campus for bat activity equipped with bat detectors and light torches. The buildings to be demolished were again inspected and passive detectors were deployed inside each of the buildings.

A dusk emergence survey was completed on the 29th of March 2023, which had two ecologists monitoring bat activity using bat detectors and light torches, at trees identified as having roost potential during the daylight preliminary ground-level roost assessment surveys. The dusk emergence surveys were carried out from *c*. 30 mins before sunset to *c*. 1 hour after sunset, between 19:30 – 21:15. All bat sightings were noted.

RECEIVED: 18/07/2023

Detector Name	Start Recording	End Recording	Recording Nights	Location (ITM)
BD1	28/04/2022	08/06/2022	41	699174 734665
BD2	28/04/2022	10/06/2022	40	698723 734974
BD3	28/04/2022	10/06/2022	40	698523 734635
BD4	09/06/2022	10/06/2022	1	699196 735000
BD5	09/06/2022	10/06/2022	1	698471 734860
BD6	10/06/2022	07/07/2022	27	698365 735071
BD7	10/06/2022	07/07/2022	27	699020 734616
BD8	10/06/2022	07/07/2022	27	698915 735139
BD9	28/03/2023	31/03/2023	3	698915 734792
BD10	28/03/2023	31/03/2023	3	698973 734742
BD11	28/03/2023	31/03/2023	3	698727 734590
BD12	28/03/2023	31/03/2023	3	699182 734534
BD13	28/03/2023	31/03/2023	3	698560 735063
BD14	28/03/2023	31/03/2023	3	698562 734670

Table 6-3. Passive Detector Deployment Detail

6.3.4.3 Birds

The conservation status of bird species was assessed with reference to; EU Birds Directive (2009/147/EC) Annex I list and Birds of Conservation Concern in Ireland; (BoCCI) Red, Amber and Green list (Gilbert *et al,* 2021). On the BoCCI list; Red-listed species are of high conservation concern in Ireland, Amber-list are considered of medium conservation concern, while Green-listed species are not of conservation concern in Ireland at present. Bird species listed on Annex I of the EU Birds Directive are considered of high conservation concern across Europe.

Four dedicated bird transects (see Bibby *et al*. 2000) were surveyed at the study area, with two completed during the breeding season (28th April and 8th June 22) and two completed during the winter season (30th November 2022 and 1st February 2023), with the same transect routes repeated. The number of each bird species seen/heard within 100m of the transect were recorded. Where a species was only seen/heard at a distance over 100m, only the presence of that species, not the number. Care was taken to minimise double-counting individuals in general, with counts focused on adult birds only where possible in line with standard transect survey practices (*e.g.* Countryside Bird Survey). Transect locations are shown in Figure 6-6 below.

During all ecological surveys, all bird species seen or heard within the study area were recorded to form a casual species list, with a separate causal bird species list compiled during an ecological site walkover of the north lands on the 1st of February 2023. Any behaviours indicative of breeding or roosting within or in the vicinity of the study area were recorded.

6.3.4.4 Other Taxa

RECEIVED: 18/07/2023

During all ecological surveys, observations of other taxa (amphibians, invertebrates, *etc.*) were recorded. The conservation status of other taxa was assessed by examining their inclusion in one or more of the following: Irish Wildlife Acts (1976–2010); Irish Red List for Butterfly (Regan *et al.* 2010); Irish Red List for Damselflies & Dragonflies (Nelson *et al.* 2011); Irish Red List for Amphibians, Reptiles & Freshwater Fish (King *et al.* 2011); Regional Red List of Irish Bees (Fitzpatrick *et al.* 2006); and the EU Habitats Directive.

RECEIVED 18/07/2023

Figure 6-3 Trail camera locations



RECEIVED: 18/07/2023

Figure 6-4 Passive Bat Detector Locations



RECEIVED: 18/07/2023

Figure 6-5 Active Bat Survey Locations



RECEIVED: 18/07/2023

Figure 6-6 Dedicated bird transect routes



RECEIVED: 18/07/2023

6.4 Results

6.4.1 Designated Conservation Sites

A nominal 15km zone, in accordance with NPWS guidance[2], is used as the initial search area and for the preparation of mapping of the designated sites in the wider hinterland of the development. However, the potential for effects on sites at larger distances are of course also considered as part of the initial assessment process, using the Source-Pathway-Receptor (SPR) model *i.e.*, where an aspect of a Natura 2000 site or 'Receptor' (*e.g.,* protected species or habitat) is potentially linked to the project. Examples of a link or 'Pathway' include a hydrological connection or use of a project site by protected species occurring outside the site boundary (*i.e.*, ex-situ).

In the event of any likelihood of potentially significant effects on any more distant Natura 2000 sites being identified these sites are included in the formal assessment process.

The proposed development site is not located within any designated Natura 2000 sites or nationally designated conservation sites. There are two Natura 2000 sites and ten pNHA sites located within 15km of the proposed development site boundary. There are an additional four Natura 2000 sites located outside of the 15km buffer but with a distant hydrological connection to the proposed development site as discussed below.

See Table 6-4, Figure 6-7 and Figure 6-8 for the locations of the designated conservation sites and the distance of the sites to the proposed development site. The closest designated site is the Rye Water Valley/Carton SAC which encompasses the Rye Water Valley/Carton pNHA and is located at a minimum distance of 960m to the north of the proposed development site.

Natura 2000 sites were also considered with regard to the proposed facilitation works *i.e.*, the proposed Eirgrid uprating works and the proposed GNI upgrade works.

Based on the information provided, it was determined that there are 13 no. Natura 2000 sites (12 no. SACs and 1 no. SPA) within 15km of the proposed Eirgrid uprating route. Of these Natura 2000 sites, the proposed uprating route crosses directly over the Rye Water Valley/Carton SAC, with the next nearest Natura 2000 site, The Long Derries, Edenderry SAC, located less than 5km from the proposed uprating route. Additionally, the Eirgrid uprating route crosses one NHA site, Carbury Bog NHA, and two pNHA sites, the Royal Canal and the Rye Water Valley/Carton. See Table 1 in Appendix 6.3 for the estimated distances of these sites to the proposed Eirgrid uprating route.

The preferred route for the proposed GNI upgrade works does not cross any designated Natura 2000 sites or nationally designated conservation sites. There are two Natura 2000 sites within 15km of the proposed GNI upgrade route, the closest being the Rye Water Valley/Carton SAC which is located 180m to the east and northeast. There are 10 no. pNHA sites within 15km of the proposed GNI upgrade route. See Table 2 in Appendix 6.3 for the distances of these sites to the proposed GNI upgrading route.

[2] https://www.npws.ie/sites/default/files/publications/pdf/NPWS_2009_AA_Guidance.pdf

The connection of the relevant Natura 2000 sites and their qualifying interests, to the proposed development site, proposed GNI upgrade route and proposed Eirgrid uprating route are discussed below. See Table 6-5 for an outline of the features of interest of the pNHA sites, where the site descriptions have been taken from the NPWS site synopses[3].

RECEIVED: 18/07/2023

The likely significant effects on European designated sites arising from the proposed development are addressed in the accompanying Screening Assessment report in support of the AA process and summarised in Section 6.5.1 below.

Site Name	Site Code	Proposed Development Site Distance (km)
Natura 2000 sites		
Rye Water Valley/Carton SAC	001398	0.96
Glenasmole Valley SAC	001209	13.83
South Dublin Bay and River Tolka Estuary SPA	004024	18.33
South Dublin Bay SAC	000210	19.55
North Bull Island SPA	004006	21.46
North Dublin Bay SAC	000206	21.47
Nationally designated sites (no NHA sites within 15km)		
Rye Water Valley/Carton pNHA	001398	0.96
Royal Canal pNHA	002103	1.11
Liffey Valley pNHA	000128	1.30
Grand Canal pNHA	002104	2.60
Slade of Saggart and Crooksling Glen pNHA	000211	10.35
Lugmore Glen pNHA	001212	11.17
Kilteel Wood pNHA	001394	12.35
Dodder Valley pNHA	000991	13.21
Donadea Wood pNHA	001391	13.50
Glenasmole Valley pNHA	001209	13.83

Table 6-4 Distance from the proposed development site to designated sites in the wider area.

Rye Water Valley/Carton SAC

Rye Water Valley/Carton SAC is located approximately 0.96km from the proposed developments and c. 179m at a minimum distance from the preferred route for the proposed GNI upgrade works. The site is designated for; Petrifying springs with tufa formation (*Cratoneurion*) [7220], *Vertigo angustior* (Narrow-mouthed Whorl Snail) [1014] and *Vertigo moulinsiana* (Desmoulin's Whorl Snail) [1016].

As outlined in Section 6.1.2, the River Liffey is hydrologically connected to the proposed development site by the surface-water drainage system that releases run-off via controlled discharge to the Leixlip Reservoir and the foul water drainage network that discharges treated foul water to the River Liffey via the Leixlip WWTP primary emission point. The Rye Water River flows into the River Liffey *c*. 450m downstream of the surface-water discharge point in the Leixlip Reservoir and *c.* 1km upstream of Leixlip WWTP primary emission point. Given the location of the confluence of the River Liffey and the Rye Water River, it is considered that no elements of the proposed development are likely to result in significant impacts on the Rye Water Valley/Carton SAC.

The Eirgrid uprating works crosses the Rye Water River and therefore the Rye Water Valley/Carton SAC. The proposed works comprise the uprating of existing overhead lines with

[3] https://www.npws.ie/protected-sites/nha

RECEIVED: 18/07/2023

no exaction works or in-stream works within the SAC required. The replacement of polesets and the upgrading of the towers, where required, will not occur within the SAC. Given the nature of the proposed works and the fact that no instream works for poleset/tower replacement works will be required within the SAC, no significant impacts to the Rye Water Valley/Carton SAC are likely.

The proposed GNI upgrade route does not cross the Rye Water River or any other watercourses. Given the urban nature of the intervening distance, along with the size/scale of the proposed GNI upgrade works, no significant impacts to the Rye Water Valley/Carton SAC are likely.

The facilitation works *i.e.*, the proposed Eirgrid uprating works and the proposed GNI upgrade works will be subject to a separate consent process including Appropriate Assessment.

Glenasmole Valley SAC

Glenasmole Valley SAC is located approximately 13.83km from the proposed development. The site is designated for; Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (*important orchid sites) [6210], Molinia meadows on calcareous, peaty or clayey-silt-laden soils *(Molinion caeruleae*) [6410] and Petrifying springs with tufa formation (*Cratoneurion*) [7220].

Glenasmole Valley SAC is located southeast of the proposed development site and in a different sub-catchment. It is not hydrologically connected to the proposed development site, nor to the facilitation works routes; therefore, no significant effects are likely on this SAC.

South Dublin Bay and River Tolka Estuary SPA

South Dublin Bay and River Tolka Estuary SPA is located approximately 18.33km from the proposed development. The site is designated for; Light-bellied Brent Goose (*Branta bernicla hrota*) [A046], Oystercatcher (*Haematopus ostralegus*) [A130], Ringed Plover (*Charadrius hiaticula*) [A137], Grey Plover (*Pluvialis squatarola*) [A141], Knot (*Calidris canutus*) [A143], Sanderling (*Calidris alba*) [A144], Dunlin (*Calidris alpina*) [A149], Bar-tailed Godwit (*Limosa lapponica*) [A157], Redshank (*Tringa totanus*) [A162], Black-headed Gull (*Chroicocephalus ridibundus*) [A179], Roseate Tern (*Sterna dougallii*) [A192], Common Tern (*Sterna hirundo*) [A193], Arctic Tern (*Sterna paradisaea*) [A194] and Wetland and Waterbirds [A999].

As outlined in Section 6.1.2, the River Liffey is hydrologically connected to the proposed development site by the surface-water drainage system that releases run-off via controlled discharge to the Leixlip Reservoir and the foul water drainage network that discharges treated foul water to the River Liffey via the Leixlip WWTP primary emission point. The River Liffey ultimately flows into Dublin Bay which makes up part of the South Dublin Bay and River Tolka Estuary SPA. A distant hydrological connection between South Dublin Bay and River Tolka Estuary SPA and the proposed development site exists.

The proposed Eirgrid uprating route crosses the Rye Water River which ultimately flows into the River Liffey. No instream works will be required as part of the uprating works nor are any significant excavation works required given that the transmission lines are overhead and any replacement of polesets or upgrading of towers, where required, will use existing foundations. The proposed GNI does not cross any watercourses. Coupled with the intervening distance between this coastal SPA and the proposed routes for the facilitation works, no significant effects as a result of the facilitation works are considered likely.

The facilitation works *i.e.*, the proposed Eirgrid uprating works and the proposed GNI upgrade works will be subject to a separate consent process including Appropriate Assessment.

RECEIVED: 18/07/2023

South Dublin Bay SAC

South Dublin Bay SAC is located approximately 19.55km from the proposed development. The site is designated for; Mudflats and sandflats not covered by seawater at low tide [1140], Annual vegetation of drift lines [1210], Salicornia and other annuals colonising mud and sand [1310] and Embryonic shifting dunes [2110].

As outlined in Section 6.1.2, the River Liffey is hydrologically connected to the proposed development site by the surface-water drainage system that releases run-off via controlled discharge to the Leixlip Reservoir and the foul water drainage network that discharges treated foul water to the River Liffey via the Leixlip WWTP primary emission point. The River Liffey ultimately flows into Dublin Bay which makes up part of the South Dublin Bay SAC. A distant hydrological connection between South Dublin Bay SAC and the proposed development site exists.

The proposed Eirgrid uprating route crosses the Rye Water River which ultimately flows into the River Liffey. No instream works will be required as part of the uprating works nor are any significant excavation works required given that the transmission lines are overhead and any replacement of polesets or upgrading of towers, where required, will use existing foundations. The proposed GNI does not cross any watercourses. Coupled with the intervening distance between this coastal SAC and the proposed routes for the facilitation works, no significant effects as a result of the facilitation works are considered likely.

The facilitation works *i.e.*, the proposed Eirgrid uprating works and the proposed GNI upgrade works will be subject to a separate consent process including Appropriate Assessment.

North Bull Island SPA

North Bull Island SPA is located approximately 21.46km from the proposed development. The site is designated for; Light-bellied Brent Goose (*Branta bernicla hrota*) [A046], Shelduck (*Tadorna tadorna*) [A048], Teal (*Anas crecca*) [A052], Pintail (*Anas acuta*) [A054], Shoveler (*Anas clypeata*) [A056], Oystercatcher (*Haematopus ostralegus*) [A130], Golden Plover (*Pluvialis apricaria*) [A140], Grey Plover (*Pluvialis squatarola*) [A141], Knot (*Calidris canutus*) [A143], Sanderling (*Calidris alba*) [A144], Dunlin *(Calidris alpina*) [A149], Black-tailed Godwit (*Limosa limosa*) [A156], Bar-tailed Godwit (*Limosa lapponica*) [A157], Curlew (*Numenius arquata*) [A160], Redshank (*Tringa totanus*) [A162], Turnstone (*Arenaria interpres*) [A169], Black-headed Gull (*Chroicocephalus ridibundus*) [A179] and Wetland and Waterbirds [A999].

As outlined in Section 6.1.2, the River Liffey is hydrologically connected to the proposed development site by the surface-water drainage system that releases run-off via controlled discharge to the Leixlip Reservoir and the foul water drainage network that discharges treated foul water to the River Liffey via the Leixlip WWTP primary emission point. The River Liffey ultimately flows into Dublin Bay which makes up part of the North Bull Island SPA. A distant hydrological connection between North Bull Island SPA and the proposed development site exists.

The proposed Eirgrid uprating route crosses the Rye Water River which ultimately flows into the River Liffey. No instream works will be required as part of the uprating works nor are any significant excavation works required given that the transmission lines are overhead and any replacement of polesets or upgrading of towers, where required, will use existing foundations. The proposed GNI does not cross any watercourses. Coupled with the intervening distance

between this coastal SPA and the proposed routes for the facilitation works, no significant effects as a result of the facilitation works are considered likely.

The facilitation works *i.e.*, the proposed Eirgrid uprating works and the proposed GNI upgrade works will be subject to a separate consent process including Appropriate Assessment.

RECEIVED: 18/07/2023

North Dublin Bay SAC

North Dublin Bay SAC is located approximately 21.57km from the proposed development. The site is designated for; Mudflats and sandflats not covered by seawater at low tide [1140], Annual vegetation of drift lines [1210], Salicornia and other annuals colonising mud and sand [1310], Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330], Mediterranean salt meadows (*Juncetalia maritimi*) [1410], Embryonic shifting dunes [2110], Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120], Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130], Humid dune slacks [2190] and *Petalophyllum ralfsii* (Petalwort) [1395].

As outlined in Section 6.1.2, the River Liffey is hydrologically connected to the proposed development site by the surface-water drainage system that releases run-off via controlled discharge to the Leixlip Reservoir and the foul water drainage network that discharges treated foul water to the River Liffey via the Leixlip WWTP primary emission point. The River Liffey ultimately flows into Dublin Bay which makes up part of the North Dublin Bay SAC. A distant hydrological connection between North Dublin Bay SAC and the proposed development site exists.

The proposed Eirgrid uprating route crosses the Rye Water River which ultimately flows into the River Liffey. No instream works will be required as part of the uprating works nor are any significant excavation works required given that the transmission lines are overhead and any replacement of polesets or upgrading of towers, where required, will use existing foundations. The proposed GNI does not cross any watercourses. Coupled with the intervening distance between this coastal SAC and the proposed routes for the facilitation works, no significant effects as a result of the facilitation works are considered likely.

The facilitation works *i.e.*, the proposed Eirgrid uprating works and the proposed GNI upgrade works will be subject to a separate consent process including Appropriate Assessment.

Site Name & Code	Conservation Summary	Minimum Distance from Site (km)
Rye Water Valley/Carton pNHA (001398)	This pNHA is encompassed within the Rye Water Valley/Carton SAC. The conservation importance of the site lies in the presence of several rare and threatened plant and animal species, and the presence of petrifying springs, a habitat type listed on Annex I of the E.U. Habitats Directive. The woods found on Carton Estate and their birdlife are of additional interest. The Rye Water River flows into the River Liffey downstream of the proposed development site. No elements of the proposed development are considered likely to result in significant impacts on the Rye Water Valley/Carton pNHA.	0.96km
Royal Canal pNHA (002103)	The Royal Canal is a man-made waterway linking the River Liffey at Dublin to the River Shannon near Tarmonbarry. The ecological value	1.11km

RECEIVED: 18/07/2023

Site Name & Code	Conservation Summary	Minimum Distance from Site (km)
	of the canal lies more in the diversity of species it supports along its linear habitats than in the presence of rare species. It crosses through agricultural land and therefore provides a refuge for species threatened by modern farming methods. Royal Canal pNHA is not hydrologically connected to the proposed development site; therefore, no significant effects are expected on this pNHA.	
Liffey Valley pNHA (000128)	This pNHA is located along the River Liffey between Leixlip Bridge on the Kildare-Dublin border and downstream of the weir at Glenaulin, Palmerstown, Co. Dublin. The site is important because of the diversity of the habitats within the site, ranging from aquatic to terrestrial. A number of rare and threatened plant species have been recorded from the site. The River Liffey, and associated Liffey Valley pNHA, is hydrologically connected to the proposed development site by the surface-water drainage system that releases run-off via controlled discharge to the Leixlip Reservoir and the foul water drainage network that discharges treated foul water to the River Liffey via the Leixlip WWTP primary emission point.	1.30km
Grand Canal pNHA (002104)	The Grand Canal is a man-made waterway linking the River Liffey at Dublin with the Shannon at Shannon Harbour and the Barrow at Athy. The ecological value of the canal lies more in the diversity of species it supports along its linear habitats than in the presence of rare species. It crosses through agricultural land and therefore provides a refuge for species threatened by modern farming methods. Grand Canal pNHA is not hydrologically connected to the proposed development site; therefore, no significant effects are expected on this pNHA.	2.60km
Slade of Saggart and Crooksling Glen pNHA (000211)	The pNHA stretches from Britta northward to c. 2km south of Saggart. The northern half of the site comprises a river valley with steep tree-covered sides, while the southern side is flatter and contains two small lakes (the Brittas Ponds). The site is important as a good example of a wooded river valley and a small wetland system that supports rare plants, invertebrates and birds. Slade of Saggart and Crooksling Glen pNHA is not hydrologically connected to the proposed development site; therefore, no significant effects are expected on this pNHA.	10.35km
Lugmore Glen pNHA (001212)	The pNHA is located 2km southeast of Saggart, Dublin. The importance of this site is that it is a fine example of a wooded glen with a good representation of woodland plants. Lugmore Glen pNHA is not hydrologically connected to the proposed development site; therefore, no significant effects are expected on this pNHA.	11.17km
Kilteel Wood pNHA (001394)	This site is located about 10 km north-east of Naas and immediately east of the village of Kilteel. This site is a fine example of a largely deciduous wood.	12.35km

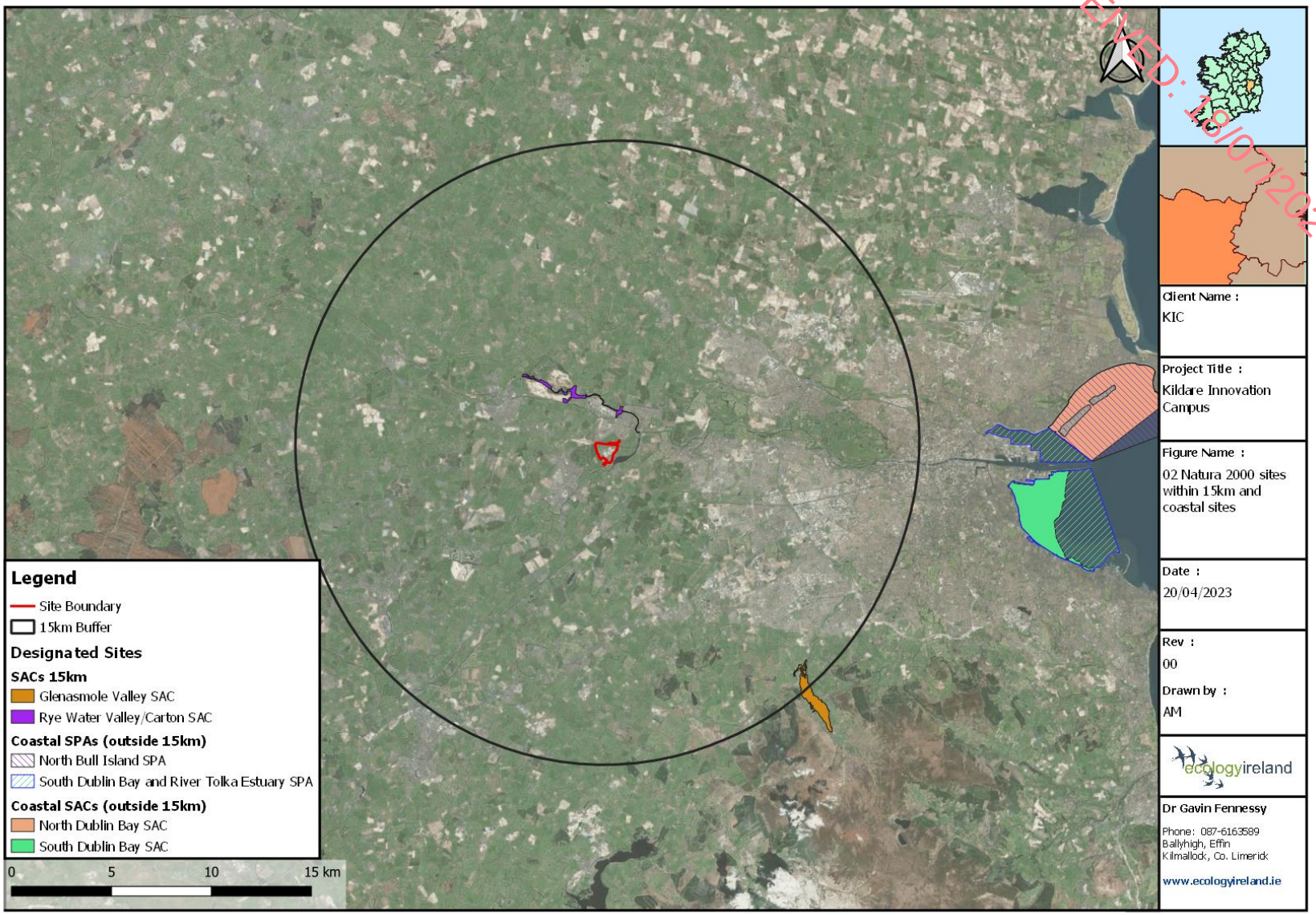
RECEIVED: 18/07/2023

Site Name & Code	Conservation Summary	Minimum Distance from Site (km)
	Kilteel Wood pNHA is not hydrologically connected to the proposed development site; therefore, no significant effects are expected on this pNHA.	
Dodder Valley pNHA (000991)	The pNHA comprises a stretch of the River Dodder that extends for about 2 kilometres between Firhouse bridge and Oldbawn bridge in the south-west of Dublin city. This site represents the last remaining stretch of natural river bank vegetation of the Dodder in the built up Greater Dublin Area. Dodder Valley pNHA is not hydrologically connected to the proposed development site; therefore, no significant effects are expected on this pNHA.	13.21km
Donadea Wood pNHA (001391)	This site is located about 6 km north of Prosperous. It is the old demesne woodland of Donadea Castle, and now owned by Coillte. his site is of scientific interest as, although highly managed, it has a significant proportion of deciduous trees and parts of the site have been wooded for a long period. Donadea Wood pNHA is not hydrologically connected to the proposed development site; therefore, no significant effects are expected on this pNHA.	13.50km
Glenasmole Valley pNHA (001209)	This pNHA is encompassed within the Glenasmole Valley SAC. The site contains a high diversity of habitats and plant communities, including three habitats listed on Annex I of the E.U. Habitats Directive. The presence of four Red Data Book plant species further adds to the value of the site, as does the presence of populations of several mammal and bird species of conservation interest.	13.83km

Table 6-5 Summary of nationally designated conservation sites closest to the application site boundary.

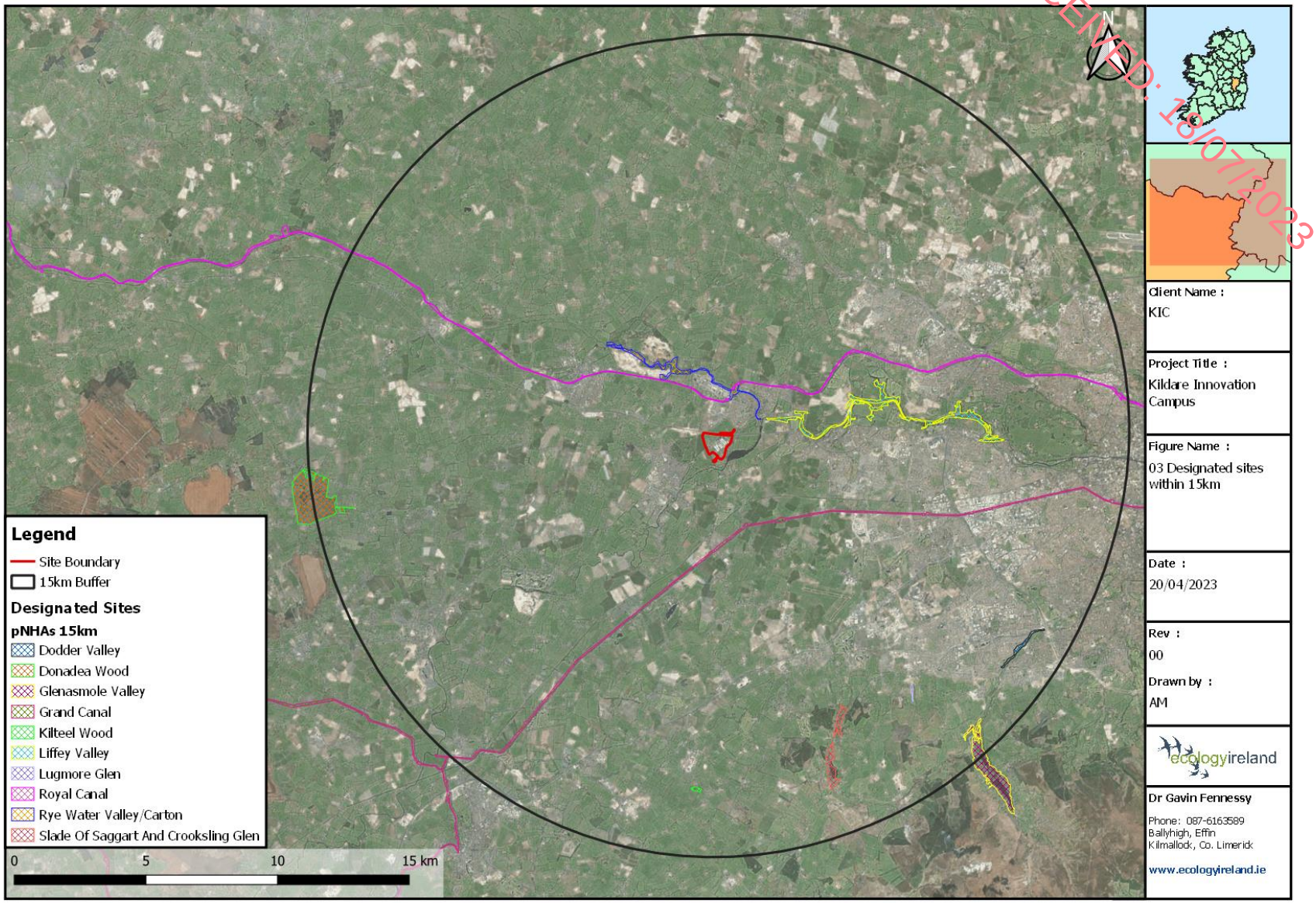
RECEIVED: 19/07/2023

Figure 6-7 Natura 2000 sites in the wider hinterland of the proposed development site



RECEIVED: 18/07/2023

Figure 6-8 pNHAs within 15km of the proposed development site.



6.4.2 Botanical and Habitat Assessment

RECEIVED: 28/07/2023

Desktop Review

According to the Leixlip Local Area Plan (2020 – 2023), there are a number of areas throughout Leixlip that have been identified as "key local biodiversity areas", including:

"*The woodlands, hedgerows, treelines, watercourses and extensive areas of grassland within the farmlands of Collinstown and Confey, in St. Catherine's Park, Leixlip Manor, Leixlip Castle Demesne, Barnhall and the surroundings of the commercial grounds of Intel and the* ***Hewlett Packard site*** *all provide excellent habitats which are interlinked and support widespread habitat connectivity across the study area and contribute to the GI network of Leixlip*."

No legally protected or red-listed plant species have been previously recorded in the NBDC database for the 2km grid square (N93X) within which the study area is located.

Notable records held on the NBDC database for the wider 10km grid square within which the study area is located (N93) included recent records (2017 and 2020) for Green Figwort (*Scrophularia umbrosa*) at Castletown House and Demesne on the banks of the River Liffey and tributary watercourses in 2km grid square N93W, *c*. 1 km southwest of the proposed development site. This species was previously classified as 'endangered' but has been re-evaluated as 'near threatened' in the most recent red-list for plants (Wyse-Jackson *et al*, 2016). Another notable record held on the NBDC database for the wider 10km grid square N93, is Corncockle (*Agrostemma githago*) has been recorded recently (2021), north of the Collinstown Industrial Park near the River Ryewater. This was recorded was captured within the 2km grid square, N93Y, which overlaps part of the proposed GNI upgrade route and is located *c*. 2.5 km north of the study area. This species was previously classified as 'regionally extinct' but has been re-evaluated as 'waiting list' in the most recent red-list for plants (Wyse-Jackson *et al*, 2016). This is due to uncertainty about the status of some populations as archaeophytes due to the inclusion of the species in contemporary wildflower seed mixes.

The BSBI database holds a number of records for plant species listed on the Flora (Protection) Order, 2022. Historic records of Red Hemp-nettle (*Galeopsis angustifolia*) (pre-1930's) and Hairy Dog-violet (*Viola hirta*) (1930-1949) are held for the 10km grid square N93. In addition, relatively recent records for Opposite-leaved Pondweed (*Groenlandia densa*) (1987-1999) are held for the 10km grid square N93 and Hairy St John's-wort (*Hypericum hirsutum*) (1987-1999) for the 2km grid square N93T and (2010-2019) N93W. These 2km grid squares are *c*. 2km northwest and south of the study area, respectively. The 2km grid squares, O03D and O03C, through which the proposed GNI upgrade route passes also contain records for Hairy St John's-wort which were recorded as recently as 2014 and 2018 respectively.

With regard to the proposed Eirgrid uprating route, the NBDC database also holds records for a number of species listed on Flora (Protection) Order 2022, including Hairy St John's wort for the 10km grid square O03. See Table 1 in Appendix 6.4 for the complete protected floral species list.

The NPWS map viewer[4] for bryophyte species listed on the Flora (Protection) Order, 2022 shows a historic record for *Pallavicinia lyellii* from 10km grid squares (O03) ay Leixlip Railway

[4] https://dahg.maps.arcgis.com/apps/webappviewer/index.html?id=71f8df33693f48edbb70369d7fb26b7e (last accessed 09/02/2023)

RECEIVED: 18/07/2023

Station near the River Rye Water in 1890. This was not found on a re-survey in 2006. There are no records from the 10km grid squares (N93) in which the proposed development site is located.

With regard to non-native invasive species, the NBDC database for 2km grid square N93X within which the proposed development site is located holds previous records for Cherry Laurel (*Prunus laurocerasus*) which knotweed is classified as a 'risk of high impact' invasive species (Kelly *et al*. 2013) as well as Sycamore (*Acer pseudoplatanus*), Douglas Fir (*Pseudotsuga menziesii*) and Wild Parsnip (*Pastinaca sativa*). These three species are classified as a 'risk of medium impact' invasive species (Kelly *et al*. 2013). For the proposed GNI upgrade route, there are records for Japanese knotweed (*Fallopia japonica*) within the 2km grid square O03D, and Canadian Waterweed (*Elodea canadensis*) within the 2km grid square N93Y. Both of these species are listed on the Third Schedule of the 2011 European Communities (Birds and Natural Habitats) Regulations (*i.e.*, species of which it is an offense to disperse, spread or otherwise cause to grow in any place) or listed as being of European Union concern (IAS Regulation 1143/2014). The NBDC database for 2km grid square N93X does not contain previous records for these species or other species listed on Third Schedule.

As outlined in Section 6.3, no dedicated habitat surveys of the proposed Eirgrid uprating route and the proposed GNI route were undertaken, with a desktop review of aerial mapping and available sources of ecological data such as Corine 2018 landcover classification used in this assessment[5]. The Corine 2018 landcover for the proposed GNI route is classified as 'Artificial Surfaces' and 'Agricultural Areas'. The Corine 2018 landcover for the proposed Eirgrid uprating route includes these classifications as well as traversing landcover areas classified as 'Forest and semi-natural areas' and 'Wetlands'.

Field Survey

No habitats listed on Annex I of the EU Habitats Directive were recorded within the study area.

Botanical species protected under the Flora (Protection) Order 2022, listed in Annex II or IV of the EU Habitats Directive (92/43/EEC), or Red listed in Ireland (Wyse-Jackson *et al*. 2016) were not recorded during the site visits.

It is noted that Kildare Innovation Campus has recently subscribed as a Business Supporter of the All-Ireland Pollinator Plan[6], which will require existing campus management to incorporate pollinator friendly practices into the overall management of the grounds in fulfilment of the membership obligations.

The campus section of the study area consists of an existing group of industrial buildings that form the Kildare Innovation Campus and associated car parking and access roads (BL3). The areas immediately surrounding these built areas consist of formal landscaping such as amenity grassland (GA2), ornamental shrubbery (WS3), ornamental hedges (WL1) and treelines (WL2). Scattered trees and parkland (WD5) with amenity grassland beneath was also recorded. A series of ornamental ponds (FL8) are also located nearby. The campus is surrounded by semi-mature, landscaping of mixed broadleaved woodland (WD1) and treelines (WL2) which provides screening from adjacent roadways. A number of areas of unmanaged dry meadow and grassy verge (GS2) semi-natural grassland areas are located around the site where

[5] https://gis.epa.ie/EPAMaps/AAGeoTool
[6]https://pollinators.ie/wp-content/uploads/2023/04/All-Ireland-Pollinator-Plan-April-2023-business-supporters-newsletter.pdf

immature trees and scrub (WS1) are developing. Smaller areas of wet grassland (GS4) were also recorded. Fields to the northwest of the study area were a similar unmanaged dry meadow and grassy verge habitat but were surrounded by hedgerows and treelines that were semi-natural in nature. Areas of gravel hardstand (ED2) associated with nearby construction activities and an existing substation, as well as areas which were recolonising (ED3) in mosaic with scrub (WS1) were also noted. The north lands (*i.e.,* the lands north of the campus and the M4, within the proposed development site boundary), primarily include a haul road which comprised a raised earthen bank (ED2) at the time of survey. Dry meadow and grassy verge (GS2) habitat bordered the haul road to the south. Farmed allotments are located to the north of this section of the application site.

RECEIVED 18/07/2023

The following habitats (with Fossitt codes, as outlined in Section 6.3.3 above) were recorded within the study area (see Figure 6-9):

- Buildings and artificial surfaces (BL3)
- Spoil and bare ground (ED2)
- Recolonising Bare Ground (ED3)/Scrub (WS1) Mosaic
- Amenity (Improved) Grassland (GA2)
- Dry Meadows and Grassy Verges (GS2)
- Wet grassland (GS4)
- Ornamental/non-native shrub (WS3)
- Scrub (WS1)
- Mixed broadleaved woodland (WD1)
- Scattered trees and parkland (WD5)
- Hedgerows (WL1)
- Treelines (WL2)
- Other artificial lakes and ponds (FL8)

Buildings and Artificial Surfaces (BL3). This habitat type was widely recorded across the study area and consisted of a number of large industrial buildings across the Kildare Innovation Campus and associated car parking areas and access roads.

The ecological valuation of the buildings and artificial surfaces habitat is considered to be of negligible value.



Plate 1: Buildings and artificial surfaces habitat within the study area.

RECEIVED: 18/07/2023

Spoil and Bare Ground (ED2). This habitat was recorded in the south-western and western sides of the study area and consisted of areas of gravel hardstand which were being used as storage depots for building materials and construction equipment for a development that was underway in the southwest corner of the Innovation Campus during the site visit. It was also recorded in the north lands as the haul road which was under-going construction at the time of survey.

The ecological valuation of the spoil and bare ground habitat is considered to be of negligible value.



Plate 2: Left - Spoil and bare ground habitat within the campus. Right – haul road undergoing construction in the north lands.

Recolonising Bare Ground (ED3)/Scrub (WS1) Mosaic. The recolonising bare ground/scrub mosaic habitat was recorded adjacent to one of the construction material hardstand areas in the southern side of the study area. This area was similar to the adjacent hardcore gravel hardstand but was being recolonised by a range of species indicating that the surface had been in place for a longer period and/or disturbance and traffic by construction machinery was reduced in these peripheral areas. The habitat contained frequent Bramble (*Rubus fructicosus* agg.), Willowherb (*Epilobium* sp.), Creeping Buttercup (*Ranunculus repens*) and St. John's-wort (*Hypericum* sp.). False-brome (*Brachypodium sylvaticum*), Creeping Thistle (*Cirsium arvense*),Cut-leaved Crane's-bill (*Geranium dissectum*), Common Ragwort (*Jacobaea vulgaris*), Common Centaury (*Centaurium erythraea*),Changing Forget-me-not (*Myosotis discolor*), Dandelion (*Taraxacum* agg.), White Clover (*Trifolium repens*), Thyme-leaved Speedwell (*Veronica serpyllifolia*), Creeping Cinquefoil (*Potentilla reptans*), Coltsfoot (*Tussilago farfara*), Rose (*Rosa* sp.), Lesser Trefoil (*Trifolium dubium*), Common Mouse-ear (*Cerastium fontanum*), Clematis (*Clematis* sp.) and Pyramidal orchid (*Anacamptis pyramidalis*) were occasionally recorded. Herb Robert (*Geranium robertianum*), Cowslip (*Primula veris*), Common Twayblade (*Neottia ovata*), Common Spotted Orchid (*Dactylorhiza fuchsii*) and Bee Orchid (*Ophrys apifera*) were rarely recorded.

Along with frequent Bramble, a number of woody shrub species were recorded within the habitat including frequent Dogwood (*Cornus* sp.) along with occasional immature Elder (*Sambucus nigra*) and Hawthorn (*Crataegus monogyna*) indicating that the area is gradually succeeding to scrub in the absence of any management. The presence of four species of orchid as well as a number of calcicole plants growing in the limestone hardcore gravel base indicates that it is possible that these species were introduced into the area with the loads of aggregate.

RECEIVED: 18/07/2023

The ecological valuation of the recolonising bare ground habitat is considered to be of local importance (higher value).



Plate 3: Recolonising bare ground/scrub mosaic habitat within the study area.

Amenity (Improved) Grassland (GA2). The amenity grassland habitat was also frequently recorded within the study area, mainly around the margins the industrial buildings, access roads and car parking areas. The habitat consisted of regularly maintained lawns with frequent Yorkshire Fog (*Holcus lanatus*), White Clover and Creeping Buttercup. Red Fescue (*Festuca rubra*) and Perennial Ryegrass (*Lolium perenne*) were occasionally recorded. Dandelion and Common Mouse-ear were rarely recorded. The amenity grassland areas had recently been mown at the time of the survey and the uniform sward was c. 3-5 cm high.

The ecological valuation of the amenity grassland habitat is considered to be of local importance (lower value).



Plate 4: Amenity grassland habitat within the study area.

Dry Meadows and Grassy Verges (GS2). This habitat was frequently recorded across the study area, in particular around the north-eastern, southern and north-western margins of the site. In some locations there was evidence of low interval mowing of this habitat such as around the margins of the amenity grassland habitat. However, the majority of this habitat did not show any evidence of regular annual mowing due to the rank and lodged grass observed in many locations as well as the development of immature and sapling tree and other scrub species within the habitat.

RECEIVED: 18/07/2023

The majority of the dry meadow and grassy verge habitat was dominated by coarse tussocky species such as abundant to frequent Cocksfoot (*Dactylis glomerata*) and False Oat-grass (*Arrhenatherum elatius*). Other grass species recorded included abundant to occasional Yorkshire Fog, occasional Meadow Foxtail (*Alopecurus pratensis*), Red Fescue, Common Couch (*Elymus repens*), Creeping Bent (*Agrostis stolonifera*), Rough Meadow-grass (*Poa trivialis*). Sweet Vernal-grass (*Anthoxanthum odoratum*) was recorded rarely in one area of grassland.

Forb species that were recorded within the habitat across the site included frequent Creeping Thistle (*Cirsium arvense*), Common Nettle (*Urtica dioica*), Cleavers (*Galium aparine*) as well as occasional Willowherb, Common Vetch (*Vicia sativa*), Meadow Vetchling (*Lathyrus pratensis*), Creeping Cinquefoil and Broad-leaved Dock (*Rumex obtusifolius*). Hairy Sedge (*Carex hirta*), Silverweed (*Argentina anserina*), Tall Fescue (*Schedonorus arundinaceus*), Cuckooflower (*Cardamine pratensis*), Curled Dock (*Rumex crispus*) and Hard Rush (*Juncus inflexus*) were rarely recorded.

As stated, the majority of the dry meadow and grassy verge habitat was unmanaged with a long sward *c*. 30 to 50 cm high and rank. A smaller area of the habitat that had been previously mown was *c*. 20 cm high and had a more open sward. Intensive grazing by rabbits around the margins of this area was also observed.

The ecological valuation of the dry meadows and grassy verges habitat is considered to be of local importance (lower value).



Plate 5: Dry meadows and grassy verges habitat within the study area.

Wet grassland (GS4). Smaller areas of wet grassland habitat were recorded in the north-eastern side of the study area where slightly lower lying areas in the surrounding dry meadows and grassy verge habitat were damp and supported a range of species including frequent Creeping Bent, Field Horsetail (*Equisetum arvense*), Silverweed, Red Fescue (*Festuca rubra*), Creeping Cinquefoil along with occasional Hairy Sedge, Yorkshire Fog, Hard Rush, Tall Fescue and Willowherb. Meadow Buttercup (*Ranunculus acris*) and Common Vetch were rarely recorded.

The sward was similar to the surrounding dry meadows and grassy verge being unmanaged and rank with *c*. 15-20 cm high sward with sapling trees scattered across the area.

The ecological valuation of the wet grassland habitat is considered to be of local importance (lower value).

RECEIVED: 18/07/2023



Plate 6: Wet grassland habitat within the study area.

Ornamental/non-native shrub (WS3). This habitat was recorded in the form of formal landscaped areas around the car parking areas and industrial buildings. The planting schemes included *Lonicera* sp., *Cotoneaster* sp., Bamboo, *Pinus* sp., *Viburnum* sp., *Prunus* sp., *Abies* sp., *Berberis* sp. and *Escallonia* sp.

The ecological valuation of the ornamental/non-native shrub habitat is considered to be of local importance (lower value).



Plate 7: Ornamental/non-native shrub habitat within the study area.

Scrub (WS1). This habitat was recorded on the western side of the study area and consisted of frequent sapling Ash (*Fraxinus excelsior*) along with Bramble (*Rubus fructicosus*) and Willowherb. Common Hogweed (*Heracleum sphondylium*) and Pendulous Sedge (*Carex pendula*) were occasionally recorded. Sapling Oak (*Quercus* sp.) was rarely recorded. Meadow Buttercup, Yorkshire Fog and Creeping Thistle (*Cirsium arvense*) were also recorded growing at the margins and in patches through the scrub.

The ecological valuation of the scrub habitat is considered to be of local importance (lower value).

RECEIVED: 18/07/2023



Plate 8: Scrub habitat within the study area.

Mixed broadleaved woodland (WD1). This habitat was recorded widely across the site with mixed broadleaved woodland around the study area to provide screening around the Innovation Campus boundary, around the existing substation and between car parking areas in the centre of the site.

Species recorded in these woodland areas included Birch (*Betula* sp.), Horse chestnut (*Aesculus hippocastanum*), Lime (*Tilia* sp.), Cherry (*Prunus avium*), Norway Maple (*Acer platanoides*), Oak, Rowan (*Sorbus aucuparia*), Ash, Ornamental *Sorbus* sp., Elder (*Sambucus nigra*), Hawthorn (*Crataegus monogyna*), Apple (*Malus* sp.), Beech (*Fagus sylvatica*), Hazel (*Corylus avellana*),Willow (*Salix* sp.), Dogwood (*Cornus*) and Sycamore (*Acer pseudoplatanus*) and Pine (*Pinus* sp.).

The trees were uniform, semi-mature in age and this combined with the species mix present indicates that this habitat was planted within the study area as part of a landscaping plan when the Innovation Campus was originally developed.

The ecological valuation of the mixed broadleaved woodland habitat is considered to be of local importance (higher value).



Plate 9: Mixed broadleaved woodland habitat within the study area.

RECEIVED: 18/07/2023

Scattered trees and parkland (WD5). This habitat was recorded within the amenity grassland areas and consisted of scattered ornamental trees within the mown lawn areas. Species present included Beech, Copper Beech, Birch and Oak.

The ecological valuation of the scattered trees and parkland habitat is considered to be of local importance (lower value), with some areas to the south considered to be of local importance (higher value), given the maturity of the trees present.



Plate 10: Scattered trees and parkland habitat within the study area. Left - local importance (lower value), Right - local importance (higher value)

Hedgerow (WL1). This habitat was recorded within the study area in the form of both semi-natural hedgerows and non-native dominated formal hedging.

The semi-natural hedgerow habitat was recorded in the southwest and northwest of the study area and represented remnant field boundary hedgerows with predated the Innovation Campus development. Species present included frequent Hawthorn and occasional Willow, Elder and Dog Rose (*Rosa canina*). Semi-mature Ash and Sycamore were occasionally recorded. Bramble, Nettle and Cleavers (*Galium aparine*) were also frequently recorded.

The ecological valuation of the semi-natural hedgerow habitat is considered to be of local importance (higher value).



RECEIVED: 18/07/2023

Plate 11: Semi-natural hedgerow habitat within the study area.

The ornamental hedge habitat was recorded around the car parking areas close to the industrial buildings with maintained hedgerows dominated by Beech which were clipped to form a box hedge *c.* 1.2 m high. Semi-mature Lime trees *c.* 6-8 m high were planted at *c.* 6 m intervals along this hedge.

The ecological valuation of the ornamental hedge habitat is considered to be of local importance (lower value).

Treeline (WL2). The treeline habitat was recorded widely across the study area. It consisted of semi-mature treelines around car parking areas which contained a mix of species and were part of the overall landscaping plan. Semi-natural treelines which correspond to old field boundaries were recorded in the northwest of the study area.

The more formal treelines around the built-up areas contained Lime, Birch and Cherry. The semi-natural treelines contained mature Oak and Ash as well as a well-developed under layer of Blackthorn (*Prunus spinosa*), Elder, Hawthorn and Bramble.

The ecological valuation of the treeline habitat is considered to be of local importance (higher value).



Plate 12: Ornamental type treeline habitat within the study area.

Other artificial lakes and ponds (FL8). This habitat was recorded on the eastern side of the study area and consisted of a number of constructed ornamental ponds. The ponds were mainly open water with Yellow Iris (*Iris pseudacorus*) frequent along the margins along with occasional Mare's Tail (*Hippuris vulgaris*) and Water Lilly (*Nymphaea* sp.) which was rarely recorded. The bank vegetation was ornamental in nature with a mix of Willow, Birch, Dogwood, New Zealand Flax (*Phormium* sp.) and Cotoneaster along with areas of open gravel.

RECEIVED: 18/07/2023

The ecological valuation of the artificial lakes and ponds habitat is considered to be of local importance (higher value).



Plate 13: Artificial lakes and ponds habitat within the study area.

Protected and Red-listed Flora

No legally protected or Red-listed plants were recorded within the boundary of the proposed development site during the baseline survey.

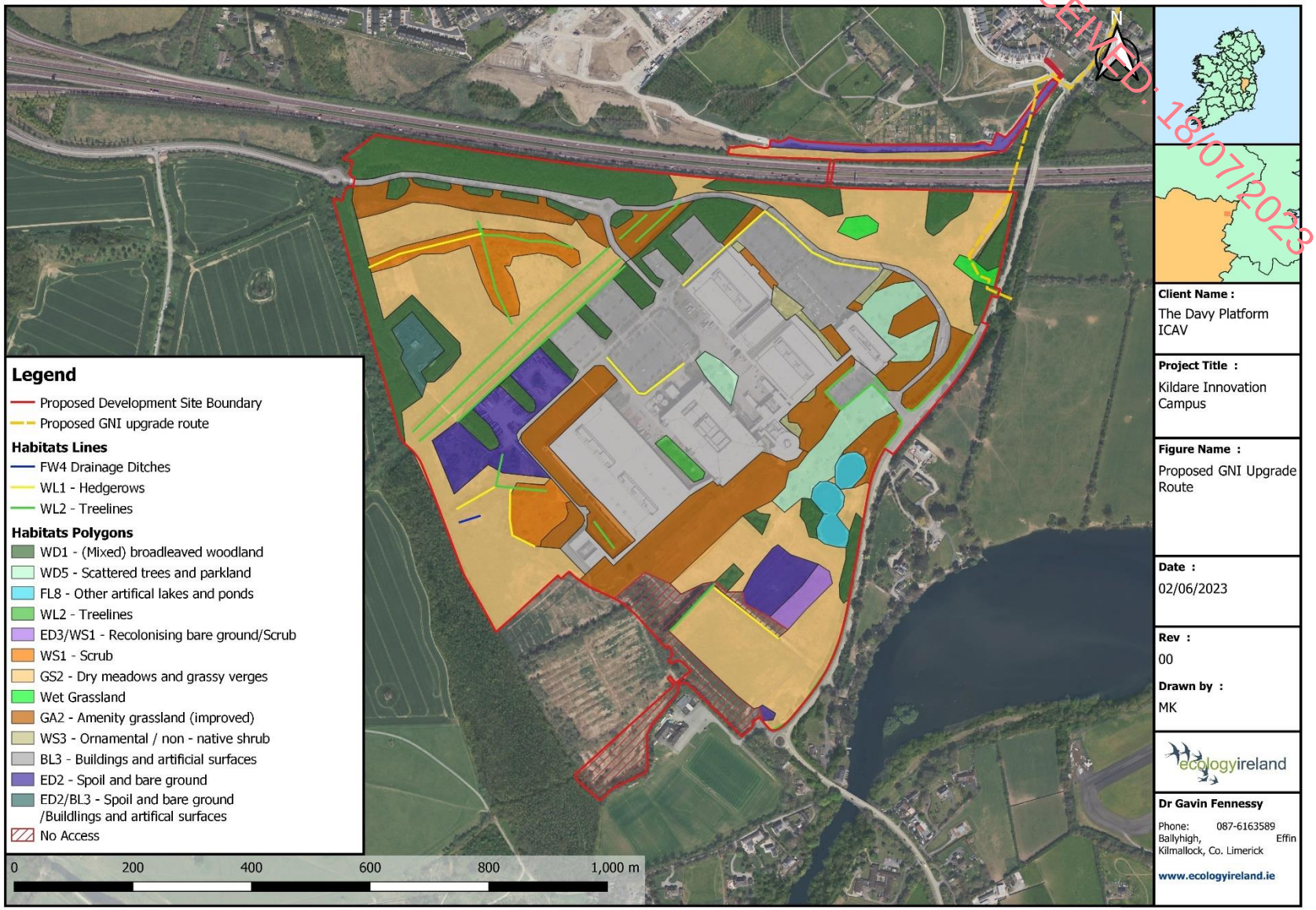
Invasive Species

No invasive species listed on the Third Schedule of the 2011 European Communities (Birds and Natural Habitats) Regulations (*i.e.*, species of which it is an offense to disperse, spread or otherwise cause to grow in any place) were recorded within the proposed development boundary or along the proposed GNI upgrade route.

Sycamore which has been identified as an invasive species with a risk of medium impact (Kelly *et al*, 2013) was recorded occasionally across the proposed development site. This species is widespread and naturalised throughout the Irish landscape.

RECEIVED: 18/07/2023

Figure 6-9 Habitat map for the study area



RECEIVED: 18/07/2023

6.4.3 Fauna Assessment

6.4.3.1 Non-Volant Mammals

Eleven confirmed non-volant mammal species were recorded during ecological surveys and by the trail cameras. Signs of Fox (*Vulpes vulpes*) and Rabbit (*Oryctolagus cuniculus)* in the form of prints and droppings were recorded throughout the study area. Foxes were regularly sighted during ecological surveys and recorded by the trail cameras. A fox cub observed on the 16th of June during the habitat and botanical survey and a picture of a fox with two cubs was captured by the trail cameras. Cats and rabbits were also regularly observed during ecological surveys. Irish Hare (*Lepus timidus hibernicus*) was observed on three occasions, once on the 28th of April 2022 within the grassland habitats to the northwest, once on the 14th of June 2022 on the roadway bordering the northeast boundary of the study area and once on the 28th of March 2023 within the parkland habitat to the northeast. Grey Squirrel (*Sciurus carolinensis*) was observed within the woodland habitats near the ponds on the 8th of June and 10th of August 2022. Small mammal burrows, likely Rabbit, were recorded within the open parkland habitats and along hedgerow field boundaries. Deer prints were recorded along the hedgerow field boundaries in the northwest section of the campus. Within areas of scrub and alongside field margins, mammal trails were observed.

Trail camera footage was analysed, and the results can be seen in Table 6-6 and Plates 14-17 below.

While no breeding and/or resting places of any protected mammal were recorded during the site walkovers of the study area (*e.g*., setts, latrines, feeding signs, *etc*.), suitable habitat exists for species such as Badger. Badger was also recorded by two of the trail cameras. As part of the ecological surveys carried out as part of the EcIA for the DB Schenker site, a potential Badger sett was recorded *c.* 100m east of the DB Schenker site boundary, with no other Badger activity recorded within the DB Schenker site (Environmental Resources Management Ltd, 2020b). No Badger sett was recorded as part of the ecological surveys undertaken as part of the planning application for the proposed development. Furthermore, while Badger was recorded by trail cameras deployed as part of the pre-construction surveys completed for the DB Schenker site, no Badger sett was located (Ecology Ireland, 2022).

There are a number of records for non-volant mammals protected under the Wildlife Acts (1976; Wildlife Amendment Act, 2000) within the 2km grid square (NBDC: N93X) overlapping the study area including Badger (*Meles meles*), Red Squirrel (*Sciurus vulgaris*) and Hedgehog (*Erinaceus europaeus*). These species are listed as "Least Concern" in Ireland at present (Marnell *et al*. 2019). There are also records for Rabbit and Fox. Grey Squirrel, a high impact invasive species, has also been recorded in N93X.

There are number of records for additional protected mammal species within the wider area of the 10km grid square (NBDC: N93) in which the campus is located: Pygmy Shrew (*Sorex minutus*), Irish Hare (*Lepus timidus hibernicus*), Irish Stoat (*Mustela erminea hibernica*), Pine Marten (*Martes martes*), Red Deer (*Cervus elaphus*), and Otter (*Lutra lutra*). Otter is listed on Annex II and Annex IV of the EU Habitats Directive. Additional invasive mammal species recorded include, American Mink (*Mustela vison*), Brown Rat (*Rattus norvegicus*), Feral Ferret (*Mustela furo*), Greater White-toothed Shrew (*Crocidura russula*) and House Mouse (*Mus musculus*) have also been recorded in this area. The protected species listed above, namely

Otter, Badger, Irish Hare, Irish Stoat, Pine Marten and Hedgehog, have also been recorded within the adjacent 2km grid squares (NBDC: N93Y, O03D and O03C) through which part of the GNI upgrade route passes. With regard to the proposed Eirgrid Uprating route, the NBDC database holds records for a number of protected species including Otter which is widely recorded throughout the range of the proposed route (NBDC N53, N54, N63, N73, N83, N84, N93, O03). See Table 2 in Appendix 6.4 for the complete list of 10km grid square records for protected non-volant mammal species held by the NBDC database for the proposed Eirgrid uprating route.

RECEIVED: 18/07/2023

Otter is a highly mobile species that can occur at a distance from the nearest suitable watercourse which in this case are the River Liffey and the Rye Water River. No Otter activity was recorded during site walkovers of the campus. There is no optimal foraging/breeding habitat for Otter within the campus or along the proposed GNI upgrade route. Therefore, any occurrence of Otter within the proposed development site would likely to be on a transient basis at most.

Table 6-6 Trail Camera Survey Results for Non-Volant Mammals

Species	Cam1	Cam2	Cam3	Cam4	Cam5	Cam6
Red Deer	1			2	1	2
Fox		58	5	83	34	
Grey Squirrel		1		5		
Hedgehog		5		2	4	
Badger		1			1	
Rabbit		10		149		
Field Mouse				8		
Unidentified small mammal (mouse/vole/shrew)				4		
Brown Rat				1		
Dog					1	



Plate 14: Grey Squirrel on trail camera footage.

RECEIVED: 18/07/2023



Plate 15: Hedgehog on trail camera footage.



Plate 16: Fox with two cubs on trail camera footage.



Plate 17: Badger on trail camera footage.

6.4.3.2 Bats

RECEIVED: 18/07/2023

From the analysis of the bat call registrations recorded by all 14 no. passive detectors, the presence of five bat species was confirmed (See Table 6-7 below). Soprano Pipistrelle, (*Pipistrellus pygmaeus*), Leisler's Bat (*Nyctalus leisleri*), Common Pipistrelle, (*Pipistrellus pipistrellus* were the most commonly recorded species with Soprano Pipistrelle accounting for 40% of all registrations. Passive detector BD1 was deployed at the ponds and recorded the most bat activity overall, followed by BD7 which was deployed just west of the ponds. For example, 94% of Daubenton's Bat (*Myotis daubentonii*) registrations were picked up at BD1. This was to be expected considering that the ponds likely provide very suitable foraging habitat for bats, particularly Daubenton's Bat. A high level of bat activity was also recorded in proximity to woodland and the semi-natural treelines with the study area with a total of 4,464 bat registrations recorded by BD8 which was deployed next to a stand of broadleaved woodland habitat. After BD1, the highest number of registrations for Leisler's Bat was recorded by BD3 with 1,788 registrations. BD3 was deployed in the vicinity of the Castletown House woodland belt that borders the west boundary of the campus. Relatively low levels of bat activity were recorded by the passives deployed by the substation (BD5) and near the large car-parking area to the northeast (BD4) (See Table 6-7).

The buildings that are proposed to be demolished, *i.e.,* 7, 8 & 9 were inspected on the 28th of April 2022 and revisited in March 2022. The building inspection recorded no evidence of current or historic signs of usage by bats inside or outside any of the three buildings, nor were any suitable roosting opportunities for bats within the buildings recorded. As seen in Table 6-7, no bat activity was recorded by the passives (BD9, BD10, BD11) deployed in these buildings.

There are 535 no. trees and 52 no. tree group areas proposed for removal in order to facilitate the construction of the proposed development. The majority of these trees were assessed as having 'Negligible' to 'Low' roosting suitability for bats. These included trees within the more managed areas of the campus such as the car-parking areas, parkland habitat surrounding the campus buildings and the treelines lining the access roads within and bordering the campus boundary, as well as the uniform woodland areas planted for the purpose of screening the existing campus and substation. These trees lacked visible potential roost features (PRFs), comprised smooth narrow trunks and had little to no ivy cover, or were considered to be too young to produce appropriate cavities/scars *etc*. (See Plate 18). 56 no. trees were assessed as having 'Moderate' to 'High' roosting suitability for bats and were located throughout the campus, particularly within the more semi-natural hedgerow and treeline habitats to the west and northwest. These trees were typically mature/over-mature deciduous species such as Oak, Lime and Beech, characterised by the presence of multiple PRFs, often quite pronounced, such as wounds, tear-outs, pruning cuts, cracks and/or strong ivy cover often partially detached from the trunk in places (See Plate 19). Such trees were often in proximity to each other such as within the same treeline area. See Appendix 6.5 for a detailed list of trees assessed as having 'Moderate' to 'High' roosting suitability.

During the preliminary ground-level roost assessment survey of trees, a number of bat boxes were recorded within the woodland area directly west of the ponds (See Plate 20). These boxes were deployed as part of the permitted development of the DB Schenker site, where a number of bat roost boxes were sourced and erected within this woodland area directly west of the ponds in proximity to the DB Schenker site. No roosting bats were recorded within the DB Schenker site during the pre-planning EcIA surveys (Environmental Resources Management Ltd, 2020b), nor were any recorded during the pre-construction surveys which included the inspection of PRFs via tree-climbing surveys prior to felling (Ecology Ireland, 2022).

Active surveys (AS1 and AS2) were carried out on the 28th March 2023 and emergence surveys (ES1 and ES2) were carried out on the 29th March 2023, with a focus on areas where large mature trees considered to have 'High' roosting suitability for bats were present (See Figure 6-5). At AS1, Three Soprano Pipistrelle were observed flying in the vicinity of the treeline habitat at 20:53, with a single Soprano Pipistrelle registration recorded. At AS2, there was almost continuous bat activity recorded from 20:40 until the end of the survey, of 2-3 Soprano Pipistrelle foraging by the streetlights along Celbridge Road (R404). Common Pipistrelle were observed on at least three occasions, at 20:56, 21:05, and 21:20. *Myotis* sp., potentially Daubenton's Bat, was recorded in the vicinity of the ponds at 21:00 with Daubenton's Bat confirmed to be feeding over the ponds at 21:20.

RECEIVED: 18/07/2023

During the emergence survey completed at ES1, no bats were observed emerging or active in the vicinity of the Oak tree under observation (Tree ID: T1670, see Plate 20) or surrounding environment, nor were there any registrations of bat activity recorded. At ES2, no signs of emergence were recorded from the vicinity of the Oak tree under observation (Tree ID: T1129). Soprano Pipistrelle were recorded towards the ponds and woodland area between 20:30-20:45, where the bats appeared to forage over a wide area. Soprano Pipistrelle was again recorded, at a distance, at 20:58 and 21:07. Leisler's Bat was records towards the end of the survey near the ponds at 21:15 when a single individual was recorded briefly commuting through the study area.

As stated in Section 6.3.4, three passive bat detectors (BD12, BD13, BD14) were deployed in order to support the active and emergence surveys. Little to no activity was recorded by BD13 and BD14 while high levels of activity were recorded by BD12, which was deployed by the ponds (See Table 6-7). It is noted that the active and emergence surveys were completed outside of the optimal survey period.

RECEIVED: 18/07/2023

Table 6-7 Number of bat registrations recorded at 14 bat detectors located throughout the study area.

Species	Scientific Name	BD1	BD2	BD3	BD4	BD5	BD6	BD7	BD8	BD9	BD10	BD11	BD12	BD13	BD14
Common Pipistrelle	*Pipistrellus pipistrellus*	1739	1030	733	1	8	265	889	2115				398	1	
Soprano Pipistrelle	*Pipistrellus pygmaeus*	5135	299	692		11	901	1901	1854				688	1	
40/50kHz Pipistrelle	*Pipistrellus sp.*	31	74	22			8	21	8				2		
Daubenton's Bat	*Myotis daubentonii*	985	14	16				35					3		
Brown Long-eared Bat	*Plecotus auritus*	22		14			15	18	3						
Myotis sp.	*Myotis sp.*	19	2	7			9	10	5					1	
Leisler's Bat	*Nyctalus leisleri*	3101	757	1788	4	5	1035	1237	479				7	2	

RECEIVED: 18/07/2023



Plate 18. Example images of trees and tree groups assessed as having 'Negligible' to 'Low' roosting suitability for bats due to a lack of suitable Potential Roost Features (PRFs). The top image shows Tree-ID G40, bottom-right shows Tree-ID W28, bottom-left shows Tree-ID T1240.



Plate 19. Examples of trees assessed as having 'Moderate' – 'High' roosting suitability for bats. Top-left shows a mature Oak with strong ivy cover and broken limbs, assessed as 'High' (Tree-ID T1670), Top-right shows an early mature Horse Chestnut with no ivy cover but visible PRFs in the form of peeling bark and a likely canker, assessed as 'Low'/'Moderate' (Tree-ID T1036), Bottom-right shows a mature Oak with no ivy cover but visible PRFs such as historical pruning cuts, assessed as 'High' (Tree-ID T1103), Bottom-left shows a mature Ash with strong ivy cover and pronounced limb breakages, assessed as 'High' (Tree-ID T1532).

RECEIVED: 18/07/2023



Plate 20. Bat box erected within the woodland habitat directly adjacent to the ponds, deployed as part of the permitted development of the DB Schenker site.

Two bat species have been recorded within the 2km grid square (NBDC: N93X) encompassing the study area: Daubenton's Bat (*Myotis daubentonii*) and Leisler's Bat (*Nyctalus leisleri*). Within N93Y, O03D and O03C 2km grid squares through which part of the GNI upgrade route passes, there are records held for Daubenton's Bat, Leisler's Bat, Brown Long-eared Bat (*Plecotus auritus*), Pipistrelle sp., and Soprano Pipistrelle (*Pipistrellus pygmaeus*). Within the 10km grid square (NBDC: N93), there are additional records for Natterer's Bat (Myotis nattereri) and Whiskered Bat (*Myotis mystacinus*). With regard to the Eirgrid uprating route, the NBDC database holds additional records for Nathusius' Pipistrelle *Pipistrellus nathusii* with the 10km grid square O03. See Table 3 in Appendix 6.4 for the complete list of 10km grid square records for bat species held by the NBDC database for the proposed Eirgrid uprating route.

The Model of Bat Landscapes (Lundy *et al.* 2011) suggests that the study area, the proposed GNI upgrade route and the proposed Eirgrid uprating route are part of a landscape that has a moderate – high resource value for bats in general (see Roche *et al.* 2014), with the exception of Lesser Horseshoe Bat *Rhinolophus hipposideros* and Nathusius' Pipistrelle, where the development site is located outside the normal range of these species.

None of the Irish bat species are of elevated conservation concern at present. All bat species occurring in Ireland are legally protected under the Irish Wildlife Acts (1976 - 2012). Under this protection, it is an offence to hunt or interfere with or destroy their breeding or resting places (unless under statutory licence/permission). Irish bat species listed are also listed on

Annex IV of the EU Habitats Directive, with Lesser Horseshoe Bats listed on Annex II and Annex IV.

RECEIVED: 18/07/2023

6.4.3.3 Birds

In total, 16 dedicated bird transect surveys were completed across April and June 2022 and November 2022 and February 2023. The results of these surveys are outlined in Table 6-8 and Table 6-9. A total of 55 bird species were recorded during transects, 48 of which were recorded during the breeding survey period and 43 that were recorded during the winter survey period. These included five Red-Listed species; Kestrel (*Falco tinnunculus*), Meadow Pipit (*Anthus pratensis*), Redwing (*Turdus iliacus*), Snipe (*Gallinago gallinago*) and Swift (*Apus apus*) (Gilbert *et al.* 2021). There is foraging and breeding habitat available for Kestrel, particularly in the more semi-natural hedgerow and treeline habitats. Meadow Pipit are ground nesting birds that are found in a wide variety of habitats from grassland habitats to upland heath and bog. Redwing is a relatively abundant migrant species that favours open lowland fields. Snipe, a ground-nesting species that is red-listed for breeding and wintering, favours habitats such as peatland and wet grassland. While there is suitable foraging habitat for Swift, particularly over the ponds, there is no suitable breeding habitat available within the study area for these species. Peregrine Falcon (*Falco peregrinus)* was recorded in flight over the main campus buildings at the centre of the study area during one of the breeding surveys completed at Transect 3. Peregrine Falcon is on the EU Birds Directive (2009/147/EC) Annex I list and is therefore considered of high conservation concern across Europe. There is no suitable breeding habitat for this species although the habitats within the campus could foraging/hunting opportunities for both species.

A casual species list for birds recorded during other ecological surveys is shown in Table 6-10, and those recorded by the trial cameras is shown in Table 6-11 and Plate 22. Barn Owl (*Tyto alba*) and Peregrine Falcon were both observed prior to the commencement of the bat surveys (emergence) on the 29th of March 2023. Barn Owl, a Red-Listed species, was observed in flight in the northwest section of the study area and Peregrine Falcon was observed flying over the main campus buildings, disturbing a small flock of Black-headed Gull. Coot, an Amber-Listed species, was recorded breeding at the ponds on the 16th of June 2022 during the habitat/botanical survey. Table 6-12 below details the bird species recorded on the 1st of February 2023 within the north lands. As part of ecological surveys completed at the site between the 28th and 30th of March 2023 (roost assessment survey of trees), numerous bird nests were observed throughout the site, with bird boxes noted to be present within the woodland area bordering the ponds to the west (See Plate 23). These bird boxes were erected as part of the permitted development of the DB Schenker site, where bird boxes were sourced and erected within this woodland area, with the bat roost boxes, directly west of the ponds in proximity to the DB Schenker site (Ecology Ireland, 2022). Coot, an Amber-Listed species, were also noted to be breeding on the ponds, during these ecological surveys (See Plate 23).

The NBDC database holds records for 61 bird species within the 2km grid squares that encompass the study area and the proposed GNI upgrade route (N93X, N93Y, O03C, O03D), with 32 of these species recorded within N93X where the study area and the majority of the proposed GNI upgrade route are located (See Table 6-13). This includes records for Pochard (*Aythya ferina*) and Scaup (*Anas marila*), both of which are Red-Listed species. While the habitats within the site, namely the ponds, could provide some foraging opportunities for these species, they would not support any substantial breeding or wintering numbers. There are also records for Great Crested Grebe (*Podiceps cristatus*), Mallard (*Anas platyrhynchos*), Mute Swan (*Cygnus olor*) and Tufted Duck (*Aythya fuligula*), all of which are Amber-Listed

species. As with Pochard and Scaup, the habitats within the site are not optimal for these species and there is more attractive habitat, namely the Leixlip Reservoir, present in the wider environment. See Table 4 in Appendix 6.4 for the complete list of 10km grid square records for bird species held by the NBDC database for the proposed Eirgrid uprating route.

RECEIVED: 18/07/2023

In general, the study area contains suitable foraging, commuting, nesting and perching habitats for a range of bird species in habitats such as the ponds, scrub and woodland and the more semi-natural treeline and hedgerow habitats. Similar habitats are also present in the wider landscape, particularly the woodland habitat directly adjacent to western boundary of the campus, and Leixlip Reservoir to the east. Most bird species are protected under the Irish Wildlife Acts (1976 - 2012), where it is an offence to hunt, interfere with or destroy their breeding or resting places (unless under statutory licence/permission).



Plate 21. Left – Pheasant, Right – Jay, on trail camera footage.



Plate 22. Left - Bird nest observed in a semi-mature lime tree (Tree ID: T739). Right – Bird box observed within the woodland habitat adjacent to the ponds, erected as part of the permitted development of the DB Schenker site.



Plate 23. Coot chicks observed within the ponds during ecological surveys of the study areas between the 28th and 30th of March 2023.

RECEIVED: 18/07/2023

RECEIVED: 18/07/2023

Table 6-8. Breeding Bird Transect Results. Visit 1 completed on the 28th of April 2022. Visit 2 completed on the 8th of June 2022. Counts provided as total within 100m on each survey visit and if only recorded beyond 100m this is noted as 'P' for present. [Note Cormorant was only seen in flight]

Species	Scientific Name	T1 (visit 1)	T1 (visit 2)	T2 (visit 1)	T2 (visit 2)	T3 (visit 1)	T3 (visit 2)	T4 (visit 1)	T4 (visit 2)
		<100m	<100m	<100m	<100m	<100m	<100m	<100m	<100m
Blackbird	*Turdus merula*	3	4	1	2	3	2	3	3
Blackcap	*Sylvia atricapilla*							1	1
Blue Tit	*Cyanistes caeruleus*	2		1	1	2	1		
Bullfinch	*Pyrrhula pyrrhula*						2		
Buzzard	*Buteo buteo*		P					P	
Chaffinch	*Fringilla coelebs*	4	3	2	3	3	2		1
Chiffchaff	*Phylloscopus collybita*		P		1		P		
Coal tit	*Periparus ater*		1			1	3		
Collared Dove	*Streptopelia decaocto*						2		
Coot*	*Fulica atra*		2						
Cormorant*	*Phalacrocorax carbo*			P					
Dunnock	*Prunella modularis*	1	1					1	
Feral Pigeon	*Columba livia f. domestica*		P	P	3				
Goldcrest*	*Regulus regulus*	3	1		2	2	2		
Goldfinch	*Carduelis carduelis*	5	3		2			3	
Great Tit	*Parus major*		1			1	2		
Grey Heron	*Ardea cinerea*		1						
Herring Gull*	*Larus argentatus*	2	P	P		P	P		
Hooded Crow	*Corvus cornix*	4	5		2				2
House Martin*	*Delichon urbicum*		2	1	3				
House Sparrow*	*Passer domesticus*						3		7
Jackdaw	*Corvus monedula*	P		2	3		1	1	1
Jay	*Garrulus glandarius*		1				1		
Kestrel^	*Falco tinnunculus*							1	
Lesser Black-backed Gull*	*Larus fuscus*	1	3	P					
Linnet*	*Carduelis cannabina*							4	
Little Grebe	*Tachybaptus ruficollis*		2						
Long-tailed Tit	*Aegithalos caudatus*						4		
Magpie	*Pica pica*	3	2		1		P	P	1
Mallard*	*Anas platyrhynchos*	3	4						

RECEIVED: 18/07/2023

Species	Scientific Name	T1 (visit 1)	T1 (visit 2)	T2 (visit 1)	T2 (visit 2)	T3 (visit 1)	T3 (visit 2)	T4 (visit 1)	T4 (visit 2)
		<100m	<100m	<100m	<100m	<100m	<100m	<100m	<100m
Meadow Pipit^	*Anthus pratensis*					1		2	2
Mistle Thrush	*Turdus viscivorus*		1		2				
Moorhen	*Gallinula chloropus*	2	3						
Peregrine Falcon†	*Falco peregrinus*					P			
Pheasant	*Phasianus colchicus*	P	P						2
Pied Wagtail	*Motacilla alba*	1		1	1				
Robin	*Erithacus rubecula*	4	4	1		2	3	3	1
Rook	*Corvus frugilegus*	2	P		P		6	4	1
Song Thrush	*Turdus philomelos*	P				1	P		
Sparrowhawk	*Accipiter nisus*								1
Starling*	*Sturnus vulgaris*	11	5	3					4
Stonechat	*Saxicola rubicola*							1	1
Swallow*	*Hirundo rustica*	4	8	6	5	7	4		P
Swift^	*Apus apus*		P				2		
Wheatear*	*Oenanthe oenanthe*						1		
Willow Warbler*	*Phylloscopus trochilus*	5	4	2		3	1	3	2
Woodpigeon	*Columba palumbus*	9	2	5	6	8	10	3	4
Wren	*Troglodytes troglodytes*	2	4	1		3	3	2	1

Key ^ Red-listed species, * Amber-listed species (Gilbert *et al*. 2021), † Annex I species under the EU Birds Directive [2009/147/EC]

Table 6-9. Wintering Bird Transect Results. Visit 1 completed on the 30th of November 2022. Visit 2 completed on the 1st of February 2023. Counts provided as total within 100m on each survey visit and if only recorded beyond 100m this is noted as 'P' for present.

Species	Scientific Name	T1 (visit 1)	T1 (visit 2)	T2 (visit 1)	T2 (visit 2)	T3 (visit 1)	T3 (visit 2)	T4 (visit 1)	T4 (visit 2)
		<100m	<100m	<100m	<100m	<100m	<100m	<100m	<100m
Blackbird	*Turdus merula*	3	2	1	1	2	1	4	3
Blue Tit	*Cyanistes caeruleus*	2		1	1	2	1		
Buzzard	*Buteo buteo*						P		1
Chaffinch	*Fringilla coelebs*	6	4	4	2	3	3	2	4
Coal Tit	*Periparus ater*	1				2	2		
Coot*	*Fulica atra*	2	2						
Dunnock	*Prunella modularis*					1		1	

RECEIVED: 19/07/2023

Species	Scientific Name	T1 (visit 1)	T1 (visit 2)	T2 (visit 1)	T2 (visit 2)	T3 (visit 1)	T3 (visit 2)	T4 (visit 1)	T4 (visit 2)
		<100m	<100m	<100m	<100m	<100m	<100m	<100m	<100m
Feral Pigeon	*Columba livia f. domestica*	4		2	3				
Goldcrest*	*Regulus regulus*	3	2			2	4		
Goldfinch	*Carduelis carduelis*	2	8	3				4	
Great Tit	*Parus major*	1	1		1			2	
Grey Heron	*Ardea cinerea*		P						
Grey Wagtail^	*Motacilla cinerea*	1							
Herring Gull*	*Larus argentatus*	P	2	2	1				
Hooded Crow	*Corvus cornix*	1	5		2			2	2
House Sparrow*	*Passer domesticus*			4	6				
Jackdaw	*Corvus monedula*	3	1	2		4	1	2	1
Jay	*Garrulus glandarius*					1	1		
Kestrel^	*Falco tinnunculus*		P						
Lesser Black-backed Gull*	*Larus fuscus*	1	2		1				
Lesser Redpoll	*Carduelis flammea cabaret*							2	
Linnet*	*Carduelis cannabina*							2	13
Long-tailed Tit	*Aegithalos caudatus*	3	5				3		
Magpie	*Pica pica*	1				1	1	2	
Mallard*	*Anas platyrhynchos*	2	3						
Meadow Pipit^	*Anthus pratensis*								2
Mistle Thrush	*Turdus viscivorus*	2	1						
Moorhen	*Gallinula chloropus*	1	2						
Pheasant	*Phasianus colchicus*		P				P	P	
Pied Wagtail	*Motacilla alba*	2	1	2	2				
Redwing^	*Turdus iliacus*	7	3	4				11	
Robin	*Erithacus rubecula*	3	5	1	1	2	2	3	2
Rook	*Corvus frugilegus*	P		2	P			5	19
Siskin	*Carduelis spinus*		2				2		
Snipe^	*Gallinago gallinago*		6					2	3
Song Thrush	*Turdus philomelos*	1	P			P	P		1
Sparrowhawk	*Accipiter nisus*			1					
Starling*	*Sturnus vulgaris*	4	10	4			2	3	9
Stonechat	*Saxicola rubicola*							2	1
Teal*	*Anas crecca*		1						

RECEIVED: 18/07/2023

Species	Scientific Name	T1 (visit 1)	T1 (visit 2)	T2 (visit 1)	T2 (visit 2)	T3 (visit 1)	T3 (visit 2)	T4 (visit 1)	T4 (visit 2)
		<100m	<100m	<100m	<100m	<100m	<100m	<100m	<100m
Tufted Duck*	*Aythya fuligula*	3							
Woodpigeon	*Columba palumbus*	5	8	4	3	8	8	6	4
Wren	*Troglodytes troglodytes*	3	4	2	1	2	4	4	3

Key ^ Red-listed species, * Amber-listed species (Gilbert *et al*. 2021).

RECEIVED: 18/07/2023

Table 6-10. Bird species recorded outside of the dedicated transects, during ecological surveys completed at the site between June 2022 and March 2023.

Species	Scientific Name
Barn Owl^	*Tyto alba*
Black-headed Gull*	*Larus ridibundus*
Buzzard	*Buteo buteo*
Coot*	*Fulica atra*
Cormorant*	*Phalacrocorax carbo*
Crossbill	*Loxia curvirostra*
Grey Wagtail^	*Motacilla cinerea*
Herring Gull*	*Larus argentatus*
Lesser Black-backed Gull*	*Larus fuscus*
Little Grebe	*Tachybaptus ruficollis*
Raven	*Corvus corax*
Reed Bunting	*Emberiza schoeniclus*
Ring-necked Duck	*Aythya collaris*
Swift^	*Apus apus*

Key ^ Red-listed species, * Amber-listed species (Gilbert *et al*. 2021).

Table 6-11. Trail Camera Survey Results for Birds

Species	Scientific Name	Cam1	Cam2	Cam3	Cam4	Cam5	Cam6
Blackbird	*Turdus merula*	1			88	2	
Great Tit	*Parus major*		5				
Hooded Crow	*Corvus cornix*		12	3		4	2
Jay	*Garrulus glandarius*	3		1			
Magpie	*Pica pica*		17		12	37	
Mistle Thrush	*Turdus viscivorus*					1	
Pheasant	*Phasianus colchicus*			1	1		
Robin	*Erithacus rubecula*		2		36		
Song Thrush	*Turdus philomelos*				18		
Starling*	*Sturnus vulgaris*		2	13		4	
Woodpigeon	*Columba palumbus*	2	8		38		1
Wren	*Troglodytes troglodytes*				1		

Key ^ Red-listed species, * Amber-listed species (Gilbert *et al*. 2021).

Table 6-12. Bird species recorded during the ecological site walkover of the north lands on the 1st of February 2023.

Species	Scientific Name
Blackbird	*Turdus merula*
Blue Tit	*Cyanistes caeruleus*
Chaffinch	*Fringilla coelebs*
Collared Dove	*Streptopelia decaocto*
Feral Pigeon	*Columba livia f. domestica*
Goldfinch	*Carduelis carduelis*
Great Tit	*Parus major*
Hooded Crow	*Corvus cornix*

RECEIVED: 18/07/2023

Species	Scientific Name
House Sparrow*	*Passer domesticus*
Jackdaw	*Corvus monedula*
Linnet*	*Carduelis cannabina*
Magpie	*Pica Pica*
Pied Wagtail	*Motacilla alba*
Redwing^	*Turdus iliacus*
Robin	*Erithacus rubecula*
Rook	*Corvus frugilegus*
Song Thrush	*Turdus philomelos*
Starling*	*Sturnus vulgaris*
Woodpigeon	*Columba palumbus*
Wren	*Troglodytes troglodytes*

Key ^ Red-listed species, * Amber-listed species (Gilbert *et al*. 2021).

Table 6-13. Bird species recorded for the 2km grid squares: N93X, which encompasses the study area and N93Y, O03C, O03D and W37T, overlapping parts of the proposed GNI upgrade route.

Species	Scientific Name	Grid Squares
Swallow*	*Hirundo rustica*	N93X N93Y O03C O03D
Magpie	*Pica pica*	N93X N93Y O03C O03D
Blackcap	*Sylvia atricapilla*	N93X N93Y O03C
Black-headed Gull*	*Larus ridibundus*	O03D
Blue Tit	*Cyanistes caeruleus*	N93X N93Y O03C O03D
Chaffinch	*Fringilla coelebs*	N93X N93Y O03C O03D
Coal Tit	*Periparus ater*	N93Y O03C O03D
Blackbird	*Turdus merula*	N93X N93Y O03C O03D
Bullfinch	*Pyrrhula pyrrhula*	N93Y O03D
Buzzard	*Buteo buteo*	N93X N93Y O03C O03D
Chiffchaff	*Phylloscopus collybita*	N93X N93Y
Coot*	*Fulica atra*	N93X
Kestrel^	*Falco tinnunculus*	N93Y O03C
Kingfisher*†	*Alcedo atthis*	N93Y
Moorhen	*Gallinula chloropus*	N93X N93Y O03D
Pheasant	*Phasianus colchicus*	N93Y O03D
Pochard^	*Aythya ferina*	N93X
Snipe^	*Gallinago gallinago*	N93X
Starling*	*Sturnus vulgaris*	N93Y O03C O03D
Swift^	*Apus apus*	N93X N93Y O03D
Woodpigeon	*Columba palumbus*	N93X N93Y O03C O03D
Collared Dove	*Streptopelia decaocto*	N93Y O03D
Jackdaw	*Corvus monedula*	N93X N93Y O03C O03D
Jay	*Garrulus glandarius*	N93Y
Sparrowhawk	*Accipiter nisus*	N93Y O03D
Eurasian Treecreeper	*Certhia familiaris*	O03C
Goldfinch	*Carduelis carduelis*	N93Y O03C O03D
Greenfinch*	*Chloris chloris*	N93X N93Y O03C O03D
Robin	*Erithacus rubecula*	N93X N93Y O03C O03D

Species	Scientific Name	Grid Squares
Fieldfare	*Turdus pilaris*	O03C
Goldcrest*	*Regulus regulus*	N93Y O03C O03D
Cormorant*	*Phalacrocorax carbo*	N93Y O03C
Great Crested Grebe*	*Podiceps cristatus*	N93X
Great Tit	*Parus major*	N93Y O03C O03D
Scaup^	*Aythya marila*	N93X
Grey Heron	*Ardea cinerea*	N93Y O03C O03D
Grey Wagtail^	*Motacilla cinerea*	N93Y O03C
Dunnock	*Prunella modularis*	N93X N93Y O03D
Hooded Crow	*Corvus cornix*	N93X N93Y O03C O03D
House Martin*	*Delichon urbicum*	O03D
House Sparrow*	*Passer domesticus*	N93Y O03D
Lesser Redpoll	*Carduelis flammea cabaret*	N93X N93Y
Little Grebe	*Tachybaptus ruficollis*	N93X N93Y
Long-tailed Tit	*Aegithalos caudatus*	N93X N93Y O03D
Mallard*	*Anas platyrhynchos*	N93X N93Y O03C O03D
Mistle Thrush	*Turdus viscivorus*	N93X O03C
Mute Swan*	*Cygnus olor*	N93X
Pied Wagtail	*Motacilla alba*	N93Y
Redwing^	*Turdus iliacus*	O03C
Reed Bunting	*Emberiza schoeniclus*	N93Y O03C O03D
Rock Pigeon	*Columba livia*	O03C
Rook	*Corvus frugilegus*	N93X N93Y O03C O03D
Sedge Warbler	*Acrocephalus schoenobaenus*	N93Y
Skylark*	*Alauda arvensis*	O03C
Song Thrush	*Turdus philomelos*	N93X N93Y O03C O03D
Stonechat	*Saxicola rubicola*	N93Y
Tufted Duck*	*Aythya fuligula*	N93X
Dipper	*Cinclus cinclus*	O03D
Willow Warbler*	*Phylloscopus trochilus*	N93X N93Y O03D
Wren	*Troglodytes troglodytes*	N93X N93Y O03D
Yellowhammer^	*Emberiza citrinella*	N93Y O03D

Key ^ Red-listed species, * Amber-listed species (Gilbert *et al*. 2021).

RECEIVED: 18/07/2023

6.4.3.4 Other Taxa

The higher value and semi-natural habitats within the study area likely provide suitable habitat for a range of taxa, with the ponds considered to be particular suitable for a range of invertebrate and amphibian species. The more manicured amenity grassland, parkland and ornamental planted areas are considered to be of low value for most species.

Other taxa recorded as part of the ecological surveys of the study area include Cinnabar moth (*Tyria jacobaeae*), Meadow Brown (*Maniola jurtina*), *Bombus terrestris, Bombus lucorum* agg., Common Carder Bee (*Bombus pascuorum*), Speckled Wood (*Pararge aegeria*), Blue tailed damselfly (I*schnura elegans*), 7-Spot ladybird (*Coccinella septempunctata*), Six-spot burnet

RECEIVED 18/07/2023

(*Zygaena filipendulae*), *Bombus pratorum*, Ringlet (*Aphantopus hyperantus*), *Bombus lapidarius*, Small tortoiseshell (*Aglais urticae*) and Red Admiral (*Vanessa atalanta*).

Although not recorded on site during walkovers, it is likely that Common Frog, which is listed on Annex V of the EU Habitats Directive and is also legally protected by the Irish Wildlife Acts (1976 – 2012), is present.

There are no protected or Red-Listed amphibians, invertebrates or other taxa recorded by the NBDC database for the 2km grid square N93X in which the study area is located. Within the additional 2km grid squares overlapping with the proposed GNI upgrade route (N93X, N93Y, O03C O03D), there are records for the 'Endangered' Barbut's Cuckoo Bee (*Bombus* (*Psithyrus) barbutellus*), and 'Near-threatened' *Halictus (Seladonia) tumulorum*, Large Red Tailed Bumble Bee (*Bombus (Melanobombus) lapidarius*), and Small Heath (*Coenonympha pamphilus*) (Fitzpatrick *et al.* 2006, Regan *et al.* 2010). Within N96Y, there are also records for Smooth Newt (*Lissotriton vulgaris*), which is protected under the Wildlife Acts (Wildlife Act, 1976; Wildlife Amendment Act, 2000).

In the wider environment of the 10km grid square encompassing the study area (N93), the NBDC holds records for the following additional species: the 'Near-Threatened' *Andrena (Andrena) fucata*, Leafcutter Bee (*Megachile (Megachile) centuncularis)*, Moss Carder-bee (*Bombus (Thoracombus) muscorum*), for the 'Vulnerable' *Andrena (Melandrena) nigroaenea* and Field Cuckoo Bee (*Bombus (Psithyrus*) *campestris*),and for the 'Endangered' Gooden's Nomad Bee (*Nomada goodeniana*) and Wall (*Lasiommata megera;* Fitzpatrick *et al.* 2006, Regan *et al.* 2010). There are also records for Common Frog (*Rana temporaria*), which is protected under the Wildlife Acts (Wildlife Act, 1976; Wildlife Amendment Act, 2000).

In addition, the NBDC 2km grid squares through which part of the GNI upgrade route passes (O03D and O03C) hold records for Barbut's Cuckoo Bee (*Bombus* (*Psithyrus) barbutellus*), listed as 'Endangered' and *Halictus (Seladonia) tumulorum*, listed as 'Near Threatened'.

With regard to the proposed Eirgrid uprating route, the NBDC database holds records for Marsh Fritillary (*Euphydryas aurinia*) across the range of the proposed route (N53, N54, N63, N73, N83, N84, O03).

The NBDC database holds records for Desmoulin's Whorl Snail (*Vertigo (Vertigo) moulinsiana*) and Narrow-mouthed Whorl Snail (*Vertigo (Vertilla) angustior*) in the 2km grid square N93Y. Both of these non-marine mollusc species are Annex II species under the EU Habitats Directive and listed as qualifying interests of the Rye Water Valley/Carton SAC. Desmoulin's Whorl Snail is listed as 'Endangered' and the Narrow-mouthed Whorl Snail is listed as 'Vulnerable' (Byrne *et al.* 2009).

6.5 Potential Ecological Impacts

Potential ecological impacts of the project on the receiving environment are discussed below. A full description of the proposed project is provided in **Chapter 2** of this EIAR.

6.5.1 Potential Impacts on Designated Conservation Sites

A Screening Assessment report in support of the Appropriate Assessment (AA) process has been prepared and accompanies the planning application for this development.

No Natura 2000 sites are located within or directly adjacent to the proposed development site. The Rye Water Valley/Carton SAC/pNHA is the nearest designated site to the proposed

development site, located *c*. 0.96km. As previously outlined in Section 6.4.1 above, it is considered that no elements of the proposed development or the proposed GNI upgrade works are likely to result in significant impacts on the Rye Water Valley/Carton SAC.

RECEIVED: 18/07/2023

As outlined in Section 6.4.1, there is a distant hydrological link between the proposed development site and the coastal Natura 2000 sites (South Dublin Bay and River Tolka Estuary SPA, South Dublin Bay SAC, North Bull Island SPA, North Dublin Bay SAC), and a hydrological link between the proposed development site and Liffey Valley pNHA via the River Liffey. For the reasons outlined below, it is considered unlikely that significant negative effects will arise in relation to these designated sites as a result of water quality deterioration associated with the proposed development.

The construction phase of the proposed development requires extensive earthworks to level parts of the site in order to facilitate the construction and landscaping works for the proposed development. As outlined in **Chapter 2 – Description of the Project**, it is predicted that 115,117m^3 of the cut material generated during site preparation/levelling (365,750 m^3) will be reused to facilitate construction of the proposed roads, carparks, buildings and landscaping berms. It is estimated c.250,634m^3 will be exported off the site and disposed of in accordance with relevant requirements. No fill will be required to be imported to the site to accommodate the development. The excavation, movement and storage of soil can potentially lead to the release of sediment-loaded run-off, resulting in indirect negative impacts to aquatic habitats within and immediately downstream of the proposed development site. Additionally, the proposed works associated with the culvert re-design could potentially result in sediment-loaded run-off and contamination to enter the watercourse with potential for downstream impacts. Water quality deterioration resulting in the loss and/or alteration of aquatic habitats can also potentially arise from the accidental spillage of fuel and/or oil from construction plant and vehicles, or from fuel stored for use by the back-up generators and energy centre.

As stated in Section 6.2.1, the current surface-water drainage system has existing mechanisms in place whereby surface-water run-off for Kildare innovation Campus, collected by the existing attenuation ponds, is released in a controlled manner that protects water quality downstream of the site. The existing surface water drainage regimen minimises the risk of downstream effects through impacts on water quality. The distance and dilution effect ensures that there is no likelihood of significant effects on the distant hydrologically linked sites even in the absence of the standard site management environmental controls that will be implemented at the site. No risks of likely significant effects were identified, and no bespoke mitigation measures have been required by the ecological specialists. There are construction phase environmental protection measures outlined in the CEMP (CSEA, 2023), in Section 7.6 of **Chapter 7 – Lands & Soils**, and Section 8.6 of **Chapter 8 – Hydrology**, and these are standard measures designed to minimise the risks to the immediate receiving environment. These will include for the protection of the ponds whereby excavated soil will be temporarily stored and protected in designated storage areas at least 30m from open water with no links or pathways to any open water. All pollutants (fuel, oil, lubricant, *etc*.) will be stored within bunded impermeable containers away from open water within the temporary site compound which will be located outside of the 30m pond buffer. A 30m buffer around the ponds will be maintained for the duration of the construction works period within which there will be no storage of construction material/vehicles or pollutants (fuel, oil, lubricant, *etc*.), with pollutants stored within bunded impermeable containers away from open water within the temporary site compound which will be located outside of the 30m buffer. There will be limited construction-related activity within this 30m buffer and where works are required, *e.g.,* proposed internal roads, additional water-protection measures will

RECEIVED: 18/07/2023

be put in place. As is the case with the management of surface-water outlined above, while there will be best practice environmental controls put in place to ensure no damage to the immediate aquatic receiving environment of the Kilmacredock stream during the construction of the proposed culvert (CSEA, 2023), likely significant effects as a result of the proposed culvert works were identified, and no specific mitigation measures for the protection of the distantly connected coastal Natura 2000 sites are considered necessary. Best practice environmental controls will include for the control of run-off where silt-fences will be in place to capture silt from runoff and prevent it from entering the existing culverted stream. The proposed construction works will adhere to best practice regarding standard environmental protection as set out in CIRIA (2001), CIRIA (2002), CIRIA (2005), CIRIA (2007) and CIRIA (2015). Therefore, significant impacts on the distantly connected designated sites located downstream are not considered likely in this case.

For the operational phase, the proposed surface-water drainage system will implement an innovative and nature-based sustainable drainage system (SuDS) strategy, which complies with the requirements of Sections 15.8 of Kildare County Council Development Plan 2017-2023. The implementation of SuDS measures can be taken into account at Screening Stage. The Kelly judgement [2019] IEHC 84) clarified that "*as a matter of fact and law, that SUDS are not mitigation measures which a competent authority is precluded from considering at the stage 1 screening stage*". Note also the recent judgement (Case C-721/21) that supports the conclusion that such measures may properly be taken into at Screening Stage "*features of that plan or project which involve the removal of contaminants and which therefore may have the effect of reducing the harmful effects of the plan or project on that site, where those features have been incorporated into that plan or project as standard features, inherent in such a plan or project, irrespective of any effect on the site*". The SuDs strategy for the proposed development site will reduce surface-water run-off by utilising controls including bio-retention areas (i.e., wetland areas), attenuation ponds (proposed and existing), swales, filter drains, permeable paving and hydrocarbon interceptors. The proposed surface-water drainage system will continue to discharge to the existing ponds and will not discharge to the culverted Kilmacredock Stream. While the proposed development will result in an overall increase in hardstanding areas within the site, the proposed surface-water drainage system will result in an overall reduction in surface water discharge from the proposed development site. With regard to the storage of fuel for the back-up generators, there is full containment for bulk fuel oil, use of interceptors as part of the SuDs approach, additional dilution within the attenuation ponds and no direct pathway to surface water from this site. Taking the above into consideration, no significant negative impacts as a result of surface-water run-off to the distantly connected Natura 2000 sites located downstream are expected.

As outlined in Section 6.2.2, the existing foul water drainage network connects to the municipal sewerage network and is ultimately treated at Leixlip WWTP (Lower Liffey Valley Regional Sewerage Scheme – D0004), which has its primary emissions point in the River Liffey, upstream of the Leixlip Reservoir and the proposed development site. During the construction phase of the proposed development, welfare facilities (canteens, toilets *etc*.) will be available within the temporary construction site compound which will connect, for the duration of the construction period, to the existing four water drainage network that is currently servicing Kildare Innovation Campus (CSEA, 2023b). According to **Chapter 8 – Hydrology**, Leixlip WWTP has sufficient capacity to accommodate the existing peak foul water outflow from Kildare Innovation Campus, c. 965m3/day, as the peak hydraulic capacity of Leixlip WWTP is 65,405 m3/day and the current hydraulic loading is 50,837m3/day. During the operational phase of the proposed development, it is proposed that Leixlip WWTP will continue to treat flows from the foul water drainage network that will service the proposed development site. The latest

RECEIVED: 18/07/2023

Annual Environmental report for Leixlip WWTP states that it is compliant with Emission Limit Values (ELVs), and "*it is considered that the discharge from the wastewater treatment plant does not have an observable negative impact on the Water Framework Directive status*" (Irish Water, 2021). The report also states that the capacity of this WWTP is not expected to be exceeded within the next three years, with a remaining organic capacity limit of 11880 PE, with the estimated PE for the operational phase of the proposed development: 2080. Taking the above into consideration, there is no likelihood for significant impact arising from the existing foul water drainage network servicing Kildare Innovation campus or from the proposed foul water drainage network for the proposed development on the distantly connected designated sites downstream of the proposed development site and Leixlip WWTP.

During the operational phase of the proposed development, the back-up generators will power the data centre in the event of an interruption to the supply of power from the National Grid. In addition, weekly scheduled testing and quarterly load-banking of all back-up generators will be carried out. As outlined in **Chapter 9 – Air Quality**, the modelling of air emissions from the site was carried out to determine the maximum number of operational hours that the back-up generators can operate, and the continuous operation of the CTGs without having a negative impact on ambient air quality as a result of nitrogen dioxide (NO2) emissions. It is noted that the air quality assessment modelled air quality using standard diesel as the standard generator emissions data sheets have not been updated to reflect the use of HVO over standard diesel. The results of the air quality modelling assessment found that ambient NO2 concentrations as a result of the proposed development are in compliance with the relevant ambient air quality limit values at all locations at or beyond the site boundary. Therefore, potential for significant effects on Natura 2000 sites arising from impacts to air quality during the operation of the proposed development are not expected.

The Screening Assessment report considers the potential for likely significant effects on Natura 2000 sites in the wider receiving environment. This includes consideration of the potential for ex-situ likely significant effects on mobile qualifying interests of designated Natura 2000 sites in the receiving environment. It is objectively concluded that there is no likelihood of significant effects on any of the Natura 2000 located in the wider area.

6.5.2 Potential Impacts on Habitats and Flora

No botanical species protected under the Flora (Protection) Order 2022, listed in the EU Habitats Directive (92/43/EEC) or listed in the Irish Red list were recorded during walkovers of the study area, and no records for such species are held by the NBDC for the 2km grid square (N93X) overlapping the study area.

As outlined in Section 6.4.2, there are records for Red-Listed and protected floral species held by the NBDC and BSBI databases for the wider environment of the 10km grid square encompassing the study area (N93), for the 2km grid squares that partially overlap the proposed GNI upgrade route (N93Y, O03C, O03D), and for the 10km grid squares overlapping the proposed Eirgrid uprating route (N53, N54, N63, N73, N83, N84, N93, N94, O03). The habitats within the site are considered to be unsuitable for these species, none of which were recorded during the dedicated habitat and botanical survey.

Apart from Sycamore, which is now considered to be naturalised in Ireland, no invasive plant species were recorded during the site walkover. No high-impact invasive species listed on the Third Schedule of the 2011 European Communities (Birds and Natural Habitats) Regulations have been recorded within the 2km grid square encompassing the study area (N93X). As

outlined in Section 6.4.2, the NBDC database holds records for Japanese knotweed and Canadian Waterweed, both listed on the Third Schedule, with the grid squares that partially overlap the proposed GNI upgrade route (N93Y, O03C, O03D). Neither these species, nor any other invasive species, were recorded as part of the ecological survey of the proposed GNI upgrade route.

RECEIVED: 18/07/2023

Construction Phase

Habitats listed on Annex I of the EU Habitats Directive were not recorded within the study area.

Direct habitat loss and the alteration of habitats within the proposed development site will occur as a result of the proposed development of lands within the proposed development site boundary. In order to facilitate the proposed development, the removal of vegetation cover, tree removal, and demolition and excavation works will be required which will result in the loss of habitats outlined below.

A number of habitats that occur within the study area are considered to be common and widespread throughout Ireland, contain low botanical diversity and are considered to be of little to no ecological value to protected flora and fauna. These habitats, assessed as being of 'negligible' or 'local importance (lower value)', include the following:

- Buildings and artificial surfaces (BL3)
- Spoil and bare ground (ED2)
- Amenity (Improved) Grassland (GA2)
- Dry Meadows and Grassy Verges (GS2)
- Wet grassland (GS4)
- Ornamental/non-native shrub (WS3)
- Scrub (WS1)
- Hedgerows (WL1) (ornamental sections)
- Scattered trees and parkland (WD5) - local importance (lower value)

While Scrub (WS1) and Dry meadow and grassy verge (GS2) are typically of ecological value to a range of species such as small mammals, birds and insects, the size and condition of this habitat is such that it is considered to be of low quality, with higher quality habitat available in the wider environment. This is also the case for the more ornamental areas of Scattered trees and Parkland (WD5) habitat where the trees were immature/semi-mature and highly managed by the existing landscaping regime for Kildare Innovation Campus. Wet grassland habitat within the site occurs in small, fragmented patches that has turned rank through a lack of management and is considered to be species poor overall. The remaining habitats listed above are considered to have little to no intrinsic value in terms of local ecological importance. The buildings proposed for demolition (Buildings 7, 8, and 9) were assessed as having no intrinsic value for roosting bats or birds.

The footprint of works for the proposed development will primarily impact on these habitats, assessed as being of 'negligible' or 'local importance (lower value)'. These habitats are the most commonly found habitat type within the site, with an estimated combined area total of covering an estimated total area of over 725,000m^2, with Dry meadows and grassy verges (GS2) making up *c.* 21,3816m^2, and Buildings and artificial surfaces (BL3) making up *c.*

19,577m^2. This loss will lead to a **permanent non-significant negative impact** on habitats and flora at the site during the construction phase.

RECEIVED: 18/07/2023

The following habitats within the study area that were assessed as being of local importance (higher value):

- Recolonising Bare Ground (ED3)/Scrub (WS1) Mosaic - local importance (higher value).
- Mixed broadleaved woodland (WD1) - local importance (higher value).
- Scattered trees and parkland (WD5) - local importance (higher value), given the maturity of the trees present.
- Hedgerows (WL1) - local importance (higher value),
- Treelines (WL2) - local importance (higher value).
- Other artificial lakes and ponds (FL8) - local importance (higher value).

As a result of the proposed development, there will be an increase of 171,641.88m^2 in hard standing (*i.e.*, artificial habitat - Buildings and artificial surfaces (BL3)) within the boundary of the proposed development site which will have a **permanent slight negative impact** on habitats and flora, particularly on the more semi-natural grassland and hedgerow/treeline habitats.

Typically, Recolonising Bare Ground (ED3) is considered to be of lower value in terms of biodiversity. In this case where it occurs in mosaic with Scrub (WS1), it has been assessed as being of higher value due to the abundance and variety of floral species recorded within such a small area, which included Orchid species. The impact of the proposed development will result in the total loss of this habitat (*c*. 4287m^2) within the site which will lead to a **permanent slight negative impact** on habitats and flora at the site during the construction phase.

Although considered to be a modified habitat comprising young uniform blocks of a small number of tree species originally created to provide screening as part of the landscaping plan developed for the existing campus, Mixed broadleaved woodland (WD1) functions as a high value habitat within the context of the proposed development site. This habitat provides foraging grounds and cover for a range of species, nesting sites for birds, and a commuting route connected to higher value habitat in the wider environment *i.e.,* the woodlands associated with Castletown House. The impact of the proposed development will result in the direct loss of *c*. 9,200m^2 of this habitat, with 66,090m^2 retained mainly along the north and northwest boundary, which will result in a **permanent moderate negative impact** on habitats and flora at the site during the construction phase.

The Hedgerows (WL1) and Treelines (WL2) within the site fulfil a similar ecological function to that of Mixed broadleaved woodland (WD1), in that these habitats are commuting corridors for species such as birds, bats and non-volant mammals to traverse the proposed development site, providing a link to foraging areas both inside and outside of the proposed development site. Further adding to the ecological value of these habitats is the presence of several large mature deciduous trees, many of which predate the existing Kildare Innovation Campus. These trees have been assessed as having 'Moderate' to 'High' roost suitability for bats, with multiple Potential Roost Features (PRFs) identified. This assessment of 'Moderate' to 'High' is also telling of their ecological value overall. These trees provide nesting sites for a range of bird species. The PRFs included dead, decaying and damaged sections of the trees which are also important habitat for a diverse range of invertebrate species, as well as mosses, fern species, fungi and lichens. In terms of species abundance, these trees can support a high level of biodiversity within a small footprint and are of particularly value when located in an

RECEIVED: 18/07/2023

area surrounded by habitats assessed as being of lower ecological value. Where these trees are present within Scattered trees and Parkland (WD5) habitat, this habitat has been assessed as being of higher ecological value, although they have limited ecological connectivity with the wider environment in comparison to those within the hedgerow and treeline habitats. As a result of the proposed development, over *c.* 780 of Hedgerows (WL1) and over *c.* 1,130m Treelines (WL2) habitat will be permanently removed. In order to facilitate the construction of the proposed development, 535 no. trees will be permanently removed. The majority of the treeline bounding either side of the protected view corridor provides views to the Wonderful Barn to the north will be retained as part of the operational phase of the proposed development, with 22 no. trees will be removed from the treelines lining each side of this corridor. According to the 211233-PD-11 Arboricultural Report, additional trees that form 52 no. tree groups (*i.e.*, scrub, hedgerows, treeline woodland) where individual trees were not counted will also be permanently lost (Charles McCorkell, 2023). Of these trees, 56 no. trees that were assessed as being of 'Moderate' to 'High' ecological value will be lost, including 31 no. Oak trees. A further 9 no. tree groups assessed as being of 'Moderate' to 'High' value will be partially removed to facilitate the development and 1 no. tree group completely removed. This will result in a **permanent significant negative impact** on habitats and flora during the construction phase. As part of the design phase of the proposed development, the layout of the site was modified where possible in order to preserve trees assessed as being of 'Moderate' to 'High' ecological value which has resulted in the retention of 8 no. trees, including 4 no. Oak, 2 no. Lime, 1 no. Beech and 1 no. Sycamore (See Charles McCorkell, 2023).

The existing ponds recorded within the site have been classified as artificial lakes and ponds (FL8). These ponds support breeding waterfowl *(e.g.* Coot) and foraging opportunities for birds and bats and are therefore assessed as being locally important (higher value). These ponds will be retained as part of the proposed development and will not be directly lost or altered as a result of the proposed construction works, thereby preserving high value habitat for faunal species in particular.

During the construction phase, the existing surface-water drainage system, in combination with additional site-specific water protection measures including for the protection of the existing ponds will continue service the proposed development site (See **Chapter 7 of EIAR – Lands and Soils**, **Chapter 8 of EIAR – Hydrology**, and the CEMP (CSEA (2023b)). The existing foul water drainage system will continue to service Kildare Innovation Campus and will service the welfare facilities located within the temporary construction site compound. For the same reasons as outlined in Section 6.5.1, the potential impacts arising from surface-water run-off/foul water drainage to the aquatic habitats within and immediately downstream of the proposed development site during the construction phase are considered to be **neutral** in the **short-term**.

Operational Phase

There will be no additional removal of habitat during the operational phase of the proposed development, nor is there any potential for impacts on habitat and flora arising for the operational phase.

The proposed development will require the installation of the total of 2 No. attenuation basins, 2 No. attenuation ponds, 1 No. infiltration basin, as well as the retention of the 3 no. existing ponds. As outlined in Section 6.2.1 and the Landscape Architectural Master Plan (AECOM, 2023), the design of these attenuation areas will also promote biodiversity within

RECEIVED: 18/07/2023

the proposed development area, with planting comprising native species associated with wetland and pond margin habitat. This will result in the creation of locally important (higher value) habitat that will be maintained for the lifetime of the proposed development. The proposed attenuation areas will result in the creation of habitats of higher ecological value where habitat of lower ecological value (*i.e.*, amenity grassland, dry meadows and grass verges, *etc.*) currently exists. This will result in a **Long-term moderate positive impact** on habitats and flora during the operational phase and lifetime of the proposed development.

As part of the proposed development, 1,400m (linear)of hedgerow habitat and 22,500m^2 of woodland habitat will be planted (AECOM, 2023). Planting of these habitats will comprise a mix (whips and feathered) of primarily native species of local provenance (See Drawing -KIC-ACM-XX-XXX-DR-LA-1000 for a detailed species list). Species will include trees such as Blackthorn, Hawthorn, Whitebeam, Hazel, Holly, Oak, Rowan, Birch, Scot's Pine, Willow, and Alder. The planting regime for Hedgerow will only partially replace the total loss of Hedgerow and Treeline lost as a result of the proposed development, resulting in a net loss of these habitat types. However, the planting regime for the proposed development site will replace the 9,200 m^2 of woodland habitat that will permanently removed as part of the construction phase of the proposed development and will result in the creation of an additional 13,300m^2 of woodland habitat. The planting regime will also require the planting of 1,370 specimen trees, which replaces the 535 trees permanently removed (and those additional trees lost in the tree groups) resulting in a net gain in trees for the proposed development site. This net gain in terms of landscape planting does not translate to an immediate positive impact on habitats and flora within the proposed development site during the operational phase. For a temporary to short-term period, there will be an overall reduction in vegetative cover (*i.e.,* hedgerows, treelines, woodland, stand-alone trees). In the short to medium term, it is unlikely that the vegetative cover will be of ecological value equal to that of which was removed, particularly in regard to the mature semi-natural hedgerows and treelines. In the long term, with proper maintenance over the lifetime of the proposed development, it is expected that the proposed landscape planting will result in a **moderate positive impact** on habitats and flora during the operational phase.

In addition to the planting outlined above, the landscaping plan also provides for the planting of grass seed mix of local provenance in order to cultivate species-rich grassland which will be managed for pollinators within the proposed site boundary. This will result in the planting of 155,300m^2 of pollinator friendly grassland habitat (147,000m^2 wildflower meadow, 7,800m^2 of wet grassland, 5,000m^2 swale planting). The grass seed mix used, and the management of the meadow grassland areas will follow guidance laid out by All-Ireland Pollinator Plan Business Framework. This will result in the creation of grassland habitat with great floral species diversity within a short-term period, resulting in a **slight positive impact** on the habitats and flora within the proposed development site during the operational phase. Amenity grassland (25,000m^2) and ornamental planting for the proposed plaza area (650m^2) will also be cultivated as part of the landscaping plan for the proposed development site. These habitats are of little to no intrinsic ecological value.

As outlined in Section 6.5.1, **Chapter 8 – Hydrology** and the Landscape Architectural Master Plan (AECOM, 2023), the proposed surface-water drainage system will incorporate a nature-based SuDs system of ponds and wetland areas which will control, attenuate and treat surface-water run which will ultimately discharge to the Leixlip Reservoir via the existing attenuation ponds. With the installation and operation of 2 No. attenuation basins, 2 No. attenuation ponds and 1 No. infiltration basin (17,434.8m^3 total), it is considered that proposed surface-water drainage system will improve upon the existing run-off discharge

RECEIVED: 18/07/2023

rates from Kildare Innovation Campus (CSEA, 2023a). Therefore, the potential impacts arising from surface-water run-off to the aquatic habitats within and immediately downstream of the proposed development site during the construction phase are considered to be **neutral** to **not-significant positive** in the **long-term**.

As outlined in Section 6.5.1 above, Leixlip WWTP has adequate capacity (WWTP Remaining PE 11888) to facilitate the treatment of foul water drainage from the proposed development site (Proposed Development PE 2080) and is currently compliant with the ELV's in the wastewater discharge licence (Irish Water, 2021). Therefore, the potential impacts to the aquatic habitats downstream of the proposed development site are considered to be **neutral** in the **long-term**.

6.5.3 Potential Impacts on Fauna

The proposed development site contains habitats with ecological importance of lower to higher value for a range of protected faunal species. The site is dominated by Buildings and Artificial Surfaces (BL3) with a variety of other habitats also present including Amenity Grassland (GA2), Scattered trees and Parkland (WD5) and Mixed broadleaved Woodland (WD1). Given the variety of habitats present it is unsurprising that the campus supports a relatively diverse assemblage of faunal species.

6.5.3.1 Non-Volant Mammals

No setts, holts or dens belonging to protected non-volant mammal species were present within the study area during ecological surveys carried out as part of the proposed development. A burrow previously identified as a possible Badger sett as part of the ecological assessment that accompanied the planning application for the DB Schenker logistics facility was confirmed to be used by Rabbit in 2022 and 2023.

Rabbits are widespread and numerous at the site, particularly in areas of amenity grassland at the site. Fox sightings are signs were frequent and widely reported and although no confirmed den was encountered it is certain that Fox breed locally as young cubs were observed on the trail cameras deployed within the site.

<u>Construction Phase</u>

The construction and associated habitat clearance will permanently decrease the areas with the site that are available to burrowing and foraging non-volant mammals. The loss of hedgerows and trees will also decrease the amount of available attractive habitat for many of the species that were recorded at the site (e.g. Badger, Grey Squirrel and Red Deer). In the absence of appropriate mitigation, the vegetation clearance could impact on breeding and resting sites of mammals, even those located outside of the immediate working area.

The phased construction of the entire facility will mean that works will be staged over a prolonged period and ongoing construction related disturbance across the development area has the potential to cause localised disturbance, displacement and mortality effects on the mammals that occur locally. Construction traffic and associated visual and other sensory disturbance effects have the potential to cause localised temporary to short-term displacement and disturbance impacts upon non-volant mammal species. Increased traffic can lead to an increase in road fatalities for non-volant mammals. It could also disrupt the existing mammal community by promoting conditions which are more favourable for certain species e.g scavengers. For instance, all edible and putrescible waste (e.g. improperly

RECEIVED: 18/07/2023

discarded food) has the potential to attract scavengers and to potentially disrupt the existing non-volant mammal community.

The construction phase will also involve demolition, substantial earthworks and increased site traffic. The buildings to be demolished are not used by any protected non-volant mammal species. However, buildings could be occupied prior to, or even during a prolonged demolition process. It will be necessary to monitor these building throughout to minimise the risk of direct impacts upon any mammal species that may be present.

Excavations and ponded water have the potential to trap, engulf or drown non-volant mammals. Construction and associated temporary fencing (and lighting) has the potential to disrupt or impede movement of mammals across the site.

During the construction phase of each phase of the development, there is likely to be a certain amount of disturbance to fauna occurring on/near the site. Given the scale of the site and the phased nature of the development the disturbance will to be some extent localised and specific to the works currently being undertaken. The greatest potential for disturbance, displacement and mortality effects will be associated with the vegetation clearance process (particularly of woodland and hedgerow habitat) ahead of the construction works of each project phase. This period will in each case be relatively concentrated and in the absence of appropriate mitigation it would be likely to have localised negative effects on the distribution and abundance of non-volant mammals at the site, in the short to medium term.

In the event that some mammals are displaced through disturbance or direct loss of habitat it is probable that many of the affected or disturbed individuals may move into adjoining lands. No burrows of protected mammal species were recorded within the application site and it appears that species such as Badger occur on site when foraging or commuting through the area.

A major run-off or pollution event could have a negative impact on the local mammal fauna through mortality and/or loss of habitat. Mammals associated with aquatic habitats (e.g. Otter) in the wider area could also potentially be subject to negative impact through activities associated with the project, such as siltation, run-off and fuel spills. The proposed development site is not directly adjacent to the sensitive riparian corridors and the existing surface water management control make significant ex-situ impacts on water quality highly unlikely. It is possible that contamination of the 'ponds' on site could have a temporary negative impact on non-volant mammal species that utilise these waterbodies as a source of freshwater or for occasional foraging opportunities. However, as described in Section 6.5.1 above and detailed in the CEMP and **Chapter 8 – Hydrology** there are comprehensive mitigation commitments that will be effective in minimising the risk of any significant contamination of local waterbodies or hydrologically connected watercourses.

The non-volant mammal community at the existing site is not particularly diverse or abundant, but it is important in a local context. In the absence of adequate mitigation and biodiversity enhancement measures it is likely that the proposed development would have a significant negative impact on the non-volant mammal community present at the site. However, the impact is likely to be highly localised in extent and occur in the short-to-medium term. The permanent loss of habitat will be addressed by the landscaping and other biodiversity enhancement measures. The benefit of these measures will not all be instantaneous and as the project is phased the localised negative impacts (loss of habitat and disturbance) will be offset to an extent by the establishment and growth of the new landscape features.

Therefore, over the course of the project, the enhanced newly established habitats in earlier phases will be available to non-volant mammals that occur locally. That is likely to substantially lessen the potential impact to overall species diversity and abundance associated with the clearance of vegetation and construction activity in later stages of the development.

RECEIVED: 18/07/2023

Operational Phase

As described above the proposed development will be phased and there will be elements of the project that are in place for at least a decade prior to the delivery of the final planned features. It means that the construction phase is extended into the operational phase and so the potential impacts of both construction and operational phases also overlap.

The maturing landscape features including 1,400m of linear hedgerow and 22,500m^2 of woodland will provide cover for foraging commuting and resting mammals. This will in the medium to long term be likely to see a moderate positive impact on the diversity and abundance of non-volant mammal species present at the site. Features with the potential to have moderate to significant positive effects in the shorter term include the planting and management of pollinator friendly grassland. These higher value grassland habitats will be attractive for small mammals and for foraging larger mammals.

The larger footprint of the built areas on site and associated increases in site traffic (and noise and lighting) is likely to be offset by the maturing landscape features in the long term leading to slight positive impacts on the diversity and abundance on non-volant mammals present in the area.

6.5.3.2 Bats

Construction Phase

The KIC campus is an existing large and landscaped site on the outskirts of Leixlip. It has large areas of built and managed habitats. The new proposed development is to be located within an area where there are already sources of artificial lighting, busy roads and many houses and gardens.

The buildings to be demolished to facilitate the development are not used by, or suitable for, roosting bats. The areas with greatest resource value for bats within KIC are around the existing ponds and areas of mature hedgerow and woodland.

Surveys conducted across multiple seasons confirmed the presence of five bat species won site, with Soprano Pipistrelle, Leisler's Bat, Common Pipistrelle, Daubenton's Bat and Brown Long-eared Bat present. No confirmed bat roost was located at the site. Ground-level assessments of the trees to be removed found that the majority of these has negligible to low suitability of roosting bats. However, there were 56 no. trees which are to be felled to facilitate the development which were assessed as having 'Moderate' to 'High' roosting suitability for bats. These trees are distributed throughout the development footprint and include some large mature and over-mature Oak, Beech and Lime. The removal of the young trees with no current suitability for roosting bats, along with the removal of the trees with moderate to high potential has the potential to result in a decline in the current and future resource value of the site for commuting, foraging and roosting bats. It is likely that among the trees with moderate to high potential that some bats may use suitable PRFs to roost. In

RECEIVED: 18/07/2023

Ireland, the majority of bat roosts are in buildings while outside Ireland, known roosting associations of certain bat species can be markedly different. For instance, in Europe Leisler's bat is considered to be highly dependent on tree roosts, whereas, in Ireland, tree roosts remain rarely recorded (Marnell & Presetnik, 2010). However, all Irish bat species have been recorded using tree roosts, at least occasionally (Roche *et al*. 2014). Therefore, without mitigation the loss of trees, particularly mature trees, at the site has the potential to remove roosting opportunities, displace, or even result in mortality of bats. Without appropriate mitigation, the risks associated with tree-felling would be greater and likely to result in much higher risk of disturbance, injury and death of roosting bats. Even in the event that no roosting bats are present in any of the trees at the time they are felled, the removal of the mature trees has the potential to result in locally reduced foraging opportunities and/or interrupt commuting routes.

Construction related lighting has the potential to cause localised disturbance and to cause avoidance of well-illuminated areas by a proportion of species known to be less tolerant of artificial lighting e.g. Brown Long-eared Bat.

There are elements of the project design which may be attractive to foraging bats such as the installation of the attenuation pond and attenuation wetland areas. Elsewhere on site the three existing ponds are hotspots of activity for foraging bats including Daubenton's Bat and it is likely that the new pond area will also be attractive for bats, to forage and to drink. Similarly, the new grassland management (species-rich grassland) is likely to be of benefit to foraging bats. Green walls/roofs may provide some foraging opportunities for bats and have been shown to have a benefit for bats in urban areas (e.g. Pearce & Hawkins 2012). Biodiverse roofs and living 'green' walls are both recommended design features in Bat Conservation Trust's publication on Landscape and Urban Design (Gunnell *et al*. 2012).

As described in Section 6.5.3.1, the construction phase will be phased and that will mean that the vegetation clearance and implementation of the landscaping strategy will also be phased. It means that for some of the trees that currently have potential for roosting bats may well have fallen or become less attractive by the passage of time before they are finally scheduled for removal. Likewise, there may be trees that are currently adjudged as having lower potential that may become attractive for roosting bats, or even or more value for commuting and foraging bats in the intervening decade. Therefore, just as bats may use natural features in a very different way at different times of year, a precautionary view must also be applied in assessing the potential for the trees present to be of value to bats, currently and prior to their removal. In the absence of mitigation, the loss of hedgerow and mature trees is likely to result in significant negative effects on bats in the local area in the short to medium term. The introduction of the newly planted trees, hedgerows, managed grassland, surface water attenuation features and green roof/walls has the potential in time to have an overall slight positive effect on foraging bats present at the site. However, without further mitigation the roost potential of the site will be significantly reduced into the longer term.

Operational Phase

The maturing landscaped features are likely to be of increasing value for locally occurring bats. The planted trees and hedgerows will take time to be of significant value to bats but these will provide in the medium to long term commuting and foraging habitat of local importance. The long term to permanent effect of the planted woodland and hedgerow will be significant positive at a local level as the trees mature and offer greater potential for foraging and

RECEIVED: 18/07/2023

roosting bats. The larger trees and woodland patches will also help screen areas from artificial lighting.

The species rich grassland areas and areas for attenuation of surface water will also continue to be of local importance for foraging bats at the site.

The lighting from buildings and lamp standards within the campus has the potential to cause some localised avoidance of these areas by less light tolerant species and to attract in certain species (e.g. Leisler's Bat) that are adept at opportunistically foraging in areas where insects are attracted. In the context of the existing site the predicted impact of the additional lighting that may be associated with the additional buildings and infrastructure is likely only to represent a slight negative effect on locally occurring bats. It is also noted that the Guidance Note on Bats and Artificial Lighting (GN 08/18 [2018]) published by Institution of Lighting Professionals and Bat Conservation Trust (2018) formed part of the design information drawn upon for the lighting design for the project (Refer to Ethos, External Lighting Design Report for further detail).

6.5.3.3 Birds

Construction Phase

The bird surveys at the site recorded a relatively diverse winter and breeding bird community. The construction of the proposed development will require the demolition of three large industrial buildings, removal of over 500 trees and areas of hedgerow and grassland habitat. In the absence of mitigation the vegetation clearance has the potential to disturb, displace and cause mortality of breeding and roosting birds. The vegetation clearance is likely to reduce the foraging, breeding and roosting potential of the site for many of the species that currently use the site. The hedgerow and tree removal must be seen in the context of the retention of large numbers of trees on the campus and the availability in the wider area of similar suitable nesting habitat.

Given that a proportion of the trees to be removed are mature broadleaved trees that are very attractive for nesting and roosting birds the likely effect of the removal of trees on the local bird community is moderate to significant negative in the short to medium term. Avoiding clearance of vegetation in the bird breeding season will be effective in reducing the potential effects of the clearance to moderate negative and localised in the short to medium term.

Construction activity will involve movement of plant and personnel and associated sources of potential disturbance. This is likely to cause local displacement of certain bird species and to result in a localised decline in species diversity and abundance. Increased site traffic has the potential to cause localised disturbance and to increase the risk of mortality through collision with vehicles and structures.

The buildings that are to be demolished (7, 8 & 9) are not used by breeding birds. On occasion, gulls, both Herring Gull, *Larus argentatus* and Lesser Black-backed Gull, *Larus fuscus* were observed on the rooftops of these buildings. However, there was no evidence of resident nesting pairs. The rooftops are subject to regular maintenance checks and this may be making it less likely that gulls are choosing to nest in regularly trafficked areas.

The existing ponds on site are a locus of avian biodiversity with several waterbird species present at all times of the year. A number of species use the ponds to breed including Coot

RECEIVED: 18/07/2023

and Mallard. Mute Swans have bred on these ponds in previous years. It was noted also that species such as Swallow and Swift were observed foraging over the ponds at the site. The retention of these ponds and addition of the new attenuation ponds and wetland attenuation areas are likely to have a positive effect on the abundance and diversity of waterbirds and hirundines present at the site.

As discussed in relation to potential construction related impacts on other fauna, the proposed development is phased over a long period and therefore the construction related disturbance is likely to be highly localised within the campus. There is potential for attraction of scavenger species into areas where edible and putresible wastes are improperly discarded. Additional lighting has the potential to cause disturbance of birds present in the illuminated areas.

The new landscaping features include substantial new areas of woodland planting (c. 22,500m^2) and c. 1,400 linear metres of new hedgerow planting. In the short to medium term this new planting will be of limited attractiveness to breeding and roosting birds. From the medium to longer term these areas of planting will have a local moderate positive effect on the avian biodiversity at the site. The areas of managed species rich grassland are likely to have more immediate benefit to species including granivores (e.g. Linnet).

Overall, in the absence of appropriate mitigation, the construction phase of the project is likely to result in slight to moderate negative effects on avian diversity and abundance at the site.

Operational Phase

In the operational phase, as the landscaping features mature, the planted areas are likely to yield a neutral to slight positive impact on the local bird community over the medium to long term. As described above, in the short-medium term the loss of mature vegetation is like to see slight to moderate negative effects on avian diversity and abundance at a highly localised level within the site, but this effect will not be long-term.

The green roofs may provide attract roosting and nesting opportunities for certain species (e.g. Gulls) and as described in the Mitigation and Enhancement section (Section 6.6) there are several measures that will be applied to reduce the potential effects arising from the vegetation clearance and to accelerate and grow the biodiversity benefits arising from the landscaping and other mitigation commitments.

6.5.3.4 Other Taxa

Construction Phase

No protected or Red-Listed amphibians, invertebrates or other taxa were recorded at the site. The removal of trees, hedgerow and grassland areas during construction are likely to cause localised disturbance and losses of invertebrates.

In general construction activities have the potential to impact upon aquatic habitats at and downstream of the site through hydrological links from the works areas. This can negatively impact the biodiversity of the waterbodies by causing a decline in the diversity and abundance of aquatic insects and a knock-on effect on the higher trophic levels. The CEMP contains detailed measures to ensure that the risks of contamination of the ponds and hydrologically connected watercourses is minimised.

RECEIVED: 18/07/2023

The management of grassland areas in accordance with the All-Ireland Pollinator Plan will yield a local significant positive benefit to other taxa in the short term and into the future. The new pond and attenuation wetlands are likely to have a significant local positive effect on other taxa from the short term.

Operational Phase

The landscaping plan includes for the planting of 1,400 linear metres of new hedgerow and some 22,500m^2 of woodland habitat with 1,370 specimen trees. These measures are likely to be of slight to moderate positive benefit to other taxa, particularly invertebrates, in the short to medium term. In the longer term the maturing woodland is likely to have a significant positive effect on the diversity and abundance of invertebrate fauna at the site.

The green roofs and walls will support a diversity of invertebrate species. The ongoing management of species rich grassland will have an ongoing significant positive effect on the diversity and abundance of other taxa, particularly invertebrates.

6.5.4 Facilitation Works

As stated in Section 6.2 above and **Chapter 2 – Description of the Project,** the facilitation works (*i.e.,* the Eirgrid uprating works and the proposed GNI upgrade works) which are included in the project do not form part of the proposed development for which consent is sought but are required in order to support the proposed development.

Proposed Eirgrid Uprating Works

As outlined in Section 6.2 above and in **Chapter 2 EIAR – Description of the Project**, the proposed uprating will be carried out to existing lines along established wayleaves that primarily cross agricultural lands. While the uprating works traverse a considerable distance, it is existing linear infrastructure that is being upgraded, where the nature of the works are temporary. Therefore, the potential for impacts upon the receiving environment are greatly reduced.

There will be no additional ground works required, as existing access roads will be used to complete the uprating works, the existing foundation will be utilised where pole sets must be replaced, and the works comprise the uprating of overhead lines where no excavation works will be required. While access roads will need to be maintained, this is an on-going requirement.

The uprating works will follow the standard methodologies outlined in '*Ecology Guidelines for Electricity Transmission Projects'* (Eirgrid, 2020). For example, the works will be timed to avoid periods of heavy rainfall and there will be protocol in place to prevent the spread of invasive species.

The overhead transmission lines that form part of the proposed uprating works cross watercourses. However, no instream works will be required. Furthermore, the replacement of polesets and upgrading of towers (where required) will use existing infrastructure (access roads, foundations, *etc*). The proposed Eirgrid uprating route crosses the Rye Water River and associated Rye Water Valley/ Carton SAC/pNHA. No ground works within these designated sites will be required. The proposed route will also cross Carbury Bog NHA and Royal Canal pNHA. While there is potential for works (the replacement of polesets, upgrading of towers) within these designated sites associated with the project, given the temporary nature of the

works and the use of existing infrastructure, significant impacts to these designated sites as a result of these facilitation works are not expected.

RECEIVED: 18/07/2023

With regard to the proposed Eirgrid uprating works and the proposed GNI upgrade works, we have considered the information provided on the proposed facilitation works, including the nature, location and scale of the Eirgrid uprating. Based on this information and the location of Natura 2000 sites in the receiving environment, it is concluded that no likely significant effects will arise in relation to these associated facilitation works. Future consent for the facilitation works will be required through Gas Networks Ireland and Eirgrid which will include the submission of a Screening Assessment report in support of the Appropriate Assessment process and the submission of an Environmental Impact Assessment.

Proposed GNI Upgrade Works

The preferred route of the proposed GNI upgrade works is not within any designated site. The nearest designated sites to the proposed GNI upgrade route are the Rye Water Valley/Carton SAC and pNHA which is located 179m to the northeast, separated by suburban development, greenfields and treelines. The preferred route does not cross any watercourses, therefore there is no direct hydrological link connecting the proposed GNI upgrade route to the Rye Water River and associated designated sites, nor to other designated sites present downstream.

Habitats listed on Annex I of the EU Habitats Directive are not present within the preferred route of the proposed GNI upgrade works, nor does the route cross any watercourses. Buildings and artificial surfaces (BL3), and recolonising bare ground (ED3) are the main habitats which will be directly impacted by the proposed GNI upgrade works. These habitats are considered to be of little to no intrinsic value to native flora and fauna. No invasive plant species were recorded along the route during ecological surveys but should they occur during the construction phase, there will be measures in place to prevent the disturbance and spread of invasive plant species (See the sample GNI Construction and Environmental Management Plan in Appendix 6.1 for more information).

There will be no additional removal of habitat during the operational phase of the proposed GNI upgrade works and there is no potential for impacts on habitat and flora arising for the operational phase of the proposed GNI upgrade works.

The proposed works will be limited to the corridor (*c*. 1.18km) of the proposed GNI upgrade route and will be temporary in nature. The effected highly modified habitats will be returned to their original state following completion of works. No watercourses will be crossed in order to facilitate the proposed works. Additional environmental protection measures as outlined in Section 6.2 and Appendix 6.1 (Sample GNI CEMP) will be in in place and specific to the proposed GNI upgrade route. As a result, it is considered likely that impacts to habitats and fauna will be **temporary** and **neutral** to **imperceptible**. Additionally, no significant impacts to the to the relevant designated sites are expected. However, future consent for these works will be required through Gas Networks Ireland which will include the submission of a Screening Assessment report in support of the Appropriate Assessment process and if required the submission of an Environmental Impact Assessment.

6.5.5 Do-Nothing Scenario

If the proposed development does not proceed, the existing operations of the industries outlined in Section 6.1.2 within Kildare Innovation Campus, associated use of the car-parking areas and access roads, and landscaping regime will continue. As part of the landscaping regime, the campus grounds will continue to be managed for pollinators as part of the All-Ireland Pollinator Plan Business Framework.

RECEIVED: 18/07/2023

In the short to medium term, 8 no. trees that form part of the hedgerow, treeline and parkland habitats assessed as being locally important (higher value), as well as being assessed as of 'Moderate' to 'High' suitability for bats (and of ecological value in general), are in such condition that they cannot be realistically retained in the context of the current land use (See Charles McCorkell, 2023). These trees have been assessed where the structural and or physiological condition of the tree is poor and is therefore at risk of falling, or the tree is dead or dying. In the long term, the remaining trees/tree groups considered to be of Moderate' or 'High' value have an estimated remaining life expectancy of at least 10 years (21 no. trees/tree groups), 20 years (24 no. trees/tree groups), or 40 years (15 no. trees/tree groups). There are little to no young trees, either planted or self-seeded, to replace these older trees when they inevitably fall.

6.5.6 Cumulative Impacts

Cumulative effects are defined by EPA Guidance (2017) as; '*the addition of many minor or significant effects, including the effects of other projects, to create larger, more significant effects*'. An assessment of plans and projects occurring in within the proposed development site boundary and within the wider landscape were evaluated in combination with the project. A review of permitted developments in the wider area was completed (see **Chapter 3 - Planning and Development Context** and Appendix 3.1), and the potential for any significant cumulative and in combination effects on the receiving environment were considered for the construction and operational phases of the proposed development below.

The plans and projects that have been proposed or implemented in recent years were considered as part of the assessment of potential cumulative and in combination effects. For instance, the current Kildare County Development Plan (2023-2029) was adopted in December 2022. In addition, the Leixlip Local Area Plan (2020-2023) and the Celbridge Biodiversity Action Plan (2021 – 2025) were also considered in relation to the local ecology and planned actions for the protection and restoration of local biodiversity.

There are several mechanisms by which projects in general may act in concert with each other to impact on the local flora, fauna and habitats in a given area. The scale at which these impacts may be felt depends greatly on the nature of these projects and the type of species and habitats in the receiving environment. Loss of habitat associated with a particular project may be exacerbated by multiple similar losses of habitat occurring in the wider area. Increases in noise or lighting from one project can have greater impact if the loss of screening vegetation associated with a neighbouring development allows for a wider cumulative 'spill' of impacts into the wider environment. Similarly, if pressures arising from the connection to wastewater services by multiple projects being developed means that the capacity of local wastewater treatment infrastructure is overwhelmed, the potential for downstream cumulative impacts must be considered. There are also potential positive cumulative effects that can be associated with the delivery of unrelated projects. For instance, if these projects cumulatively increase the amounts of a certain habitat attractive for species of importance and through their own landscaping commitments help improve the ecological connectivity through the wider area.

RECEIVED: 18/07/2023

There are several developments that have either been submitted for planning permission or have been granted permission within and in close proximity to the proposed development site. The client, The Davy Platform ICAV, received planning permission for the development of 4 no. 20 kV ESB double substations at four sites within the proposed development site (planning ref: 22/1096). The location of these substations is within habitats considered to be of low ecological value (Buildings and artificial surfaces (BL3), *etc*.) and cover a total floor area of 591m^2. Given the location of the substations, the scale of the works required and the type/condition of the habitats in which the substations will be located, no significant impacts in combination with the project are expected. Barnhall Rugby club received permission (Planning Ref. 21/730) for the construction of a new vehicle access and all ancillary works. The site is directly adjacent and overlaps in places, with the proposed development site boundary to the south. In combination effects between this development and the proposed development are not expected to result in significant impacts. Glenveagh Development (Planning Ref 23/513), a large scale residential development is located northeast of the proposed development site, opposite the entrance to the Barnhall Meadows estate. The site primarily comprises agricultural grassland bounded by hedgerows and treelines that provide commuting corridors for various species to habitats in the wider environment. A Screening for Appropriate Assessment and the Biodiversity chapter of the EIAR completed by Enviroguide Consulting (2023) found that "*no significant negative impact to any valued habitats, designated sites or individual or group of species as a result of the proposed development*".

As outlined in **Chapter 3 - Planning and Development Context**, the Wonderful Barn lands are likely to be the subject of a regeneration project including the restoration of the main features of the complex and its historical landscape by Kildare County Council in the foreseeable future. The Wonderful Barn is directly adjacent to and overlapping with the lands north of the M4 within the proposed development site boundary. Given the estimated time period in which the different stages of the proposed development are going to be completed, there is potential for in-combination effects on the habitats and flora between this project and the proposed development. This project will require the submission of a Screening Assessment report in support of the Appropriate Assessment process and the submission of an Environmental Impact Assessment.

There are a number of large-scale developments in the wider area that have the potential to interact with the project, resulting in in-combination and/or cumulative impacts in the receiving environment. Several of the notable projects are discussed below.

Intel Ireland Limited were granted planning permission for the revised design of their manufacturing facility in May 2017 (Planning Ref: 16/1229 amended under reg. ref. 1991). The facility is located *c.*1.5km north of Kildare Innovation Campus, and the granted revised design is currently under construction. The original Natura Impact Statement completed by Environmental Impact Services (2016), found that wastewater discharged to Leixlip WWTP would remain inside the licensed limits for the facility and have a negligible impact on the River Liffey. The Natura Impact Statement submitted for the amended planning application (Planning Ref: 1991) takes into account the environmental protection policies outlined in the Kildare County Development Plan 2017-2023 and Leixlip Local Area Plan 2017 – 2023 and states that "*the proposed development itself will not have any effects on the conservation objectives of any European sites*" (Scott Cawley, 2019). The Intel campus has been developed over a number of phases and has had to implement stringent design and environmental controls, particularly as it is located directly adjacent to the Rye Water Valley/Carton SAC.

RECEIVED: 18/07/2023

These include management of surface water and wastewater in accordance with EPA licence requirements, as outlined. Several development projects at this facility have been subject to the Appropriate Assessment process. Having considered the location and design of the Intel facility, no interactions resulting in significant cumulative effects upon the receiving environment in relation to the Intel development and the proposed development are expected. We have also considered the potential for cumulative effects arising between the Intel Facility and the proposed facilitation works *i.e.,* the proposed Eirgrid uprating works and the proposed GNI upgrade works, that will be required as part of the current project. While the overhead transmission lines traverse the Intel facility, the uprating works are highly localised, temporary and of a nature that no potential for significant cumulative effects upon the receiving environment in relation to the Intel development and the proposed development are expected.

Irish Water have applied for permission to upgrade Leixlip WWTP which would involve the demolition of the existing workshop and activated carbon building, and the construction of a new Sulphuric Acid Storage and Dosing Facility (Planning Ref: SD21A/0272). The site of the proposed works is located in proximity to the River Liffey, on the opposite bank to the proposed development site, less than 1km form the proposed development site. There were no interactions between the proposed works and any designated Natura 2000 site identified (Ryan Hanley, 2021). No interactions resulting in significant cumulative effects upon the receiving environment in relation to this WWTP upgrade and the proposed development are expected. With regard to the facilitation works *i.e.,* the proposed Eirgrid uprating works and the proposed GNI upgrade works, we have considered the information provided on the proposed facilitation works, including the nature, location and scale of the GNI upgrade and Eirgrid uprating. Based on this information, no interactions resulting in significant cumulative effects upon the receiving environment in relation to the Leixlip WWTP upgrades and the facilitation works are expected.

A 10-year planning permission was granted for a c. 47.44 ha Solar Farm development (Planning Ref: 18250) in Killeenlea, Co. Kildare, located to the southwest of the proposed development site. The Screening report in support of the AA process completed by Scott Cawley (2018) stated that there is no pathway linking to designated sites upstream. Given this and the distance of this site from the proposed development site, no interactions resulting in significant cumulative effects upon the receiving environment in relation to this solar farm development and the proposed development are expected. With regard to the facilitation works *i.e.,* the proposed Eirgrid uprating works and the proposed GNI upgrade works, we have considered the information provided on the proposed facilitation works, including the nature, location and scale of the GNI upgrade and Eirgrid uprating. Based on this information, no interactions resulting in significant cumulative effects upon the receiving environment in relation to this solar farm and the facilitation works are expected.

The DART+ West project (ABP ref: NA29S.314232) is seeking permission to significantly increase rail capacity on the Maynooth & M3 Parkway lines. The route of this project passes to the southeast of the proposed development site, opposite the Leixlip Reservoir. The Natura Impact Statement completed by IDOM and ROD on behalf of CIÉ (2022) found that "*given the full and proper implementation of the mitigation prescribed in this NIS, the proposed development, either individually or in combination with other plans or projects, will not adversely affect the integrity of the Rye Water Valley/Carton SAC, the South Dublin Bay and the River Tolka Estuary SPA, the North Bull Island SPA or any other European site*". Having considered the nature and scale of the Dart+ West project and the environmental commitments provided for in the EIAR and NIS, we conclude that there is no potential for

interaction resulting in significant cumulative effects with the current proposed KIC development. We have also considered the potential for cumulative effects arising between this project and the proposed facilitation works *i.e.,* the proposed Eirgrid uprating works and the proposed GNI upgrade works, that will be required as part of the current project. The overhead transmission lines that form part of the Eirgrid uprating route traverse the Dart+ upgrade route. For the same reasons as outlined above, no potential for significant cumulative effects upon the receiving environment in relation to the Intel development and the proposed development are expected.

RECEIVED: 18/07/2023

There are several large residential developments that have been granted permission in the wider environment of the proposed development (See Appendix 3.1). These developments and other active sites in the wider area are to be seen in the context of a well-developed urban infrastructure with appropriate planning, monitoring, and licensing in place.

6.6 Avoidance Mitigation & Enhancement Measures

RECEIVED: 18/07/2023

6.6.1 Avoidance

Through an iterative design process opportunities to reduce the potential for impacts on the local biodiversity were explored. This included reducing the number of mature higher value trees to be removed insofar as possible and seeking to implement tree protection measures as part of the CEMP. Direct impacts on areas where there are existing bird and bat boxes within the campus were successfully avoided. The lighting design has also taken the guidance on impacts of artificial lighting on bats into account.

6.6.2 Mitigation

The following mitigation measures will be applied to minimise the potential impacts identified on the receiving and wider environment.

- A suitably qualified Ecological Clerk of Works will be appointed for each phase of the construction of the project to ensure the full and proper implementation of the mitigation strategy.
- There will be no tree or hedgerow removal within the bird breeding season (1st March to 31st March inclusive).
- Any areas where vegetation removal or construction activity is due to commence will be subject to a pre-works survey by a suitably qualified ecologist. In the event that there are any protected species present works will only be permitted to proceed on the advice of the ecologist and with any required derogation licensing in place.
    - All trees judged to have moderate or high roost potential for bats will be subject to a detailed inspection, including as appropriate tree-climbing (and/or roost emergence surveys) in the weeks prior to planned felling. In the event that there is evidence of a presence a roosting bats no felling will take place without a derogation licence. A bat specialist will liaise with the licensing unit and local NPWS staff and implement an agreed management protocol ahead of the commencement of felling. The bat specialist will be present during any subsequent felling and will inspect the felled trees before they are logged or removed.
    - Areas where construction is scheduled will be surveyed in advance to check for the presence of Invasive Plant Species. In the event that any Third Schedule Invasive Plant species are present an Invasive Species Management Plan will be prepared and implemented ahead of the removal of vegetation from the affected area.
- All soil removed from the site will be disposed of at approved licenced facilities.
- All environmental controls described in the CEMP and elsewhere in the EIAR will be integrated into a live CEMP which will be regularly reviewed and updated as appropriate during the construction phase.
    - Root protection zones will be marked and appropriate exclusion of vehicles and personnel will be in place to ensure that disturbance to habitats adjoining construction sites is minimised.
- The proposed Landscaping Plan (AECOM 2023) will be implemented in full.
    - If soil is imported to the site for landscaping, infilling or embankments, the contractor shall gain documentation from suppliers that it is free from invasive species.

RECEIVED: 28/07/2023

- Construction operations will take place during the hours of daylight for the most part to minimise disturbances to roosting birds or any active crepuscular/nocturnal bird species.
- A Toolbox Talk will be prepared and incorporated as part of the construction phase site induction. A wildlife register will be maintained by the environmental site staff during the construction phase. Site staff will be encouraged to report any wildlife sightings of note made during the construction phase and this information will be logged by the environmental site staff. The site manager will continue to maintain a wildlife register throughout the operational phase.
- The construction footprint will not be lit at night (with the exception of low-level switchable safety lighting). All lighting systems will be designed to minimise nuisance through light spillage. Shielded, downward directed lighting will be used wherever possible and all non-essential lighting will be switched off during the hours of darkness.
    - Where possible all light fittings will be LED, have asymmetrical projection i.e. directional, and with colour temperature of 2700K (warm spectrum preferred by bats). The radiation will be above 500nm to avoid the blue or UV light, most disturbing to bats.
- All edible and putrescible wastes will be stored and disposed of in an appropriate manner. Similarly, all construction materials will be stored and stockpiled at prescribed locations and all waste materials will be disposed of to licensed facilities.
- All edible and putrescible wastes will be stored and disposed of in an appropriate manner. Similarly, all construction materials will be stored and stockpiled according to the CEMP.
- Areas where spoil is to be stored temporarily, or permanently, will be checked in advance for the presence of Frogs (and spawn) or other protected species. Any areas with pooled surface water, shall be checked in advance for the presence of Frogs (and spawn). If protected species are present, the environmental staff will translocate these, if possible (under licence if applicable). The same measure should be applied for any drains or areas of standing water forded by construction machinery. These areas will be checked on an ongoing basis by the ECoW and any areas with breeding frogs, spawn or tadpoles will be mapped and if possible fenced off temporarily to allow Frogs to metamorphose. If such areas cannot be avoided by site traffic the environmental staff will translocate the frogs (adults/young) under licence if applicable.
    - If other taxa such as other species of Lepidoptera, Common Lizard etc. are recorded within or adjacent to the site these sightings will be logged on a wildlife register.
- All excavations, or areas with pooled water will be checked regularly by the ECoW. Access/egress boards will be provided in the event that any excavations are to be left open or accessible to fauna for any prolonged period. A protocol for dealing with any trapped or injured wildlife will be developed as part of the construction phase environmental management plan including information regarding local veterinary care and local NPWS staff. The ECoW will prepare information on treatment of wildlife and emergency procedures which will be included as part of the site induction process.
- Any newly installed perimeter fencing will have a gap of c. 200mm at the base, or regular mammal gates (at maximum 150m intervals), to allow the free passage of terrestrial mammals through the site.

6.6.3 Enhancement Measures

- A minimum of 75 bird nest boxes will be erected within the campus lands. These will include a selection of woodcrete or recycled plastic nest boxes. It will include the following:

RECEIVED: 18/07/2023

  - Two Barn Owl boxes site on poles at 4-6m above ground level and sited with input from a suitably qualified ecologist.
  - 12 Swift boxes/bricks that will be integrated into the buildings on-site. These will be equipped with a tape lure (under licence) that will help attract Swifts to the nesting location(s).
  - A selection of nest box types including cavity nest boxes will be erected at locations chosen by a suitably qualified ecologist.
  - A nesting/roosting raft will be installed on one of the ponds at the site under the supervision of the ECoW. This will be designed according to the RSPB Guidance (https://www.rspb.org.uk/our-work/conservation/conservation-and-sustainability/advice/conservation-land-management-advice/nesting-rafts/).
  - The bird nest boxes will be checked and cleaned by a suitably qualified ecologist on an annual basis and any boxes requiring repair or replacement will be done so promptly on the advice of the ecologist.
- A minimum of 50 bat boxes will be erected and maintained within the campus. These will include a selection of roosting box designs and be selected and erected under the supervision of a bat specialist.
  - The bat boxes will be checked by a suitably qualified and licensed ecologist on an annual basis and any boxes requiring repair or replacement will be done so promptly on the advice of the ecologist.
- A biodiversity audit of the site will be carried out every five years and the findings will inform a Biodiversity Management Plan for the site for the following 5-year period. This will capture the elements of the landscaping and ecological mitigation, monitoring and enhancement (including the measures undertaken as part of the AIPP) and set goals and objectives for the next plan. The audit will look at the biodiversity on site and the progress towards previously stated objectives. The BMP and biodiversity audit will be published and feedback will be welcomed. The first BMP will be prepared ahead of the commencement of construction activity.

6.7 Residual Impacts

With the implementation of the environmental controls, mitigation and landscaping commitments it is likely that the overall impacts on biodiversity at the site will be locally slight to moderate negative in the short to medium term but that with the maturation of the landscaping measures and ongoing commitment to biodiversity management that it is predicted that the longer term impacts on local biodiversity arising from the proposed development will be locally moderate positive.

The Screening Assessment report that accompanies this EIAR considers the potential for likely significant effects on Natura 2000 sites in the wider receiving environment. This also includes consideration of the potential for ex-situ likely significant effects on mobile qualifying interests of designated Natura 2000 sites in the receiving environment. It is objectively concluded that there is no likelihood of significant effects on any of the Natura 2000 located in the wider area.

6.8 References

RECEIVED: 18/07/2023

AECOM (2023). Landscape Architectural Master Plan Design Report: Kildare Innovation Campus, Leixlip, County Kildare.

Bang, P. & Dahlstrom, P. 2004. Animal Tracks and Signs. Oxford University Press, Oxford.

Bibby C., Burgess N., Hill D. and Mustoe S. 2000. Bird Census Techniques. Academic Press, UK.

Blackthorn Ecology (2016), Confey Solar Farm: Ecological Report.

Byrne, A., Moorkens, E.A., Anderson, R., Killeen, I.J. & Regan, E.C. (2009). Ireland Red List No. 2 – Non-Marine Molluscs. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland.

Charles McCorkell Arboricultural Consultancy (2023). Tree Survey, Arboricultural Impact Assessment & Arboricultural Method Statement: Kildare Innovation Campus Co. Kildare.

CIRIA, (2001), Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors, (C532) Construction Industry Research and Information Association.

CIRIA (2002) Control of water pollution from construction sites: guidance for consultants and contractors (SPI56) Construction Industry Research and Information Association.

CIRIA (2005), Environmental Good Practice on Site (C650); Construction Industry Research and Information Association.

CIRIA 697 (2007), The SUDS Manual.

Clark, M. 1988. Badgers. Whittet Books, London.

CSEA (2023a). Engineering Services Report Drainage and Water Services: Kildare Innovation Campus.

CSEA (2023b). Construction Environmental Management Plan Kildare Innovation Campus.

Collins, J. (ed.) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn). The Bat Conservation Trust, London.

Ecology Ireland (2022). Pre-construction phase Ecological Advice & Monitoring 2021: DB Schenker Site, Leixlip, Co. Kildare

Eirgrid (2020). Ecology Guidelines for Electricity Transmission Projects

EPA. 2022. Guidelines on the Information to be Contained in Environmental Impact Assessment Reports. Draft, August 2017. Environmental Protection Agency.

Envirico (2020). Level 2 Botany Survey Leixlip, Co Kildare.

RECEIVED: 18/07/2023

Enviroguide Consulting (2023). Appropriate Assessment Screening Report: Glenveagh Homes Large Scale Residential Development

Environmental Impact Services (2016). Natura Impact Statement: Revised Design and Configuration of Previously Permitted Manufacturing Facility, Support Buildings and Site Infrastructure

Environmental Resources Management Ltd (2020a). Appropriate Assessment Screening: Liffey Business Campus – Building NU-02, Leixlip, County Kildare.

Environmental Resources Management Ltd (2020b). Ecological Impact Assessment: Liffey Business Campus – Building NU-02, Leixlip, County Kildare.

Fitzpatrick, U., Murray, T.E., Byrne, A., Paxton, R.J. & Brown, M.J.F. 2006. The Regional Red List of Irish Bees. Queens University Belfast, Northern Ireland.

Fossitt J.A. 2000. A Guide to Habitats in Ireland. Heritage Council, Kilkenny.

Gilbert G., Stanbury, A. and Lewis, L., 2021. "Birds of Conservation Concern in Ireland 2020 – 2026". Irish Birds 9: 523—544

Grant, G., Gunnell, K. & Williams C. (2012) Landscape and urban design for bats and biodiversity Bat Conservation Trust, London.

IDOM, ROD (2022). Natura Impact Statement: DART+ West Railway Order.

ILP (2018). Guidance Note 08/18 Bats and Artificial Lighting in the UK. Bats and the Built Environment Series Publication with BCT.

Irish Water (2021). Annual Environmental Report 2020. Agglomeration Name: Lower Liffey Valley Regional Sewerage Scheme. Licence Register No. D0004.

JNCC (2004). Common Standards Monitoring Guidance for Terrestrial Mammals, Version August 2004, ISSN 1743-8160.

Kelleher, C. & Marnell, F. (2006) Bat Mitigation Guidelines for Ireland. Irish Wildlife Manuals, No. 25. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.

Kelly, J., O' Flynn, C., and Maguire, C. 2013. Risk analysis and prioritisation for invasive and non-native species in Ireland and Northern Ireland. A report prepared for the Northern Ireland Environment Agency and National Parks and Wildlife Service as part of Invasive Species Ireland.

King,J.L., Marnell, F., Kingston, N., Rosell, R., Boylan, P., Caffrey,J.M., FitzPatrick,Ú., Gargan,P.G., Kelly,F.L., O'Grady,M.F., Poole,R., Roche,W.K. & Cassidy, D. 2011. Ireland Red List No. 5: Amphibians, Reptiles & Freshwater Fish. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

Lundy, M.G., Aughney, T., Montgomery, W.I. & Roche, N. 2011. Landscape Conservation for Irish Bats & Species-Specific Roosting Characteristics. Bat Conservation Ireland.

RECEIVED: 18/07/2023

Marnell, F., Looney, D. & Lawton, C. (2019) Ireland Red List No. 12: Terrestrial Mammals. National Parks and Wildlife Service, Department of the Culture, Heritage and the Gaeltacht, Dublin, Ireland.

Marnell F, Presetnik P (2010) Protection of overground roosts for bats (particularly roosts in buildings of cultural heritage importance). EUROBATS Publication Series No. 4. UNEP / EUROBATS Secretariat, Bonn, Germany

Nairn, R. & Fossitt, J. 2004. The Ecological Impacts of Roads, and an Approach to their Assessment for National Roads Schemes. In: J. Davenport & J.L. Davenport (eds) The Effects of Human Transport on Ecosystems: Cars and Planes, Boats and Trains, 98-114. Royal Irish Academy, Dublin.

Nelson, B., Ronayne, C. & Thompson, R. (2011). Ireland Red List No.6: Damselflies & Dragonflies (Odonata). National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland.

Pearce, Huma & Hawkins (Walters), Charlotte. (2012). Do Green Roofs Provide Habitat for Bats in Urban Areas?. Acta Chiropterologica. 14. 469-478. 10.3161/150811012X661774.

Regan, E.C., Nelson, B., Aldwell, B., Bertrand, C., Bond, K., Harding, J., Nash, D., Nixon, D., & Wilson, C.J. (2010) Ireland Red List No. 4 – Butterflies. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Ireland.

Roche, N., Aughney, T., Marnell, F. and Lundy M. 2014. Irish Bats in the 21st Century. Bat Conservation Ireland, Cavan.

Ryan Hanley (2021). Appropriate Assessment Screening Report: Leixlip WWTP Upgrades.

Scott Cawley (2018). Appropriate Assessment Screening Report: Proposed Solar Farm Development, Celbridge, Co. Kildare

Scott Cawley (2019). Natural Impact Statement: Provision of Information for Appropriate Assessment for Revised and Extended Manufacturing Facility at Intel Collinstown Industrial Park, Leixlip, Co. Kildare.

Smith G.F., O'Donoghue P., O'Hora K. & Delaney E. 2011. Best Practice Guidance for Habitat Survey and Mapping. The Heritage Council.

Sutherland W.J (Ed.) (1996). Ecological Census Techniques, a Handbook. Cambridge, UK.

Wyse Jackson M., FitzPatrick Ú., Cole E., Jebb M., McFerran D., Sheehy Skeffington M. & Wright M. 2016. Ireland Red List No. 10: Vascular Plants. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs, Dublin, Ireland.

RECEIVED: 18/07/2023

7.0 LAND, SOILS, GEOLOGY AND HYDROGEOLOGY

7.1 INTRODUCTION

This chapter of the Environmental Impact Assessment Report (EIAR) has been prepared by AWN Consulting Ltd. which assesses and evaluates the likely significant impacts of the project on the land, soil, geological and hydrogeological aspects of the site and surrounding area associated with the principal and facilitation works. These are as follows:

A. The 'principal' works subject to the development consent being sought from Kildare County Council, i.e. the proposed development; and
B. 'Facilitation works' required to support the development which do not form part of the development consent being sought from Kildare County Council. The facilitation works include a mix of works that will be required to be undertaken for or on behalf of statutory undertakers such as Gas Networks Ireland and EirGrid.

The principal works include the proposed expansion of the existing innovation campus and all those works included within the redline boundary and described on the statutory notices accompanying the application. The facilitation works are those known works that are required to facilitate the proposed development over the life of the permission being sought.

In assessing likely impacts, account is taken of both the importance of the existing land, soils, geological and hydrogeological attributes and the predicted scale and duration of the likely impacts.

7.1.1 PROJECT PERSONNEL

Teri Hayes (BSc MSc PGeol EurGeol) is a Director and Senior Hydrogeologist with AWN Consulting with over 25 years of experience in water resource management, environmental assessment and environmental licensing. Teri is a former President of The International Association of Hydrogeologists (IAH, Irish Group) and is a professional member of the Institute of Geologists of Ireland (IGI) and European Federation of Geologists (EurGeol). She has qualified as a competent person for contaminated land assessment as required by the IGI and EPA. Her project experience includes contributions to a wide range of complex Environmental Impact Statements, planning applications and environmental reports for Industry Infrastructure and residential developments. Teri's specialist area of expertise is water resource management, eco-hydrogeology, hydrological assessment and environmental impact assessment. Teri will be assisted by the water and environment section at AWN which includes a team of experienced hydrogeologists and environmental scientists.

Conor McGrath is a Senior Environmental Consultant at AWN, with over 12 years' experience working in the geology and environmental science fields. Conor is a Chartered Environmentalist (CEnv) and is a professional member of the Institute of Geologists of Ireland (PGeo) and European Federation of Geologists (EurGeol). Conor has experience with a wide range of projects including site investigations, contaminated land, project management, environmental compliance and licencing, environmental remediation programmes and environmental impact assessments. Conor has extensive experience in managing development projects, stakeholder engagement, leading teams, change management, operational transformation, corporate compliance, and governance programmes.

RECEIVED: 18/07/2023

Alan Wilson is an Environmental Consultant with AWN Consulting. Alan holds a BSc Honours in Environmental Management in Agriculture/Environmental and Geographical Sciences, working on projects involving EIA Reports, Flood Risk Assessments, Soil and Water Baseline Reports, Environmental Site Investigations and carrying out soil and groundwater monitoring on contaminated lands and a range of other developments. Alan has over 2 years' experience as an Environmental Consultant including roles in Ecology and Forestry related work.

7.2 PROJECT DESCRIPTION (PRINCIPAL WORKS)

The Davy Platform ICAV, on behalf of the Liffey Sub-Fund, intend to apply for permission for development of an integrated campus Masterplan proposal including 2 no. Deep Tech Buildings, 4 no. Data Centres, an Energy Centre, new campus entrance incl. signalised intersection, a new public road, internal roads & pathways, a new pedestrian/cycle overpass of the M4 Motorway and supporting infrastructure with an overall area of c. 72.2 ha inclusive of 1.83 ha of lands within the ownership of KCC. The proposal will also include the demolition of existing buildings no's 7, 8 & 9.

The site will include the provision for 4 No. Data Centres and a total of 80no. generators. The fuel for the generators will be stored in individual, double-skinned storage tanks. Each tank has the capacity to store 15.5 m*3* of diesel; therefore, a total of 1,240 m3 across all Data Centres (or 1066 tonnes at a density of 0.86 tonnes / m*3*). The energy centre will have its own HVO bulk storage of c.3440 tonnes.

There will be an increase in overall hardstand as a result of the proposed development of c. 171,641.88 m2. The existing site has a total hardstanding of c. 86,029.00 m2. The proposed development will have a total hardstanding of c. 257, 670.88 m2.

Attenuation measures include bio retention areas, attenuation ponds, swales, filter drains, permeable paving and hydrocarbon interceptors. Proposed discharge rates for the Proposed Development and the overall landholding are addressed in CSEA's *Engineering Services Report Drainage and Water Services* submitted with the planning application.

7.2.1 Facilitation Works

The facilitation works required to support the development are works which do not form part of the development consent being sought from Kildare County Council. The facilitation works include a mix of works that will be required to be undertaken for or on behalf of statutory undertakers such as Gas Networks Ireland and EirGrid. The facilitation works will be subject to future consents as required by GNI and EirGrid but are included the project for the purpose of the EIAR.

<u>GNI Gas Upgrades</u>

The GNI upgrades will be delivered through a local upgrade of the gas network over a length of approximately 1.5km through predominantly residential areas. The route of the upgrades will be along Ryevale Lawns along Station Road, Old Hill and Celbridge Road for a distance of approximately 1.5km up to the entrance of Barnhall Meadows. The pipe will run under the existing road pavement. At the entrance to Barnhall Meadows, the pipe will run underground

RECEIVED: 18/07/2023

through the Barnhall Meadows lands (adjacent to the existing haul road) and will then cross the M4 Motorway through Horizontal Directional Drilling and enter the Kildare Innovation Campus then connecting to the proposed Gas Skid.

EirGrid Uprating

Upon completion of Phase 1 of the KIC Masterplan, including the development of the proposed replacement 110kV Substation, uprating of existing overhead lines from the replacement 110kV Rinawade substation to Derryiron/Maynooth and Dunfirth/Kinnegad will be required to facilitate commencement of Phase 3 of the KIC Masterplan. The uprating will be carried out to existing lines along established wayleaves primarily traversing agricultural lands.

A detailed description of the project is outlined in Chapter 2 of this EIAR.

7.3 METHODOLOGY

The following relevant policy, legislation and guidance has informed the preparation of this chapter:

- *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2022);*
- *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessments (Department of Housing, Planning and Local Government – August, 2018);*
- *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2022);*
- *Environmental Impact Assessment of Projects – Guidance on the preparation of the Environmental Impact Assessment (European Union, 2017);*

The preparation of this chapter has also been informed by desktop studies of relevant policy documents and data sources including:

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

7.3.1 Baseline Scenario/Receiving Environment Analysis Methodology

The EPA Guidelines on the Preparation of an EIAR (EPA, May 2022) state that:

> *"It is important to demonstrate that correct methodologies and experts have been used. It is also important that the methodology used in establishing the baseline scenario is documented to permit replicable future monitoring so that the later results*

can be properly compared (where required). Standard recognised methods should be applied where available and appropriate."

RECEIVED: 16/08/2023

This Chapter evaluates the effects, if any, which the project will have on Land, Soils, Geology and Hydrogeology as defined in the Environmental Protection Agency (EPA) '*Guidelines on the Information to be contained in Environmental Impact Assessment Reports'* (EPA, 2022) as well as in line with Article 94 and Schedule 6 of the Planning and Development Regulations 2001 (as amended) and Article 5 and Annex IV of the EIA Directive (2011/92/EU, as amended).

The Draft EPA document entitled '*Advice Notes for Preparing Environmental Impact Statements'* (EPA, 2015) is also followed in this geological and hydrogeological assessment and classification of environmental effects. Due consideration is also given to the guidelines provided by the Institute of Geologists of Ireland (IGI) in the document entitled '*Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements'* (IGI 2013).

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

The baseline/future receiving environment analysis for this Chapter has been undertaken in accordance with the EPA Guidelines on the Preparation of an EIAR (EPA, May 2022) and all other documents outlined above.

7.3.2 Impact Assessment Methodology

The rating of potential environmental effects on the land, soil, geological and hydrogeological environment is based on the standard EIAR impact predictions table included in Chapter 1 which takes account of the quality, significance, duration and type of effect characteristic identified.

The duration of each effect is considered to be either momentary, brief, temporary, short-term, medium term, long-term, or permanent. Momentary effects are considered to be those that last from seconds to minutes. Brief effects are those that last less than a day. Temporary effects are considered to be those which are construction related and last less than one year. Short term effects are seen as effects lasting one to seven years; medium-term effects lasting seven to fifteen years; long-term effects lasting fifteen to sixty years; and permanent effects lasting over sixty years.

The TII (2009) criteria for rating the magnitude and significance of impacts on the geological related attributes and the importance of hydrogeological attributes at the site during the EIA stage.

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

- Geological heritage sites within the vicinity of/ within the perimeter of the proposed development site;
- Landfills, industrial sites in the vicinity of the site and the potential risk of encountering contaminated ground;

RECEIVED: 19/07/2023

- The quality, drainage characteristics and range of agricultural use(s) of subsoil around the site;
- Quarries or mines in the vicinity and the potential implications (if any) for existing activities and extractable reserves;
- The extent of topsoil and subsoil cover and the potential use of this material on site as well as any requirement to remove it off-site as waste for disposal (D) or recovery (R) options;
- High-yielding water supply wells/ springs in the vicinity of/ within the site boundary to within a 2km radius and the potential for increased risk presented by the proposed development;
- Classification (regionally important, locally important etc.) and extent of aquifers underlying the site boundary area;
- Increased risks presented to the groundwater bodies by the proposed development associated with aspects such as, for example, the removal of subsoil cover, removal of aquifer (in whole or part thereof), spatial drawdown in water levels, alteration in established flow regimes, and changes in local/ regional groundwater quality;
- Natural hydrogeological/ karst features in the area and potential for increased risk presented by the activities at the site; and
- Groundwater-fed ecosystems and the increased risk presented by operations both spatially and temporally.

The analysis of the predicted impacts of the project on land, soil, geology and hydrogeology during 'do-nothing' scenario and construction and operation are presented in this Chapter. The assessment considered geological features identified within the project site and the surrounding vicinity in accordance with the methodology outlined above and below, to determine the significance of the impacts. Where likely significant impacts are highlighted, mitigation and monitoring are proposed, and any residual impacts are assessed.

The impact assessment for this Chapter has been undertaken in accordance with the *EPA Guidelines on the Preparation of an EIAR* (EPA, May 2022) and all other documents outlined above.

7.3.3 Scoping and Identification Methods

The EPA Guidelines, 2022 state that:

> *"each* [environmental] *factor is typically explored by examining a series of headings and/or topics relevant to that factor"* and *"The relevant topics for any given EIAR should be established during scoping".*

The methods employed for scoping and identification of the relevant environmental topics for this Chapter have been:

1. Expert Opinion stemming from the baseline/future receiving environment analysis
2. Review of Strategic Environmental Assessment prepared for the Kildare County Development Plan 2023-2029 (including a review of the Development Plan itself).
3. Geospatial Analysis (cumulative impacts only – used to identify planning permissions/applications within a 5 km radius)

RECEIVED: 18/07/2023

4. Other relevant documentation consulted as part of this assessment included the following site specific sources:

   - Clifton Scannell Emerson Associates Limited, Consulting Engineers – `Construction Environmental Management Plan Kildare Innovation Campus. Project No. 21_048. February 2023;
   - Clifton Scannell Emerson Associates Limited, Consulting Engineers – Engineering Services Report Drainage and Water Services. Project No. 21-_048. February 2023.
   - Clifton Scannell Emerson Associates Limited, Consulting Engineers – Site Specific Flood Risk Assessment – Kildare Innovation Campus. February 2023;
   - LBC Preliminary Site Assessment Report. Project No. 0523254. September 2020
   - RSK Ireland Limited (RSK) Preliminary Environmental Site Assessment Report. Project No. 602128-R01(00). March 2018; and
   - IGSL Factual Ground Investigation Report. Liffey Park Technology Campus. February, 2020;
   - Assimilative Capacity Study – Liffey Science and Technology Business Park. ARUP, May 2023;
   - Various design site plans and drawings; and
   - Consultation with site engineers/ planners/ architects.
   - Various design site plans and drawings.

7.3.4 Assessment and Evaluation Methods

Assessment and evaluation methods quantify and predict the magnitude and significance of impacts.

The methods employed for assessment and evaluation of the environmental topics for this Chapter have been:

1. The rating of potential environmental effects on the hydrogeological environment is based on the standard EIAR impact predictions table included in Chapter 1 which takes account of the quality, significance, duration and type of effect characteristic identified (in accordance with impact assessment criteria provided in the EPA Guidelines (2022) publication) set out in Chapter 1 Table 1.2; and
2. The TII criteria for rating the magnitude and significance of impacts and the importance of hydrogeological attributes at the site during the EIA stage are also relevant in assessing the impact and are presented in Tables 1-3 in Appendix 7.1.

7.3.5 Forecasting Issues or Difficulties Encountered

There were no difficulties encountered in compiling this chapter of the EIAR.

7.4 CURRENT STATE OF THE RECEIVING ENVIRONMENT

The EIA Directive requires the following to be described relating to the baseline scenario:

RECEIVED: 18/07/2023

"A description of the relevant aspects of the current state of the environment (baseline scenario)".

The receiving environment is discussed in terms of land geology, soils, hydrogeology, and site history including potential for existing and historical contamination.

7.4.1 Site Setting

Principal Works

The proposed development site of c 72.2 ha is located on the Celbridge Road, Leixlip, County Kildare located approximately 4km south of Leixlip town and approximately 21km west of Dublin city centre. The site is centred at Irish Grid reference N 99080 34746 at an altitude of approximately 51m.

The site comprises of 10 buildings with approximately 1,600 car spaces and associated green spaces. The site operated as an inkjet cartridge manufacturing plant and construction of the site was completed in 1996. The site now operates as an Innovation Campus with a mix of science and technology related tenants. The site includes a two-storey office building, two manufacturing facilities, warehousing and lab spaces, a main canteen building and two energy centre buildings which house heating boilers and associated ancillary equipment. The site is accessible by via the Celbridge Road and a private road located near the M4 motorway slipway (Junction 6).

The site is bordered to the north by the M4 motorway, to the south Barnhall Rugby and football club with residential dwellings and the river Liffey beyond, to the west agricultural land with Celbridge town beyond and to the east is agricultural land with Weston Airport beyond.

Facilitation Works

The facilitation works include a mix of works that will be required to be undertaken for or on behalf of statutory undertakers such as Gas Networks Ireland and EirGrid.

GNI Upgrades

The GNI upgrades will be delivered through a local upgrade of the gas network over a length of approximately 1.5km through predominantly residential areas. The route of the upgrades will be along Ryevale Lawns along Station Road, Old Hill and Celbridge Road for a distance of approximately 1.5km up to the entrance of Barnhall Meadows running underground through the Barnhall Meadows lands (adjacent to the existing haul road) before crossing the M4 Motorway through Horizontal Directional Drilling and enter the Kildare Innovation Campus then connecting to the proposed Gas Skid.

EirGrid Uprating

RECEIVED: 18/07/2023

Upon completion of Phase 1 of the KIC Masterplan, including the development of the proposed replacement 110kV Substation, uprating of existing overhead lines from the replacement 110kV Rinawade substation to Derryiron/Maynooth and Dunfirth/Kinnegad will be required to facilitate commencement of Phase 3 of the KIC Masterplan. The uprating will be carried out to existing lines along established wayleaves primarily traversing agricultural lands.

Due to the nature of the proposed EirGrid works being minimal and comprising only minor line and structural replacement, they have been scoped out of this assessment as the interaction between land, soils, geology and hydrogeology with the proposed works is negligible.

The surrounding environment for both the principal and facilitation works can be described as a mix of agricultural and residential. The site location map for the proposed development is presented in presented in Figure 7.1 below.

A detailed description of the project is outlined in Chapter 2 of this EIAR.

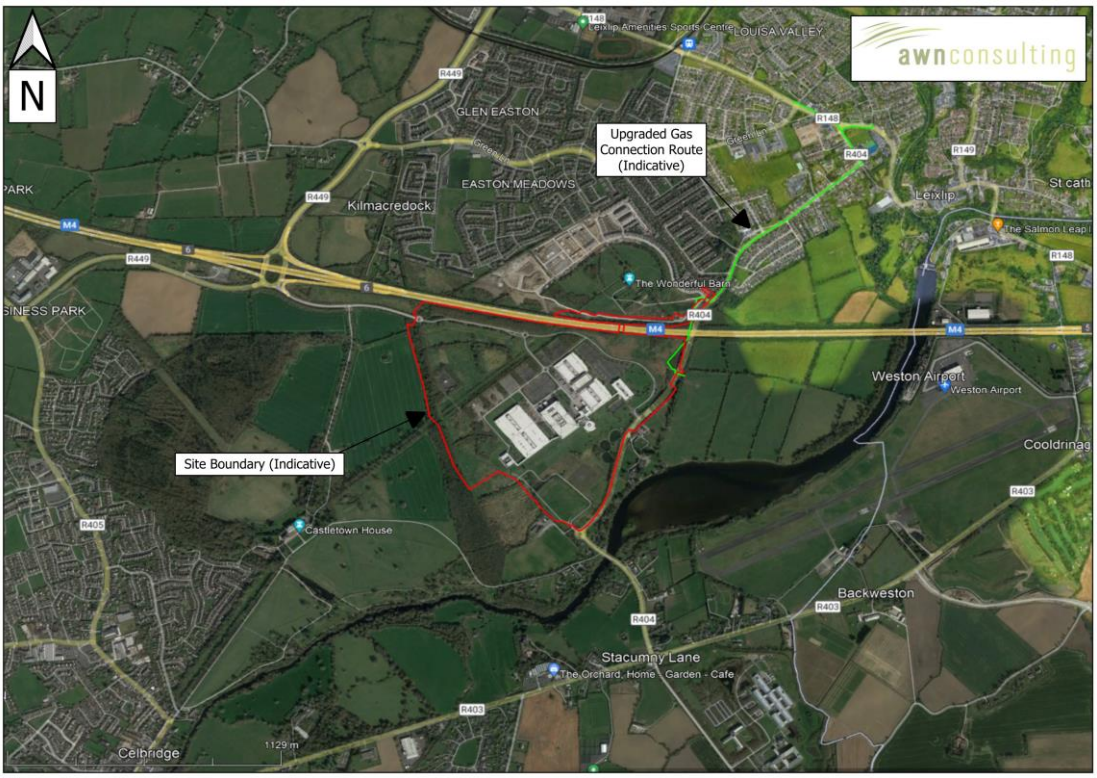


Figure 7.1 *Site Location and Surrounding Land Use (AWN, 2022)*

(*Note: The proposed EirGrid Uprating has been excluded from the drawing set of this EIAR due to the scale of the uprating route being too large to display in drawing. Due to the nature of the proposed works being minimal, they have been excluded from the scope of this assessment*).

7.4.2 Topography and Setting

RECEIVED: 18/07/2023

The site is generally flat and has an elevation of 51.0 m above Ordnance Datum (mAOD). The existing Liffey River run adjacent to the site in a west to north east direction. There is an existing Reservoir east of the site location which forms part of the Liffey River. The site discharges its surface water runoff into the Leixlip Reservoir following confirmation of water quality through electronic monitoring mechanisms inclusive of shut off valves, upstream of the existing Retention Ponds near the existing site entrance off the Celbridge Road.

7.4.3 Areas of Geological Interest and Historical Land Use

The GSI (2022) on-line mapping was reviewed to identify sites of geological heritage for the proposed development and surrounding area. Details of the Site history and previous land use are included in Chapter 15 -Archaeology & Cultural Heritage.

A review of the site history was undertaken by assessing the available historical maps and reports. The earliest available map dates from the period 1837-1842 and shows the principal works site as being undeveloped agricultural land. On the site is a small barn/farm labelled “Barn Hall”. The facilitation works site also show for this time period the majority of the surrounding land is in agricultural use along the road now known as “Celbridge Road”. Along the now “Old Hill” Road the New and Old R.C. Chapel was located which is now the location of “Scoil Chearbhaill”, “Our Lady’s Navity” and the “Parish Centre”.

The next available map dates from the period 1888 - 1913 and shows little change to the site or the surrounding area for both the principal and facilitation works. The map still shows the surrounding area as undeveloped agricultural land with the only notable development being the construction of a number of residential dwellings to the east and south of the principal works site along the River Liffey. Some Residential developments are also noted to the east of the facilitation works also.

1995 aerial imagery show early signs of construction on the principal works site and large amounts of residential developments surrounding both the principal and facilitation works sites. The 2000 aerial imagery shows the principal works site in its current configuration. Anecdotal evidence indicates that the site operated as an abattoir and meat packaging facility prior to the development of the HP facility in the mid-1990’s. The most recent aerial imagery available to date shows no great changes to surrounding land use in relation to the principal and facilitation works from the period 2000.

During redevelopment work a significant volume of canned meat and animal carcasses were encountered and removed. No significantly contaminating historical site uses have been identified.

The historic mapping below from c. 1837-1842 indicates the historic use of the principal and facilitation works sites being predominately agricultural use with some small unidentified residential buildings located to the west of the facilitation works – See Figure 7.2 below.

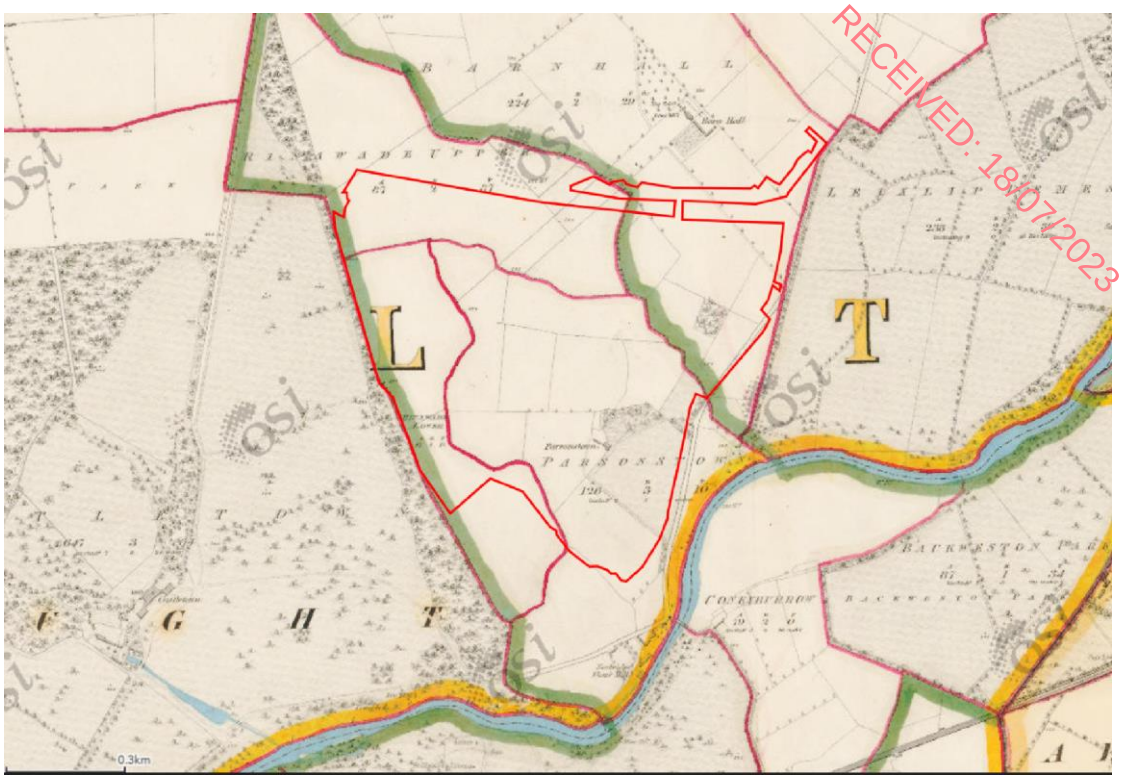


Figure 7.2 *Historic Map 6 inch Colour (c. 1837-1842) (source www.osi.ie): showing the Indicative Site Outline highlighted in red*

7.4.4 Soils

The GSI/Teagasc soil mapping indicates that the principal soil type underlying the principal works area of the proposed development to be Mineral Poorly Drained (Mainly Basic) BminPD with the GNI Transmission Line Alignment underlain mostly by Made Ground and Deep Well Drained Mineral Soil (BminDW)– refer to Figure 7.3 below.

According to the site investigation undertaken by IGSL between December 2019 and February 2020 reported the ground conditions to be consistent with made ground deposits described as sandy gravelly Clay with some occasional fragments of tarmacadam and concrete.

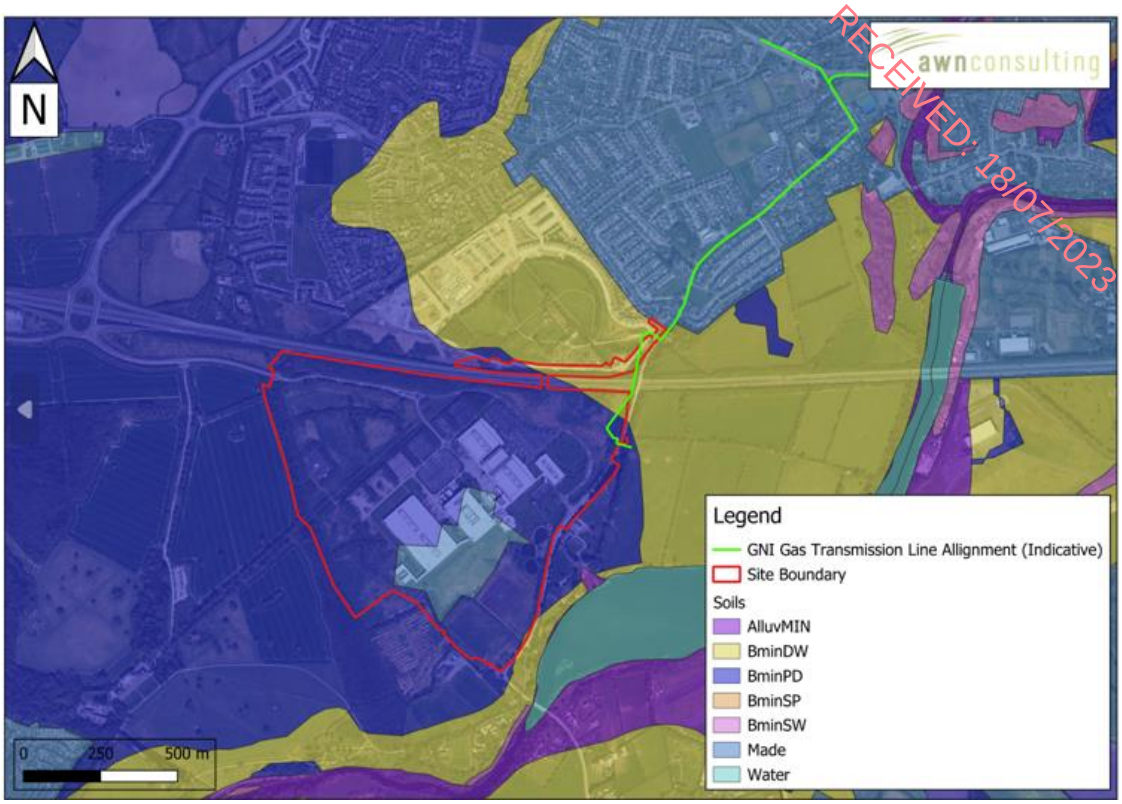


Figure 7.3 *Soils Map (Source: Teagasc, 2022)*

7.4.5 Subsoils

The Quaternary geological period extends from about 1.5 million years ago to the present day and can be sub-divided into the Pleistocene Epoch, which covers the Ice Age period, and which extended up to 10,000 years ago and the Holocene Epoch, which extends from that time to the present day.

The GSI/ Teagasc mapping database of the subsoils in the area of the principal works site indicates two principal soil types, as shown in Figure 7.4 below. The quaternary subsoil type present across the principal site is Carboniferous limestone till (TLs) “Till derived from limestone”. This till is made up of glacial clay which are less permeable than alluvium subsoils. The GNI Transmission Line Alignment “facilitation works” is underlain almost entirely by Made Ground with the southern portion underlain by “Till derived from limestone” .

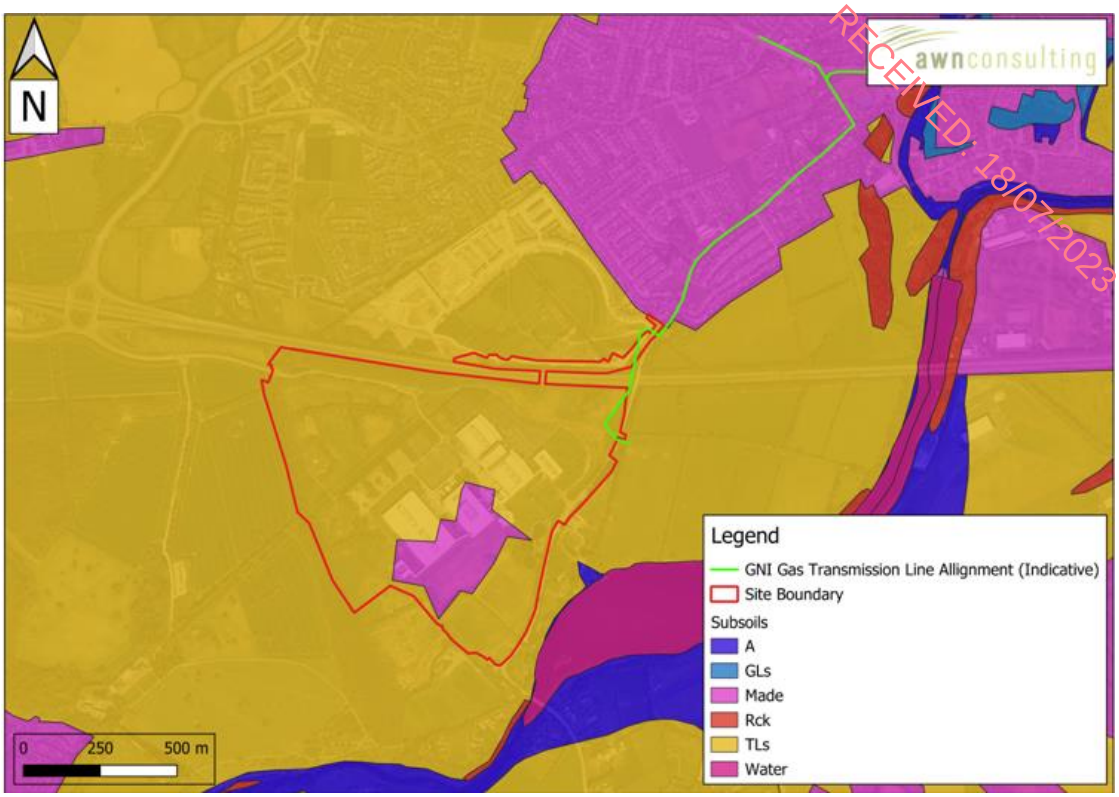


Figure 7.4 *Subsoils Map (Source: Teagasc, 2022)*

7.4.6 Site Investigations

IGSL Ltd. carried out/undertook an environmental site investigation at the proposed development site between October and December 2019. The scope of works included trial pitting, subsoil sampling, interpretation of chemical data and reporting. The sequence of subsoils deposits recorded during the site investigations are shown in Table 7.1. Site investigation locations are shown in Appendix 7.1.

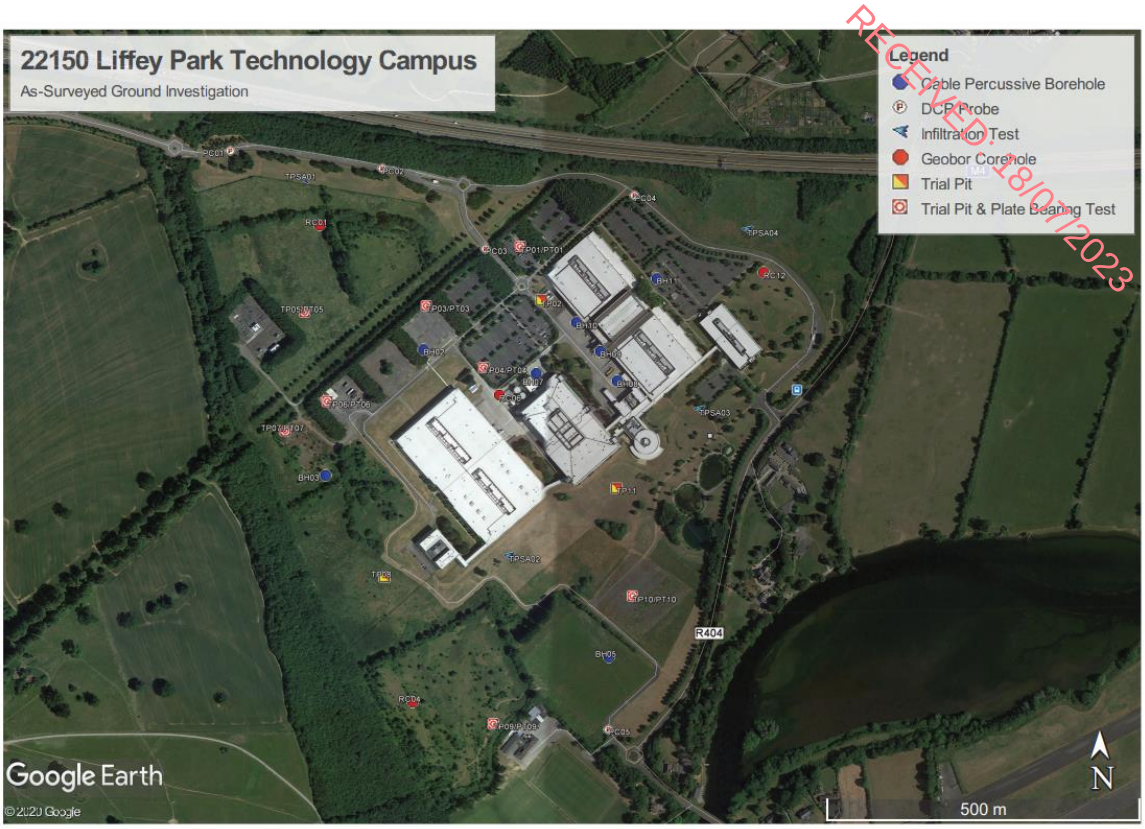
Site investigation works entailed Environmental Laboratory testing and waste classification. Refer to Figure 7.5 below for locations of these investigation points.

The programme of exploratory works included the following:

- 7 no. cable percussive boreholes
- 4. No rotary core holes
- 15 no. mechanically excavated trial pits
- 8 no. dynamic cone penetrometer (DCP) tests
- Groundwater monitoring at borehole locations
- A programme of geotechnical and chemical laboratory testing

Samples recovered from trial pits or trenches meet the requirements of IS ISO 22475-1. It is highlighted that unforeseen circumstances such as variations in geological strata may lead to lower quality sample classes being obtained.

Refer to appendix 7.1 for Factual Ground Investigation Report 2020.



RECEIVED 18/07/2023

Figure 7.5 *Site Investigation Points (Source: IGSL, 2019)*

Name	Depths/ Notes
Topsoil	0.0 m - 0.2 m below ground level (mbgl)
Made Ground	Made Ground deposits were generally encountered from surface or beneath the Topsoil and were present to a variable depth of between 0.4 m and 1.3 mbgl. These deposits were described generally as fill characterized by brown clayey fine to coarse rounded Gravel with abundant cobbles or alternatively, slightly sandy gravelly CLAY with occasional redbrick, concrete and glass fragments.
Cohesive Deposits	Cohesive deposits were encountered beneath the Made Ground or Topsoil and were described typically as Firm grey slightly sandy slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded.
Granular Deposits	The granular deposits were encountered within the cohesive deposits and were typically described as Very strong to medium strong, thickly to thinly bedded (to thinly laminated where fissile mudstone/shale), grey/dark grey/black, fine-grained limestone.

Table 7.1 ***Strata Noted from Site Investigations (IGSL, 2019)***

RECEIVED: 18/07/2023

7.4.7 Bedrock Geology

The Geological Survey of Ireland (GSI) reports that the solid geology underlying both the principal and facilitation works site is Carboniferous Limestone derived from the Lucan formation which comprises dark-grey to black, fine-grained, occasionally cherty, micritic limestones that weather paler, usually to pale grey. There are rare dark coarser grained calcarenitic limestones, sometimes graded, and interbedded dark-grey calcar - refer to 7.6 below.

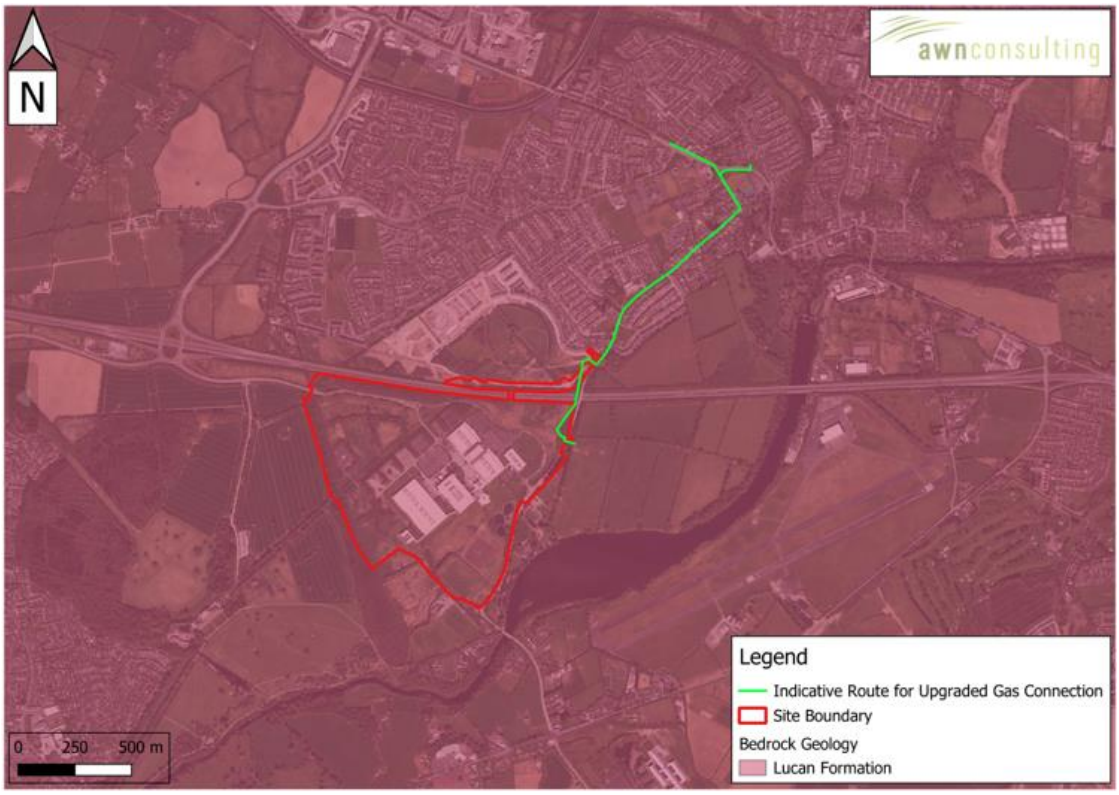


Figure 7.6 *Bedrock Geology Map (source: GSI, 2022)*

7.5 Regional Hydrogeology

The GSI has devised a system for classifying the bedrock aquifers in Ireland. The aquifer classification for bedrock depends on a number of parameters including, the area extent of the aquifer (km^2), well yield (m^3/d), specific capacity ($m^3/d/m$) and groundwater transmissivity (mm^3/d). There are three main classifications: regionally important, locally important and poor aquifers. Where an aquifer has been classified as regionally important, it is further subdivided according to the main groundwater flow regime within it. This sub-division includes regionally important fissured aquifers (Rf) and regionally important karstified aquifers (Rk). Locally important aquifers are sub-divided into those that are generally moderately productive (Lm) and those that are generally moderately productive only in local zones (Ll). Similarly, poor aquifers are classed as either generally unproductive except for local zones (Pl) or generally unproductive (Pu).

RECEIVED: 18/07/2023

7.5.1 Aquifer Classification

From analysis of GSI National data the bedrock aquifer underlying the study site is classified as 'Locally Important' which is characterised as moderately productive only in Local Zones - refer to Figure 7.7 below.



Figure 7.7 *Aquifer Classification Map (source: GSI, 2022)*

7.5.2 Aquifer Vulnerability

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

As can be seen from Table 7.2 below, moderate and high vulnerability denotes a depth of bedrock of 5 – 10 m and 3 – 5 m, respectively. The results obtained from the ground investigations report carried out by IGSL in October to December 2019 indicate a vulnerability rating of extreme/high, as bedrock was encountered at depths from 0.4 – 3.2mbgl across the site. It should be noted that bedrock was not encountered in the majority of the excavation holes in areas 3, 4 and 5 (north-east, north-west and western portion of site) which would indicate a vulnerability rating of 'moderate', which is consistent with the GSI classification of the entire central and southern portions of the site.

RECEIVED: 18/07/2023

Vulnerability Rating	Hydrogeological Condition				
	Subsoil Permeability (type) and Thickness[5]			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 m	0 - 3 m	0 - 3 m	0 - 3 m	-
High (H)	> 3 m	3 - 10 m	3 - 5 m	> 3 m	n/a
Moderate (M)	n/a	> 10 m	5 - 10 m	n/a	n/a
Low (L)	n/a	n/a	> 10 m	n/a	n/a

Table 7.2 *Groundwater Vulnerability Mapping Guidelines (Source: GSI, 2022)*

The GSI currently displays/shows varied aquifer vulnerability across site and its immediate vicinity. The eastern portion of the site and a small portion of the GNI Transmission Line Alignment to the north overlies a 'High' vulnerable aquifer, whilst the majority of the site has a vulnerability classification decreases to 'Moderate'.

This is confirmed by the 2019 investigation undertaken by IGSL. The aquifer vulnerability class in the region of the site is presented below as Figure 7.8.

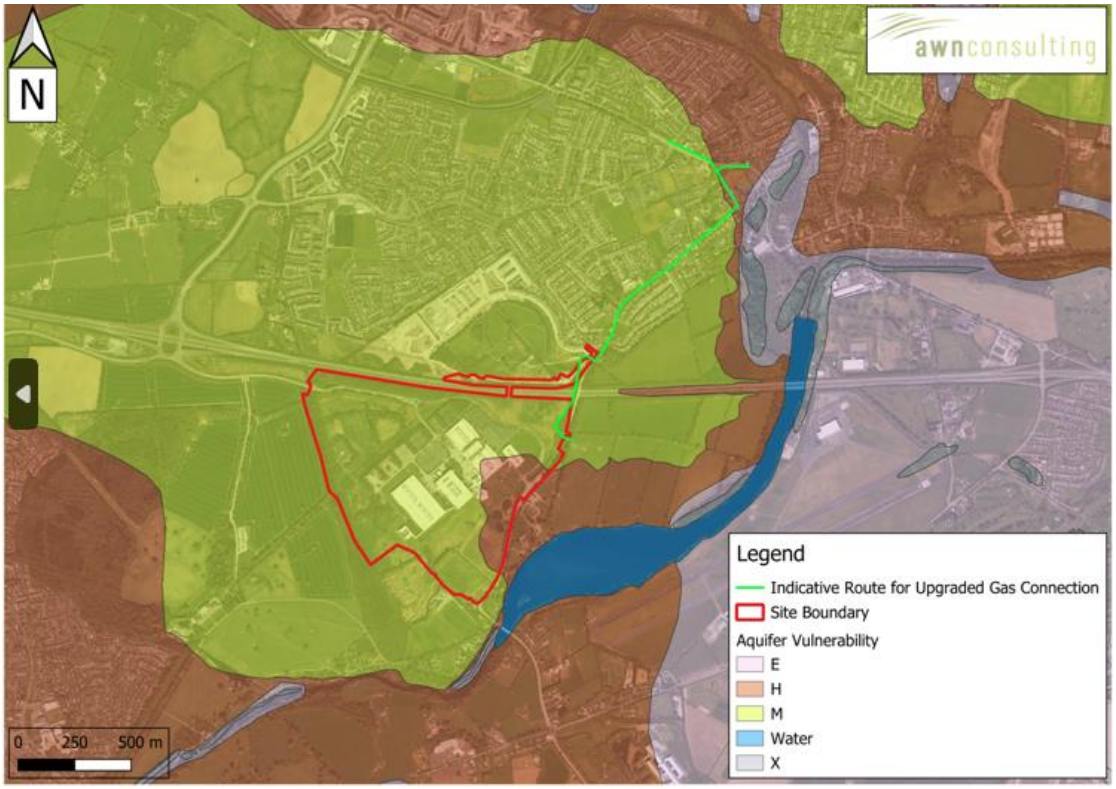


Figure 7.8 *Aquifer Vulnerability Map (source: GSI, 2022)*

RECEIVED: 18/07/2023

7.5.3 Description of the Groundwater Body

The groundwater body in the region of the site (Dublin GWB) is classified as 'Good' per the WFD Risk Score system. The Dublin GWB (Code: IE_EA_G_008) achieved 'Good Status' in the period 2016-2021.

7.5.4 Groundwater Wells and Flow Direction

The topography on-site is generally flat and has an elevation of 51.0 m above Ordnance Datum (mAOD). The topography of the site slopes gently down towards the south east, which is consistent with the surrounding area. It is presumed that the local groundwater flow is to the east towards Leixlip Reservoir.

There is no licencing system for wells in Ireland at present and as such no complete data set. The GSI Well Card Index is a record of wells drilled in Ireland, kept by the Geological Survey of Ireland. It is noted that this record is not comprehensive as licensing of wells is not currently a requirement in ROI.

This current index, however, indicates there are 6 groundwater wells within the vicinity / boundary line of the proposed development site. Table 7.3 presents the GSI well search for the area surrounding the site (note this source does not include all wells).

GSI Name	Depth (m)	Depth to Bedrock (m)	Townland	County	Use	Yield Class	Yield m3/day
2923SWW126	114.3	3	PARSONSTOWN	Kildare	Unknown	Good	305
2923SWW186	21.6		BARNHALL	Kildare	Agri & domestic use	-	-
2923SWW138	8.5	3.5	CASTLETOWN	Kildare	Other	-	-
2923SWW136	15	3.9	CASTLETOWN	Kildare	Other	-	-
2923SWW137	16	3.8	CASTLETOWN	Kildare	Other	-	-
2923SWW131	14.5	3.5	CASTLETOWN	Kildare	Other	-	-

Table 7.3. *Summarises the details of recorded wells present within this search area*

These wells are categorised as Agri and domestic use or other but they are probably inactive. The area is serviced by public mains therefore it is unlikely that any wells are used for potable supply. There are no ground water source protection areas within 10km radius within proposed development site. The nearest is the Dunboyne PWS (public water supply), which is located c. 7.6km to the north. The proposed development site is outside of the zone of contribution of this supply – refer to Figure 7.9 below.

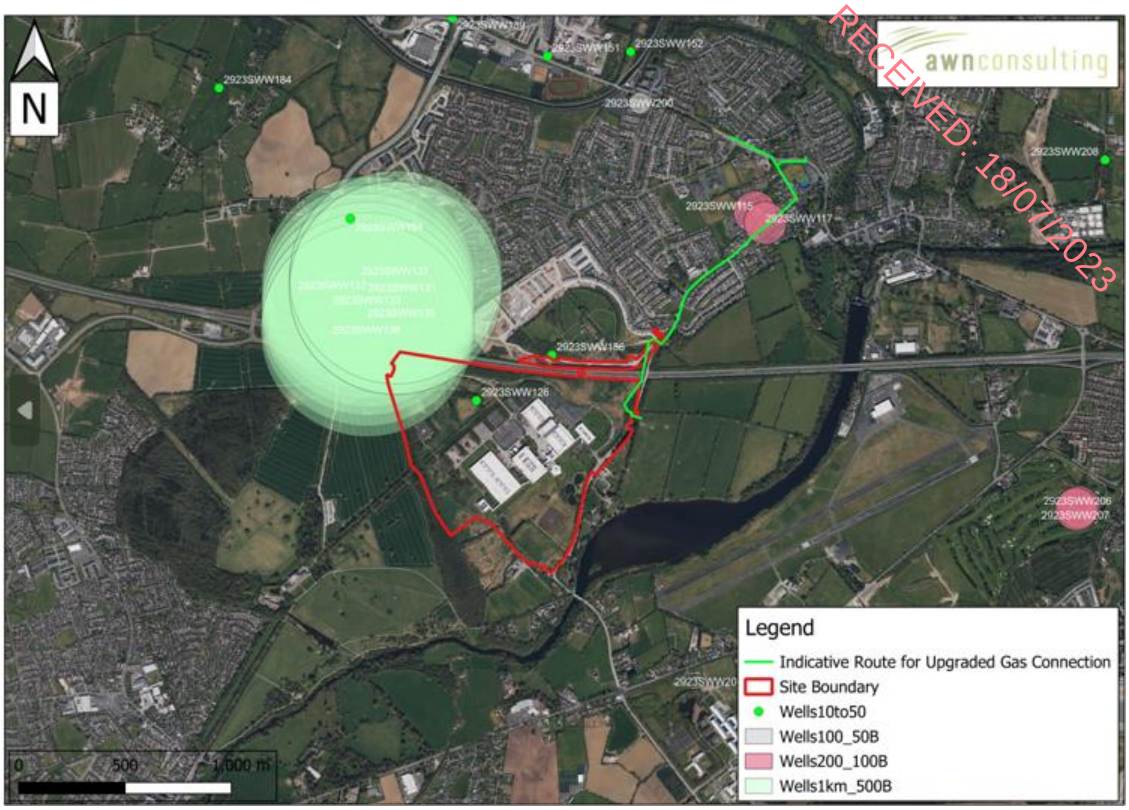


Figure 7.9 *GSI Well Search Map (Source: GSI, 2022)*

7.5.5 Hydrogeological Features

There is no evidence of karstification at the immediate vicinity of the Site according to the GSI Karst and well database.

7.5.6 Groundwater Monitoring Event

A groundwater monitoring event was completed at the site during May 2018 by RSK Ireland Limited to confirm the contamination status of the groundwater underlying the site. A copy of the groundwater monitoring report has been included in Appendix 7.1 of this chapter. Laboratory analysis of groundwater samples reported that concentrations of contaminants of concern did not exceed the adopted Generic Assessment Criteria (GAC) i.e., commercial land use for the site. The groundwater underlying the site is not considered to present a significant risk to human health or the environment.

7.5.7 Soil Quality

There are no legislated threshold values for soils in Ireland. Soil samples were compared to Generic Assessment Criteria (GAC) derived to be protective of human health, water bodies (including groundwater) and also ecology for residential and commercial / industrial end use.

GAC in the UK has been derived using the Contaminated Land Exposure Assessment (CLEA) model to be protective of human health for a number of different land uses. Land Quality Management (LQM) and the CIEH (Chartered Institute of Environmental Health) developed a document in July 2009 detailing their own research and derivation of their own 'LQM GACs'.

RECEIVED: 18/07/2023

A total of 82 substances, including many organic substances had LQM GACs derived, for the standard land uses of residential, commercial / industrial and allotments. This was updated in 2015 following further research and the derived results are now called LQM / CIEH Suitable 4 Use Levels (S4UL). The LQM / CIEH S4ULs are intended for use in assessing the potential risks posed to human health by contaminants in soil and as transparently derived and cautious "trigger values" above which further assessment of the risks or remedial action may be needed. For each contaminant, S4ULs have been derived for six land use scenarios based on assessing exposure pathways in each planning scenario. In this instance, the commercial scenario has been considered. Soil type and soil organic matter (SOM) has an influence on the behaviour of contaminants. S4ULs have been derived for three SOM contents (1%, 2.5% and 6%) to cover the likely range in soils. A prudent approach has been taken by considering the lower 1% SOM content.

The UK values do not have any legal standing within the Republic of Ireland and no statutory guidance for assessing the significance of soil contamination currently exists. However, the values do provide a means of placing the data within context when considering magnitude of risk, and have been used in that capacity in this assessment.

In addition, in line with the requirement of Council Decision 2003/33/EC, during the 2020 site investigations, samples were recovered from the on-site trial pit locations and sent for analysis. In order to assess materials, which may be excavated and removed from site, in terms of waste classification, a selection of samples collected were analysed for a suite of parameters which allowed for the assessment of the soils in terms of total pollutant content for classification of materials as hazardous or non-hazardous referred to as the 'RILTA Suite'.

The parameter list for the RILTA suite includes analysis of the solid samples for arsenic, barium, cadmium, chromium, copper, lead, nickel, mercury, zinc, chloride, fluoride speciated aliphatic and aromatic petroleum hydrocarbons, pH, soluble sulphate, sulphide, phenols, total dissolved solids, moisture content, soil organic matter and an asbestos screen. The total pollutant content analysis also provides analytical data which can be used to assess the quality of the subsoils underlying the Site and allow an assessment of their suitability for a range of proposed uses against generic assessment criteria.

The RILTA Suite also includes those parameters specified in the EU Council Decision Establishing Criteria for the Acceptance of Waste at Landfills (Council Decision 2003/33/EC), referred to as Waste Acceptance Criteria (WAC), which for the solid samples are pH; total organic carbon (TOC); speciated aliphatic and aromatic petroleum hydrocarbons; benzene, toluene, ethylbenzene and xylene (BTEX); phenol; polychlorinated biphenyls (PCB); and polycyclic aromatic hydrocarbons (PAH).

The laboratory analysis did not identify any asbestos containing materials (ACMs) in any of the samples tested.

There was no evidence of waste deposited on-site during Site investigation works (IGSL, 2019). Please see Chapter 12 Waste Management for further discussion on waste categorisation and removal.

RECEIVED: 18/07/2023

7.5.8 Areas of Conservation

According to the NPWS (2022) on-line database there are no special protected areas (SPA's), special areas of conservation (SAC's) within the boundary or immediate vicinity of the subject site. The European listed sites located in closest proximity are as follows:

- The Royal Canal (Site Code: 002103) pNHA - circa. 1.3km north of the site;
- Liffey Valley (Site Code: 000128) pNHA – circa. 1.6km north-east of the site; and
- Roy Water Valley/Carton SAC (Site Code: 001398) – circa. 1.4km north of the site.

The subject site has no hydrological connection with the Rye Water Valley/Carton SAC as the Rye Water is upstream of the River Liffey. However, the site has indirect hydrological connection with Liffey Valley pNHA through the local drainage network and the River Liffey. Potential adverse effects on these European sites from the proposed development are highly unlikely given the distance of removal and inherent mitigation measures in place through standard SuDS measures on site – refer to Figure 7.10 below for the locations of the European sites mentioned above in the context of the site.

The proposed development will have a neutral imperceptible effect on water quality and flow of designated sites within the zone of impact of the development site. A full assessment of the ecology has been undertaken and is included in Chapter 6 of the EIAR.

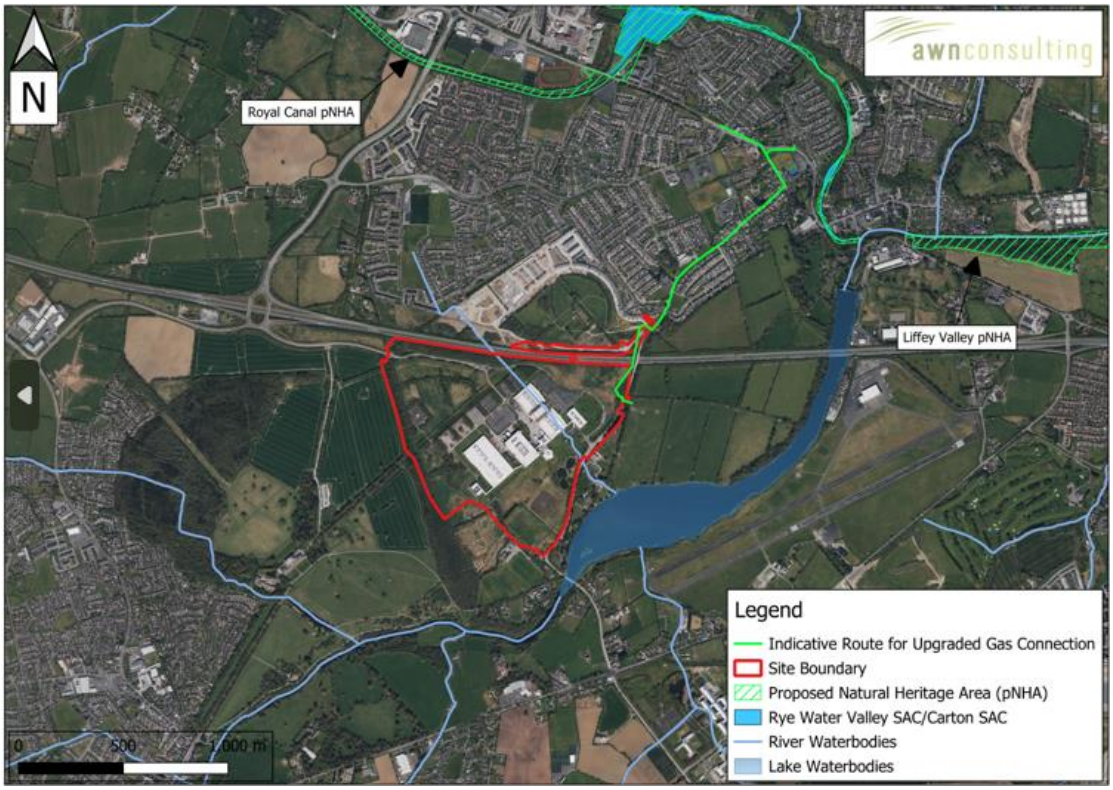


Figure 7.10 *Conservation Areas in context of the proposed development site (EPA, 2022)*

RECEIVED: 18/07/2023

7.5.9 Conceptual Site Model

The cross section and the description below present the Conceptual Site Model (CSM) – refer to Figure 7.11 The CSM was developed in order to identify any likely Source-Pathway-Receptor linkages relating to the site and the proposed development. The site is generally flat with uniform relief at an elevation of 51.0 m above Ordnance Datum (mAOD). The regional gradient westwards towards the River Liffey.

A review of the hydrogeology and geology in the surrounding region indicates that;
The limestone is classified by the GSI as a Locally Important Bedrock Aquifer (LI), which is described as 'moderately productive only in local zones'. The bedrock aquifer is well protected by low permeability clay and characterised by the GSI as a moderate vulnerability area. Groundwater flow within the bedrock unit is eastward in line with the regional gradient. There is no continuous perched groundwater table on-site. The groundwater body in the region of the site (Dublin GWB) is classified under the WFD Risk Score system as currently 'Good'. Previously (2016-2021) the Dublin GWB was given 'Good Status'. Presently, the EPA identify the aquifer beneath the subject site as 'under review'. All of the soil samples collected at the site can be categorised as inert (as per Council Decision annex 2003/33/EC). There was no evidence of contamination during Site investigation works. The proposed Project is outside of any delineated drinking water protection area. There are a number of domestic/ agricultural wells in the surrounding lands. There are no groundwater dependent terrestrial ecosystems which have potential to be impacted by the proposed Project. This is addressed in Chapter 8 (Hydrology) and Chapter 6 (Biodiversity).

RECEIVED: 18/07/2023

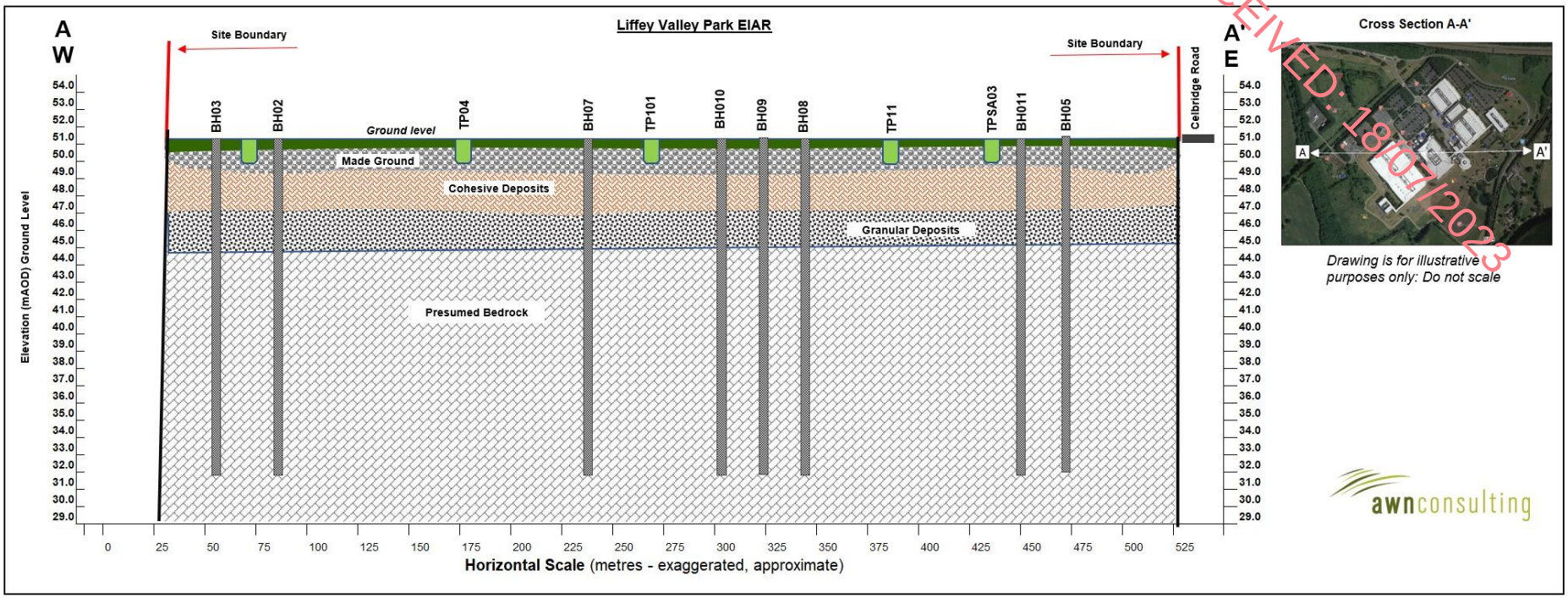


Figure 7.11 *Site Conceptual Model, local cross section of the Site (A-A' northwest to southeast)*

RECEIVED: 18/07/2023

7.5.10 Economic Geology

The EPA Extractive Industry Register and the GSI (2022) mineral database were consulted to determine whether there were / are any mineral sites in the vicinity of the Site. The Belgard Quarry (Keegan Quarries) is an active quarry for extracting sand, pebble, and natural/uncrushed gravel (graded aggregate) and is situated circa 10 km to the southwest of the proposed development.

The mineral locality in closest proximity to the site was identified as an iron deposit in the townland of Laraghcon (Lucan Iron Works), approximately 4.2 km east of the subject site.

7.5.11 Radon

According to the EPA (now incorporating the Radiological Protection Institute of Ireland), the majority of the site is located within a localised zone (encompassing the adjacent Ballina Bog pNHA) where approximately 1 in 20 homes are likely to have high radon levels (above reference level). This would be considered a 'Low' Radon area as per the EPA online mapping tool.

According to the EPA Radon pre May 2022 the subject site location is a Low Radon Area where is it estimated that less than 1.898% of dwellings within the given 10 km grid square will exceed the Reference Level of 200 Bq/m3. This is the lowest of the five radon categories which are assessed by the EPA.

7.5.11 Geohazards

Much of the Earth's surface is covered by unconsolidated sediments which can be especially prone to instability. Water often plays a key role in lubricating the slope failure. Instability is often significantly increased by human activities, e.g. construction, agricultural activities, etc. Mass movements / mass wasting (such as landslides, mud flows, bog bursts and debris flows) are a result. In general, Ireland suffers few landslides. Landslides are more common in unconsolidated material than in bedrock; and where the sea constantly erodes the material at the base of a cliff, landslides and falls lead to recession of the cliffs. Landslides have also occurred in Ireland in recent years in upland peat areas due to disturbance of peat associated with construction activities. The GSI landslide database was consulted and there are no recorded landslides in the immediate vicinity of the proposed Project. Due to the local topography and the underlying strata, there is a negligible risk of a landslide event occurring at the Site.

In Ireland, seismic activity is recorded by the Irish National Seismic Network. The Geophysics Section of the School of Cosmic Physics at the Dublin Institute for Advanced Studies (DIAS) has been recording seismic events in Ireland since 1978. The station configuration has varied over the years. However, currently there are five permanent broadband seismic recording stations in Ireland, operated by DIAS. The seismic data from the stations comes into DIAS in real-time and are studied for local and regional events. Records since 1980 show that the nearest seismic activity to the site of the proposed Project was in the Irish Sea c. 30km to the east of the site (1.0 – 2.0 Ml magnitude) and ~55 km to the south in the Wicklow Mountains. There is a very low risk of seismic activity at the site. There are no active volcanoes in Ireland so there is no risk from volcanic activity.

RECEIVED: 18/07/2023

7.5.12 Characteristics of Importance of Geological and Hydrogeological Attributes

Based on the TII (previously NRA) methodology (2009), criteria for rating site importance of geological features, the importance of the bedrock and soil features at this site is rated as *'Low Importance'* due to local geological attribute has a low quality, significance or value on a local scale.

Based on the TII methodology (2009), the importance of the hydrogeological features at this site is rated as '*Medium Importance'* based on the assessment is a Locally Important (LI) bedrock aquifer which is moderately productive.

7.5.13 Likely Future Receiving Environment

The EIA Directive requires the following to be described relating to the future receiving environment (the 'Do Nothing' scenario):

> *"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".*

It is likely that the land use will change over time even if this development does not go ahead. The associated impact of any such development will be similar to the proposed development for the underlying land soils and hydrogeological regime.

In the event of a 'Do Nothing' scenario, the subject site would remain in operation as an existing ICT campus.

7.6 LIKELY IMPACTS OF THE PROJECT

An analysis of the potential impacts of the proposed development on the land, soils, geology and hydrogeological environment during the construction and operation is outlined below. Due to the inter-relationship between soils, geology and hydrogeology and surface water (hydrology) the following impacts discussed will be considered applicable to both Chapter 7 and 8 of the EIA Report. Remediation and mitigation measures included in the design of this project to address these potential impacts are presented in Section 7.6.1 and Section 7.6.2.

7.6.1 Construction phase

The following potential effects to land soil and groundwater have been considered:

- There was no evidence of waste deposited on-site during Site investigation works carried out by IGSL in 2019. Therefore the risk of contaminated soils being present onsite is low and this was confirmed by onsite soil sampling and analysis. Nonetheless material, which is exported from site, if not correctly managed or handled, could impact negatively on human beings (onsite and offsite) as well as water and soil environments.
- Excavation of soil, tarmac and hardcore will be required for both the principal works and some of the facilitation works (GNI Upgrades). The GNI upgrades will be delivered through

RECEIVED: 18/07/2023

a local upgrade of the gas network over a length of approximately 1.5km Ryevale Lawns along Station Road, Old Hill and Celbridge Road for a distance of approximately 1.5km up to the entrance of Barnhall Meadows. The pipe will run under the existing road pavement. At the entrance to Barnhall Meadows, the pipe will run underground through the Barnhall Meadows lands (adjacent to the existing haul road) and will then cross the M4 Motorway through Horizontal Directional Drilling and enter the Kildare Innovation Campus then connecting to the proposed Gas Skid.

- Local removal and reinstatement (including infilling) of the 'protective' topsoil and subsoil cover across the development area at the site will not change the overall vulnerability category for the site which is already 'high to extreme'. Capping of the energy centre, data centre, deep tech buildings and the overall substation footprint of the site by hardstand/ building following construction and installation of drainage which will minimise the potential for contamination of the aquifer beneath the site: The Locally Important Bedrock Aquifer (Ll) which is moderately productive in local zones only. Site investigation and laboratory analysis has not identified any existing contamination with hazardous substances. Although, there is no soil quality data obtained along the route of the 110kV transmission line upgrades. No treatment of any water will be required during construction works. The entire uprating works will comprise only line and structural replacements and the interactions between the proposed works and land, soils, geology and hydrogeology will be negligible.
- The proposed development will require site preparation, excavations and levelling for foundations, the installation of services and landscaping. It is assumed that the material removed along the roadways for the GNI pipeline upgrades is expected to be contaminated. This material will be required to be removed and disposed by a licenced contractor to an appropriate waste facility.
- As with all construction projects there is potential for water (rainfall and/or groundwater) to become contaminated with pollutants associated with construction activity. Contaminated water which arises from construction sites can pose a significant short-term risk to groundwater quality for the duration of the construction if contaminated water is allowed percolate to the aquifer. The potential main contaminants include:
  - Suspended solids (muddy water with increased turbidity (measure of the degree to which the water loses its transparency due to the presence of suspended particulates)) – arising from excavation and ground disturbance;
  - Cement/concrete (increase turbidity and Ph) – arising from construction materials;
  - Hydrocarbons (ecotoxic) – accidental spillages from construction plant or onsite storage;
  - Wastewater (nutrient and microbial rich) – arising from poor on-site toilets and washrooms.

7.6.2 Operational phase

The following risks have been considered in relation to the operational phase of the development:

- There will be an increase in overall hardstand as a result of the development of c 171,641.88 m^2.
- The inherent SuDs design has been provided to control runoff frequency, flow rates, volumes and, reduce concentrations of contaminants to acceptable levels. The proposed treatment train approach assures that both runoff quantity and quality are addressed

RECEIVED: 28/07/2023

through the overall techniques of pollution prevention, source control and regional control. Bioretention ponds with sediment forebay have been proposed in this framework as in integral element to the overall site attenuation system. The proposals provide an integrated and innovative surface water drainage design solution which manages water quality and quantity in accordance with Kildare County Council objectives.

- There is a potential for leaks and spillages from vehicles along access roads and in parking areas. Any accidental emissions of oil, petrol or diesel associated with fuel storage tanks for the energy centre and belly tanks for the data centres could cause soil/groundwater contamination if the emissions are unmitigated.
- In the event of a fire, firewater could become contaminated and in the absence of mitigation may contaminate soil and groundwater.
- Groundwater abstraction does not form part of the proposed development. There will be no impact on local or regional groundwater resources (abstraction) as a result of the proposed development.

The residual cumulative impact on land, soils, geology and hydrogeology for the construction and operation phases is anticipated to be ***Long-Term, Neutral*** in terms of quality and ***Not Significant***, once appropriate mitigation measures are implemented in accordance with the CEMP and in compliance with the legislative requirements for each development.

7.7 MITIGATION MEASURES AND MONIOTRING OF IMPACTS

In order to reduce impacts on the soils, geological and hydrogeological environment, a number of mitigation measures will be adopted as part of the construction works on site.

7.7.1 Construction Phase

This section describes a range of mitigation measures designed to avoid or reduce any potential adverse geological and hydrogeological impacts identified.

Construction Environment Management Plan

A Construction & Environmental Management Plan (CEMP) has been prepared in respect of the proposed development (refer to CSEA's CEMP).It contains best practice measures and protocols to be implemented during the construction phase of the proposed development to avoid/minimise environmental impacts.

To ensure the CEMP remains fit for purpose, it will be regarded as a live document. The appointed contractor will be responsible for updating the CEMP, as required; e.g. to reflect the publication of relevant new or revised guidelines and / or new statutory requirements. The full schedule of environmental commitments (i.e. all mitigation measures set out in the CEMP, Environmental Impact Assessment Report and submitted as part of the planning application, as well as any applicable conditions of development consent) will be included in the CEMP by the appointed contractor.

The CEMP was formulated in accordance with best international practice including but not limited to:

RECEIVED: 18/07/2023

- Construction Industry Research and Information Association CIRIA, (2001), Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors;
- Construction Industry Research and Information Association (CIRIA) Environmental Good Practice on Site (C650), 2005;
- BPGCS005, Oil Storage Guidelines;
- Eastern Regional Fisheries Board, (2016), Guidelines on protection of fisheries during construction works in and adjacent to waters; and
- CIRIA 697, The SUDS Manual, 2007;

Culvert Works

It is proposed to redesign the culvert as part of the proposed scheme. As per the CSEA CEMP the proposed design of the culvert will ensure that there is no reduction in the hydraulic capacity of the culvert and no resultant increase in flood risk. The new culvert will be built as part of the phase 1 development. The new culvert route will be constructed prior to the decommissioning of the existing culvert. This will ensure minimal operational disturbance of the existing infrastructure. The contractor will begin the works by initially excavating the proposed route for the new culvert. The proposed culvert will then be fully constructed except for the tie-in locations to the existing culvert. Once the proposed culvert is constructed, cleaned, and inspected the tie-in locations to the existing culvert will be completed. This will ensure minimal operational disturbance to the existing infrastructure. Once the existing water course has been diverted through the new route, the existing culvert will be removed. The proposed diverted culvert will be c.360m in length, located c.90 south-west of the existing culvert. The work will be achieved over 8 weeks. As per the AA Screening Report findings, no significant effects whether arising from the project itself or in combination with any other plan or project, are likely to occur to the Natura 2000 sites largely due to the significant distance of the project from the identified sites. Notwithstanding this, best practice environmental controls will be put in place as per the balance of the site to ensure no damage to the immediate aquatic receiving environment. Run-off from the site or any area of exposed soils should be channelled and intercepted and discharged to silt traps with over-flows directed to land rather than the existing culvert. A maintenance schedule and operation procedure should be implemented by the Contractor for the silt and pollution control measures during the construction of the diverted culvert.

Control of Soil Excavation

Site preparation, excavations and levelling works required to facilitate construction of foundations, access roads and the installation of services will require imported material.

- Suitable soils will be reused on site as backfill in the grassed areas, where possible.
- Contractors shall be required to submit and adhere to a method statement indicating the extent of areas likely to be affected and demonstrating that this is the minimum disturbance necessary to achieve the required works.
- Temporary storage of soil will be carefully managed in such a way as to prevent any potential negative impact on the receiving environment and the material will be stored away from any open surface water drains. No soil storing will be allowed within 30 m of any open water including the existing retention ponds which is likely achievable given the size of the site, and is in line with Inland Fisheries Ireland guidelines.

RECEIVED: 18/07/2023

- Movement of material will be minimised in order to reduce degradation of soil structure and generation of dust.
- Although there is no evidence of historical contamination in the proposed development area, all excavated materials will be visually assessed for signs of possible contamination such as staining or strong odours. Should any unusual staining or odour be noticed, samples of this soil will be analysed for the presence of possible contaminants in order to ensure that historical pollution of the soil has not occurred. Should it be determined that any of the soil excavated is contaminated, this will be disposed of by a licensed waste disposal contractor.
- Stockpiles have the potential to cause negative impacts on air and water quality. Stockpiles will be formed within the proposed development site boundary and the contractor will ensure that there are no direct links or pathways from stockpiles to any surface water body.
- Overburden material will be protected from exposure to wind by storing the material in sheltered parts of the site, where possible.

Sources of Fill & Aggregates

All fill and aggregate for the proposed development 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 proposed development;
- Environmental management status; and
- Regulatory and legal compliance status of the company.

Fuel & Chemical Handling

To minimise any impact on the underlying subsurface strata from material spillages, all oils, solvents and paints used during construction will be stored within temporary bunded areas. Oil and fuel storage tanks shall be stored in designated areas, and these areas shall be bunded to a volume of 110% of the capacity of the largest tank/container within the bunded area(s) (plus an allowance of 30 mm for rainwater ingress). Drainage from the bunded area(s) shall be diverted for collection and safe disposal.

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

Where feasible, all ready-mixed concrete will be brought to site by truck. A suitable risk assessment for wet concreting will be completed prior to works being carried out, which will include measures to prevent discharge of alkaline wastewaters or contaminated storm water to the underlying subsoil. Wash down and washout of concrete transporting vehicles will take place at an appropriate facility off-site.

RECEIVED: 19/07/2023

In the case of drummed fuel or other chemical which may be used during construction, containers should be stored in a dedicated internally bunded chemical storage cabinet and labelled clearly to allow appropriate remedial action in the event of a spillage.

Emergency response procedures will be outlined in the CEMP. All personnel working on the site will be suitably trained in the implementation of the procedures.

Control of Water during Construction

There shall not be any discharge of ***untreated***, silty, or contaminated water from the works to any watercourse or stormwater network.

The implementation of industry best practice and full adherence to the mitigation measures set out in the CEMP can largely mitigate against the risk of discharge from contaminated soils to receiving surface and ground waterbodies.

The discharge of ***treated*** construction water (i.e. water free from silt and other pollutants) from rainfall into excavated areas, or from any localised dewatering may be required during the construction phase. The treated water will discharge to the existing Leixlip Reservoir.

Pre-treatment and silt reduction measures on site will include a combination of silt fencing, settlement measures (silt traps, 20 m buffer zone between machinery and watercourses, refuelling of machinery off site) and hydrocarbon separator. These specific measures will provide protection to the receiving soil and water environments during the construction phase.

Operational Phase

A number of design measures will be put in place to minimise the likelihood of any spills entering the groundwater environment. An existing bypass petrol interceptor is located upstream of the outfall from the site, and it is proposed to retain this interceptor. Furthermore, it is a requirement for car parking areas with 10 spaces or more as outlined in Section 20.1 of the Greater Dublin Regional Code of Practice.

There is potential for surface water and condensate to accumulate in the exhaust stacks which serve the generators. Gullies which serve the exhaust stacks will discharge to a dedicated surface water drainage pipe which will be connected to a Class 1 full retention separator. Two full retention interceptors will be required, per data centre building, to serve the exhaust stacks. In the event of an accidental leakage of oil from the parking areas, this will be intercepted by the drainage infrastructure proposed.

The following mitigation measures will be undertaken at the operational stage to manage any leaks from vehicles resulting in soil and/or groundwater quality impacts:

- Provision of spill kit facilities and training of operatives in use of same;
- Where mobile fuel bowsers are used the following measures will be taken:
  - Any flexible pipe, tap or valve will be fitted with a lock and will be secured when not in use;
  - The pump or valve will be fitted with a lock and will be secured when not in use;
  - All bowsers to carry a spill kit;

RECEIVED: 18/07/2023

- Operatives must have spill response training; and
- Portable generators or similar fuel containing equipment will be placed on suitable drip trays.

In relation to the principal works site, a number of inherent SuDS measures will be implemented to minimise the likelihood of any spills entering the surface water and groundwater environment to include the design of attenuation techniques such as Swales, Tree pits, Green roofs, Filter drains, Permeable paving, Rainwater Harvesting system, Bio-Retention ponds, Hydrocarbon interceptors, Silt Traps and Attenuation facilities..

As a result, the proposed development will result in a reduction of surface water discharge from the principal works site. This will have a net positive result on the surrounding hydrological and hydrogeological regime as the overall discharged runoff will have an improved water quality.

7.8 LIKELY CUMULATIVE AND INTERACTION IMPACTS OF THE PROJECT

The anticipated cumulative effect of the Proposed Development with any/all relevant other planned or permitted developments as outlined in Chapter 2 and 3 are discussed below for construction and operational phases respectively.

7.8.1 Construction Phase

In relation to the potential cumulative impact on the geological or hydrogeological environment during the construction phases, the key engineering works which would have additional impacts above are:

- Construction works will require additional removal of topsoil and subsoil cover and will further increase the vulnerability of the underlying bedrock. Although this is minimised due to the underlying clayey overburden. Capping of significant areas of the sites by hardstand/ buildings following construction and installation of drainage will minimise the potential for contamination of groundwater.

7.8.2 Operational Phase

In relation to the potential cumulative impacts from the operational stages, the following would apply:

- Overall increase in hardstanding: Cumulatively these developments will result in localised reduced recharge to ground and increase in surface run-off. The aquifer underlying the site is a locally important aquifer which is moderately productive only in local zones. The proposed development will have a relatively small footprint in comparison to the underlying aquifer size. As such, the impact is considered to be Low.
- Accidental releases from fuel storage/unloading could contaminate groundwater or soil environments unless mitigated adequately. Localised accidental discharge of hydrocarbons could occur in car parking areas and along roads unless diverted to surface

RECEIVED: 18/07/2023

water drainage system with petrol interceptors. However, all developments are required to ensure they do not have an impact on the receiving water environment in accordance with the relevant legislation (primarily the Local Government (Water Pollution) Act, 1977 and 1990 as amended and Groundwater Threshold Value (Groundwater Directive S.I. No. 9 of 2010 and amendment; S.I. No. 366 of 2016) and EPA Interim Guidelines for groundwater where available) such that they would be required to manage runoff and fuel leakages.

- There will be a further loss of greenfield area locally however, the area of development is small in the context of the overall agricultural land available in the region. It is likely that the land use will change over time based on the current zoning of the proposed land in the vicinity as EE. The site is an existing underdeveloped business campus, zoned for 'Industry and Warehousing' in *the Leixlip Local Area Plan 2020-2023 (extended to 2026).*
- The residual cumulative effect on land, soils, geology and hydrogeology for the construction and operation phases are anticipated to be long-term, neutral in terms of quality and of not significant, once the appropriate mitigation measures are put in place for each development.

7.8.3 Interaction Impacts with Hydrology

Construction Phase

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

Taking into account the design and mitigation measures set out in Chapter 6 and 7 of this EIA Report, there is a residual negative interaction between land, soil, and hydrology during the construction phase. The interaction is considered to be ***neutral***, ***not significant***, and ***short term***.

Operational Phase

Taking into account the design and mitigation measures set out in 6 (Hydrology) and Chapter 7 (Land, Soils and Hydrogeology) of this EIA Report there are no potentially significant interactions identified between land, soils and hydrogeology, and hydrology during the operational phase.

7.8.4 Interaction Impacts with Biodiversity

Construction Phase

In the absence of standard mitigation measures to control the construction phase there is potential for silt laden material or pollution to enter the watercourse and impact on local biodiversity and European sites downstream from the works. Furthermore, dust emissions

RECEIVED: 18/07/2023

from exposed earthworks have the potential to settle on plants causing impacts to local ecology.

Taking into account the design and mitigation measures outlined in this Section 7.7, there still remains a residual negative interaction between land, soils, geology and hydrogeology and biodiversity during the construction phase. The interaction is considered to be ***negative, not significant***, and ***short term***.

Operational Phase

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

7.8.5 Interaction Impacts with Air Quality and Climate

Construction Phase

Demolition and construction phase activities such as land clearing, excavations, stockpiling of materials etc. have the potential for interactions between air quality and land and soils and the water environment (hydrology) in the form of dust emissions. With the appropriate mitigation measures to prevent fugitive dust emissions, it is predicted that interactions between air quality and land and soils and hydrology will be ***short-term*** and ***imperceptible***.

Operational Phase

There are no potentially significant interactions identified between land, soils and hydrogeology, and air quality and climate during the operational phase

7.8.6 Noise and Vibration

Construction Phase

There are no potentially significant interactions identified between land, soils and hydrogeology, and noise and vibration during the construction phase.

Operational Phase
There are no potentially significant interactions identified between land, soils and hydrogeology, and noise and vibration during the operational phase.

7.8.7 Landscape and Visual Impacts

Construction Phase

There are no potentially significant interactions identified between land, soils and hydrogeology, and landscape and visual impacts during the construction phase.

Operational Phase

RECEIVED: 18/07/2023

There are no potentially significant interactions identified between land, soils and hydrogeology, and landscape and visual impacts during the operational phase.

7.8.8 Archaeological, Architectural and Cultural Heritage

Construction Phase

There are no potentially significant interactions identified between hydrology, and archaeological, architectural and cultural heritage during the construction phase.

Operational Phase

There are no potentially significant interactions identified between land, soils and hydrogeology, and archaeological, architectural and cultural heritage during the operational phase.

7.8.9 Material Assets, including Utilities, Waste, and Transport

Construction Phase

There are no potentially significant interactions identified between land, soils and hydrogeology, and material assets during the construction phase.

Operational Phase

The proposed development will follow the SuDS and surface water management strategy; utilising an innovative natural based SuDS components to provide the necessary processes to control runoff frequency, flow rates and volumes. The use of SuDS during operations will mean that the runoff will discharge from the proposed bioretention and attenuation systems before out falling to the existing pond system and existing monitoring regime on-site resulting in a reduction of surface water discharge from the development site. This will have a net positive result on the downstream surrounding areas as the potential for flooding will be reduced and the overall discharged runoff will have an improved water quality due to the proposed SuDS upgrades. The SuDs features have been designed to provide sufficient capacity to contain and convey all surface water runoff associated with the 1 in 100-year event plus an additional allowance of 30% for climate change and 10% urban creep. This is as per Kildare County Council Water Services Department draft guidance on Drainage and SuDS Strategy.

Attenuation measures include bio retention areas, attenuation ponds, swales, filter drains, permeable paving and hydrocarbon interceptors. The interaction is considered to be ***negative***, ***not significant***, and ***long-term***.

7.9 MAJOR ACCIDENTS

The EPA Guidelines, 2022, state that:

> *"To address unforeseen or unplanned effects the Directive further requires that the EIAR takes account of the vulnerability of the project to risk of major accidents and /or*

RECEIVED: 18/07/2023

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

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

Much of the earth's surface is covered by unconsolidated sediments which can be especially prone to instability. Water often plays a key role in lubricating slope failure. Instability is often significantly increased by man's activities in building houses, roads, drainage and agricultural changes. Landslides, mudflows, bog bursts (in Ireland) and debris flows are a result. In general, Ireland suffers few landslides. Landslides are more common in unconsolidated material than in bedrock, and where the sea constantly erodes the material at the base of a cliff and leads to recession of the cliffs. Landslides have also occurred in Ireland in recent years in upland peat areas due to disturbance of peat associated with construction activities. The GSI landslide database was consulted and the nearest landslide to the proposed development was c.7.5km to the north, referred to as the Diswellstown event which occurred on 24th December 1999. There have been no recorded landslide events at the site. Due to the local topography and the underlying strata, there is a negligible risk of a landslide event occurring at the site.

In Ireland, seismic activity is recorded by the Irish National Seismic Network. The Geophysics Section of the School of Cosmic Physics at the Dublin Institute for Advanced Studies (DIAS) has been recording seismic events in Ireland since 1978. The station configuration has varied over the years. However, currently, there are five permanent broadband seismic recording stations in Ireland and operated by DIAS. The seismic data from the stations comes into DIAS in real-time and are studied for local and regional events. Records since 1980 show that the nearest seismic activity to the proposed location was in the Irish sea c. 30km to the east of the site (1.0 – 2.0 Ml magnitude) and ~55 km to the south in the Wicklow Mountains. There is a very low risk of seismic activity to the proposed development site. There are no active volcanoes in Ireland so there is no risk from volcanic activity. ReFER TO Chapter 17 – Major Accidents and Disasters for further detail.

7.10 MONITORING

7.10.1 Construction Phase

During construction phase the following monitoring measures will be implemented:

- Regular inspection of surface water run-off and sediments controls (e.g., silt traps);
- Soil sampling to confirm disposal options for excavated soils in order to avoid contaminated run-off; and

RECEIVED: 18/07/2023

- Regular inspection of construction / mitigation measures (e.g. concrete pouring, refuelling, etc).

7.10.2 Operational Phase

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

7.11 RESIDUAL IMPACTS

The proposed development with mitigation will have no significant impact on the natural groundwater regime either qualitatively or quantitatively.

7.11.1 Construction Phase

Following the implementation of mitigation measures detailed in Section 5.6.1 above, the predicted impact on the geological and hydrogeological environment during the construction phase is ***neutral, imperceptible*** and ***short-term,*** the magnitude of impact is considered ***negligible***.

7.11.2 Operational Phase

Following the implementation of mitigation measures detailed in Section 5.6.2 above, the predicted impact on the geological and hydrogeological environment during the construction phase is ***neutral, imperceptible*** and ***long-term,*** the magnitude of impact is considered ***negligible***.

7.12 REFERENCES

- CIRIA (2001). Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors.
- CIRIA (2005). Environmental Good Practice on Site (C650).
- CIRIA (2007). CIRIA 697: The SUDS Manual.
- Enterprise Ireland (n.d.). Best Practice Guide BPGCS005: Oil Storage Guidelines.
- EPA (2022a). Guidelines on the Information to be Contained in Environmental Impact Assessment Reports.
- EPA (2022b). EPA Maps.
- GSI (2022). GSI Map Viewer.
- Institute of Geologists of Ireland (2013). Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements.
- NPWS (2022). Designations Viewer.
- NRA (2009). Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes.
- OPW (2022). Flood Maps.
- OPW (2009). The Planning System and Flood Risk Management: Guidelines for Planning Authorities.
- Institute of Geologists of Ireland (2013). Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements.

RECEIVED: 28/07/2023

- Dublin City Council (2005). Greater Dublin Strategic Drainage Study: Technical Documents of Regional Drainage Policies. Dublin: Dublin City Council.
- Teagasc (2022). Teagasc Map Viewer.
- National Roads Authority (NRA) (2009). Guidelines on Procedures for the Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes.

RECEIVED: 28/07/2023

8. HYDROLOGY (WATER)

8.1 Introduction

This chapter of the Environmental Impact Assessment Report (EIAR) has been prepared by AWN Consulting and assesses and evaluates the potential for significant impacts on the surrounding hydrological environment associated with the principal and facilitation works of the proposed project.

This assessment considers the following:

A. The 'principal' works subject to the development consent being sought from Kildare County Council, i.e. the proposed development; and

B. 'Facilitation works' required to support the development which do not form part of the development consent being sought from Kildare County Council. The facilitation works include a mix of works that will be required to be undertaken for or on behalf of statutory undertakers such as Gas Networks Ireland and EirGrid.

The principal works include the proposed expansion of the existing innovation campus and all those works included within the redline boundary and described on the statutory notices accompanying the application. The facilitation works are those known works that are expected to be required to facilitate the proposed development over the life of the permission being sought.

In assessing likely impacts, account is taken of both the importance of the existing hydrological attributes and the predicted scale and duration of the likely impacts.

8.1.1 PROJECT PERSONNEL

Teri Hayes (BSc MSc PGeol EurGeol) is a Director and Senior Hydrogeologist with AWN Consulting with over 25 years of experience in water resource management, environmental assessment and environmental licensing. Teri is a former President of The International Association of Hydrogeologists (IAH, Irish Group) and is a professional member of the Institute of Geologists of Ireland (IGI) and European Federation of Geologists (EurGeol). She has qualified as a competent person for contaminated land assessment as required by the IGI and EPA. Her project experience includes contributions to a wide range of complex Environmental Impact Statements, planning applications and environmental reports for Industry Infrastructure and residential developments. Teri's specialist area of expertise is water resource management, eco-hydrogeology, hydrological assessment and environmental impact assessment. Teri will be assisted by the water and environment section at AWN which includes a team of experienced hydrogeologists and environmental scientists.

Conor McGrath is a Senior Environmental Consultant at AWN, with over 12 years' experience working in the geology and environmental science fields. Conor is a Chartered Environmentalist (CEnv) and is a professional member of the Institute of Geologists of Ireland (PGeo) and European Federation of Geologists (EurGeol). Conor has experience with a wide range of projects including site investigations, contaminated land, project management, environmental compliance and licencing, environmental remediation programmes and environmental impact assessments. Conor has extensive experience in managing development projects, stakeholder engagement, leading teams, change management, operational transformation, corporate compliance, and governance programmes.

Alan Wilson is an Environmental Consultant with AWN Consulting. Alan holds a BSc Honours in Environmental Management in Agriculture/Environmental and Geographical Sciences, working on projects involving EIA Reports, Flood Risk Assessments, Soil and Water Baseline Reports, Environmental Site Investigations and carrying out soil and groundwater monitoring on contaminated lands and a range of other developments. Alan has over 2 years' experience as an Environmental Consultant including roles in Ecology and Forestry related work.

RECEIVED: 18/07/2023

8.2 Project Description (Principal Works)

The Davy Platform ICAV, on behalf of the Liffey Sub-Fund, intend to apply for permission for development of an integrated campus Masterplan proposal including 2 no. Deep Tech Buildings, ~~45~~ no. Data Centres, an Energy Centre, new campus entrance incl. signalised intersection, a new public road, internal roads & pathways, a new pedestrian/cycle overpass of the M4 Motorway and supporting infrastructure with an overall area of c. 72~~3.296~~ ha inclusive of 1.83 ha of lands within the ownership of KCC. The proposal will also include the demolition of existing buildings no's 7, 8 & 9.

The site will include the provision for 4 No. Data Centres and a total of 80no. generators . The fuel for the generators will be stored in individual, double-skinned storage tanks. Each tank has the capacity to store 15.5 m*3* of diesel; therefore, a total of 1,240 m*3* across all Data Centres (or 1066 tonnes at a density of 0.86 tonnes / m*3*). The energy centre will have its own HVO bulk storage of c.3440 tonnes.

There will be an increase in overall hardstand as a result of the proposed development of c. 171,641.88 m^2. The existing site has a total hardstanding of c. 86,029.00 m^2. The proposed development will have a total hardstanding of c. 257, 670.88 m^2.

The proposed development will follow the SuDS and surface water management strategy; utilising an innovative natural based SuDS components to provide the necessary processes to control runoff frequency, flow rates and volumes. The runoff will discharge from the proposed bioretention and attenuation systems before out falling to the existing pond system and existing monitoring regime on-site resulting in a reduction of surface water discharge from the development site. This will have a net positive result on the downstream surrounding areas as the potential for flooding will be reduced and the overall discharged runoff will have an improved water quality due to the proposed SuDS upgrades. The SuDs features have been designed to provide sufficient capacity to contain and convey all surface water runoff associated with the 1 in 100-year event plus an additional allowance of 30% for climate change and 10% urban creep. This is as per Kildare County Council Water Services Department draft guidance on Drainage and SuDS Strategy.

Attenuation measures include bio retention areas, attenuation ponds, swales, filter drains, permeable paving and hydrocarbon interceptors. Proposed discharge rates for the Proposed Development and the overall landholding are addressed in CSEA's *Engineering Services Report Drainage and Water Services* submitted with the planning application.

8.2.1 Facilitation Works

The facilitation works required to support the development are works which do not form part of the development consent being sought from Kildare County Council. The facilitation works include a mix of works that will be required to be undertaken for or on behalf of statutory undertakers such as Gas Networks Ireland and EirGrid. The facilitation works will be subject

to future consents as required by GNI and EirGrid but are included the project for the purpose of the EIAR.

RECEIVED: 18/07/2023

GNI Gas Upgrades

The GNI upgrades will be delivered through a local upgrade of the gas network over a length of approximately 1.5km through predominantly residential areas. The route of the upgrades will be along Ryevale Lawns along Station Road, Old Hill and Celbridge Road for a distance of approximately 1.5km up to the entrance of Barnhall Meadows. The pipe will run under the existing road pavement. At the entrance to Barnhall Meadows, the pipe will run underground through the Barnhall Meadows lands (adjacent to the existing haul road) and will then cross the M4 Motorway through Horizontal Directional Drilling and enter the Kildare Innovation Campus then connecting to the proposed Gas Skid.

EirGrid Uprating

Upon completion of Phase 1 of the KIC Masterplan, including the development of the proposed replacement 110kV Substation, uprating of existing overhead lines from the replacement 110kV Rinawade substation to Derryiron/Maynooth and Dunfirth/Kinnegad will be required to facilitate commencement of Phase 3 of the KIC Masterplan. The uprating will be carried out to existing lines along established wayleaves primarily traversing agricultural lands. Due to the nature of the proposed EirGrid works being minimal and comprising only minor line and structural replacement, they have been scoped out of this assessment as the interaction between land, soils, geology and hydrogeology with the proposed works is negligible.

A detailed description of the project is outlined in Chapter 2 of this EIAR.

8.3 Methodology

Alongside the legislation, policy, and guidance outlined in Chapter 1, the following relevant legislation, policy, and guidance has informed the preparation of this chapter:

- Environmental Protection Agency (EPA), Advice Notes for Preparing Environmental Impact Statements Draft (September 2015)
- Environmental Protection Agency (EPA) 2022, Guidelines on the Information to be Contained in Environmental Impact Assessment Reports
- Environmental Impact Assessment of Projects - Guidance on the preparation of the Environmental Impact Assessment Report, European Union 2017
- Department of Housing, Planning and Local Government (DoHPLG), Guidelines for Planning Authorities and An Bord Pleanála on Carrying Out Environmental Impact Assessment (August 2018); and,
- Transport Infrastructure Ireland (TII) 'Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes', by the Transport Infrastructure Ireland (2009).

This assessment was considered in the context of the available baseline information, potential impacts, consultations with statutory bodies and other parties, and other available relevant

information. In collating this information, the following sources of information and references were consulted:

RECEIVED 18/07/2023

- Latest EPA Maps & Envision water quality monitoring data for watercourses in the area (these data can be accessed at https://gis.epa.ie/EPAMaps/ & catchments.ie);
- National River Basin Management Plan 2018-2021;
- DRAFT National River Basin Management Plan 2022-2027;
- Eastern River Basin District (ERBD) Management Plan;
- The Planning System and Flood Risk Management, Guidelines for Planning Authorities (Department of the Environment, Heritage and Local Government (DoEHLG)
- Office of Public Works (OPW) flood mapping data (www.floodmaps.ie);
- Relevant Eastern Catchment Flood Risk Assessment and Management (CFRAM) Flood Reports;
- Requirements for the Protection of Fisheries Habitat During Construction and Development Works at River Sites (Eastern Regional Fisheries Board (ERFB);
- Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters' (Inland Fisheries Ireland, 2016);
- Annual Environmental Report 2020 prepared for D0004-02, Lower Liffey Valley Regional Sewer Scheme in Kildare;
- Kildare County Development Plan 2023-2029; and
- Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors" (CIRIA 532, 2001).

8.3.1 Baseline Scenario/Receiving Environment Analysis Methodology

The EPA Guidelines on the Preparation of an EIAR (EPA, May 2022) state that:

"It is important to demonstrate that correct methodologies and experts have been used. It is also important that the methodology used in establishing the baseline scenario is documented to permit replicable future monitoring so that the later results can be properly compared (where required). Standard recognised methods should be applied where available and appropriate."

This Chapter evaluates the effects, if any, which the project will have on hydrology as defined in the Environmental Protection Agency (EPA) '*Guidelines on the Information to be contained in Environmental Impact Assessment Reports*' (EPA, 2022) as well as in line with Article 94 and Schedule 6 of the Planning and Development Regulations 2001 (as amended) and Article 5 and Annex IV of the EIA Directive (2011/92/EU, as amended).

The Draft EPA document entitled '*Advice Notes for Preparing Environmental Impact Statements*' (EPA, 2015) is also followed in this hydrological assessment and classification of environmental effects. Due consideration is also given to the document entitled '*Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes*' by the Transport Infrastructure Ireland (TII) formerly National Roads Authority (NRA) (TII, 2009) is referenced where the methodology for assessment of impact is appropriate.

The baseline/future receiving environment analysis for this Chapter has been undertaken in accordance with the EPA Guidelines on the Preparation of an EIAR (EPA, May 2022) and all other documents outlined above.

RECEIVED: 18/07/2023

8.3.2 Impact Assessment Methodology

This chapter evaluates the effects, if any, which the project will have on hydrology as defined in the Environmental Protection Agency (EPA) 'Guidelines on the Information to be contained in Environmental Impact Assessment Reports' (EPA, 2022). The Draft EPA document entitled 'Advice Notes for Preparing Environmental Impact Statements' (EPA, 2015) is also followed in this hydrological assessment and classification of environmental effects. In addition, the document entitled 'Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes' by the Transport Infrastructure Ireland (TII, 2009, previously NRA) is referenced where the methodology for assessment of impact is appropriate.

The rating of potential environmental effects on the hydrological environment is based on the standard EIAR impact predictions table included in Chapter 1 which takes account of the quality, significance, duration and type of effect characteristic identified (in accordance with impact assessment criteria provided in the EPA Guidelines (2022) publication) set out in Chapter 1 Table 1.2.

The TII criteria for rating the magnitude and significance of impacts and the importance of hydrological attributes at the site during the EIA stage are also relevant in assessing the impact and are presented in Tables 1-3 in Appendix 8.1.

The analysis of the predicted impacts of the proposed development hydrology during 'do-nothing' scenario and construction and operation are presented in this Chapter. The assessment considered hydrological features identified within the project site and the surrounding vicinity in accordance with the methodology outlined above and below, to determine the significance of the impacts. Where likely significant impacts are highlighted, mitigation and monitoring are proposed, and any residual impacts are assessed.

The impact assessment for this chapter has been undertaken in accordance with the *EPA Guidelines on the Preparation of an EIAR* (EPA, May 2022) and all other documents outlined above.

The *European Commission Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions*, 1999, breaks down appropriate methodologies, involved in the assessment of impacts, into 'scoping and identification' methods and 'assessment and evaluation' methods.

8.3.3 Scoping and Identification Methods

The EPA Guidelines, 2022 state that:

> *"each* [environmental] *factor is typically explored by examining a series of headings and/or topics relevant to that factor"* and *"The relevant topics for any given EIAR should be established during scoping".*

The methods employed for scoping and identification of the relevant environmental topics for this Chapter have been:

RECEIVED 18/07/2023

1. Expert Opinion stemming from the baseline/future receiving environment analysis
2. Review of Strategic Environmental Assessment prepared for the Kildare County Development Plan 2023-2029 (including a review of the Development Plan itself).
3. Geospatial Analysis (cumulative impacts only – used to identify planning permissions/applications within a 5 km radius)
4. Other relevant documentation consulted as part of this assessment included the following site specific sources:

    - Clifton Scannell Emerson Associates Limited, Consulting Engineers – Site Specific Flood Risk Assessment Kildare Innovation Campus. Project No. 21_048. February 24th 2023;
    - Clifton Scannell Emerson Associates Limited, Consulting Engineers – Surface Water Management Strategy Report. Project No. 21_048. November 11th 2022;
    - Clifton Scannell Emerson Associates Limited, Consulting Engineers – Construction Environmental Management Plan Kildare Innovation Campus. Project No. 21_048. 24th February 2023;
    - Clifton Scannell Emerson Associates Limited, Consulting Engineers – Engineering Services Report Drainage and Water Services. Project No. 21-_048. 24th February 2023;
    - LBC Preliminary Site Assessment Report. Project No. 0523254. September 2020;
    - Assimilative Capacity Study – Liffey Science and Technology Business Park. ARUP, May 2023;
    - RSK Ireland Limited (RSK) Preliminary Environmental Site Assessment Report. Project No. 602128-R01(00). March 2018; and
    - Various design site plans and drawings.

8.3.4 Assessment and Evaluation Methods

Assessment and evaluation methods quantify and predict the magnitude and significance of impacts.

The methods employed for assessment and evaluation of the environmental topics for this Chapter have been:

1. The rating of potential environmental effects on the hydrological environment is based on the standard EIAR impact predictions table included in Chapter 1 which takes account of the quality, significance, duration and type of effect characteristic identified (in accordance with impact assessment criteria provided in the EPA Guidelines (2022) publication) set out in Chapter 1 Table 1.2; and
2. The TII criteria for rating the magnitude and significance of impacts and the importance of hydrological attributes at the site during the EIA stage are also relevant in assessing the impact and are presented in Tables 1-3 in Appendix 8.1.

8.3.5 Forecasting Issues or Difficulties Encountered

There were no difficulties encountered in compiling this chapter of the EIAR.

8.4 Receiving Environment

RECEIVED: 19/07/2023

The receiving environment is discussed in terms of hydrology, flood risk and water quality. The principal site, Kildare Innovation Campus (KIC), is located in north east Kildare, in the administrative district of Kildare County Council. The site is an existing underdeveloped business campus, zoned for 'Industry and Warehousing' in *the Leixlip Local Area Plan 2020-2023 (extended to 2026).* Leixlip town is located 4km to the north and Dublin city centre is located approximately 21km to the east.

8.4.1 Principal Works

The site is principally bounded by: the M4 Motorway to the north; Cellbridge Road to the east; Barnhall Rugby Football Club to the south; and by grounds associated with Castletown House to the west. The River Liffey flows in a north-easterly direction on the opposing side of Celbridge Road to the east of the site where the Liffey Reservoir is also located. To the immediate west and east of the site agricultural lands are located - refer to Figure 8.1 below.

The site has an overall area of c. 72.23 ha. The planning application site covers the majority of the existing business campus, with a 5.7-hectare parcel of land known as the DB Schenker (DBS) site being excluded as it has recently been developed in accordance with a separate planning permission (KCC Reg. Ref:. 20-873). The planning application site also includes a portion of Celbridge Road along the eastern boundary of the site which will cater for a new access to the campus.

8.4.2 Facilitation Works

The facilitation works include a mix of works that will be required to be undertaken for or on behalf of statutory undertakers such as Gas Networks Ireland and EirGrid.

<u>GNI Upgrades</u>

The GNI upgrades will be delivered through a local upgrade of the gas network over a length of approximately 1.5km through predominantly residential areas. The route of the upgrades will be along Ryevale Lawns along Station Road, Old Hill and Celbridge Road for a distance of approximately 1.5km up to the entrance of Barnhall Meadows running underground through the Barnhall Meadows lands (adjacent to the existing haul road) before crossing the M4 Motorway through Horizontal Directional Drilling and enter the Kildare Innovation Campus then connecting to the proposed Gas Skid.

<u>EirGrid Uprating</u>

Upon completion of Phase 1 of the KIC Masterplan, including the development of the proposed replacement 110kV Substation, uprating of existing overhead lines from the replacement 110kV Rinawade substation to Derryiron/Maynooth and Dunfirth/Kinnegad will be required to facilitate commencement of Phase 3 of the KIC Masterplan. The uprating will be carried out to existing lines along established wayleaves primarily traversing agricultural lands.

Due to the nature of the proposed EirGrid works being minimal and comprising only minor line and structural replacement, they have been scoped out of this assessment as the

interaction between land, soils, geology and hydrogeology with the proposed works is negligible.

RECEIVED 18/07/2023

The surrounding environment for both the principal and facilitation works can be described as a mix of agricultural and residential. The site location map for the proposed development is presented in presented in Figure 8.1 below.

A detailed description of the project is outlined in Chapter 2 of this EIAR.

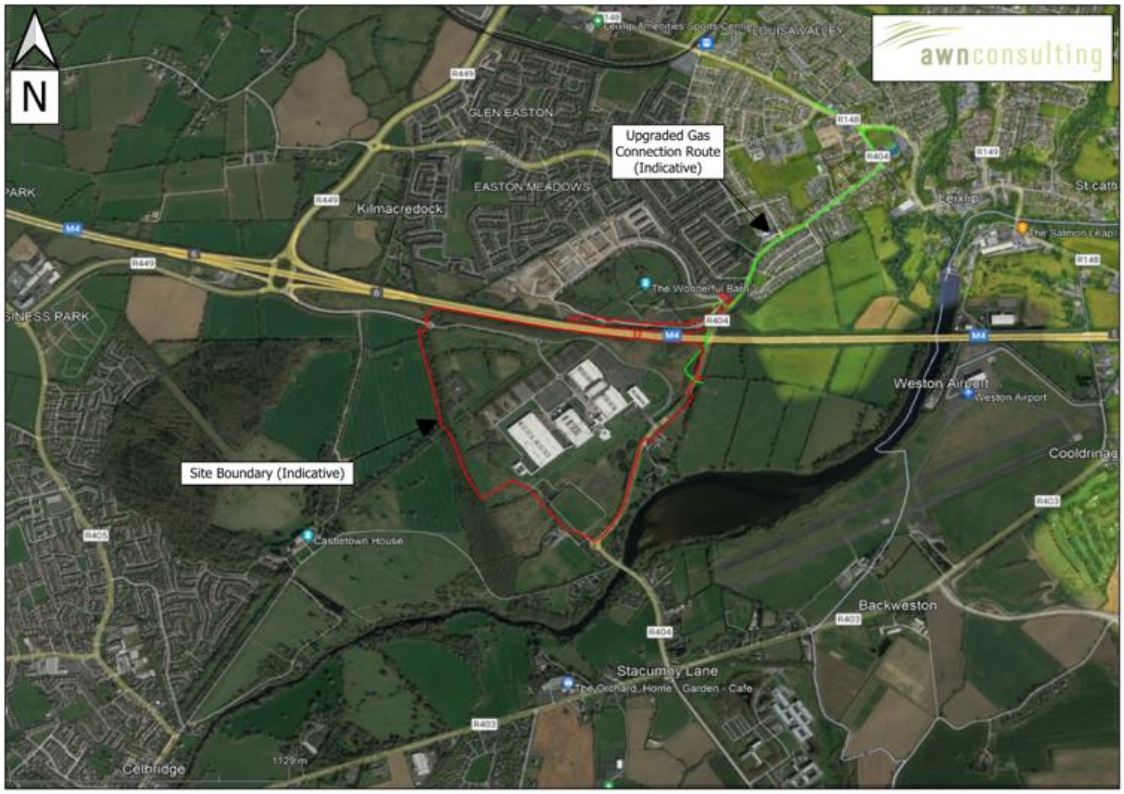


Figure 8.1 Site Location and Surrounding Land Use (Google Earth Pro, 2023)

8.4.1 Hydrology (Surface Water)

The topography on-site is generally flat and has an elevation of 51.0 m above Ordnance Datum (mAOD). The topography of the site slopes gently down towards the south east, which is consistent with the surrounding area. The site is located within the Liffey and Dublin Bay catchment, which encompasses an area of approximately 1,616 km^2. The River Liffey extends from the mountains of Kippure and Tonduff in County Wicklow to the sea at Dublin Bay with major tributaries including the River Dodder, The River Poddle and River Camac. The main channel covers approximately 120 km and numerous tributaries enter along its course. The proposed development site is within the sub-catchment Liffey_SC_080 (Catchment ID: 09).

There is an existing Reservoir (Leixlip Reservoir) east of the principal works site which forms part of the River Liffey. The site discharges its surface water runoff directly into the Leixlip Reservoir via an outfall pipe following confirmation of water quality through electronic monitoring mechanisms inclusive of shut off valves, upstream of the existing retention ponds near the existing site entrance off the Celbridge Road (Refer to CSEA Drawing No. DR-C-2100). The Kilmacredock_Upper watercourse is mapped on the EPA as flowing in a south-easterly direction through the site. This watercourse has already been diverted beneath the site via a

1.5m culvert and outfalls into the Leixlip Reservoir east of the Celbridge Road. The proposed development does not discharge into the Kilmacredock_Upper. It is proposed to redesign the culvert as part of the proposed scheme. The proposed design of the culvert will ensure that there is no reduction in the hydraulic capacity of the culvert and no resultant increase in flood risk. The maximum allowable discharge rate for the site is 149.75 l/s (12,938.4m3/day). Leixlip WWTP has a maximum capacity of 33,745m3/day. Therefore Leixlip WWTP has sufficient capacity for the proposed development site - refer to Figure 8.2 below and CSEA's *Engineering Services Report Drainage and Water Services* submitted with the planning application.

RECEIVED 18/07/2023

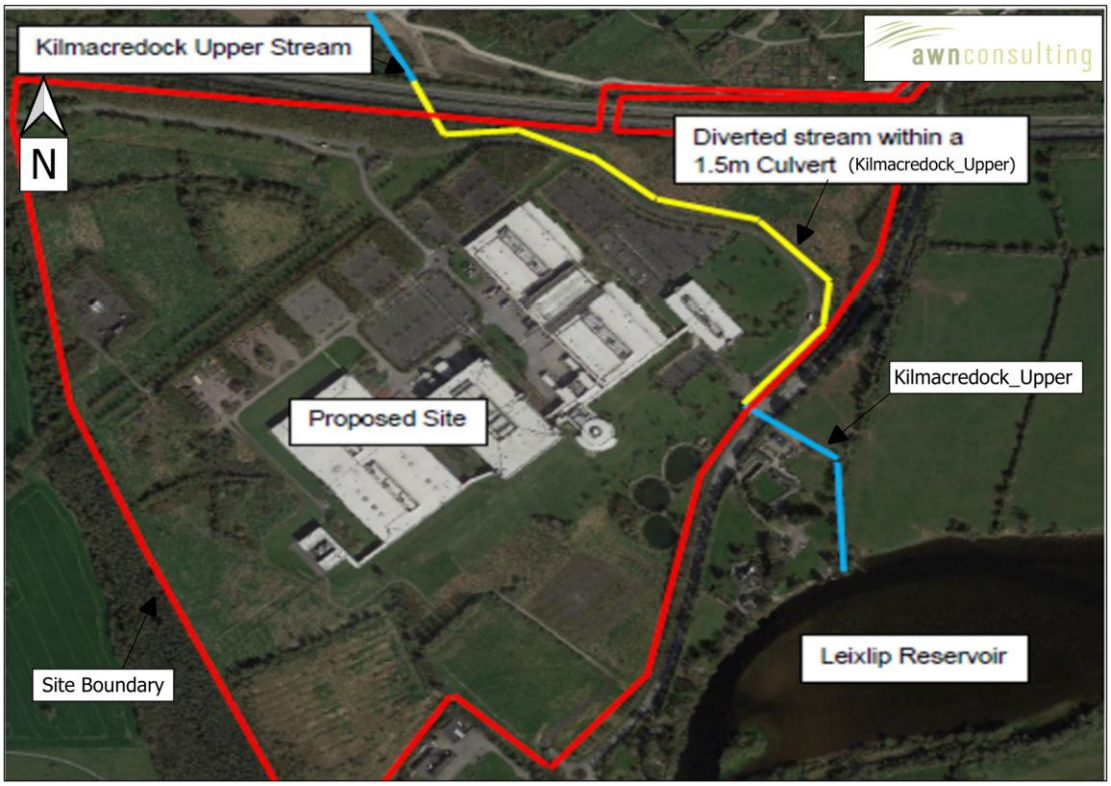


Figure 8.2 Local Hydrological Environment (CSEA – SSFRA, 2023*)*

The most significant drainage system in the vicinity is the River Liffey which flows adjacent to the site's south-eastern boundary in a west to north east direction on the opposite side of Celbridge Road – refer to Figure 8.3 below.

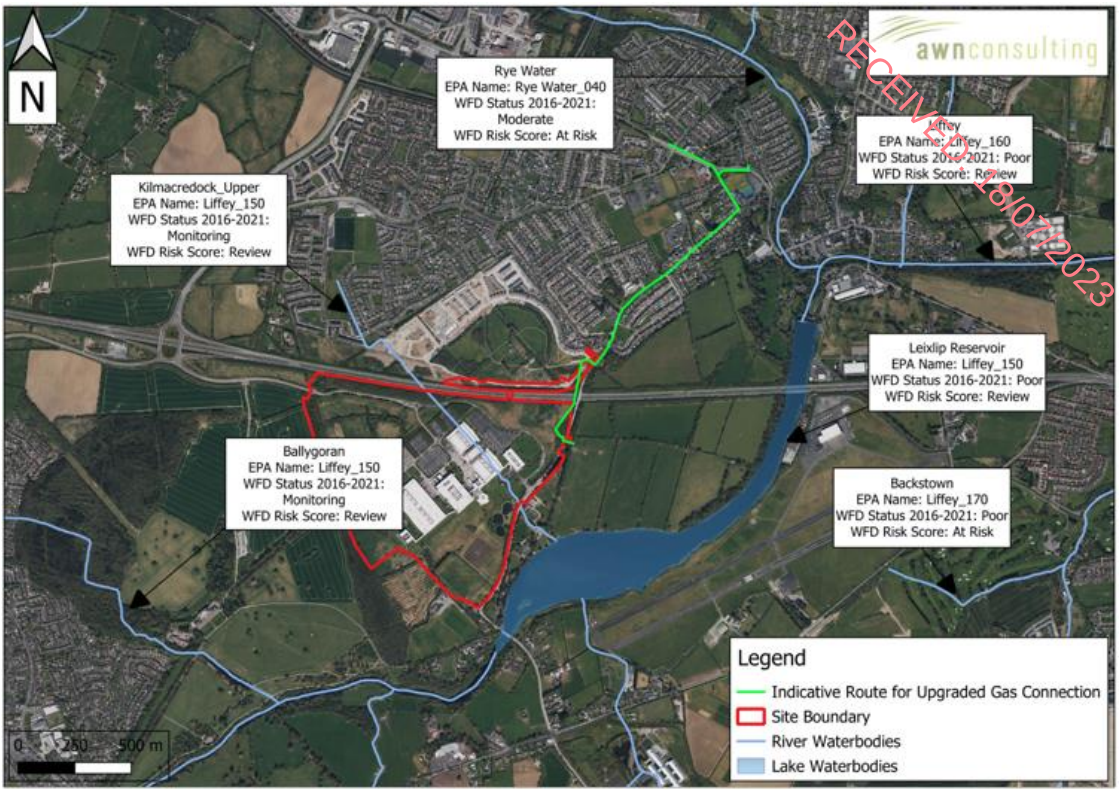


Figure 8.3 Regional Hydrological Environment (EPA, 2023)

8.4.2 Surface Water Quality

The Proposed Development (principal and facilitation works) is located within the former ERBD (now the Irish River Basin District), as defined under the European Communities Directive 2000/60/EC, establishing a framework for community action in the field of water policy – this is commonly known as the Water Framework Directive (WFD). It is situated in Hydrometric Area No. 09 of the Irish River Network. It is located within the sub-catchment Liffey_SC_080 (Catchment ID: 09).

The aim of the WFD is *'Good Water Status'* for all European waters to be achieved through a system of river basin management planning and extensive monitoring. 'Good status' means both *'Good Ecological Status'* and *'Good Chemical Status'.*

Water bodies identified as being '*At Risk'* of not achieving their environmental objectives need to have targeted measures implemented to achieve objectives outline in River Basin Management Plans.

During the development of this third RBMP, a prioritisation exercise was undertaken by the local authorities, the EPA and other stakeholders to identify those water bodies that require immediate action within this plan cycle to 2021. During the catchment characterisation, the EPA identified those water bodies either *'At Risk'* of not achieving their objectives or *'Under Review'*. The outcome of this prioritisation process was the selection of 190 Areas for Action across the 5 Local Authority regions. Within these 190 areas, a total of 726 water bodies were selected for initial actions during this RBMP cycle. There are 832 water bodies identified as being '*At Risk'* of not achieving their environmental objectives under this Plan that have not been included in the Areas for Action. For most of these water bodies, targeted actions will be undertaken in the third cycle RBMP from 2022-2027. The draft 3rd cycle RBMP has been reviewed in the context of ensuring mitigation measures comply with current and expected

RECEIVED: 18/07/2023

future measures required to be implemented for protection of water body status within the context of the Proposed Project.

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

- European Communities (Water Policy) Regulations, 2003 (S.I. No. 722 of 2003);
- European Communities (Drinking Water) Regulations 2014 (S.I. 122 of 2014) and amended in 2017 (S.I. No. 464/2017);
- European Communities Environmental Objectives (Surface Waters); Regulations, 2009 (S.I. No. 272 of 2009) & 2015 (S.I. No. 386 of 2015);
- European Communities Environmental Objectives (Groundwater) Regulations, 2010 (S.I. No. 9 of 2010) & 2016 (S.I. No. 366 of 2016);
- European Communities (Good Agricultural Practice for Protection of Waters) Regulations, 2010 (S.I. No. 610 of 2010);
- European Communities (Good Agricultural Practice For Protection of Waters) Regulations 2022 (S.I. No. 113 of 2022);
- European Communities (Technical Specifications for the Chemical Analysis and Monitoring of Water Status) Regulations, 2011 (S.I. No. 489 of 2011); and
- European Union (Water Policy) (Abstractions Registration) Regulations 2018 (S.I. No. 261 of 2018).

Figure 8.4 below presents the EPA national monitoring stations in the context of the proposed developemnt and other regional hydrological features.

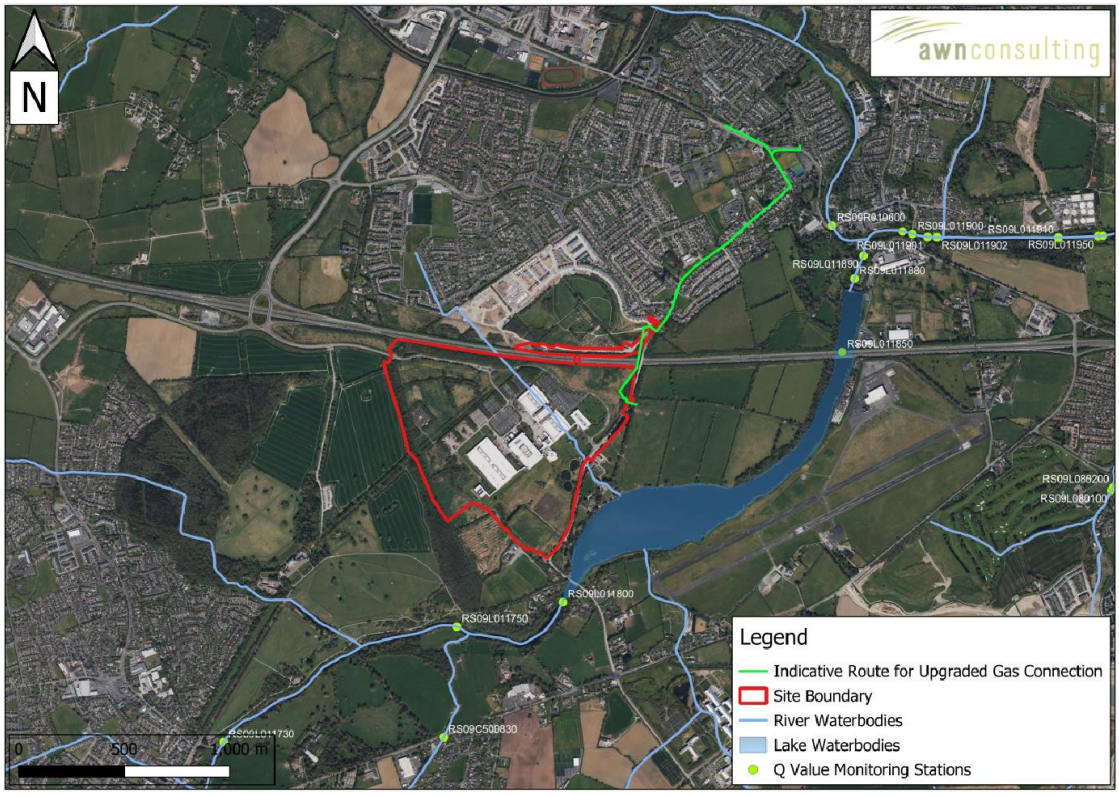


Figure 8.4 National Monitoring Stations (EPA, 2023)

Surface water quality is monitored periodically by the EPA at various regional locations along principal and other smaller watercourses. The EPA assess the water quality of rivers and

RECEIVED: 18/07/2023

streams across Ireland using a biological assessment method, which is regarded as a representative indicator of the status of such waters and reflects the overall trend in conditions of the watercourse. The biological indicators range from Q5 - Q1. Level Q5 denotes a watercourse with good water quality and high community diversity, whereas Level Q1 denotes very low community diversity and bad water quality.

With reference to the site setting, the nearest EPA Q value monitoring station is situated along the River Liffey c. 1.4 km north-east of the principal works site and c. 400m to the east of the facilitation works site. The EPA Q value monitoring station (Station Name: Leixlip Br (RHS) – Station Code: RS09L011900) obtained a Q4 – Good Status in 2022.

In accordance with the WFD, each river catchment was assessed by the EPA and a water management plan detailing the programme of measures was put in place for each. Currently, the EPA classifies the WFD Ecological Status for the Liffey_150 and Rye Water_040 waterbodies as having a '*Poor'* status (2016-2021) with the current WFD River Waterbody risk score being under '*Review'* for the Liffey_150 and '*At Risk'* for the Ryewater_040. According to the EPA Map viewer, the Leixlip Reservoir also received a '*Poor'* status (2016-2021) and the WFD Lake Waterbodies Risk score is currently under '*Review'.* Figure 8.5 below presents the WFD river waterbody risk map.

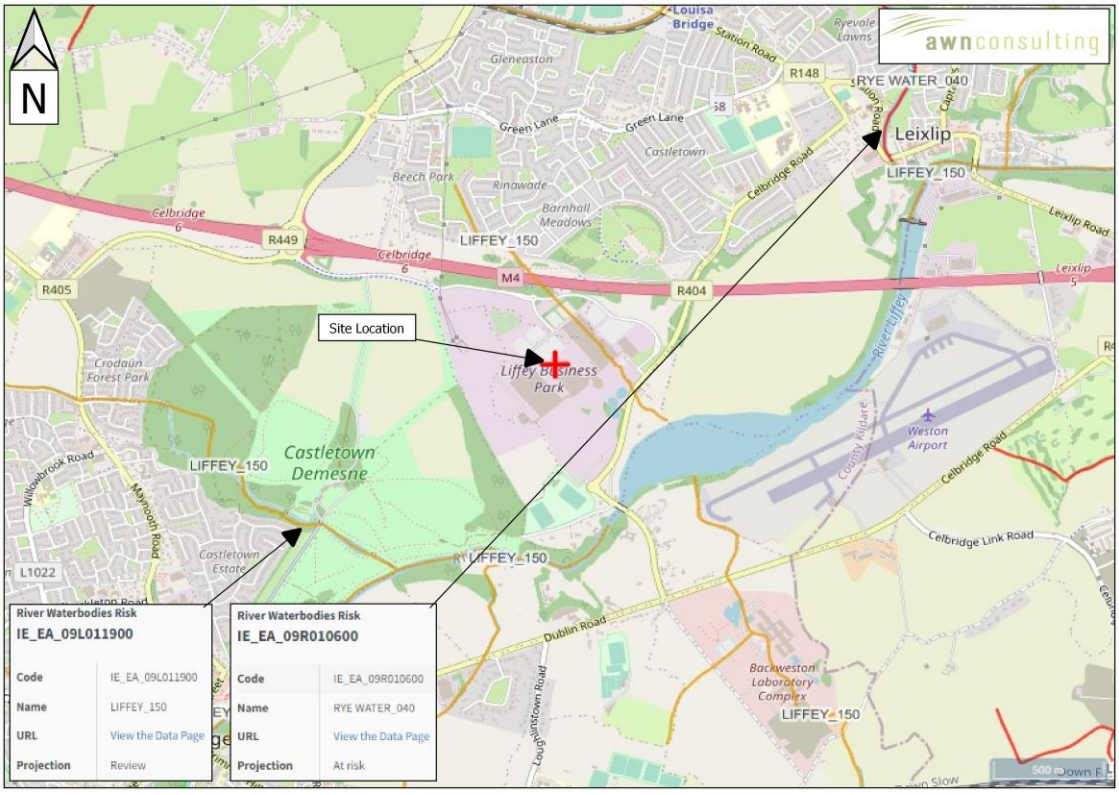


Figure 8.5 WFD River Waterbody Risk Score – Principal site location indicated with a + (EPA, 2023)

The main pressures identified on the Liffey_150 are associated with urban run-off. The poor status is likely attributable to diffuse urban sources (Source: Catchments.ie).

The main pressures identified on the Rye Water_040 are associated with urban run-off, domestic waste water and agriculture. This poor status is likely attributable to a combination of poor ecological, biological and invertebrate status and/or potential as well as diffuse urban sources (Source: Catchments.ie).

RECEIVED: 18/07/2023

The main pressures identified on the Leixlip Reservoir are associated with anthropogenic pressures. This poor status is likely attributable to a combination of nutrient, organic and sediment pollution (Source: Catchments.ie).

8.4.3 Flood Risk Assessment

The potential risk of flooding on the site was also assessed. A Site-Specific Flood Risk Assessment was completed and is included as Appendix 8.3 (CSEA SSFRA, 2023). The assessment identified no flood hazards for the Proposed Development (principal and facilitation works). The Proposed Development (principal and facilitation works) resides within Flood Zone C and is not at risk of flooding from a 1% or 0.1% Annual Exceedance Probability (AEP) event. The flood zonation confirms that the site is suitable for this type of industrial development.

The principal and facilitation works site has no recorded historical flood events as noted in the OPW's flood maps – refer to Figure 8.6 below.

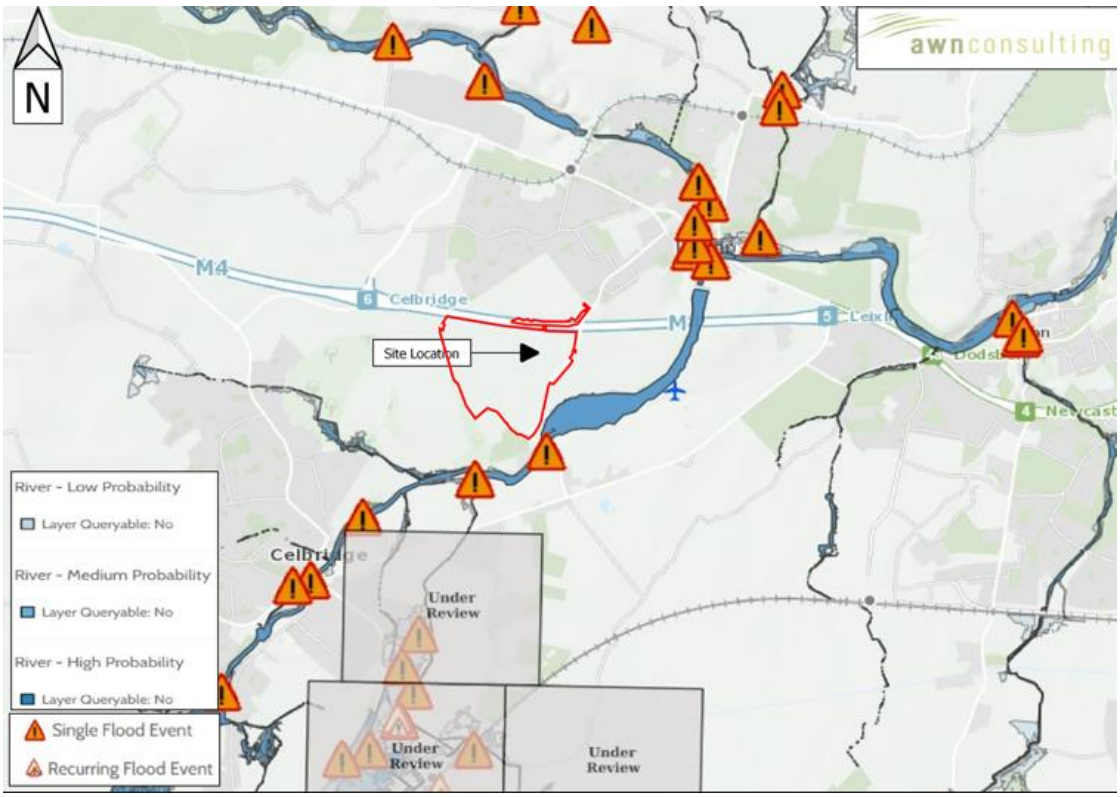


Figure 8.6 CFRAM River Flood Extents & Probability – Indicative Principal Site Boundary *only* (OPW, 2023)

The Kildare County Development Plan 2023-2029 (adopted January 28th 2023) has indicated that the subject lands are located outside the 0.1% AEP Zone.

- Predicted flood mapping for pluvial/tidal & fluvial flood events will not affect the subject lands.
- Following the flood risk assessment stages, it was determined that the site is within Flood Zone C as defined by the Guidelines and based on the CFRAMS mapping. Therefore, the development on the subject site is appropriate for the site's flood zone category and a justification test as outlined in the Guidelines is not required.

- A regularly maintained drainage system will ensure that the network remains effective and in good working order should a large pluvial storm occur.
- The likelihood of onsite flooding from the hydrogeological ground conditions are deemed to be minor and within acceptable levels.

RECEIVED: 19/07/2023

Therefore, this development is in compliance with Kildare County Development Plan 2023-2029 objectives and the Planning System and Flood Risk Management Guidelines 2009 for Planning Authorities (or any updated guidelines).

8.4.4 Existing Surface Water Drainage Network

Existing storm water runoff from the existing building surface areas discharges to the existing retention pond system. This includes roof run-off, runoff from carparking, associated access roadways and general yard areas which all discharge through petrol/ oil separators prior to the retention pond system. Two existing surface water retention ponds are located on the western site boundary. An additional fire water retention pond is also located there. Additional bunded storage is provided in the surrounding landscaped area in the event of an overflow occurring. The normal capacity of the retention ponds is 5000m3, with and additional 25,000m3 being able to be accommodated in the bunded overflow area. The discharge to the outfall is controlled to ensure an appropriate volume of water is retained at all times. These ponds serve the existing site as attenuation during extreme storm events as well as to provide the firefighting network with water when required. The site ultimately discharges its surface water runoff directly via an outfall pipe to the Leixlip Reservoir (Refer to CSEA Drawing No. DR-C-2100), following confirmation of water quality through electronic monitoring mechanisms inclusive of shut off valves, upstream of the existing Retention Ponds near the existing site entrance off the Celbridge Road.

The site is also connected to the local municipal sewerage network where wastewater streams drain by gravity to the Kildare County Council sewer and is treated within the municipal wastewater treatment plant in Leixlip.

8.4.5 Proposed Surface Water Drainage Network

The proposed drainage plan for the principal works site incorporates a SuDS Strategy which complies with the requirements of Sections 15.8 of Kildare County Council (KCC) Development Plan 2017-2023. There are four separate surface water drainage networks in the proposed development drainage plan which flow to separate surface water attenuation basins from which attenuated flows are discharged, via carrier drains, to the existing attenuation ponds within the site. The site is divided up into five catchment areas. These areas are defined by the topographical characteristics of the site and the proposed finish levels of the development. Each catchment collects the surface runoff and attenuates it within a pond up to the 1:100 year event. A flow control device will be installed within each catchment to slowly releases the water into the existing ponds. The portion of the site on the north side of the M4 will drain into small swales and landscaping. No attenuation or piped infrastructure will be required in this area.

The surface water runoff from the proposed development will follow the SuDS and surface water management strategy; utilising an innovative natural based SuDS components to provide the necessary processes to control runoff frequency, flow rates and volumes. The runoff will discharge from the proposed bioretention and attenuation systems before

outfalling to the existing pond system and existing monitoring regime on-site. The existing outfall from the existing ponds to the Leixlip Reservoir is to be retained. The following SuDS drainage elements are proposed:

RECEIVED: 18/07/2023

Source Control Measures

- Swales;
- Tree Pits;
- Rainwater Harvesting;
- Permeable Paving;
- Green Roofs; and
- Filter Drains.

Site Control Measures

- Ponds; and
- Permeable paving with stone-fill storage.

Refer to CSEA's *Engineering Services Report Drainage and Water Services* for further information regarding proposed site drainage, proposed source and site control measures and proposed pollution prevention measures.

Due to the increase in hardstanding area (c. 171,641.88 m^2) for the principal works site, which are going to replace existing brownfield lands, the attenuation system has been designed to provide sufficient capacity to contain and convey all surface water runoff associated with the 1 in 100-year event plus an additional allowance of 30% for climate change and 10% urban creep. This is as per Kildare County Council Water Services Department draft guidance on Drainage and SuDS Strategy.

As a result of the SuDS drainage, the proposed development will result in a reduction of surface water discharge from the development site. This will have a net positive result on the downstream surrounding areas as the potential for flooding will be reduced and the overall discharged runoff will have an improved water quality.

8.4.6 Existing Foul Water Drainage Network

The existing foul/wastewater inflows were pumped to the public sewerage system at the northeast corner of the site. Two pumping stations are located on the site with 200mm diameter pumping mains with provision included for future development.

Site watermain inflow record information indicates that outflow to the public sewerage network was likely to be up to 965m^3 per day during HP's previous operation at the site. Peak (3 x DWF) 34 l/s during 2009/ 2010. Peak DWF for the proposed development has been calculated at 2.52 l/s. The existing catering facility drainage system included a large capacity grease separator (estimated to cater for 1800 meals each day).

The existing foul pumping stations with the 200mm dia. pump rising mains shall be retained and upgraded where necessary to accommodate the new developments on the site. Upgrading shall include consideration of the pumps and automated pumping controls upgrade/updating/replacement etc. The station operation data signals etc shall be connected to the new location for the campus facilities management building etc. Underground 24-hour storage tanks shall be provided at each of the existing stations. The route of the existing pumping mains from the stations shall be realigned to facilitate the new development, as

shown on CSEA Drawing No's . 21_048-CSE-ZZ-ZZ-DR-C-2200, 21_048-CSE-ZZ-ZZ-DR-C-2210 - 1_048-CSE-ZZ-ZZ-DR-C-2218 in support of the planning application to foul water drainage.

RECEIVED: 18/07/2023

There are no new requirements for new foul connections outside of the overall landholding. The wastewater discharged from the site will ultimately discharge to the Waste Water Treatment Plant at Leixlip. There are no proposed process water emissions.

According to the Annual Environmental Report 2020 prepared for D0004-02, Lower Liffey Valley Regional Sewer Scheme in Kildare the peak hydraulic capacity of Leixlip WWTP is 65,405 m^3/day and the current hydraulic loading is 50,837m^3/day. Therefore Leixlip WWTP has sufficient capacity to accommodate the peak foul water outflow from the existing outflow to the public drainage network (c. 965m^3/day).

Further detail in relation to wastewater emissions is presented in CSEA's *Engineering Services Report Drainage and Water Services.*

8.4.7 Proposed Foul Water Drainage Network

A pre-connection enquiry (PCE) form was submitted to Uisce Éireann which addressed water and wastewater demand for the development. A response to the Pre-Connection Enquiry is awaited. It is anticipated that no upgrades to the surrounding infrastructure is required. It is proposed to outfall the foul drainage from the site to the existing 450mmø foul sewer in the Celbridge Road to the east of the development site. The proposed foul water drainage network has been designed in accordance with the requirements of Appendix B of the Uisce Éireann Code of Practice for Wastewater Infrastructure (IW-CDS-5030-03).

The proposed foul water drainage network collects domestic foul water flows from the administration block of the proposed Data Storage Facilities, the Deep Technology Buildings, Energy Centre and the 110kV substation and has been designed in accordance with the requirements of Appendix B of the Uisce Éireann Code of Practice for Wastewater Infrastructure (IW-CDS-5030-03).

8.4.7 Water Supply

A pre-connection enquiry (PCE) form was submitted to Uisce Éireann which addressed water and wastewater demand for the proposed development (principal works site). A response to the Pre-Connection Enquiry is awaited. Any upgrade works to the surrounding area will be identified within the Confirmation of Feasibility. There is an existing 150mmø water main located in the site which spurs from Celbridge Road.

It is proposed to connect a 150mmø watermain to this existing line within the Celbridge Road where connections will be provided from the 150mmø incoming water supply main to the admin area of the data centre buildings, the water treatment plant room, the sprinkler storage tanks, the substation, and the Deep Technology Buildings. The water main will also serve the proposed buildings, water treatment plant, sprinkler tanks, deep tech buildings and proposed substation. A separate fire hydrant main will be provided to serve the fire hydrants which will be feed from the sprinkler tanks.

The domestic water supply peak daily demand for the proposed development has been estimated as follows:

RECEIVED: 18/07/2023

- Population = 2080;
- Consumption = 45 litres per person per day + 30 litres per meal are added for Deep Technology buildings which are equipped with canteens;
- Daily Demand = 1.74 l/s;
- Average Day/Peak Week Demand = 1.25 x 1.74 = 2.18 litres/sec; and
- Peak Demand = 5.0 x 2.18 litres/sec = 10.9 litres/sec.

Each of the C1, C2 and C3 Data Centres have an annual expected potable water demand of 1643.8m3 with the B Data Centre having an annual expected potable water demand of 1166.1m3. These annual demands only be required during the peak summer periods.

- Total Annual Demand = 1643.8m^3 x 3 + 1166.1m^3 = 6097.5m3

The Data Centres will require an annual water demand of 6097.5m^3 resulting from the peak summer months only. This water will be stored on-site such that no water is required from Uisce Éireann during the peak summer months. In order to facilitate the tanks, the development will be required to fill up these tanks during the colder/winter periods at a very slow rate. It is proposed to fill up these tanks over a two-week period during the colder/winter periods in an attempt to reduce the water demand of Uisce Éireann network during the summer months.

- Peak Demand = 6097.5m3 x 1000 / [(2 weeks x 14 days) x 24 x 60 x 60] = 2.52 l/s

Further detail in relation to wastewater and water emissions is presented in CSEA's *Engineering Services Report Drainage and Water Services.*

8.4.8 Conservation Areas

According to the NPWS (2022) on-line database there are no special protected areas (SPA's), special areas of conservation (SAC's), National Heritage Areas (NHA's) or Proposed Natural Heritage Areas (pNHA's) within the boundary or immediate vicinity of the subject site. The European listed sites located in closest proximity are as follows:

- The Royal Canal (Site Code: 002103) pNHA - circa. 1.3km north of the site;
- Liffey Valley (Site Code: 000128) pNHA – circa. 1.6km north-east of the site; and
- Roy Water Valley/Carton SAC (Site Code: 001398) – circa. 1.4km north of the site.

The proposed development (principal and facilitation works) has no hydrological connection with the Rye Water Valley/Carton SAC as the Rye Water is upstream of the River Liffey. However, the principal works site has an indirect hydrological connection with Liffey Valley pNHA through the local drainage network and the River Liffey. Potential adverse effects on these European sites from the proposed development are highly unlikely given the distance of removal and integrated mitigation measures in place through standard SuDS measures on site – refer to Figure 8.7 below for the locations of the European sites mentioned above in the context of the site.

The proposed development (principal and facilitation works) will have a neutral imperceptible effect on water quality and flow of designated sites within the zone of impact of the development site. A full assessment of the ecology has been undertaken and is included in Chapter 6 of the EIAR.

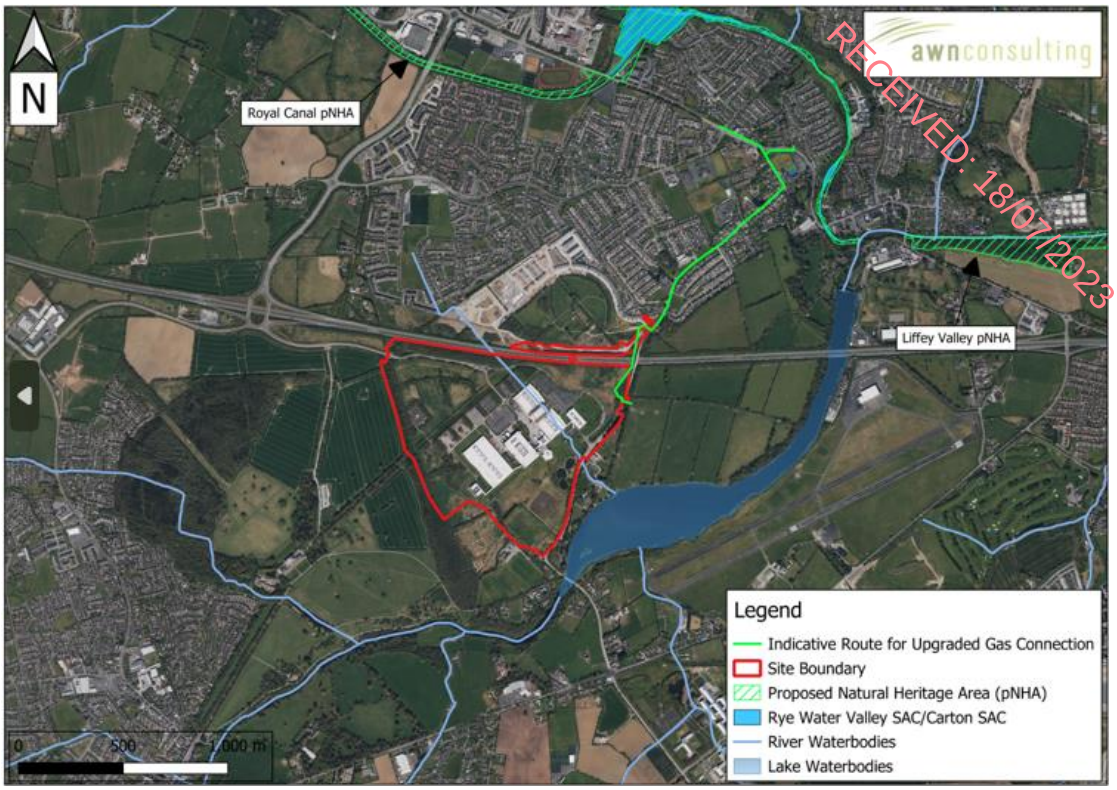


Figure 8.7 Areas of Conservation (GSI, 2023)

8.4.9 Rating of site importance of the hydrological features

In accordance with the 'Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes' by the TII (2009) the environmental significance of the nearest receiving environment (River Liffey) has been considered as having **Medium Importance** or value on a local scale.

8.4.10 Likely Future Receiving Environment

The EIA Directive requires the following to be described relating to the future receiving environment (the 'Do Nothing' scenario):

> *"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".*

It is likely that the land use will change over time even if this development does not go ahead. The associated impact of any such development will be similar to the proposed development for the underlying hydroogical regime.

In the event of a 'Do Nothing' scenario, the subject site would remain in operation as an existing ICT campus.

8.5 Likely Impacts of the Project

The potential impacts in relation to hydrology during the construction and operational phases are outlined below and the assessment of effects defined based on the description of effects as set out in the EIA Report Guidelines (2022) (Table 1.2 Chapter 1) and the EPA criteria detailed in Appendix 8.1.

RECEIVED: 18/07/2023

8.5.1 Construction Phase

During the construction phase of the proposed development (principal and facilitation works), the potential impacts in relation to hydrology (in the absence of mitigation) are assessed in the following sections.

Increased Run-off and Sediment Loading

Surface water run-off from site preparation, levelling and excavations during the construction phase may contain increased silt levels or become polluted from construction activities. Run-off containing large amounts of silt can cause damage to surface water systems and receiving watercourses. Silt water can arise from excavations, exposed ground, stockpiles, and access roads.

During the construction phase at the principal works site in particular, there is potential for a slight increase in run-off due to the introduction of impermeable surfaces, increase in hardstanding (171,641.88 m^2) and the compaction of soils. This will reduce the infiltration capacity and increase the rate and volume of direct surface run-off. The potential impact of this is a possible increase in surface water run-off and sediment loading which could potentially impact local drainage. In particular through the excavation works required to facilitate the local extension upgrades of the gas transmission network over a length of approximately 7km from the R136 roundabout at Lucan.

Excavation for foundations, services, and landscaping

The proposed development (principal and facilitation works) will require site preparation, excavations and levelling for foundations, the installation of services and landscaping. The GNI upgrades will be delivered through a local upgrade of the gas network over a length of approximately 1.5km Ryevale Lawns along Station Road, Old Hill and Celbridge Road for a distance of approximately 1.5km up to the entrance of Barnhall Meadows. The pipe will run under the existing road pavement. At the entrance to Barnhall Meadows, the pipe will run underground through the Barnhall Meadows lands (adjacent to the existing haul road) and will then cross the M4 Motorway through Horizontal Directional Drilling and enter the Kildare Innovation Campus then connecting to the proposed Gas Skid.

Some removal of perched rainwater from the excavation may be required. Volumes will be quite low, and all pumped water will be subject to onsite settlement before release to the Leixlip Reservoir.

Contamination of Local Water Courses

During the construction phase, there is a risk of accidental pollution incidences from the following sources:

- Localised spillage or leakage of fuels (and oils) stored on site for construction.
- Spillage or leakage of fuels (and oils) from construction machinery or site vehicles.
- Spillage of oil or fuel from refuelling machinery on site.

- Alkaline run-off due to use of concrete and cement.

RECEIVED: 19/07/2023

Machinery activities on site during the construction phase may result in contamination of runoff/surface water. Potential impacts could arise from accidental spillage of fuels, oils, paints etc. which could impact surface water if allowed to infiltrate to runoff to surface water systems and/or receiving watercourses. However, implementation of the mitigation measures detailed in Sections 8.6.1 will ensure that this does not occur.

Summary of the Construction Phase Impacts

A summary of construction phase impacts for the Proposed Development (with and without mitigation) following EPA (2022) EIA guidelines is provided below.

The magnitude of the impact for the construction phase without mitigation and design measures is ***Temporary*** in duration with ***Slight*** effect rating to the hydrological environment present.

However, with the implementation of design and mitigation measures for the Proposed Development site the impact of the construction phase is ***short-term*** in duration with an ***Imperceptible*** effect rating.

8.5.2 Operational Phase

The following risks have been considered in relation to the operational phase of the development:

Surface Water

There is a direct connection to the Leixlip Reservoir east of the proposed development (principal works site) which falls part of the River Liffey. The principal works site discharges its surface water runoff directly into the Leixlip Reservoir following confirmation of water quality through electronic monitoring mechanisms inclusive of shut off valves, upstream of the existing retention ponds near the existing site entrance off the Celbridge Road. The Kilmacredock_Upper watercourse is mapped on the EPA as flowing in a south-easterly direction through the site. This waterocourse has been diverted beneath the site via a 1.5m culvert and outfalls into the Leixlip Reservoir east of the Celbridge Road. The existing and proposed development does not discharge to the Kilmacredock_Upper waterocurse. The SuDs features have been designed to accommodate surface water drainage from the proposed development. Attenuation measures include bio retention areas, attenuation ponds, swales, filter drains, permeable paving and hydrocarbon interceptors. Proposed discharge rates for the Proposed Development and the overall landholding are addressed in CSEA's *Engineering Services Report Drainage and Water Services.*.

Wastewater

The existing foul/wastewater inflows were pumped to the public sewerage system at the northeast corner of the site. Two pumping stations are located on the site with 200mm dia. pumping mains with provision included for future development. The existing foul pumping stations with the 200mm dia. pump rising mains shall be retained and upgraded where necessary to accommodate the new developments on the site. Upgrading shall include

consideration of the pumps and automated pumping controls upgrade/updating/replacement etc. Underground 24-hour storage tanks shall be provided at each of the existing stations.

RECEIVED 18/07/2023

The route of the existing pumping mains from the stations shall be realigned to facilitate the new development, as shown on CSEA Drawing No's . 21_048-CSE-ZZ-ZZ-DR-C-2200, 21_048-CSE-ZZ-ZZ-DR-C-2210 - 1_048-CSE-ZZ-ZZ-DR-C-2218 submitted as part of the planning application.

A new, additional pumping facility shall be provided to service areas of development outside the catchments of the existing stations. There are no new requirements for new foul connections outside of the overall landholding. The wastewater discharged from the site will ultimately discharge to the Waste Water Treatment Plant at Leixlip. There are no proposed process water emissions. The proposed foul network will be designed in accordance with the Uisce Éireann Code of Practice for Wastewater.

It is not proposed to discharge any trade effluent to the foul sewer.

Refer to CSEA's *Engineering Services Report Drainage and Water Services.* for further design information.

A pre-connection enquiry (PCE) form was submitted to Uisce Éireann which addressed water and wastewater demand for the development. A response to the Pre-Connection Enquiry is awaited. Any upgrade works to the surrounding area will be identified within the Confirmation of Feasibility.

Refer to CSEA's *Engineering Services Report Drainage and Water Services* for further information.

Fuel and Other Accidental Spills

There is a potential for leaks and spillages from the proposed fuel oil generators to occur on site. In addition to this there is a potential for leaks and spillages from vehicles along access roads, loading bays and in parking areas. Any accidental emissions of oil, petrol or diesel could cause contamination if the emissions enter the water environment unmitigated.

In the event of a fire at the facility, firewater will also need to be contained or it may contaminate receiving waters.

The fuel for the generators will be stored in individual, double-skinned storage tanks. Each tank has the capacity to store 15.5 m^3 of diesel; Each tank has the capacity to store 15.5 m*3* of diesel; therefore, a total of 1,240 m*3* across all Data Centres (or 1066 tonnes at a density of 0.86 tonnes / m*3*). The energy centre will have its own HVO bulk storage of c.3440 tonnes.

As there is full containment for bulk fuel oil, use of interceptors as part of the SuDS approach, additional dilution within the attenuation ponds and no direct pathway to surface water from this site there is no likely potential impact on offsite watercourses.

Increase in Hardstanding

In relation to the principal works site, there will be an increase in overall hardstand as a result of the proposed development of c. 171,641.88 m^2. The existing site has a total hardstanding

of c. 86029.00 m^2. The proposed development will have a total hardstanding of c. 257, 670.88 m^2. This may increase the run-off rates from the proposed development site into receiving surface waterbodies (Leixlip Reservoir, River Liffey). However, the proposed development will follow the SuDS and surface water management strategy; utilising an innovative natural based SuDS components to provide the necessary processes to control runoff frequency, flow rates and volumes. Attenuation measures include bio retention areas, attenuation ponds, swales, filter drains, permeable paving and hydrocarbon interceptors. This will have a net positive result on the downstream surrounding areas as the potential for flooding will be reduced and the overall discharged runoff will have an improved water quality due to the proposed SuDS upgrades.

RECEIVED 18/07/2023

Proposed discharge rates for the Proposed Development and the overall landholding are addressed in CSEA's *Engineering Services Report Drainage and Water Services.*

Summary of the Operational Phase Impacts

A summary of operational phase impacts for the Proposed Development (with and without mitigation) following EPA (2022) EIA guidelines is provided below.

In the absence of mitigation measures, the operational phase of the proposed development will likely have a **Neutral**, **Long-Term** and **Slight** impact.

With the implementation of the appropriate mitigation measures outlined in Section 8.6.2, the operational phase of the proposed development will likely be ***Long-Term, Neutral*** in terms of quality and ***Not Significant.***

8.6 Mitigation Measures and Monitoring of Impacts

The design of the Proposed Development (principal and facilitation works) has taken account of the potential impacts of the development and the risks to the water environment specific to the areas where construction is taking place as described in Section 8.5 above.

The proposed development (Principal works site) has a direct hydrological connection with Leixlip Reservoir via the surface water drainage network and an indirect connection to the River Liffey and Liffey Valley pNHA. Caution will be taken to mitigate the potential effects on the local water environment. These measures seek to avoid or minimise potential effects in the main through the implementation of best practice construction methods and adherence to all relevant legislation.

8.6.1 Construction Phase

Construction Environnemental Management Plan (CEMP)

A Construction Environmental Management Plan (CSEA, 2023) has been prepared for planning which details project-specific construction methodologies. A sample CEMP for the GNI works has also been provided (Appendix 6.1) A project-specific CEMP will be prepared and maintained by the appointed contractors during the construction phase of the proposed project. The CEMP will cover all potentially polluting activities and include an emergency response procedure. All personnel working on the site will be trained in the implementation of the CEMP. At a minimum, the manual will be formulated to the standard best international practice including, but not limited, to:

RECEIVED: 18/07/2023

- CIRIA, (2001), *Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors, (C532)* Construction Industry Research and Information Association;
- CIRIA (2002) *Control of water pollution from construction sites: guidance for consultants and contractors (SPI56)* Construction Industry Research and Information Association;
- CIRIA (2005), *Environmental Good Practice on Site* (C650); Construction Industry Research and Information Association;
- BPGCS005, *Oil Storage Guidelines*;
- CIRIA 697 (2007), *The SUDS Manual*; and

To ensure the CEMP remains fit for purpose, it will be regarded as a live document. The appointed contractor will be responsible for updating the CEMP, as required; e.g. to reflect the publication of relevant new or revised guidelines and / or new statutory requirements. The full schedule of environmental commitments (i.e. all mitigation measures set out in the CEMP, Environmental Impact Assessment Report and submitted as part of the planning application, as well as any applicable conditions of development consent) will be included in the CEMP by the appointed contractor.

Culvert Design

As per the CSEA CEMP the proposed redesign of the culvert will ensure that there is no reduction in the hydraulic capacity of the culvert and no resultant increase in flood risk. The new culvert will be built as part of the phase 1 development. The new culvert route will be constructed prior to the decommissioning of the existing culvert. This will ensure minimal operational disturbance of the existing infrastructure. The contractor will begin the works by initially excavating the proposed route for the new culvert. The proposed culvert will then be fully constructed except for the tie-in locations to the existing culvert. Once the proposed culvert is constructed, cleaned, and inspected the tie-in locations to the existing culvert will be completed. This will ensure minimal operational disturbance to the existing infrastructure. Once the existing water course has been diverted through the new route, the existing culvert will be removed.

The proposed diverted culvert will be c.360m in length, located c.90 south-west of the existing culvert. The work will be achieved over 8 weeks. As per the AA Screening Report findings, no significant effects whether arising from the project itself or in combination with any other plan or project, are likely to occur to the Natura 2000 sites largely due to the significant distance of the project from the identified sites. Notwithstanding this, best practice environmental controls will be put in place as per the balance of the site to ensure no damage to the immediate aquatic receiving environment. Run-off from the site or any area of exposed soils should be channelled and intercepted and discharged to silt traps with over-flows directed to land rather than the existing culvert. A maintenance schedule and operation procedure should be implemented by the Contractor for the silt and pollution control measures during the construction of the diverted culvert.

Surface Water Run-off

Run-off water containing silt will be contained on site via settlement tanks and treated to ensure adequate silt removal. Silt reduction measures on site will include a combination of silt fencing, settlement measures (silt traps, silt sacks and settlement ponds).

Should any discharge of construction water be required during the construction phase, the discharge will be treated using sediment traps as required.

RECEIVED 18/07/2023

The temporary storage of soil will be carefully managed. Stockpiles will be tightly compacted to reduce runoff and graded to aid in runoff collection. This will prevent any potential negative impact on the storm water drainage and the material will be stored away from any surface water drains. Movement of material will be minimised to reduce the degradation of soil structure and generation of dust. Excavations will remain open for as little time as possible before the placement of fill. This will help to minimise the potential for water ingress into excavations.

Weather conditions will be considered when planning construction activities to minimise the risk of run-off from the site through the excavation works required to facilitate the local extension upgrades of the gas transmission. The suitable distance of topsoil piles from surface water drains will also be maintained.

Fuel and Chemical Handling

The following mitigation measures will be taken at the construction stage in order to prevent any spillages of fuels and prevent any resulting impacts to the surface water system;

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

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

- Secure storage of all containers that contain potential polluting substances in a dedicated internally bunded chemical storage cabinet unit or inside concrete bunded areas. The containment measures planned will minimise the risk of release of solid/ liquid material spillages to the water environment. Containment measures will include storage of fuels on site in bunded containers or compartments. The design of all bunds will conform to standard bunding specifications - BS EN 1992-3:2006, *Design of Concrete Structures – Part 3: Liquid retaining and containment measures*;
- Clear labelling of containers so that appropriate remedial measures can be taken in the event of a spillage;
- All drums to be quality approved and manufactured to a recognised standard;
- If drums are to be moved around the site, they should be done so secured and on spill pallets; and
- Drums to be loaded and unloaded by competent and trained personnel using appropriate equipment.

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

RECEIVED: 18/07/2023

Accidental Releases

Emergency response procedures will be outlined in the site CEMP and are set out in the CEMP included with the application. All personnel working on the site will be suitably trained in the implementation of the procedures.

Soil Removal and Compaction

Temporary storage of soil will be carefully managed in such a way as to prevent any potential negative impact on the receiving environment. The material will be stored away from any open surface water drains (see Surface Water Run-off section above). Movement of material will be minimised to reduce degradation of soil structure and generation of dust. No soil storage will occur within 30 m of any of the open surface water features including the existing retention ponds. Given the size of the site where sufficient working areas are available within the site boundaries this is achievable. All soil storage and removal practices during the construction phase will be in accordance with Inland Fisheries Ireland guidelines (Guidelines on protection of fisheries during construction works in and adjacent to waters, 2016).

Site investigations carried out at the site by IGSL in December 2019 found no residual contamination on site. Nonetheless, all excavated materials will be visually assessed for signs of possible contamination such as staining or strong odours. Should any unusual staining or odour be noticed, samples of this soil will be analysed for the presence of potential contaminants to ensure that historical pollution of the soil has not occurred. Should it be determined that any of the soil excavated is contaminated, this will be segregated and appropriately disposed of by a suitably permitted/licensed waste disposal contractor.

8.6.2 Operational Phase

Environmental Procedures

The Operator of the proposed data centre buildings implements an Environmental Management System at each of its facilities. Prior to operation of the Proposed Development, a comprehensive set of operational procedures will be established (based on those used at other similar facilities) which will include site-specific mitigation measures and emergency response measures as outlined below, similar procedures will be developed for the DeepTech buildings and energy infrastructure:

Fuel and Chemical Handling

The containment measures planned will minimise the risk of release of solid/ liquid material spillages to the water environment. Containment measures will include storage of fuels on site in bunded containers or compartments. The design of all bunds will conform to standard bunding specifications - BS EN 1992-3:2006, *Design of Concrete Structures – Part 3: Liquid retaining and containment measures.*

RECEIVED: 18/07/2023

Storm and Foul Water Drainage

The proposed development (principal works site) will provide a significant improvement to the local drainage as it is proposed to provide full attenuation for increase in hardstand area (c. 171,641.88 m^2) in compliance with the requirements of the Greater Dublin Strategic Drainage Study.

A number of attenuation measures will be implemented to minimise the likelihood of any spills entering the water environment to include the design ofattenuation techniques such as Swales, Tree pits, Green roofs, Filter drains, Permeable paving, Rainwater Harvesting system, Bio-Retention ponds, Hydrocarbon interceptors, Silt Traps and Attenuation facilities will protect from on-site and off-site flooding which is in compliance with Kildare County Development Plan 2023-2029 that requires the use of sustainable drainage systems (SuDS) to minimise and limit the extent of hard surfacing and paving and require the use of sustainable drainage techniques where appropriate, for new development or for extensions to existing developments, in order to reduce the potential impact of existing and predicted flooding risks.

As a result, the proposed development (principal works site) will result in a reduction of surface water discharge from the development site. This will have a net positive result on the downstream surrounding areas as the potential for flooding is reduced and the overall discharged runoff will have an improved water quality. Refer to CSEA's *Engineering Services Report Drainage and Water Services* for further information.

The proposed foul and surface water network will be designed in accordance with the Uisce Éireann Code of Practice for Wastewater.

Water Supply

A Pre-Connection Enquiry has been submitted to Uisce Éireann. Refer to Chapter 2 for further detail.

There is an existing 150mmø water main located in the site which spurs from Celbridge Road. Uisce Éireann are proposing updates to the network which will serve the development. It is proposed to connect a 150mmø watermain to this existing line within the Celbridge Road to provide connections from the 150mmø incoming water supply main to the admin area of the data centre buildings, the water treatment plant room, the sprinkler storage tanks, the substation, and the Deep Technology Buildings.

The Data Centres will require an annual water demand of 6097.5m^3 resulting from the peak summer months only. This water will be stored on-site such that no water is required from Uisce Éireann during the peak summer months. In order to facilitate the tanks, the development will be required to fill up these tanks during the colder/winter periods at a very slow rate. It is proposed to fill up these tanks over a two-week period during the colder/winter periods in an attempt to reduce the water demand of Uisce Éireann network during the summer months.

8.7 Likely Cumulative and Interaction Impacts of the Project

8.7.1 Cumulative Impacts

RECEIVED: 18/07/2023

The anticipated cumulative effect of the Proposed Development with any/all relevant other planned or permitted developments as outlined in Chapter 2 and 3 are discussed in below for construction and operational phases respectively.

Construction Phase

In relation to the potential cumulative impact on hydrology during the construction phase, the construction works which would have potential cumulative impacts include:

- Surface water run-off during the construction phase may contain increased silt levels or become polluted from construction activities. Run-off containing large amounts of silt can cause damage to surface water systems and receiving watercourses.
- Contamination of local water sources from accidental spillage and leakage from construction traffic and construction materials unless project-specific CEMPs are put in place for each development and complied with.

Operational Phase

In relation to the potential cumulative impact on hydrology during the operational phase, operational works which would have potential cumulative impacts include:

- Increased hard standing areas (171,641.88 m^2) for the principal works site will reduce local recharge to the ground and increase surface water run-off potential if not limited to the green field run-off rate from the site.
- Increased risk of accidental releases from fuel storage/delivery unless mitigated adequately i.e. bunded tank.
- Increased risk of accidental discharge of hydrocarbons from car parking areas and along roads and unless diverted to surface water system with petrol interceptor; and
- Any additional foul discharges should be treated where appropriate and/or diverted to the foul sewer system and not directly to ground.

All developments will be required to manage any discharges to water and operate in compliance with relevant legislation (European Communities Environmental Objectives (Surface Waters); Regulations, 2009 (S.I. No. 272 of 2009 as amended by SI No. 77 of 2019). As such there will be no likely cumulative impact on water quality.

Increase in wastewater loading and water supply requirement is an impact of all developments: Each development will require approval from the IW confirming available capacity in the water and wastewater infrastructure. The surface water and foul drainage infrastructure and water supply requirements for the proposed development has been designed and assessed to accommodate the requirements of the proposed development.

Development will result in an increase in hard standing which will result in localised reduced recharge to ground and increase in run-off rate. However, each permitted development is required by the Local Authority and IW to comply with the Greater Dublin Strategic Drainage Strategy (GDSDS) and Local Authority and IW requirements by providing suitable attenuation on site to ensure greenfield run-off rates and ensure that there is no increase in offsite flooding as a result of development.

The residual cumulative impact on hydrology for the construction and operation phases is anticipated to be ***Long-Term, Neutral*** in terms of quality and ***Not Significant***, once appropriate

mitigation measures to manage water quality runoff in compliance with legislative requirement are put in place for each development.

RECEIVED: 18/07/2023

8.8.1 Interaction Impacts with Biodiversity

Construction Phase

Dust emissions have the potential to settle on plants causing impacts to local ecology. Mitigation measures during the construction phase of the proposed development will ensure that dust generation is minimised and the effect on biodiversity will be short term, imperceptible and neutral.

There is potential for impacts to biodiversity associated with uncontrolled discharges to surface waters. In this instance the site discharges its surface water runoff directly into the Leixlip Reservoir via an outfall pipe following confirmation of water quality through electronic monitoring mechanisms inclusive of shut off valves, upstream of the existing retention ponds near the existing site entrance off the Celbridge Road.

There is an indirect hydrological connection for the principal works site with a number of nationally and internationally important habitats located within Dublin Bay. However due to the hydrological distance of removal and volume, there are no adverse effects anticipated (c. 22km to the east). The use of standard demolition and construction control measures as provided in the CEMP and the standard sustainable urban drainage systems implemented on-site will result in no potential for impact on biodiversity downstream of the site. The impact upon biodiversity from hydrological impacts would be long-term and neutral.

Taking into account the design and mitigation measures set out in Chapter 6 of this EIA Report, there remains a residual negative interaction between hydrology, and biodiversity during the construction phase. The interaction is considered to be ***negative***, ***not significant***, and ***short term***.

Operational Phase

There is potential for impacts to biodiversity associated with uncontrolled discharges to surface waters. In this instance the site discharges its surface water runoff directly into the Leixlip Reservoir via an outfall pipe following confirmation of water quality through electronic monitoring mechanisms inclusive of shut off valves, upstream of the existing retention ponds near the existing site entrance off the Celbridge Road.

There is an indirect hydrological connection with a number of nationally and internationally important habitats located within Dublin Bay. However due to the hydrological distance of removal and volume, there are no adverse effects anticipated (c. 22km to the east). The use of standard demolition and construction control measures as provided in the CEMP and the standard sustainable urban drainage systems implemented on-site will result in no potential for impact on biodiversity downstream of the site. The impact upon biodiversity from hydrological impacts would be long-term and neutral.

Taking into account the design and mitigation measures set out in Chapter 6 of this EIA Report, the interaction between hydrology, and biodiversity during the operational phase is considered to be ***neutral***, and ***long term***.

RECEIVED: 18/07/2023

8.8.2 Interaction Impacts with Air Quality and Climate

Construction Phase

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

Mitigation measures implemented during the construction phase will ensure that the deposition of dust is minimised. With the appropriate mitigation measures to prevent fugitive dust emissions, it is predicted that there will be no significant interactions between air quality and hydrology.

The interaction is considered to be ***negative***, ***not significant***, and ***short term***. There are no potentially significant interactions identified between hydrology, and climate during the construction phase.

Operational Phase

There are no potentially significant interactions identified between hydrology, and air quality during the operational phase. Climate change has the potential to lead to increased rainfall in future years which may result in flood impacts and interactions between Hydrology and Land, Soils and Geology.

A detailed Site Specific Flood Risk Assessment (SSFRA) was carried out for the proposed development which states that the site is located in Flood Zone C with an annual probability of flooding (fluvial) of less than 0.1%.

The site is divided up into five catchment areas. These areas are defined by the topographical characteristics of the site and the proposed finish levels of the development. Each catchment collects the surface runoff and attenuates it within a pond up to the 1:100 year event. A flow control device will be installed within each catchment to slowly releases the water into the existing ponds. The SuDs features have been designed to provide sufficient capacity to contain and convey all surface water runoff associated with the 1 in 100-year event plus an additional allowance of 30% for climate change and 10% urban creep.

Therefore it can be determined that there is no significant risk to the proposed development as a result of increased rainfall and climate. No significant interactions between climate, hydrology and land, soils and ecology is predicted.

8.8.3 Noise and Vibration

Construction Phase

There are no potentially significant interactions identified between hydrology, and noise and vibration during the construction phase.

RECEIVED: 18/07/2023

Operational Phase

There are no potentially significant interactions identified between hydrology, and noise and vibration during the operational phase.

8.8.4 Landscape and Visual Impacts

Construction Phase

There are no potentially significant interactions identified between hydrology, and landscape and visual impacts during the construction phase.

Operational Phase

There are no potentially significant interactions identified between hydrology, and landscape and visual impacts during the operational phase.

8.8.5 Archaeological, Architectural and Cultural Heritage

Construction Phase

There are no potentially significant interactions identified between hydrology, and archaeological, architectural and cultural heritage during the construction phase.

Operational Phase

There are no potentially significant interactions identified between hydrology, and archaeological, architectural and cultural heritage during the operational phase.

8.8.6 Material Assets, including Utilities, Waste, and Transport

Construction Phase

There are no potentially significant interactions identified between hydrology, and material assets during the construction phase.

Operational Phase

The proposed development (principal works site) will follow the SuDS and surface water management strategy; utilising an innovative natural based SuDS components to provide the necessary processes to control runoff frequency, flow rates and volumes. The use of SuDS during operations will mean that the runoff will discharge from the proposed bioretention and attenuation systems before out falling to the existing pond system and existing monitoring regime on-site resulting in a reduction of surface water discharge from the development site. This will have a net positive result on the downstream surrounding areas as the potential for flooding will be reduced and the overall discharged runoff will have an improved water quality due to the proposed SuDS upgrades. The SuDs features have been designed to provide sufficient capacity to contain and convey all surface water runoff associated with the 1 in 100-year event plus an additional allowance of 30% for climate change and 10% urban creep. This is as per Kildare County Council Water Services Department draft guidance on Drainage and SuDS Strategy.

Attenuation measures include bio retention areas, attenuation ponds, swales, filter drains, permeable paving and hydrocarbon interceptors. The interaction is considered to be ***negative***, ***not significant***, and ***long-term***.

RECEIVED: 19/07/2023

8.9 Mitigation Measures and Monitoring of Cumulative and Interaction Impacts

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

There are no relevant other permitted or proposed developments within the immediate vicinity of the proposed development site.

8.9.1 Construction Phase

Every development will have to incorporate SuDS measures to protect water quality in compliance with legislative standards for receiving water quality (European Communities Environmental Objectives (Surface Water) Regulations (S.I. 272 of 2009 and S.I. 77 of 2019).

During construction phase the following monitoring measures will be implemented:

- Regular inspection of surface water run-off and sediments controls (e.g., silt traps);
- Soil sampling to confirm disposal options for excavated soils in order to avoid contaminated run-off; and
- Regular inspection of construction / mitigation measures (e.g., concrete pouring, refuelling, etc).

As a result, there will be minimal cumulative potential for change in the natural hydrological regime. The cumulative impact is considered to be ***short-term***, ***neutral*** and ***imperceptible***.

8.9.2 Operational Phase

All the operational cumulative developments are required to manage discharges in accordance with S.I 272/2009 and 77/2019 amendments. As such there will be no cumulative impact to surface water quality and therefore there will be no cumulative impact on the Surface Waterbody Status.

During operational phase the following monitoring measures will be implemented:

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

The operation of the proposed development is concluded to have a ***long-term***, ***imperceptible*** significance with a ***neutral*** impact on surface water quality.

8.10 Major Accidents and/or Disasters

RECEIVED: 19/07/2023

The EPA Guidelines, 2022, state that:

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

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

There are currently no COMAH / SEVESO sites in proximity to the proposed development site. A Risk Assessment following the methodology set out by the HSA's *Guidance on Technical* Land Use Planning Advice (HSA, 2023), has been carried out, by AWN Consulting Ltd., as part of this planning application in accordance with the Guidance on Technical Land Use Planning Advice (HSA, 2023) and includes a Major Accident to the Environment (MATTE) assessment (CDOIF, 2017).

The major accident hazards for the proposed development are presented in Table 17. 4 and the natural disaster hazards are presented in Table 17. 5 in Chapter 17 "Major Accidents and Disasters" of this EIAR.

The following scenarios have been identified that could impact the construction and operational phases of the proposed development.

8.10.1 Construction Phase

The following scenarios have been identified that could impact the construction phase of the project:

- Extreme heat or cold weather resulting in result structural damage and/or pollution to soils, groundwater or surface waters;
- Storm events resulting in structural damage and/or pollution to groundwater and surface waters;
- Flooding; and
- Pollution to soils / groundwater / surface water.

There are no likely impacts on the project or to off-site receptors during the construction phase in relation to major accidents and disasters.

8.10.2 Operational Phase

The potential hazards associated with substances stored at the proposed development and processes at the proposed development which have the potential to cause a major accident

are summarised in the following section. All hazards identified require a loss of containment to occur; such as, catastrophic damage or failure of pipework and/or storage tanks.

RECEIVED: 18/07/2023

Fire

Flash Fire: A flash fire can occur following a loss of containment of natural gas from the natural gas pipeline, which results in a flame which passes through the mixture at less than sonic velocity such that explosion overpressures are negligible. A flash fire may be caused by releases at high or low pressure into an open, unconfined area which contacts an active source of ignition.

Jet Fire: A jet fire can occur following a loss of containment of natural gas from the natural gas pipeline, via a source such as a leak or failure of flanged pipework joints, pipework or another asset which contacts an active source of ignition

Explosion

Vapour Cloud Explosion (VCE): A loss of containment of natural gas, within a turbine enclosure, which does not ignite immediately may form a cloud of flammable material depending on the conditions of the release. If this cloud contacts an active source of ignition, a VCE can result and generate potentially harmful overpressures

Major Accident to the Environment (MATTE)

A loss of containment of liquids such as fuel oils which are accidentally released to water, land and/ or groundwater in significant quantities can cause harm to the environment.

In keeping with EIA guidance these results are a summary of the Land Use Planning Assessment (report reference: MM.237501.0007RR01). There are no likely impacts to off-site receptors, as a result of the proposed development, during the operational phase in relation to major accidents and disasters.

8.11 Mitigation Measures and Proposed Response to such Emergencies

The proposed development has been designed in line with good industry practice, and, as such, mitigation against the risk of major accidents and/or disasters is embedded through the design and in accordance with planning and legislative requirements.

8.12 Residual Impacts

The residual effects are the final predicted or intended effects which occur after the proposed mitigation measures have been implemented. It will not always be possible or practical to mitigate all adverse effects.

This assessment has identified the potential for major accident hazards to occur. These scenarios can have significant consequences; however, the likelihood of these events occurring is low due to engineering and operational safeguards that will be implemented at the development. The Land Use Planning Assessment concluded that the risk contours do not extend off-site; therefore, there are no impacts to off-site receptors.

RECEIVED 18/07/2023

In the case of the Proposed development (principal and facilitation works), there will be no significant residual impacts; the potential impact on surface water during operation and closure (following the EPA Draft EIA Report Guidelines (2017) will be l***ong term imperceptible*** and ***neutral*** i.e. an impact capable of measurement but without noticeable consequences.

8.14 References

- CIRIA (2001). Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors.
- CIRIA (2005). Environmental Good Practice on Site (C650).
- CIRIA (2007). CIRIA 697: The SUDS Manual.
- Department of Housing, Planning & Local Government (2018). River Basin Management Plan for Ireland 2018 – 2021.
- Eastern Regional Fisheries Board (2006). Fisheries Protection Guidelines: Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites.
- Enterprise Ireland (n.d.). Best Practice Guide BPGCS005: Oil Storage Guidelines.
- EPA (2022a). Guidelines on the Information to be Contained in Environmental Impact Assessment Reports.
- EPA (2022b). EPA Maps.
- GSI (2022). GSI Map Viewer.
- Institute of Geologists of Ireland (2013). Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements.
- NPWS (2022). Designations Viewer.
- NRA (2009). Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes.
- OPW (2022). Flood Maps.
- OPW (2009). The Planning System and Flood Risk Management: Guidelines for Planning Authorities.
- Kildare County Development Plan 2023-2029. Appendices. Kildare County Council.
- Teagasc (2022). Teagasc Map Viewer.
- National Roads Authority (NRA) (2009). Guidelines on Procedures for the Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes.
- Lower Liffey Valley Regional Sewerage Scheme – Annual Environmental Report 2013

RECEIVED: 18/07/2023

9.0 AIR QUALITY

9.1 Introduction

AWN Consulting Limited has been commissioned by Tom Phillips and Associates on behalf of the Davy Platform ICAV for and on behalf of the Liffey Sub Fund to conduct an air quality impact assessment of the proposed development and associated facilitation works.

This chapter evaluates the impacts which the project may have on Air Quality as defined in the EPA EIA Report Guidelines 2022.

Air dispersion modelling was carried out using the United States Environmental Protection Agency's regulated model AERMOD. The AERMOD model has USEPA regulatory status and is one of the advanced models recommended within the air modelling guidance document 'Air Dispersion Modelling from Industrial Installations Guidance Note (AG4)' published by the EPA in Ireland (EPA, 2020). Further information on the background of the AERMOD model can be found in Appendix 9.1. The modelling of air emissions from the site was carried out to assess concentrations of nitrogen dioxide (NO_2) at a variety of locations beyond the site boundary.

In relation to the proposed development, the facility will have 9 combustion turbine generators (CTGs) which will have a stack height of 15m above ground level and 80 back-up generators which will have a stack height of 18m above ground level. The back-up generators will power the data centre in the event of an interruption to the supply of power from the National Grid. The other aspects of the development including the data halls and the Deep Tech buildings and facilitation works will lead to some air emissions during construction but will not be significant sources of air emissions during the operational phase.

The dispersion modelling study consisted of the following components:

- Review of the construction phase of the proposed development including the facilitation works;
- Review of emissions data and other relevant information needed for the modelling study;
- Review of background ambient air quality in the vicinity of the facility;
- Air dispersion modelling of significant substances released from the site;
- Identification of predicted concentrations of released substances beyond the site boundary;
- Evaluation of the environmental significance of these predicted concentrations, including consideration of whether these concentrations are likely to exceed relevant ambient air quality standards and guidelines.

This chapter has been prepared by AWN Consulting Limited – Dr Edward Porter (BSc PhD C Chem MRSC MIAQM) and reviewed by Dr. Avril Challoner (BSc PhD C Chem MRSC MIAQM).

Dr. Edward Porter is Director with responsibility for Air Quality with AWN Consulting. He holds a BSc from the University of Sussex (Chemistry), and a PhD in Environmental Chemistry (Air Quality) in UCD where he graduated in 1997 and is a Full Member of the Royal Society of Chemistry (MRSC CChem) with 25 years' experience. He specialises in the fields of air quality, odour and air dispersion modelling.

RECEIVED: 18/07/2023

Dr. Avril Challoner is an Environmental Consultant in the Air Quality section of AWN Consulting. She holds a BEng (Hons) in Environmental Engineering from the National University of Ireland Galway, HDip in Statistics from Trinity College Dublin and has completed a PhD in Environmental Engineering (Air Quality) in Trinity College Dublin graduating in 2013. She is a Member of the Institute of Air Quality Management and specialises in the fields of air quality, EIA and air dispersion modelling.

9.2 Methodology

The air quality assessment has been carried out in line with the guidance outlined in the European Commission publication "*Environmental Impact Assessment of Projects – Guidance on the preparation of the Environmental Impact Assessment Report*" (EC, 2017) and the EPA publication "*Guidelines on the Information to be Contained in Environmental Impact Assessment Reports 2022*" (EPA, 2022) and using the methodology outlined in the guidance documents published by the United States Environmental Protection Agency (USEPA) (USEPA, 2017, 2022) and the EPA (EPA, 2020).

9.2.1 Ambient Air Quality Standards

Air quality significance criteria are assessed on the basis of compliance with the appropriate standards or limit values. The applicable standards in Ireland include the Air Quality Standards Regulations 2022, which incorporate EU Directive 2008/50/EC, which combines the previous air quality framework and subsequent daughter directives (see Table 9.1). Although the EU Air Quality Limit Values are the basis of legislation, other thresholds outlined by the EU Directives are used which are triggers for particular actions (see Appendix 9.1).

The concern from a health perspective is focussed on particles of dust which are less than 10 microns (µm) in diameter. EU ambient air quality standards (Council Directive 2008/50/EC transposed into Irish law as S.I. 739 of 2022) centres on PM_{10} (particles less than 10 microns) as it is these particles which have the potential to be inhaled into the lungs and cause some adverse health impact. Council Directive 2008/50/EC also sets an ambient standard for $PM_{2.5}$ (particles less than 2.5 microns in diameter) which came into force in 2015 (see Table 9.1).

DUST DEPOSITION GUIDELINES

With regard to larger dust particles that can give rise to nuisance dust, there are no statutory guidelines regarding the maximum dust deposition levels that may be generated during the construction phase of a development in Ireland.

With regard to dust deposition, the German TA-Luft standard for dust deposition (non-hazardous dust) (TA Luft, 2002) sets a maximum permissible emission level for dust deposition of 350 mg/(m^2*day) averaged over a one-year period at any receptors outside the site boundary. Recommendations from the Department of the Environment, Health & Local Government (DEHLG, 2006) apply the TA Luft limit of 350 mg/(m^2*day) to the site boundary of quarries.

GOTHENBURG PROTOCOL

In 1999, Ireland signed the *Gothenburg Protocol to the 1979 UN Convention on Long Range Transboundary Air Pollution*. The objective of the Protocol is to control and reduce emissions of Sulphur Dioxide (SO_2), Nitrogen Oxides (NO_x), Volatile Organic Compounds (VOCs) and Ammonia

RECEIVED: 18/07/2023

(NH_3). In 2012, the Gothenburg Protocol was revised to include national emission reduction commitments for the main air pollutants to be achieved in 2020 and beyond and to include emission reduction commitments for $PM_{2.5}$. In relation to Ireland, 2020 emission targets were 25 kt for SO_2 (65% on 2005 levels), 65 kt for NO_X (49% reduction on 2005 levels), 43 kt for VOCs (25% reduction on 2005 levels), 108 kt for NH_3 (1% reduction on 2005 levels) and 10 kt for $PM_{2.5}$ (18% reduction on 2005 levels).

European Commission Directive 2001/81/EC, the National Emissions Ceiling Directive (NECD), has prescribed the same emission limits. A National Programme for the progressive reduction of emissions of these four transboundary pollutants has been in place since April 2005. Directive (EU) 2016/2284 "*On the Reduction of National Emissions of Certain Atmospheric Pollutants and Amending Directive 2003/35/EC and Repealing Directive 2001/81/EC*" was published in December 2016. The Directive applies the 2010 NECD limits until 2020 and establishes new national emission reduction commitments which are applicable from 2020 to 2029 and from 2030 onwards for SO_2, NO_X, NMVOC, NH_3 and $PM_{2.5}$. In relation to Ireland, 2020-29 emission targets are for SO_2 (65% below 2005 levels), for NO_X (49% reduction), for VOCs (25% reduction), for NH_3 (1% reduction) and for $PM_{2.5}$ (18% reduction). In relation to 2030, Ireland's emission targets are for SO_2 (85% below 2005 levels), for NO_X (69% reduction), for VOCs (32% reduction), for NH_3 (5% reduction) and for $PM_{2.5}$ (41% reduction). The data available from the EU for 2020[(6)] indicated that Ireland complied with the emissions ceilings for NOX, SO_2 and $PM_{2.5}$ in 2020 but failed to comply with the ceilings for NMVOCs and NH_3.

Pollutant	Regulation	Limit Type	Value
Nitrogen Dioxide	2008/50/EC	Hourly limit for protection of human health – not to be exceeded more than 18 times/year	200 µg/m^3
		Annual limit for protection of human health	40 µg/m^3
		Critical level for protection of vegetation	30 µg/m^3 NO + NO_2
Sulphur dioxide	2008/50/EC	Hourly limit for protection of human health – not to be exceeded more than 24 times/year	350 µg/m^3
		Daily limit for protection of human health – not to be exceeded more than 3 times/year	125 µg/m^3
		Critical limit for the protection of ecosystems	20 µg/m^3
Particulate Matter (as PM_{10})	2008/50/EC	24-hour limit for protection of human health – not to be exceeded more than 35 times/year	50 µg/m^3
		Annual limit for protection of human health	40 µg/m^3
$PM_{2.5}$	2008/50/EC	Annual limit for protection of human health	25 µg/m^3
		Indicative Annual limit for protection of human health	20 µg/m^3
Carbon Monoxide (CO)	2008/50/EC	8-hour limit (on a rolling basis) for protection of human health	10 mg/m^3 (8.6 ppm)

Table 9.1: Air Quality Standards Regulations 2022

9.2.2 Construction Phase

For the purpose of the qualitative air quality assessment of the construction phase, the combined impact of demolition and concurrent construction of all proposed buildings at the site has been

RECEIVED 18/07/2023

assumed to occur together. In addition, the facilitation works for the gni upgrade including the upgrade of the existing gas skid on site to power the proposed energy centre and the development of the proposed replacement 110kV Substation and uprating of existing overhead lines from the replacement 110kV Rinawade substation to Derryiron/Maynooth and Dunfirth/Kinnegad has been assessed.

The current assessment thus focused firstly on identifying the existing baseline levels of NO_2, PM_{10} and $PM_{2.5}$ in the region of the proposed development by an assessment of EPA monitoring data. Thereafter, the impact of the demolition and construction phase of the development on air quality was determined by a qualitative assessment of the nature and scale of dust generating demolition and construction activities associated with the proposed development.

9.2.3 Operational Phase

Air dispersion modelling was carried out by AWN using the United States Environmental Protection Agency's regulated model AERMOD (Version 22112). AERMOD is recommended as an appropriate model for assessing the impact of air emissions from industrial facilities in the EPA Guidance document "Air Dispersion Modelling from Industrial Installations Guidance Note (AG4)" (EPA, 2020). The model is a steady-state Gaussian plume model used to assess pollutant concentrations associated with industrial sources including dust emissions from area sources. The model has been designated the regulatory model by the USEPA for modelling emissions from industrial sources in both flat and rolling terrain (USEPA, 2017). The AERMET meteorological pre-processor (USEPA, 2018) was used to generate hourly boundary layer parameters for use by AERMOD. The air dispersion modelling input data consists of detailed information on the physical environment (including land use and terrain features), emission rate information and a full year of meteorological data. Using this input data, the air dispersion model predicts ambient ground level concentrations for each hour of the modelled meteorological year. The model post-processes the data to identify the location and maximum value of the worst-case ground level concentration in the applicable format for comparison with the relevant limit values. The worst-case concentration is then added to the existing baseline concentration, where relevant, to give the worst-case predicted ambient concentration level of the relevant pollutants.

<u>The modelling incorporated the following features:</u>

- A receptor grid was created at which concentrations would be modelled with a greater density of receptors in the area surrounding the facility. In addition, boundary receptors around the site were input into the model giving a total of 12,708 calculation points for the model.

- Detailed terrain has been mapped into the model using Shuttle Radar Topography Mission (SRTM) data with 30m resolution. The site is located in an area of gently rolling terrain. All terrain features have been mapped in detail into the model using the terrain pre-processor AERMAP (USEPA, 2019).

- Hourly-sequenced meteorological information has been used in the model. Meteorological data for Casement Aerodrome for the years 2017 - 2021 was used in the model (see Figure 9.1).

- The source and emission data have been incorporated into the model.

RECEIVED: 18/07/2023

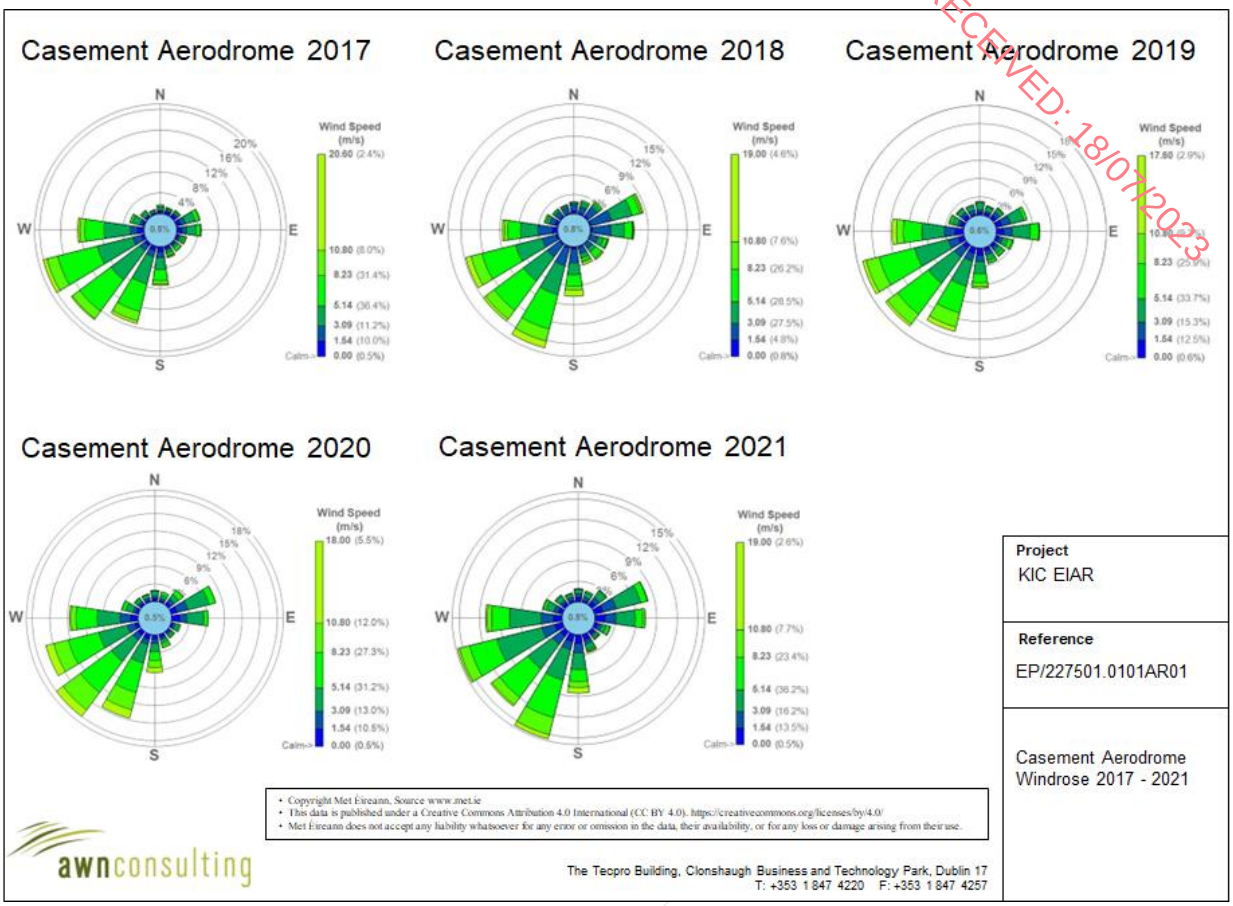


Figure 9.1: Windroses for Casement Aerodrome 2017 - 2021 (Met Eireann, 2022).

PROCESS EMISSIONS

In relation to the Proposed Development, there will be 9 CTGs associated with the Energy Centre whilst there will be 80 no. diesel generators associated with the data centres, with a maximum of 72 no. diesel generators in operation at any one time, which will provide power to the site when there is a loss of power from the National Grid to the data halls.

The modelling of air emissions from the site was carried out to determine the maximum number of operational hours that the back-up generators can operate without having a negative impact on ambient air quality as a result of nitrogen dioxide (NO_2) emissions.

The facility has been modelled based on a worst-case scenario which is the maximum number of air emission points which will operate at any one time. The worst-case scenario is based on eight (with one backup) continuous CTGs which have a stack height of 15m above ground level and 80 no. back-up generators each, all of which have a stack height of 18m above ground level. 2 no. of the generators in each building are 'catcher' generators to provide redundancy to the remaining generators (i.e. 72 of the 80 no. generators will operate in the event of a power failure to the site). Although the CTGs have been modelled as operating continuously (for 8760 hours per year), in reality they will operate no more than 330 days per year and thus the current assessment is a worst-case.

The back-up generators will only run when there is an interruption to the supply of electricity from the National Grid with the exception of testing. In order to allow for the unpredictability of the runtimes of the standby generators, two methodologies have been used in this assessment

RECEIVED: 18/07/2023

to determine the impact to ambient air quality from the back-up generators on site. The USEPA methodology includes emergency operations and scheduled testing of the generators. The UK Environment Agency methodology includes emergency operation of the generators only.

The specific testing regime included in the modelling is outlined below, this is somewhat more conservative than the testing that is carried out in practice. Thus, the worst-case approach used in this study will lead to an over-estimation of the actual levels that will arise. Testing is assumed to occur once per week of all 80 no. back-up generators at 25% load for a maximum of 30 minutes each, one generator at a time, sequentially. However, in reality, testing is likely to be on a monthly basis. In addition, load testing at 100% load will occur for each generators for a maximum of one hour each, one generator at a time, sequentially four times per year.

USEPA Guidance suggests that for emergency operations, an average hourly emission rate should be used rather than the maximum hourly rate (USEPA, 2011). For modelling purposes only, all of the generators were modelled as being in operation for 250 hours in total per year which is the maximum number of hours the standby generators can operate whilst staying in compliance with the ambient air quality standards. However, in reality, and based on recent experience over the past number of years, generators are rarely used other than during testing and maintenance described above. As a result, the maximum hourly emission rates from all the back-up generators were reduced by a factor of (250/8760) to give an average hourly emission rate (in line with USEPA protocol) and the generators were modelled over a period of one full year.

A second methodology for modelling back-up generators has been published by the UK Environment Agency. The consultation document is entitled "Diesel Generator Short-Term NO_2 Impact Assessment" (UKEA, 2016). The methodology is based on considering the statistical likelihood of an exceedance of the NO_2 hourly limit value (18 exceedances are allowable per year before the air standard is deemed to have been exceeded). The assessment assumes a hypergeometric distribution to assess the likelihood of exceedance hours coinciding with the operational hours of the back-up generators. The cumulative hypergeometric distribution of 19 and more hours per year is computed and the probability of an exceedance determined. The guidance suggests that the 95th percentile confidence level should be used to indicate if an exceedance is likely. More recent guidance (UKEA, 2019) has recommended this probability should be multiplied by a factor of 2.5 and thus the 98th percentile confidence level should be used. The guidance suggests that the assessment should be conducted at the nearest residential receptor or at locations where people are likely to be exposed and that there should be no running time restrictions on these generators when providing power on site during an emergency.

Both the methodology advised in the USEPA guidance as well as the approach described in the UK EA guidance have been applied in this study to ensure a robust assessment of predicted air quality impacts from the back-up generators. The methodology for converting NO_X to NO_2 was based on the ozone limiting method (OLM) approach based on an initial NO_2/NO_X ratio of 0.1 for the backup diesel generators and an initial NO_2/NO_X ratio of 0.2 for the CTGs and a background ozone level of 58 µg/m^3 based on a review of EPA data for similar Zone C locations.

The process emissions used in the modelling assessment are outlined in Table 9.2.

							NO_x

RECEIVED: 18/07/2023

Stack Reference	Stack Height Above Ground Level (m)	Exit Diameter (m)	Cross-Sectional Area (m^2)	Temp (K)	Volume Flow (Nm^3/hr at 15% Ref. O_2)	Exit Velocity (m/sec actual)	Concentration (mg/Nm^3 at 15% Ref. O_2)	Mass Emission (g/s)
Emergency Operations & Test 2 (100% load)	18m	0.60	0.28	696.2	22,119	34.0	842	0.148 Note 1 / 5.18 Note 2
Test 1 (25% Load)				613.2	6,671	12.9	679	1.26 Note 3
CTGs	15m	3.5	9.6	736.15	344,226	18.9	50	4.78

Note 1 Reduced emission rates based on USEPA protocol (assuming 250 hours / annum) used to model emissions during emergency operation of generators.

Note 2 Maximum emission rates for diesel generators used to model emissions during emergency operation of generators for UK EA assessment methodology and for Test 2 assumptions for USEPA assessment methodology.

Note 3 Emission rates used to model emissions during Test 1 assumed to occur once per week, per generator.

Table 9.2: Summary of Process Emission Information

9.2.2 Terrain

The AERMOD air dispersion model has a terrain pre-processor AERMAP (USEPA, 2019) which was used to map the physical environment in detail over the receptor grid. The digital terrain input data used in the AERMAP pre-processor was obtained from the Shuttler Radar Topography Mission (SRTM) . This data was run to obtain for each receptor point the terrain height and the terrain height scale. The terrain height scale is used in AERMOD to calculate the critical dividing streamline height, H_{crit}, for each receptor. The terrain height scale is derived from the Digital Elevation Model (DEM) files in AERMAP by computing the relief height of the DEM point relative to the height of the receptor and determining the slope. If the slope is less than 10%, the program goes to the next DEM point. If the slope is 10% or greater, the controlling hill height is updated if it is higher than the stored hill height.

In areas of complex terrain, AERMOD models the impact of terrain using the concept of the dividing streamline (H_c). The air dispersion plume is the flow in the atmosphere of the pollutant mass emitted from a source. As outlined in the AERMOD model formulation (USEPA, 2022) a plume embedded in the flow below H_c tends to remain horizontal; it might go around the hill or impact on it. A plume above H_c will ride over the hill. Associated with this is a tendency for the plume to be depressed toward the terrain surface, for the flow to speed up, and for vertical turbulent intensities to increase.

AERMOD model formulation states that the model “captures the effect of flow above and below the dividing streamline by weighting the plume concentration associated with two possible extreme states of the boundary layer (horizontal plume and terrain-following). The relative weighting of the two states depends on: 1) the degree of atmospheric stability; 2) the wind speed; and 3) the plume height relative to terrain. In stable conditions, the horizontal plume "dominates" and is given greater weight while in neutral and unstable conditions, the plume traveling over the terrain is more heavily weighted” (USEPA, 2022).

RECEIVED: 18/07/2023

The terrain in the region of the facility is complex in the sense that the maximum terrain in the modelling domain peaks at 92m which is above the release height of the emissions. However, in general, the region of the site has gently sloping terrain particularly in the immediate vicinity of the facility.

9.2.3 Surface Characteristics

AERMOD simulates the dispersion process using planetary boundary layer (PBL) scaling theory (USEPA, 2022). PBL depth and the dispersion of pollutants within this layer are influenced by specific surface characteristics such as surface roughness, albedo and the availability of surface moisture. Surface roughness is a measure of the aerodynamic roughness of the surface and is related to the height of the roughness element. Albedo is a measure of the reflectivity of the surface whilst the Bowen ratio is a measure of the availability of surface moisture.

AERMOD incorporates a meteorological pre-processor AERMET (USEPA, 2018) to enable the calculation of the appropriate parameters. The AERMET meteorological pre-processor requires the input of surface characteristics, including surface roughness (z_0), Bowen Ratio and albedo by sector and season, as well as hourly observations of wind speed, wind direction, cloud cover, and temperature. The values of albedo, Bowen Ratio and surface roughness depend on land-use type (e.g., urban, cultivated land etc.) and vary with seasons and wind direction. The assessment of appropriate land-use type was carried out to a distance of 10km from the meteorological station for Bowen Ratio and albedo and to a distance of 1km for surface roughness in line with USEPA recommendations (USEPA, 2006).

In relation to AERMOD, detailed guidance for calculating the relevant surface parameters has been published. The most pertinent features are:

- The surface characteristics should be those of the meteorological site (Casement Aerodrome) rather than the installation;
- Surface roughness should use a default 1km radius upwind of the meteorological tower and should be based on an inverse-distance weighted geometric mean. If land use varies around the site, the land use should be sub-divided by sectors with a minimum sector size of 30º;
- Bowen ratio and albedo should be based on a 10km grid. The Bowen ratio should be based on an un-weighted geometric mean. The albedo should be based on a simple un-weighted arithmetic mean.

AERMOD has an associated pre-processor, AERSURFACE[15], which has representative values for these parameters depending on land use type. The AERSURFACE pre-processor currently only accepts NLCD92 land use data which covers the USA. Thus, manual input of surface parameters is necessary when modelling in Ireland. Ordnance survey discovery maps (1:50,000) and digital maps such as those provided by the EPA, National Parks and Wildlife Service (NPWS) and Google Earth® are useful in determining the relevant land use in the region of the meteorological station. The Alaska Department of Environmental Conservation has issued a guidance note for the manual calculation of geometric mean for surface roughness and Bowen ratio for use in AERMET[16]. This approach has been applied to the current site.

RECEIVED: 18/07/2023

9.3 Receiving Environment

9.3.1 Meteorological Data

Selection of the appropriate meteorological data has followed the guidance issued by the USEPA (USEPA, 2022) and the EPA (EPA, 2020). Casement Aerdrome meteorological station, which is located approximately 6 km south-east of the site, collects data in the correct format and has a data collection rate of greater than 90%. Long-term hourly observations at Casement Aerdrome meteorological station provide an indication of the prevailing wind conditions for the region (see Figure 9.1). Results indicate that the prevailing wind direction is from westerly to south-westerly in direction over the period 2017 - 2021. The mean wind speed is approximately 4.6 m/s over the period 1981-2010.

9.3.2 Background Concentrations

Air quality monitoring programmes throughout Ireland have been undertaken in recent years by the EPA and Local Authorities[28,29]. The most recent annual report on air quality "Air Quality Monitoring Annual Report 2021"[28, 29], 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 for air quality management and assessment purposes in Ireland [29]. Dublin is defined as Zone A and Cork as Zone B. Zone C is composed of 25 towns with a population of greater than 15,000. The remainder of the country, which represents rural Ireland but also includes all towns with a population of less than 15,000 is defined as Zone D. In terms of air monitoring, the area surrounding the facility is categorised as Zone C[29].

NO_2

With regard to NO_2, continuous monitoring data from the EPA[29] at the Zone C locations of Dundalk, Kilkenny and Portlaoise in 2021 show that levels of NO_2 are below both the annual and 1-hour limit values (see Table 9.3). Average long-term concentrations at Kilkenny and Portlaoise range from 5 - 11 µg/m^3 for the period 2016 – 2021; suggesting an upper average over the five-year period of no more than 11 µg/m^3. There were no exceedances of the maximum 1-hour limit of 200 µg/m^3 in any year (18 exceedances are allowed per year). Based on these results an estimate of the background NO_2 concentration in the region of the development is 12 µg/m^3.

In relation to the short-term 1-hour results, a background concentration of 24 µg/m^3 was added to the 1-hour process concentration which is twice the estimated annual mean concentration.

RECEIVED: 18/07/2023

Station	Averaging Period	Year					
		2016	2017	2018	2019	2020	2021
Kilkenny	Annual Mean NO_2 (µg/m^3)	7	5	6	5	4	4
	99.8th%ile 1-hr NO_2 (µg/m^3)	51	41	44	41	45	42
Portlaoise	Annual Mean NO_2 (µg/m^3)	11	11	11	11	11	8
	99.8th%ile 1-hr NO_2 (µg/m^3)	86	60	68	60	52	49
Dundalk	Annual Mean NO_2 (µg/m^3)	-	-	14	12	10	11
	99.8th%ile 1-hr NO_2 (µg/m^3)	-	-	67	69	73	67

Table 9.3: Trends In Zone C Air Quality - Nitrogen Dioxide (µg/m^3) (EPA, 2022)

9.4 Likely Impacts

9.4.1 Construction Phase

Construction dust has the potential to cause local impact through dust nuisance at the nearest sensitive receptors. Construction activities such as excavation, earth moving and backfilling may generate quantities of dust, particularly in dry and windy weather conditions. While dust from construction activities tends to be deposited within 200m of a construction site, the majority of the deposition occurs within the first 50m. The extent of any dust generation depends on the nature of the dust (soils, peat, sands, gravels, silts etc.) and the nature of the construction activity. In addition, the potential for dust dispersion and deposition depends on local meteorological factors such as rainfall, wind speed and wind direction. Vehicles transporting material to and from the site also have the potential to cause dust generation along the selected haul routes from the construction areas.

The proposed development will comprise demolition work, construction of an energy centre and associated ancillary development and facilitation works. The key civil engineering works which will have a potential impact on air quality during construction are summarised below:

(i) During demolition of Buildings No's 7, 8 and 9 there will be the potential for dust emissions associated with the generation and movement of the waste material associated with the demolition. A combination of excavators, trucks and other soil shifting plant will undertake the main site clearance, demolitions, and levelling aspects on a phase by phase basis.

(ii) During construction, an amount of soil will be generated as part of the site preparation works and during excavation for installation of foundations, drainage services and ancillary infrastructure;

(iii) Following completion of the building shell, commissioning of the mechanical and electrical equipment is undertaken;

(iv) Infilling and landscaping will be undertaken. Spoil generated during site preparation will

RECEIVED: 18/07/2023

be re-used where possible;

(v) Temporary storage of construction materials and fuels; and

(vi) Construction traffic accessing the site will emit air pollutants during transport in addition to onsite contruction machinery air emissions.

As outlined in Section 9.6, dust mitigation measures will be implemented for the construction phase of the proposed development to ensure no dust nuisance occurs at nearby sensitive receptors.

Appendix 8 of the "*Guidelines for the treatment of Air Quality During the Planning & Construction of National Road Schemes*"[31] discusses construction phase impacts. Table 9.4 below shows the potential distance for dust soiling from source ranges from 25m to 100m and for the potential significant impact to PM_{10}, the distance ranges from 10m to 25m depending on the scale of the construction activity. In relation to the principal works, which will occur within the site boundary, given that the façade of the nearest residence is greater than 100m from the nearest boundary, the guidance above would indicate that there is negligible potential for impacts from soiling, PM_{10} and to vegetation and therefore, no significant impacts are expected when the mitigation measures outlined in Section 9.6.1 are taken into account. The impact due to construction dust, for the principal works, at sensitive receptors is predicted to be short-term, reversible, and imperceptible.

In relation to the facilitation works, the main work with the potential for air emissions is the laying of a new gas pipeline within the Barnhall Meadows Lands, underneath the M4 and into the Kildare Innovation Campus. However, with reference to Table 9.4, the facilitation works, from a dust perspective, would be classified as minor in scale and thus any risk of soiling will be limited to 25m with the risk from PM_{10} / vegetation effects limited to 10m.

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

Table 9.4: Assessment Criteria for the Impact of Dust Emissions from Construction Activities with Standard Mitigation in Place (Source: Appendix 8: Assessment of Construction Impacts taken from "*Guidelines for the treatment of Air Quality During the Planning & Construction of National Road Schemes*" [38]).

9.4.2 Operational Phase

The key works which will have a potential impact on air quality during operation of the proposed development are summarised below:

(i) The operation of the CTGs in the energy centre and the scheduled testing of the back-up generators in the data storage facilities will release air pollutant emissions (primarily NO_x

RECEIVED: 18/07/2023

emissions). For the purposed of the air modelling, a worst-case assumption of the continuous operation fo the CTGs has been assumed. However, the CTGs will never operate for more than 330 days per year and it is more likely that they will not operate for more than 1,500 hours per year.

(ii) The infrequent emergency operation of the back-up generators for the data storage facilities in the event of a loss of power from the National Grid due to a power outage would release air pollutant emissions (primarily NO_x emissions). A review of operational data from similar operational data storage facilities in Ireland indicates that it is highly unlikely that the back-up generators would be used for emergency operations for more than 24 - 48 hours per year.

(iii) Road traffic accessing the site will emit air pollutants. However, the operational phase of the proposed development is not expected to contribute a significant volume of additional traffic on the local road network (see Chapter 13). Therefore, no local air quality assessment of the traffic impact is required for this development; and

(iv) The direct air emissions, based on operation of the CTGs for up to 330 days per year and the infrequent operation of the backup diesel generators will have an impact on air emissions. However, it is predicted that these will not be significant in relation to Ireland's national emission ceiling limits for NO_X, SO_2 and NMVOCs.

9.5 Likely Significant Impacts

9.5.1 Construction Phase

The greatest impact on air quality during the construction phase of the proposed development is from construction dust emissions as a result of excavation works, infilling and landscaping activities and storage of soil in stockpiles. This leads to the potential for nuisance dust. While construction dust tends to be deposited within 100m of a construction site, the majority of the deposition occurs within the first 50m (IAQM, 2014). The extent of any dust generation depends on the nature of the dust (soils, peat, sands, gravels, silts etc.) and the nature of the construction activity. In addition, the potential for dust dispersion and deposition depends on local meteorological factors such as rainfall, wind speed and wind direction.

Fuels will be stored in sealed containers and emissions to air are likely to be minimal. Therefore, there is unlikely to be an impact to air quality as the result of the temporary storage of fuels for the construction phase.

Initial commissioning activities will involve testing of the back-up generators on site for 4 hours at 90% load, i.e. the first testing sequence will be commissioning of the back-up generators. The operational modelling has considered load testing of the generators four time per year at 90% load and and this does not result in a significant impact to air quality. Therefore, it is predicted that the initial commissioning tests for the back-up generators will result in an ***imperceptibly negative*** impact to air quality in the ***short-term*** and thus have a ***not significant*** impact.

In relation to the CTGs, initial commissioning activities will involve testing of the CTGs on site in a similar manner to the operational phase. The operational modelling has considered the continuous operation of the CTGs and this does not result in a significant impact to air quality. Therefore, it is predicted that the initial commissioning tests for the CTGs will result in an

RECEIVED: 18/07/2023

imperceptibly negative impact to air quality in the ***short-term*** and thus have a ***not significant*** impact.

9.5.2 Operational Phase

Air emissions during the operational phase of a project need to take into account the ambient air quality standards and ensure that air emissions remain in compliance with the ambient air quality standards. In relation to the proposed development, as outlined in Section 9.6, an iterative stack height determination was undertaken as part of the air dispersion modelling study to ensure that an adequate release height was selected for all emission points to aid dispersion of the plume and ensure compliance with the ambient air quality limit values at all locations beyond the site boundary.

9.5.3 Do Nothing Scenario – Construction Phase

Under the Do Nothing Scenario no construction works will take place and the previously identified impacts of fugitive dust and particulate matter emissions and emissions from equipment and machinery will not occur. The ambient air quality at the site will remain as per the baseline and will change in accordance with trends within the wider area, changes in road traffic, etc. Therefore, this scenario can be considered ***neutral*** in terms of air quality.

9.5.4 Do Nothing Scenario – Operational Phase

Under the Do Nothing Scenario no operational emissions will take place. The ambient air quality at the site will remain as per the baseline and will change in accordance with trends within the wider area, changes in road traffic, etc. Therefore, this scenario can be considered ***neutral*** in terms of air quality.

9.5.5 Do Something Scenario – Operational Phase

The Do Something Scenario comprises the continuous operation of the CTGs as a worst-case although in reality they will not operate more than 330 dyas per year. In addition, the operation of the backup generators for 250 hours per year which involves the emergency operation of 72 of the 80 generators (the remaining generator serving as a "catcher" generator) has also been modelled in the same modelling run in order to capture the impact of both the CTGs and the back-up generators. The scenario also included weekly testing of all 80 generators at 25% load for 30 minutes and load bank testing at 90% load of all generators for one hour four time per year. The process emissions used for the Do Something are outlined in Table 9.5.

<u>USEPA Methodology</u>

The NO_2 modelling results at the maximum location at and beyond the site boundary are detailed in Table 9.4 based on the operation of the CTGs on a continuous basis, as a worst-case, and the operation of the backup generators for 250 hours per year in addition to the scheduled weekly and load banking testing of all back-up generators.

The results indicate that the ambient ground level concentrations are within the relevant air quality standards for NO_2. For the maximum year modelled, emissions from the site lead to an ambient NO_2 concentration (including background) which is 63% of the maximum ambient 1-hour limit value (measured as a 99.8th percentile) and 94% of the annual limit value at the maximum

RECEIVED: 18/07/2023

off-site receptor. Concentrations decrease with distance from the site boundary. The geographical variations in the 1-hour mean (99.8th percentile) and annual mean NO_2 ground level concentrations for the Do Something Scenario are illustrated as concentration contours in Figures 9.2 and 9.3.

The operational phase impact of the Do Something Scenario, based on the EPA EIAR Guidelines (EPA, 2022), is considered ***long-term***, ***localised***, ***negative*** and ***slight***.

Pollutant / Year	Averaging Period	Process Contribution (µg/m^3)	Annual Mean Background (µg/m^3) Note 1	Predicted Environmental Concentration (PEC) (µg/m^3)	EU Limit Value (µg/m^3)	PEC as a %age of Limit Value
NO_2 / 2017	Annual mean	25.4	12	37.4	40	94%
	99.8th%ile of 1-hr Means	98.7	24	122.7	200	61%
NO_2 / 2018	Annual mean	23.5	12	35.5	40	89%
	99.8th%ile of 1-hr Means	98.7	24	122.7	200	61%
NO_2 / 2019	Annual mean	23.1	12	35.1	40	88%
	99.8th%ile of 1-hr Means	98.6	24	122.6	200	61%
NO_2 / 2020	Annual mean	24.7	12	36.7	40	92%
	99.8th%ile of 1-hr Means	101.4	24	125.4	200	63%
NO_2 / 2021	Annual mean	22.9	12	34.9	40	87%
	99.8th%ile of 1-hr Means	100.8	24	124.8	200	62%

Note 1 S.I. 739 of 2022 and EU Directive 2008/50/EC

Table 9.5: Do Something Scenario - Dispersion Modelling Results for NO_2

RECEIVED: 28/07/2023

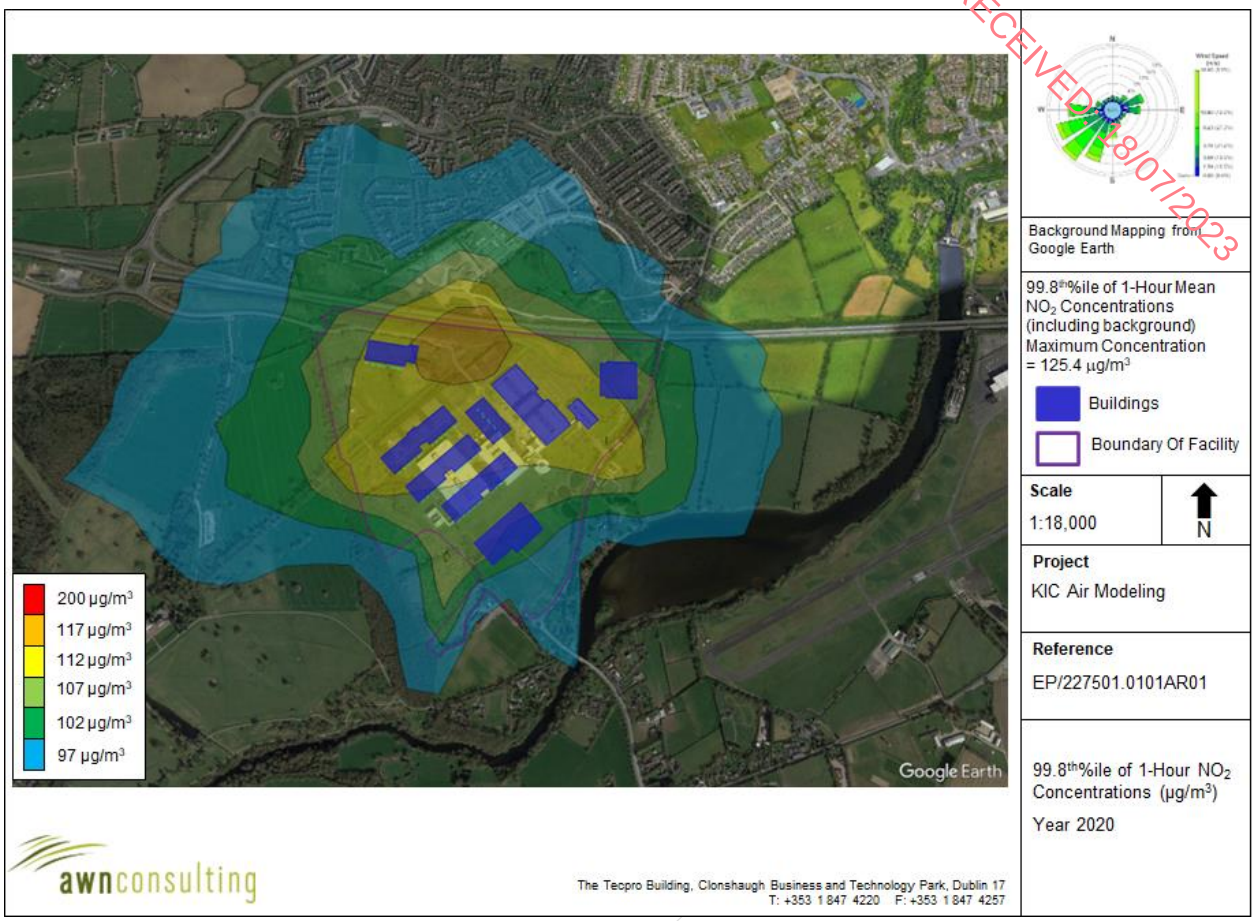


Figure 9.2 Maximum 1-Hour NO_2 Concentrations (as 99.8th percentile) (Year 2020)

RECEIVED: 18/07/2023

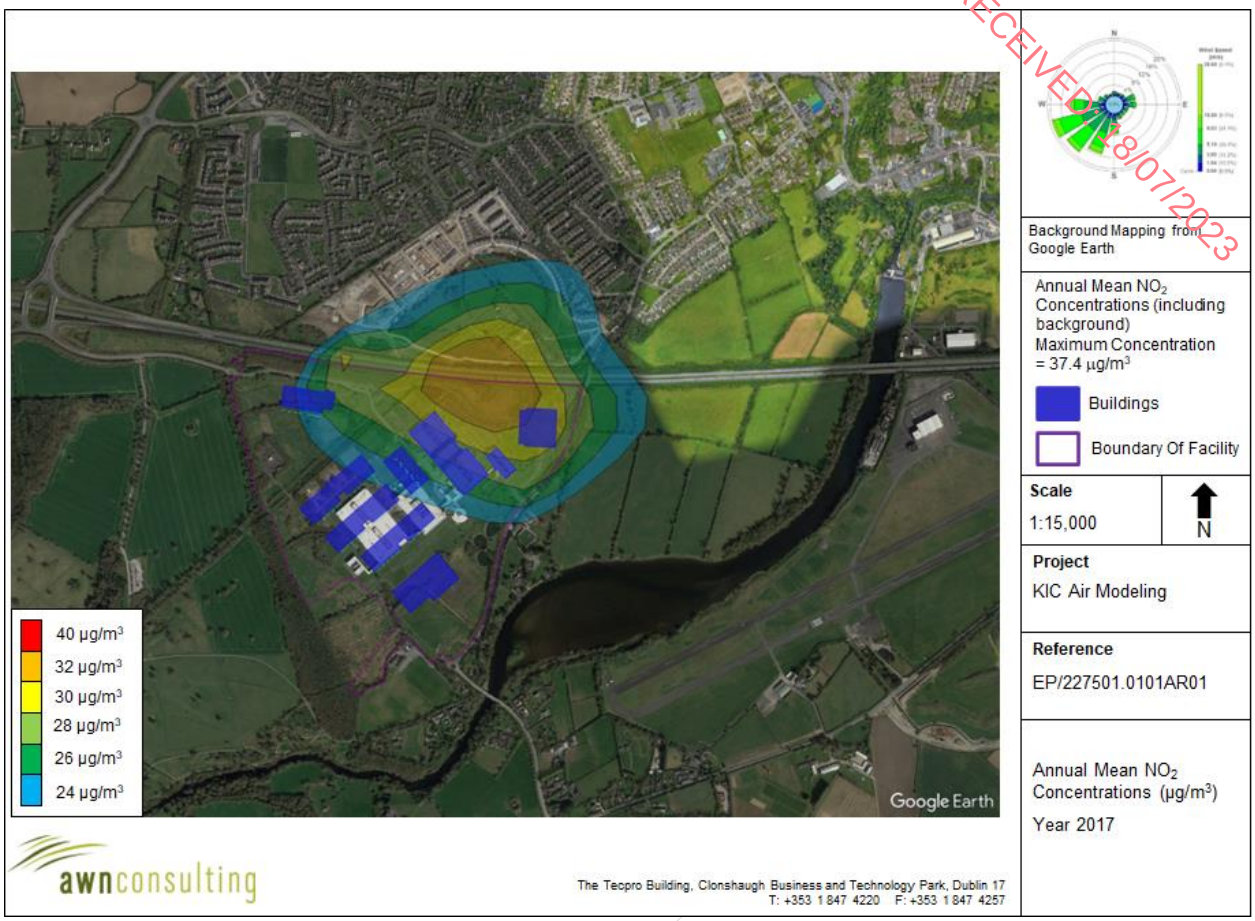


Figure 9.3 Annual Mean NO_2 Concentrations (Year 2017

UK Environment Agency Methodology

The methodology, based on considering the statistical likelihood of an exceedance of the NO_2 hourly limit value assuming a hypergeometric distribution, has been undertaken at the maximum residential receptor for the Do Something Scenario. The cumulative hypergeometric distribution of 19 and more hours per year is computed and the probability of an exceedance determined as outlined in Table 9.6. The results have been compared to the 98th percentile confidence level to indicate if an exceedance is likely at various operational hours for the back-up generators. The results indicate that in the maximum year, the emergency generators for the Proposed Development can operate for up to 345 hours per year in addition to the continuous operation of the CTGs, as a worst-case, before there is a likelihood of an exceedance of the ambient air quality standard (at a 98th percentile confidence level). Figure 9.4 shows the statistical distribution predicted for the 98th percentile (based on 345 hours of operation per year). However, the UK guidance recommends that there should be no running time restrictions placed on back-up generators which provide power on site only during an emergency power outage.

RECEIVED: 18/07/2023

Pollutant / Meteorological Year	Hours of operation (Hours) (98th%ile) Allowed Prior To Exceedance Of Limit Value	UK Guidance – Probability Value = 0.02 (98th%ile)Note 1
NO_2 / 2017	446	**0.02**
NO_2 / 2018	360	
NO_2 / 2019	383	
NO_2 / 2020	**345**	
NO_2 / 2021	440	

Note 1 Guidance Outlined In UK EA publication "Diesel Generator Short-term NO_2 Impact Assessment" (EA, 2016)

Table 9.6 Hypergeometric Statistical Results at Maximum Residential Receptor – NO_2, Do Something Scenario

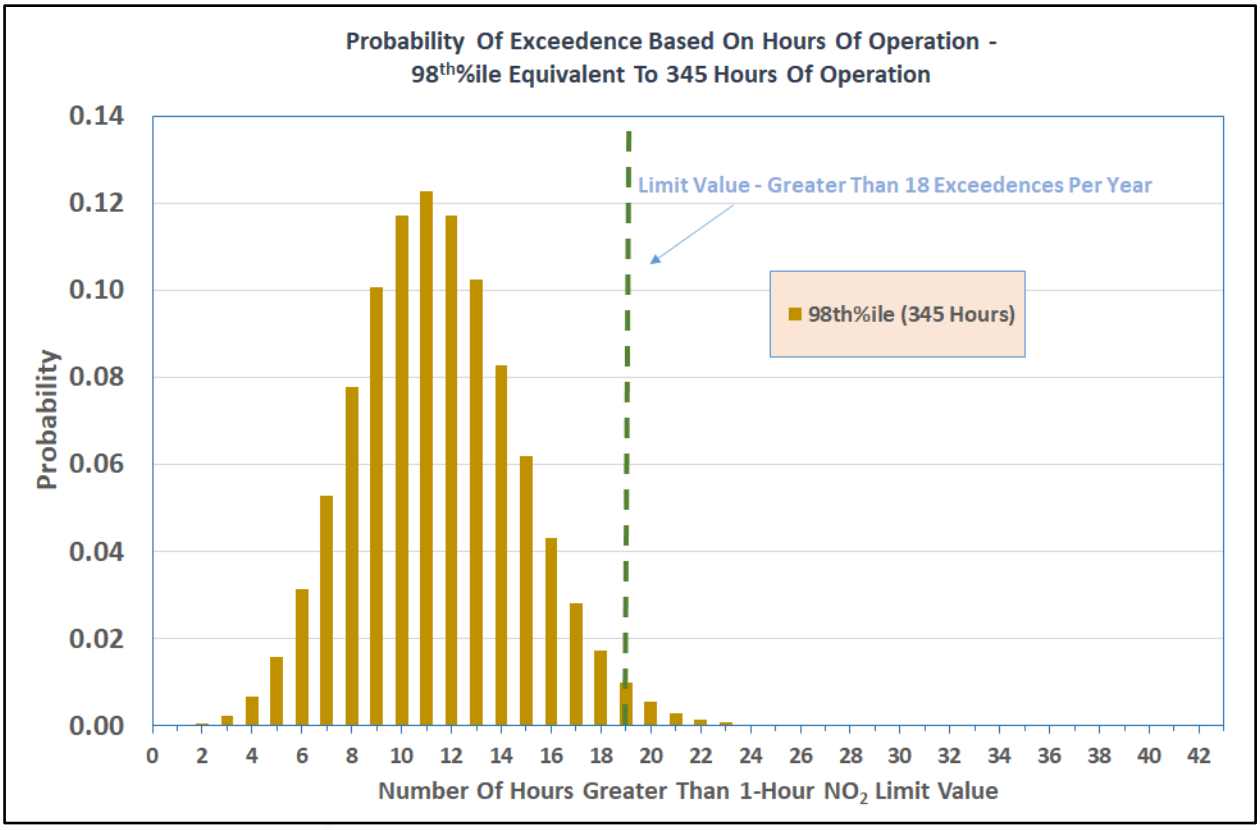


Figure 9.4 Probability of Exceedance of 1-Hour NO_2 Ambient Air Quality Limit Value based on Hours of Operation for Emergency Generators for Proposed Development

9.6 Mitigation Measures

In order to sufficiently ameliorate the likely air quality impact, a schedule of air control measures has been formulated for the construction and operational phases associated with the proposed development.

9.6.1 Construction Phase - Air Quality

The objective of dust control at the site is to ensure that no significant nuisance occurs at nearby sensitive receptors. In order to develop a workable and transparent dust control strategy, the following management plan has been formulated by drawing on best practice guidance from

RECEIVED: 18/07/2023

Ireland, the UK and the USA based on the following publications:

- 'Guidance on the Assessment of Dust from Demolition and Construction' (IAQM, 2014);
- 'Planning Advice Note PAN50 Annex B: Controlling The Environmental Effects Of Surface Mineral Workings Annex B: The Control of Dust at Surface Mineral Workings' (The Scottish Office, 1996);
- 'Controlling the Environmental Effects of Recycled and Secondary Aggregates Production Good Practice Guidance' (UK Office of Deputy Prime Minister, 2002);
- 'Controlling Particles, Vapours & Noise Pollution From Construction Sites' (BRE, 2003);
- 'Fugitive Dust Technical Information Document for the Best Available Control Measures' (USEPA, 1997); and
- 'Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition' (periodically updated) (USEPA, 1986).

9.6.1.1 Site Management

The aim is to ensure good site management by avoiding dust becoming airborne at source. This will be done through good design and effective control strategies.

At the construction planning stage, the siting of activities and storage piles will take note of the location of sensitive receptors and prevailing wind directions in order to minimise the potential for significant dust nuisance (see Figure 9.1 for the windrose for Casement Aerodrome). As the prevailing wind is predominantly westerly to south-westerly, locating construction compounds and storage piles downwind (to the east or north-east) of sensitive receptors will minimise the potential for dust nuisance to occur at sensitive receptors.

Good site management will include the ability to respond to adverse weather conditions by either restricting operations on-site or quickly implementing effective control measures before the potential for nuisance occurs. When rainfall is greater than 0.2mm/day, dust generation is generally suppressed (UK Office of Deputy Prime Minister (2002), BRE (2003)). The potential for significant dust generation is also reliant on threshold wind speeds of greater than 10 m/s (19.4 knots) (at 7m above ground) to release loose material from storage piles and other exposed materials (USEPA, 1986). Particular care should be taken during periods of high winds (gales) as these are periods where the potential for significant dust emissions are highest. The prevailing meteorological conditions in the vicinity of the site are favourable in general for the suppression of dust for a significant period of the year. Nevertheless, there will be infrequent periods where care will be needed to ensure that dust nuisance does not occur. The following measures shall be taken in order to avoid dust nuisance occurring under unfavourable meteorological conditions:

- The Principal Contractor or equivalent will monitor the contractors' performance to ensure that the proposed mitigation measures are implemented, and that dust impacts and nuisance are minimised;

- During working hours, dust control methods will be monitored as appropriate, depending on the prevailing meteorological conditions;

- The name and contact details of a person to contact regarding air quality and dust issues shall be displayed on the site boundary, this notice board will also include head/regional office contact details;

- Community engagement shall be undertaken before works commence on site explaining

RECEIVED: 18/07/2023

the nature and duration of the works to local residents and businesses;

- A complaints register will be kept on site detailing all telephone calls and letters of complaint received in connection with dust nuisance or air quality concerns, together with details of any remedial actions carried out;

- It is the responsibility of the contractor at all times to demonstrate full compliance with the dust control conditions herein;

- The procedures put in place will be reviewed at regular intervals and monitoring conducted and recorded by the principal contractor. It is recommended that reviews are conducted on a monthly basis as a minimum.

The dust minimisation measures shall be reviewed at regular intervals during the works to ensure the effectiveness of the procedures in place and to maintain the goal of minimisation of dust through the use of best practice and procedures. In the event of dust nuisance occurring outside the site boundary, site activities will be reviewed and satisfactory procedures implemented to rectify the problem. Specific dust control measures to be employed are described below.

9.6.1.2 Site Roads / Haulage Routes

Movement of construction trucks along site roads (particularly unpaved roads) can be a significant source of fugitive dust if control measures are not in place. The most effective means of suppressing dust emissions from unpaved roads is to apply speed restrictions. Studies show that these measures can have a control efficiency ranging from 25 to 80% (UK Office of Deputy Prime Minister, 2002).

- A speed restriction of 20 km/hr will be applied as an effective control measure for dust for on-site vehicles using unpaved site roads;

- Access gates to the site shall be located at least 10m from sensitive receptors where possible;

- Bowsers or suitable watering equipment will be available during periods of dry weather throughout the construction period. Research has found that watering can reduce dust emissions by 50% (USEPA, 1997). Watering shall be conducted during sustained dry periods to ensure that unpaved areas are kept moist. The required application frequency will vary according to soil type, weather conditions and vehicular use; and

- Any hard surface roads will be swept to remove mud and aggregate materials from their surface while any unsurfaced roads shall be restricted to essential site traffic only.

RECEIVED: 18/07/2023

9.6.1.3 Land Clearing / Earth Moving

Land clearing / earth-moving works during periods of high winds and dry weather conditions can be a significant source of dust.

- During dry and windy periods, and when there is a likelihood of dust nuisance, watering shall be conducted to ensure moisture content of materials being moved is high enough to increase the stability of the soil and thus suppress dust; and
- During periods of very high winds (gales), activities likely to generate significant dust emissions shall be postponed until the gale has subsided.

9.6.1.4 Storage Piles

The location and moisture content of storage piles are important factors which determine their potential for dust emissions;

- Overburden material will be protected from exposure to wind by storing the material in sheltered regions of the site. Where possible storage piles should be located downwind of sensitive receptors;

- Regular watering will take place to ensure the moisture content is high enough to increase the stability of the soil and thus suppress dust. The regular watering of stockpiles has been found to have an 80% control efficiency (UK Office of Deputy Prime Minister, 2002); and

- Where feasible, hoarding will be erected around site boundaries to reduce visual impact. This will also have an added benefit of preventing larger particles from impacting on nearby sensitive receptors.

9.6.1.5 Site Traffic on Public Roads

Spillage and blow-off of debris, aggregates and fine material onto public roads will be reduced to a minimum by employing the following measures:

- Vehicles delivering or collecting material with potential for dust emissions shall be enclosed or covered with tarpaulin at all times to restrict the escape of dust;

- At the main site traffic exits, a wheel wash facility shall be installed. All trucks leaving the site must pass through the wheel wash. In addition, public roads outside the site shall be regularly inspected for cleanliness, as a minimum on a daily basis, and cleaned as necessary.

9.6.1.6 Summary of Dust Mitigation Measures

The pro-active control of fugitive dust will ensure that the prevention of significant emissions, rather than an inefficient attempt to control them once they have been released, will contribute towards the satisfactory performance of the contractor. The key features with respect to control of dust will be:

- The specification of a site policy on dust and the identification of the site management responsibilities for dust issues;

- The development of a documented system for managing site practices with regard to dust control;

RECEIVED: 18/07/2023

- The development of a means by which the performance of the dust minimisation plan can be regularly monitored and assessed; and
- The specification of effective measures to deal with any complaints received.

RECEIVED: 18/07/2023

9.6.2 Operational Phase

The stack heights of the CTGs at 15m above local ground level and back-up generators at a stack height of 18m above local ground level have been designed in an iterative fashion to ensure that an adequate height was selected to aid dispersion of the emissions and achieve compliance with the EU ambient air quality standards at all off-site locations (including background concentrations). No additional mitigation measures are proposed for the operational phase of the development.

A green wall will be installed within the campus which will trap 838.5kg of dust and produce 11.0kg of oxygen every year.

9.7 RESDIUAL EFFECTS OF THE PROPOSED DEVELOPMENT

9.7.1 Construction Phase

Dust and Particulate Matter
When the dust mitigation measures detailed in the mitigation section (section 9.6.1) of this report are implemented, fugitive emissions of dust and particulate matter from the site will be ***neutral***, ***short-term*** and ***not significant*** in nature, posing no nuisance at nearby receptors.

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

9.7.2 Operational Phase

The Operational Phase Scenario, after mitigation, remains unchanged from the results outlined in Section 9.5, which is based on the worst-case assumption of the CTGs emission points running on gas for the full year in addition to the operation of the backup generators operating for 250 hours per year which involves the emergency operation of 72 of the 80 generators (the remaining generator serving as a “catcher” generator). The scenario also included scheduled weekly testing and quarterly load-banking of all back-up generators.

The operational phase impact of the Proposed Development, based on the EPA EIAR Guidelines (EPA, 2022), is considered ***long-term***, ***localised***, ***negative*** and ***slight***.

9.7.2.1 *Summary of Modelling Assessment*

The modelling assessment has found that ambient NO_2 concentrations as a result of the Proposed Scenario are in compliance with the relevant ambient air quality limit values at all locations at or beyond the site boundary. The impacts to air quality from operation of the proposed development are therefore deemed ***long-term*** and ***slight*** in terms of significance and ***negative*** in terms of quality.

RECEIVED: 18/07/2023

9.7.2.2 Regional Air Quality

Directive (EU) 2016/2284 "*On The Reduction Of National Emissions Of Certain Atmospheric Pollutants And Amending Directive 2003/35/EC And Repealing Directive 2001/81/EC*" was published in December 2016. The Directive will apply the 2010 National Emission Ceiling Directive limits until 2020 and establish new national emission reduction commitments which will be applicable from 2020 and 2030 for SO_2, NO_X, NMVOC, NH_3 and $PM_{2.5}$ as detailed in Section 9.2.1.

Based on the generation of 173.2 MW, the NO_X emissions based on electricity from the National Grid over the course of one year (equivalent to 809.8 GWh) will equate to 167 tonnes per annum which is 0.40% of the National Emission Ceiling limit for Ireland in 2030. Similarly, SO_2 emissions associated with this electricity use over the course of one year (809.8 GWh) will equate to 60 tonnes per annum which is 0.55% of the National Emission Ceiling limit for Ireland in 2030. Additionally, NMVOC emissions associated this electricity over the course of one year (809.8 GWh) will equate to 8.6 tonnes per annum which is 0.017% of the National Emission Ceiling limit for Ireland in 2030. Additionally, $PM_{2.5}$ emissions associated this electricity over the course of one year (809.8 GWh) will equate to 7.5 tonnes per annum which is 0.067% of the National Emission Ceiling limit for Ireland in 2030. Thus, the NO_X, SO_2, NMVOC and $PM_{2.5}$ indirect emissions associated with the operation of the Proposed Development based on electricity from the national grid are ***indirect***, ***long-term, negative*** and ***slight*** with regards to regional air quality.

9.7.2.3 Human Health

Air dispersion modelling was undertaken to assess the impact of the development with reference to EU ambient air quality standards which are based on the protection of human health. As demonstrated by the dispersion modelling results, emissions from the site, assuming scheduled testing as well as emergency operation of the back-up generators, are compliant with all National and EU ambient air quality limit values and, therefore, will not result in a significant impact on human health. In relation to the spatial extent of air quality impacts from the site, ambient concentrations will decrease significantly with distance from the site boundary.

RECEIVED: 18/07/2023

9.8 Cumulative Effects

Construction Phase

When the dust mitigation measures detailed in the mitigation section (section 9.6.1) of this report are implemented, cumulative fugitive emissions of dust and particulate matter from the site and nearby facilities undergoing construction will be ***neutral***, ***short-term*** and ***not significant*** in nature, posing no nuisance at nearby receptors.

Operational Phase

There are no nearby sources with emissions of NO_2/NO_X of sufficient magnitude to overlap with site emissions from the proposed facility and thus therefore no offsite cumulative impacts are anticipated. With appropriate mitigation measures it is not predicted that any cumulative impacts will occur during the combined construction and operational phase due to NO_2/NO_X impacts.

9.9 Residual Impact

Modelled emissions associated with the facility will lead to ambient concentrations which are within the relevant ambient air quality standards for all pollutants modelled. There are no significant residual impacts on air quality due the proposed development associated with the operation of the facility.

9.10 Interactions

The potential interaction between Air Quality and other Sections in the EIAR is primarily limited to *Population & Human Health*, *Traffic & Transportation* and the chapter on *Interactions*. This Air Quality Section has been prepared in consideration of and in conjunction with the relevant outputs of these Sections.

9.11 Monitoring

As part of the sites operational licence (IEL), any NO_X monitoring requirements will be set out in the licence.

9.12 Difficulties Encountered In Compiling Information

No significant difficulties were encountered in the process of compiling the air quality chapter of the EIAR.

RECEIVED: 18/07/2023

REFERENCES

- Alaska Department of Environmental Conservation (2008) ADEC Guidance re AERMET Geometric Means (http://dec.alaska.gov/air/ap/modeling.htm)
- BRE (2003) Controlling Particles, Vapours & Noise Pollution From Construction Sites
- DEHLG (2004) National Programme for Ireland under Article 6 of Directive 2001/81/EC for the Progressive Reduction of National Emissions of Transboundary Pollutants by 2010
- DEHLG (2007) Update and Revision of the National Programme for Ireland under Article 6 of Directive 2001/81/EC for the Progressive Reduction of National Emissions of Transboundary Pollutants by 2010
- EPA (2006) Environmental Management Guidelines - Environmental Management in the Extractive Industry (Non-Scheduled Minerals)
- EPA (2020) Air Dispersion Modelling from Industrial Installations Guidance Note (AG4)
- EPA (2022) Guidelines on the Information to be contained in Environmental Impact Statements
- EPA (2022) Air Quality Monitoring Report 2021 (& previous annual reports 1997-2020)
- EPA (2022) EPA Website: http://www.epa.ie/whatwedo/monitoring/air/
- EPRI (2020) Phase II Assessment of NO_2/NO_X Ratios at Fossil Fuel Power plants
- German VDI (2002) Technical Guidelines on Air Quality Control – TA Luft
- IAQM (2016) Guidance on the Assessment of Dust from Demolition and Construction
- Iqbal (1983) An Introduction To Solar Radiation
- Met Éireann (2022) Met Éireann Website: www.met.ie
- The Scottish Office (1996) Planning Advice Note PAN50 Annex B: Controlling The Environmental Effects Of Surface Mineral Workings Annex B: The Control of Dust at Surface Mineral Workings
- UK EA (2016) Diesel Generator Short-term NO_2 Impact Assessment
- UK Environment Agency (2019) Emissions from specified generators - Guidance on dispersion modelling for oxides of nitrogen assessment from specified generators
- USEPA (1985) Good Engineering Practice Stack Height (Technical Support Document For The Stack Height Regulations) (Revised)
- USEPA (1986) Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition' (periodically updated)
- USEPA (1997) Fugitive Dust Technical Information Document for the Best Available Control Measures
- USEPA (1999) "Comparison of Regulatory Design Concentrations: AERMOD vs. ISCST3 vs. CTDM PLUS"
- USEPA (2008) AERSURFACE User's Guide
- USEPA (2011) Additional Clarification Regarding Application of Appendix W Modelling Guidance for the 1-Hour National Ambient Air Quality Standard
- USEPA (2017) Guidelines on Air Quality Models, Appendix W to Part 51, 40 CFR Ch.1
- USEPA (2019) AERMAP Users Guide
- USEPA (2021) AERMOD Description of Model Formulation and Evaluation
- USEPA (2021) User's Guide to the AERMOD Meteorological Preprocessor (AERMET)
- UK Office of Deputy Prime Minister (2002) Controlling the Environmental Effects of Recycled and Secondary Aggregates Production Good Practice Guidance

RECEIVED: 18/07/2023

10.0 CLIMATE

10.1 Introduction

AWN Consulting Limited has been commissioned by Tom Phillips and Associates to conduct a climate impact assessment of the proposed development and associated facilitation works.

This chapter evaluates the impacts which the project may have on Climate as defined in the Guidelines on the information to be contained in Environmental Impact Assessment Reports (EPA, 2022).

In relation to the proposed development, the facility will have 9 combustion turbine generators (CTGs) which will have a stack height of 15m above ground level and 80 back-up generators which will have a stack height of 18m above ground level. The turbines will be fueled by natural gas or biogas supplied by Gas Networks Ireland (GNI) via their existing high-pressure network that runs close to the site. The turbines will be enclosed by a wall c.14m in height.

The back-up generators will power the data centre in the event of an interruption to the supply of power from the National Grid. The other aspects of the development including the facilitation works, the data halls and the Deep Tech buildings will lead to some greenhouse gas (GHG) emissions during construction but will not be significant sources of air emissions during the operational phase.

This chapter has been prepared by AWN Consulting Limited – Dr Edward Porter (BSc PhD C Chem MRSC MIAQM) and reviewed by Dr. Avril Challoner (BSc PhD C Chem MRSC MIAQM). Dr. Edward Porter is Director with responsibility for Air Quality with AWN Consulting. He holds a BSc from the University of Sussex (Chemistry), and a PhD in Environmental Chemistry (Air Quality) in UCD where he graduated in 1997 and is a Full Member of the Royal Society of Chemistry (MRSC CChem) with 25 years' experience. He specialises in the fields of climate, air quality, odour and air dispersion modelling.

Dr. Avril Challoner is a Principal Environmental Consultant in the Air Quality section of AWN Consulting. She holds a BEng (Hons) in Environmental Engineering from the National University of Ireland Galway, HDip in Statistics from Trinity College Dublin and has completed a PhD in Environmental Engineering (Air Quality) in Trinity College Dublin graduating in 2013. She is a Member of the Institute of Air Quality Management and specialises in the fields of climate, air quality, EIA and air dispersion modelling.

10.2 Methodology

The climate assessment has been carried out in line with the guidance outlined in the European Commission publication "*Environmental Impact Assessment of Projects – Guidance on the preparation of the Environmental Impact Assessment Report*" (EC, 2017) and the EPA publication "*Guidelines on the Information to be Contained in Environmental Impact Assessment Reports 2022*" (EPA, 2022a) and using the methodology outlined in the guidance documents published by IEMA and the EPA.

The climate assessment has been carried out in line with the guidance outlined below:

RECEIVED: 19/07/2023

- EPA (2022a) Guidelines on the Information to be contained in Environmental Impact Statements,
- European Commission (2013) Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment,
- European Commission (2017) Environmental Impact Assessment of Projects – Guidance on the preparation of the Environmental Impact Assessment Report,
- IAQM (2016) Guidance on the Assessment of Dust from Demolition and Construction,
- IEMA (2010) Principles Series on Climate Change Mitigation & EIA,
- IEMA (2020a) EIA Guide to: Climate Change Resilience and Adaptation,
- IEMA (2022) Assessing Greenhouse Gas Emissions and Evaluating their Significance, and
- UKHA (2021) Design Manual for Roads and Bridges Volume 11 Environmental Assessment, Section 3 Environmental Assessment Techniques, Part 14 LA 114 – Climate.

In the absence of specific Irish or United Kingdom (UK) guidance in relation to industrial facilities, the guidance from the UK Highway Agency (UKHA) "*Design Manuals for Roads and Bridges (DMRB) - LA 114 Climate*" (hereafter referred to as LA 114 Climate) (UKHA, 2021) has been consulted which is still relevant to GHG emissions from industrial sources. LA 114 Climate advises that the assessment of a Proposed Development should describe the likely significant effects on the environment resulting from both the:

- Impact of a project on climate (GHG emissions); and
- Vulnerability of a project to climate change (adaptation).

The assessment methodology has been derived with reference to the most appropriate guidance documents relating to climate which are set out in the following sections of this Chapter. An overview of the methodology undertaken for the climate impact assessment is outlined below:

- A detailed baseline review of GHG emissions has been undertaken in order to characterise the baseline environment. This has been undertaken through review of available published GHG emission data;
- A review of the most applicable guidelines for the assessment of GHG emissions has been carried out in order to define the significance criteria for the Construction and Operational Phases of the Proposed Development. These guidelines describe appropriate methods for quantifying the emissions of GHG emissions from the Proposed Development;
- Predictive calculations and impact assessments relating to the likely Operational Phase climatic impacts of the Proposed Development have been undertaken;
- An assessment of the vulnerability of the Proposed Development to climate change has been undertaken; and
- A schedule of mitigation measures has been incorporated where required to reduce, where necessary, the identified potential climatic impacts associated with the Proposed Development.

10.2.1 Relevant Guidelines, Policy and Legislation

Ireland is party to both the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol. The Paris Agreement, which entered into force in 2016, is

RECEIVED 19/07/2023

an important milestone in terms of international climate change agreements and includes an aim of limiting global temperature increases to no more than 2°C above pre-industrial levels with efforts to limit this rise to 1.5°C. The aim is to limit global GHG emissions to 40 gigatonnes as soon as possible whilst acknowledging that peaking of GHG emissions will take longer for developing countries. Contributions to GHG emissions was based on Nationally Determined Contributions (INDCs) which formed the foundation for climate action post 2020. Significant progress was also made in the Paris Agreement on elevating adaption onto the same level as action to cut and curb emissions.

In order to meet the commitments under the Paris Agreement, the EU enacted *Regulation (EU) 2018/842 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement and amending Regulation (EU) No. 525/2013* (the Regulation) relating to the non-ETS sector and Directive (EU) 2018/410 of the European Parliament and of the Council of 14 March 2018 relating to the ETS sector. These measures. These measures aim to deliver, collectively by the EU in the most cost-effective manner possible, reductions in GHG emissions from the Emission Trading System (ETS) and non-ETS sectors amounting to 43% and 30%, respectively, by 2030 compared to 2005. Ireland's obligation under the Regulation is a 30% reduction in non-ETS greenhouse gas emissions by 2030 relative to its 2005 levels. The Sharm el-Sheikh Implementation Plan was drafted at COP27 in November 2022. This plan included a new funding arrangement for "loss and damage" for vulnerable countries hit hard by climate disasters. No significant agreements were made regarding the phasing out of fossil fuels or limiting global heating to 1.5°C above pre-industrial levels, however the plan resolves to pursue further efforts to limit the rise to 1.5°. In order to limit global warming to 1.5 °C rapid, deep and sustained reductions in global greenhouse gas emissions of 43% by 2030 relative to the 2019 level will be required.

Following on from the recently published European Climate Law (EU, 2021), and as part of the EU's "*Fit for 55*" legislative package where the EU has recently committed to a domestic reduction of net greenhouse gas emissions by at least 55% compared to 1990 levels by 2030, *Regulation (EU) 2018/842 Regulation (EU) 2018/842 of the European Parliament and of the Council of 30 May 2018 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement and amending Regulation (EU) No 525/2013* (the Effort Sharing Regulation) is proposed to be strengthened with increased ambition by the year 2030. The proposal for Ireland is to increase the GHG emission reduction target from 30% to 42% relative to 2005 levels whilst the ETS market will also have more stringent reductions from the currently proposed reduction of 43% by 2030 compared to 2005 to a 61% reduction by 2030 based on annual reductions of 4.2% compared to the previous annual reduction level of 2.2% per year (EU, 2021) with levels in 2021 reducing to 1,307 million tonnes CO_{2eq}.

10.2.1.1 Emission Trading System

The ETS is an EU-wide scheme which regulates the GHG emissions of larger industrial emitters including electricity generation, cement manufacturing, heavy industry and facilities which have greater than 20MW thermal input capacity (which is applicable to the Proposed Development). Under the ETS, there are no country-specific targets. The non-ETS sector includes all domestic GHG emitters which do not fall under the ETS and thus includes GHG emissions from transport, residential and commercial buildings and agriculture. In contrast to the ETS, Ireland has a country-specific obligation under the Regulation of a 42% reduction in non-ETS GHG emissions by 2030 relative to its 2005 levels.

RECEIVED: 19/07/2023

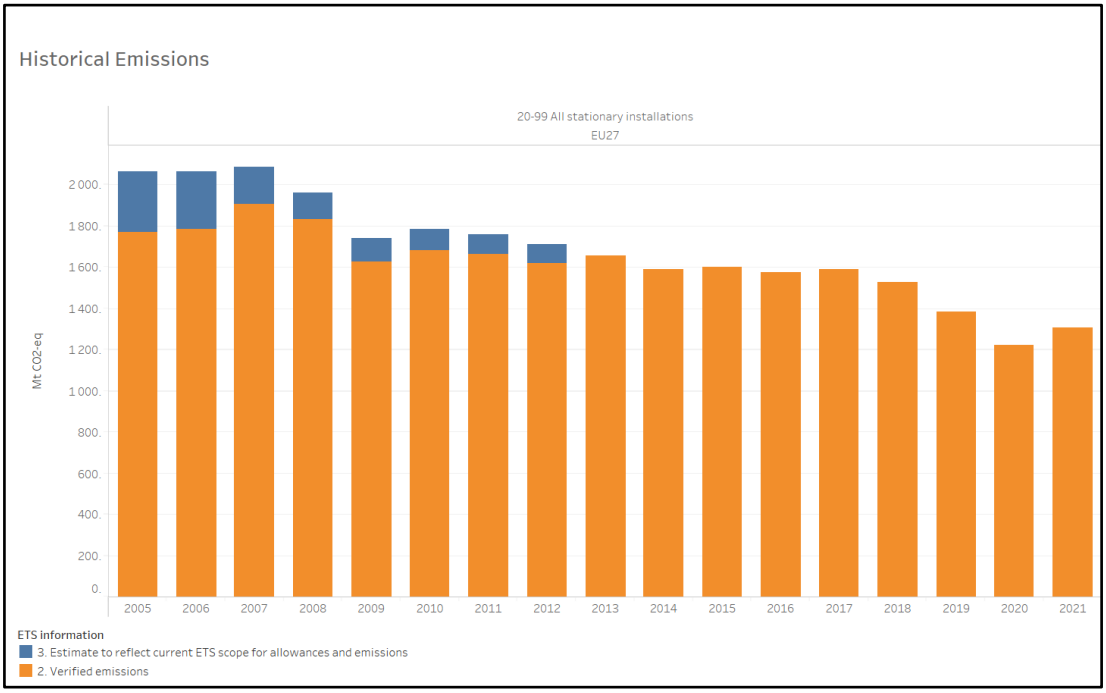
As outlined in European Commission publication "*Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment*" (EC, 2013) the assessment of the impact of the project on climate should be context-specific. Within the context of global or EU-wide emissions, the GHG emissions associated with the project should be assessed in the context of the ETS. The approach that has been adopted at EU level is the EU Climate and Energy Package. In this regard, the EC guidance (EC, 2013) has stated that:

"The EU Emissions Trading System, the backbone of the EU mitigation effort, which sets a cap on emissions from the most polluting sectors including over 11,000 factories, power plants and other installations, including airlines. By 2020, the cap should result in a 21% reduction relative to 2005 levels. The EU ETS covers about 40% of all EU emissions." (EC, 2013).

As outlined in the EU publication "*The EU Emissions Trading System in 2020: trends and projections*" (EU, 2020), the European Union's energy system is decarbonising rapidly. The report states:

"*Total ETS emissions from stationary installations declined by 9.1% between 2018 and 2019, the largest drop in a decade, driven by a strong decrease in coal use for power production*" (EU, 2020)

As shown in Figure 10.1 in the most recent verified emissions from the ETS covering 2005 – 2021 this trend is continuing with the exception of 2020 due to COVID.



Taken from https://www.eea.europa.eu/data-and-maps/dashboards/emissions-trading-viewer-1

Figure 10.1 *Historical ETS Verified Emissions 2005 - 2021*

The European Topic Centre on Climate report entitled "*Trends and projections in the EU ETS in 2020*" (ETC, 2020) indicates that the reduction in GHG emissions is predicted to continue up to at least 2030 due to current policies in place. As shown in Figure 10.2, both the energy industries and "other industries" are predicted to decrease significantly by 2030.

RECEIVED: 18/07/2023

Figure 3.1 **EU ETS historic and projected emissions between 2005 and 2030 for EU-27, by inventory category**

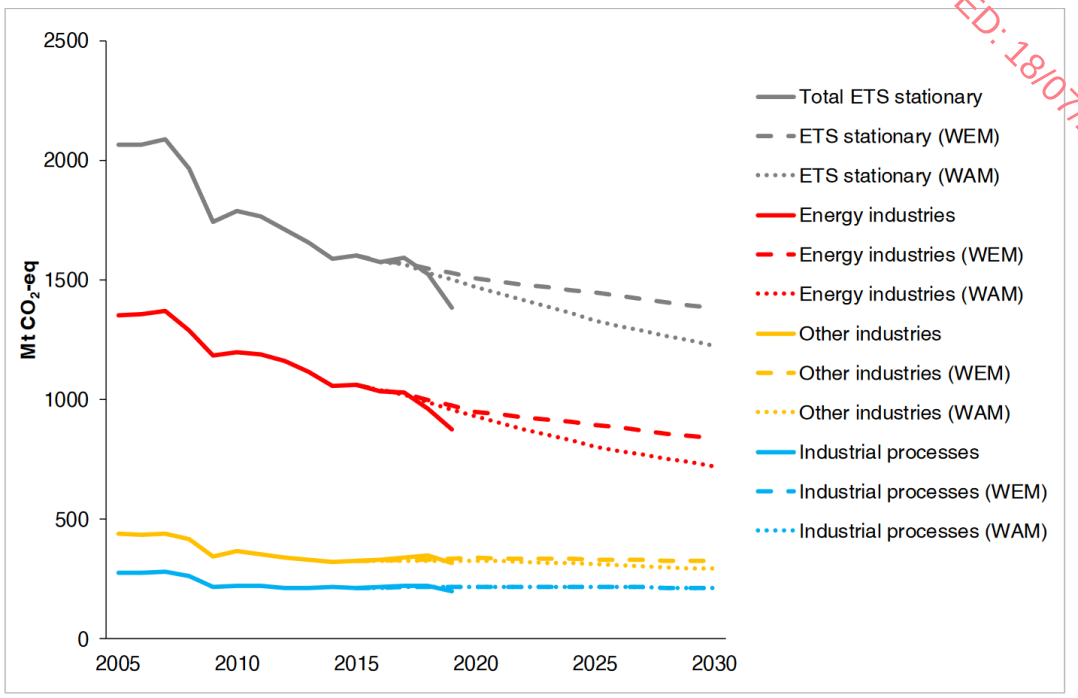


Figure 10.2 *Historical ETS Verified Emissions & Project Emissions 2005 – 2030 (WEM = with existing measures, WAM = with additional measures)*

10.2.1.2 National Legislation

In 2015, the Climate Action and Low Carbon Development Act 2015 (No. 46 of 2015) (Government of Ireland, 2015) was enacted (the 2015 Act). The purpose of the Act was to enable Ireland 'to pursue, and achieve, the transition to a low carbon, climate resilient and environmentally sustainable economy by the end of the year 2050' (3.(1) of No. 46 of 2015). This is referred to in the Act as the 'national transition objective'.

The 2019 *Climate Action Plan* (CAP) (Government of Ireland, 2019), published in June 2019, outlined the current status across key sectors including Electricity, Transport, Built Environment, Industry and Agriculture and outlined the various broadscale measures required for each sector to achieve ambitious decarbonisation targets. The 2019 CAP also detailed the required governance arrangements for implementation including carbon-proofing of policies, establishment of carbon budgets, a strengthened Climate Change Advisory Council and greater accountability to the Oireachtas. The 2019 CAP set a built environment sector reduction target of 40 - 45% relative to 2030 pre-NDP (National Development Plan) projections.

In June 2020, the Government published the Programme for Government – Our Shared Future (Government of Ireland 2020). In relation to climate, there is a commitment to an average 7% per annum reduction in overall greenhouse gas emissions from 2021 to 2030 (51% reduction over the decade) with an ultimate aim to achieve net zero emissions by 2050. Policy changes include the acceleration of the electrification of the transport system, including electric bikes, electric vehicles and electric public transport, alongside a ban on new registrations of petrol and diesel cars from 2030. In addition, there is a policy to ensure an unprecedented model shift in all areas by a reorientation of investment to walking, cycling and public transport.

RECEIVED 19/07/2023

The Climate Action and Low Carbon Development (Amendment) Act 2021 (the 2021 Climate Act) (No. 32 of 2021) was published in July 2021. The purpose of the 2021 Climate Act is to provide for the approval of plans '*for the purpose of pursuing the transition to a climate resilient, biodiversity rich and climate neutral economy by no later than the end of the year 2050*'. The 2021 Climate Act will also '*provide for carbon budgets and a sectoral emissions ceiling to apply to different sectors of the economy*'. The 2021 Climate Act removed any reference to a national mitigation plan and instead refers to both the Climate Action Plan, as published in 2019, and a series of National Long Term Climate Action Strategies. In addition, the Environment Minister shall request each local authority to make a 'local authority climate action plan' lasting five years and to specify the mitigation measures and the adaptation measures to be adopted by the local authority. The 2021 Climate Act set a target of a 51% reduction in the total amount of greenhouse gases over the course of the first two carbon periods ending 31 December 2030 relative to 2018 annual emissions. The 2021 Climate Act defined the carbon budget as 'the total amount of greenhouse gas emissions that are permitted during the budget period'

The Climate Action and Low Carbon Development (Amendment) Act 2021 (No. 32 of 2021) outlines a series of specific actions including:

- To make a strategy to be known as the 'National Long Term Climate Strategy' not less than once in every five-year period with the first to be published for the period 2021 to 2035 and with each subsequent Strategy covering the next three five-year carbon budgets and also include a longer term perspective of at least 30 years;
- To adopt a system of carbon budgets which will be determined as part of a grouping of three five-year periods calculated on an economy-wide basis, starting with the periods 2021 to 2025, 2026 to 2030, and 2031 to 2035;
- To introduce a requirement for Government to adopt "sectoral emission ceilings" for each relevant sector within the limits of each carbon budget;
- To request all local authorities to prepare climate action plans for the purpose of contributing to the national climate objective. These plans should contain mitigation and adaptation measures that the local authority intends to adopt;
- Increasing the power of the Advisory Council to recommend the appropriate climate budget and policies;
- Requiring the Minister to set out a roadmap of actions to include sector specific actions that are required to comply with the carbon budget and sectoral emissions ceiling for the period to which the plan relates; and
- Reporting progress with the CAP on an annual basis with progress including policies, mitigation measures and adaptation measures that have been adopted.

In terms of wider energy policy, as outlined in the EPA publication "*Ireland's Greenhouse Gas Projections 2021-2040*" (EPA, 2022b) under the *With Additional Measures* scenario, emissions from the energy industries sector are projected to decrease by 415.9% to 4.5 Mt CO_{2eq} over the period 2020 to 2030 including the proposed increase in renewable energy generation to approximately 80% of electricity consumption:

- In this scenario it is estimated that renewable energy generation increases to approximately 80% of electricity consumption. This is mainly a result of further expansion in wind energy (comprising 5.0 GW offshore). Expansion of other renewables (e.g. solar photovoltaics) also occurs under this scenario.
- Under the With Additional Measures, one power station operates to the end of 2023 with 30% co-firing.

RECEIVED 18/07/2023

- In this scenario the Moneypoint power station is assumed to operate in the market up to end 2025 at which point it no longer generates electricity from coal.
- In terms of inter-connection, it is assumed that the Greenlink 500MW interconnector to the UK to come on stream in 2025 and the Celtic 700MW interconnector to France to come on stream in 2027 (EPA, 2022b).

The 2023 *Climate Action Plan* (CAP) (Government of Ireland, 2022) provides a detailed plan for taking decisive action to achieve a 51% reduction in overall greenhouse gas emissions by 2030 and setting us on a path to reach net-zero emissions by no later than 2050, as committed to in the Programme for Government and set out in the Climate Act 2021. The plan outlines the current status across key sectors including Electricity, Transport, Built Environment, Industry and Agriculture and outlined the various broadscale measures required for each sector to achieve ambitious decarbonisation targets. CAP 2023 also detailed the required governance arrangements for implementation including carbon-proofing of policies and establishment of sectoral emission ceilings and carbon budgets. In relation to data centres, the *CAP 2021* provides that emissions from industry sectors covered by the ETS are subject to EU-wide rather than national targets set out under EU Effort Sharing Regulation. Box 2.1 states:

> *"emissions from electricity generation and large industry in the ETS are subject to EU-wide targets which require that emissions from these sectors be reduced by 43% by 2030, relative to 2005 levels"*.

In relation to the 2023 Climate Action Plan, under Section 13.3.5 EU Emission Trading System, the 2023 CAP states:

> *"The EU ETS is an important measure for reducing industry GHG emissions. The Fit for 55 proposals for the reformed EU ETS will increase emissions reductions in this sector from the current 43% to 61%, in the period 2005 to 2030. Changes include a steeper annual reduction in the emissions ceiling and reductions in free allowances, alongside the corresponding introduction of a carbon border adjustment mechanism." (2023 CAP, page 155).*

As part of the preparation of a 'local authority climate action plan', each local authority shall consult and co-operate with an adjoining local authority in making a local authority climate action plan and co-ordinate the mitigation measures and adaptation measures to be adopted, where appropriate. Each local authority is also required to consider any significant effects the implementation of the local authority climate action plan may have on the adjoining local authority.

Individual county councils in Ireland have also published their own Climate Change Strategies which outline the specific climate objectives for that local authority and associated actions to achieve the objectives. The Kildare Climate Change Adaptation Strategy 2019 – 2024 (KCC, 2019) outlines a number of goals and plans to prepare for and adapt to climate change. There are three key action areas within the Kildare Climate Change Adaptation Strategy which are:

(i) Ensure a proper comprehension of the key risks and vulnerabilities of climate change

(ii) Bring forward the implementation of climate resilient actions in a planned and proactive manner and,

(iii) Ensure that climate adaptation considerations are mainstreamed into all plans and policies

RECEIVED 19/07/2023

and integrated into all operations and functions of Kildare County Council.

The Long-term Climate Action Strategy has not yet been published although the government issued the "*Long-term Strategy on Greenhouse Gas Emissions Reduction*" in November 2019 (Government of Ireland, 2019). In relation to electricity the Government commits to the full decarbonisation of the electricity system by 2050. In addition, the Gas Networks Ireland (GNI) report *Vision 2050 – A Net Zero Carbon Gas Network For Ireland*" (Ervia, 2019) highlights that by 2050 natural gas will be replaced by biomethane, abated natural gas (with Carbon Capture & Storage (CCS)) and hydrogen. By 2030 it is envisaged that 20% of current demand will be biomethane gas and increasing to 37% by 2050 with hydrogen accounting for 13% by 2050. The report states that CCS technologies will increasingly capture and store CO_2 emissions from natural gas used for power generation and large industry and will deliver net zero carbon by 2050. Thus, Gas Networks Ireland has stated that the impact of using gas supplied by Ervia by 2050 will not be significant and will have an overall net zero impact on climate.

The carbon budget programme was published in November 2021 and comprises three successive 5-year carbon budgets. In relation to carbon budgets, the Climate Action and Low Carbon Development (Amendment) Act 2021 states '*A carbon budget, consistent with furthering the achievement of the national climate objective, shall be proposed by the Climate Change Advisory Council, finalised by the Minister and approved by the Government for the period of 5 years commencing on the 1 January 2021 and ending on 31 December 2025 and for each subsequent period of 5 years (in this Act referred to as a 'budget period')*'. The carbon budget is to be produced for 3 sequential budget periods with the third carbon budget in draft format. The carbon budget can be revised where new obligations are imposed under the law of the European Union or international agreements or where there are significant developments in scientific knowledge in relation to climate change. The total emissions allowed under each budget is set out below in Table 10.1, as well as the average annual reduction for each 5-year period.

Period	Mt CO2eq	Emission Reduction Target
2021-2025	295 Mt CO2eq	Reduction in emissions of 4.8% per annum for the first budget period.
2026-2030	200 Mt CO2eq	Reduction in emissions of 15.3% per annum for the second budget period.
2031-2035	151 Mt CO2eq	Reduction in emissions of 3.5% per annum for the third provisional budget.

Table 10.1 *5-Year Carbon Budgets 2021-2025, 2026-2030 and 2031-2025*

The CAP 2023 provides that the economy-wide carbon budgets will be supplemented by sectoral emissions ceilings, setting the maximum amount of GHG emissions that are permitted in a given sector of the economy during each five-year carbon budget. The recently agreed Sectoral Emission Ceilings for each Sector are shown in Table 10.2. It should be noted that 5.25 $MtCO_{2eq}$ of annual emissions reductions are currently unallocated on an economy-wide basis for the second carbon budget period (2026-2030). These will be allocated following a mid-term review and identification of additional abatement measures. The electricity sector emitted approximately 10.5 $MtCO_{2eq}$ in 2018 and has a ceiling of 3 $MtCO_{2eq}$ in 2030 which is a 71% reduction over this period.

RECEIVED: 18/07/2023

Sector	Reduction Required	2018 Emissions ($MtCO_{2eq}$)	2030 Emission Ceiling ($MtCO_{2eq}$)
Electricity	75%	10.5	3
Transport	50%	12	6
Buildings (Commercial and Public)	45%	2	1
Buildings (Residential)	40%	7	4
Industry	35%	7	4
Agriculture	25%	23	17.25
Other**	50%	2	1

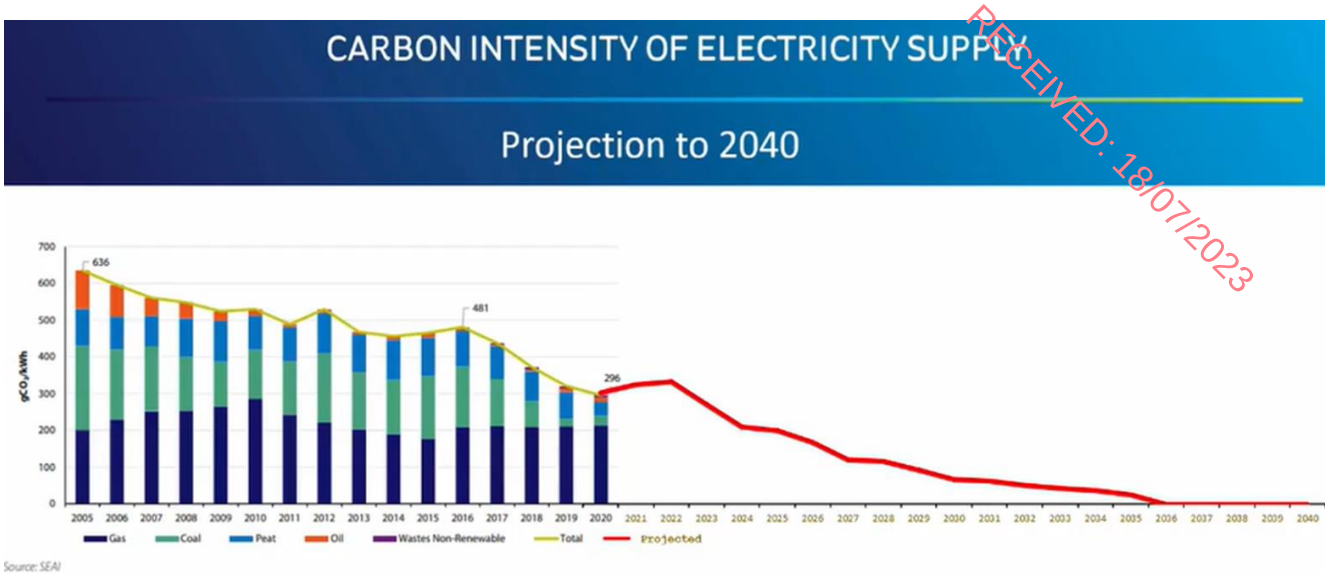
Table 10.2 *Sectoral Emission Ceiling 2030*

As outlined in the "*The Government Statement on the Role of Data Centres in Ireland's Enterprise Strategy*" (Government of Ireland 2022) the policy document states that "the Government has a preference for data centres developments that can demonstrate a clear pathway to decarbonise and ultimately provide net zero data services. It is expected that data centres will align with the EU Climate Neutral Data Centre Pact energy efficiency and water use targets and set themselves targets to achieve zero carbon electricity use at all hours. System operators will work with large energy users to facilitate accurate hourly emissions reporting, grid carbon-intensity transparency, and allow data centre to optimise computing loads to maximise use of renewables and minimise carbon emissions (as per Action 99 of Climate Action Plan 2021)".

The 2023 CAP has outlined the path towards the electricity target by 2030. The core measures are:

- Increasing the share of renewable electricity to 80%,
- Indicative Onshore Wind Capacity of up to 9GW,
- Indicative Offshore Wind Capacity of at least 5GW,
- Indicative Solar PV Capacity of 8GW.

A research report by Baringa / Wind Energy Ireland (Baringa, 2021) has indicated that a carbon intensity of between 38 – 84 gCO_2/kWh was achievable for the national grid. At a keynote speech for the EPA's Climate Change conference in June 2022 the ESB Chief Executive stated that the projected carbon intensity figure for 2030 is likely to be 66 gCO_2/kWh (ESB 2022) as shown in Figure 10.3 which is in line with the Baringa report. The ESB has also committed to net zero by 2040 as outlined in recent publications (ESB,2021, 2022). Thus, the current assessment has been conducted on the basis of 100 gCO_2/kWh in 2030 which is a conservative assumption.



RECEIVED: 18/07/2023

Figure 10.3 *ESB Presentation At EPA Climate Change Conference 2022*

In relation to the decarbonisation of natural gas and the availability of biomethane, the publication "*Sustainability of Biomethane Production in Ireland*" (KPMG/GNI, 2021) has assessed the environmental sustainability of a proposed national biomethane industry in Ireland based on farm-scale anaerobic digestion (AD) plants. The report found that the industry is technically feasible with the current government target of 1.6 TWh by 2030 achievable and more ambitious targets set out in the Government's Renewable Heat Obligation consultation of 5.5TWh also feasible.

The report envisages a roll-out of 125 x 20 GWh farm-scale biomethane AD plants by 2030 leading to 2.5TWh of biomethane production which will require 125,000 acres (1.1% of Ireland's agricultural land). The level of production would be sufficient to displace 15% of current commercial and industrial natural gas consumption. As outlined in *EU Directive 2018/2001 on the promotion of the use of energy from renewable sources (RED II Directive)*, the use of biomethane to produce electricity based on wet manure in a closed digestate system is at least carbon neutral and thus replacing natural gas by biomethane will lead to direct GHG emission savings.

These measures in total have the potential for an additional abatement impact of between 6 – 8 $MtCO_{2eq}$ which can be compared to the target of 7.5 $MtCO_{2eq}$ reduction required by 2030. In addition, there is a target of between 1-3TWh of zero-emission gas generation (including green hydrogen).

10.3 Climate Criteria For The Rating Of Impacts

The Institute of Environmental Management and Assessment (IEMA) guidance note on "*Assessing Greenhouse Gas Emissions and Evaluating their Significance*" (IEMA, 2022) states that **"***the crux of significance regarding impact on climate is not whether a project emits GHG emissions, nor even the magnitude of GHG emissions alone, but whether it contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050"*. Mitigation has taken a leading role within the Guidance compared to the previous edition published in 2017. Early stakeholder engagement is key and therefore mitigation should be considered from the outset of the project and continue throughout the project's lifetime in order to maximise GHG emissions savings.

RECEIVED 19/07/2023

The assessment aims to quantify the difference in GHG emissions between the proposed project and the baseline scenario (the alternative project/solution in place of the proposed project). This is done by calculating the difference in whole life net GHG emissions between the two options. The IEMA EIA guidance (IEMA, 2022) does not recommend a particular approach for this due to variations of situations but instead it sets out advice for the key common components necessary for undertaking a GHG emissions assessment. During the assessment IEMA recommend the use of a reasonable worst-case scenario rather than an absolute worst-case scenario. The IEMA Guidance (IEMA, 2022) states that a GHG emissions assessment should incorporate the following steps into any climate assessment:

1. Set the scope and boundaries of the GHG assessment;
2. Develop the baseline;
3. Decide upon the emissions calculation methodologies;
4. Data collection;
5. Calculate/determine the GHG emissions inventory; and
6. Consider mitigation opportunities and repeat steps 4 & 5.

Activities that do not significantly change the result of the assessment can be excluded where expected emissions are less than 1% of total emissions, and where all such exclusions should be clearly stated and total a maximum of 5% of total emissions.

When considering the cumulative assessment, all global cumulative GHG sources are relevant to the effect on climate change as outlined in the IEMA Guidance (IEMA, 2022) as all GHG emissions contribute to global warming irrespective of geographical location. As a result, the effects of GHG emissions from specific cumulative projects therefore in general should not be individually assessed. This is due to the fact that there is no basis for selecting any particular (or more than one) cumulative project that has GHG emissions for assessment over any other. The following section details the specific appraisal methods utilised in order to complete the assessment in accordance with the IEMA Guidance (IEMA, 2022).

10.3.1 Construction Phase

For the purpose of the qualitative climate assessment of the construction phase, the combined impact of demolition of Buildings No's 7, 8 and 9 and the concurrent construction of all proposed buildings at the site has been assumed to occur together. In addition, the facilitation works, including the upgrade of the gas main external to the site, the upgrade of the existing gas skid on site to power the proposed energy centre and the development of the proposed replacement 110kV Substation and uprating of existing overhead lines from the replacement 110kV Rinawade substation to Derryiron/Maynooth and Dunfirth/Kinnegad has been assessed.

The current assessment focused on identifying the impact of the facilitation works and the demolition and construction phase of the development on climate was determined by a qualitative assessment of the nature and scale of GHG generating demolition and construction activities associated with the proposed development.

10.3.2 Operational Phase

The assessment for the Proposed Development is based on the use of electricity to power the facility in addition to the emergency operation of the backup generators for 250 hours per year based on the use of diesel with hydrogenated vegetable oil (HVO) used in preference where

RECEIVED: 18/07/2023

available. The back-up generators are only used in the event of an interruption to the supply of electricity from the National Grid with the exception of testing. In reality and based on recent experience over the past number of years of the electricity network (Eirgrid, 2022), backup generators are rarely used other than during testing and maintenance.

The on-site energy centre will also provide dispatchable power to the national electrical grid. The Energy Centre is not proposed as the primary power supply for the proposed development. It will not be connected to the proposed data centres or deeptech buildings. The energy centre will operate as dispatchable power in line with CRU and EirGrid requirements. The CTGs will operate no more than 330 days per year and it is likely they will operate no more than 1,500 hours per year as dispatchable power.The turbines will be fueled by natural gas / biogas supplied by Gas Networks Ireland (GNI) via the upgraded high-pressure network that runs close to the site. The combustion turbine generator's (CTG's) will be primarily fuelled by natural gas supplied by Gas Networks Ireland (GNI). The facility will also include a 5-day supply of HVO as a backup fuel should the natural gas system be unavailable in an emergency situation.

When assessing significance, the *2010 IEMA Principles Series on Climate Change Mitigation & EIA* (IEMA, 2010) defines three overarching principles:

- The GHG emissions from all projects will contribute to climate change, the largest interrelated cumulative environmental effect;
- The consequences of a changing climate have the potential to lead to significant environmental effects on all topics in the EIA Directive (e.g. human health, biodiversity, water, land use, air quality); and
- GHG emissions have a combined environmental effect that is approaching a scientifically defined environmental limit; as such any GHG emissions or reductions from a project might be considered to be significant. The environmental limit is the global GHG emission budget that defines a level of dangerous climate change, and any GHG emission that contributes to exceedance of that budget or threatens efforts to stay within it can be considered as significant.

The 2020 Guidance (IEMA, 2022) document builds on those principles with three points:

- When evaluating significance, all new GHG emissions contribute to a negative environmental impact; however, some projects will replace existing development or baseline activity that has a higher GHG profile. The significance of a project's emissions should therefore be based on its net impact over its lifetime, which may be positive, negative or negligible;
- Where GHG emissions cannot be avoided, the goal of the EIA process should be to reduce the project's residual emissions at all stages; and
- Where GHG emissions remain significant, but cannot be further reduced, approaches to compensate the project's remaining emissions should be considered.

The criteria for determining the significance of effects are a two-stage process that involves defining the magnitude of the impacts and the sensitivity of the receptors. In relation to climate, there is no project specific assessment criteria, but the project will be assessed against the recommended IEMA (IEMA, 2022) significance determination. This takes account of any embedded or committed mitigation measures that form part of the design which should be considered.

RECEIVED 19/07/2023

- Major or moderate adverse impact (significant): A project that follows a 'business-as-usual' or 'do minimum' approach and is not compatible with the net zero[1] trajectory by 2050 or sectoral based transition to net zero targets, results in a significant adverse effect. It is down to the consultant completing the assessment to differentiate between the 'level' of significant adverse effects e.g. 'moderate' or 'major' adverse effects. A project's impact can shift from significant adverse to nonsignificant effects by incorporating mitigation measures that substantially improve on business-as-usual and meet or exceed the science-based emissions trajectory of ongoing but declining emissions towards net zero. Meeting the minimum standards set through existing policy or regulation cannot necessarily be taken as evidence of avoiding a significant adverse effect. This is particularly true where policy lags behind the necessary levels of GHG emission reductions for a science based 1.5°C compatible trajectory towards net zero.
- Minor adverse impact (not significant): A project that is compatible with the budgeted, science based 1.5°C trajectory (in terms of rate of emissions reduction) and which complies with up-to-date policy and 'good practice' reduction measures to achieve that has a minor adverse effect that is not significant. The project may have residual impacts but is doing enough to align with and contribute to the relevant transition scenario. A 'minor adverse' or 'negligible' non-significant effect conclusion does not necessarily refer to the magnitude of GHG emissions being carbon neutral[2] (i.e. zero on balance) but refers to the likelihood of avoiding severe climate change and achieving net zero by 2050. A 'minor adverse' effect or better is a high bar and indicates exemplary performance where a project meets or exceeds measures to achieve net zero earlier than 2050.
- Negligible Impact (not significant): A project that achieves emissions mitigation that goes substantially beyond the reduction trajectory, or substantially beyond existing and emerging policy compatible with that trajectory, and has minimal residual emissions, is assessed as having a negligible effect that is not significant.
- Beneficial Impact (significant): A project that causes GHG emissions to be avoided or removed from the atmosphere has a beneficial effect that is significant. Only projects that actively reverse (rather than only reduce) the risk of severe climate change can be judged as having a beneficial effect.

The impact of the operational phase of the proposed development on climate was determined by an assessment of the direct (due to natural gas and infrequent diesel usage) and indirect CO_2 emissions associated with electricity over the period 2025 to 2040. The details and results of the assessment are provided in Section 10.7.2.2. The change in the renewable fraction of electricity from the national grid and the biomethane fraction of natural gas with time have also been considered.

[1] Net Zero: "*When anthropogenic emissions of greenhouse gases to the atmosphere are balanced by anthropogenic removals over a specified period.*" Net zero is achieved where emissions are first reduced in line with a 'science-based' trajectory with any residual emissions neutralised through offsets.

[2] Carbon Neutral: "*When anthropogenic emissions of greenhouse gases to the atmosphere are balanced by anthropogenic removals over a specified period irrespective of the time period or magnitude of offsets required.*"

RECEIVED 19/07/2023

10.3.4 Significance Criteria – Vulnerability of the Proposed Scheme to Climate Change

Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment (EC, 2013) and *IEMA EIA Guide to Climate Change Resilience and Adaptation* (IEMA, 2020) outlines an approach for undertaking a risk assessment where there is a potentially significant impact on the project receptors due to climate change. The approach to the assessment is based on the following steps:

- Identify potential climate change risk to a project;
- Assess these risks (potentially prioritising to identify the most severe); and
- Formulating mitigation actions to reduce the impact of the identified risks.

The risk assessment assesses the likelihood and consequence of the impact occurring, leading to the evaluation of the significance of the impact. The assessment of likelihood should include consideration of available climate projections data for the project (IPCC, 2015). The Operational Phase assessment, after identifying the hazards and benefits of the climate change impacts, has assessed the likelihood and consequences using the framework outlined in recent risk assessment publications (Raydugin Y. (2014), EPA (2010)) as outlined in Tables 10.3, 10.4 and 10.5.

RECEIVED: 18/07/2023

Likelihood Category (Score)	Description (Probability and Frequency of Occurrence)
Very high (5)	The event may occur with a > 90% probability
High (4)	The event may occur with a 50% - 90% probability
Medium (3)	The event may occur with a 10% - 50% probability
Low (2)	The event may occur with a 0.1% - 10% probability
Very Low (1)	The event may occur with a <0.1% probability

Note 1 Based on "Consistent Application of Risk Management for Selection of Engineering Design Options in Mega-Projects", Int. Journal of Risk & Contingency Management (Oct 2014)

Table 10.3 Likelihood Categories

Consequence of Impact (Score)	Description [Note 1]
Very large adverse (5)	Very heavy contamination, widespread effects of extended duration
Large adverse (4)	Heavy contamination, localised effects of extended duration
Moderately adverse (3)	Simple contamination, widespread effects of short duration
Minor adverse (2)	Simple contamination, localised effects of short duration
Negligible (1)	No contamination, localised effects

Note 1 Based on "Guidance to Licensees/COA holders on the Notification, Management and Communication of Environmental Incidents" (EPA, 2010)

Table 10.4 Measure of Consequence

		Measure of Likelihood				
		Very Low	Low	Medium	High	Very High
Measure of Consequence	Very Large	5	10	15	20	25
	Large	4	8	12	16	20
	Moderate	3	6	9	12	15
	Minor	2	4	6	8	10
	Negligible	1	2	3	4	5

Note 1 Based on "Consistent Application of Risk Management for Selection of Engineering Design Options in Mega-Projects", Int. Journal of Risk & Contingency Management (Oct 2014) (Red = high risk, Yellow = medium risk, Green = low risk)

Table 10.5 Significance Matrix

10.4 Receiving Environment

Climate is defined by the IPCC (IPCC, 2015) as the average weather over a period of time, whilst climate change is a significant change to the average weather. Climate change is a natural phenomenon but in the industrial age human activities, through the release of GHGs, have impacted on the climate (EPA, 2017). The release of anthropogenic GHGs is altering the Earth's atmosphere resulting in a 'Greenhouse Effect'. This effect is causing an increase in the atmosphere's heat trapping abilities resulting in increased average global temperatures over the past number of decades. The release of CO_2 as a result of burning fossil fuels, has been one of the leading factors in the increase of the 'Greenhouse Effect'. The most significant GHGs are CO_2, methane (CH_4) and nitrous oxide (N_2O).

RECEIVED 19/07/2023

For the purposes of this assessment, the definition outlined in Council Directive 2009/28/EC on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC (hereafter referred to as the Renewable Energy Directive) for GHGs has been used. In Annex V, C. Methodology Point 5 of the Renewable Energy Directive the relevant GHGs are defined as CO_2, CH_4 and N_2O. CO_2 accounted for 63.7% of total GHG emissions in Ireland in 2018 while CH_4 and N_2O combined accounted for 34.4%. The main source of CH_4 and N_2O is from the agricultural sector. Perfluorocarbons are not relevant in the context of the Renewable Energy Directive as they are not emitted in significant quantities by energy sources.

GHGs have different efficiencies in retaining solar energy in the atmosphere and different lifetimes in the atmosphere. In order to compare different GHGs, emissions are calculated on the basis of their Global Warming Potential (GWPs) over a 100-year period, giving a measure of their relative heating effect in the atmosphere. The IPCC AR5 Synthesis Report: Climate Change 2014 of the Fifth Assessment Report (AR5) (IPCC 2015) sets out the global warming potential for a 100-year time period (GWP100) for CO_2 as the basic unit (GWP = 1) whereas CH_4 has a global warming potential equivalent to 28 units of CO_2 and N_2O has a GWP100 of 265. This approach is also maintained in the IPCC AR6 Technical Summary (IPCC 2021).

10.4.1 Climate Baseline

LA 114 Climate (UKHA, 2021) states that a baseline climate scenario should identify, consistent with the study area for the project, GHG emissions without the project for both the current and future baseline (i.e. Do Minimum scenarios).

Given the circumstances of Ireland's declaration of a climate and biodiversity emergency in May 2019 and the November 2019 European Parliament approval of a resolution declaring a climate and environment emergency in Europe, in conjunction with Ireland's current failure to meet its EU binding targets under the GHG Regulation, changes in GHG emissions either beneficially or adversely are of more significance than previously viewed prior to these declarations. Thus, the baseline climatic environment should be considered a highly sensitive environment for the assessment of impacts.

Anthropogenic emissions of greenhouse gases (GHGs) in Ireland included in the European Union's Effort Sharing Regulation (ESR) (EU 2018/842) are outlined in the most recent review by the EPA which details provisional emissions up to 2021 (EPA, 2022b). The greenhouse gas emission inventory for 2021 is the first of ten years over which compliance with targets set in the ESR will be assessed. This Regulation sets 2030 targets for emissions outside of the Emissions Trading System (known as ESR emissions) and annual binding national limits for the period 2021-2030. Ireland's target is to reduce ESR emissions by 30% by 2030 compared with 2005 levels, with a number of flexibilities available to assist in achieving this. Ireland's ESR emissions annual limit for 2021 is 43.48 Mt CO_2eq. Ireland's provisional 2021 GHG ESR emissions are 46.19 Mt CO_2eq, this is 2.71 Mt CO_2eq more than the annual limit for 2021 (EPA, 2022b). Agriculture continues to be the largest contributor to overall emissions at 37.5% of the total. Transport, energy industries and the residential sector are the next largest contributors, at 17.7%, 16.7% and 11.4%, respectively. GHG emissions for 2021 are estimated to be 4.7% higher than emissions in 2020, this is due to a gradual lifting of covid restrictions and an increase in the use of coal and less renewables within electricity generation. Ireland's GHG emissions have increased by 11.4% from 1990 – 2021.

Provisional National total emissions (including LULUCF) for 2021 are 69.29 Mt CO_2eq, these

RECEIVED: 19/07/2023

have used 23.5% of the 295 Mt CO_2eq Carbon Budget for the five-year period 2021-2025. This leaves 76.5% of the budget available for the succeeding four years, requiring an 19.4% average annual emissions reduction from 2022-2025 to stay within budget.

The EPA 2022 GHG Emissions Projections Report for 2021 – 2040 (EPA, 2022b) notes that there is a long-term projected decrease in greenhouse gas emissions as a result of inclusion of new climate mitigation policies and measures that formed part of the National Development Plan (NDP) which was published in 2018 and the 2021 Climate Action Plan published in 2021. Implementation of these are classed as a "*With Additional Measures"* scenario for future scenarios. A change from generating electricity using coal and peat to wind power and diesel vehicle engines to electric vehicle engines are envisaged under this scenario. While emissions are projected to decrease in these areas, emissions from agriculture are projected to grow steadily due to an increase in animal numbers. However, over the period 2021 to 2030 Ireland is projected to cumulatively exceed its compliance obligations with the EU's Effort Sharing Regulations (Regulation (EU) 2018/842) 2030 targets by approximately 52.3MtCO_{2eq} under the "*With Existing Measures*" scenario. However, the projections indicate that Ireland can meet its non-ETS EU targets over the period 2021 – 2030 assuming full implementation of the Climate Action Plan and the use of the flexibilities available (EPA, 2022b).

10.4.2 Vulnerability of the Project to Climate Change

The Proposed Development study area for assessing a project's vulnerability to climate change is based on the construction footprint / project boundary. Impacts as a result of climate change involve increases in global temperatures and increases in the number of rainfall days per year. Ireland has seen increases in the annual rainfall in the north and west of the country, with small increases or decreases in the south and east (EPA, 2015). The EPA have compiled a list of potential adverse impacts as a result of climate change including the following which may be of relevance to the Proposed Development:

- More intense storms and rainfall events;
- Increased likelihood and magnitude of river and coastal flooding;
- Water shortages in summer in the east;
- Adverse impacts on water quality; and
- Changes in distribution of plant and animal species.

The historical regional weather data for Casement Aerodrome which is representative of the current climate in the region of the Proposed Development is shown in Table 10.6 (Met Eireann, 2022). The region of the Proposed Development has a temperate, oceanic climate, resulting in mild winters and cool summers. The Met Éireann weather station at Casement Aerodrome, is the nearest weather and climate monitoring station to the Proposed Development that has meteorological data recorded for the 30-year period from 1981 to 2010. Casement Aerodrome meteorological station is located approximately 6 km southeast of the Proposed Development at the closest point. Meteorological data recorded at Casement Aerodrome drome over the 30-year period from 1981 to 2010 indicates that the wettest months were October and December, and the driest month on average was February. July was the warmest month with a mean temperature of 15.7°C.

The recent weather patterns and extreme weather events recorded by Met Éireann have been reviewed. A noticeable feature of the recent weather has been an increase in the frequency and severity of storms with notable events including Storm Darwin in February 2014, Storm Emma in March 2018, and Storm Ophelia in October 2018. The maximum wind gust for

RECEIVED 19/07/2023

Casement Aerodrome for Storm Ophelia peaked at 117 km/hr with a 10-minute speed of 85 km/hr.

Heavier historical rainfall events have also been recorded in recent years including heavy rainfall and flooding in the summer of 2008, severe flooding in November 2009, and heavy rainfall in the Greater Dublin Area (GDA) on the 24 October 2011. The rainfall recorded on 24 October 2011 totalled 76.5 mm over a nine-hour period at Casement Aerodrome, which has an annual probability of 1 in 60 years.

Future climate predictions undertaken by Met Éireann have been published in 'Ireland's Climate: the road ahead (Met Eireann, 2013) based on four scenarios (RCP2.6, RCP4.5, RCP6.0 and RCP8.5) which is named with reference to a range of radiative forcing values for the year 2100 (i.e. 2.6, 4.5, 6.0 and 8.5 W/m^2 (watts per square metre)) respectively with focus on RCP4.5 (medium-low) and RCP8.5 (high) scenarios. In terms of mean temperatures, it is predicted that increases of between 1°C to 3°C will occur under RCP4.5 rising to 2°C to 4°C under RCP8.5. Warm extremes are expected to rise by 2°C to 3°C (RCP4.5) but by up to 5°C under RCP8.5.

The EPA sponsored Report No.159 '*Ensemble of regional climate model projections for Ireland*' (EPA, 2015) which has projected significant decreases in mean annual, spring and summer precipitation amounts with extended dry periods. The decreases are largest for summer, with reductions ranging from 0% to 13% and from 3% to 20% for the medium-to-low and high emission scenarios, respectively. Conversely increases of heavy precipitation of up to 20% are projected to occur during the winter and autumn months. The number of extended dry periods is projected to increase substantially by mid-century during autumn and summer.

In relation to storms, '*Report No.159 – Ensemble of regional climate model projections for Ireland*' (EPA, 2015) indicates that the overall number of North Atlantic cyclones is projected to decrease by 10% coinciding with a decrease in average mean sea-level pressure of 1.5 hectopascals (hPa) for all seasons by mid-century. Wind energy is also predicted to decrease for spring, summer and autumn with a projected increase in winter.

EPA's State of the Irish Environment Report (Chapter 2: Climate Change) (EPA 2020a) notes that projections show that full implementation of additional policies and measures, outlined in the 2019 Climate Action Plan, will result in a reduction in Ireland's total GHG emissions by up to 25 per cent by 2030 compared with 2020 levels. Climate change is not only a future issue in Ireland, as a warming of approximately 0.8°C since 1900 has already occurred. The report (EPA 2020a) underlines that the next decade needs to be one of major developments and advances in relation to Ireland's response to climate change in order to achieve these targets and that Ireland must accelerate the rate at which it implements GHG emission reductions. The report states that mid-century mean annual temperatures in Ireland are projected to increase by between 1.0°C and 1.6°C (subject to the emissions trajectory). In addition, heat events are expected to increase by mid-century (EPA 2020a). While individual storms are predicted to have more severe winds, the average wind speed has the potential to decrease (EPA 2020a).

Future climate predictions undertaken by the EPA have been published in 'Research 339: High-resolution Climate Projections for Ireland – A Multi-model Ensemble Approach (EPA 2020b). The future climate was simulated under both Representative Concentration Pathway 4.5 (RCP4.5) (medium-low) and RCP8.5 (high) scenarios. This study indicates that by the middle of this century (2041–2060). Mid-century mean annual temperatures are projected to increase

RECEIVED 19/07/2023

by 1 to 1.2°C and 1.3 to 1.6°C for the RCP4.5 and RCP8.5 scenarios, respectively, with the largest increases in the east. Warming will be enhanced at the extremes (i.e. hot days and cold nights), with summer daytime and winter night-time temperatures projected to increase by 1 to 2.4°C. There will be a substantial decrease of approximately 50% which is projected for the number of frost and ice days. Summer heatwave events are expected to occur more frequently, with the largest increases in the south. In addition, precipitation is expected to become more variable, with substantial projected increases in the occurrence of both dry periods and heavy precipitation events. Climate change also has the potential to impact future energy supply which will rely on renewables such as wind and hydroelectric. Wind turbines need a specific range of wind speeds to operate within and droughts or low ground water levels may impact hydroelectric energy generating sites. More frequent storms have the potential to damage the communication networks requiring additional investment to create resilience within the network.

Thus, in summary, the recent research into the changing climate as outlined above shows that there is likely to be future increases in weather variability including increased frequency and intensity of storms and high winds, increased temperatures in summer, the potential for heat waves and flooding from heavy precipitation events.

RECEIVED: 18/07/2023

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Temperature (°C)													
Mean Daily Max	8.0	8.2	10.2	12.4	15.2	17.9	19.8	19.5	17.1	13.6	10.2	8.3	13.4
Mean Daily Min	2.1	2.0	3.3	4.1	6.6	9.4	11.5	11.3	9.5	7.0	4.2	2.4	6.1
Mean Temperature	5.1	5.1	6.8	8.2	10.9	13.6	15.7	15.4	13.3	10.3	7.2	5.4	9.7
Absolute Max.	15.2	15.9	17.3	22.7	24.9	27.6	31.0	29.5	25.4	21.3	17.7	14.8	31.0
Min. Maximum	-3.0	-0.7	2.3	4.5	7.1	10.2	10.6	11.7	10.8	5.2	-3.1	-4.7	-4.7
Max. Minimum	11.3	13.0	11.5	12.6	13.8	17.2	18.1	18.3	17.8	16.4	13.8	12.7	18.3
Absolute Min.	-12.4	-8.0	-9.0	-5.5	-2.4	0.4	4.6	2.2	0.2	-4.1	-9.1	-15.7	-15.7
Mean Num. of Days with Air Frost	7.5	7.7	4.6	3.4	0.8	0.0	0.0	0.0	0.0	1.3	4.3	7.6	37.2
Mean Num. of Days with Ground Frost	14.0	14.0	11.0	11.0	4.0	0.0	0.0	0.0	1.0	4.0	9.0	14.0	82.0
Mean 5cm Soil	3.7	3.6	5.3	8.4	12.6	15.7	17.1	16.0	12.8	9.2	6.0	4.2	9.6
Mean 10cm Soil	3.9	3.8	5.2	7.6	11.4	14.6	16.2	15.3	12.6	9.2	6.2	4.4	9.2
Mean 20cm Soil	4.6	4.5	5.9	8.1	11.5	14.5	16.3	15.8	13.4	10.1	7.1	5.1	9.7
Relative Humidity (%)													
Mean at 0900UTC	87.2	86.7	84.5	80.1	77.4	77.7	79.7	82.2	84.5	86.3	88.9	88.4	83.6
Mean at 1500UTC	82.2	76.7	71.8	67.7	67.3	67.9	68.9	69.0	71.8	76.6	81.6	84.1	73.8
Sunshine (hours)													
Mean Daily Duration	1.7	2.5	3.3	5.1	6.0	5.3	4.9	4.8	4.1	3.3	2.2	1.5	3.7
Greatest Daily Duration	8.1	9.2	10.9	13.2	15.4	16.0	15.5	14.4	12.3	10.1	8.5	6.9	16.0
Mean Num. of Days with No Sun	8.9	5.8	4.4	2.5	1.8	2.1	1.6	1.1	2.4	4.5	7.0	9.9	52.0
Rainfall (mm)													
Mean Monthly Total	63.8	48.5	50.7	51.9	59.1	62.5	54.2	72.3	60.3	81.6	73.7	75.7	754.2
Greatest Daily Total	30.0	32.2	31.1	38.7	29.8	97.5	33.7	89.3	51.1	50.1	82.0	46.8	97.5
Mean Num. of Days with >= 0.2mm	17	14	16	14	15	14	15	16	14	16	16	16	183

RECEIVED: 18/07/2023

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Mean Num. of Days with >= 1.0mm	12	10	11	10	11	10	10	11	10	12	11	12	130
Mean Num. of Days with >= 5.0mm	4	3	3	3	3	3	3	4	4	4	4	5	43
Wind (knots)													
Mean Monthly Speed	13.6	12.9	12.4	9.8	9.1	8.6	8.8	9.0	9.6	11.1	11.6	12.3	10.7
Max. Gust	80	78	71	59	63	51	58	55	59	65	66	82	82
Max. Mean 10-Minute Speed	57	54	47	43	43	36	39	36	38	44	46	57	57
Mean Num. of Days with Gales	4.5	3.2	2.1	0.6	0.4	0.1	0.1	0.2	0.3	1.2	1.9	3.5	18.1
Weather (mean no. of days with.)													
Snow or Sleet	4.1	3.9	2.5	1.1	0.1	0.0	0.0	0.0	0.0	0.0	0.5	2.3	14.6
Snow Lying at 0900UTC	1.8	1.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.0	4.1
Hail	1.0	1.5	2.7	2.4	1.5	0.2	0.2	0.1	0.2	0.2	0.7	0.6	11.3

Table 10.6 Casement Aerodrome 1981-2010

RECEIVED: 18/07/2023

10.4.3 Existing GHG Emissions Baseline

For 2021, the latest year available, baseline GHG emissions in Ireland are estimated to be 61.528 Mt CO_{2eq} as shown in Table 10.7. The sector with the highest emissions is agriculture at 37.5% of the total, followed by transport at 17.7% and energy industries at 16.7%. In relation to energy, the total emissions amount to 10,272 kiltonnes of CO_{2eq} in 2021.

Category	Kilotonnes (kt) CO_{2eq}	% of Total GHG Emissions
Waste	937	1.5%
Energy Industries	10,272	16.7%
Residential	7,040	11.4%
Manufacturing Combustion	4,593	7.5%
Commercial Services	817	1.3%
Public Services	663	1.1%
Transport	10,912	17.7%
Industrial Processes	2,460	4.0%
F-gases	738	1.2%
Agriculture	23,097	37.5%
Total	61,528	100%

***Table* 10.7** *GHG Emissions In Ireland 2021*

10.5 Potential Impacts

10.5.1 Construction Phase

The proposed development will comprise demolition of several existing buildings and construction of Deep Tech buildings, data centres, an energy centre, a substation and associated ancillary development and facilitation works. The key civil engineering works which will have a potential impact on climate during construction are summarised below:

(i) During demolition of Buildings No's 7, 8 and 9 there will be the potential for GHG emissions associated with the generation and movement of the waste material associated with the demolition. A combination of excavators, trucks and other soil shifting plant will undertake the main site clearance, demolitions, and levelling aspects on a phase by phase basis.

(ii) During demolition and construction, GHG emissions from machinery will occur as part of the site preparation works and during excavation for installation of foundations, drainage services and ancillary infrastructure;

(iii) Following completion of the building shell, commissioning of the mechanical and electrical equipment is undertaken;

(iv) Infilling and landscaping will be undertaken. Spoil generated during site preparation will be re-used where possible thus reducing GHG emissions from transport; and

RECEIVED: 18/07/2023

(v) Construction traffic accessing the site will emit air pollutants during transport.

In relation to the facilitation works, the main work with the potential for GHG emissions is the laying of a new gas pipeline within the Barnhall Meadows Lands, underneath the M4 and into the Kildare Innovation Campus. However, the GHG emissions associated with these works will not be significant.

As outlined in Section 10.6, mitigation measures will be implemented for the construction phase of the proposed development to ensure GHG emissions will be minimised.

10.5.2 Operational Phase

The key works which will have a potential impact on climate during operation of the proposed development are summarised below. The facilitation works and the data halls and deep tech buildings will not be significant sources of GHG emissions:

(i) The operation of the CTGs in the energy centre and the scheduled testing of the back-up generators in the data storage facilities will release GHG emission. For the purposed of the this assessment, a worst-case assumption of the operation of the CTGs for 330 days per year although it is more likely that they will not operate for more than 1,500 hours per year.

(ii) Indirect GHG emissions from electricity from the national grid which will power the proposed development;

(iii) The infrequent emergency operation of the back-up generators for the data centres in the event of a loss of power from the National Grid due to a power outage would release GHG emissions. It has been assumed that the back-up generators will operate for 250 hours per year as a worse-case. A review of operational data from similar operational data centres in Ireland indicates that it is highly unlikely that the back-up generators would be used for emergency operations for more than 24 - 48 hours per year. This is an over-estimation of the actual usage;

(iv) Road traffic accessing the site will emit GHG emissions. However, the operational phase of the proposed development will not contribute a significant volume of additional traffic on the local road network (see Chapter 13). Therefore, no local GHG emissions assessment of the traffic impact is required for this development.

The combustion turbine generator's (CTG's) will be primarily fuelled by natural gas/biogas supplied by Gas Networks Ireland (GNI) via their existing high-pressure network (subject to upgrade). It is likely that the fraction of biogas in the network will increase substantially in future years. The facility will also include a 5-day supply of HVO as a backup fuel should the natural gas system be unavailable in an emergency situation. Hydrotreated Vegetable Oil (HVO) is a low-carbon biofuel that operates as a direct replacement for conventional diesel. It is made from renewable, sustainable raw materials which do not release any new CO_2 into the atmosphere. HVO is made from 100% renewable plant-waste matter, and meets bio content requirements with no FAME (Fatty Acid Methyl Ester). HVO is considered to have substantially

RECEIVED: 18/07/2023

lower emissions[3] than traditional fossil fuels. It is noted that burning renewable diesel results in CO_2 emissions, however emissions from renewable diesels are significantly less than fossil fuel as growing the biomass feedstocks for production of renewable diesel may offset the CO_2 produced in the burning of HVO. For comparison, fossil fuel derived diesel has a total lifecycle emissions of c. 94 gCO_2e/MJ while renewable diesel using waste cooking oil as feedstock can be as low as 5.6 gCO_2e/MJ.

The data centre operator, similar to the energy centre, is committed to using HVO as the back -up fuel supply for the back-up generators where available. As such, significant environmental benefits will be achieved through the use of HVO as referenced above.

10.6 Likely Significant Impacts

10.6.1 Do Nothing Scenario – Construction Phase

Under the Do Nothing Scenario no construction works will take place and the previously identified impacts of GHG emissions and emissions from equipment and machinery will not occur. The climate at the site will remain as per the baseline and will change in accordance with trends within the wider area, changes in road traffic, etc. Therefore, this scenario can be considered ***neutral*** in terms of climate.

10.6.2 Do Nothing Scenario – Operational Phase

Under the Do Nothing Scenario no operational emissions will take place. The climate at the site will remain as per the baseline and will change in accordance with trends within the wider area, changes in road traffic, etc. Therefore, this scenario can be considered ***neutral*** in terms of climate.

10.6.3 Do Something Scenario – Construction Phase

Construction traffic would be expected to be the dominant source of direct greenhouse gas emissions as a result of the Construction Phase of the Proposed Development and facilitation works. Construction vehicles and machinery will give rise to CO_2 and N_2O emissions during construction of the Proposed Development. The Institute of Air Quality Management document '*Guidance on the Assessment of Dust from Demolition and Construction*' (IAQM, 2016) states that site traffic and plant is unlikely to make a significant impact on climate. Indirect emissions of GHGs will also occur due to the embodied carbon associated with the raw materials used in the construction of the data centre including cement and steel with GHG emissions occurring at the point of manufacture. In addition, embodied carbon emissions will occur from material used in internal access road and the pedestrian overpass associated with the works.

It is important to note that the potential impacts associated with the construction phase of the Proposed Development are short-term in nature. When the mitigation measures detailed in the mitigation section (see Section 10.7.1) of this chapter are implemented, direct GHG emissions from the site will not be significant. Due to the duration and nature of the construction activities, CO_2 and N_2O emissions from construction vehicles and machinery will have a ***short-term*** and ***imperceptibly negative*** impact on climate and thus have a ***not significant*** impact.

[3] https://www.eia.gov/energyexplained/biofuels/biofuels-and-the-environment.php

RECEIVED: 18/07/2023

Initial commissioning activities will involve testing of the back-up generators on site for 4 hours at 90% load, i.e. the first testing sequence will be commissioning of the back-up generators. The operational modelling has considered load testing of the generators four time per year at 90% load and this does not result in a significant impact to climate. Therefore, it is predicted that the initial commissioning tests for the back-up generators will result in an ***imperceptibly negative*** impact to climate in the ***short-term*** and thus have a ***not significant*** impact.

In relation to the CTGs, initial commissioning activities will involve testing of the CTGs on site in a similar manner to the operational phase. The operational modelling has considered the continuous operation of the CTGs and this does not result in a significant impact to climate post mitigation. Therefore, it is predicted that the initial commissioning tests for the CTGs will result in an ***imperceptibly negative*** impact to climate in the ***short-term*** and thus have a ***not significant*** impact.

10.6.1.1 Impact of Climate Change on the Construction Phase

Appropriate flood risk measures and extreme weather events have been considered as part of the construction planning. However, the potential for changes to long-term seasonal averages as a result of climate change are not considered to be as significant. Thus, in line with the methodology outlined in Table 10.3, Table 10.4 and Table 10.5, the likelihood of extreme weather and flooding is assessed to be of a low likelihood and with a moderate adverse effect leading to a finding of low risk and thus a non-significant impact.

10.6.2 Do Something Scenario – Operational Phase

Projects of this nature will release GHG emissions during the operational phase of the project. The quantity that is released will depend on the power consumption of the data halls, the need for back-up generation due to power outages from the national grid and the frequency of use of the CTGs. A range of mitigation measures can be employed to reduce the GHG emissions associated with the project as outlined in Section 10.7.

The Proposed Scenario comprises the proposed development operating on electricity for the full year, the CTG emission points associated with the proposed development providing dispatchable electricity for 330 days per year as a worst-case in addition to the operation of the backup generators operating for 250 hours per year which involves the emergency operation of 72 of the 80 generators (the remaining generator serving as a "catcher" generator).

Under the Proposed Development Scenario, the main GHG emissions will be indirect emissions associated with the use of electricity for the operation of the data centres and deep tech, use of the CTGs to provide dispatchable power to the grid for up to 330 days per year and operation of the backup generators for a worst-case 250 hours per year. The indirect (due to electricity) and direct (due to natural gas and diesel usage) CO_2 emissions to operate the Proposed Development has been assessed below in the context of Ireland's national annual CO_2 emissions. The expected emission rates for each year from 2025 to 2040 is shown below in Table 10.8 for electricity.

RECEIVED: 18/07/2023

Year	Electricity[Note 1] (g CO_2 / kWh)
2025	0.237
2026	0.209
2027	0.182
2028	0.155
2029	0.127
2030	0.100
2031	0.095
2032	0.090
2033	0.085
2034	0.080
2035	0.075
2036	0.070
2037	0.065
2038	0.060
2039	0.055
2040	0.050

Note 1 Based on a carbon intensity of 348 g CO_2 / kWh in 2021 and assuming linear interpolation to 100 CO_2 / kWh by 2030 and zero CO_2 / kWh by 2050.

Table 10.8 *Carbon Intensity of Electricity From 2025 - 2040*

The GHG emissions from natural gas / biomethane will be based on the expected GHG emission rate in 2025 taking into the account the GNI projections out to 2040 (Ervia, 2019). The expected values for each year from 2025 to 2040 is shown below in Table 10.9.

RECEIVED: 18/07/2023

Year	Natural Gas Note 1 (g CO_2 / kWh)
2025	0.187
2026	0.183
2027	0.178
2028	0.173
2029	0.170
2030	0.166
2031	0.164
2032	0.162
2033	0.354
2034	0.347
2035	0.341
2036	0.334
2037	0.329
2038	0.325
2039	0.318
2040	0.311

Note 1 Based on a carbon intensity of 203 g CO_2 / kWh in 2020 and based on the penetration of biomethane as outlined in GNI publication "*Vison 2050 – A Net Zero Carbon Gas Network For Ireland*". It has been assumed that there is no hydrogen in the network and that there is no carbon capture of natural gas as a worst-case assumption.

Table 10.9 *Carbon Intensity of Natural Gas/Biomethane From 2025 - 2040*

For the Proposed Development, the facility will primarily use electricity from the National Grid. Thus, based on electricity from the National Grid for 8,510 hours per year and diesel generators usage for 250 hours per year (HVO fuel will be used where available although it has been assumed that HVO emits the same level of GHG as diesel as a worst-case), will consume 19.2MW of power in Phase 1 which equates to 224.6 GWh annually. This translates to approximately 54,839 tonnes of CO_2eq per year (including generator testing) based on the likely 2025 electricity mix and approximately 48,809 tonnes of CO_2eq per year (including generator testing) based on the likely 2026 electricity mix (ESB, 2022) as outlined in Table 10.10. In addition, for Phase 1, the CTGs will be available to dispatch 16MW to the national grid for up to 330 days per year. This translates to approximately 52,592 tonnes of CO_2eq per year based on the likely 2025 natural gas / biomethane carbon intensity and approximately 51,448 tonnes of CO_2eq per year based on the likely 2026 natural gas / biomethane carbon intensity (GNI, 2020) as outlined in Table 10.10.

For Phase 1 & 2, based on electricity from the National Grid for 8,510 hours per year and diesel generators usage for 250 hours per year, will consume 19.2MW of power which equates to 241.5 GWh annually. This translates to approximately 45,850 tonnes of CO_2eq per year (including generator testing) based on the likely 2027 electricity mix and approximately 39,359 tonnes of CO_2eq per year (including generator testing) based on the likely 2028 electricity mix (ESB, 2022) as outlined in Table 10.10. In addition, for Phase 1 & 2, the CTGs will be available to dispatch 16MW to the national grid for up to 330 days per year. This translates to approximately 50,019 tonnes of CO_2eq per year based on the likely 2027 natural gas / biomethane carbon intensity and approximately 48,590 tonnes of CO_2eq per year based on the likely 2028 natural gas / biomethane carbon intensity (Ervia, 2019) as outlined in Table 10.10.

RECEIVED: 18/07/2023

For Phase 1, 2 & 3, based on electricity from the National Grid for 8,510 hours per year and diesel generators usage for 250 hours per year, will consume 173.2MW of power which equates to 853.1 GWh annually. This translates to approximately 103,120 tonnes of CO_2eq per year (including generator testing) based on the likely 2029 electricity mix and approximately 40,492 tonnes of CO_2eq per year (including generator testing) based on the likely 2040 electricity mix (ESB, 2022) as outlined in Table 10.10. In addition, for Phase 1, 2 & 3, the CTGs will be available to dispatch 170MW to the national grid for up to 330 days per year. This translates to approximately 507,159 tonnes of CO_2eq per year based on the likely 2029 natural gas / biomethane carbon intensity and approximately 419,089 tonnes of CO_2eq per year based on the likely 2040 natural gas / biomethane carbon intensity (Ervia, 2019) as outlined in Table 10.10.

RECEIVED: 19/07/2023

Year	Phase / GWh	Electricity GHG Emissions (GWh)	Back-Up Generator GHG Emissions (GWh)	CTGs GHG Emissions (GWh)	Electricty GHG Emissions (tonnes CO2eq)	Back-Up Generator GHG Emissions (tonnes CO2eq)	CTGs GHG Emissions (tonnes CO2eq)	Total (tonnes CO2eq)	% of Sectoral Emission Ceiling
2025	**Phase 1**	220.6	4.0	126.7	52,209	2,630	52,592	107,430	4%
2026					46,179	2,630	51,448	100,257	3%
2027	**Phase 1 & 2**	233.5	8.0	126.7	43,220	2,630	50,019	95,869	3%
2028					36,729	2,630	48,590	87,949	3%
2029	**Phase 1, 2 & 3**	766.5	43.3	1346.4	103,120	28,470	507,159	638,748	21%
2030					80,984	28,470	498,048	607,502	20%
2031					76,935	28,470	491,975	597,379	20%
2032					72,886	28,470	485,901	587,256	20%
2033					68,836	28,470	476,790	574,096	19%
2034					64,787	28,470	467,680	560,936	19%
2035					60,738	28,470	458,569	547,777	18%
2036					56,689	28,470	449,458	534,617	18%
2037					52,640	28,470	443,384	524,494	17%
2038					48,590	28,470	437,311	514,371	17%
2039					44,541	28,470	428,200	501,211	17%
2040					40,492	28,470	419,089	488,051	16%

Table 10.10 GHG Emissions For Proposed Development Scenario (Tonnes CO2eq) Prior To Mitigation

RECEIVED: 18/07/2023

10.6.2.1 Determination Of The Impact of the Operational Phase on Climate

The criteria for determining the significance of effects are a two-stage process that involves defining the magnitude of the impacts and the sensitivity of the receptors as set out in Section 10.2.4. In relation to climate, as there is no project specific assessment criteria, the proposed development has been assessed against the recommended IEMA (IEMA, 2022) significance determination (see Section 10.2.4).

In reference to Principle 1 of IEMA Guidance (IEMA, 2022), the Proposed Scenario will replace activities which have a higher GHG profile. Data centre facilities represent a significantly more efficient means of data storage when compared to a distributed model of enterprise data storage by individuals and companies (or 'enterprise sites'). Data centres are more energy efficient than enterprise sites due to comprehensive efficiency central to the design of the proposed development. In a June 2020 report, the International Energy Agency noted: *"Hyperscale data centres are very efficient large-scale cloud data centres that run at high capacity, owing in part to virtualisation software that enables data centre operators to deliver greater work output with fewer servers. The shift away from small, inefficient data centres towards much larger cloud and hyperscale data centres is evident in the shrinking share of data centre infrastructure in total energy demand..."*[4]. A study published in 2020 by Science[5] Magazine, found that while cloud computing productivity has grown globally by 550% between 2010 and 2018, energy consumption rose in tandem during the same period by just 6%, demonstrating the energy efficiency improvements of the industry, most notably by hyperscale data centres, as per the current project. A report from IEA entitled "Data Centres & Data Transmission Networks (IEA, 2021) found that while global internet traffic surged by more than 40% in 2020, this strong growth in demand for data centre services continues to be mostly offset by ongoing efficiency improvements for data centre infrastructure as shown in Figure 10.4.

[4] IEA Data Centres and Data Transmission Networks – June 2020
[5] Masanet, Eric; Shehabi; Arman, Lei; Nuoa, Smith, Sarah; Koomey, Jonathan; "Recalibrating global data center energy-use estimates", Sciencemag.org, February 28, 2020, Vol. 367, Issue 6481; ("Expressed as energy use per compute instance, the energy intensity of global datacenters has decreased by 20% annually since 2010….").

RECEIVED: 18/07/2023

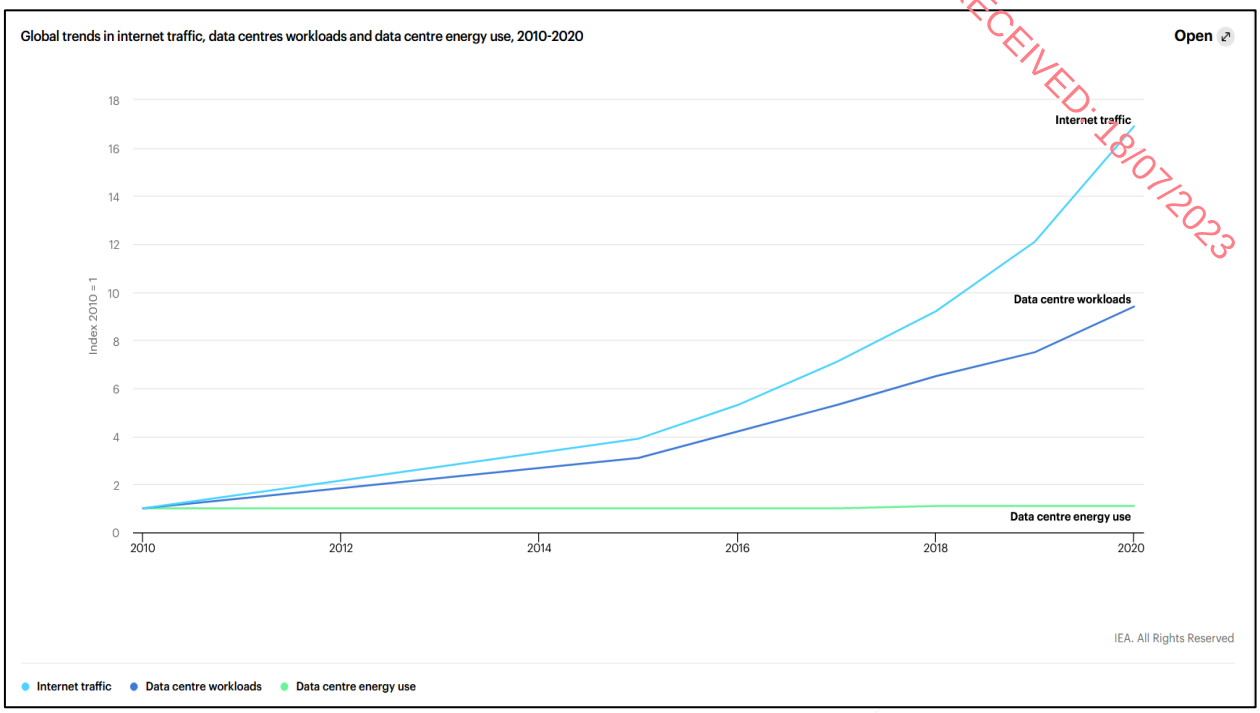


Figure 10.4 *Global Trends In Internet Traffic, Data Centres Workloads & Data Centre Energy Use, 2010 – 2020 (IEA, 2021)*

In the wider context, data centres are at least 84% more efficient than on-premises servers and the associated GHG savings associated have not been accounted for in the current analysis[6]. In addition, the carbon intensity of electricity is predicted to decrease from 348 gCO_2/kWh in 2021 to less than 100 gCO_2/kWh in 2030 as a result of the increase in renewables to near 80% of the electricity market by 2030. Overall, all data centres in Ireland are estimated to account for 1.85% of Ireland's total carbon emissions in 2020 and it is predicted that data centres in Ireland will peak at 2.2% of total GHG emissions in 2025 and will fall or level off after this date (Host In Ireland, 2020).

The Proposed Development will account for approximately 810 GWh of peak demand when fully completed. However as outlined below, the facility will operate in compliance with the policies and objectives of the 2021 Climate Act. The phasing of the development and the period taken to reach full capacity within each planned phase will result in the 'ramping up' of demand associated with the project over a number of years during the lifetime of the 10-year permission to reach 810 GWh.

Table 10.10 also shows the significance of the Proposed Development when compared to the Electricity 2030 Sectoral Emission Ceiling based on the approach set out in IEMA guidance (IEMA, 2022) on a year-by-year basis. The assessment is presented prior to mitigation. As shown in Table 10.10, the combined impact of the operation of the data centres, using electricity (and backup diesel generators), and the operation of the CTGs will be equivalent to the up to 4% of the electricity sectoral emission ceiling in Phase 1, up to 3% of the electricity sectoral emission ceiling in Phase 1 & 2 and up to 21% of the electricity sectoral emission ceiling in Phase 1, 2 and 3 with

[6] https://blog.aboutamazon.eu/aws/amazon-announces-new-project-in-ireland-as-part-of-commitment-to-be-100-powered-by-renewable-energy-by-2025

RECEIVED: 18/07/2023

the five-year average over the period 2026-2030 being equivalent to 10% of the electricity sectoral emission ceiling.

The impact of the Proposed Development prior to mitigation would be deemed to be a moderate, adverse impact as shown in Table 10.11. Although the Proposed Development prior to mitigation is better than the "do-nothing" scenario of enterprise computers, the impact would still be significant in the absence of appropriate mitigation.

Scenario	% Of 2030 ETS Total[Note 1, 2]	% Of Electricity Emission 2030 Ceiling[Note 2]	Significance (Prior to mitigation)
Proposed Development	0.044%	10%	Moderate Adverse

Note 1 ETS 2030 Total = 690.91 Million Tonnes CO_{2eq}
Note 2 Based on 5-year average 2026 - 2030

Table 10.11 *GHG Emissions Associated With Proposed Scenario Compared To Sectoral Emission Ceiling & ETS*

The operational phase impact of the Proposed Development, prior to mitigation, based on the EPA EIAR Guidelines (EPA, 2022), is considered ***long-term***, ***negative*** and ***moderate***.

10.6.2.2 Vulnerability of the Operational Phase of the Project to Climate Change

Climate change has the potential to alter weather patterns and increase the frequency of rainfall in future years. Changes in climate will lead to a variety of associates GHG impacts including:

- Increased average temperatures will lead to a greater requirement for cooling of the data centre leading to greater energy use and associated GHG emissions;
- Increase rainfall will lead to a greater risk of flooding;
- Periods of drought may lead to reduction in water availability.

As a result of this there is the potential for flooding related impacts on site in future years. Chapter 8 (Hydrology & Hydrogeology) of the EIAR has investigated the likelihood of flooding and has found that there is no current or predicted flood risk for the site. Thus, in line with the methodology outlined in Table 10.3, Table 10.4 and Table 10.5, the likelihood of extreme weather and flooding was assessed to be of low likelihood and with a moderate adverse effect leading to a finding of low risk and thus a non-significant impact. Therefore, the impact of climate change on the Proposed Development will be **imperceptible**.

10.7 Mitigation Measures

In order to sufficiently ameliorate the likely climate impact, a schedule of mitigation measures has been formulated for the construction and operational phases associated with the proposed development.

10.7.1 Construction Phase

The objective of the mitigation measures outlined below is to ensure that GHG emissions are minimized wherever possible during the demolition and construction phase of the proposed

RECEIVED: 18/07/2023

development. The measures will include:

- All vehicles will be required to switch off engines when stationary (no idling);
- All vehicles will be serviced and maintained to ensure emissions are minimised;
- Embodied carbon will be investigated at detailed design stage;
- Where practicable, materials will be reused within the extent of the Proposed Development; and
- Where practicable, materials will be sourced locally to reduce the embodied emissions associated with transport.

10.7.2 Operational Phase

The CTGs and diesel generators will be regularly serviced to ensure that they operate to their maximum efficiency whilst the fuel used to power the back-up generators will be HVO which has a substantially lower GHG footprint than diesel. Further mitigation measures which will reduce GHG emissions, as outlined in Section 2.7 of the EIAR include:

- Passive Solar Design to minimise solar gain to reduce cooling energy requirements,
- The building fabric of the new development will be designed and constructed to limit heat loss and where appropriate, limit heat gains through the fabric of the building,
- The mechanical HVAC strategy is to minimise energy associated with space conditioning through the use of high efficiency systems, heat recovery and the efficient control of both ventilation rates and of heating and / or cooling supply,
- High Efficiency Electrical Systems including low energy lighting solutions and power factor correction,
- Sustainable Energy Initiatives including waste heat recovery,
- Data Processing Area Electrical Design Elements (transformers, emergency back-up generators, high efficiency external and internal lighting,
- Data Processing Area Mechanical Design Elements (Water demand reduction and rainwater harvesting, data storage room environmental design, use of direct evaporative Air Handling Units (AHUs) and use of an electronic building management system for air handling,
- Offices & ancillary Areas Mechanical & Electrical design elements including high efficiency air conditioning, energy efficient heat recovery units for air ventilation systems, efficient low energy LED lighting and control systems, PV panels, electric vehicle charging infrastructure).

As outlined in Section 2.7 of the EIAR, KIC is committed to a future of carbon neutrality for the entire campus through a range of mechanisms. The developer and data centre end user are committed to continued renewables additionality nationally and investment in new generation, repowering or otherwise increasing in-country renewable energy capacity. In this regard the proposed development will have a Maximum Import Capacity (MIC) of 170MW once fully developed (c.2034/2035). The development will be delivered in phases over a 10-year period, as such the data centre energy demand will ramp up over a significant period of time. It is proposed to proportionally match the impact of the forecasted energy demand through a mix of renewables on site and CPPA's.

On site commitments include:

- Provision of significant Solar PV installations with c.8,560 panels being proposed across the 4no. data centre buildings and the 2no. Deeptech buildings.
- Use of Hydrotreated Vegetable Oil (HVO) as back-up fuel source for the Energy Centre upon

RECEIVED: 18/07/2023

full build out rather than diesel.

- Implement District Heating system, which will use recaptured heat produced from the data centres to provide recycled heat the existing campus buildings being retained as well as the new buildings A1 and A2. Further to this, the district heating system has been designed to provide export heat to surrounding community uses.

The future data centre end user will commit to entering into arrangements which are capable of underpinning new renewable energy generation calculated to offset the energy consumed by the proposed data centre development from the electricity grid. It is proposed that these arrangements would ramp up overtime in line with the operation of the data centre use and would be secured in the in the form of CPPAs and provide for the establishment of new renewable energy generation projects by the data centre end user which demonstrates that the energy consumed by the data centre development on site is offset with renewable energy generation.

The agreements may be on a phased basis and shall confirm:

- That the new renewable will not be supported by government or consumer subsidies.
- The new renewable projects will be located in Ireland.
- The new renewable energy projects will be provided by the data centre end user.
- The new renewable energy generation shall relate to energy that is not being generated at the date of which the proposal is permitted.
- The power ramping schedule for each CPPA to align with Data Centre power consumption.

The CPPA's will align with the ramping up of energy use by the proposed data centre development. In this regard, Phase 1 of the proposed data centre development is to be provided with c.16MW through an existing Eirgrid connection agreement. Phase 3 will include the balance of the proposed power capacity (c.154MW). The final signed CPPAs shall align with the proposed ramping schedule for each data centre building.

Further to the above CPPA's, Kildare Innovation Campus will commit to similar CPPA's for the offset of any non-renewables used by the proposed energy centre. CPPA's for renewable energy projects will include bio-gas and/or hydrogen as well as other available renewables. Final evidence of signed CPPAs shall include the proposed ramping schedule for the energy centre building and may be agreed in phases prior to occupation of the relevant phase of the energy centre.

The agreements for the energy centre may be on a phased basis and shall confirm:

- That the new renewable will not be supported by government or consumer subsidies.
- The new renewable projects will be located in Ireland.
- The new renewable energy projects will be provided by Kildare Innovation Campus.
- The new renewable energy generation shall relate to energy that is not being generated at the date of which the proposal is permitted
- The power ramping schedule for each CPPA to align with Energy Centre phase power consumption.

Furthermore, as the Proposed Development is over 20 MW thermal input, a greenhouse gas emission permit will be required for the facility which will be regulated under the EU-wide Emission Trading System (ETS) which necessitates operating under a "cap and trade" scheme. Thus, the proposed development will operate under a system where carbon emissions will

RECEIVED: 18/07/2023

become increasingly costly and will encourage the least-cost pathway to GHG emission reductions.

In addition, as outlined in the *Regulation (EU) 2018/842*, any new electricity provider (including the Proposed Development*)* will be treated as a "new entrant" under Phase IV of the ETS (i.e. an electricity generator or site obtaining a GHG emissions permit for the first time after 30th June 2018). The new electricity provider will be required to purchase allocations in the same manner as existing players in the market using the European Energy Exchange. EU leaders have also decided that during Phase IV (2021-2030) 90% of the revenue from the auctions will be allocated to the Member States on the basis of their share of verified emissions with 10% allocated to the least wealthy EU member states. The revised EU ETS Directive has enshrined in law the requirement that at least 50% of the auctioning revenues or the equivalent in financial value should be used for climate and energy related purposes. Any fossil-fuel related GHG emissions related, directly or indirectly, to energy generation for the proposed development will be continue to be controlled, increasingly stringently, by the ETS which is the subject of Directive 2003/87/EC (as amended). On an EU-wide basis, where the ETS market in 2021 was approximately 1,307 million tonnes CO_2eq and is scheduled to reduce to 691 million tonnes CO_2eq by 2030, the impact of the emissions associated with the Proposed Development will be no more than 0.090% of the total EU-wide ETS market in 2030 which is imperceptible.

In reference to Principle 2 of IEMA Guidance (IEMA, 2022), and as outlined above, an extensive range of mitigation measures will be employed which are in line with "best practice" as outlined in the IEMA guidance (IEMA, 2022) including the installation of Solar PV panels, waste heat recovery and passive solar design. Additionally, 2 no. district heating pump house areas and inground piping for district heating system will be installed.

In reference to Principle 3 of IEMA Guidance (IEMA, 2022), it is the intention of the applicant that measures will be implemented in line with "best practice" as outlined in the IEMA guidance (IEMA, 2022). The data centre end user and the developer group are committed to Ireland's 2023 Climate Action Plan to meet 80% of electricity demand from renewable sources by 2030. As noted above, the applicant intends to undertake a Corporate Power Purchase Agreement which will offtake 100% of the power from renewable projects.

10.8 RESDIUAL EFFECTS OF THE PROPOSED DEVELOPMENT

10.8.1 Construction Phase After Mitigation

Based on the scale and temporary nature of the construction works and the intermittent use of equipment, and with the implementation for the mitigation measures outlined in Section 10.7.1, the impact on climate change from the Proposed Project is deemed to be ***short-term, imperceptibly negative*** and ***not significant*** in relation to Ireland's obligations under the EU 2030 target.

When the mitigation measures detailed in the mitigation section (section 10.7.1) of this chapter are implemented, emissions of GHG from the site will be ***neutral***, ***short-term*** and ***not significant*** in nature.

10.8.2 Operational Phase After Mitigation

RECEIVED: 18/07/2023

10.8.2.1 Impact of the Operational Phase on Climate

Under the Proposed Project Scenario, the main GHG emissions will be indirect emissions associated with the use of electricity for the operation of the data centres and deep tech, use of the CTGs to provide dispatchable power to the grid for up to 330 days per year and operation of the backup generators for a worst-case 250 hours per year.

For the Proposed Development, the facility will primarily use electricity from the National Grid equivalent to 19.2MW of power in Phase 1 which equates to 224.6 GWh annually. In addition, for Phase 1, the CTGs will be available to dispatch 16MW to the national grid for up to 330 days per year. However, as shown in Table 10.12, the facility will install PV panels and purchase CPPAs in order to fully offset the GHG emissions associated with the use of electricity, diesel and natural gas / biomethane leading to net zero GHG emissions from the facility.

For Phase 1 & 2, the facility will primarily use electricity from the National Grid equivalent to 19.2MW of power which equates to 241.5 GWh annually. In addition, for Phase 1 & 2, the CTGs will be available to dispatch 16MW to the national grid for up to 330 days per year. However, as shown in Table 10.12, the facility will install PV panels and purchase CPPAs in order to fully offset the GHG emissions associated with the use of electricity, diesel and natural gas / biomethane leading to net zero GHG emissions from the facility.

For Phase 1, 2 & 3, the facility will primarily use electricity from the National Grid equivalent to 173.2MW of power which equates to 853.1 GWh annually. In addition, for Phase 1, 2 & 3, the CTGs will be available to dispatch 170MW to the national grid for up to 330 days per year. However, as shown in Table 10.12, the facility will install PV panels and purchase CPPAs in order to fully offset the GHG emissions associated with the use of electricity, diesel and natural gas / biomethane leading to net zero GHG emissions from the facility.

RECEIVED: 18/07/2023

Year	Phase / GWh	Electricty, Generators & CTGs GHG Emissions (GWh)	Electricty GHG Emissions (tonnes CO2eq)	Back-Up Generator GHG Emissions (tonnes CO2eq)	CTGs GHG Emissions (tonnes CO2eq)	Total (tonnes CO2eq)	% of Sectoral Emission Ceiling	PV Panels GHG Emissions (GWh)	CPPAs (GWh)
2025	**Phase 1**	351.3	52,209	2,630	52,592	107,430	4%	1.96	349.34
2026			46,179	2,630	51,448	100,257	3%		
2027	**Phase 1 & 2**	368.2	43,220	2,630	50,019	95,869	3%	2.01	366.19
2028			36,729	2,630	48,590	87,949	3%		
2029	**Phase 1, 2 & 3**	2,156.2	103,120	28,470	507,159	638,748	21%	2.26	2,153.94
2030			80,984	28,470	498,048	607,502	20%		
2031			76,935	28,470	491,975	597,379	20%		
2032			72,886	28,470	485,901	587,256	20%		
2033			68,836	28,470	476,790	574,096	19%		
2034			64,787	28,470	467,680	560,936	19%		
2035			60,738	28,470	458,569	547,777	18%		
2036			56,689	28,470	449,458	534,617	18%		
2037			52,640	28,470	443,384	524,494	17%		
2038			48,590	28,470	437,311	514,371	17%		
2039			44,541	28,470	428,200	501,211	17%		
2040			40,492	28,470	419,089	488,051	16%		

Table 10.12 GHG Emissions For Proposed Development Scenario (Tonnes CO2eq)

RECEIVED: 18/07/2023

Table 10.13 shows the significance of the Proposed Development when compared to the Electricity 2030 Sectoral Emission Ceiling based on the approach set out in IEMA guidance (IEMA, 2022). The assessment is presented post mitigation. As outlined above the project will use "best practice" adaptive design measures (PV panels, passive solar design, facilitating district heating) and by using long term corporate power purchase agreements. With the implementation of these measures the impact of the Proposed Development, in line with the IEMA methodology (IEMA, 2022), is reduced to a minor adverse, non-significant impact.

Scenario	% Of 2030 ETS Total[Note 1, 2]	% Of Electricity Emission 2030 Ceiling[Note 2]	% Of Electricity Emission 2030 Ceiling After Mitigation	Significance (After mitigation)
Proposed Development	0.044%	10%	Net Zero	Minor Adverse

Note 1 ETS 2030 Total = 690.91 Million Tonnes CO_{2eq}
Note 2 Based on 5-year average 2026 - 2030

Table 10.13 *GHG Emissions Associated With Proposed Scenario Compared To Sectoral Emission Ceiling & ETS*

Through a series of measures including project replacement, a reduction in residual emissions through best practice and the implementation of a series of adaptive design measures, the net impact of the Proposed Development is not significant. Given that the use of electricity to power the facility will achieve net zero by 2050 and the commitment to fully offset all interim fossil fuel derived GHG emissions by the purchase of Corporate Power Purchase Agreements (CPPAs) the predicted impact to climate from electricity associated with the development is deemed to be ***indirect***, ***long-term, negative*** and ***minor adverse*** and the predicted impact to climate from CTGs associated with the development is deemed to be ***direct***, ***long-term, negative*** and ***minor adverse.***

In summary, once the mitigation measures outlined in Section 10.7 are implemented, the residual impacts on climate from the construction of the Proposed Development and facilitation works will be ***short-term*** and ***imperceptibly negative*** and for the operational phase of the Proposed Development will be ***long-term, negative*** and ***minor adverse.*** Thus, in terms of climate, both the construction phase and operational phase of the Proposed Development will be ***not significant***.

10.8.2.2 Impact of Climate Change on the Operational Phase: Proposed Development

A detailed flood risk assessment has been undertaken as part of this planning application and adequate attenuation and drainage have been provided for to account for increased rainfall in future years. Therefore, the impact of climate change on the Proposed Development will be ***imperceptible***.

10.9 Cumulative Impact

In relation to climate, all global cumulative GHG sources are relevant to the effect on climate change. As a result, the effects of GHG emissions from specific cumulative projects therefore in general should not be individually assessed. This is due to the fact that there is no basis for selecting any particular (or more than one) cumulative project that has GHG emissions for assessment over any other (IEMA, 2022).

10.10 Interactions

RECEIVED: 18/07/2023

The potential interaction between Climate and other Sections in the EIAR is primarily limited to *Population & Human Health* and *Traffic & Transportation* and chapter 18 on *Interactions*. This Climate Section has been prepared in consideration of and in conjunction with the relevant outputs of these Sections.

10.11 Monitoring

As part of the sites operational Greenhouse Gas Permit, there will be a requirement for ongoing GHG monitoring.

10.12 Difficulties Encountered In Compiling Information

No significant difficulties were encountered in the process of compiling the climate chapter of the EIAR.

10.13 Compliance With Section 15 Of The Climate Action & Low Carbon Development Act (Amended) 2021

Section 15 of the Climate Action & Low Carbon Development Act (Amended) 2021 states that:

(1) "A relevant body shall, in so far as practicable, perform its functions in a manner consistent with:
(a) the most recent approved climate action plan,
(b) the most recent approved national long term climate action strategy,
(c) the most recent approved national adaptation framework and approved sectoral adaptation plans,
(d) the furtherance of the national climate objective, and
(e) the objective of mitigating greenhouse gas emissions and adapting to the effects of climate change in the State."

The GHG emissions associated with the proposed project are in compliance with the above mentioned plans, strategies and objectives. In relation to (a) 2023 Climate Action Plan, under Section12.3.1 Emission Trading System, the 2023 CAP states:

> *"The EU ETS is an important measure for reducing industry GHG emissions. The Fit for 55 proposals for the reformed EU ETS will increase emissions reductions in this sector from the current 43% to 61%, in the period 2005 to 2030. Changes include a steeper annual reduction in the emissions ceiling and reductions in free allowances, alongside the corresponding introduction of a carbon border adjustment mechanism." (2023 CAP, page 155).*

Thus, the indirect electricity emissions and the direct emissions from CTGs and backup diesel generators will both require greenhouse gas permits under the ETS in order to operate and thus the GHG emissions associated with the proposed development will be in line with the 2023 CAP.

In relation to (B), the Long-term Climate Action Strategy was published on the 28th April 2023. In relation to electricity the Government commits to the full decarbonisation of the electricity

RECEIVED: 18/07/2023

system by 2050. In relation to the EU ETS, the Long-term Climate Action Strategy states that "A strong price signal, as part of a reformed EU ETS, including progressively more restrictive rules on how many allowances will be available within the EU ETS, is expected to drive decarbonisation over the coming decade by increasing the cost to firms in the EU ETS of doing nothing to reduce their emissions" (DOECC, 2023).

In relation to data centres, the Long-term Climate Action Strategy states that "Energy demand, including data centres, will be expected to operate within sectoral emissions ceilings and further signals will be required to locate demand where existing or future electricity grid is available and close to renewable energy generation. Research and development in energy storage and flexibility (such as a science challenge to industry) will be required to put Ireland on a pathway to net zero-carbon data centres" (DOECC, 2023).

The current project is in line with this strategy as the electricity associated with the project will reduce in line with national policy to obtain net zero by 2050.

In relation to (C) national and sectoral adaptation plans and (E) "adapting to the effects of climate change on the state", the project has completed a detailed flood risk assessment for the project and adequate attenuation and drainage have been provided to account for increased rainfall in future years. Thus, the granting of permission for the Proposed Development will not be inconsistent with the national and sectoral adaptation plans.

In relation to (D) the national climate objective, the 2023 CAP has stated that:

"Under the Climate Action and Low Carbon Development (Amendment) Act 2021, Ireland's national climate objective requires the State to pursue and achieve, by no later than the end of the year 2050, the transition to a climate-resilient, biodiversity-rich, environmentally sustainable and climate-neutral economy. The Act also provides for a reduction of 51% in GHG emissions by 2030, compared to 2018 levels.

Our statutory national climate objective and 2030 targets are aligned with Ireland's obligations under the Paris Agreement and with the European Union's objective to reduce GHG emissions by at least 55% by 2030, compared to 1990 levels and to achieve climate neutrality in the European Union by 2050." (2023 CAP, page 30)

Thus, the Proposed Development aligns with the national climate objective as the Proposed Development will be within the EU ETS which is the cornerstone of the EU's objective to reduce GHG emissions by at least 55% by 2030 (compared to 1990) and to achieve climate neutrality by 2050. As outlined in the EU Climate Law (EU, 2021) under the Item (13): "The EU ETS is a cornerstone of the Union's climate policy and constitutes its key tool for reducing greenhouse gas emissions in a cost-effective way."

In regards to (E) the objectives of mitigating greenhouse gases, the Proposed Development has the following benefits which will all help to mitigate greenhouse gas emissions:

I. The Proposed Development will replace activities which have a higher GHG profile. Data centre facilities represent a significantly more efficient means of data storage when compared to a distributed model of enterprise data storage by individuals and companies (or 'enterprise sites'). A study published in 2020 by Science Magazine, found that while cloud computing productivity has grown globally by 550% between 2010 and 2018, energy

RECEIVED: 18/07/2023

consumption rose in tandem during the same period by just 6%, demonstrating the energy efficiency improvements of the industry, most notably by hyperscale data centres.

II. A range of measures will be employed which is in line with "best practice" as outlined in IEMA (IEMA, 2022) including the installation of PV panels, passive solar design and facilitating district heating to a local user for heat or a future heat network.

III. Measures will be implemented in line with "best practice" as outlined in IEMA (IEMA, 2022). The applicant is committed to offset all interim fossil fuel derived GHG emissions by the purchase of Corporate Power Purchase Agreements (CPPAs).

In summary, the facility will operate under the ETS and will thus be required to operate within the limits of the system which includes carbon pricing and a linear reduction in GHG emissions going forward. Economy-wide reductions that Ireland achieves towards its own national periodic targets, 2030 to 2050 (and intermediate quantitative targets), will be contributed to by the reductions achieved by those Irish installations that are part of the EU ETS. The 2050 target as outlined under the EU Climate Law is one of achieving climate neutrality ('Net Zero') by 2050, and thus aligns with the commitment Ireland has undertaken under the Climate Action and Low Carbon Development Act 2015 (as amended in 2021) and all reductions achieved by Irish EU ETS-participating installations will contribute towards that.

RECEIVED: 18/07/2023

References

- Baringa / Wind Energy Ireland (2021) A zero-carbon electricity plan for Ireland
- DCCAE (2019) Electricity & Gas Networks Sector Climate Change Adaptation Plan
- Eirgrid (2022) All-Island Transmission System Performance Report 2021
- EPA (2010) Guidance to Licensees/COA holders on the Notification, Management and Communication of Environmental Incidents
- EPA (2015b). Ensemble of regional climate model projections for Ireland (Report No. 159)
- EPA (2017b). What impact will climate change have for Ireland? [Online] Available at http://www.epa.ie/climate/communicatingclimatescience/whatisclimatechange/whatimpactwillclimatechangehaveforireland/
- EPA's State of the Irish Environment Report (2020a) (chapter 2 on climate change)
- Environmental Protection Agency (EPA) (2020b). Research 339: High-resolution Climate Projections for Ireland – A Multi-model Ensemble Approach.
- EPA (2022a) Guidelines on the Information to be contained in Environmental Impact Statements
- EPA (2022b) Ireland's Greenhouse Gas Emissions Projections 2021 – 2040
- ESB (2021) Net Zero – ESB Strategy 2040
- ESB (2022) ESB Sustainability Report 2021
- European Topic Centre on Climate (2020) Trends and projections in the EU ETS in 2020
- European Commission (2013) Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment
- Ervia (2019) Vision 2050 – A Net Zero Carbon Gas Network For Ireland
- European Commission (2017) Environmental Impact Assessment of Projects – Guidance on the preparation of the Environmental Impact Assessment Report
- European Council (2014) European Council (23 and 24 October 2014) Conclusions on 2030 Climate and Energy Policy Framework, SN 79/14
- EU (2020) *The EU Emissions Trading System in 2020: trends and projections*
- EU (2021) European Climate Law
- Framework Convention on Climate Change (FCCC) (1997) Kyoto Protocol To The United Nations Framework Convention On Climate Change
- FCCC (1999) Ireland - Report on the in-depth review of the second national communication of Ireland
- Government of Ireland (2022) Climate Action Plan 2023 CAP23
- Government of Ireland (2022) Government Statement on the Role of Data Centres in Ireland's Enterprise Strategy
- Host In Ireland (May 2021) Ireland's Data Hosting industry 2021 Q1 Update
- IAQM (2016) Guidance on the Assessment of Dust from Demolition and Construction
- IEMA (2010) Principles Series on Climate Change Mitigation & EIA
- IEMA (2020a) EIA Guide to: Climate Change Resilience and Adaptation
- IEMA (2022) Assessing Greenhouse Gas Emissions and Evaluating their Significance
- IPCC (2006) 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 2: Energy – Chapter 3.2 Road Transportation
- IPCC (2015). AR5 Synthesis Report: Climate Change 2014
- IPCC (2021). Draft AR5 Technical Report: Climate Change 2021
- Met Éireann (2013). Ireland's Climate: the road ahead
- Met Éireann (2022). Historical Rainfall Data. Available from: https://www.met.ie/climate-ireland/1981-2010/dublin.html
- Raydugin Y (2014) Consistent Application of Risk Management for Selection of Engineering Design Options in Mega-Projects, Int. Journal of Risk & Contingency Management (Oct 2014)
  UKHA (2021) Design Manual for Roads and Bridges Volume 11 Environmental Assessment, Section 3 Environmental Assessment Techniques, Part 14 LA 114 - Climate

11.0 NOISE AND VIBRATION

RECEIVED: 28/07/2023

11.1 Introduction

This document has been prepared by AWN Consulting Ltd. (AWN) to assess the potential noise and vibration impacts of the proposed development in the context of current relevant standards and guidance.

This assessment has been prepared by Mike Simms BE MEngSc MIOA MIET, Principal Acoustic Consultant at AWN, who has worked in the field of acoustics for 20 years. He has extensive experience in all aspects of environmental surveying, noise modelling and impact assessment for various sectors including, energy, industrial, commercial and residential.

This chapter includes a description of the receiving ambient noise climate in the vicinity of the subject site and an assessment of the potential noise and vibration impact associated with the proposed development, during both the short-term construction phase and the permanent operational phase, on its surrounding environment. The assessment of direct, indirect and cumulative noise and vibration impacts on the surrounding environment have been considered as part of the assessment.

Mitigation measures are included, where relevant, to ensure the proposed development is constructed and operated so as ensure minimal impact on the receiving noise environment.

11.2 Project Description

The Project is an integrated masterplan proposal that includes for the expansion of the existing campus, allowing for a mix of Deep Tech, ICT and Innovation uses. The proposal will include for the demolition of some of the existing buildings on site and construction of new buildings, an energy centre and replacement substation. The proposal will include significant public infrastructure including a new signalised intersection on Celbridge Road (R404), a new Public Link Road through the campus (between Barnhall Road and the new signalised intersection), a pedestrian/cycle overpass of the M4, pedestrian and cycle links through the site and along the designated protected view corridor and supporting infrastructure. The project to which this EIAR relates also includes facilitation works which comprise uprating of existing 110kV power lines to the site and the provision of a local upgrade to the gas network to service the site. The facilitation works which are included in the project do not form part of the development for which consent is sought. Future consents for the facilitation works will be required through EirGrid and Gas Networks Ireland. A detailed description of the project is outlined in Chapter 3 of this EIAR.

The development site which is subject to the application for consent measures c. 73.95 ha and is principally bounded by: the M4 Motorway to the north; Celbridge Road to the east; Barnhall Rugby Football Club to the south; and by grounds associated with Castletown House to the west.

The site comprises the existing Kildare Innovation Campus, which was formerly the Hewlett Packard Campus originally permitted in 1995 under KCC Reg. Ref 95923. The development site also encompasses lands with the jurisdiction of Kildare County Council (KCC)

Refer to Chapter 3 for a more detailed description of the site's location and context.

RECEIVED: 18/07/2023

11.3 Methodology

Alongside the legislation, policy, and guidance outlined in Chapter 1, the following relevant legislation, policy, and guidance has informed the preparation of this chapter:

- Environmental Protection Agencies *Guidelines on the Preparation of an EIAR* (EPA, May 2022)
- British Standard Institute (BSI) British Standard (BS) 5228-1:2009 +A1:2014 *Code of Practice for noise and vibration control of construction and open sites - Part 1: Noise* (hereafter referred to as BS 5228–1) (BSI 2014a);
- BS 5228-2:2009+A:2014 *Code of Practice for noise and vibration control of construction and open sites - Part 2: Vibration* (hereafter referred to as BS 5228–2) (BSI 2014b);
- BS 7385: 1993 *Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration* (hereafter referred to as BS 7385–2) (BSI 1993);
- United Kingdom Highways Agency (UKHA) *Design Manual for Roads and Bridges (DMRB) Sustainability & Environment Appraisal LA 111 Noise and Vibration Revision 2* (hereafter referred to as DMRB Noise and Vibration) (UKHA 2020);
- Environmental Protection Agencies Guidance Note for Noise: *Licence Applications, Surveys and Assessments in Relation to Scheduled Activities* (hereafter referred to as NG4) (EPA 2016);
- BS 4142: 2014+A1:2019: *Methods for Rating and Assessing Industrial and Commercial Sound* (hereafter referred to as BS4142) (BSI 2019);
- International Organization for Standardization (ISO) ISO 9613-2:1996 *Acoustics – Attenuation of sound during propagation outdoors - Part 2: General method of calculation* (hereafter referred to as ISO 9613–2) (ISO 1996);
- ISO 1996:2017: *Acoustics – Description, measurement, and assessment of environmental noise* (hereafter referred to as ISO 1996) (ISO 2017);
- UK Department of Transport, Welsh Office (DoT) *Calculation of Road Traffic Noise* (hereafter referred to as CTRN) (HMSO, 1988)
- Institute of Environmental Management and Assessment (IEMA) *Guidelines for Environmental Noise Impact Assessment* 2nd ed. (2014).
- United Kingdom Department of Transport (UK DOT) *Calculation of Road Traffic Noise* (hereafter referred to as CRTN) (UK DOT, 1988)

11.3.1 Scoping and Heading/Topic Identification

The following is an outline of the methodology which has been adopted for this assessment; each section is described in detail in the subsequent sections.

- Review appropriate guidance in order to identify appropriate noise and vibration criteria for the construction and operational phases;
- Carry out noise monitoring at a number of locations (e.g. in the vicinity of nearest sensitive properties/boundaries) to identify existing levels of noise in the vicinity of the development;
- Develop of a detailed 3D noise model of the proposed development, and;
- Comment on predicted levels against the appropriate criteria and existing noise levels and outline required mitigation measures (if any).

Appendix 11.1 of this document presents a glossary of the acoustic terminology used

throughout this chapter.

RECEIVED: 18/07/2023

11.3.2 Baseline Scenario/Likely Future Receiving Environment Analysis Methodology

In the first instance it is considered appropriate to define a noise sensitive location (NSL). In this context, the definition supplied by the Environmental Protection Agency (EPA) is adopted, which states the following in NG4 Appendix I:

> *NSL – any dwelling house, hotel or hostel, health building, educational establishment, place of worship or entertainment, or any other facility or other area of high amenity which for its proper enjoyment requires the absence of noise at nuisance levels.*

The baseline noise environment has been characterised by a set of surveys of environmental noise levels at a range of noise-sensitive locations in the area surrounding the proposed development. Full details are presented in Section 11.3.3.3.

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

- construction and decommissioning phases, and
- operational phase.

The construction phase will involve demolition, excavation, general site preparation over the development site and the erection of new buildings, along with construction of a public link road through the site, a new interchange along the R404, and a pedestrian/cycle overpass over the M4 motorway, all over a phased construction period. An assessment will also be presented in the following sections in relation to noise from construction traffic on local roads.

'Facilitation works' have been identified as being required to support the development consent being sought from Kildare County Council. This planning application to KCC does not encompass a request for development consent in relation to the facilitation works.

The facilitation works include a mix of works that will be required to be undertaken for or on behalf of statutory undertakers such as Gas Networks Ireland and EirGrid.

The primary sources of outward noise in the operational context are deemed long term and will involve:

- fixed plant at data centres and energy centre;
- emergency site operations, and;
- a new public link road;
- additional vehicular traffic on public roads, and
- a pedestrian and cycle overpass.

11.3.2.1 Baseline Scenario Analysis Methodology

Mapping of the surrounding area was reviewed in order to select NSLs. The NSLs used in the assessment are presented in Section 11.4.1. A representative subset of these were selected for the baseline noise survey.

RECEIVED: 18/07/2023

The environmental noise survey has been conducted at the selected locations in order to quantify the existing noise environment. The survey was conducted in accordance with ISO 1996. Noise levels were measured over 15-minute intervals at each location in a round-robin fashion. Measured noise levels were saved to instrument memory. Survey personnel noted sources of noise contributing to measure noise levels.

11.3.2.2Likely Future Receiving Environment Analysis Methodology

Construction noise calculations have been conducted in accordance with BS 5228-1. For the operational phase, prediction calculations for plant noise have been conducted in accordance with ISO 9613. See Appendices 11.2 and 11.3 for further details of the noise modelling software and parameters.

Changes in road traffic noise on the local road network have been considered using prediction guidance contained within CRTN.

The steps involved in predicting the future receiving environment are as follows:

1. Collect the sound emission levels for each item of outdoor plant with potential to emit noise to the receiving environment;

2. Prepare a computer-based 3D noise model in order to quantify the noise level associated with the proposed buildings at NSLs. For details of the noise modelling software, see Appendix 11.2.

3. Assess the predicted noise levels in light of relevant EPA NG4 criteria and other guidance, taking into account the background noise levels.

11.3.3 Impact Assessment Methodology

The analysis of the predicted impacts of the proposed development on noise and vibration during construction and operation are presented in this Chapter. The assessment considered noise and vibration features, identified in Section 11.3.1 above, within the project site and the surrounding vicinity in accordance with the methodology outlined above and below, to determine the significance of the impacts. Where likely significant impacts are highlighted, mitigation and monitoring are proposed, and any residual impacts are assessed.

The impact assessment for this Chapter has been undertaken in accordance with the *EPA Guidelines on the Preparation of an EIAR* (EPA, May 2022) and all other documents outlined above.

Assessment methods quantify and predict the magnitude and significance of impacts. Further details on the assessment methods are presented in the following sections.

11.3.3.1Construction Phase Noise Criteria

There is no published statutory Irish guidance relating to the maximum permissible noise level that may be generated during the construction phase of a project. Local authorities or An Bord

RECEIVED: 18/07/2023

Pleanála normally control construction activities by imposing limits on the hours of works and/or applying noise limits for construction noise at noise-sensitive locations.

In the absence of specific noise limits, criteria relating to permissible construction noise levels for a development of this scale are taken from BS 5228-1 Annex E Section E.3.2.

ABC Method

The approach adopted in BS 5228-1 calls for the designation of a noise sensitive location into a specific category (A, B or C) based on existing ambient noise levels in the absence of construction noise. This then sets a threshold noise value that, if exceeded at this location, indicates a potential significant noise impact is associated with the construction activities.

The BS 5228-1 document sets out guidance on permissible noise levels relative to the existing noise environment. Table 11.1 sets out the values which, when exceeded, signify a potential significant effect at the facades of residential receptors as recommended by BS 5228-1. These are construction noise levels only and not the cumulative noise level due to construction plus existing ambient noise.

Assessment category and threshold value period (L_{Aeq})	Threshold value, in decibels (dB)		
	Category A Note A	Category B Note B	Category C Note C
Night-time (23:00 to 07:00hrs)	45	50	55
Evenings and weekends Note D	55	60	65
Daytime (07:00 – 19:00) and Saturdays (07:00 – 13:00)	65	70	75

Note A) Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are less than these values.
Note B) Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are the same as category A values.
Note C) Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are higher than category A values.
Note D) 19:00 – 23:00 weekdays, 13:00 – 23:00 Saturdays and 07:00 – 23:00 Sundays.

Table 11.1 Example Threshold of Potential Significant Effect at Dwellings

It should be noted that this assessment method is only valid for residential properties Construction noise limits for non-residential locations are discussed below.

The approach is as follows: for each period (i.e. daytime, evening and night time) the ambient noise level is determined and rounded to the nearest 5 dB. Baseline monitoring carried out as part of this assessment is presented in Section 11.4.1. The results indicate that the categories detailed in Table 11.2 are appropriate in terms of the nearest noise sensitive locations being considered in this instance.

Period	Baseline Noise Category	Construction Noise Threshold Value $L_{Aeq,1hr}$ (dB)
Daytime (07:00 – 19:00) and Saturdays (07:00 – 13:00)	A	65
Evening (19:00 to 23:00hrs)	A	55
Night time (23:00 to 07:00hrs)	A	45

Table 11.2 Rounded baseline noise levels and associated categories

RECEIVED: 18/07/2023

Fixed Limits

When considering non-residential receptors, such as those sharing a boundary with the proposed development, BS 5228-1 gives several examples of acceptable limits for construction noise, the most simplistic being based upon the exceedance of fixed noise limits. For example, paragraph E.2 states:

> *"Noise from construction and demolition sites should not exceed the level at which conversation in the nearest building would be difficult with the windows shut."*

Paragraph E.2 goes on to state: -

> *"Noise levels, between say 07.00 and 19.00 hours, outside the nearest window of the occupied room closest to the site boundary should not exceed: -*
>
> - *70 decibels (dBA) in rural, suburban areas away from main road traffic and industrial noise;*
> - *75 decibels (dBA) in urban areas near main roads in heavy industrial areas".*

Proposed Construction Threshold Noise Levels

Taking into account the guidance outlined above and making reference to the baseline noise environment monitored around the development site (see Section 11.4.1), the following Construction Noise Threshold (CNT) levels are proposed for the construction stage of this development:

- For residential NSLs it is considered appropriate to adopt 65 dB(A) CNT depending on existing noise level. Given the baseline monitoring carried out, it would indicate that Category A values are appropriate using the ABC method.
- For non-residential NSLs it is considered appropriate to adopt the 70 dB(A) CNT, given the environment in which the proposed development is set, in line with BS5228-1 Annex E2.

Interpretation of the CNT

In order to assist with interpretation of CNTs, Table 11.3 includes guidance as to the likely magnitude of impact associated with construction activities, relative to the CNT. This guidance is derived from Table 3.16 of United Kingdom Highways Agency (UKHA) *Design Manual for Roads and Bridges (DMRB) Sustainability & Environment Appraisal LA 111 Noise and Vibration Revision 2* (UKHA, 2020) and adapted to include the relevant significance effects from the EPA Guidelines (EPA 2022).

RECEIVED: 18/07/2023

Construction Noise Level	Magnitude of Impact (DMRB)	EPA Significance of Effect
Below or equal Baseline Noise Level	Negligible	Not Significant
Above Baseline and below or equal to CNT	Minor	Slight – Moderate
Above threshold and below or equal to CNT + 5dB	Moderate	Moderate – Significant
Above CNT + 5dB	Major	Significant – Very Significant

Table 11.3 Description of the magnitude of impacts. Adapted from DMRB Table 3.16

The adapted DMRB guidance outlined will be used to assess the predicted construction noise levels at NSLs and comment on the likely impacts during the construction stages.

11.3.3.2Construction Phase Vibration Criteria

There are two aspects to the issue of vibration that are addressed in the standards and guidelines: the risk of cosmetic or structural damage to buildings and human perception of vibration. In the case of this development, vibration levels used for the purposes of evaluating building protection and human comfort are expressed in terms of Peak Particle Velocity (PPV) in mm/s. There is no published statutory Irish guidance relating to the maximum permissible vibration level. The following standards are the most widely accepted in this context and are referenced here in relation to cosmetic or structural damage to buildings:

- BS 7385: Evaluation and measurement for vibration in buildings – Part 2: Guide to damage levels from groundborne vibration (1993); and
- BS 5228: 2009 +A1 2014: Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration.

BS7385-2 and BS5228-2 advise that, for soundly constructed residential properties and similar light-framed structures that are generally in good repair, a threshold for minor or cosmetic (i.e. non-structural) damage should be taken as a peak component particle velocity (in frequency range of predominant pulse) of 15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz and 50 mm/s at 40 Hz and above for transient vibration. Where the dynamic loading caused by continuous vibration is such as to give rise to dynamic magnification due to resonance, especially at the lower frequencies where lower guide values apply, then the guide values in Table B.2 of BS5228-2 may need to be reduced by up to 50%. On a cautious basis, therefore, continuous vibration limits are set as 50% of those for transient vibration across all frequency ranges. For buildings or structures that are structurally unsound, lower vibration magnitudes will apply, typically 50% of those for structurally sound buildings. Protected or historic buildings are not automatically assumed to be more vulnerable to vibration unless they have existing structural defects. The values are summarised in Table 11.4.

Type of Building	Peak component particle velocity in frequency range of predominant pulse	
	4Hz to 15Hz	15Hz and above

Reinforced or framed structures Industrial and heavy commercial buildings.	50 mm/s at 4 Hz and above	
Unreinforced or light framed structures. Residential or light commercial building types.	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.

RECEIVED: 28/07/2023

Note 1 Values referred to are at the base of the building.

Note 2 At frequencies below 4Hz, a maximum displacement of 0.6 mm (zero to peak) is not to be exceeded.

Table 11.4 Transient Vibration Guide Values for Cosmetic Building Damage

BS 5228-2 and BS 7485-2 state that minor structural damage can occur at vibration magnitudes greater than twice those in Table 11.4 and major structural damage can occur at vibration magnitudes greater than four times those in Table 11.4.

These guidelines relate to predominantly transient vibration which does not give rise to resonant responses in structures, and to low rise buildings.

Human Perception

It is acknowledged that humans are particularly sensitive to vibration stimuli and that any perception of vibration may lead to concern. In the case of traffic, vibration is perceptible at around 0.5mm/s and may become disturbing or annoying at higher magnitudes. Higher levels of vibration, however, are typically tolerated for single events or events of short duration. For example, during piling, one of the primary sources of vibration during construction, vibration levels may typically be tolerated at up to 2.5mm/s. This guidance is applicable to the daytime only; it is unreasonable to expect people to be tolerant to such activities during the night-time (or if they are trying to sleep during the daytime).

BS 5228-2 also provides a useful guide relating to the assessment of human response to vibration in terms of the peak particle velocity (PPV). Table 11.5 below summarises the range of vibration values and the associated potential effects on humans.

Vibration Level, PPV	Effect
0.14 mm/s	Vibration might be just perceptible in the most sensitive situations for most vibration frequencies. At lower frequencies people are less sensitive to vibration.
0.3 mm/s	Vibration might be just perceptible in residential environments.
1 mm/s	It is likely that a vibration level of this magnitude in residential environments will cause complaint.
10 mm/s	Vibration is likely to be intolerable for any more than a brief exposure to this level

Table 11.5 Guidance on effects of human response to PPV magnitudes

Expected vibration levels from the construction works will be discussed further in 11.5.1.1.

RECEIVED: 18/07/2023

11.3.3.3Construction Phase Traffic

There are no specific guidelines or limits relating to traffic related sources along the local or surrounding roads. Given that traffic from the construction of the Proposed Development will make use of existing roads already carrying traffic volumes, it is appropriate to assess the calculated increase in traffic noise levels that will arise because of vehicular movements associated with construction works.

In order to assist with the assessment of construction traffic noise, reference is made to the *DMRB Noise and Vibration*. DMRB has been used to assess the likely magnitude of effect associated with changes in traffic noise levels along an existing road. Table 11.6 below presents the likely effects associated with change in traffic noise level and is adapted from Table 3.17 of the DMRB to include a column on the significance of effects in EPA/EIAR terms.

Change in Sound Level (dB)	Subjective Reaction	DMRB Magnitude of Impact (Short-term)	EPA Significance of Effect
Less than 1 dB	Inaudible	Negligible	Imperceptible
1 – 2.9	Barely Perceptible	Minor	Not Significant
3 – 4.9	Perceptible	Moderate	Slight, Moderate
≥ 5	Up to a doubling of loudness	Major	Significant

Table 11.6 Classification of magnitude of traffic noise changes in the short-term

In accordance with the DMRB Noise and Vibration Guidance, construction noise and construction traffic noise effects shall constitute a significant effect where it is determined that a major or moderate magnitude of effect will occur for a duration exceeding:

- Ten or more days or night in any 15 consecutive day or nights, or
- A total number of days exceeding 40 in any six consecutive months.

11.3.3.4Operational Phase Noise Criteria – Plant Noise

EPA NG4

The proposed development, if permitted, will require an IED Licence from the EPA. An assessment of noise under the EPA NG4 guidance requires a noise survey of baseline conditions and then derives appropriate criteria for noise due to the operation of the site. The criteria apply at the façades of the noise-sensitive locations.

The first part of selecting the noise criteria is to carry out a ‘quiet area’ screening on the location of the site. To be considered a 'quiet area’, the following three criteria are tested:

- The site must be located at least 3km from an urban area with a population of more than 1,000 people: in this instance the site lies between Leixlip and Celbridge and this criterion is not met.

- The site must be at least 3 km away from any local industry: Collinstown Industrial Park lies at less than 2km to the north therefore this criterion is not met.
- The site must be at least 5km away from any National Primary Route: the M4 motorway runs along the northern boundary of the site therefore this criterion is not met.

RECEIVED: 18/07/2023

In this instance, none of the above criteria are met and therefore the site is not considered to be in a 'quiet area'.

Having confirmed that the site is not in a 'quiet area', the next part of the derivation of Noise criteria according to NG4 is to test whether the site meets the criteria for an 'area of low background noise'.

For a noise-sensitive location in the vicinity of the site to be considered an 'area of low background noise', the noise levels measured at that location during the environmental noise survey need to satisfy all three the following criteria:

- Arithmetic Average of L_{A90} During Daytime Period ≤40 dB L_{A90},
- Arithmetic Average of L_{A90} During Evening Period ≤35 dB L_{A90}, and;
- Arithmetic Average of L_{A90} During Night-time Period ≤30 dB L_{A90}.

Finally, depending on whether each location is considered an 'area of low background noise', Table 11.7 below outlines the noise emission limit criteria detailed in the NG4 document.

Scenario	Daytime Noise Criterion, dB $L_{Ar,T}$ (07:00 to 19:00hrs)	Evening Noise Criterion, dB $L_{Ar,T}$(19:00 to 23:00hrs)	Night Noise Criterion, dB L_{Aeq} (23:00 to 07:00hrs)
Areas of Low Background Noise	45 dB	40 dB	35 dB
All Other Areas	55 dB	50 dB	45 dB

Table 11.7 NG4 Approach for Determining Appropriate Noise Criteria

The noise levels measured during the baseline noise surveys are presented in Section 11.4 of this chapter.

The data centre elements of the proposed developments would operate continuously. On the other hand, the energy compound would be required by the national grid provide dispatchable power. It would not be expected to operate 24/7, but as the hours of operation cannot be restricted or foreseen, (See section 2.5.4 for further detail), the precautionary approach taken here is to use assess the noise effects as if the energy compound were to operate continuously. This implies that the night-time noise criterion is critical to the assessment.

Section 11.4.1 presents the noise survey results and discusses applicable noise criteria according to NG4. In general, as these noise-sensitive locations are not identified as areas of low background noise as per the NG4 guidance, a 45 dB $L_{Aeq,T}$ night time criterion applies. Note if plant noise were designed to this level, plant noise would be clearly audible and the

dominant background source of noise at a number of noise sensitive locations in the vicinity of the development. NG4 guidance refers to the noise complaint assessment method BS4142 in the case of noise complaint, thus this methodology is also used assess the predicted noise levels.

RECEIVED: 18/07/2023

Other Guidance – BS 4142

BS 4142:2014: *Methods for rating and assessing industrial and commercial sound* is the industry standard method for analysing fixed plant sound emissions to residential receptors. BS 4142 describes methods for rating and assessing sound of an industrial and/or commercial nature. The methods described in this British Standard use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident. It should also be noted that the EPA NG4 document indicates that the BS 4142 assessment methodology should be used in the assessment of complaints associated with a site's operations. As an Industrial Emissions Licensing (IED) licence will be sought for the site, the guidance contained therein needs to be given due regard.

For an appropriate BS 4142 assessment it is necessary to compare the measured external background sound level (i.e. the $L_{A90,T}$ level measured in the absence of plant items) to the rating level ($L_{Ar,T}$) of the various plant items, when operational. Where sound emissions are found to be tonal, impulsive, intermittent or to have other sound characteristics that are readily distinctive against the residual acoustic environment, BS 4142 advises that penalties be applied to the specific level to arrive at the rating level.

The subjective method for applying a penalty for tonal sound characteristics outlined in BS 4142 recommends the application of a 2dB penalty for a tone which is just perceptible at the receptor, 4dB where it is clearly perceptible, and 6dB where it is highly perceptible. In relation to intermittency, BS 4142 recommends that If the intermittency is readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied. The following definitions as discussed in BS 4142 as summarised below:

ambient sound level, $L_{Aeq,T}$	equivalent continuous A-weighted sound pressure level of the totally encompassing sound in a given situation at any given time, usually from many sources near and far, at the assessment location over a given time interval, T.
residual sound level, $L_{Aeq,T}$	equivalent continuous A-weighted sound pressure level of the residual sound (i.e. ambient sound remaining at the assessment location when the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound) at the assessment location over a given time interval, T.
specific sound level, $L_{Aeq,T}$	equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, Tr.
Rating level, $L_{Ar,T}$	specific sound level plus any adjustment for the characteristic features of the sound.

background sound level, $L_{A90,T}$ — A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, measured using time weighting F and quoted to the nearest whole number of decibels.

RECEIVED: 18/07/2023

In order to establish an initial estimate of impact, BS 4142 states the following:

Obtain an initial estimate of the impact of the specific sound by subtracting the measured background sound level from the rating level, and consider the following.

a. Typically, the greater this difference, the greater the magnitude of the impact.
b. A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
c. A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.
d. The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

Adverse impacts include, but are not limited to, annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact.

Assessment of Significance

The 'Guidelines for Environmental Noise Impact Assessment' produced by the Institute of Environmental Management and Assessment (IEMA) (2014) have been referenced in order to categorise the potential effect of changes in the ambient noise levels during the operational phases of the proposed development.

The guidelines state that for any assessment, the potential significance should be determined by the assessor, based upon the specific evidence and likely subjective response to noise. Due to varying factors which effect human response to environmental noise (prevailing environment, noise characteristics, time periods, duration and level etc.) assigning a subjective response must take account of these factors.

The scale adopted in this assessment is shown in Table 11.8 below is based on an example scale within the IEMA guidelines. The corresponding significance of effect from the 'Guidelines on the Information to be Contained in Environmental Impact Assessment Reports' (EPA, 2022) is also presented.

Noise Level Change dB(A)	Subjective Response	Long Term Impact Classification (IEMA, 2014)	Effect Guidelines on the Information to be contained in EIARs (EPA)
≥ 0	No change	Negligible	Imperceptible
≥ 0 and < 3	Barely perceptible	Negligible	Not Significant

Noise Level Change dB(A)	Subjective Response	Long Term Impact Classification (IEMA, 2014)	Effect Guidelines on the Information to be contained in EIARs (EPA)
≥ 3 and < 5	Noticeable	Minor	Slight - Moderate
≥ 5 and < 10	Up to a doubling of loudness	Moderate	Moderate - Significant
≥10	More than a doubling of loudness	Major	Significant Profound

RECEIVED: 28/07/2023

Table 11.8 Noise Impact Scale - Operational Noise Sources

The significance table reflects the key benchmarks that relate to human perception of sound. A change of 3 dB(A) is generally considered to be the smallest change in environmental noise that is perceptible to the human ear. A 10 dB(A) change in noise represents a doubling or halving of the noise level. The difference between the minimum perceptible change and the doubling or halving of the noise level is split to provide greater definition to the assessment of changes in noise level.

It is considered that the ratings specified in the above table provide a good indication as to the likely significance of changes on noise levels in this case and have been used to assess the impact of operational noise.

The assessment methods detailed in above refer to residential properties. Methods for assessing noise at other kinds of noise-sensitive locations are described in the following sections.

Commercial Properties

A number of commercial / industrial properties are located in the vicinity of the site. In terms of noise emissions from the site it is considered that an appropriate noise criterion at these locations is 55 dB $L_{Aeq,15min}$, which corresponds to the noise criterion for daytime periods in NG4.

Amenity Areas

The Wonderful Farm Parkland, situated to the north of the proposed development on the northern site of the M4 motorway is a recreational amenity and is considered noise-sensitive during daytime hours. This location is represented by NSL01 (See Table 11.10 and **Figure *11.1***). It is recommended that noise limits associated with the day-to-day operations of the proposed development would not exceed 55 dB $L_{Aeq,15min}$ at NSL01.

Similarly, the grounds of Castletown House are considered noise-sensitive and the noise criterion for the day-to-day operations of the proposed development is 55 dB $L_{Aeq,15min}$ at the assessment location NSL10 in order to protect the recreational amenity of the establishment.

Emergency Operation

Stand-by generators are integral to the current proposal. These generators will only operate in a situation where there is a failure in the electricity supply from the national grid and will be tested routinely. Routine testing will be conducted during regular weekday daytime periods

only. Section 4.4.1 of the EPA NG4 contains the following comments in relation to emergency plant items:

> *'In some instances, …sites will have certain items of emergency equipment (e.g. standby generators) that will only operate in urgent situations (e.g. grid power failure). Depending upon the context, it may be deemed permissible for such items of equipment to give rise to exceedances in the noise criteria/limits during limited testing and emergency operation only. If such equipment is in regular use for any purposes other than intermittent testing, it is subject to the standard limit values for the site'.*

RECEIVED: 18/07/2023

As generators will only run if there is a loss of power to the site, or for scheduled testing during daytime periods, the noise criterion of 55 dB $L_{Aeq,15min}$ on these emergency units is proposed. Generators have been selected in order to achieve this design goal at nearby residential noise sensitive locations.

11.3.3.5Operational Phase Noise Criteria – Additional Traffic on Public Roads

In order to assist with the interpretation of the noise associated with vehicular traffic on public roads, Table 11.9 offers guidance as to the likely impact associated with any particular change in traffic noise level based on DMRB Noise and Vibration, and EPA Guidelines 2022.

Change in Sound Level (dB)	Subjective Reaction	DMRB Magnitude of Impact (Short-term)	EPA Significance of Effect
0	Inaudible	No Change	Neutral
0.1 – 2.9	Barely Perceptible	Negligible	Imperceptible
3 – 4.9	Perceptible	Minor	Slight
5 – 9.9	Up to a doubling of loudness	Moderate	Moderate
10+	Doubling of loudness and above	Major	Significant

Table 11.9 Classification of magnitude of traffic noise changes in the long term

11.3.4 Operational Phase Vibration Criteria

There is no expected source of vibration associated with the operational phase, therefore, vibration criteria have not been specified for this phase.

11.4 Baseline Scenario/Future Receiving Environment Analysis

11.4.1 Current State of the Environment (Baseline Scenario)

Context

NSLs identified nearby are located in a range of existing noise environments. Those to the north of the proposed development are near the M4 motorway and have higher existing noise levels. Those to the south east and south west have lower existing noise levels. The following NSLs in Table 11.10 and shown in Figure 11.1 have been considered as part of this assessment.

RECEIVED 19/07/2023

Receptor	Description
NSL01	Recreational NSL (Wonderful Farm Parkland).
NSL02	Residential NSL located on The Drive, Barnhall Meadows Estate.
NSL03	NSL located to the east of the site on the opposite side of the Celbridge Road.
NSL04	NSL located to the east of the site on the opposite side of the Celbridge Road.
NSL05	NSL located to the east of the site on the opposite side of the Celbridge Road.
NSL06	NSL located to the east of the site on the opposite side of the Celbridge Road.
NSL07	NSL located to the south east of the site on the opposite side of the Celbridge Road.
NSL08a	Commercial NSL: Montessori facility
NSL08b	Commercial NSL: Rugby club
NSL09	NSL located to the south of the site on the opposite side of the Celbridge Road.
NSL10	Recreational NSL within Castletown demesne.
NSL11	NSL (Castletown House).
NSL12a/b/c	Residential NSLs located on Woodview Estate.
NSL13	NSL located to the north west of the site on the opposite side of the M4.
NSL14	Residential NSL located on Beech Park Estate.
NSL15	Residential SHD with application ref. no. 18/300606, currently under construction

Table 11.10 Assessment Locations



Figure 11.1 Assessment Locations

Character

The existing noise environment is described in the following sections:

Measurement Locations

Baseline noise monitoring has been completed at a number of representative locations in the vicinity of the development and is reviewed here to inform a preliminary discussion of the existing noise environment and selection of suitable noise criteria for a planning application. Figure 11.2 illustrates the approximate location of the noise monitoring locations.

A description of each location is as follows:

Location A	In an open area to the north-east of the existing campus. The noise survey at this location is representative of that at the housing area on the opposite side of the M4 motorway.
Location B	Near the entrance to the existing campus, at a location representative of the house on the opposite site of Celbridge Road.
Location C	At the boundary with MU Barnhall Rugby Football Grounds. On the most recent survey visit there was new plant operating at this location.

RECEIVED: 18/07/2023

Location C (Night) At a location representative of the noise environment at the houses to the east of the roundabout.

Location D Within the Castletown house grounds.

Location D (Night) Within the Woodview housing estate to the southwest of the proposed development.

Location E At a roundabout on a local road to the north-west of the existing campus. The noise survey at this location is representative of the housing area on the opposite site of the M4 motorway.



Figure 11.2 Noise Survey Locations

The noise survey results are summarised in **Table 11.11** below.

Noise Measurement Parameters

L_{Aeq} is the equivalent continuous sound level. It is a type of average and is used to describe a fluctuating noise in terms of a single noise level over the sample period.

L_{A90} is the sound level that is exceeded for 90% of the sample period. It is typically used as a descriptor for background noise.

RECEIVED: 18/07/2023

Measured Noise Levels

The noise survey results are summarised in Table 11.11 below. For a table of individual noise level measurements, see Appendix 11.4.

Monitoring Location	Period	Measured 15 Minute Noise Level, dB(A) Free-Field		
		L_{Aeq} Note 1	L_{AF90} Note 1	L_{AF90} Note 2
A	Day	65 – 67	63 – 65	64
	Evening	59	56	56
	Night	56 – 57	50 – 54	52
B	Day	60 – 61	56 – 58	57
	Evening	51	48	48
	Night	49 – 50	46	46
C	Day	56 – 62	55 – 56	55
	Evening	47	46	46
C Night	Night	47 – 48	44 – 46	45
D	Day	53 – 57	48 – 53	50
	Evening	38	28	28
D Night	Night	30 – 38	26 – 27	26
E	Day	62 – 67	60 – 65	63
	Evening	56	51	51
	Night	55	44 – 45	44

Note 1 Range of measured levels presented
Note 2 Arithmetic average L_{A90}
Table 11.11 Noise Monitoring Results

Significance

The measured noise levels are each considered representative of their respective settings, i.e. higher noise levels measured near major roads and lower noise levels at distances away from flowing traffic.

In accordance with NG4, noise levels at each measurement location are assessed as to whether they meet the criteria for an 'area of low background noise' as presented in Section 11.3.3.4. No location meets all three of the criteria; however, the night-time noise level at location 'D Night' is below 30 dB L_{A90} and this is taken into account in the assessment presented in Section 11.5.2.

Sensitivity

Criteria for the assessment of significance of a change in noise levels are provided in Section 11.3.3.4.

Facilitation Works

RECEIVED: 18/07/2023

To assist in establishing a representative baseline noise environment in the vicinity of the GNI Upgrade, reference has been made to the Environmental Protection Agency (EPA) strategic noise mapping. The noise maps are provided for the overall day-evening-night period in terms of L_{den} and for the night-time period in terms of L_{night}. All data has been taken from the EPA Mapping website http://gis.epa.ie. As the GNI construction will take place during daytime, the existing night-time noise environment is not considered in this assessment,

Figure 11.3 presents the mapped noise levels for road traffic in terms of L_{den}. Daytime noise levels in the locations where there are residential NSLs are in the range 65 to 69 dB L_{den} at the highest, ranging to below 55 dB L_{den} at locations away from major roads.

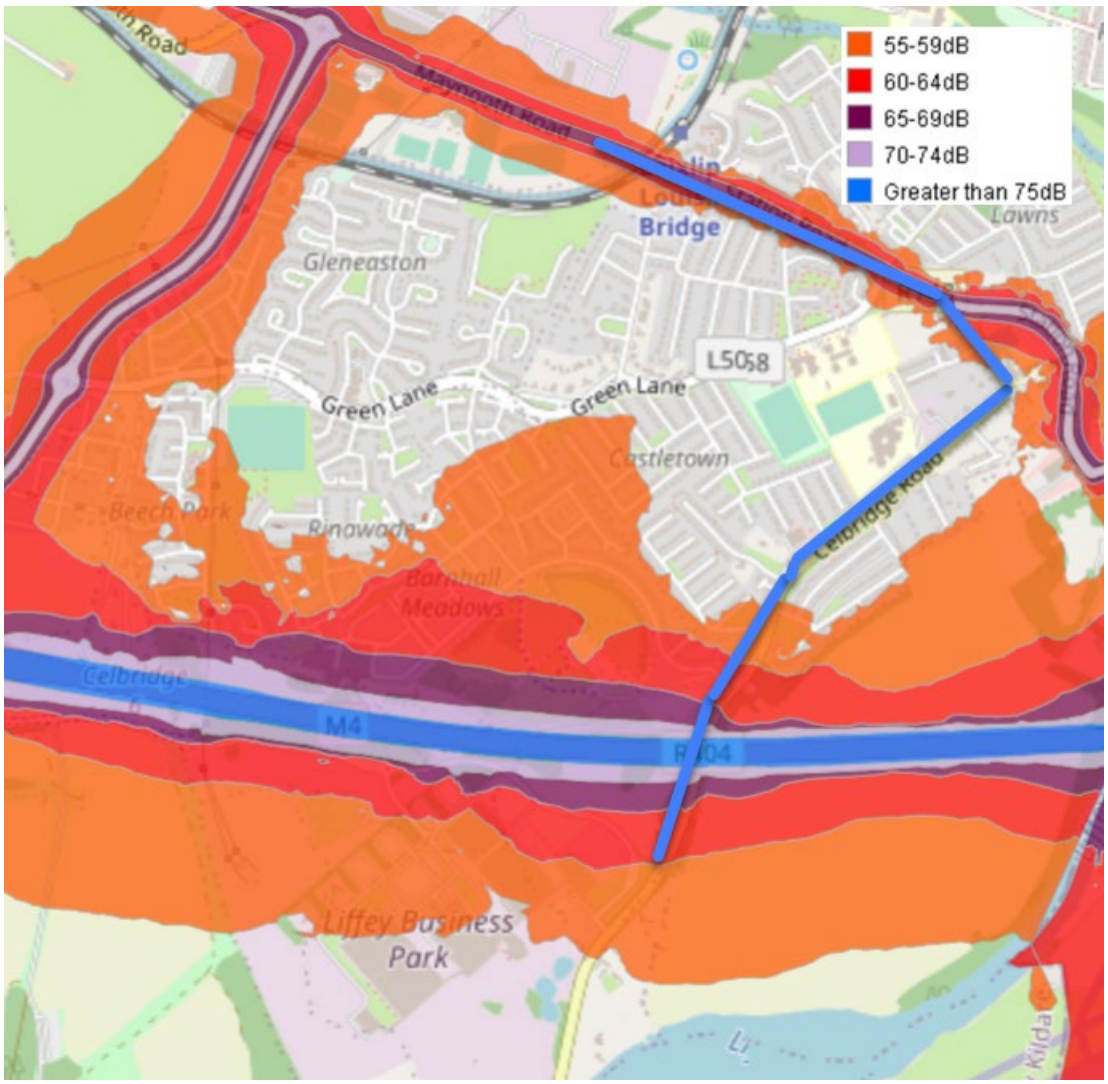


Figure 11.3 L_{den} Road Traffic Noise Levels with approximate gas pipeline route indicated in blue.

Based on noise levels measured during daytime periods at location B, it is assumed that daytime noise levels along Celbridge road are of the order of 60 dB L_{Aeq}.

11.4.2 Likely Future Receiving Environment ('Do Nothing' Scenario)

RECEIVED: 28/07/2023

In the event of a 'Do Nothing' scenario, the site would remain in operation as an existing ICT campus.

It would mean the noise environment at the nearest noise sensitive locations and within the development site will remain largely unchanged resulting in a neutral and local impact in the long-term.

11.5 Likely Impacts of the Project

11.5.1 Construction Phase

The largest noise and vibration impact of the proposed project will occur during the construction phase due to the operation of various plant machinery and HGV movement to, from and around the site. In this instance, the construction phase can be classed as a mid-term phase (approximately ten years in duration on a phased basis as described in Chapter 2 Section 2.6). The nearest noise-sensitive location to the main site is the childcare facility to the south of the proposed development at a distance of 40 m from the boundary and a distance of 100 m from the nearest proposed building. Along the route of the GNI Upgrade, there are NSLs at distances of 10 to 15 m from the road edge along Celbridge road and Station Road.

Construction noise due to the GNU Upgrade works are included in the assessment below of noise at the nearest NSLs to the principal works site. Construction noise effects of the GNI Upgrade works on NSLs along the gas pipeline route is assessed in a section thereafter. Cumulative construction noise effects of the GNI Upgrade works are discussed in Section 11.7.1.1.

Based on the results of the baseline noise surveys undertaken, the ambient daytime noise level at these properties was found to be between 56 and 63 dB $L_{Aeq,15min}$.

Thresholds for significant noise from construction can be determined by referring to and the baseline ambient noise levels, as outlined in the assessment criteria section. The daytime significance threshold for construction noise at the site is set at 65 dB $L_{Aeq,1hr}$. A night-time threshold is not included as construction work will not be taking place at night.

BS 5228-1 contains noise level data for various construction machinery. Table 11.12 outlines typical plant items and associated noise levels that are anticipated for various phases of the construction programme.

Guidance on the approximate attenuation achieved by barriers surrounding the site is also provided in BS 5228-1. It states that when the top of the plant is just visible to the receiver over the noise barrier, an approximate attenuation of 5 dB can be assumed, while a 10 dB attenuation can be assumed when the noise screen completely hides the sources from the receiver.

RECEIVED: 19/07/2023

The latter scenario can be assumed in this case due a standard hoarding will be erected around the site. Table 11.12 shows the potential noise levels calculated at various distances based on the assumed sound power level and attenuation provided by the barrier of 10 dB.

It is assumed an 'on-time' of 66% applies to construction plant, i.e. that equipment will be in used for up to 8 hours over a 12-hour working day.

Phase	Item of Plant (BS 5228-1 Ref.)	Construction Noise Level at 10m Distance(dB $L_{Aeq,1hr}$)
Foundations	Tracked Excavator (C3.24)	74
	Concrete Pump (C3.25)	78
	Compressor (D7 6)	77
	Poker Vibrator (C4 33)	78
Steel Erection	Tower Crane (C4.48)	76
	Articulated lorry (C11.10)	77
General Construction	Hand tools	81
	Pneumatic Circular Saw (D7.79)	75
	Internal fit – out	70
Landscaping	Dozer (C2.13)	78
	Dump Truck (C4.2)	78
	Surfacing (D8.25)	68
GNI Upgrade Works	Mini Tracked Excavator with Rock Breaker (C5.2)	83
	Wheeled Loader Lorry (C2.28)	76
	Dump Truck (C.4.2)	78
	Generator (C.2.44)	77

Table 11.12 Typical noise levels associated with construction plant items

Table 11.13 presents indicative predicted noise levels based on distances to the works.

Location	Noise Level $L_{Aeq,1hr}$ for construction phase				
	Foundations	Steel Erection	General Construction	Landscaping	GNI Upgrade Works
NSL01	60	57	59	58	49
NSL02	50	47	49	48	62
NSL03	65	62	64	63	49
NSL04	60	57	59	58	45
NSL05	59	56	58	57	44
NSL06	60	57	59	58	40
NSL07	52	49	51	50	40
NSL08a	64	61	63	62	39
NSL08b	64	61	63	62	40
NSL09	52	49	51	50	37
NSL10	51	48	50	49	37
NSL11	39	36	38	37	34
NSL12a/b/c	36	33	35	34	33
NSL13	51	48	50	49	37
NSL14	52	49	51	50	40
NSL15	50	47	49	48	42

Table 11.13 Typical noise levels associated with the various construction phases for the principal works site.

RECEIVED: 18/07/2023

The indicative predicted noise are within the construction noise threshold (CNT) of 65 dB $L_{Aeq,1hr}$ at all locations. There are no construction activities that would be expected to give rise to noise construction levels that would be considered out of the ordinary or in exceedance of the levels outlined in Table 11.2 on an on-going basis or give rise to a potential significant impact through the process outlined in Section 11.3.3.1.

The impact on the noise environment due to construction activities according to the criteria in Table 11.3 is presented in Table 11.14, where it is shown that the effects are not significant for the majority of locations and slight to moderate at locations NSL03, NSL08a NSL08b. Best-practice mitigation measures are presented in Section 11.6.1.

Location	Significance of Effect for Construction Phase				
	Foundations	Steel Erection	General Construction	Landscaping	GNI Upgrade Works
NSL01	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
NSL02	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
NSL03	Slight-Moderate	Slight-Moderate	Slight-Moderate	Slight-Moderate	Not Significant
NSL04	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
NSL05	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
NSL06	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
NSL07	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
NSL08a	Slight-Moderate	Slight-Moderate	Slight-Moderate	Slight-Moderate	Not Significant
NSL08b	Slight-Moderate	Slight-Moderate	Slight-Moderate	Slight-Moderate	Not Significant
NSL09	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
NSL10	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
NSL11	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
NSL12a/b/c	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
NSL13	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
NSL14	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
NSL15	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant

Table 11.14 Construction Phase Effects for Principal Works Site

The effect of construction noise is therefore considered negative, not significant to moderate and medium-term.

GNI Upgrade Works

As the Construction Phase progresses along the length of the GNI Upgrade works, a variety of plant items will be required for the varying phases. When works are occurring immediately outside NSLs, they will be clearly audible and will generate high levels of construction noise.

The nature of the works associated with the GNI Upgrade works are, however, transient in nature and each activity will occur for intermittent periods at any one time. For example, the use of breakers, excavators and planers, some of the highest noise generating plant items will operate outside a NSL for a limited period as it progresses along the length of a working area.

For indicative calculation purposes, an average plant noise level has been calculated for each phase of work making reference to the plant list in Table 11.12.

RECEIVED: 18/07/2023

The average value is used to account of the mobile element of works assuming plant items associated with any activity are operating within a 50m linear work area at any one time. The average construction for each phase of work has been used to assess construction noise levels at the closest NSLs. The following sections present a range of indicative construction noise calculations associated with the key construction activities associated with this section of the project. The calculations assume that the ground is hard between the works and the noise-sensitive locations and that there is a solid hoarding between the noise source and the receiver, which offers a noise reduction of 10 dB. The closest NSLs are typically at a distance of 15m from the GNU Upgrade works.

Based on noise levels measured during daytime periods at location B, it is assumed that daytime noise levels along the

Item (BS 5228 Ref.)	Plant Noise level at 10m Distance (dB LAeq,T)	Predicted Noise Level (dB $L_{Aeq,T}$) at distance (m)			
		15 m	30 m	40 m	50 m
Mini Tracked Excavator with Rock Breaker (C5.2)	83	67	61	59	57
Wheeled Loader Lorry (C2.28)	76	60	54	52	50
Dump Truck (C.4.2)	78	62	56	54	52
Generator (C.2.44)	77	67	61	59	57
Total	86	70	64	62	60
Significance		Moderate to Significant	Slight to Moderate	Slight to Moderate	Slight to Moderate

Table 11.15 Construction Noise Effects for the GNI Upgrade Works

The construction noise effects of the GNU Upgrade Works are therefore negative, slight to significant and temporary.

11.5.1.1Construction Vibration

Potential for vibration impacts during the construction phase programme are likely to be limited given the ground breaking, piling and excavations required. There is potential for piling to be used for the construction of the buildings. For the purposes of this assessment the expected vibration levels during piling assuming augured or bored piles have been determined through reference to published empirical data. BS 5228-2, publishes the measured magnitude

RECEIVED: 18/07/2023

of vibration of rotary bored piling using a 600mm pile diameter for bored piling into soft ground over rock, (Table D.6, Ref. No. 106):

- 0.54 mm/s at a distance of 5 m, for auguring;
- 0.22 mm/s at a distance of 5 m, for twisting in casing;
- 0.42 mm/s at a distance of 5 m, for spinning off, and;
- 0.43 mm/s at a distance of 5 m, for boring with rock auger.

Considering the low vibration levels at very close distances to the piling rigs, vibration levels at the nearest buildings are not expected to pose any significance in terms of cosmetic or structural damage. In addition, the range of vibration levels is typically below a level which would cause any disturbance to occupants of nearby buildings.

In this instance, taking account of the distance to the nearest sensitive off-site buildings, vibration levels at the closest neighbouring buildings are expected to be orders of magnitude below the limits set out in Table 11.4 to avoid any cosmetic damage to buildings. Vibration levels are also expected to be below a level that would cause disturbance to building occupants, as set out in Table 11.5. The potential vibration impact during the construction phase if of neutral, imperceptible and medium-term impact.

11.5.1.2Construction Traffic

This section has been prepared in order to assess likely noise effects associated with construction traffic using the local road network. Information presented at Chapter 13, regarding vehicle types and predicted traffic volumes, have been used to inform this assessment.

The likely noise effects of HGV movements are assessed through consideration of the cumulative noise level associated with a series of individual events. The noise level associated with an event of short duration, such as a vehicle drive-by, may be expressed in terms of its Sound Exposure Level (SEL; LAx). The SEL can be used to calculate the contribution of an event or series of events to the overall noise level in a given period. The appropriate formula, based on basic acoustic principles, is as follows:

$$L_{Aeq,T} = L_{Ax} + 10\log_{10}(N) - 10\log_{10}(T) - 10\log_{10}(r_2/r_1)\ dB$$

Where:

- $L_{Aeq,T}$ is the equivalent continuous sound level over the time period T (s);
- L_{Ax} is the "A-weighted" Sound Exposure Level of the event under consideration (dB);
- N is the number of events over the course of time period T.
- r_2 is the distance from the edge of the entrance road to the façade of nearest property
- r_1 is the distance from vehicle to the point of original measurement

The mean value of Sound Exposure Level a HGV movement is of the order of 85dB L_{Ax} at 5m from the vehicle. This figure is based on a series of measurements conducted under controlled conditions.

RECEIVED: 18/07/2023

Based on information in Chapter 13, the peak hourly number of vehicles is 76 per hour per unit which assuming the worst-case scenario of the construction of six units' construction periods overlapping, give 465 vehicle movements per hour.

Also in Chapter 13, it is stated that the route of the construction vehicles will be along the M4 and accessing the site from the northwest via Barnhall Road. Assuming that the traffic impact in terms of vehicle flows along the M4 is negligible, the assessment here focusses on construction traffic using Barnhall Road. The nearest noise-sensitive locations to this section of Barhall Road are the those on the northern side of the motorway, represented by NSL13, at a distance of 125m.

The predicted noise level at these NSLs, based on the methodology above is 62 dB $L_{Aeq,1hr}$. In the context of measured noise levels of 62 to 67 dB LAeq measured during daytime periods at noise survey locations A and E, based on the criteria in Table 11.6, the effect associated with construction traffic noise is negative, not significant and medium-term.

11.5.2 Operational Phase

The primary sources of outward noise from the proposed development in the operational context are deemed long term and will involve:

- fixed plant at data centres and energy centre;
- emergency site operations, and;
- a new public link road;
- additional vehicular traffic on public roads, and
- a pedestrian and cycle overpass.

These issues are assessed in detailed in the following sections. See Appendix 11.3 for details of the noise modelling undertaken for this assessment and associated input information.

11.5.2.1 Fixed Plant at Data Centres and the Energy Centre

Three scenarios have been developed to consider the noise impact of the proposed operations. These are as follows:

- Scenario A: Day to Day Operations;
- Scenario B: Emergency Operations, and;
- Scenario C: Generator Testing.

Scenario A is considered to be the most representative of the day to day operation, and includes the direct operation of the combustion turbine generators (CTGs) in the energy centre. This scenario assumes the worst-case scenario that the CTGs are also required to operate 24/7, however we understand that this is unlikely to occur. Notwithstanding this, the

use of the CTGs cannot be restricted by hours (to meet EirGrid requirements) and therefore the precautionary approach has been taken.

RECEIVED: 18/07/2023

Scenario B is representative of emergency situation when a power outage or issue with supply from the national grid has occurred and backup electrical power is therefore required to keep the data centres operation. It should be noted that such an event is an extremely rare occurrence.

Scenario C considers the impact associated with the testing of emergency generators. Testing of generators will occur once per week for a maximum of 1 hour each, one generator at a time, sequentially during daytime periods. (For the noise assessment of generator testing, it is assumed that each unit generate the same noise levels as for Scenario B). The predicted noise level for Scenario C presented here assume that the closest generator to existing NSL08a/b is being tested. It should be noted that the testing of generators shall take place only between 09.00 and 17.00hrs.

Predicted noise levels are presented in Tables 11.16, 11.17 and 11.18. Noise contours for the three scenarios are presented in Appendix 11.5.

Ref	Predicted Noise Level dB(A)	Period	EPA NG4 Criterion dB $L_{Aeq,15min}$	Excess	Complies?
NSL01[1]	45	Day	55	--	✓
		Evening	50	--	✓
		Night	--	--	--
NSL02	42	Day	55	--	✓
		Evening	50	--	✓
		Night	45	--	✓
NSL03	43	Day	55	--	✓
		Evening	50	--	✓
		Night	45	--	✓
NSL04	44	Day	55	--	✓
		Evening	50	--	✓
		Night	45	--	✓
NSL05	44	Day	55	--	✓
		Evening	50	--	✓
		Night	45	--	✓
NSL06	41	Day	55	--	✓
		Evening	50	--	✓
		Night	45	--	✓
NSL07	39	Day	55	--	✓
		Evening	50	--	✓
		Night	45	--	✓
NSL08a	42	Day	55	--	✓
		Evening	50	--	✓
		Night	45	--	--
NSL08b	43	Day	55	--	✓

RECEIVED: 18/07/2023

Ref	Predicted Noise Level dB(A)	Period	EPA NG4 Criterion dB $L_{Aeq,15min}$	Excess	Complies?
		Evening	50	--	✓
		Night	45	--	✓
NSL09	35	Day	55	--	✓
		Evening	50	--	✓
		Night	45	--	✓
NSL10[1]	34	Day	55	--	✓
		Evening	50	--	✓
		Night	--	--	--
NSL11[1]	35	Day	55	--	✓
		Evening	50	--	✓
		Night	--	--	--
NSL12a	34	Day	55	--	✓
		Evening	50	--	✓
		Night	45	--	✓
NSL12b	34	Day	55	--	✓
		Evening	50	--	✓
		Night	45	--	✓
NSL12c	32	Day	55	--	✓
		Evening	50	--	✓
		Night	45	--	✓
NSL13	42	Day	55	--	✓
		Evening	50	--	✓
		Night	45	--	✓
NSL14	45	Day	55	--	✓
		Evening	50	--	✓
		Night	45	--	✓
NSL15	45	Day	55	--	✓
		Evening	50	--	✓
		Night	45	--	✓

Note 1: Non-residential NSLs do not have a night-time criterion as they are assumed not to be in use during night-time periods.

Table 11.16 Scenario A: Predicted Noise Levels compared to noise criteria

Ref	Predicted Noise Level dB(A)	Period	EPA NG4 Criterion dB $L_{Aeq,15min}$	Excess	Complies?
NSL01	50	Day	55	--	✓
		Evening	55	--	✓
		Night	55	--	✓
NSL02	47	Day	55	--	✓
		Evening	55	--	✓

RECEIVED: 18/07/2023

Ref	Predicted Noise Level dB(A)	Period	EPA NG4 Criterion dB $L_{Aeq,15min}$	Excess	Complies?
		Night	55	--	✓
NSL03	53	Day	55	--	✓
		Evening	55	--	✓
		Night	55	--	✓
NSL04	54	Day	55	--	✓
		Evening	55	--	✓
		Night	55	--	✓
NSL05	53	Day	55	--	✓
		Evening	55	--	✓
		Night	55	--	✓
NSL06	51	Day	55	--	✓
		Evening	55	--	✓
		Night	55	--	✓
NSL07	49	Day	55	--	✓
		Evening	55	--	✓
		Night	55	--	✓
NSL08a	55	Day	55	--	✓
		Evening	55	--	✓
		Night	55	--	✓
NSL08b	54	Day	55	--	✓
		Evening	55	--	✓
		Night	55	--	✓
NSL09	44	Day	55	--	✓
		Evening	55	--	✓
		Night	55	--	✓
NSL10	44	Day	55	--	✓
		Evening	55	--	✓
		Night	55	--	✓
NSL11	43	Day	55	--	✓
		Evening	55	--	✓
		Night	55	--	✓
NSL12a	43	Day	55	--	✓
		Evening	55	--	✓
		Night	55	--	✓
NSL12b	42	Day	55	--	✓
		Evening	55	--	✓
		Night	55	--	✓
NSL12c	40	Day	55	--	✓
		Evening	55	--	✓
		Night	55	--	✓
NSL13	49	Day	55	--	✓
		Evening	55	--	✓
		Night	55	--	✓

Ref	Predicted Noise Level dB(A)	Period	EPA NG4 Criterion dB $L_{Aeq,15min}$	Excess	Complies?
NSL14	49	Day	55	--	✓
		Evening	55	--	✓
		Night	55	--	✓
NSL15	49	Day	55	--	✓
		Evening	55	--	✓
		Night	55	--	✓

RECEIVED: 18/07/2023

Table 11.17 Scenario B: Predicted Noise Levels compared to Emergency Operating Criteria

Ref	Predicted Noise Level dB(A)	Period	EPA NG4 Criterion dB $L_{Aeq,15min}$	Excess	Complies?
NSL01	45	Day	55	--	✓
		Evening	--	--	--
		Night	--	--	--
NSL02	42	Day	55	--	✓
		Evening	--	--	--
		Night	--	--	--
NSL03	44	Day	55	--	✓
		Evening	--	--	--
		Night	--	--	--
NSL04	44	Day	55	--	✓
		Evening	--	--	--
		Night	--	--	--
NSL05	44	Day	55	--	✓
		Evening	--	--	--
		Night	--	--	--
NSL06	44	Day	55	--	✓
		Evening	--	--	--
		Night	--	--	--
NSL07	42	Day	55	--	✓
		Evening	--	--	--
		Night	--	--	--
NSL08a	49	Day	55	--	✓
		Evening	--	--	--
		Night	--	--	--
NSL08b	47	Day	55	--	✓
		Evening	--	--	--
		Night	--	--	--
NSL09	36	Day	55	--	✓
		Evening	--	--	--

Ref	Predicted Noise Level dB(A)	Period	EPA NG4 Criterion dB $L_{Aeq,15min}$	Excess	Complies?
		Night	--	--	--
NSL10	36	Day	55	--	✓
		Evening	--	--	--
		Night	--	--	--
NSL11	37	Day	55	--	✓
		Evening	--	--	--
		Night	--	--	--
NSL12a	36	Day	55	--	✓
		Evening	--	--	--
		Night	--	--	--
NSL12b	35	Day	55	--	✓
		Evening	--	--	--
		Night	--	--	--
NSL12c	34	Day	55	--	✓
		Evening	--	--	--
		Night	--	--	--
NSL13	44	Day	55	--	✓
		Evening	--	--	--
		Night	--	--	--
NSL14	46	Day	55	--	✓
		Evening	--	--	--
		Night	--	--	--
NSL15	45	Day	55	--	✓
		Evening	--	--	--
		Night	--	--	--

RECEIVED: 18/07/2023

Table 11.18 Scenario C: Predicted Noise Levels compared to Generator Testing Criteria

Review of Increases in Noise Level

Table 11.19 presents the predicted changes in noise level associated with the development at the nearest noise sensitive locations to the site.

Ref	Predicted Noise Level $L_{Aeq,15min}$	Background Noise Level $L_{A90,15min}$	Cumulative Noise Level dB(A)	Change in Noise Level dB(A)	EPA Glossary of Effects
NSL01	45	52	52.8	+0.8	Not Significant
NSL02	42	52	52.4	+0.4	Not Significant
NSL03	43	46	47.8	+1.8	Not Significant
NSL04	44	46	48.1	+2.1	Not Significant
NSL05	44	46	48.1	+2.1	Not Significant
NSL06	41	45	46.5	+1.5	Not Significant
NSL07	39	45	46	+1.0	Not Significant
NSL08a	42	50	50.6	+0.6	Not Significant

NSL08b	43	50	50.8	+0.8	Not Significant
NSL09	35	45	45.4	_0.4	Not Significant
NSL10	34	50	50.1	+0.1	Not Significant
NSL11	35	50	50.1	+0.1	Not Significant
NSL12a	34	26	34.6	+8.6	See text
NSL12b	34	26	34.6	+8.6	See text
NSL12c	32	26	33.0	+7.0	See text
NSL13	42	44	46.1	+2.1	Not Significant
NSL14	45	44	47.5	+3.5	Slight, Moderate
NSL15	45	44	47.5	+3.5	Slight, Moderate

RECEIVED: 28/07/2023

Table 11.19 Review of Predicted Changes in Noise Levels

At locations NSL12a, b, and c, an increase of the order of 7 to 9 dB is indicated. However, the predicted noise levels are below of 35 dB $L_{Aeq,T}$ which corresponds to the EPA NG4 night-time criterion for low-noise areas. As 35 dB L_{Aeq} remains a low level of noise, the effects are therefore considered 'not significant'.

At locations NSL06 and NSL07, a slight to moderate effect is predicted, however the predicted noise levels of 41 and 39 dB(A) remain within the EGA NG4 criterion of 45 dB(A) $L_{Aeq,T}$., Similarly, the effects are therefore considered 'slight to moderate'.

Deep Tech Buildings

As mentioned in chapter 2, "the ultimate tenant for the proposed Deep Tech buildings is not yet agreed. Buildings A1 and A2 have been designed to be flexible to accommodate a range of potential end user requirements" and "noise and vibration is not expected to be significant with modern deep tech not requiring the same level of cooling equipment as might be required by Pharma or traditional manufacturing". At detailed design stage, building services required for the Deep Tech buildings will be designed so the total site plant noise level remains within the noise criteria presented in this chapter. The resulting effect of the overall site noise remains 'not significant to moderate'.

Summary

Taking the above into account, the overall environmental noise effects during the operational phase are negative, not significant to moderate and long-term.

11.5.2.2New Public Link Road

The proposed development includes a public link road between the R404 and the junction 6 of the M4 motorway. As stated in Chapter 2, *'This has been designed to meet objective MT3.12 of the LLAP 2020-2026 which seeks a "new link road from the Celbridge Road (R404) to the south of the M4 connecting to the M4 Leixlip/Celbridge Interchange".'*

The public link road will carry public traffic from the entrance at the north-west corner of the site, past the site buildings and re-join the existing road network at the R404. The expected traffic flows along this road expressed as an Annual Average Daily Traffic (AADT) flow is 1252 AADT. The nearest NSL to the proposed public link road is NSL13 at a distance of approximately 125 m. Based on the calculation in CRTN and assuming the %HGV of 10% and a speed of 60 km/h, the expected noise level at this NSL is 51 dB L_{Aeq} for daytime periods.

RECEIVED: 18/07/2023

Reference to Table 11.11 shows that the noise levels at Location E, which is a similar distance from the M4 Motorway as NSL13, were measured at 62-67 dB L_{Aeq} for daytime periods. In this context noise from the new public link road at this location is imperceptible. The environmental noise effects are neutral, imperceptible and long-term.

At the interchange on the R404, the traffic will re-join the public road network. Noise from increases in traffic flows along existing public roads is assessed in the next section.

11.5.2.3Additional Vehicular Traffic on Public Roads

During the operational phase of the proposed development, there will be an increase in vehicular traffic associated with the site and other planned developments on surrounding roads. The predicted change in noise levels due to an increase in road traffic has been calculated for each of these roads. Projected traffic data used for the purpose of this assessment includes committed and planned developments in the vicinity of the project site as listed in the Traffic and Transport of this EIAR.

For the purposes of assessing potential noise impact, it is appropriate to consider the relative increase in noise level associated with traffic movements on existing roads surrounding the subject site with and without development using the Annual Average Daily Traffic (AADT). The impact from the increase in traffic from the proposed development has been assessed for the year 2043 relative to the Do Nothing scenario for the same year, along the sections of road detailed in Table 11.20.

In terms of the overall traffic flows, in order to increase traffic noise levels by 1dB, traffic volumes would need to increase by the order of 25% approximately. Table 11.20 presents a review of the potential traffic level increases attributable to the proposed development and indicates that the development will not give rise to increases of this magnitude on the surrounding road network.

Link No.	Link Name	Do Nothing AADT 2043	Do Something AADT 2043	Noise level Increase (dB L_{A10}) between Do Nothing and Do Something (2047)
Link 1	Station Road W	16826	16914	0.0
Link 2	Station Road E	15377	15487	0.0
Link 3	Celbridge Road	10187	10274	0.0
Link 4	Celbridge Road N	9266	9441	+0.1
Link 5	Access Road	1077	1252	+0.7
Link 6	Celbridge Road S	9919	10182	+0.1
Link 7	Barnhall Road	4733	6465	+1.4
Link 8	R449 S	16653	16741	0.0
Link 9	M4 Off Slip	7512	8060	+0.3
Link 10	R449 N	5143	5253	+0.1
Link 11	M4 Off Slip	22736	23043	+0.1
Link 12	RBT R404 N	5143	5253	+0.1
Link 13	RBT Access	9016	9543	+0.2
Link 14	RBT R404 S	2369	2632	+0.5
Link 15	R404	9627	9890	+0.1

Link 16	R403 E	9562	9899	+0.2
Link 17	Stacumny Lane	14207	14426	+0.1
Link 18	R403 W	3074	3096	0.0

Table 11.20 Predicted Change In Noise Level associated with Vehicular Traffic. AADT values from Table 13.6 in Chapter 13 *Material Assets – Traffic and Transportation*

RECEIVED: 18/07/2023

The predicted increase in traffic flows associated with the development in the year 2043 will result in an increase less than 3 dB along all roads receiving traffic from the proposed development; reference to Table 11.9 shows that noise from additional traffic flow will have a negligible effect. The effect is therefore neutral, imperceptible and long-term.

11.5.2.4Pedestrian and Cycle Overpass

From Chapter 2:

> *Construction of a new pedestrian and cycle overpass across the M4 motorway and pedestrian/cycle path adjacent to lands known as the Wonderful Barn Allotments; the overpass will link the new publicly accessible link road within Kildare Innovation Campus to the entrance of Barnhall Meadows estate.*

The overpass, as it is not designed for vehicular use, will not give rise to any significant noise or vibration effects in the operational phase.

11.6 Mitigation Measures and Monitoring of Impacts

11.6.1 Construction Phase

With regard to construction activities, best practice control measures for noise and vibration from construction sites are found within BS 5228-1. Whist construction noise and vibration impacts are expected to vary during the construction phase depending on the distance between the activities and noise sensitive buildings, the contractor will ensure that all best practice noise and vibration control methods will be used, as necessary in order to ensure impacts at off-site noise sensitive locations are minimised. The best practice measures set out in BS 5228-1 and BS 5228-2 include guidance on several aspects of construction site mitigation measures, including, but not limited to:

- selection of quiet plant;
- noise control at source;
- screening;
- hours of work, and;
- liaison with the public.

Detailed comment is offered on these items in the following paragraphs. Noise control measures that will be considered include the selection of quiet plant, enclosures and screens around noise sources, limiting the hours of work and noise and vibration monitoring, where required.

RECEIVED: 18/07/2023

11.6.1.1Selection of Quiet Plant

The potential for any item of plant to generate noise will be assessed prior to the item being brought onto the site. The least noisy item will be selected wherever possible. If a particular item of plant already on the site is found to generate high noise levels, the first action will be to identify whether said item can be replaced with a quieter alternative.

11.6.1.2Noise Control at Source

If replacing a noisy item of plant is not a viable or practical option, options to noise control "at source" will be implemented. This refers to the modification of an item of plant or the application of improved sound reduction methods in consultation with the supplier. For example, resonance effects in panel work or cover plates can be reduced through stiffening or application of damping compounds; rattling and grinding noises can often be controlled by fixing resilient materials in between the surfaces in contact. Referring to the potential noise generating sources for the works under consideration, the following best practice migration measures should be implemented as needed:

- The lifting of bulky items, dropping and loading of materials will be restricted to normal working hours.
- Mobile plant will be switched off when not in use and not left idling.
- For concrete mixers, control measures will be employed during cleaning to ensure no impulsive hammering is undertaken at the mixer drum.
- For all materials handling ensure that materials are not dropped from excessive heights, lining drops chutes and dump trucks with resilient materials.
- All items of plant will be subject to regular maintenance in order to prevent unnecessary increases in plant noise and this serves to prolong the effectiveness of noise control measures.

11.6.1.3Screening

Screening is an effective method of reducing the noise level at a receiver location and can be used successfully as an additional measure to all other forms of noise control. Standard 2.4m hoarding will be provided on boundaries opposite sensitive residential receptors; in this instance at the boundary with the NSL08a and NSL08b, these being the Montessori and the Rugby Club school.

11.6.1.4Liaison with the Public

A designated environmental liaison officer will be appointed to site during construction works. Any noise complaints will be logged and followed up in a prompt fashion by the liaison officer. In addition, where a particularly noisy construction activity is planned or other works with the potential to generate high levels of noise, or where noisy works are expected to operate outside of normal working hours etc., the liaison officer will inform the nearest noise sensitive locations of the time and expected duration of the noisy works.

RECEIVED: 18/07/2023

11.6.1.5Project Programme

The phasing programme will be arranged so as to control the amount of disturbance in noise and vibration sensitive areas at times that are considered of greatest sensitivity. While high noise generating works are in progress on a site at the same time as other works of construction that themselves may generate significant noise and vibration, the working programme will be phased so as to prevent unacceptable disturbance at any time.

11.6.1.6Hours of Works

Construction works will be undertaken within the times below, taken from the Construction Environmental Management Plan:

- Monday to Friday: 07:00 to 18:00hrs
- Saturday: 08:00 to 13:00hrs
- Sunday and Public Holidays No noisy work on site.

However, it may be necessary for some construction operations to be undertaken outside these times, for example, to facilitate connections to public service systems or utilities. Such works will be agreed in advance with the local authority.

11.6.1.7Monitoring

Where required, construction noise monitoring will be undertaken at periodic sample periods at the nearest noise sensitive locations to the development works to check compliance with the construction noise criterion. Noise monitoring should be conducted in accordance with the ISO 1996.

Vibration monitoring stations should continually log vibration levels using the Peak Particle Velocity parameter (PPV, mm/s) in the X, Y and Z directions, in accordance with BS ISO 4866.

11.6.2 Operational Phase

11.6.2.1Fixed Plant at Data Centres and Energy Centre

The mitigation measures in respect of building service are as summarised here and are included in the design of the proposed development:

- Adherence to the maximum sound power levels for each item, as presented in Appendix 11.3;
- A 14 m high acoustic barrier around the energy centre, with an acoustically absorptive inner face;
- At the data centre buildings, screens around Extract Fan areas to a height of 7 m, with an acoustically absorptive inner face;
- Reverberation Time of no more than 1 s in DAHU hall, north and south, by way of application of acoustically absorptive material to ceiling;
- Acoustic treatment to include the ceiling of the plenum area over electrical room;

RECEIVED: 18/07/2023

- DAHU hall louvres on north facades (in combination with the additional acoustic treatments inside the louvre) to achieve minimum sound reduction index values as in Table 11.21 and;
- Tonal components and low-frequency components to be avoided at NSLs.

Element	Sound Reduction Index, dB at Octave Band Centre Frequency, Hz.							
	63	125	250	500	1000	2000	4000	8000
DAHU Louvre (B Buildings)	4	5	8	9	12	9	7	6
DAHU Louvre (C Buildings)	4	5	5	5	5	5	5	5

Table 11.21 Louvre Sound Reduction Index (SRI)

The effects of these mitigation measures are included in the figures presented earlier in Section 11.5.2.1.

11.6.2.2Additional Vehicular Traffic on Public Roads

During the operational phase of the development, noise mitigation measures with respect to the (outward) impact of traffic from the development are not deemed necessary.

11.7 Likely Cumulative and Interaction Impacts of the Project

11.7.1 Cumulative Impacts

11.7.1.1 Facilitation Works – GNI Gas Upgrades

Chapter 2 provides details of the GNI Gas Upgrades which are to support the first phase of the proposed development and include replacement of approximately 1.5 km of underground gas pipeline.

In respect of construction noise, the main noise-generating activities are the excavation of trenches and the generator associated with horizontal directional drilling. The construction noise effects of the GNI Upgrade works on the nearest NSLs to the principal works site are discussed in Section 11.5.1.

The cumulative effects of the principal works site and the GNI Upgrade is assessed as follows: with reference to Table 11.13, the phase within the principal works site with the highest predicted noise levels is that for the Foundations. Combining the predicted noise levels for the Foundation phase and the Gas Upgrade Networks gives the values in Table 11.21 below.

Location	Noise Level $L_{Aeq,1hr}$ for construction phase			Significance of Effect
	Foundations	GNI Upgrade Works	Cumulative Construction	
NSL01	60	49	60	Not Significant
NSL02	50	62	62	Not Significant
NSL03	65	49	65	Slight-Moderate

NSL04	60	45	60	Not Significant
NSL05	59	44	59	Not Significant
NSL06	60	40	60	Not Significant
NSL07	52	40	52	Not Significant
NSL08a	64	39	64	Slight-Moderate
NSL08b	64	40	64	Slight-Moderate
NSL09	52	37	52	Not Significant
NSL10	51	37	51	Not Significant
NSL11	39	34	40	Not Significant
NSL12a/b/c	36	33	38	Not Significant
NSL13	51	37	51	Not Significant
NSL14	52	40	52	Not Significant
NSL15	50	42	51	Not Significant

RECEIVED 28/07/2023

Table 11.22 Cumulative construction noise for Principal Works and GNI Upgrade works.

Cumulative construction noise levels remain below the criterion of 65 dB L_{Aeq} and therefore the effect is considered to be negative, not significant to moderate and short-term.

In respect NSLs along the GNI Upgrade works route, the construction noise from the GNI works will dominate and due to the distance to the principal works site, there no cumulative construction noise effect is expected.

11.7.1.2Facilitation Works – Eirgrid Uprating

Similarly, Chapter 2 provides details of the uprating of existing lines proposed as part of the Facilitation Works. These works involve replacing the overhead electric cables, retaining the existing pylons, therefore no new foundation works or concrete pouring are envisaged. Consequently, the noise generated during these works will be minimal and will progress along the route. These works are not expected to give rise to significant cumulative noise or vibration effects.

11.7.1.3Other Developments

A list of developments for assessment of potential cumulative impacts was prepared by Tom Phillips and Associates. Their locations in relation to the proposed development is shown in **Figure 11.4**.

In respect of noise, the following comments are made:

- 300606 refers to a housing development currently under construction. It is included in the assessment of the proposed development as NSL15; As a residential development, no significant noise effects will be generated and therefore significant cumulative noise effects are likely.
- 19998 refers to works at the Canoe Club along the river front, where predicted noise levels due to the proposed development are of the order of 44 dB L_{Aeq}. No significant noise effects will be generated and therefore significant cumulative noise effects are likely.
- 22/1096 refers to four small 20kV electrical substation buildings; a noise assessment was submitted as a Further Information response for that application. The assessment concluded that noise from these substations would be inaudible at noise-sensitive locations, therefore no significant cumulative noise effects are likely.

RECEIVED: 18/07/2023

- 23/513 Refers to a Large-Scale Residential Development (LRD) at a site of c. 14.3 hectares to the north of the M4 and the east of the R404. NSL02 in this assessment is located closer to the proposed project than the LRD site therefore any impacts on LRD have been taken into account. As the LRD itself is a residential development, no significant noise effects will be generated and therefore significant cumulative noise effects are likely. This development has been taken account of in Chapter 13 (Traffic) at section 13.17.1.
- 21/730 for development of the construction of a new vehicle access to the rugby club. As mentioned in chapter 3, this proposal "has been incorporated into the design of the subject project where the red lines overlap. Interactions between both projects are not likely to result in significant impacts." As this development does not generate significant noise no significant cumulative noise effects are likely.
- Regeneration of the Wonderful Barn lands is a Kildare County Council project which is at an early stage in the design. As this development does not generate significant noise, no significant cumulative noise effects are likely.

By their nature, neither of these developments is expected to generate noise or vibration which could give rise to a significant cumulative effect.

All other developments are at sufficient distance so as not to give rise to cumulative noise or vibration impacts with the proposed development.



Figure 11.4 Other planning applications for assessment of potential cumulative impact

11.7.2 Interaction Impacts

Noise and Vibration Effects interact with Traffic and Transport Effects; assessment of the noise effects noise of construction traffic is included in Section 11.5.1.1 and operational traffic are included in Section 11.5.2.2.

RECEIVED: 18/07/2023

11.8 Mitigation Measures and Monitoring of Cumulative and Interaction Impacts

11.8.1 Construction Phase

Not applicable, as no significant cumulative construction impacts are likely.

11.8.2 Operational Phase

Not applicable as no significant cumulative operational impacts are likely.

11.9 Major Accidents and/or Disasters

The likelihood of a significant adverse noise or vibration impact on the environment as a result of a major accident or natural disaster is extremely unlikely and would have minor consequences for both human health and environmental effects.

11.10 Mitigation Measures and Proposed Response to such Emergencies

Not applicable.

11.11 Residual Impacts

11.11.1 Construction Phase

The construction noise assessment has shown that in accordance with the 'significance' thresholds presented in the BS 5228-1 there is not a significant impact at noise-sensitive locations in terms of ambient noise levels subject to appropriate management of the issues on the site as presented in Section 11.6.1.

11.11.2 Operational Phase

The robust operational noise assessment of fixed plant associated with the proposed development has shown that there will be a negative, not significant to moderate, long-term effect at the NSLs identified on Figure 11.2. Ambient noise levels are and will continue to be dictated by road traffic noise in the area while a low level of plant noise is expected to be audible during lulls in other sources (e.g. distant traffic noise).

It is reiterated that the predictions presented here assume that day to day plant is operating at full/high duty which is a conservative assumption. This is extremely unlikely to occur, and more likely to operate less than c.1500 hours per year, however given the uncertainty in relation to the hours Eirgrid will require for operation the energy centre the worst-case scenario (i.e. all plant running 24/7) has been assessed. In all likelihood, the actual noise levels for the majority of the time will be lower than those presented here. The noise effect is negative, not significant to moderate and short-term.

RECEIVED: 18/07/2023

GNI Upgrade Works

The impact assessment of the GNI Upgrade works on NSLs along the pipeline route is negative, slight to significant and temporary.

Construction Traffic

The operational noise assessment of vehicle movements associated with the site has shown that in accordance with the scale in the EPA EIA Report Guidelines 2022 there will be an imperceptible impact off site noise sensitive locations considering existing traffic volumes on the local road network. See Chapter 13 Traffic and Transportation for the traffic impact assessment.

11.12 Difficulties Encountered

No difficulties were encountered in the preparation of this chapter.

11.13 References

Guidance documents used in the preparation of this Chapter are listed in Section 11.3

12.0 MATERIAL ASSETS – WASTE MANAGEMENT

RECEIVED: 18/07/2023

12.1 Introduction

This chapter evaluates the likely significant effects, if any, which the proposed development and facilitating works may have on Material Assets – Waste as defined in the EIA Directive (Directive 2011/92/EU as amended by Directive 2014/52/EU), the EPA EIA Report Guidelines 2022 and EPA Draft Advice Notes for EIS 2015.

This chapter was completed by Chonaill Bradley. Chonaill Bradley is a Principal Environmental Consultant in the Environment Team at AWN. He holds a BSc in Environmental Science and is currently undertaking a Postgraduate Diploma, Circular Economy Leadership for the Build environment. He is an Associate Member of the Institute of Waste Management (CIWM). Chonaill has over eight years' experience in the environmental consultancy sector.

This chapter has also been prepared to address the issues associated with material assets - waste during the construction and operational phases of the proposed development and facilitating works as described in Chapter 2.

A site-specific Resource Waste Management Plan (RWMP) has been prepared by AWN Consulting Ltd to deal with waste generation during the demolition, excavation and construction phases of the proposed development and facilitating works has been included as Appendix 12.1. The RWMP was prepared in accordance with the Environmental Protection Agency's (EPA) document 'Best Practice Guidelines for the Preparation of Resource and Waste Management Plans for Construction & Demolition Projects' (2021).

The Chapter has been prepared in accordance with European Commissions Guidelines, Guidance on the preparation of the Environmental Impact Assessment Report (2017), the EPA Guidelines on the Information to be contained in EIAR (2022) and the EU Commission Notice on changes and extensions to projects, (2021).

These documents listed above will ensure the management of wastes arising during the construction and operational phases of this proposed project is undertaken in accordance with legislative requirements and best practice standards.

12.2 Project Description

The project is an integrated masterplan proposal that includes for the expansion of the existing campus, allowing for a mix of Deep Tech, ICT and Innovation uses. The proposal will include for the demolition of some of the existing buildings on site and construction of new buildings, an energy centre and replacement substation. The proposal will include significant public infrastructure including a new signalised intersection on Celbridge Road (R404), a new Public Link Road through the campus (between Barnhall Road and the new signalised intersection), a pedestrian/cycle overpass of the M4, pedestrian and cycle links through the site and along the designated protected view corridor and supporting infrastructure. The project to which this EIAR relates also includes facilitation works which comprise uprating of existing 110kV power lines to the site and the enhancement of the local gas network to the site. The facilitation works which are included in the project do not form part of the development for which consent is sought. Future consents for the facilitation works will be

required through EirGrid and GNI. A detailed description of the project is outlined in Chapter 2 of this EIAR.

RECEIVED: 28/07/2023

The development site which is subject to the application for consent measures c. 72.23 ha and is principally bounded by: the M4 Motorway to the north; Cellbridge Road to the east; Barnhall Rugby Football Club to the south; and by grounds associated with Castletown House to the west.

The site comprises the existing Kildare Innovation Campus, which was formerly the Hewlett Packard Campus originally permitted in 1995 under KCC Reg. Ref 95923. The development site also encompasses lands with the jurisdiction of Kildare County Council (KCC).

Refer to Chapter 2 and 3 for a more detailed description of the site's location and context.

12.3 Methodology

The assessment of the impacts of the proposed development, arising from the consumption of resources and the generation of waste materials, was carried out taking into account the methodology specified in relevant guidance documents, along with an extensive document review to assist in identifying current and future requirements for waste management; including national and regional waste policy, waste strategies, management plans, legislative requirements and relevant reports.

This Chapter is based on the proposed development, as described in Chapter 2 (Description of the Proposed Development) and considers the following aspects:

Legislative context;

- Construction phase (including demolition/renovation, site preparation and excavation); and
- Operational phase.

A desktop study was carried out which included the following:

- Review of applicable policy and legislation which creates the legal framework for resource and waste management in Ireland;
- Description of the typical waste materials that will be generated during the Construction and Operational phases; and
- Identification of mitigation measures to prevent waste generation and promote management of waste in accordance with the waste hierarchy.

Estimates of waste generation during the construction and operational phases of the proposed development have been calculated and are included in section 12.4 of this chapter. The waste types and estimated quantities are based on published data by the EPA in the National Waste Reports and National Waste Statistics, data recorded from Irish and US EPA waste generation research as well as other available research sources.

Mitigation measures are proposed to minimise the effect of the proposed development on the environment during the construction and operational phases, to promote efficient waste

segregation and to reduce the quantity of waste requiring disposal. This information is presented in Section 12.6
A detailed review of the existing ground conditions on a regional, local and site-specific scale are presented in Chapter 7 of this EIAR (Land, Soils, Geology and Hydrogeology).

RECEIVED: 18/07/2023

12.3.1 Legislation and Guidance

Waste management in Ireland is subject to EU, national and regional waste legislation and control, which defines how waste materials must be managed, transported and treated. The overarching EU legislation is the Waste Framework Directive (2008/98/EC) which is transposed into national legislation in Ireland. The cornerstone of Irish waste legislation is the Waste Management Act 1996 (as amended). European and national waste management policy is based on the concept of 'waste hierarchy', which sets out an order of preference for managing waste (prevention > preparing for reuse > recycling > recovery > disposal) (Figure 12.1).



Figure 12.1 Waste Hierarchy (Source: European Commission).

EU and Irish National waste policy also aims to contribute to the circular economy by extracting high-quality resources from waste as much as possible. Circular Economy (CE) is a sustainable alternative to the traditional linear (take-make-dispose) economic model, reducing waste to a minimum by reusing, repairing, refurbishing and recycling existing materials and products. (Figure 12.2).



RECEIVED: 18/07/2023

Figure 12.2 Circular Economy (Source: Repak).

The Irish government issues policy documents which outline measures to improve waste management practices in Ireland and help the country to achieve EU targets in respect of recycling and disposal of waste. The most recent policy document, Waste Action Plan for a Circular Economy (WAPACE) – Waste Management Policy in Ireland, was published in 2020 and shifts focus away from waste disposal and moves it back up the production chain. The move away from targeting national waste targets is due to the Irish and international waste context changing in the years since the launch of the previous waste management plan, A Resource Opportunity, in 2012.

One of the first actions to be taken from the WAPCE was the development of the Whole of Government Circular Economy Strategy 2022-2023 'Living More, using Less' (2021) to set a course for Ireland to transition across all sectors and at all levels of Government toward circularity and was issued in December 2021.

The Circular Economy and Miscellaneous Provisions Act 2022 was signed into law in July 2022. The Act underpins Ireland's shift from a "take-make-waste" linear model to a more sustainable pattern of production and consumption, that retains the value of resources in our economy for as long as possible and that will significantly reduce our greenhouse gas emissions. The Act defines Circular Economy for the first time in Irish law, incentivises the use of recycled and reusable alternatives to wasteful, single-use disposable packaging, introduces a mandatory segregation and incentivised charging regime for commercial waste, streamlines the national processes for End-of-Waste and By-Products decisions.

The strategy for the management of waste from the construction phase is in line with the requirements of the EPA's 'Best Practice Guidelines for the Preparation of Resource and Waste Management Plans for Construction & Demolition Projects' (2021). The guidance documents, Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects and Construction and Demolition Waste Management: A Handbook for Contractors and Site Managers (FÁS & Construction Industry Federation, 2002), were also consulted in the preparation of this assessment.

There are currently no Irish national guidelines on the assessment of operational waste generation, and guidance is taken from industry guidelines, plans and reports including the

Eastern Midlands Region (EMR) Waste Management Plan 2015 – 2021, Regional Waste Management Planning Offices, Draft National Waste Management Plan for a Circular Economy (2023),BS 5906:2005 Waste Management in Buildings – Code of Practice, the Kildare County Council (KCC) Waste Management (Segregation, Storage and Presentation of Household & Commercial Waste) Bye-Laws (2018), the EPA National Waste Database Reports 1998 – 2020 and the EPA National Waste Statistics Web Resource.

RECEIVED:28/07/2023

12.3.2 Terminology

Note that the terminology used herein is consistent with the definitions set out in Article 3 of the Waste Framework Directive. Key terms are defined as follows:

Waste - Any substance or object which the holder discards or intends or is required to discard.

Prevention - Measures taken before a substance, material or product has become waste, that reduce:

a) the quantity of waste, including through the re-use of products or the extension of the life span of products;

b) the adverse impacts of the generated waste on the environment and human health; or

c) the content of harmful substances in materials and products.

Reuse - Any operation by which products or components that are not waste are used again for the same purpose for which they were conceived.

Preparing for Reuse - Checking, cleaning or repairing recovery operations, by which products or components of products that have become waste are prepared so that they can be re-used without any other pre-processing.

Treatment - Recovery or disposal operations, including preparation prior to recovery or disposal.

Recovery - Any operation the principal result of which is waste serving a useful purpose by replacing other materials which would otherwise have been used to fulfil a particular function, or waste being prepared to fulfil that function, in the plant or in the wider economy. Annex II of the Waste Framework Directive sets out a non-exhaustive list of recovery operations.

Recycling - Any recovery operation by which waste materials are reprocessed into products, materials or substances whether for the original or other purposes. It includes the reprocessing of organic material but does not include energy recovery and the reprocessing into materials that are to be used as fuels or for backfilling operations.

Disposal - Any operation which is not recovery even where the operation has as a secondary consequence the reclamation of substances or energy. Annex I of the Waste Framework Directive sets out a non-exhaustive list of disposal operations.

.

RECEIVED: 18/07/2023

12.4 Baseline Scenario/Future Receiving Environment Analysis

12.4.1 Current State of the Environment (Baseline Scenario)

The project is an integrated masterplan proposal that includes for the expansion of the existing campus, allowing for a mix of Deep Tech, ICT and Innovation uses.

Operational Waste is currently produced and managed onsite from similar type operations. The proposed project will lead to an increase in waste produced at this proposed project site and waste will continue to be managed in line with national and local waste legislation and guidelines as covered in section 12.3.1.

A full description of the proposed development can be found in Chapter 2. The characteristics of the proposed development that are relevant in terms of waste management are summarised below.

12.4.2 Demolition

There will be waste materials generated from the demolition (Buildings No's 7, 8 and 9 and renovation (Building No's 1-6) of the existing buildings and hardstanding areas on site to accommodate the new development and facilitation works.

Further detail on the waste materials likely to be generated during the demolition works are presented in the project-specific RWMP in Appendix 12.1. The RWMP provides an estimate of the main waste types likely to be generated during the C&D phase of the proposed Development. The reuse, recycling / recovery and disposal rates have been estimated using the EPA National Waste Reports and the developments targeted recycling and reuse rates. The quantities of waste material have been supplied by the project architects (Scott Tallon Walker) are summarised in Table 12.1.

Waste Type	Tonnes	Reuse		Recycle / Recovery		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Glass	2286.8	0	0.0	85	1943.8	15	343.0
Concrete, Bricks, Tiles, Ceramics	12958.8	30	3887.6	65	8423.2	5	647.9
Plasterboard	1016.4	0	0.0	80	813.1	20	203.3
Asphalts	254.1	0	0.0	25	63.5	75	190.6
Metals	3811.4	5	190.6	80	3049.1	15	571.7
Slate	0.0	0	0.0	85	0.0	15	0.0
Timber	3049.1	10	304.9	40	1219.7	50	1524.6
Asbestos	1.0	0	0.0	0	0.0	0	1.0
Total	**23377.6**		**4383.1**		**15512.4**		**3482.1**

Table 12.1: Estimated off-site Reuse, Recycle and Disposal Rates for Demolition Waste

12.4.3 Construction

RECEIVED: 18/07/2023

During the construction phase of the proposed development and facilitating works, waste will be produced from surplus materials such as broken or off-cuts of timber, plasterboard, concrete, tiles, bricks, etc. Waste from packaging (cardboard, plastic, timber) and oversupply of materials may also be generated. The appointed Contractor will be contractually required to ensure that oversupply of materials is kept to a minimum and opportunities for reuse of suitable materials is maximised.

It is predicted that 115,117m3 of the cut material generated during site preparation/levelling (365,750 m3) will be reused to facilitate construction of the proposed roads, carparks, buildings and landscaping berms. It is estimated c.250,634m3 will be exported off the site and disposed of in accordance with relevant requirements. No fill will be required to be imported to the site to accommodate the development material that needs to be removed offsite due to the limited opportunities for reuse on site, will be taken for appropriate offsite reuse, recovery, recycling and / or disposal.

The facilitating works from the Gas Networks Ireland (GNI) upgrades will involve c. 754.55m3 of material excavated along the length of the line. It is estimated c.60% may be re-used, leaving 301.82m3 that will be removed offsite for appropriate reuse, recycling or disposal.

If any material that requires removal from the site is deemed to be a waste, removal and reuse / recycling / recovery / disposal of the material will be carried out in accordance with the Waste Management Act 1996 (as amended), the Waste Management (Collection Permit) Regulations 2007 (as amended) and the Waste Management (Facility Permit & Registration) Regulations 2007 (as amended). The volume of waste requiring recovery / disposal will dictate whether a Certificate of Registration (COR), permit or licence is required for the receiving facility. Alternatively, the material may be classed as by-product under Regulation 27 (By-products), as amended, of S.I. No. 323/2020 - European Union (Waste Directive) Regulations 2011-2020, (Previously Article 27 of the European Communities (Waste Directive). For more information in relation to the envisaged management of by-products, refer to the RWMP (Appendix 12.1).

In order to establish the appropriate reuse, recovery and / or disposal route for the soils and stones to be removed off-site, it will first need to be classified. Waste material will initially need to be classified as hazardous or non-hazardous in accordance with the EPA publication *Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous* (2019). Environmental soil analysis will be carried out prior to removal of the material on a number of the soil samples in accordance with the requirements for acceptance of waste at landfills (Council Decision 2003/33/EC Waste Acceptance Criteria). This legislation sets limit values on landfills for acceptance of waste material based on properties of the waste, including potential pollutant concentrations and leachability. Any surplus excavated material will be suitable for acceptance at either inert or non-hazardous soil recovery facilities / landfills in Ireland or, in the event of hazardous material being encountered, be transported for treatment / recovery or exported abroad for disposal in suitable facilities.

Waste will also be generated from construction phase workers e.g. organic / food waste, dry mixed recyclables (waste paper, newspaper, plastic bottles, packaging, aluminium cans, tins and Tetra Pak cartons), mixed non-recyclables and, potentially, sewage sludge from temporary welfare facilities provided on-site during the Construction phase. Waste printer / toner cartridges, waste electrical and electronic equipment (WEEE) and waste batteries may also be generated in small volumes from site offices.

RECEIVED: 18/07/2023

Further detail on the waste materials likely to be generated during the excavation and construction works are presented in the project-specific RWMP (Appendix 12.1). The RWMP provides an estimate of the main waste types likely to be generated during the Construction phase of the proposed development. These are summarised in Table 12.2.

Waste Type	Tonnes	Reuse		Recycle / Recovery		Disposal	
		%	Tonnes	%	Tonnes	%	Tonnes
Mixed C&D	1979.5	10	197.9	80	1583.6	10	197.9
Timber	1679.5	40	671.8	55	923.8	5	84.0
Plasterboard	599.8	30	180.0	60	359.9	10	60.0
Metals	479.9	5	24.0	90	431.9	5	24.0
Concrete	359.9	30	108.0	65	233.9	5	18.0
Other	899.8	20	180.0	60	539.9	20	180.0
Total	**5998.4**		**1361.6**		**4072.9**		**563.8**

Table 12.2: Predicted on and off-site reuse, recycle and disposal rates for construction waste

12.4.4 Operation

Following construction, it is anticipated the operational phase of the development will generate a range of mostly non-hazardous wastes with some hazardous wastes (mostly at the energy centre for maintenance etc.).

An Operational Waste Management Plan (OWMP) will be developed prior to commencement. The plan will seek to ensure the facility contributes to the targets outlined in the EMR Waste Management Plan 2015 – 2021. The EMR and other regional waste management plans are due to revised and a draft version of the new plan is expected to be released by the regional waste management offices in 2023. Mitigation measures proposed to manage impacts arising from wastes generated during the operation of the Proposed Development are summarised in Section 12.6 below.

All waste materials will be segregated into appropriate categories and will be stored in appropriate bins or other suitable receptacles in a designated, easily accessible areas of the site.

The main hazardous and non-hazardous waste expected to be generated form the operational phase of the Proposed Development are summarised below:

Non-Hazardous Waste

Non-hazardous waste which is expected to be produced at the site includes:

- Packaging waste
- General non-hazardous waste
- Non-hazardous WEEE
- Canteen/ Kitchen waste
- Landscaping waste
- Non-hazardous Lightbulbs

It should be noted that it will generate no more than any similar industrial facility and the area is well serviced by local waste management contractors. All wastes be managed through the permitted/licenced waste contractors and in accordance with best practice and all EU and Irish waste management legislation.

RECEIVED: 18/07/2023

Hazardous Wastes

Hazardous waste which is expected to be produced at the site includes:

- Hazardous WEEE and lightbulbs;
- Waste filters, lube oil and other spares;
- Waste batteries; and
- Waste sludge from the petrol interceptors which will be pumped out/removed as required by a suitably permitted/licenced contractor

The above types of hazardous wastes would be expected from any industrial facility. All waste be managed through the permitted/licenced waste contractors and in accordance with best practice and all EU and Irish waste management legislation.

Table 12.3 below summarises the anticipated management strategy to be used for typical wastes to be generated at the site.

Waste Name	Hazard Y/N	On-site Storage/Treatment Method (anticipated)	Method of Treatment or disposal	Quantity
Mixed Dry Recyclables (Packaging Waste)	N	Segregated bins/skips	Recycle	3.84 tonnes / per week
Plastic and Cardboard (Baled)	N	Bailer onsite	Recycle	8.26 tonnes / per week
General Non-Hazardous Waste Office/Canteen / Kitchen Waste	N	Segregated bins for contaminated or non-recyclable waste, plastics, cardboard, general waste	Recycle/Recovery Disposal of other general waste to landfill	4.82 tonnes / per week
Organic Waste	N	Compost Recycling Bins	Onsite compost bins (Offsite Composting)	1.47 tonnes / per week
Glass	N	Glass Recycling Bin	Recycle Bins	32kg / per month
Polystyrene	N	Segregated Receptacle	Off-site recovery	720kg per month
Non-Haz and Haz WEEE	Both Non-Haz and Haz	Segregated bins for waste electric and electronic equipment (WEEE)	Off-site recovery	3 no. WEEE Roll Cage (combined) 1 cage every 2 months
Landscaping waste	N	Compost waste bins	Onsite compost bins (Offsite Composting)	30kg / per month
Cleaning Products / Solvents	N	Bunded Storage	Off-site recovery	3 litres / per month
Lightbulbs	N	Specialised container in waste storage area	Off-site recovery	1 no. WEEE Roll Cage (combined)

				1 cage every 2 months
Waste Oil, Filters & Spares	Y	Oil drum in external waste storage area	Off-site recovery	3 Drums every 2 months
(Wet) Batteries	Y	Specialised container in waste storage area	Return to supplier	1 no. WEEE Roll Cage (combined) 1 cage every 2 months
(Dry) Batteries	Y	Specialised container in waste storage area	Off-site recovery	1 no. WEEE Roll Cage (combined) 1 cage every 2 months

RECEIVED: 18/07/2023

Table 12.3 Proposed Waste Management Strategy

All waste receptacles stored on site are collected from within the developments redline boundary by the permitted waste contractor and taken to registered, permitted and/or licensed facilities. No waste collection of operational waste occurs outside of the development's ownership.

12.4.5 Likely Future Receiving Environment ('Do Nothing' Scenario)

If the proposed development was not to go ahead (i.e. in the Do-Nothing scenario) there would be no demolition, excavation or construction at this site. Current or operational waste would continue to be generated at the same levels. There would, therefore, be a neutral effect on the environment in terms of waste.

The site is zoned for development, and it is likely that in the absence of this subject proposal that a development of a similar nature would be progressed on the site that accords with national and regional policies and therefore the likely significant effects would be similar to this proposal.

12.5 Likely Impacts of the Project

This section details the potential waste effects associated with the proposed development.

12.5.1 Construction Phase

The proposed Development and facilitating works will generate a range of non-hazardous and hazardous waste materials during site demolition, excavation and construction (see appendix 12.1 for further detail). General housekeeping and packaging will also generate waste materials, as well as typical municipal wastes generated by construction employees, including food waste. Waste materials will be required to be temporarily stored in the construction site compound or adjacent to it, on-site pending collection by a waste contractor. If waste material is not managed and stored correctly, it is likely to lead to litter or pollution issues at the Development Site and in adjacent areas. The indirect effect of litter issues is the presence of

RECEIVED: 19/07/2023

vermin in areas affected. In the absence of mitigation, the effect on the local and regional environment is likely to be **indirect, *short-term, significant*** and ***negative***.

The use of non-permitted waste contractors or unauthorised waste facilities could give rise to inappropriate management of waste, resulting in indirect negative environmental impacts, including pollution. It is essential that all waste materials are dealt with in accordance with regional and national legislation, as outlined previously, and that time and resources are dedicated to ensuring efficient waste management practices. In the absence of mitigation, the effect on the local and regional environment is likely to be **indirect, *long-term, significant*** and ***negative***.

Wastes arising will need to be taken to suitably registered / permitted / licenced waste facilities for processing and segregation, reuse, recycling, recovery, and / or disposal, as appropriate. There are numerous licensed waste facilities in the EMR which can accept hazardous and non-hazardous waste materials, and acceptance of waste from the proposed project would be in line with daily activities at these facilities. At present, there is sufficient capacity for the acceptance of the likely C&D waste arisings at facilities in the region. The majority of construction materials are either recyclable or recoverable. However, in the absence of mitigation, the effect on the local and regional environment is likely to be **indirect, *short-term, significant*** and ***negative***.

There is a quantity of excavated material which will need to be excavated to facilitate the proposed development. A detailed review of the existing ground conditions on a regional, local site-specific scale are presented in Chapter 7. It is anticipated that c. c.250,634m^3 of excavated material will need to be removed off-site and a further 452.73m^3 will be required to be removed as part of the GNI works. Correct classification and segregation of the excavated material is required to ensure that any potentially contaminated materials are identified and handled in a way that will not impact negatively on workers as well as on water and soil environments, both on and off-site. However, in the absence of mitigation, the effect on the local and regional environment is likely to be **indirect, *short-term, significant*** and ***negative***.

12.5.2 Operational Phase

The potential impacts on the environment of improper, or a lack of, waste management during the operational phase would be a diversion from the priorities of the waste hierarchy which would lead to small volumes of waste being sent unnecessarily to landfill. In the absence of mitigation, the effect on the local and regional environment is likely to be **indirect, *long-term, significant*** and ***negative***.

The nature of the development means the generation of waste materials during the operational phase is unavoidable. Networks of waste collection, treatment, recovery and disposal infrastructure are in place in the region to manage waste efficiently from this type of development. Waste which is not suitable for recycling can be sent for energy recovery. There are also facilities in the region for segregation of municipal recyclables which is typically exported for conversion in recycled products (e.g. paper mills and glass recycling).

If waste material is not managed and stored correctly, it is likely to lead to litter or pollution issues at the development site and in adjacent areas. The knock-on effect of litter issues is the presence of vermin in affected areas. However, in the absence of mitigation, the effect on the local and regional environment is likely to be **indirect, *short-term, significant*** and ***negative.***

RECEIVED: 18/07/2023

Waste contractors will be required to service the proposed development on a scheduled basis to remove waste. The use of non-permitted waste contractors or unauthorised facilities could give rise to inappropriate management of waste and result in negative environmental impacts or pollution. It is essential that all waste materials are dealt with in accordance with regional and national legislation, as outlined previously, and that time and resources are dedicated to ensuring efficient waste management practices. However, in the absence of mitigation, the effect on the local and regional environment is likely to be **indirect, *long-term, significant*** and ***negative.***

12.6 Mitigation Measures and Monitoring of Impacts

This section outlines the measures that will be employed in order to reduce the amount of waste produced, manage the wastes generated responsibly and handle the waste in such a manner as to minimise the effects on the environment.

The concept of the 'waste hierarchy' is employed when considering all mitigation measures. The waste hierarchy states that the preferred option for waste management is prevention and minimisation of waste, followed by preparing for reuse and recycling / recovery, energy recovery (i.e. incineration) and, least favoured of all, disposal.

12.6.1 Construction Phase

As previously stated, a project specific RWMP has been prepared in line with the requirements of the requirements of The EPA, *Best Practice Guidelines for the Preparation of Resource and Waste Management Plans for Construction & Demolition Projects' (2021)* and is included as Appendix 12.1. The mitigation measures outlined in the RWMP will be implemented in full and form part of the mitigation strategy for the site. The mitigation measures presented in this RWMP will ensure effective waste management and minimisation, reuse, recycling, recovery and disposal of waste material generated during the excavation and construction phases of the proposed development.

- Prior to commencement, the appointed Contractor(s) will be required to refine / update the RWMP (Appendix 12.1) in agreement with KCC and in compliance with any planning conditions, or submit an addendum to the RWMP to KCC, detailing specific measures to minimise waste generation and resource consumption, and provide details of the proposed waste contractors and destinations of each waste stream.

- The Contractor will implement the RWMP throughout the duration of the proposed excavation and construction phases.

A quantity of topsoil and sub soil will need to be excavated to facilitate the proposed development. The project engineers have estimated that c.250,634m3of material from site preparation / levelling will need to be removed off-site. Correct classification and segregation of the excavated material is required to ensure that any potentially contaminated materials

are identified and handled in a way that will not impact negatively on workers as well as on water and soil environments, both on and off-site.

RECEIVED: 18/07/2023

In addition, the following mitigation measures will be implemented:

- Building materials will be chosen to 'design out waste';
- On-site segregation of waste materials will be carried out to increase opportunities for off-site reuse, recycling and recovery. The following waste types, at a minimum, will be segregated:
    - Concrete rubble (including ceramics, tiles and bricks);
    - Plasterboard;
    - Metals;
    - Glass; and
    - Timber.

- Left over materials (e.g. timber off-cuts, broken concrete blocks / bricks) and any suitable construction materials shall be re-used on-site, where possible; (alternatively, the waste will be sorted for recycling, recovery or disposal);
- All waste materials will be stored in skips or other suitable receptacles in designated areas of the site;
- Any hazardous wastes generated (such as chemicals, solvents, glues, fuels, oils) will also be segregated and will be stored in appropriate receptacles (in suitably bunded areas, where required);
- A Resource Manager will be appointed by the main Contractor(s) to ensure effective management of waste during the excavation and construction works;
- All construction staff will be provided with training regarding the waste management procedures;
- All waste leaving site will be reused, recycled or recovered, where possible, to avoid material designated for disposal;
- All waste leaving the site will be transported by suitably permitted contractors and taken to suitably registered, permitted or licenced facilities; and
- All waste leaving the site will be recorded and copies of relevant documentation maintained.
- Nearby sites requiring clean fill material will be contacted to investigate reuse opportunities for clean and inert material, if required. If any of the material is to be reused on another site as by-product (and not as a waste), this will be done in accordance with Regulation 27 of the EC (Waste Directive) Regulations (2011-2020). EPA approval will be obtained prior to moving material as a by-product.

These mitigation measures will ensure that the waste arising from the construction phase of the proposed development and facilitation works is dealt with in compliance with the provisions of the Waste Management Act 1996, as amended, associated Regulations and the Litter Pollution Act 1997, and the EMR Waste Management Plan 2015 – 2021. It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved and will promote more sustainable consumption of resources.

12.6.2 Operational Phase

The following mitigation measures will be implemented during the operational phase of the proposed development:

RECEIVED: 18/07/2023

- All waste materials will be segregated into appropriate categories and will be temporarily stored in appropriate bins, skips or other suitable receptacles in a designated, easily accessible areas of the site.
- The Operator / Buildings Manager of the Site during the operational phase will be responsible for ensuring – allocating personnel and resources, as needed – for the production, updating and implementation of an Operational Waste Management Strategy, ensuring a high level of recycling, reuse and recovery at the Site of the proposed Development.
- The Operator / Buildings Manager will regularly audit the onsite waste storage facilities and infrastructure, and maintain a full paper trail of waste documentation for all waste movements from the site.
- The following mitigation measures will be implemented:
- The Operator will ensure on-site segregation of all waste materials into appropriate categories, including (but not limited to):
    - Packaging Waste
    - General Non-Hazardous Waste
    - Mixed Dry Recycling
    - General Non-Hazardous Waste
    - Organic
    - Glass
    - Non-Haz and Haz WEEE
    - Landscaping waste
    - Lightbulbs
    - Waste Oil
    - (Wet) Batteries
    - (Dry) Batteries.

- The Operator will ensure that all waste materials will be stored in colour coded bins or other suitable receptacles in designated, easily accessible locations. Bins will be clearly identified with the approved waste type to ensure there is no cross contamination of waste materials;
- The Operator will ensure that all waste collected from the Site of the proposed development will be reused, recycled or recovered, where possible, with the exception of those waste streams where appropriate facilities are currently not available; and
- The Operator will ensure that all waste leaving the Site will be transported by suitable permitted contractors and taken to suitably registered, permitted or licensed facilities.

These mitigation measures will ensure the waste arising from the proposed project is dealt with in compliance with the provisions of the *Waste Management Act 1996*, as amended, associated Regulations, the *Litter Pollution Act 1997*, the *EMR Waste Management Plan (2015 - 2021)* and the KCC waste bye-laws. It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved.

12.7 Likely Cumulative and Interaction Impacts of the Project

As has been identified in the receiving environment section all cumulative developments that are already built and in operation contribute to our characterisation of the baseline environment. As such any further environmental impacts that the proposed development may

have in addition to these already constructed and operational cumulative developments has been assessed in the preceding sections of this chapter.

RECEIVED: 18/07/2023

12.7.1 Construction Phase

Further environmental impacts that the proposed development may have in addition to already constructed, operational and approved but not yet constructed cumulative developments have been assessed in the preceding sections of this chapter.

There are multiple permissions remaining in place in the area. In a worst-case scenario, multiple developments in the area could be developed concurrently or overlap in the construction phase.

Developments that have been assessed and could potentially overlap during the construction phase of the proposed development and facilition works can be found in Appendix 1.1, along with descriptions.

Due to the high number of waste contractors in the Kildare region and Ireland there would be sufficient contractors available to handle waste generated from many these sites simultaneously, if required. The National Waste Collection Permit Office can be contacted to obtain a list of waste contractors and waste collection permit details. Similar waste materials would be generated by all the developments.

Other developments in the area will be required to manage waste in compliance with national and local legislation, policies and plans which will mitigate against any potential cumulative effects associated with waste generation and waste management. As such the effect will be **short-term, not significant and neutral.**

12.7.2 Operational Phase

There are existing residential and commercial developments close by, along with the multiple permissions remaining in place. All of the current and potential developments will generate similar waste types during their operational phases. Authorised waste contractors will be required to collect waste materials segregated, at a minimum, into recyclables, organic waste and non-recyclables. An increased density of development in the area is likely improve the efficiencies of waste collections in the area.

Other developments in the area, and the indicative future masterplan development, will be required to manage waste in compliance with national and local legislation, policies and plans which will minimise/mitigate any potential cumulative impacts associated with waste generation and waste management. As such the effect will be a **long-term, imperceptible and neutral.**

12.8 Mitigation Measures and Monitoring of Cumulative and Interaction Impacts

The implementation of the mitigation measures outlined in Section 12.6 will ensure that targeted rates of reuse, recovery and recycling are achieved at the site of the Proposed Development during the construction and operational phases. It will also ensure that European, National and Regional legislative waste requirements with regard to waste are met and that associated targets for the management of waste are achieved.

12.8.1 Construction Phase

RECEIVED: 18/07/2023

A carefully planned approach to waste management as set out in Section 12.6.1 and adherence to the RWMP (which include mitigation) (Appendix 12.1) during the construction phase will ensure that the predicted effect on the environment will be ***short-term, imperceptible*** **and** ***neutral*****.**

12.8.2 Operational Phase

During the operational phase, a structured approach to waste management as set out in Section 12.6.2 will promote resource efficiency and waste minimisation. Provided the mitigation measures are implemented and a high rate of reuse, recycling and recovery is achieved, the predicted impact of the operational phase on the environment will be **long-term, imperceptible** and **neutral**.

12.9 Major Accidents and/or Disasters

There is no Risk of Major Accidents or Disasters related to Material Assets Waste and the proposed development.

12.10 Residual Impacts

The implementation of the mitigation measures outlined in Section 12.6 will ensure that high rates of reuse, recovery and recycling are achieved at the Site of the proposed development during the construction and operational phases. It will also ensure that European, National and Regional legislative waste requirements with regard to waste are met and that associated targets for the management of waste are achieved.

12.11 Difficulties Encountered

Until final materials and detailed construction methodologies have been confirmed, it is difficult to predict with a high level of accuracy the construction waste that will be generated from the proposed works as the exact materials and quantities may be subject to some degree of change and variation during the construction process.

There is a number of licensed, permitted and registered waste facilities in the Kildare and EMR regions and across Ireland and Northern Ireland. However, these sites may not be available for use when required or may be limited by the waste contractor selected to service the development in the appropriate phase. In addition, there is potential for more suitably placed waste facilities or recovery facilities to become operational in the future which may be more beneficial from an environmental perspective.

The ultimate selection of waste contractors and waste facilities would be subject to appropriate selection criteria proximity, competency, capacity and serviceability. The waste facilities selected will ultimately be selected to minimise the environmental impacts on the surrounding environment.

Provided all mitigation measures as set out in this chapter and the attached RWMP, the overall predicted impact of the proposed development is **long-term, imperceptible** and **neutral**.

RECEIVED: 18/07/2023

12.12 References

1. Waste Management Act 1996 - 2021 (No. 10 of 1996) as amended.
2. Protection of the Environment Act 2003, (No. 27 of 2003) as amended.
3. Litter Pollution Act 1997 (S.I. No. 12 of 1997) as amended
4. Eastern Midlands Region Waste Management Plan 2015 – 2021 (2015).
5. Department of Environment and Local Government (DoELG) *Waste Management – Changing Our Ways, A Policy Statement* (1998).
6. European Commission, Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (2017).
7. Environmental Protection Agency (EPA) 'Guidelines on the information to be contained in Environmental Impact Assessment Reports' (2022)
8. Forum for the Construction Industry – Recycling of Construction and Demolition Waste.
9. Department of Communications, Climate Action and Environment (DCCAE), *Waste Action Plan for the Circular Economy - Ireland's National Waste Policy 2020-2025* (Sept 2020).
10. DCCAE, *Whole of Government Circular Economy Strategy 2022-2023 'Living More, Using Less*' (2021)
11. Environmental Protection Agency (EPA) *'Best Practice Guidelines for the Preparation of Resource and Waste Management Plans for Construction & Demolition Projects' (2021)*
12. Department of Environment, Heritage and Local Government, *Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects* (2006).
13. FÁS and the Construction Industry Federation (CIF), Construction and Demolition Waste Management – a handbook for Contractors and site Managers (2002).
14. Kildare County Council (KCC) (Segregation, Storage and Presentation of Household and Commercial Waste) Bye-laws, (2018)
15. Regional Waste Management Planning Offices, Draft The National Waste Management Plan for a Circular Economy (2023).
16. KCC, *Kildare County Development Plan 2023-2029* (2023).
17. BS 5906:2005 Waste Management in Buildings – Code of Practice
18. Planning and Development Act 2000 (No. 30 of 2000) as amended
19. Environmental Protection Agency (EPA), Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous (2015)
20. Council Decision 2003/33/EC, establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 of and Annex II to Directive 1999/31/EC.
21. EPA, *European Waste Catalogue and Hazardous Waste List* (2002)
22. EPA, National Waste Database Reports 1998 – 2020.
23. US EPA, *Characterisation of Building Uses* (1998);

24. EPA and Galway-Mayo Institute of Technology (GMIT), EPA Research Report 146 – A Review of Design and Construction Waste Management Practices in Selected Case Studies – Lessons Learned (2015)

RECEIVED: 18/07/2023

13.0 MATERIAL ASSETS –TRAFFIC AND TRANSPORTATION

RECEIVED: 28/07/2023

13.1 Introduction

This chapter of the Environmental Impact Assessment Report has been prepared by SYSTRA Ltd to assess the potential impact of the project in terms of Traffic and Transport. This chapter provides an overview of the existing receiving environment, a detailed and robust assessment of the potential impact of the project on the operation of the local road network both during the short-term construction phase and long-term operational phase and outlines mitigation measures to ensure any significant effects are minimised or avoided.

The assessment of the traffic and transport section has been prepared by Sheelagh McGuinness B.Eng (hons) MBA and Andrew Archer, CEng of SYSTRA Ltd. Andrew is a Project Director for SYSTRA's operation in Ireland, with over 20 years of diverse and challenging experience in a wide range of transportation planning and engineering projects. Works completed include detailed Traffic and Transport assessments for residential and commercial developments throughout Dublin & Ireland, including mixed use development at Clonburris, Monard & Cherrywood Strategic Development Zones (SDZs), residentials development at Water Rock Midleton and Oldtown Celbridge amongst others. Sheelagh is an associate consultant with 19 years' experience in transport planning, traffic engineering and development planning. She has worked on numerous Transport Impacts Assessments, Mobility Management Plans and Environmental Impact Assessments including applications for industrial, retail, medical and residential land use

Full details of the Traffic Impact Assessment undertaken by SYSTRA Ltd are provided in the Traffic & Transport Assessment, Mobility Management Plan and Outline Construction Traffic Management Plan included under sperate cover as part of this planning application for the principal works the subject of the planning application.

Design
Consideration has been given to all modes during the design development including pedestrians, cyclists, cars, service vehicles and construction vehicles travelling to and through the site.

Construction
There will be additional traffic generated during the construction of the proposed development to facilitate the required works. This is assessed in this chapter.

Operation
There will be traffic generated during the operation of the proposed development. The effect of this additional traffic is assessed as part of this chapter.

13.2 Project Description

The Davy Platform ICAV for an on behalf of the Liffey Sub-Fund, intend to apply for permission for development of an integrated campus Masterplan proposal including 2 no. deep tech Buildings, 4 no. Data Centres, an Energy Centre, new campus entrance incl. signalised intersection, a new public road, internal roads & pathways, a new pedestrian/cycle overpass of the M4 Motorway and supporting infrastructure. The proposal will also include the

demolition of existing buildings no's 7, 8 & 9. Known facilitation works include GNI (Gas Network Ireland) local upgrade of the gas network and EirGrid Uprating over five stages.

A detailed description of the project is outlined in Chapter 2 of this EIAR.

RECEIVED: 18/07/2023

13.3 Methodology

Alongside the legislation, policy, and guidance outlined in Chapter 1, the following relevant legislation, policy, and guidance has informed the preparation of this chapter:

- Transport Infrastructure Ireland's (TII) Traffic & Transport Assessment Guidelines (2014)

There are also a number of relevant national and regional policies which have guided the assessment and the identification and, where necessary, the design of mitigation measure. These include the following documents:

- The Kildare County Development Plan 2023-2029 (KCC 2023)
- Design Manual for Urban Roads and Streets (DTTAS, 2013)
- National Cycle Manual

The methodology adopted for the assessment is outlined below and in line with the guidance set out in TII's Assessment Guidelines.

- Baseline Assessment: Site visits, data collection including traffic surveys, existing accessibility, identification of opportunities and constraints, local travel patterns and policy review.
- Trip Generation: Forecast vehicle trip rates to/from development. These are converted to model trips based on expected mode share, to be informed by modelling and baseline assessment.
- Traffic Growth: Growth in traffic volumes to be forecast based on current TII forecasts.
- Trip Assignment and Distribution: vehicular trip to be assigned based on predicted final destination and distribution across the wider network based on strategic modelling and/or baseline travel patterns.
- Impact Analysis: assessment of the resultant impact of development on the wider network with detailed modelling undertaken locally. The rating of impacts is in line with the terminology set out in Table 3.4 of the EPA Guidelines, outlined previously in Chapter 1 of this EIAR.
- Conclusion and Recommendations: Identification of potential impacts and necessary mitigation and supporting measures.

13.4 Assessment Criteria

The EPA EIAR guidelines (2022) outlines a number of definitions that can be used to describe potential significant effects. This includes definitions for the quality of effects, significant of effects, extent of effects, probability of effects, duration and frequency of effects and the type of effects. Whilst some of these are easily qualified using the EPA guidelines the significant of the effects is open to interpretation and relies on the professional engineering judgement.

In Ireland, there are currently no guidelines or standards which outline how the effect of traffic

and transport should be quantified or described for the purposes of Environmental Impact Assessment. However, TII's 'Traffic and Transport Guidelines' indicate that if the impact generated by the additional traffic generated by a new development may be expected to exceed 10% of the existing traffic movements, it is considered material in the context of the local network. This threshold is reduced to 5% in situations where the network is congested or at other sensitive locations'.

RECEIVED: 18/07/2023

Similarly, the UK's Institute of Environmental Management and Assessment (IEMA) 'Guidelines for the Environmental Assessment of Road Traffic' (2003) state that only links which experience an increase in traffic of 30% should be considered for more detailed assessment, or 10% in sensitive locations or where HGV traffic increases substantially. As referenced in the IEMA Guidelines, a range of indicators for determining the significance of the relief from severance advises that changes in traffic flow of 30%, 60% and 90% are regarded as producing 'slight', 'moderate' and 'substantial' changes respectively. Additionally, it is generally accepted that traffic flow increases of less than 10% on uncongested roads are generally considered to be 'not significant', given that daily variations in background traffic flow may vary by this amount.

Based on these guidelines, the prevailing traffic levels local to the proposed development and professional judgement, a rating of the potential effects has been assigned to the definitions within the EPA guidelines based on potential traffic increases, as outlined in Table 13.1. To ensure the robustness of the assessment these ratings are more conservative than outlined in the IEMA guidelines. This is intended to guide the assessment of the likely effects of the proposed development.

Imperceptible	0-2.5%
Not Significant	2.5-5%
Slight	5-10%
Moderate	10-20%
Significant	20-30%
Very Significant	30-50%
Profound	50%+

Table 13.1: Rating of Effects Based in Traffic Contribution

13.5 Consultation

A number of Pre-Application meetings were held with Kildare County Council as part of planning consultation process. There were also a number of communications with Kildare County Council's Transport and Roads Department relating specifically to the Transport Assessment for the proposed development. The methodology for the Transport Assessment was presented along with the proposed access strategy and road layout design. The proposed car parking and cycling parking ratio and proposed mobility management measures were discussed at length. KCC broadly accepted the proposed strategies but emphasised the Leixlip Local Area Plan objective for a cycle and pedestrian overpass of the M4 in proximity to the development lands.

13.6 Receiving Environment

RECEIVED: 18/07/2023

The baseline/future receiving environment analysis for this Chapter has been undertaken in accordance with the EPA Guidelines on the Preparation of an EIAR (EPA, May 2022) and all other documents outlined above.

The baseline assessments have been informed by both site visits, desk top studies and independent surveys.

13.6.1 Site Location

The site is strategically located southeast of the M4 junction 6 interchange. The site is bounded by the M4 to the north which separates it from Leixlip urban area. Located to the southwest is Castletown House, and beyond that, the town of Celbridge. The general location of the proposed development in relation to the surrounding strategic road network is indicated in Figure 13.1.

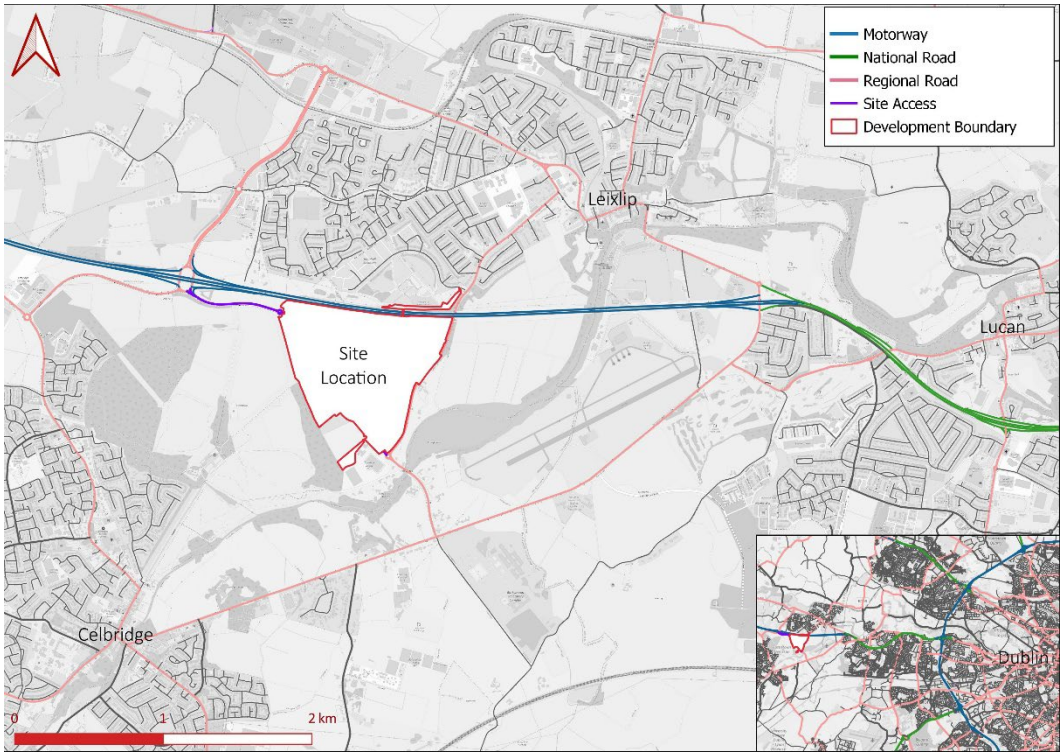


Figure 13.1 Site Location

13.6.2 Walking and Cycling Accessibility and Infrastructure

Footways and segregated cycle lanes are provided in both directions on the Barnhall Road and on the R449 which is the primary access route to the site. This high standard of footway and segregated cycle lanes is maintained along the R449 and R405 which link the development site with the towns of Leixlip and Celbridge.

To the east of the site, the R404 provides a footway in both directions, however no cycle facilities are available along this route. Internally there are a total of 50 cycle parking spaces for the existing site users.

There are facilities within the site for staff including canteen and gym which limit the need to travel offsite during the working day the internal site has a number of footpaths throughout the site linking buildings and parking facilities.

RECEIVED: 18/07/2023

13.6.3 Public Transport Accessibility & Infrastructure

Bus Services
There is a bus stop located to the east of the site at the R404 entrance. This stop is served by Dublin Bus Routes L58 (half-hourly Service). L58 provides connection from Hazelhatch, through Leixlip village towards River Forest.

Train Services
The site is located approximately 2.5km from Leixlip Louisa Bridge Rail Station, and 3.5km from Leixlip Confey Rail Station. Both stations are on the Western Suburban Rail Corridor, with services running to/from Maynooth and the main terminus at Dublin Connolly at 10-30 minute intervals. Hazelhatch Station is located 5km south of the business park and provides a link to the south west commuter services (Heuston / Phoenix Park tunnel) and various intercity services.

At peak periods, the previous occupants of the site, Hewlett Packard, ran a private shuttle bus service between the site and Leixlip Louisa Bridge / Hazlehatch stations. This service will not be reinstated as it is envisaged that it will be replaced by a regular service under the NTA's Bus Connects programme, further details are provided in Section 4 of the Transport Assessment Report.

13.6.4 Road Network & Traffic Conditions

Trips to and from the site are primarily made via the M4 junction 6 and the R449. However, it is also possible to access the site from the east, via the R404. In total, there are three junctions which provide access to the site, these are:

- M4 / Barnhall Rd Junction – Large Roundabout with dedicated merge lane for traffic approaching from the westbound lane of the M4;
- R404 / Liffey Business Campus North – Signal Controlled T-Junction with dedicated right and left turn lanes on the R404 for traffic turning right and left into the Business Park;
- R404 /Liffey Business Campus South – 3-arm roundabout with single lane approaches on all arms. This access is shared with Barnhall Rugby Club and serves the DB Shenker logistics unit to the south east of the site..

As part of the baseline assessment traffic surveys were commissioned and undertaken in the local area. Surveys were undertaken on a natural weekday, during school term on Wednesday 19th October 2022. Traffic turning counts were undertaken at the following junctions:

- R148 Station Road / R404 Celbridge Road.
- R404 Celbridge Road / Barnhall Meadows
- R404 Celbridge Road / Former HP site access
- R404 Celbridge Road / Barnhall Rugby Club / Former HP site access
- R404 Celbridge Road / R403 Dublin Road
- M4 Junction 6 interchange

The Road Safety Authority's (RSA's) online collision map is no longer available. Available data up to 2016 was reviewed and indicated no reoccurring safety concern.

RECEIVED: 18/07/2023

Future Infrastructural Improvements

BusConnects

The NTA's BusConnects programme will overhaul the current bus system in the wider Dublin region to create a better public transport network that is more efficient and reliable. There are a variety of measures included in the plan, such as the introduction of a state-of-the-art cashless ticketing system, new bus stops and shelters, and various bus-based Park and Ride sites, all of which should improve patronage. Core to the plan is a network of 'next generation' bus corridors along the busiest bus routes to make bus journeys faster, predictable and reliable. The programme has proposed a series of continuous high-quality bus lanes spanning the city.

Crucially, the N4 which provides a direct route to/from Dublin from Leixlip and Celbridge is designated as the C Spine Route. There are also plans for a number of new local, orbital, and express routes which will interchange with the C spine routes and other existing services at designated points, including a park and ride facility at M4 Junction 5.

DART Expansion Programme 2018-2027 – Iarnród Éireann

DART (Dublin Area Rapid Transit) is an electrified commuter railway line serving the Dublin coastline. It has operated since 1984, initially only between Bray and Howth, but now between Malahide and Greystones since 2000. It has been one of Ireland's greatest public transport success stories with up to 75,000 journeys being made every day.

Based on this success story, a new expansion programme is planned for all other existing Dublin commuter rail lines that will bring them up to the same modern electrified standard. This will deliver a more sustainable, reliable, and faster rail service with increased train frequencies and customer carrying capacity on the following lines:

- Northern Commuter – as far as Drogheda station
- Western Commuter – as far as Maynooth / M3 Parkway stations
- Southwestern Commuter – as far as Hazelhatch (Celbridge)

Key to the development proposals, the local stations in Leixlip and at Hazelhatch are included in the plans as they are on the Western (Maynooth) and Southwestern commuter lines respectively.

To facilitate these improvements a range of measures will be carried out including the removal of some level crossings, additional track, overbridge alterations, improved signalling, new rolling stock, and new depots with maintenance capabilities.

13.7 Do Nothing Scenario

The proposed development site is part of the former Hewlett Packard campus. There are an existing ten buildings on site totalling a footprint of 130,064sqm of manufacturing, warehouse plus ancillary office, with staff facilities including cafeteria and gym. The entire footprint consists of 136,066sqm when including plant rooms and link corridors.

The occupancy of the site, as the time of the traffic counts was circa 800 staff compared to the full occupancy capacity under Hewlett Packard of circa 3,000 staff. Kildare County

Council's Local Area Plan (LAP) 2020-2026 recognises that, given the size and scale of the site, it is important to work with all stakeholders to ensure the site can be redeveloped and remain a key employment hub, both for Leixlip, and for the wider Dublin Metropolitan Area. The site is currently zoned for category H: Industry and Warehousing.

RECEIVED: 18/07/2023

It is possible that the site could be reoccupied to full capacity of circa 3,000 staff, with associated traffic generation, with its current buildings and permitted uses, without any planning process. The proposed development seeks to increase employment numbers to circa 3,000 on the campus, however the proposal also seeks to increase the overall footprint of the campus, increased infrastructure and include a change of use, as such an application for planning has been prepared.

13.8 Characteristics of the Project

Please refer to Chapter 2 of the Environmental Impact Assessment Report for the full description of the project.

Vehicular access to the proposed campus will be retained from both the east and west of the site. The existing Barnhall Road access, from the Junction 6 interchange along the current private access to the site will be upgraded and form part of the proposed Link Road. The Link Road to form a junction with the R404 Celbridge to the east of the site. This junction will replace the existing signalised junction and will be relocated circa, 60m to the north of the current position.

The access into the campus from the R404 Celbridge Road roundabout, to the southeast of the site, currently serving Barnhall Rugby Club and the DBS development, will extend and form a main route through the campus.

A number of routes permeating the site will extend from the access points. The Link Road will be taken in charge and be fully accessible to all users. All other internal routes within the site will be private and will be furnished with security barriers.

An extensive network of footpath and cycle paths are proposed within the campus. The Link Road includes segregated footpath and cycleways. The proposed overbridge will connect lands to the north of the M4 onto the Link Road directly with further connections through the site.

Car and cycle parking is provided in accordance with Kildare County Council's development Plan. Where no standards are provided in the Plan for Data Centres, these have been derived from first principles based on existing Data Centre developments.

There are 1,613 car parking spaces on site currently. An additional 686 spaces will be provided bringing the total to 2,299. Of these 206will be allocated to the combined data centre units and 1,163 to the deep tech uses. The remainder of car parking spaces will predominantly serve the existing buildings 1 to 6, with 16 car parking spaces allocated to the energy centre. As required, 5% of car parking spaces will be mobility spaces and 10.7% (244) will be equipped with electric vehicle charging points. A car parking EV hub, accessible by the public will be provided adjacent to the existing building 1 which will allow for car charging.

In addition to the car parking EV hub, a bus EV parking hub will also be provided. It is anticipated that an agreed bus service provider will be able to avail of this facility, which would allow for over night charging of buses.

RECEIVED: 18/07/2023

The campus currently has 50 cycle parking spaces. These, on observation, are underutilised. By applying the council standards would result in circa 1000 spaces being proposed with a risk of them not being used. It was agreed with Kildare County Council that a minimum 10% of all planned car parking spaces would equate to the number of cycle parking spaces to be provided and that their use would be monitored and increase if demand was not met.
A total of 350 cycle parking spaces are proposed within the campus, located convenient to building access and cycle lane access.

Facilitation works are known to be required for the project. this includes upgrades to both the gas and electricity supply networks within the local area by GNI and EirGrid respectively.

13.9 Predicted Effects of the Proposed Development

13.9.1 Construction Phase

The proposed development will be constructed over three phases with the proposed Link Road delivered in phase one. For the traffic and transport assessment it has been anticipated that the full development will be occupied by 2035. Phase one and phase two will be from 2024 to 2028 while phase three is planned to start in 2028. Phase three includes the demolition of some existing buildings on site.

A Construction Traffic Management Plan accompanies this application. Estimates of traffic generation associated with the construction phase has been provided by the design team engineers, at this stage of development proposals it is anticipated that 76 vehicular movements per new unit will be generated per hour during the working day. The proposed route of construction vehicles will be to and from the M4 along Barnhall Road.

As the application progresses it will be possible to make a more informed assumption of staff traffic during construction periods. This will be agreed with the road section of Kildare County Council.

Temporary car and cycle parking facilities for construction vehicles and staff will be provided within the site boundary.

Construction traffic associated with the known facilitation works will be managed by GNI and ESB / Eirgrid, through traffic management plans.

13.9.2 Operational Phase

The proposed development will be developed over three phases as follows:

- Phase 1 – fully occupied by 2027
    - New signalised junction onto the R404 Celbridge Road.
    - Link road between R404 Celbridge Road and Celbridge Road
    - M4 Pedestrian and cycle overbridge
    - A1 deep tech building
    - B1 data centre
    - Initial energy centre phase

RECEIVED: 18/07/2023

- Phase 2 – fully occupied by 2028
  - A2 deep tech building

- Phase 3 – fully occupied by 2033
  - C1, C2 and C3 Data Centres
  - Energy centre

Trip Generation

An operational trip generation exercise for the proposed development was undertaken as part of the Traffic and Transport Assessment. Due to the unique nature of the data centre element of the development proposals, the TRICS database was deemed to not contain enough comparable sites to provide an adequate trip generation assessment. TRICS was used for the other elements of the development.

SYSTRA has therefore retrieved trip generation figures of previously approved data centre sites in the Republic of Ireland, mostly consented within the last ten years. The trip rates per 100sqm GFA were subsequently calculated for these sites. The mean trip rates and trips generated (based off a total data centre GFA of 68,600sqm) resulting from this analysis are shown in Table 13.2.

Employment use criteria was utilised for the deep tech element of the proposals. TRICS was interrogated for office and industrial unit land use.

The energy centre and substation are anticipated to generate low, intermittent levels of traffic that would not impact on the peak traffic periods.

	Trip Rates (per 100sqm GFA)				Trips			
	AM		PM		AM		PM	
	ARR	DEP	ARR	DEP	ARR	DEP	ARR	DEP
Data Centre	0.139	0.086	0.012	0.023	95	59	8	16
Deep Tech (Car/LGV)	0.315	0.140	0.057	0.348	187	83	34	207
Deep Tech (OGV)	0.024	0.027	0.000	0.003	14	16	0	2
Office	1.062	0.082	0.057	0.730	134	10	7	92
Mean Trip Generation					450	190	49	319

Table 13.2 Trip Generation

Table 13.2 shows that the development is likely to generate 640 two-way trips in the AM peak and 369 two-way trips in the PM peak.

As part of the proposed development, the existing buildings of 7, 8 and 9 will be demolished. SYSTRA has derived the vehicle trip generation associated with these existing buildings and used this to present the net trip generation of the proposed development.

Building 9 is plant and generates service vehicles only which is minimal traffic.

Using trip rates for manufacturing type use the vehicle trip generation for the existing buildings 7 and 8 (based off a total GFA of 80,783 sqm) is shown in Table 13.4. The resulting PCU (Passenger car unit) value is calculated.

RECEIVED: 18/07/2023

Vehicle Type	Trip Rates (per 100 sqm GFA)				Trips			
	AM		PM		AM		PM	
	ARR	Dep	ARR	Dep	ARR	DEP	ARR	DEP
Car/LGV	0.315	0.140	0.057	0.348	254	113	46	281
OGV	0.024	0.027	0.000	0.003	45	50	0	6
Total (PCUs)	-	-	-	-	299	163	46	287

Table 13.3 Building 7&8 Trips

Net Change

The combined Data Centre (mean trip rates) and deep tech type use trip generation for the proposed development is shown in Table 13.4, as well as the combined trip generation for the existing development buildings to be demolished and the net change. All values presented are in PCUs.

	AM			PM		
	Arr	Dep	Two-Way	Arr	Dep	Two-Way
Mean Trip Generation	450	190	640	49	319	369
Existing Trip Generation	299	163	462	46	287	333
Net Trip Generation	151	27	178	3	32	36

Table 13.4 New Trips

13.10 Traffic Impact

The development traffic has been distributed onto the surrounding road network based upon the existing east west split of those currently accessing the site and as per the existing turning movements on the surrounding road network.

All HGVs routing to and from the Site are assumed to access and egress via the M4 Junction 6 roundabout and Site Link Road.

Once the proposed development is operational, the R404/Site South Access junction will be available for use by regular Site traffic. It is assumed that this junction will be used by the majority of Site traffic currently using the R404/Site North Access junction to route south on the R404. Due to the locations of the respective building car parks, all traffic routing between the R404 and Building A2 is assumed to use the R404/Site South Access junction only. All non-HGV traffic routing between the R404 and Building A1 is assumed to use the R404/Site North Access junction only. Remaining generated traffic for B1 and C1, C2 and C3 is distributed as described above.

A full breakdown of the proposed development's traffic distribution arriving and departing the Site in both peak periods is shown in Table 13.5.

Junction	Arm	AM		PM	
		Arriving	Departing	Arriving	Departing
M4 Junction 6	R449 (North)	14%	30%	67%	31%
	M4 (East)	24%	5%	10%	11%
	R449 (South)	4%	20%	3%	5%
	M4 (West)	36%	25%	8%	39%
R404/Site Access North	R404 Cellbridge Road (North)	10%	8%	7%	5%
R404/Site Access South	R404 (South)	12%	12%	5%	9%
Total		100%	100%	100%	100%

RECEIVED: 18/07/2023

Table 13.5 Proposed Development Distribution

13.10.1 Impact Assessment Methodology

To assess the traffic and transportation impacts of the proposed development vehicular trip generations has been developed based on first principles for the data centre element and using TRICS database for the deep tech. It is anticipated that the energy centre will not generates traffic during the peak periods.

Trip distribution and assignment of trips is based on existing movements from the current site occupants to assess the likely percentage to route east and west from the site. The internal road layout, car park positioning and access and land use positioning within the campus was then used to formulate the distribution of traffic from the development onto the road network. All HGVs are routed west of the site towards the M4 interchange allowing access to the strategic road network.

The proposed development traffic distributed onto the network is then assessed using a microsimulation software package, VISSIM. This allows an assessment of the traffic impact on the surrounding road network overall.

In accordance with TII TIA guidelines the opening year plus 5 years and plus 15 years are required assessment. This would result in an assessment year of 2050. It is the professional opinion of SYSTRA Ltd, based on the transport targets for Ireland by 2040 and the requirement to reduce our transport emissions, that traffic growth as currently predicted in TIIs PAG Unit 5.3 Travel Demand Projections is not appropriate. The Unit 5.3 growth factors have been used however it is considered that an opening year for phase 1 and phase 2 of 2028 be considered as the opening year. Plus five year assessment of 2033, which would include phase 1 and phase 2 occupied and the construction of phase 3 and the plus 15 year assessment of 2043 which would be the proposed development fully occupied.

The analysis of the predicted impacts of the proposed development on traffic and transportation during construction and operation are presented in this Chapter. The assessment considered traffic and transportation features, identified in Section 5.3.1 above, within the project site and the surrounding vicinity in accordance with the methodology outlined above and below, to determine the significance of the impacts. Where likely significant impacts are highlighted, mitigation and monitoring are proposed, and any residual impacts are assessed.

RECEIVED: 18/07/2023

The impact assessment for this Chapter has been undertaken in accordance with the *EPA Guidelines on the Preparation of an EIAR* (EPA, May 2022) and all other documents outlined above.

Assessment methods quantify and predict the magnitude and significance of impacts.

13.10.2 The Likely Impacts of the Principal Works

The development contribution to the future year link flows on the wider local road network is outlined in Table 13.6. AADT (Annual Average Daily Traffic) figures have been calculated by expansion factors in TII PE-PAG-02039, applied to the 2022 observed flows. The total AADT for the fully operational development is 2,192.

Link No.	Link Name	Speed Limit (kph)	Base AADT 2022	Do Nothing AADT 2043	Do Something AADT 2043	% Difference
Link 1	Station Road W	50	13741	16826	16914	0.5%
Link 2	Station Road E	50	12527	15377	15487	0.7%
Link 3	Celbridge Road	50	8381	10187	10274	0.9%
Link 4	Celbridge Road N	60	7604	9266	9441	1.9%
Link 5	R404 Site Access Road /Link Road	60	1077	1077	1252	16.3%
Link 6	Celbridge Road S	60	8031	9919	10182	2.7%
Link 7	Barnhall Road	60	3818	4733	6465	36.6%
Link 8	R449 S	60	13633	16653	16741	0.5%
Link 9	M4 On Slip WB		6112	7512	8060	7.3%
Link 10	M4 off Slip EB	60	4155	5143	5253	2.1%
Link 11	R449 N	60	18498	22736	23043	1.3%
Link 12	M4 on slip EB	60	4155	5143	5253	2.1%
Link 13	M4 off slip WB		7381	9016	9543	5.8%
Link 14	R404 RBT Site Access	60	1939	2369	2632	11.1%
Link 15	RBT R404 S	60	7881	9627	9890	2.7%
Link 16	R404	60	7828	9562	9899	3.5%
Link 17	R403 E	60	11630	14207	14426	1.5%
Link 18	Stacumny Lane	60	2517	3074	3096	0.7%
Link 19	R403 W	60	15314	18706	18750	0.2%

Table 13.6 AADT

The results demonstrate that during the operation phase, aside from the access roads, the proposed development will contribute up to a maximum of 7.3% on the M4 on slip westbound from the interchange junction.

As per the rating off effects in traffic contribution in Table 13.7, which is based on a conservative interpretation of the EPA Guidelines and IEMA Guidelines, the proposed development is expected to result in a 'slight' or less effect on the majority of the local roads.

RECEIVED: 18/07/2023

It is noted that a 36.6% and 16.3% impact is predicted on the access roads from the west and east of the site respectively, however this is to be expected as they comprise the two access roads, Barnhall Road and the R404, into the proposed development The base flow on these junctions is low with counts taken in 2022 at a time that the campus was not fully operational with the impact percentage therefore representing a higher-level change than if the current campus was fully operational.

13.10.3 Model Development

An existing 2016 base year VISUM model developed for Maynooth Town Centre was agreed with KCC as an appropriate model as a base for the strategic modelling. The model was updated to add more detail and to improve the calibration of the area of interest of this study. The proposed link road was then tested in this updated base year model and the revised flows fed back into a VISSIM microsimulation model.

A base year VISSIM model has been developed for a larger study area. To ensure the replicated observed driver behaviour and baseline traffic conditions, it was calibrated against observed traffic counts and validated against observed journey time data (from the October 2022 traffic surveys). The model was calibrated and validated in accordance with the guidelines set out by TII Pag Unit 5.1 – Construction of Transport Models. Further detail of the model development undertaken is set out in the Transport Assessment.

A summary of the network statistics is provided in Table 13.7. The summary includes for assessments with the Link road open, known committed development included and with and without the proposed development for comparison across the assessment years.

Year	Link Road	Committed Dev	KIC Dev	AM Average Delay (S)	AM Average Speed (km/h)	AM Latent Demand (veh)
2022	Closed	Not in	Not In	25.2	68.1	0.0
2022	Open	Not in	Not In	25.7	68.1	0.1
2028	Open	In	Not In	29.7	65.7	0.6
2028	Open	In	In	45.0	61.0	0.7
2033	Open	In	Not In	33.8	64.6	0.5
2033	Open	In	In	76.1	53.9	2.1
2043	Open	In	Not In	40.9	62.7	0.7
2043	Open	In	In	66.4	56.4	0.6

Table 13.7 Network Statistics AM Peak

The results indicate that the with development, as anticipated, would result in an increase in delay and a decrease in speed across the network. The level of impact is not considered to be material however. The 2033 with development scenario sees Phase 1 and Phase 2

operational but with construction still ongoing for Phase 3. This is prior to the demolition of buildings also, hence indicates a greater impact on the network. The maximum delay across the full network is averaged at 76 seconds, with average stops of 2.

RECEIVED: 19/07/2023

The final year assessments for 2043, which include significant background traffic growth and the full masterplan operational, indicates a 26 second delay average across the full study area network. This is not considered to be a significant impact during the AM peak. Table 13.8 present the Network Performance Statistics from the PM peak models.

Year	Link Road	Committed Dev	KIC Dev	PM Average Delay (S)	PM Average Speed (km/h)	PM Latent Demand (veh)
2022	Closed	Not in	Not In	30.0	70.0	0.3
2022	Open	Not in	Not In	31.8	69.4	0.3
2028	Open	In	Not In	56.3	62.0	0.5
2028	Open	In	In	73.0	57.6	56.0
2033	Open	In	Not In	72.6	58.3	15.7
2033	Open	In	In	87.9	54.5	250.1
2043	Open	In	Not In	97.9	53.3	71.8
2043	Open	In	In	82.7	56.0	15.4

Table 13.8 Network Statistics PM Peak

The results from the modelled assessments for the PM indicate that it is the more critical period.

The 2033 period being the more onerous due to the continued construction on site over a relatively short period of time. The modelled results for the PM period indicate an increase of 15.3 seconds on the average delay, with a decrease in speed of less than 4km/h. This is not considered to be a material impact.

It is noted that during the 2043 assessment when the site is fully operational the net traffic impact results in a decrease in the average delay and an increase in average speed across the network.

The latent demand, indicating the level of traffic not able to enter the model study area, is significantly increased during the PM peak period. Although the result is for the full network the latent demand is experienced where traffic is not able to exit the M4 motorway westbound onto the interchange. Some delay is also experienced within the site. Mitigated by shift patterns and internal movements

Table 13.9 provides the results from the model where the proposed signalisation of the interchange, as part of the proposed mitigation from the Intel development, is included in the model assessment.

By its nature, signals increase delay on the network due to the nature of stopping, the inclusion of signals allows for the decrease in latent demand from the M4 the increase latent demand and remove any queuing onto the M4 from the interchange as was previously evident.

RECEIVED: 18/07/2023

Year	Link Road	Committed Dev	KIC Dev	PM Average Delay (S)	PM Average Speed (km/h)	PM Latent Demand (veh)
2028	Open	In	Not In	47.2	64.3	0.5
2028	Open	In	In	64.5	59.4	0.5
2033	Open	In	Not In	61.2	60.9	1.1
2033	Open	In	In	103.6	51.5	1.5
2043	Open	In	Not In	86.9	55.4	0.6
2043	Open	In	In	69.8	58.7	2.7

Table 13.9 PM Peak Network Statistics with interchange signals

13.11 Mitigation Measures and Monitoring of Impacts

13.11.1 Incorporated Design Mitigation

There are measures which have been included from the outset in the design of the development to reduce any potential negative effects on the local transport network arising from additional traffic generated by the development.

The most significant measure is the provision of pedestrian and cycle infrastructure across the M4 and linking to surrounding cycle routes.

Construction Phase

This assessment concludes that the proposed development will not have a significant effect on the local road network during the construction phase. Notwithstanding this, a Construction Traffic Management Plan has been prepared as a 'best practice' measure which identifies measures that aim to minimise the effect of construction traffic on the surrounding road network with respect to potential temporary changes to vehicular traffic and pedestrian movements. The CTMP measures include the following:

- Construction Staff will be encouraged to arrive before 07:30 and leave after 18:00 (i.e. avoiding network peak periods);
- Appropriate level of cycle and vehicle parking on site for staff, with staff encouraged to travel by sustainable means;
- Parking provided to prevent overspill onto surrounding network;
- Appointment of Construction Site Manager/Community Liaison Officer by the Principal Contractor to manage the implementation of the CTMP and act as the main point of contact for staff, contractors, KCC and general public;
- Construction staff Travel Plan to be developed by appointed Contractor;

RECEIVED: 18/07/2023

- Sufficient cycle parking, storage and drying areas will be provided on site to meet the needs of all construction staff;
- KCC agreed haulage routes along designated HGV routes;
- Minimising HGV deliveries during the peak hours (generally 08:00-09:00 and 17:00-18:00);
- On-site wheel wash facilities;
- HGVs carrying soil to be fully sheeted;
- HGVs inspected for dirt and mud before exiting onto public road network;
- Road cleaning and sweeping along sections of roads adjacent to the site;
- Construction signage at all entrances and exits;
- Control and timing of deliveries where possible;
- Entrances and exits manned during deliveries.

A more detailed and comprehensive CTMP will be produced by the contractor for specific phases of the development construction post-planning consent.

CTMPs will be prepared prior to commencement of all associated facilitation works. These will be reviewed and agreed to KCC.

Operational Phase

The site specific Mobility Management Plan, prepared by SYSTRA Ltd ,the improved access for pedestrian and cyclists, including the provision of new M4 overpass, and the provision of EV charging hub are the key operational mitigation measures.

The aim of the Mobility Management Plan is to further reduce the proportion of car trips, from an already low baseline, by promoting sustainable travel by future residents of the development. These mobility measures will also support and enable those residents who may be living 'car-free' providing them with a range of sustainable mobility options and negating the need to own a car.

The measures in the Mobility Management Plan comprise[1]:

- Appointment of Mobility Manger (by the campus management company) who will market and promote the Mobility Management Plan to residents of the site, and monitor the progress of the Mobility Management Plan;
- A Welcome Travel Pack will be provided to occupants with details of local transport network, maps of local amenities, detail of on-site facilities, incentives for sustainable travel use;
- Marketing and Travel information and Personalised Travel Planning will be provided by Mobility Manager to inform occupants and visitors of the sustainable travel options available, this will include for business travel and commuting;
- Walking and Cycling Challenges and promotion events.
- Refer to the Mobility Management Plan prepared by SYSTRA Ltd and submitted with the application for further detail.

13.12 Predicted Effects of the Proposed Development post mitigation

[1] This is not an exhaustive list, full measures are detailed further in the Mobility Management Plan which is provided as part of the planning application submission

RECEIVED: 18/07/2023

13.12.1 Demolition & Construction Phase

Prior to mitigation, the assessment of potential demolition and construction traffic impact already demonstrates that no significant adverse effects are expected to arise from traffic associated with the proposed development.

Notwithstanding this, a CTMP will be implemented during the construction phase which will ensure that the impact of construction traffic is managed and minimised as far as is practicable. As such, the predicted impact during the construction phase is considered to have a negative, slight and short-term effect.

As facilitation works are programmed, they too will require a CTMP as part of their planning and delivery. This will need to take into account the construction traffic as the baseline scenario and plan accordingly.

13.12.2Operational Phase

The campus design incorporates a number of mitigation measures including the provision of the cycle and pedestrian overbridge and its links through the site, facilities for public bus charging and EV parking and significant increase in cycle parking on site. The assessment of potential operational traffic impact already demonstrates that no significant effects are expected to arise from operational traffic associated with the project.

Notwithstanding this, a Mobility Management Plan will be implemented as a 'best practice' measure which will seek to minimise car-based trips, particularly single-occupancy car trips, through the proposed measures (refer to Section 9.9.3) to discourage car use and encourage sustainable transport options. As such, the predicted impact during the operational phase is considered to have a negligible and 'not significant' long-term effect.

13.13 Monitoring

13.13.1 Demolition & Construction Phase

The construction phase will be monitored by the appointed site manager and regular progress reports will be prepared. The manager will ensure the mitigation measures outlined will be implemented and adhered to.

13.13.2 Operational Phase

A Mobility Manager will be appointed from within the campus management company to ensure the implementation of the Mobility Management Plan. They will act as a point of contact for employees for all mobility and access related issues.

13.14 Residual Effects

The effect of the construction phase in terms of traffic and transport will be imperceptible and short-term in nature. The measures outlined in the CEMP, will help alleviate the effect of the additional traffic and limit the effect to outside the busier peak hours. The measures, including wheel washing and dust mitigation, will also ensure the standard of the public road network is maintained in terms of dust and dirt from construction traffic.

With the mitigation measures in place, the effect of the proposed development on traffic and transport is envisaged to be slight, likely in probability and long-term. The proposed

development is located within an area with well-integrated walking infrastructure to encourage sustainable travel choices to and through the proposed development. The Mobility Management Plan initiatives and design of the campus and its accessibility improvements are likely to result in lower volumes of car traffic than that assumed in the modelling assessment.

RECEIVED: 18/07/2023

13.15 Reinstatement

Following the construction phase, all excavations will be made good, and all hard and soft landscaped areas will be delivered in accordance with the Landscape.

13.16 Interactions and Potential Cumulative Effects

13.16.2 Interactions

Trip generation and resultant traffic flow contribution on the local network impacts on the performance of the road network (in terms of network delays), air quality and noise in the local environment. The impacts on the performance of the transport network are addressed in this EIAR and the Traffic and Transport Assessment report produced by SYSTRA.

The impacts on air quality and noise and vibration are addressed in Chapter 9 Air Quality and Climate (AWN), and Chapter 10 Noise and Vibration (AWN) respectively. The combined impact on Population and Human Health is addressed in Chapter 5 (TPA).

13.17. Likely Cumulative and Interaction Impacts of the Project

13.17.1 Potential Cumulative Impacts

Regarding the construction phase, the CTMP will ensure coordination with any known nearby construction. The strict routing for HGVs to the nearby M4 and mitigation measures outlined in the CTMP will ensure impact is slight and short-term.

The road network analysis undertaken accounts for a robust background growth in traffic and known developments, within close proximity to the site, as outlined in Chapter 3 and Appendix 1.1 of this EIAR. The results of the analysis conclude that with signals installed at the interchange junction and the link road full operational, that the network operated within capacity.

14.0 MATERIAL ASSETS: SITE SERVICES

RECEIVED: 28/07/2023

14.1 Introduction

This section of the EIAR describes the existing material assets (site services) for the foul and surface drainage, potable water, power, gas, heating & telecom aspects of the proposed development site. An assessment is made of the likely specific, direct and indirect impacts arising during the construction and operational phases of the proposed development on these elements.

This chapter was prepared by Brian Minogue of Tom Phillips & Associates with assistance from Kevin Owen of Clifton Scannell Emerson Associates, Gary O'Keefe of Ethos Engineering, Paul O'Halloran of H&MV and Tom McMahon of MDM Engineering. Brian Minogue is a Member of the Irish Planning Institute and has been practicing as a town planner for over 15 years. Brian holds an undergraduate degree in Spatial Planning (Hons), (2007) DIT. Kevin Owen is a qualified civil engineer with over 6 year's experience. Gary O'Keefe is a qualified mechanical and electrical engineer with over 20 years experience. Padraic McGurl is a qualified electrical engineer with over 5 years experience. Tom McMahon is a qualified civil engineer with over 30 years experience.

14.2 Project Description

The Project is for the expansion of the existing campus, allowing for a mix of Deep Tech, ICT, Data Centre and Innovation uses. The proposal will include for the demolition of some of the existing buildings on site and construction of new buildings, an energy centre and replacement substation. The proposal will include significant public infrastructure including a new signalised intersection on Celbridge Road (R404), a new Public Link Road through the campus (between Barnhall Road and the new signalised intersection), a pedestrian/cycle overpass of the M4, pedestrian and cycle links through the site and along the designated protected view corridor and supporting infrastructure. The project to which this EIAR relates also includes facilitation works which comprise uprating of existing 110kV power lines to the site and the provision of an upgraded natural gas connection to the site. The facilitation works which are included in the project do not form part of the development for which consent is sought. Future consents for the facilitation works will be required through EirGrid and GNI. A detailed description of the project is outlined in Chapter 2 of this EIAR.

Refer to Chapter 2 for a more detailed project description and description of the site's location and context.

14.3 Methodology

The Directive requires an assessment of the direct and indirect significant effects of a project on the following factors:

a) Population and human health:
b) Biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC:
c) Land, soil, water, air and climate:
d) Material assets, cultural heritage and the landscape:
e) The interaction between the factors referred to in points (a) to (d).

RECEIVED: 18/07/2023

The EPA Guidelines (2022) state that material assets are taken to mean *"built services and infrastructure, roads and traffic and waste management"*. Built Services are further described as including *'electricity, telecommunications, gas, water supply infrastructure and sewerage'*. The EPA Advice Notes (2015) also gives examples of material assets including assimilative capacity of air and water; ownership and access; and tourism and recreational infrastructure. The European Commission Guidance (2017) refers to a number of examples of material assets including buildings, other structures, mineral resources and water resources.

In this EIAR, the impacts on some of the material assets described in the above guidance have already been considered in the below chapters and therefore these aspects will not be addressed in specific detail within this chapter.

- Chapter 4, Population and Human Health.
- Chapter 5, Land, Soils, Geology & Hydrogeology.
- Chapter 6, Hydrology.
- Chapter 8, Air Quality & Climate.
- Chapter 11, Cultural Heritage
- Chapter 12, Traffic & Transportation; and
- Chapter 14, Waste Management.

This chapter assesses built services and infrastructure, which have not already been addressed elsewhere in this EIAR. The potential impacts on built services and infrastructure, if any, are assessed in terms of foul drainage, surface water drainage, water supply, power supply, gas supply and heating supply.

The associated built services and infrastructure in the vicinity of the site are summarised in the following sections and additional detail is provided within the planning application documentation. The assessment of impact on utilities has been undertaken by consultation with regard to availability with the utility supplier, Gas Networks Ireland, ESB Networks, Telecom and Irish Water (IW). Mitigation measures are proposed where required.

Alongside the legislation, policy, and guidance outlined in Chapter 1, the following relevant legislation, policy, and guidance has informed the preparation of this chapter:

- Greater Dublin Strategic Drainage Study (GDSDS),
- Method outlined in Irish Water's Pre-Connection Enquiry Application,
- Method outlined in Irish Water's Code of Practice for Wastewater Infrastructure,
- Method outlined in Irish Water's Code of Practice for Water Infrastructure,
- Regional Code of Practice For Drainage Works - Version 6.
- Good practice guidelines on the control of water pollution from construction sites developed by the Construction Industry Research and Information Association (CIRIA).
- Gas Networks Ireland's 10 Year Network Development Plan 2021
- GNI's Gas Forecast Statement 2022
- Eirgrid Ecology Guidelines for Electricity Transmission Projects

The preparation of this chapter has also been informed by desktop studies of relevant data sources including:

- Flood Risk Assessment Report completed by CSEA which accompanies this Planning Application.
- Engineering Planning Report, Drainage and Water Services by CSEA
- All available information concerning the development, this included existing topographical information & relevant utility drawings, as well as a physical site inspection.

RECEIVED: 28/07/2023

14.3.1 Scoping and Heading/Topic Identification

The EPA Guidelines, 2022, state that:

> *"each* [environmental] *factor is typically explored by examining a series of headings and/or topics relevant to that factor".*
>
> [and]
>
> *"The relevant topics for any given EIAR should be established during scoping".*

The methods employed for scoping and identification of the relevant environmental topics for this Chapter has been expert opinion/judgement on the possible site services likely to be impacted by the project.

The headings and/or topics scoped into this Chapter's assessment are:

1. Foul drainage
2. Surface water drainage
3. Water supply
4. Power supply
5. Gas supply
6. Heating supply.

14.3.2 Baseline Scenario/Likely Future Receiving Environment Analysis Methodology

The EPA Guidelines on the Preparation of an EIAR (EPA, May 2022) state that:

> *"It is important to demonstrate that correct methodologies and experts have been used. It is also important that the methodology used in establishing the baseline scenario is documented to permit replicable future monitoring so that the later results can be properly compared (where required). Standard recognised methods should be applied where available and appropriate."*

The baseline/future receiving environment analysis for this Chapter has been undertaken in accordance with the EPA Guidelines on the Preparation of an EIAR (EPA, May 2022) and all other documents outlined in section 14.3.

RECEIVED: 18/07/2023

Baseline Scenario Analysis Methodology

The steps involved in the baseline scenario analysis were as follows:

1. Identify existing site services related to the project.
2. Gather available data regarding the characteristics of the existing site services.
3. Assess the characteristics of the site services including condition and capacity as well as significance and sensitivity.

Likely Future Receiving Environment Analysis Methodology

The methodology employed in predicting the likely future receiving environment was inductive reasoning stemming from the professional experience and knowledge of the experts and a review of the cumulative projects in the surrounding area and KCC County Development Plan 2023-2029 (including its associated Strategic Environmental Assessment).

14.3.3 Impact Assessment Methodology

The analysis of the predicted impacts of the project on site services during construction and operation are presented in this Chapter. The assessment considered site service features, identified in Section 14.3.1 above, within the project site and the surrounding vicinity in accordance with the methodology outlined in this section 14.3, to determine the significance of the impacts. Where likely significant impacts are highlighted, mitigation and monitoring are proposed, and any residual impacts are assessed.

The impact assessment for this Chapter has been undertaken in accordance with the *EPA Guidelines on the Preparation of an EIAR* (EPA, May 2022) and all other documents outlined in section 14.3.

Assessment methods quantify and predict the magnitude and significance of impacts.

The methods employed for assessment and evaluation of the environmental topics for this Chapter have been:

1. Assess the current condition, capacity, significance and sensitivity of the site services (the 'baseline').
2. Identify the anticipated level of development, which includes the expected population growth and economic activities that are likely to take place in the surrounding area. This has been predicted in Chapter 5 (Population & Human Health) and is informed by information sourced from CSO and from *Kildare County Development Plan 2023-2029*.
3. Assess the potential impact on site services as a result of the development. Based on the anticipated level of development and the current condition and capacity

of the site services, the potential impact on site services has been assessed. This includes identifying potential bottlenecks, such as limitations in capacity or technical problems that may arise due to the increased demand from the proposed development.

4. Consultation with experts, including Kildare County Council, Uisce Éireann , EirGrid, ESB, and Gas Networks Ireland.

5. Expert opinion of the Project Team engineers as identified in section 14.1 above.

6. Review of Strategic Environmental Assessment prepared for the *Kildare County Development Plan 2023-2029* (including a review of the Development Plan itself). According to the EPA Guidelines, 2022, this can reduce the number of cumulative effects that need to be considered in an EIAR.

7. Geospatial Analysis (cumulative impacts only – used to identify planning permissions/applications within a 5 km radius).

Overall, predicting the future impact on site services has involved obtaining a thorough understanding of the condition, capacity, significance and sensitivity of the existing site services and the expected level of development.

RECEIVED: 19/07/2023

14.4 Baseline Scenario/Future Receiving Environment Analysis

14.4.1 Current State of the Environment (Baseline Scenario)

The EIA Directive requires the following to be described relating to the baseline scenario:

> *"A description of the relevant aspects of the current state of the environment (baseline scenario)".*

Foul Drainage

Context & Character

The existing foul/ wastewater inflows are pumped to the public sewerage system at the northeast corner of the site (see Figure 14.1, below).

Two pumping stations are located on the site (see Figure 14.2, below) with 200mm dia. pumping mains with provision included for future development.

Site watermain inflow record information indicates that outflow to the public sewerage network was likely to be up to 965m^3 per day during HP's previous operation at the site. Peak (3 x Dry Weather Flow [DWF]) 34 l/s during 2009/ 2010.

The existing catering facility drainage system includes a large capacity grease separator (estimated to cater for 1800 meals each day).

The foul drainage system is in place since the development of the HP site and is in adequate working condition.

RECEIVED: 18/07/2023

Sensitivity

Foul drainage systems can be sensitive to changes in their design, installation, and maintenance. The performance of a foul drainage system can be affected by various factors, including:

- Changes in the flow rate of wastewater can impact the system's ability to transport wastewater to the treatment plant. High flow rates can cause blockages and overflows, while low flow rates can cause sedimentation and accumulation of solids.
- The size and slope of the pipes can affect the velocity and capacity of the wastewater transport, which can impact the system's ability to function effectively.
- The type of pipe materials used can affect the durability and lifespan of the system. Some materials may corrode over time or be susceptible to damage from tree roots or ground movements.
- Regular maintenance of the foul drainage system is essential to prevent blockages, leaks, and other issues that can impact the system's performance.
- Human errors and accidents such as excavation or equipment failure can cause damage to the system.
- Changes in climate conditions, such as heavy rainfall or drought, can impact the flow rates and capacity of the foul drainage system.
- Changes in land use, such as new developments or industrial activities, can increase the volume and strength of wastewater, which can impact the system's ability to handle the additional load.

Overall, foul drainage systems are moderately sensitive to changes.

Surface Water Drainage

Context & Character

Surface water runoff from hardstanding areas with the existing site are collected in a sealed system of pipes and gullies which drain towards the east side of the site. The topography of the site falls moderately in a northwest to east direction (59.25AOD – 45.00AOD). Two existing surface water retention ponds are located on the eastern site boundary. The existing retention pond system includes two individual ponds to allow for alternating, with a single pond use during routine inspections and maintenance. An additional fire water retention pond is also located there. Additional bunded storage is provided in the surrounding landscaped area in the event of an overflow occurring. The normal capacity of the retention ponds is 5000m3, with and additional 25,000m3 being able to be accommodated in the bunded overflow

area. The discharge to the outfall is controlled to ensure an appropriate volume of water is retained at all times. These ponds serve the existing site as attenuation during extreme storm events as well as to provide the firefighting network with water when required.

RECEIVED: 18/07/2023

The site ultimately discharges its surface water runoff directly via an outfall drain to the Leixlip Reservoir via a 1.350mØ culvert, following confirmation of water quality through electronic monitoring mechanisms inclusive of shut off valves, downstream of the existing Retention Ponds near the existing site entrance off the Celbridge Road.

These ponds serve the existing site for attenuation purposes as well as for fire retention water. The quality of the surface water discharge from the ponds is mechanically measured to ensure no contaminates are allowed to enter the Liffey Reservoir. A shut off valve is automatically enabled in event of a contamination event.

An additional attenuation pond exists on the campus beside the DBS building. This pond does not affect the development site as it has been designed for attenuation of the DBS site. The DBS site is outside the redline boundary of the proposed development and is connected directly to Barnhall Road Stormwater Sewer following flow control and quality monitoring.

Existing storm water runoff from the existing building surface areas discharge to the retention ponds. Existing runoff from carparking, associated access roadways and general yard areas discharge through petrol/ oil separators to the retention pond system.

Surface water discharge outfalls into the Liffey Reservoir, following confirmation of water quality through electronic monitoring mechanisms inclusive of shut off valves, downstream of the existing Retention Ponds near the existing site entrance off the Celbridge Road.

Kilmacredock Upper Stream passes through the proposed development. The stream has since been diverted across the site development by means of a 1.5m culvert. See Figure 14.3 below.



RECEIVED: 18/07/2023

Figure 14.3: Diverted Stream within the KIC Site.

The surface water drainage system is in place since the development of the HP Site and is in adequate working condition.

The existing development pre-dates current surface water design standards and SuDS guidance.

Sensitivity

Surface water drainage systems can be sensitive to changes in their design, installation, and maintenance. Some of the factors that can affect the sensitivity of surface water drainage systems include:

- Changes in land use, such as urbanisation, can increase the number of impervious surfaces, such as roads and buildings, which can lead to increased stormwater runoff and reduced infiltration into the soil.

- Changes in precipitation patterns and increased frequency of extreme weather events can impact the sensitivity of surface water drainage systems.

- The type of soil in a particular area can affect the ability of a drainage system to manage stormwater runoff effectively. For example, soils with high clay content may have a low infiltration capacity and can cause waterlogging and flooding.

- Proper maintenance of drainage systems, such as regular cleaning of catch basins and culverts, is essential to ensure their functionality and prevent clogging and blockages.

- Human errors and accidents such as excavation or equipment failure can cause damage to the system.

Overall, surface water drainage systems are moderately sensitive to changes.

RECEIVED: 18/07/2023

Water Supply

Context & Character

The original water supply to the site for the initial phase of the HP development in the late nineties was from the Celbridge Road to the east. The supply was also connected to the existing sprinkler storage pond near the main entrance off the Celbridge Road. A pump house was constructed alongside the storage pond to pressurise the HP fire main systems on the site.

During the construction of the link roadway to the M4 Interchange a new 250mm watermain was brought to the site along the link road. The 250mm watermain enters the site along this entrance roadway from the M4 Interchange. The watermain downsizes to 150mm within the site – refer to CSEA Drawing 2300 to 2318. The new watermain was designed to cater for the completed additional Phase 2 HP development and planned future phases.

The existing water meter is located immediately outside the site boundary at the external roundabout in the north west of the site.

The water supply system is in place since the development of the HP Site and is in adequate working condition.

Sensitivity

Water systems can be sensitive to changes in their design, installation, and maintenance. Some of the factors that can affect the sensitivity of water systems include:

- The quality of the water source, such as rivers, lakes, or groundwater, can affect the treatment processes required to produce safe drinking water. Changes in source water quality due to natural or human-caused factors can impact the quality of water provided to the site.

- Aging water infrastructure, such as pipes, valves, and treatment facilities, can become vulnerable to leaks, breaks, and other failures that can impact the ability to provide quality water supply.

- Human errors and accidents such as excavation damage or equipment failure can cause leaks or supply interruptions.

RECEIVED: 28/07/2023

- Climate change can affect the quantity and quality of water resources, as well as impact the reliability of water infrastructure during extreme weather events such as floods and droughts.

- Contamination incidents, such as chemical spills or microbial outbreaks, can impact the quaility of water servicing systems and threaten public health.

- Increased demand for water can result in reduced water pressure for existing customers.

Overall, water systems are moderately sensitive to changes.

Gas Supply

Context & Character

The Kildare Innovation Campus is currently provided with a connection to the existing gas distribution network via an existing gas skid to the northeast of the campus. The gas mains on site is provided in a loop of the campus with primary function of serving the boilers on site and the cafeteria. The existing gas network is in place since the development of the HP Site and provides adequate supply to the site for the existing tenants and development on site.

The natural gas supply line to the site connects from the existing gas skid under Celbridge Road under the M4 and northwards into Leixlip.

Sensitivity

Gas supply systems can be sensitive to changes in their design, installation, and maintenance. Some of the factors that can affect the sensitivity of gas supply systems include:

- Natural disasters such as storms and floods can damage the gas infrastructure, leading to gas leaks or supply interruptions.

- Gas pipelines can be vulnerable to corrosion, physical damage, and other forms of degradation, which can lead to leaks or pipeline failures.

- Human errors and accidents such as excavation damage or equipment failure can cause gas leaks or supply interruptions.

- Changes in gas demand can impact the capacity of the gas infrastructure to supply sufficient gas to meet the demand.

- Changes in gas supply, including global supply issues, can impact on ability to meet demand at local level.

Overall, gas supply systems are moderately sensitive to changes.

RECEIVED: 28/07/2023

Power Supply

Context & Character

Power supply to the Campus is provided via the existing 110kV Rinawade Substation located southwest within the Site. The current Air Insulated Switchgear (AIS) substation known as the Rinawade 110kV sub is fed by 2 x 110kV Overhead lines (OHL).

Eirgrid/ESB own & operate the 110kV part of the substation; the Client/landlord owns & operates the transformers & 20kV switchgear on the customer side of the substation. The local utility concession holder, ESB Networks, is currently not involved anywhere on the campus.

The 110kV OHL is terminated onto a common busbar from which two 110/20kV, 20MVA, transformers are energised. These transformers currently supply power to the campus.

Through consultation with Eirgrid, H&MV have advised that the current 110kV Rinawade Substation is close to its end of life and to renew the current power agreement on site significant upgrades would be required to the existing substation, or alternatively a replacement substation would be required.

A second power supply to the campus is provided to a 20Mv substation adjacent to the existing DB Schenker development. This substation is supplied from Adamstown 110kV Substation.

Sensitivity

Power supply systems can be sensitive to changes in their design, installation, and maintenance. Some of the factors that can affect the sensitivity of power supply systems include:

- Natural disasters such as storms and floods can damage the electricity infrastructure, leading to power outages or supply interruptions.
- Aging electricity infrastructure, such as transformers, and transmission lines, can become vulnerable to failures and disruptions that can impact the ability to provide electricity supply.
- Changes in electricity demand can impact the capacity of the electricity infrastructure to supply sufficient electricity to meet the demand.
- The source of fuel for power supply can also impact on security of supply during global events such as wars.

Overall, power supply systems are highly sensitive to changes.

Telecommunications Supply

Existing fibre optic cable distribution is available on site and serves the current buildings.

Context & Character

RECEIVED: 18/07/2023

The fibre optic cable infrastructure on site has been developed overtime as technology has advanced.

Sensitivity

Fibre supply systems are not considered sensitive to changes in their design, installation, and maintenance. The main factor that can affect sensitivity of change is advancement in technology. Overall, fibre systems are slightly sensitive to changes.

Heating Supply

The existing campus operates off centralised heating from the campus boiler room within Building No.6, which operates from the existing gas network. Pipes travel through each of the existing buildings providing heat to the internal spaces.

Context & Character

The heating system was developed as part of the initial HP development. Overall, the system in place is a typical central heating system to provide heat to the campus buildings, which would otherwise not receive heat to keep room temperatures comfortable.

Although still widely used as a primary heating system in many buildings, heating technologies have become available, such as district heating, which can be a more efficient and cost saving approach to heating.

Sensitivity

Heating supply systems can be sensitive to changes in their design, installation, and maintenance. Some of the factors that can affect the sensitivity of power supply systems include:

- The availability and price of fuel used for heating, such as natural gas, oil, or electricity, can impact the cost and reliability of heating.
- Extreme weather events such as cold snaps or heatwaves can strain heating systems, leading to potential failures or malfunctions.
- Aging heating infrastructure, such as boilers or furnaces, can become more prone to failures and breakdowns that can impact the ability to provide heating.
- Human errors and accidents such as improper installation, maintenance, or misuse of heating systems can cause malfunctions, inefficiencies, or safety hazards.
- Changes in heating demand, such as occupancy levels or changes in building use, can impact the capacity of heating systems to provide sufficient heat to meet demand.

Overall, power supply systems are moderately sensitive to changes.

RECEIVED: 18/07/2023

14.4.2 Likely Future Receiving Environment ('Do Nothing' Scenario)

The EIA Directive requires the following to be described relating to the future receiving environment (the 'Do Nothing' scenario):

> *"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".*

In the event of a 'Do Nothing' scenario, the site would remain in operation as an existing Science and Technology campus. The undeveloped parts of the site would remain so. Some maintenance and upgrades to existing assets may be required over time however most would remain as is. The exception to this is the existing power supply to the campus. As advised by Eirgrid, the current 110kV substation would still need to be upgraded or replaced to extend the current Eirgrid agreement and provide power to any new tenants that may come on site and occupy the existing vacant buildings, however alternative supply agreements may be reached, similar to the DB Schenker development. As a result, the uprating works required to facilitate the proposed project would likely not be required, nor would the local enhancement of the gas network be required.

14.5 Likely Impacts of the Project

14.5.1 Construction Phase

Surface Water and Foul Drainage Infrastructure and Water Supply

Subject to grant of planning permission a construction compound will be required to be located to serve each of the three phases of development similar to what occurred for the recent development of the DB Schenker adjacent to the south-east entrance to the campus. A temporary connection to the mains water supply will need to be established for the construction of each phase. The water demand during the construction phases will not be significant enough to affect existing pressures. A temporary connection to the foul water drainage network will need to be established for the construction of each phase. The current campus has previously catered for in excess of 1,200 persons on site and the existing foul network has been designed to cater for this demand. Sufficient capacity is available within the existing network to cater for the wastewater discharges from the welfare facilities for the short-term construction phase. Approval for a temporary connection to the water supply and foul water drainage network will be sought from Uisce Éireann by the contractor.

If stormwater collects in excavation pits on campus during construction, it will need to be discharged to sewer. Any discharge will be treated as standard using a siltbuster or similar to remove suspended solids prior to discharge as outlined in the project Construction and Environmental Management Plan (CEMP) and Chapter 8 (Hydrology) of this EIAR.

RECEIVED: 19/07/2023

The surface water, foul water generated and water demand during the construction phase is not likely to have a significant negative impact on the existing networks as overall demand is low and in line with previous developments on the campus.

Overall, proper planning and management of the foul drainage and water systems during the project construction will help minimise potential impacts and ensure the continued safe and reliable operation of the systems.

As outlined in Chapter 8 (Hydrology), with the implementation of design and mitigation measures for the Proposed Development site the impact of the construction phase is ***short-term*** in duration with an ***Imperceptible effect*** rating. Similarly, the potential impacts associated with storm and wastewater for the proposed development for the construction phase are ***short-term, neutral and imperceptible***

Power Supply

The Contractor as part of construction of the proposed site will require a power supply. The power supply for the construction compound will be a combination of generator supply and existing connection to the electrical network on campus. The power requirements for the construction phase will be relatively minor and therefore the power demand for the construction phase will have a temporary imperceptible impact.

Any extension of the power supply to the Proposed Development will be within the overall landholding and will not require any off-site connections. If works are not carried out correctly there is potential for the construction works to cause accidental damage to the infrastructure for the permitted development. As the connection works are entirely within the existing site boundaries, these would not have any potential offsite impact.

Gas Supply

The Contractor as part of construction of the proposed site is not expected to require gas supply as such there would be no potential for offsite impact.

Telecommunications Supply

Telecommunications including fibre required during construction phase will be provided via a temporary mobile connection.

The existing fibre optic cable distribution network for the permitted developments will be extended through shallow trenching to the proposed development. As the connection works are entirely within the site boundary and excavations required are shallow, there will be no offsite impact.

14.5.2 Operational Phase

RECEIVED: 18/07/2023

Foul Drainage

The existing foul pumping stations with the 200mm dia. pump rising mains shall be retained and upgraded to accommodate the new developments on the site. Upgrading shall include consideration of the pumps and automated pumping controls upgrade/updating/replacement etc. The station operation data signals etc shall be connected to the new location for the campus facilities management building etc. Underground 24-hour storage tanks shall be provided at each of the existing stations. The route of the existing pumping mains from the stations shall be realigned to facilitate the new development, as shown in the CSEA drawings No 21_048-CSE-ZZ-ZZ-DR-C-2200 and 21_048-CSE-ZZ-ZZ-DR-C-2210 to 21_048-CSE-ZZ-ZZ-DR-C-2218.

A new, additional pumping facility shall be provided to service areas of development outside the catchments of the existing stations. Refer to CSEA drawings for details of the new pumping station and *CSEA Planning Drainage & Water Supply Report* for drainage calculations.

It is not expected that there will be new requirements for new foul connections outside of the overall landholding. The wastewater discharged from the site will ultimately discharge to the Waste Water Treatment Plant at Leixlip. There are no proposed process water emissions. If insufficient capacity is available in the public infrastructure, there is a potential for increased levels of pollution in receiving waters, however confirmation of feasibility from Uisce Éireann on the wastewater requirements for the proposed development has been previously provided.

The industrial wastewater demand for the proposed development is zero. The peak foul flow is calculated at 4.81 l/s and similar to the previous maximum capacity/peak foul flow of the HP site when at its former capacity. The overall wastewater discharge associated with the proposed development has previously been agreed with Uisce Éireann by letter dated 12 July 2022 confirming that there are no upgrades required to the network by Uisce Éireann. The wastewater discharge rate agreed with Uisce Éireann is in accordance with the discharge rates outlined in the PCE (ref CDS23003038) submitted to Uisce Éireann for the Proposed Development. The predicted impact will be ***long-term, neutral and imperceptible*** for the operational phase.

Surface Water

The proposed surface water networks for the proposed development collect runoff from roofs, roads and other hard standing areas in a combination of SuDS systems and sealed system of pipes and gullies. There are five separate surface water drainage networks in the proposed development which are proposed to flow to new surface water attenuation basins (Refer to Drawing No's 21_048-CSE-00-XX-DR-C-2111 to 21_048-CSE-00-XX-DR-C-2118) from which attenuated flows are discharged, via carrier drains, to the existing retention ponds within the site.

The site is divided up into five catchment areas. These areas are defined by the topographical characteristics of the site and the proposed finish levels of the development. Each catchment collects the surface runoff and attenuates it within a pond up to the 1:100 year event. A flow control device will be installed within each catchment to slowly releases the water into the existing ponds, from there the water will discharge to the Leixlip Reservoir. The portion of the

site on the north side of the M4 will drain into small swales and landscaping and infiltrate to ground. No attenuation or piped infrastructure will be required in this area.

RECEIVED: 18/07/2023

In order to account for climate change, an additional allowance of 30% in rainfall intensities have been allowed as per Kildare County Council (KCC) requirements which exceeds the requirements of Table 6.1 of Volume 2 of the GDSDS (10%). In addition, an urban creep factor of 10% has been included as per KCC requirements.

Analysis of the 1 in 30 year storm event yields a critical required storage volume of 18,658 m3 during the 1440 minute of the 1 in 30 year storm event for the entire site. Similarly, analysis of the 1 in 100 year storm event yields a critical required storage volume of 23806.4 m3 during the 1440 minute of the 1 in 100 year storm event for the entire site. See CSEA's *Engineering Services Report Drainage and Water Services* for analysis the 1 in 30 and 1 in 100 year storm event for each catchment.

As a result, the required surface water storage is 23806 m3 during the 1440 minute of the 1 in 100 year storm event. Due to site conditions and underground service congestion, 2 No. attenuation basins, 2 No. attenuation ponds, 1 No. infiltration basin, 3 No. permeable paving with stone storage and 1 No. StormTechTM systems by Cubic M3 or similar is being proposed.. See section CSEA's *Engineering Services Report Drainage and Water Services* for breakdown of proposed surface water storage across the site.

The surface water runoff from the proposed development will follow the SuDS and surface water management strategy; utilising an innovative natural based SuDS components to provide the necessary processes to control runoff frequency, flow rates and volumes.

Three different types of pollution control elements will be implemented as part of surface water infrastructure in the development prior to discharge from the site into the Leixlip Reservoir and are as following:

1. A Class 1 full retention separators (Klargestor Model No. NSFA015 or equivalent) will be provided downstream of any used in high-risk spillage areas in accordance with Section 20 of the Greater Dublin Regional Code of Practice. The full retention separator is designed to treat the full design flow that can be delivered in the drainage system, which is normally equivalent to the flow generated by a rainfall intensity of 50mm/hour. This is provided in the vicinity of the existing loading dock area.
2. An existing bypass petrol interceptor is located upstream of the outfall from the site and will be retained. Furthermore, it is a requirement for car parking areas with 10 spaces or more as outlined in Section 20.1 of the Greater Dublin Regional Code of Practice.
3. There is potential for surface water and condensate to accumulate in the exhaust stacks which serve the generators. Gullies which serve the exhaust stacks will discharge to a dedicated surface water drainage pipe which will be connected to a Class 1 full retention separator. Two full retention interceptors will be required, per data centre building, to serve the exhaust stacks.

Rainwater runoff from the roof areas of the proposed building will be utilised to reduce water demand. Rainwater harvesting will be utilised from the roof of each data centre throughout the year for the water to be available during those hottest periods during summer months when adiabatic cooling may be needed. Rainwater harvesting from Deep Tech buildings will provide irrigation for green walls across the site. The harvested rainwater will be utilised to

offset the demand from Uisce Éireann . Refer to CSEA's *Engineering Services Report Drainage and Water Services* and Ethos *Energy & Sustainability Statement* for further detail.

RECEIVED: 18/07/2023

The runoff will discharge from the proposed retention and attenuation systems before outfalling to the existing pond system and monitoring regime on-site which includes an automatic shut off valve in the event of contaminants being detected. The existing outfall from the existing ponds to the Liffey Reservoir is to be retained. Refer to CSEA's *Engineering Services Report Drainage and Water Services* and Ethos *Energy & Sustainability Statement* for further detail.

Further detail on the SUDs systems, the surface water drainage system and its design basis is provided within the *Engineering Services Report Drainage and Water Services* and drawings (*Drawing No 21_048-CSE-ZZ-ZZ-DR-C-2300 and Drawing's No 21_048-CSE-ZZ-ZZ-DR-C-2310 – 2318*) prepared by CSEA and submitted with the planning application.

The design incorporates measures for management of hydrocarbons and mitigation for any leaks and spills though interceptors (see Chapter 8 Hydrology). The predicted impact will be ***long-term-neutral*** and ***imperceivable*** for the operational phase.

Water Supply

The existing watermain network for the development areas shall be retained where possible and diverted, where necessary to accommodate the new development areas – refer to CSEA drawings (*Drawing No 21_048-CSE-ZZ-ZZ-DR-C-2300 and Drawing's No 21_048-CSE-ZZ-ZZ-DR-C-2310 – 2318*).

The new buildings & road developments shall be serviced from the existing incoming 250mm and 150mm main supply with fire hydrants etc. in accordance with Part B of the Building Regulations and the KCC fire officer requirements. The existing 250mm main supply was laid, in recent years, as part of the link of the HP facility to the nearby N4 Interchange.

The Energy Compound, 110kV Substation and Deep Tech Buildings do not have an industrial water demand. General potable supply for drinking and sanitary facilities will be provided from mains supply with rainwater harvesting also proposed to reduce overall water demand. The energy compound will include a Firewater Tank which will be provided from mains supply.

The Data Centres will use the water supplied by Uisce Éireann for domestic and evaporative cooling. The design philosophy will be to limit the evaporative cooling process to peak summer months only. The water used during these peak summer months will be supplied by on-site industrial water storage only. The industrial storage will be filled during the winter months (Dec - Jan - Feb). Using historic weather data it is estimated that evaporative cooling utilizing process water will only commence during peak summer temperatures. For all temperatures below the peak summer days, the cooling system will operate on direct air only and thus the process water usage will be zero (0 l/s). To confirm, no water demand is required during the winter period.

Each of the C1, C2 and C3 Data Centres have an annual expected potable water demand of 1643.8m3 with the B Data Centre having an annual expected potable water demand of 1166.1m3. Resulting in an annual water demand of 6097.5m3 in the peak summer months only.

This water will be storage on-site such that no water is required from Uisce Éireann during the peak summer months. In order to facilitate the tanks, the development will be required to fill-up these tanks during the months of December, January and February over a two-week period. This duration is an estimate, the exact duration of filling will be determined by Uisce Éireann Operations Team subject to supply constraints. The peak industrial water demand for the proposed data centre element of the development is estimated at 5.05 l/s per the submitted PCE (CDS23003038).

RECEIVED: 18/07/2023

The proposed buildings are designed to harvest a significant portion of the annual cooling water requirements through rainwater harvesting, reducing the water used from the local supply from the first year of operation.

To reduce both energy and water use in its data centre facilities, the data centre operator utilises direct evaporative cooling systems, which predominately utilise outside air to cool servers.

If capacity is not available this could result in insufficient pressure in the public mains network to accommodate the demand of existing customers in the area and a drop in pressure may be experienced. To avoid this additional storage is proposed within the design.

There are no likely significant negative impacts on the water supply systems predicted as a result of the proposed project. Final confirmation of feasibility will be required from Uisce Éireann prior to the commencement of the development. Any required enhancement works to the existing water network will be carried out prior to the operation phase of the development.

Further information in relation to water supply is provided in the *Engineering Services Report Drainage and Water Services* by CSEA, which accompanies the planning application. The predicted impact on water supply will be ***long-term, neutral*** and ***imperceptible***.

Fire Water

On site storage will be required for fire fighting purposes. The volume of storage required will be 450 m3 for the Data Centre Buildings. The fire water tank will be filled over a 24 hour period at a flow rate of 5 l/s during off-peak periods as required.

A separate fire water tank is required for the Gas Power Generation Plant which will have 757 m3. This fire tank will fill over 8 hours at a flow rate of 28 l/s during off-peak periods as required.

For the other buildings (Deep Technology, Substation and Energy Plant) on-site fire hydrants will be required to be served from the public supply. Fire flow rate of 35 l/s will be required as per UK National Guidance document on the provision of water supply for firefighting and Kildare County Council Fire Service Requirements. The fire water requirements have been included in the overall water supply requirements and assessed above.

Power Supply

The power requirements for the proposed project will be provided from the 110kV replacement substation that will be provided on site. Full details on power supply, energy

RECEIVED: 18/07/2023

efficiency and sustainability are provided in the Sustainability and Energy Statement prepared by Ethos and provided with the planning application material.

The new replacement substation will connect to the existing overhead lines via short runs of underground cable. The replacement 110kV substation will include 6 No. transformers, with a client control building and a 2 storey GIS substation building a fenced compound.

The existing Maynooth – Rinawade 110kV overhead circuit which enters the site in the north-west corner will be retained and diverted to the new replacement substation. The existing Rinawade-Dunfirth/Kinnegad overhead circuit that enters the site in the north-west corner will also be retained and diverted to the new replacement substation. Upon completion of the replacement substation, the existing Rinawade AIS substation will be decommissioned and removed. A diversion of the existing 110kV power line that runs along the north side of the M4 is also required to accommodate the proposed pedestrian and cycle overpass.

The proposed substation will replace the existing Rinawade 110kV substation and will utilise the existing grid connection into the site. On completion of the 110kV replacement substation sufficient power will be available to power the initial Data Centre B1 (16MW) and a connection agreement is in place with EirGrid for the initial supply. The initial Deep Tech Building A1 will be provide sufficient power through existing site connection from Adamstown via the existing 20kv substation on site. The new substation will also be sufficient to cater for the entire build out of the proposed development and meet its power requirements (170MW). A connection agreement is in place with Eirgrid for the first 16MW of power required. However, to accommodate the full build out of the KIC Masterplan[1] and maximise the new 110kV substation capabilities future uprating/line replacements of the existing overhead lines into the site will be required. TNEI & H&MV on behalf of the developer has undertaken an analysis of the required uprating / line replacements to increase the overall power supply to the campus (Refer to *Network Demand Capability Analysis* by TNEI & H&MV).

The analysis concludes that four total uprates and a 150 MVA STATCOM (on-site), is required to accommodate a connection of 170MW. The uprates relate to the Overhead Lines (OHLs) between Maynooth – Rinawade, Dunfirth – Kinnegad – Rinawade, Derryiron – Maynooth and Derryiron – Kinnegad. With the identified uprates a capacity of 170 MW is possible with no thermal overloads or voltage violations being detected. The overhead lines to be uprated are identified in section 3.2.2 above. The uprates outlined do not form part of the application for which consent is sought.

The proposed development will include its own energy centre to be built out over the life of the permission. The Energy Centre will include 9no. combustion turbine generator's (CTG's) to ensure equal power can be replaced within the grid to alleviate any potential constraints to the electrical transmission system arising from the data centre usage. Further to this, the CTG's will also provide reinforcement to grid if and when required. The developer has entered into a continuous supply agreement for renewable diesel (HVO) which will be the back-up fuel for the energy centre in the event that there is a gas supply outage. MDM Engineering have advised that there has never been a gas block out or interruption of supply in the history of the state, as such, the requirement for the CTGs to operate of HVO is considered extremely low.

[1] The masterplan refers to all works subject to the application for consent, described on the public notices and included within the 'redline' boundary on the Site Layout Plan

There are no likely significant negative impacts on the power supply to the site predicted as a result of the proposed project. Power used from the national grid will be met with dispatchable power equal to or greater than the electricity used from the grid ensuring that there will be no net impact on grid stability. It is predicted that there will be a ***long-term, neutral, not-significant*** effect on power supply during the operation phase of the development.

RECEIVED: 28/07/2023

Gas Supply

The energy centre will be supplied by GNI's enhancement of the existing supply to the site to support the proposal (identified above under 'Facilitation Works'). A replacement gas skid and above ground infrastructure will also be required to accommodate the upgraded gas connection. GNI have confirmed that sufficient gas supply is available subject to the enhancement of the existing supply. The Energy Centre will include 9no. CTG's to ensure equal power can be replaced within the grid to alleviate any potential constraints of the data centre usage. Further to this, the CTG's will also provide reinforcement to grid if and when required.

The initial phase of the energy centre will include one CTG, a natural gas fuel supply system, a Hydrotreated Vegetable Oil (HVO) fuel storage and supply system (c.1,720 tonnes initial), a fire protection system, low and medium voltage electrical systems with transformers, a service building and warehouse, and other miscellaneous equipment. The final phase of the energy centre will include an additional eight CTG's with selective catalytic reduction (SCRs), additional HVO supply and supporting equipment.

The CTGs will be primarily fuelled by natural gas/bio-gas supplied by Gas Networks Ireland (GNI) via their existing high-pressure network that runs close to the site (subject to upgrade). It is envisaged that the energy centre will aim to use as much renewable gas as is commercially available in the market. With some modifications, the CTGs are capable of operating on at least a mix of hydrogen should this be available in the future. It is predicted that there will be ***long-term, neutral, not significant effect*** on gas supply during the operational phase of the proposed development.

Heating Supply

As the activities of the data centres generate a significant amount of excess heat, the concept of heat recapture and district heating was chosen as the heating approach for the campus replacement of the centralised heating system.

Through studies by Ethos Engineering, it has been estimated that c. 18 MW of energy could be provided to the campus, community, and surrounding area through recaptured heat and the implementation of district heating.

District heating will be included as part of Phase 1 to supply the deep tech buildings on site, the existing campus buildings to be retained as well potential to supply Barnhall RFC, Salmon Leap Canoe Club, Castletown Estate as well as the future residential zoned lands known as Celbridge East KDA.

Phase 3, which is the balance of the data centres (Buildings C1 – C3), could further provide for additional community buildings and schools in Leixlip.

Whilst the proposed project is not dependent on the future development of a district heating network beyond KIC, it will facilitate its future development by providing for the in-ground infrastructure within the campus lands up to the boundary or in close proximity to the Celbridge East KDA lands, Castletown Estate, Barnhall Rugby Club and Salmon Leap Canoe Club. There are no likely significant negative impacts on the heating systems predicted as a result of the proposed project, with a slight, positive effect likely from the introduction of a district heating system on site.

RECEIVED: 18/07/2023

14.6 Mitigation Measures & Monitoring

14.6.1 Construction Phase

Construction of the proposed development will require connections to water supply and drainage infrastructure, power and telecommunications. Ongoing consultation with Gas Networks Ireland, KCC, Uisce Éireann , EirGrid and ESB Networks and other relevant service providers within the locality and compliance with any requirements or guidelines they may have will ensure a smooth without disruption to local and business community. The works contractor will be obliged to put best practice measures in place to ensure that there are no interruptions to utilities considered above, unless this has been agreed in advance

Electricity Supply

The power demand for the construction phase will be relatively minor and the connection works are entirely within proposed site boundaries, so it is not anticipated that this would have any significant potential offsite impact. As such, no remedial or mitigation measures are required in relation to power supply for the construction phase.

Surface Water

During the construction phase, any surface water run-off collecting in excavations or from exposed soil may contain sediment load. This will be diverted for appropriate settlement and will not be allowed to directly discharge directly to the existing ditches on site. Measure for protection of receiving waters are outlined in the CEMP provided with planning.

Foul Drainage

Portable toilets will be provided for construction staff and a temporary connection will be established for each phase of development. Foul drainage for the proposed development will be in accordance with the Building Regulations Technical Guidance Document H for design and construction. Strict quality control measures will be undertaken while laying pipes to minimise or eradicate infiltration and ex-filtration.

Water Supply

A connection will be put in place for the construction of the proposed development. The works contractor will be obliged to put best practice measures in place to ensure that there are no

interruptions to the water supply, unless this has been agreed in advance. Strict quality control measures will be undertaken while laying pipes to minimise or eradicate infiltration and ex-filtration.

RECEIVED: 18/07/2023

14.6.2 Operational Phase

Surface Water

The stormwater system has been designed to collect rainwater runoff from the impermeable areas of the site, roofs and road/car park and directed to an appropriate SuDS and attenuation system. The allowable greenfield runoff rate has been established by the project engineers, using the methodology set out in the Engineering Services Report.

Three different types of pollution control elements will be implemented as part of surface water infrastructure in the development as following:

A. Class 1 full retention separators (Klargestor Model No. NSFA015 or equivalent) will be provided downstream of any used in high-risk spillage areas in accordance with Section 20 of the Greater Dublin Regional Code of Practice. The full retention separator is designed to treat the full design flow that can be delivered in the drainage system, which is normally equivalent to the flow generated by a rainfall intensity of 50mm/hour. This is provided in the vicinity of the existing loading dock area.
B. An existing bypass petrol interceptor is located upstream of the outfall from the site and will be retained Furthermore, this is a requirement for car parking areas with 10 spaces or more as outlined in Section 20.1 of the Greater Dublin Regional Code of Practice.
C. There is potential for surface water to accumulate in the exhaust stacks which serve the generators. Gullies which serve the exhaust stacks will discharge to a dedicated surface water drainage pipe which will be connected to a Class 1 full retention separator. Two full retention interceptors will be required, per data centre building, to serve the exhaust stacks. Details of the full retention separator proposed are provided in the supporting layouts.

The design of the surface water system has incorporated attenuation within the design to ensure that there is no potential for off site flooding as a result to the proposed increase in hardstanding area. If this was not included in the design of the campus there could be potential impact in off site flooding as storm water flows would not be attenuated on site and may result in overflows to the existing retention ponds on site in excess of the existing capacity.

Foul Drainage and Water Supply

The overall wastewater discharge associated with the proposed development has previously been agreed with Uisce Éireann by letter dated 12 July 2022 confirming that there are no upgrades required to the network by Uisce Éireann. The wastewater discharge rate agreed with Uisce Éireann is in accordance with the discharge rates outlined in the PCE (ref CDS23003038) submitted to Uisce Éireann for the Proposed Development. No mitigation measures are required in relation to foul drainage infrastructure.

Water storage tanks are to be provided as part of the proposed development; pumps will supply water to the proposed A buildings for irrigation use and the B and C buildings for cooling requirements. The storage tanks will be used for rainwater harvesting and will be topped up by mains supply during off-peak months to reduce overall demand on public mains supply. A pre-connection enquiry (PCE) form was submitted to Uisce Éireann which addressed water and wastewater demand for the development. A response to the final Pre-Connection Enquiry is awaited. Any required local enhancement of the network will be required to be undertaken prior to operation commencing.

RECEIVED: 18/07/2023

Power Supply

A connection agreement to supply phase 1 (16MW) of the proposed development is in place with Eirgrid. Phase 1 of the power requirement is accounted for as it is existing power supplied to the campus. to accommodate the full build out of the KIC Masterplan and maximise the new 110kV substation capabilities future uprating/line replacements of the existing overhead lines into the site will be required. TNEI & H&MV on behalf of the developer has undertaken an analysis of the required uprating / line replacements to increase the overall power supply to the campus (Refer to *Network Demand Capability Analysis* by TNEI & H&MV). The analysis concludes that four total uprates and a 150 MVA STATCOM (on-site), is required to accommodate a connection mode of 170MW. The uprates relate to the Overhead Lines (OHLs) between Maynooth – Rinawade, Dunfirth tee – Kinnegad – Rinawade, Derryiron – Maynooth and Derryiron – Kinnegad. With the identified uprates a capacity of 170 MW is possible with no thermal overloads or voltage violations being detected. The overhead lines to be uprated are identified in Chapter 2. The uprates outlined do not form part of the application for which consent is sought. Further engagement with Eirgrid will occur following grant of permission for the proposed development.

As detailed in Chapter 2 (Description of the Project) and the *Sustainability and Energy Statement* by Ethos, a number of sustainability measures have been incorporated into the design of the proposed development including an installation of an array of photovoltaic panels on the roofs of Buildings A1, A2, B1, C1, C2 and C3. The photo voltaic (PV) array will consist of 8,560 modules yielding a total yielding a total peak power generated of 2859.19kWp to offset the lighting and IT electrical power requirements during the peak summer months for the administration section of the buildings. The installation significantly exceeds that required for code compliance under NZEB.

The Sustainability and Energy Statement also describes how the proposed waste heat system included with the application for development can be utilised to provide waste heat to adjoining community uses as well as potentially a wider future district heating system developed by KCC or others in the future.

Gas Supply

To supply the energy centre with natural gas a local upgrade to the network will be required as outlined in Chapter 2. The upgrade is identified as part of the facilitation works for the project and will ensure that there is no negative effect to gas supply within the area as a result of the proposal. The existing gas skid on site will also be replaced with a new gas skid and an above ground installation (AGI) to accommodate the upgraded gas connection to the site.

Operation of the energy centre will be undertaken in compliance with Gas Networks Ireland (GNI) and EirGrid requirements. The CTGs will be capable of running on biofuel and hydrogen

once supply is available in the future (and HVO in the event of interruption to the gas supply to the site). Energy reduction measures have been undertaken throughout the design and are described in the Energy and Sustainability report (Ethos 2022) provided with planning.

RECEIVED: 18/07/2023

14.7 Likely Cumulative and Interaction Impacts of the Project

14.7.1 Cumulative Impacts

The anticipated cumulative effect of the Proposed Development with any/all relevant other planned or permitted developments as outlined in Chapter 3 and Appendix 1.1 are discussed in below for construction and operational phases respectively.

14.7.2 Construction Phase

The proposed development and the other identified development will require site clearance, excavations and levelling which will generate localised requirement for soil removal and/or import, power and water supply and wastewater discharge. However, provided standard mitigation measures set out in the EIA Reports and CEMPs for these developments or where EIA does not apply, provided that planning conditions are implemented, the cumulative impact will be ***short-term, negative*** and ***not significant***.

14.7.3 Operational Phase

The proposed development and all permitted developments considered are required to engage with GNI, KCC, Uisce Éireann and ESB to ensure that there is sufficient capacity to cater for the increase in water and wastewater and electricity requirements. Based on known current and known future developments there is adequate capacity of supply available within the local environs. GNI have confirmed that subject to local upgrades (Facilitation Works) there is sufficient gas supply to cater for the proposed development, similarly a connection agreement is in place with Eirgrid for the initial phase (16MW). Uprates (Facilitation Works) have been identified as being required by the project team to facilitate the full build out of the campus. Subject to the uprates sufficient capacity has been confirmed through the *Network Demand Capability Analysis* by TNEI & H&MV. Furthermore, the proposed grid connection for the full build out will be supported by dispatchable power via the proposed energy centre to ensure that the propsoed development will not unduly impact on power supply. Eirgrid as the national authority for grid has the requirement to ensure that future connections will not impact or reduce the capacity within the local network to support the neighbouring area.

Irish Water have previously confirmed that there is sufficient wastewater capacity available with a response to an updated PCE pending. Furthermore, as set out in Chapter 8 (Hydrology), the maximum proposed allowable discharge rate for the site is 149.75 l/s (12,938.4m3/day). Leixlip WWTP has a maximum capacity of 33,745m3/day. Therefore Leixlip WWTP has sufficient capacity for the proposed development site. There will be no increase in stormwater flow off the site as a result of the development. The location of the proposed project has access to existing utilities and, through confirmation by utilities suppliers the final development will not have an impact on capacity off-site for the development. Therefore, there will be no potential for cumulative impacts with any other development within the study area.

In developing long term plans for security of supply, these National Authorities for water and energy supply are required to develop resources in compliance with sustainable environmental planning. Based on the availability of on-site electricity & gas for power supply and the energy centre, there is a ***short-term, neutral***, and ***not significant*** effect on power supply during the operational phase of the proposed development.

RECEIVED: 18/07/2023

14.7.4 Interaction Impacts

During the construction phase the implementation of the respective CEMPs for the proposed development will ensure that there are no interruptions to service from the existing telecommunications network, watermain, sewer and electrical grid. Any planned interruptions will be agreed in advance with the utility providers. Strict quality control measures will be undertaken while undertaking works to minimise or eradicate infiltration and ex-filtration.

During operational phase the opportunity for interactions is minimal as connection agreements confirming supply and suitability of existing infrastructure or (upgraded/uprated) is sufficient to cater for the proposed development.

14.8 Mitigation Measures and Monitoring of Cumulative and Interaction Impacts

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

There are no relevant other permitted or proposed developments within the immediate vicinity of the proposed development site which haven't received required connection agreements from utility suppliers.

It is noted that a connection agreement from EirGrid is in place for the first phase of the proposed development, an agreement is in place with GNI and a connection agreement is pending from Uisce Éireann. In the current climate Eirgrid requires planning permission to be obtained before a new connection agreement is reached. Therefore, the planning application proposes that the relevant future development phases will not be constructed until the relevant connection agreements are in place.

14.9 Residual Impacts

Once operational, the proposed development has connection agreement to supply the first phase of the development with Eirgrid. Facilitation Works have been identified as required for enhance the local gas network and also uprating works to the electricity network. Furthermore, the proposed development will not commence construction until the relevant connection agreements are in place for future phases. As per the assessments undertaken in this chapter, there will be no significant impact on material assets in the wider area. The overall predicted residual impact of the proposed development can be classed as ***long-term, neutral*** and ***not-significant*** with respect to material assets.

The interactions and cumulative impact are assessed in Chapter 18 of this EIAR.

RECEIVED: 28/07/2023

14.10 Major Accidents and Disasters

The following accidents & disasters involving built services during construction could potentially give rise to a serious incident putting people at risk:

- Excavation works coming into contact with live electricity lines
- Excavation works causing damage and leaks to gas mains

With the implementation of the aforementioned mitigation measures, the likelihood of such events occurring would be local and not significant.

The following accidents & disasters involving built services during operation could potentially give rise to a serious incident putting end users at risk:

- Gas explosions. The installation of services is tightly monitored and controlled by Gas Networks Ireland. Therefore, the residual risk is not considered significant.

14.11 Difficulties Encountered

A pre-connection enquiry (PCE) form was submitted to Uisce Éireann which addressed water and wastewater demand for the development. A response to the Pre-Connection Enquiry is awaited as such, any required future enhancement of the local network that will be required to be undertaken prior to operation commencing is not yet know, however Irish Water previously agreed by letter dated 12 July 2022 that there was sufficient capacity within the network to accommodate the wastewater demand. Water supply to the site is proposed to be managed through the use of on-site industrial water storage during winter months so to have no impact on the supply of water during peak summer months, as such it is not expected that upgrades to the water network will be required to accommodate the development.

15.0 CHAPTER 15 ARCHAEOLOGY AND CULTURAL HERITAGE

RECEIVED: 28/07/2023

15.1 Introduction

This chapter of the Environmental Impact Assessment Report (EIAR) has been prepared by Shanarc Archaeology Ltd. with respect to archaeology and MESH Architects with respect to architectural and landscape heritage. It describes the baseline archaeology and cultural heritage environment at the Kildare Innovation Campus (KIC) lands, it identifies the likely significant effects of the proposed developments at the KIC lands on the archaeological and cultural heritage resource, and it proposes measures to mitigate predicted effects.

Facilitation works required to support proposed development at the KIC lands, namely the provision of an enhanced gas connection by Gas Networks Ireland (GNI) to the site and EirGrid uprating of existing overhead power lines to the site have also been considered in the assessment of effects.

The term 'cultural heritage' is broadly used to describe any combination of tangible archaeological, architectural and cultural heritage material remains or assets, as well as intangible associations of people with place and values; in general:

- Archaeological heritage comprises movable objects, monuments, buildings, landscapes or environmental evidence that generally pre-date AD1700, present both above and below ground level;
- Architectural heritage, also referred to as built heritage, comprises structures, buildings, their settings and contents that generally post-date AD1700; and
- Cultural heritage relates to less tangible aspects of heritage and the landscape such as historical events, folklore, traditions, placenames and cultural associations.

Date is not in itself a determinant of cultural heritage significance or interest, and any material remains that can contribute to understanding past societies, whether pre-dating or post-dating AD1700, may have archaeological, architectural or cultural heritage significance (Department of Arts, Heritage, Gaeltacht and the Islands 1999, 10).

15.2 Project Description

The Project is an integrated masterplan proposal that includes for the expansion of the existing campus, allowing for a mix of Deep Tech, ICT and Innovation uses. The proposal will include for the demolition of some of the existing buildings on site and construction of new buildings, an energy centre and replacement substation. The proposal will include significant public infrastructure including a new signalised intersection on Celbridge Road (R404), a new Public Link Road through the campus (between Barnhall Road and the new signalised intersection), a pedestrian/cycle overpass of the M4, pedestrian and cycle links through the site and along the designated protected view corridor and supporting infrastructure. The project to which this EIAR relates also includes facilitation works which comprise uprating of existing 110kV power lines to the site and the provision of an enhanced gas connection to the site. The facilitation works which are included in the project do not form part of the development for which consent is sought. Future consents for the facilitation works will be required through EirGrid and GNI. A detailed description of the project is outlined in Chapter 2 of this EIAR.

The development site which is subject to the application for consent measures c. 73.95 ha and is principally bounded by: the M4 Motorway to the north; Celbridge Road to the east; Barnhall Rugby Football Club (RFC) to the south; and by grounds associated with Castletown House to the west.

RECEIVED: 18/07/2023

The site comprises the existing Kildare Innovation Campus, which was formerly the Hewlett Packard Campus originally permitted in 1995 under KCC Reg. Ref 95923. The development site also encompasses lands within the jurisdiction of Kildare County Council (KCC).

Refer to Chapter 3 for a more detailed description of the site's location and context.

15.3 Methodology

Alongside the legislation, policy, and guidance outlined in Chapter 1, the following relevant legislation, policy, and guidance has informed the preparation of this Chapter:

Ireland has ratified several international and European conventions and charters on the protection of archaeology and cultural heritage, principally:

- UNESCO World Heritage Convention 1972;
- Charter for the Conservation and Restoration of Monuments and Sites (Venice) 1964; and
- European Convention on the Protection of the Archaeological Heritage (Valetta Convention) 1992.

National legislation protecting archaeology and cultural heritage comprises:

- National Monuments Act 1930 (as amended);
- Heritage Act 1995;
- National Cultural Institutions Act 1997;
- Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act 1999; and
- Planning and Development Act 2000 (as amended).

Principal policy and guidance documents relating to archaeology and cultural heritage are:

- 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; and
- Guidelines for the Assessment of Archaeological Heritage Impacts of National Road Schemes (2005), National Roads Authority.

Codes of Practice have been developed to provide a framework within existing legislation and policies that enable State infrastructure providers to implement infrastructural programmes while strengthening the management and protection of archaeology and cultural heritage. Agreed Codes of Practice between the Minister (Department of Housing, Local Government and Heritage) and State infrastructure providers include:

RECEIVED: 28/07/2023

- Code of Practice between Bord Gáis Eireann and The Minister for Arts, Heritage, Gaeltacht and the Islands (2002);
- Code of Practice between the Department of the Environment, Heritage and Local Government and EirGrid (2009); and
- Code of Practice between the Department of the Environment, Heritage and Local Government and ESB Networks (2009).

Agreed actions of the Codes of Practice include for the appointment of a nominated archaeologist (or Project Archaeologist) to oversee the archaeological components of a project in its entirety, from the route planning and design stage through to the co-ordination and implementation of all the required archaeological work. The Project Archaeologist prepares required specifications for the cultural heritage consultant as part of the impact assessment stage of a project, and ensures that the impact assessment and mitigation recommendations are in keeping with existing legislation, policy and best practice. The Codes of Practice with EirGrid and with ESB Networks state that a Project Archaeologist will be appointed for all schemes that will be the subject of an environmental impact assessment (EIA).

EirGrid also operates under Cultural Heritage Guidelines for Electricity Transmission Projects (2015). The guidelines standardise the approach for cultural heritage impact assessment in the planning, design, construction and operation of high voltage electricity transmission projects undertaken by EirGrid. The guidelines serve to strengthen the relationship between the Minister of Housing, Local Government and Housing and EirGrid, and EirGrid's commitment under the Code of Practice to working with the Minister and the National Monuments Service to protect cultural heritage. Both the Code of Practice and guidelines outline the commitment of EirGrid to avoid direct archaeological impacts where possible. In relation to the maintenance, refurbishment and uprating of existing power lines, impacts may arise when there is a cultural heritage asset in proximity to proposed works.

The preparation of this chapter has also been informed by a desk-based study of relevant data sources including:

National Monuments

Under the National Monuments Act 1930 (as amended), archaeological sites in the ownership or guardianship of the State or a Local Authority and sites under Preservation Orders are designated as National Monuments. Such sites are offered the highest level of protection under Irish legislation. Lists of National Monuments in State care are managed by the National Monuments Service of the Department of Housing, Local Government and Heritage and those in the ownership of individual Local Authorities are managed by the relevant Local Authority. The lists of National Monuments in State Care (Ownership and Guardianship) for Counties Kildare, Meath and Offaly are made available on the National Monuments Service website, archaeology.ie. Those vested in the relevant local authorities are listed in the Kildare County Development Plan 2023 – 2029, Chapter 11; the Meath County Development Plan 2021-2027, Appendix No. 9; and the Offaly County Development Plan 2021-2027, Chapter 10.

Sites and Monuments Record and Record of Monuments and Places

The Record of Monuments and Places (RMP) was established under Section 12 of the 1994 National Monuments (Amendment) Act. The statutory RMP is a list of archaeological monuments known to the National Monuments Service, and records known upstanding monuments, their original location (in cases of destroyed monuments) and the position of possible sites identified as cropmarks on aerial photographs. The RMP is based on the Sites

and Monuments Record (SMR) files housed at the National Monuments Service, with new sites identified being added to the SMR and then scheduled for inclusion in the statutory RMP. All sites recorded on the RMP receive statutory protection under the National Monuments (Amendment) Act 1994. Records of monuments are available in an on-line digital service (the Historic Environment Viewer, maps.archaeology.ie) provided by the Department of Housing, Local Government and Heritage.

RECEIVED: 18/07/2023

Register of Historic Monuments

The Register of Historic Monuments (RHM) was established under Section 5 of the National Monuments (Amendment) Act, 1987, allowing the responsible Minister to establish and to maintain a Register of Historic Monuments. The RHM is also afforded statutory protection, and similar to the statutory RMP, when the owner or occupier of a property, or any other person proposes to carry out, or to cause, or to permit the carrying out of any work at or in relation to a Recorded Monument or a Registered Monument they are required to give notice in writing to the Minister two months before commencing that work. All registered monuments are included in the Record of Monuments and Places.

Urban Archaeological Survey

The Urban Archaeology Survey, 1982-1995, was established to record archaeological monuments and information relating to Irish towns, in particular former medieval boroughs that developed into modern urban settings. One of the main objectives was to highlight the archaeological potential of Irish towns and the Survey produced maps and plans highlighting monuments and zones of archaeological potential (based on the available evidence) that could be used for planning purposes, as well as by archaeologists and other researchers. The Urban Archaeological Survey of County Kildare (1986), including Leixlip and Celbridge towns, was commissioned by the Office of Public Works (OPW) and compiled by John Bradley, Andrew Halpin and Heather A. King.

Topographical Files of the 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, and are available for consultation at 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 find-spots of artefacts can be an important indication of the archaeological potential of an area. Any archaeological object found without a known owner at the time it was found is protected under National Monument's legislation and is deemed to be in the ownership of the State.

Excavations Bulletin and Excavations Database

The Excavations Bulletin and the Excavations Database (excavations.ie) provides summary accounts of archaeological investigations and excavations carried out in Ireland – north and south – from 1969. The Excavations Bulletin is a published annual directory for the years 1970-2010, substituted with an on-line database from 2011 onwards. The on-line database is updated on a constant basis.

Local Authority County Development and Local Area Plans

Each City and County Development Plan is compiled in accordance with the requirements of the Planning and Development Act 2000 (as amended) and contains lists of national monuments (both in State Ownership or Guardianship, and those vested in the care of a Local Authority), recorded monuments, a Record of Protected Structures (a list of buildings which cannot be materially altered or demolished without grant of permission under the Act), registered historic monuments as well as monuments that are subject to a Preservation Order.

RECEIVED: 18/07/2023

The Kildare County Development Plan 2023 – 2029 came into effect on 28th January 2023 and sets out the Local Authorities' strategy, policies and objectives to protect, conserve and manage the archaeological and cultural heritage resource. The Leixlip Local Area Plan 2020 – 2023 (extended to 30th March 2026) and Celbridge Local Area Plan 2017 – 2023 also set out relevant strategies, policies and objectives to protect, conserve and manage the cultural heritage and archaeological resource in the context of the County Development Plan. The Wonderful Barn and Barnhall House Action Area Plan 2004 was also consulted.
With regard to the EirGrid uprating works, the Meath County Development Plan 2021-2027 and the Offaly County Development Plan 2021-2027 were also consulted.

National Inventory of Architectural Heritage
The National Inventory of Architectural Heritage (NIAH) is an ongoing survey within the Department of Housing, Heritage and Local Government. 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 structures of note.

Cartographic Sources
Information gathered from historic cartographic sources is fundamental to the identification of archaeological and cultural heritage sites, including cultural landscapes e.g. demesne landscapes, which, based on the level of landscape change, are now often identified from cartographic records alone. The earliest Ordnance Survey maps date to the late 1830s and early 1840s, but 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 and into the 21st century, making these a valuable resource in tracing the development of a study area.

Aerial Photographs
Aerial photographs are a useful aid in identifying archaeological monuments which are not visible at ground level, and in accessing landscape change and use post-dating historic cartographic sources. Cropmarks of sub-surface archaeological features are revealed from the air by variations in plant growth. The successful detection of cropmarks through aerial photography varies, and is subject to a number of factors, including the position of the sun when the photograph was taken, the type of crop growing and the amount of rainfall in a growing season.

Toponomy Sources
A townland name may preserve information relating to its archaeology, history, folklore, ownership, topography or land use. Most placenames were anglicised by the Ordnance Survey. Despite some inaccuracies in translation, the Gaelic, Viking, Anglo-Norman and English origins of placenames are generally recognisable. The Placenames Database of Ireland website (wwww.logainm.ie) hosts online bi-lingual placename research and archival records for townlands.

Documentary Sources
Documentary sources are a valuable means of completing the written archaeological and cultural heritage record of an area, and of gaining insight into the history of the receiving environment. Sources included existing unpublished archaeological assessment and investigation reports available through the Archive Unit of the National Monuments Service.

On-site Inspection

On-site inspection offers the opportunity to examine a study area in light of desk-based research and evidence. Inspection is essential in determining the nature and extent of any surviving above-ground evidence, and in predicting the potential effects of a proposal on potential below-ground remains. A site inspection at the KIC lands was conducted by Shanarc Archaeology Ltd. on 08 February 2022. Facilitation works required to support proposed development at the KIC lands, being at an early stage in planning, were not subject to on-site inspection.

RECEIVED: 18/07/2023

15.3.1 Scoping and Heading/Topic Identification

The methods employed for scoping and identification of the relevant environmental topics for this Chapter have been:

1. Expert opinion
2. Baseline study of readily available existing records and archival material
3. Site inspection

The headings and/or topics scoped into this Chapter's assessment are:

1. Consideration of effects on the recorded archaeological and cultural heritage resource
2. Consideration of effects on the unknown or undesignated archaeological and cultural heritage resource
3. Consideration of effects on areas of archaeological potential or archaeological sensitivity based on the known archaeological record and on knowledge of archaeological settlement patterns

Visual effects or consideration of setting and amenity value of recorded archaeological monuments were scoped out of this Chapter's assessment as a result of the existing developed nature of the KIC lands and its surroundings, the mainly sub-surface nature of recorded archaeology within a 1km radius and a lack of intervisibility between the KIC lands and recorded monuments. The GNI enhancement works are sub-surface and will not significantly effect the setting and amenity value of recorded monuments. EirGrid uprating transmission lines are existing, and upgrades will have no addition visual or amenity value effects on surface visible recorded monuments.

The scoped study area for this Chapter's assessment was broadly a radius of 1km from the boundary of the KIC lands. The linear nature, and early stage planning of facilitation works resulted in a much reduced scoped study area, up to 100m either side of the indicative alignment of the GNI enhancement works and up to 50m of existing power lines subject to EirGrid uprating.

15.3.2 Baseline Scenario/Likely Future Receiving Environment Analysis Methodology

The baseline/future receiving environment analysis for this Chapter has been undertaken in accordance with the EPA Guidelines on the Preparation of an EIAR (EPA, May 2022) and all other documents outlined above.

RECEIVED: 18/07/2023

Baseline Scenario Analysis Methodology

The information used to describe the current state of the environment (baseline scenario) has been gathered from a desk-based study of standard data sources in respect of archaeology and cultural heritage as described in Section 15.3 Methodology. The desk-based study is a programme of research of the historic and cultural environment that facilitates an understanding of the evolution of historic landscape character and human use of landscape through time, and allows for the identification of heritage assets, resources and cultural associations within a defined study area. The desk-based study of the KIC lands was supported by an on-site inspection.

The analysis methodology used in relation to the facilitation works was at a higher level than the methodology used in relation to the KIC lands, in consequence of their extensive linear nature and early stage planning. The GNI gas transmission line was analysed for likely significant effects using the key data sources in respect of archaeology, namely the Sites and Monuments Record (SMR) and Record of Monuments and Places (RMP), the Topographical Files of the National Museum of Ireland and the Excavations Database. EirGrid uprating alignments were analysed on the basis of the Sites and Monuments Record (SMR) and Record of Monuments and Places (RMP), as the likely significant effects will relate to potential direct impact on a recorded monument or archaeologically sensitive zone in proximity to existing infrastructure. The facilitation works were not subject to a site inspection.

Likely Future Receiving Environment Analysis Methodology

There is no modelling software or tools in the context of archaeology and cultural heritage to predict the likely future receiving environment in the event of a Do Nothing Scenario. The likely future receiving environment analysis methodology is based on expert opinion and on existing trends.

15.3.3 Impact Assessment Methodology

The significance of likely effects has been classified by professional consideration of the sensitivity of the archaeology and cultural heritage resource and the magnitude of the potential effect. The assessment of effects has been undertaken in accordance with the *EPA Guidelines on the Preparation of an EIAR* (EPA, May 2022), and in accordance with industry guidelines, including the National Roads Authority *Guidelines for the Assessment of Archaeological Heritage Impacts of National Road Schemes* (NRA, 2005).

Type of Effect

The criteria for assessing the type of effect are presented in Table 15.1.

Type of Effect	Description

Direct	Occurs where the archaeological or cultural heritage resource is physically located within the footprint of development, resulting in the partial or total removal of the resource. The effect can be on the fabric of the heritage resource, as well as on setting.
Indirect	Changes to an archaeological or cultural heritage resource that is produced in consequence of development, but away from the project site.
Residual	The degree of change in the archaeological or cultural heritage environment or resource that will occur after proposed mitigation measures have taken effect.
Cumulative	The addition of many small effects to create one larger, more significant, effect.
None predicted	Occurs where the archaeological or cultural heritage resource is not adversely or positively affected by development.

Table 15.1: Type of Effect

RECEIVED: 18/07/2023

Quality of Effect

The criteria for assessing the quality of effect are presented in Table 15.2.

Quality of Effect	Description
Positive	A change that will improve or enhance an archaeological or cultural heritage asset or setting.
Negative	A change that will detract from or permanently remove an archaeological or cultural asset or association.
Neutral	A change that does not affect the archaeological or cultural heritage resource.

Table 15.2: Quality of Effect

Sensitivity Criteria

The criteria for assessing the sensitivity of the baseline environment are presented in Table 15.3.

Sensitivity of Receptor	Definition
High	The receptor has no or low ability to absorb change without fundamentally altering its present character, and / or is of high environmental value in an international context, such as World Heritage Sites, and is of high environmental value in a national context, such as National Monuments, recorded monuments (RMP), newly identified archaeological sites, or undesignated archaeological and cultural heritage assets.
Medium	The receptor has moderate capacity to absorb change without significantly altering its present character, and / or has environmental value in a regional context.
Low	The receptor is tolerant of change without detriment to its character, has low environmental value, or local importance. Includes undisturbed greenfield areas and riverine environs, which have an inherent archaeological potential.

Sensitivity of Receptor	Definition
Negligible	The receptor is resistant to change and is of little environmental value, or has little or no value at local or any other scale. Can include areas previously heavily disturbed by groundworks or where groundworks have been previously resolved

Table 15.3: Sensitivity Criteria

RECEIVED: 18/07/2023

Magnitude of Change

The criteria for assessing the magnitude of change are presented in Table 15.4.

Magnitude of Change	Definition
High	A fundamental change to the baseline condition of the archaeological or cultural heritage resource, leading to total loss or major alteration of character, including key visual or other relationship, such as an extensive change in setting.
Medium	A material, partial loss or alteration of character relating to the archaeological or cultural heritage resource, including a change in setting.
Low	A slight, detectable, alteration of the baseline condition of the archaeological or cultural heritage resource.
Negligible	No change or effect, or a barely distinguishable change from the baseline condition of an archaeological cultural heritage resource.

Table 15.4: Magnitude of Change

Significance of effects

The definition of the significance of effects are presented in Table 15.5.

Effects	Definition
Imperceptible	An impact capable of measurement but without noticeable consequences.
Not Significant	An impact which causes noticeable changes in the character of the environment but without significant consequences.
Slight	An impact which causes minor changes in the character of the environment and does not affect the archaeological and cultural heritage resource in a moderate or significant manner.
Moderate	An impact that alters the character of the environment in a manner consistent with existing and emerging baseline trends. A moderate impact arises where a change in the character of an archaeological site is proposed, which although noticeable, is not such that the archaeological integrity of the site is compromised, and which is reversible. This arises where an archaeological feature can be incorporated into modern day development without damage and that all procedures used to facilitate this are reversible.
Significant	An impact which, by its magnitude, duration or intensity, alters an important aspect of the environment. An impact like this would be

Effects	Definition
	where part or all of a site would be permanently impacted upon, leading to a significant loss of character, integrity and data about the archaeological/ cultural heritage asset.
Very Significant	An impact which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.
Profound	Applies where mitigation would be unlikely to remove adverse impacts. Reserved for adverse, negative impacts only. These impacts arise where the archaeological or cultural heritage resource is completely and irreversibly destroyed by a proposed development.

RECEIVED: 18/07/2023

Table 15.5: Significance of Effects

15.4 Baseline Scenario/Future Receiving Environment Analysis

15.4.1 Current State of the Environment (Baseline Scenario)

Principal Works

Site Description

The KIC lands at Barnhall Road are largely developed and landscaped lands containing the re-branded Liffey Business Campus (formerly known as the Hewlett Packard Campus), which was preceded by the Irish Meat Packers facility, which in turn had developed at, and incorporated the site of a substantial residence once named Parsonstown, after the townland in which it was sited.

Parsonstown townland (civil parish of Donaghcumper, barony of Salt North) extends from the River Liffey to the south and south-east, northwards to Barnhall and Rinawade Upper townlands, and is bordered to the west partly by Castletown townland, containing Castletown House and demesne, and Rinawade Lower townland, partly bordering Leixlip Demesne to the east. Of these townlands, the KIC lands encompasses the majority of Parsonstown and Rinawade Lower, and parts of Rinawade Upper and Barnhall.

The placename Parsonstown has origins in the medieval period, being variously referred to as *Parsoneston* (1344/5), *Personestoun* (1462) (Colgan 2005), *Personston* (1540-1541), and Parsonstowne (Civil Survey 1654) (www.logainm.ie). Colgan (2005, 148) has suggested that the name may derive from a one time resident parson, having noted that an 1752 map of Co. Kildare by Noble and Keenan shows a church on the north bank of the River Liffey at the south end of the townland. Colgan (2005, 148) traces a reference to Parsonstown dating from 1344-45, when a deed outlined the lease of the manor of Parsoneston by Ralph Pedilowe, on behalf of Christ's Church, Dublin to Richard Bakepus, witnessed, amongst others, by the prior of St Wolstan's. There are further deeds and records relating to changes in landholders of Parsonstown lands through subsequent centuries. Parsonstown may have had a manor-house, reputedly still standing in 1671 (Boylan n.d., in Breen 1995). This could have been located on the site of the later Parstonstown residence, in office use as part of the Irish Meat Packers facility (Breen 1995); alternatively, it may have been located closer to the bank of the River Liffey to the south of the townland. However, the Civil Survey, a survey of landholdings carried out in 1654-56, makes no mention of a building on lands at Parstonstown. Separate sources date the Parsonstown residence, which was later known as Barn Hall, both to the 18th century (Colgan 2005, 148) and to 1823 (Boylan n.d., in Breen 1995). The residence was removed at an unknown date in advance of the Hewlett Packard Campus development.

RECEIVED: 18/07/2023

The modified nature of the historic cultural landscape at the KIC lands, which began in modern times with the development of the Irish Meat Packers Facility, has also arisen as a result of the development of the M4, opened in 1994, through Rinawade Upper and Barnhall townlands, and further developed with the Celbridge Interchange, completed in 2003, partly to service the needs of the Hewlett Packard Campus, the construction of which commenced in the mid-1990s. The Barnhall RFC grounds, which border the southern boundary of KIC lands, close to the 'New Bridge' spanning the River Liffey, are historically tied to the Irish Meat Packers, the club being founded by employees of the Irish Meat Packers in 1969, and purchasing its grounds from the Irish Meat Packers in 1986 (mubarnhall.com/history; accessed 25.01.2023). The nearby 'New Bridge', and present alignment of the Celbridge Road (R404), forming the eastern boundary of the KIC lands, were further infrastructural upgrades servicing the Hewlett Packard Campus. The 'New Bridge' marks the location of a medieval bridge, constructed 1308, replaced in 1949, and subsequently upgraded, possibly also marking an earlier fording point, and which provided a key link between medieval settlement on both banks of the River Liffey, the early 13th century Augustinian priory being on the south bank at St. Wolstans and an early 15th century castle being sited in Castletown townland.

The present Cois Abhann road, aligned west from the 'New Bridge' into Castletown Demesne at the Batty Langley gate lodge, may well have medieval origins. This road currently forms part of the way-marked 'Arthur's Way Heritage Trail', between Leixlip and Castletown House, which celebrates the association of Arthur Guinness (the founder of the Guinness brewery) with a number of historic sites across north-east Co. Kildare, inclusive of both Leixlip and Celbridge. Arthur Guinness was born in Celbridge in 1725, and founded his first brewery in Leixlip, before moving the brewery to Dublin in 1759. The trail is a 16km walking and cycle trail, commencing in Leixlip and passing by way of the Wonderful Barn via the Celbridge Road (R404) (intokildare.ie/arthurs-way).

Archaeological and Historical Background

The existing archaeological record demonstrates that the KIC lands and surrounding area was a focus of settlement in the prehistoric period. This was probably owing to the area's proximity to the River Liffey, and to nearby fording points, one of which is recorded to the River Liffey at Leixlip (KD011-036----), the exact location of the ford being unknown. Celbridge is also reputed to be situated where the *Sli Mor* (an ancient route from Dublin to Celbridge and to the west) forded the Liffey. The KIC lands have to date produced prehistoric evidence in the form of a polished-stone axe (in Parsonstown townland), a flint blade (in Rinawade Upper townland) and a *fulacht fiadh* (KD011-062----) (in Barnhall townland), each recorded as part of the development of the Hewlett Packard Campus in the mid-1990s.

An Early Mesolithic flint assemblage was exposed in Cooldrinage townland (DU017-079----), south of Leixlip, approximately 1.1km north-east of the KIC lands, along with a ring-barrow (DU017-075001), part of the Bronze /Iron Age burial tradition (*c.* 2400 BC – AD 400). A mound (KD011-018----) in Leixlip Demesne on the west bank of the river Liffey, approximately 870m east of the KIC lands, may also be of similar age. Development of the Celbridge Interchange in Castletown and Kilmacredock Upper townlands, from approximately 600m west and north-west of the KIC lands, revealed a cluster of archaeological sites, including a Late Bronze Age ring-ditch, corn-drying kilns, *fulachta fiadh,* burnt mounds, habitation evidence and smelting furnaces, indicative of industrial or metalworking activity. In the front lawn of Castletown House, approximately 700m west of the KIC lands, a cemetery of pit burials (KD011-060----) associated with pottery of the Early Bronze Age was exposed as part of on-going restoration works by the Office of Public Works. On the south side of the River Liffey, two possible ring-

RECEIVED: 18/07/2023

ditches (KD011-071----, KD011-072----), identified as circular cropmarks in Ballyoulster townland, from approximately 830m of the KIC lands, may be prehistoric barrows or round houses, but equally could be modern in nature.

The archaeological record also demonstrates that the area was densely settled throughout the medieval period (5th century to *c*. 1550-1600). Early medieval (5th-12th century) settlement is represented by a possible early monastic site at Kilmacredock Upper (KD011-002---), approximately 1.2km north-west of the KIC lands. Celbridge (from the Irish *Kildrought*, the church of the bridge), derives its name from an early monastery founded by St. Mochua of Clondalkin (KD011-012004-), thought to have been located at, or near the site of the later medieval church (KD011-012005-) and graveyard (KD011-012006) in the town. The 'donagh' (from *domhnach*, church) element of the placename Donaghcumper, to the south of the River Liffey, west and south-west of St. Wolstans, also suggests an early foundation, but of which there is no obvious visible evidence. A later medieval parish church (KD011-013----) and graveyard (KD011-013001) at Donaghcumper, approximately 1.1km to the south-west of the KIC lands, represent the known ecclesiastical remains in the townland.

Leixlip (*Leim an Bhradáin*) derives from the Scandinavian 'Lex-hlaup', translated as 'salmon leap' (a name applied to a former waterfall on the River Liffey upriver of the town), which is suggestive of a Viking settlement at the confluence of the River Liffey and Rye Water, the area forming part of the broader hinterland of Viking Dublin (O Drisceoil & Fitzgibbon 2017). In the late-12th/early-13th century, Leixlip was also known by the name 'Ernia' or 'Hernie', possibly derived from *An Urnaidhe*, meaning oratory, which may also indicate the presence of a pre-Norman ecclesiastical site (Bradley *et al* 1986). Physical evidence of a Viking settlement at, or near Leixlip has yet to be found, although a stirrup-ringed crutch-headed pin, a pin type that may have developed in Viking Dublin is provenanced to Leixlip. A probable Viking grave is also provenanced to Barnhall townland, or to the lands of Barnhall, discovered in *c.* 1785. Known only from an account published in Joseph Cooper Walker's (1788) *An Historical Essay on the Dress of the Ancient and Modern Irish*, the published evidence suggests the grave was an inhumation (buried human remains) accompanied by an iron axe and some other artefacts (Harrison & O Floinn 2014). A tentative location of the burial is to the Wonderful Barn, where it may have been uncovered during the structure's construction, in the earlier period 1741-1743, associated with developments initiated by the then owner of Castletown House, Katherine Conolly (Harrison & O Floinn 2014). Alternatively, the burial may have been discovered anywhere in Barnhall, or Rinawade Upper or Rinawade Lower townlands (O Drisceoil & Fitzgibbon 2017).

The earliest definite evidence for settlement at Leixlip follows the Anglo-Norman conquest, with the granting of the manor of Leixlip to Adam de Hereford, who established a castle - Leixlip castle (KD011-004002-) - and borough in the late 12th-century. The church of St. Mary of Hernie (KD011-004003-) at Leixlip was granted by Adam de Hereford to the Abbey of St. Thomas in Dublin before 1212. St Wolstan's, known as 'Scala Caeli' (Steps of Heaven), was founded by Adam de Hereford *c*. 1205 with Richard, the first prior, as an Augustinian foundation (KD011-014----). In the early 17th century a house (KD011-028----) was reportedly built by John Allen to the east of the priory, the priory being suppressed in 1536 and the lands granted to the Lord Chancellor, also John Allen, where it developed in subsequent centuries as a landscaped estate. No ecclesiastical buildings associated with the priory survive, and the upstanding remains comprise the defensive, enclosing elements of the priory. The priory's ruins presented a gothic aspect, and being visible from the north bank of the River Liffey, from within the grounds of Castletown House, was a considered visual element in landscape developments in the Castletown estate grounds (O' Kane 2004).

RECEIVED: 28/07/2023

Castletown (i.e. the town of the castle of Celbridge), intimately linked with the development of Celbridge, similarly owes its origins to medieval settlement. Celbridge (*Kildrought*), understood to be the location of an Early Christian monastery associated with St. Mochua, and thereby a focus of pre Anglo-Norman settlement, formed part of the lands granted to Adam De Hereford before 1176. De Hereford subsequently granted the manor to his brother John, who was in turn succeeded by his son Thomas De Hereford, who is reputed to have built a castle from 1202. Celbridge subsequently passed to the de Rochfords, who held it until around the mid-14th century, and subsequently to the Earl of Kildare, Maurice FitzThomas (*c.* 1397-9). There is a lack of early references to the castle, and it is thought as a result that a castle at Castletown may only have been constructed after the Earl of Kildare gained possession of the manor in *c.* 1397-9 (Bradley *et al* 1986). The castle (KD011-023----) that stood in Castletown townland was described as 'a hall built after the Irish or country manner, covered with straw'. In 1587, the manor was granted to John Dongan, and the Dongan's held it for most of the 17th century. The evidence indicates that the castle stood in the immediate vicinity of Castletown House, to its south-west side, at the location of the estate's farm buildings. The medieval castle and estate were acquired by Speaker William Conolly from the Dongan family in 1709, with construction of a new house, the present Castletown House, beginning in 1722 (O'Kane 2004).

The proximity of the River Liffey will have influenced the on-going settlement of the wider area surrounding the KIC lands area in the post-medieval period, the period after *c*. 1550-1600, when the area was heavily influenced by 18th century landscape design, such as developed at Leixlip Demesne, at St. Wolstans and at Castletown. The designed landscape at Castletown extended eastward to the boundary with the KIC lands, the boundary being both a townland boundary between Castletown and Rinawade Upper, Rinawade Lower and Parsonstown, as well as a civil parish boundary, Castletown being in civil parish of Kildrought and Rinawade Upper, Rinawade Lower and Parsonstown being in the civil parish of Donaghcumper. The landscape developments from the period of the Conolly's onward will have been imposed on the pre-existing Dongan landscape (O'Kane 2004), and there is evidence on this part of the River Liffey that landscape design extended beyond the limit of the larger demesnes. There is evidence of united landscape efforts and the use of topography and structures in the surrounding landscape on which to fix axial avenues (O'Kane 2004) or views, such as the axis to the Conolly obelisk, aligned to the north-west of Castletown House, and that to the Wonderful Barn, to the north-east of Castletown House.

The large granary that came to be known as the Wonderful Barn, built 1743, formed part of the 18th century landscape of Barn Hall, which was probably built in the 1740s as the seat of Joseph Cooper, who was a prominent figure in the management of the Conolly estate (O Drisceoil & Fitzgibbon 2017). Cooper's estate encompassed the townlands of Barnhall, Rinawade Upper and Rinawade Lower, and in 1773 an additional 70 acres at Parstonstown was leased to his estate. In the period 1847-1864, when Richard Griffith oversaw the first full scale valuation of property in Ireland i.e. the Primary Valuation, also known as Griffith's Valuation, all of the land in Parsonstown (just over 103 acres) to the west of the Celbridge Road (R404) and to the north of Cois Abhann, accessing the Castletown estate, was held by a single landholder, Humphries Peare, who leased a house, offices and land to John Smith. Rinawade Lower was leased by Edward Coley from Thomas Conolly, Esq. of Castletown, Thomas Conolly also holding the whole of Rinawade Upper. Landownership at this time highlights the historic connection of the Castletown Estate with Rinawade Upper and Rinawade Lower townlands, which partly form the KIC lands, and between the 18th century

Barn Hall estate (the Wonderful Barn) with Rinawade Upper, Rinawade Lower and Parstonstown townlands.

RECEIVED: 18/07/2023

The site of the proposed development stands adjacent lands historically associated with the highly significant Castletown Estate, home of William Connolly, and largely development during the C18th as one of Ireland's grandest and most extensive examples of Georgian architectural and landscape designs. The site of the proposed development consisted of a separately owned estate, adjacent to the formally laid out parkland and demesne containing Castletown House proper. While visible from some rooms in the grand house, and from some vantage points within its surrounding parkland, the site of the proposed development was not the subject of large scaled plantings or other designed landscape exercises, but existed as an adjacent rural agricultural landscape. However, there did exist a long view from the side elevation of Castletown House across the subject site, towards another outlying property that was owned by the greater Castletown Estate, to a large folly structure known as The Wonderful Barn. The planting of rows of trees along portions of this view corridor, close to Castletown House and The Wonderful Barn, is believed to have occurred during the late C18 and early C19th, but there is no evidence that such a grand allee was previously in existence across the fields included in the Parsonstown or Renawade Lower lands, now included within the proposed development. During the late C20th, when the initial stages of development of the Hewlett Packard Industrial Park were planned and begun, additional lines of trees were planted within the development site along the same alignment as the view corridor, and the importance of the view corridor was acknowledged and given a presence across lands that were not historically included in the grand landscape designs.

Historic Cartographic Analysis

The analysis of successive historic maps shows how landscape has evolved over time, and in comparing maps evidence for the presence, alteration or removal of cultural heritage can be traced.

Down Survey Maps (1656-1658)

The Down Survey is a mapped survey carried out between 1656 - 1658 under the direction of Sir William Petty that recorded land confiscated from Irish Catholics to facilitate Cromwellian settlement. The survey recorded townland boundaries, their areas and proprietors, along with detail on roads, rivers, towns, churches, castles, houses and fortifications, as well as topographic and landuse detail. The maps were produced at county, barony and parish level.

The county map of Kildare records the River Liffey and its confluence with the Rye Water, along with bridge crossings, including the crossing at Celbridge (*Killdrough*) and the crossing at the southern boundary of Parsonstown. Tower houses or castles are depicted at 'Lexlip' and 'Castletowne', with 'S Wolstons' named to the south bank of the Liffey. The barony map of Salt and Straffan (Figure 15.1), providing more detail, records 'Parsonstowne' townland and the 'New Bridg' on the River Liffey, with a building sited to the north bank of the River in Parsonstown; this may have been a house or mill on the riverbank. The Castletown lands appear to incorporate the land forming the present Rinawade Lower townland.

A population census of Parsonstown at the time of the Survey recorded 12 people over 15 years living in the townland (Colgan 2005, 149). The Civil Survey, in progress at the time of the Down Survey, records the proprietor of Parsonstown as Lady Allen, who held 50 acres (40 under arable and 10 under shrubby wood), the Allen family being connected with land at Parsonstown from at least 1540-41 (Colgan 2005, 149). The lands at Parsonstown are described in the Civil Survey as directly bordering the land of Castletown on the west side.

RECEIVED: 18/07/2023

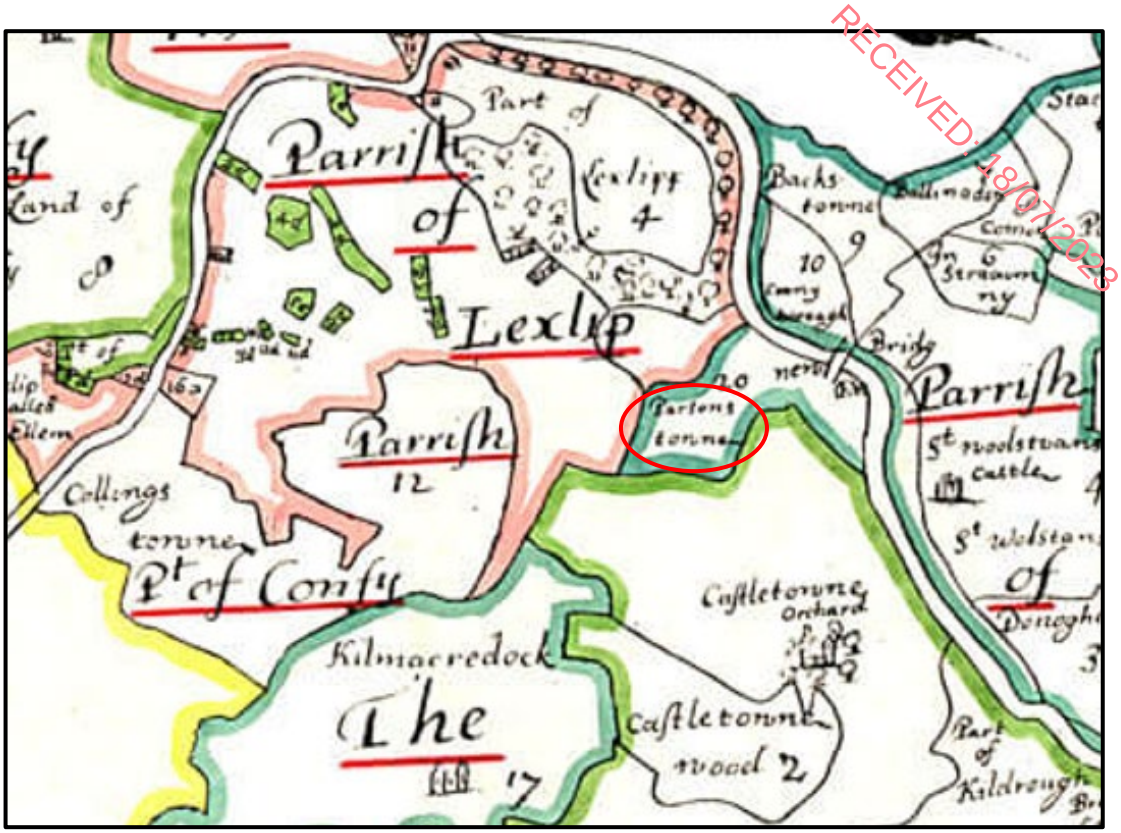


Figure 15.1: Extract from the Down Survey Barony Map of Salt and Straffan, 1656-58, with approximate location of KIC lands highlighted (*in red*) (Source: https://downsurvey.tchpc.tcd.ie).

Noble and Keenan's Map of Kildare (1752)

John Noble and James Keenan published their survey of the county of Kildare in 1752 (Figure 15.2), providing much more detail on the nature of the cultural landscape in the period following the acquisition of Castletown by Speaker William Conolly. The enclosed nature of the Castletown estate dominates to the west of the KIC lands, and the map depicts the Wonderful Barn, annotated 'Magazine', to the north-east of the estate. The placenames 'Loghnamona' (Loughnamona, a former townland from which Barnhall was carved after the 18th century) and Parsonstown are recorded, with a focus of settlement in Parsonstown clearly sited to the west side of the 'New Bridge' river crossing on the southern boundary of the townland. This settlement cluster comprises of at least two buildings, with what appears to be a church set apart a short distance further to the west; the structures are likely to have been sited to the south side of present Cois Abhann road. Leixlip Demesne, with Leixlip castle, is depicted to the east of the KIC lands, the demesne clearly depicted by woodland.



RECEIVED: 18/07/2023

Figure 15.2: Extract from the Noble & Keenan Map of County Kildare, 1752, with Parsonstown placename highlighted (*in red*) (Source: https://www.logainm.ie).

John Rocque's Map of the County of Dublin (1760)

Following his arrival in Dublin in 1754, surveyor and cartographer John Rocque set about producing a series of maps of Dublin City, six in all. His Actual Survey of the County of Dublin (1760, Figure 15.3) reached beyond the city, and even beyond the county boundary to depict the demesnes of Carton Park and Castletown in north Co. Kildare, as well as St. Wolstans on the south bank of the River Liffey opposite Castletown, illustrating the significance of these estates. While no detail is provided on the map of the KIC lands, the map highlights one of the main roads into Castletown, crossing the 'New Bridge' from the south, and entering the demesne at Castletown from the south-east corner, present Cois Abhann road. Three structures are shown on the road on the north bank of the Liffey at the 'New Bridge', and a Porters Lodge is shown at the boundary of the enclosed demesne.

RECEIVED: 18/07/2023

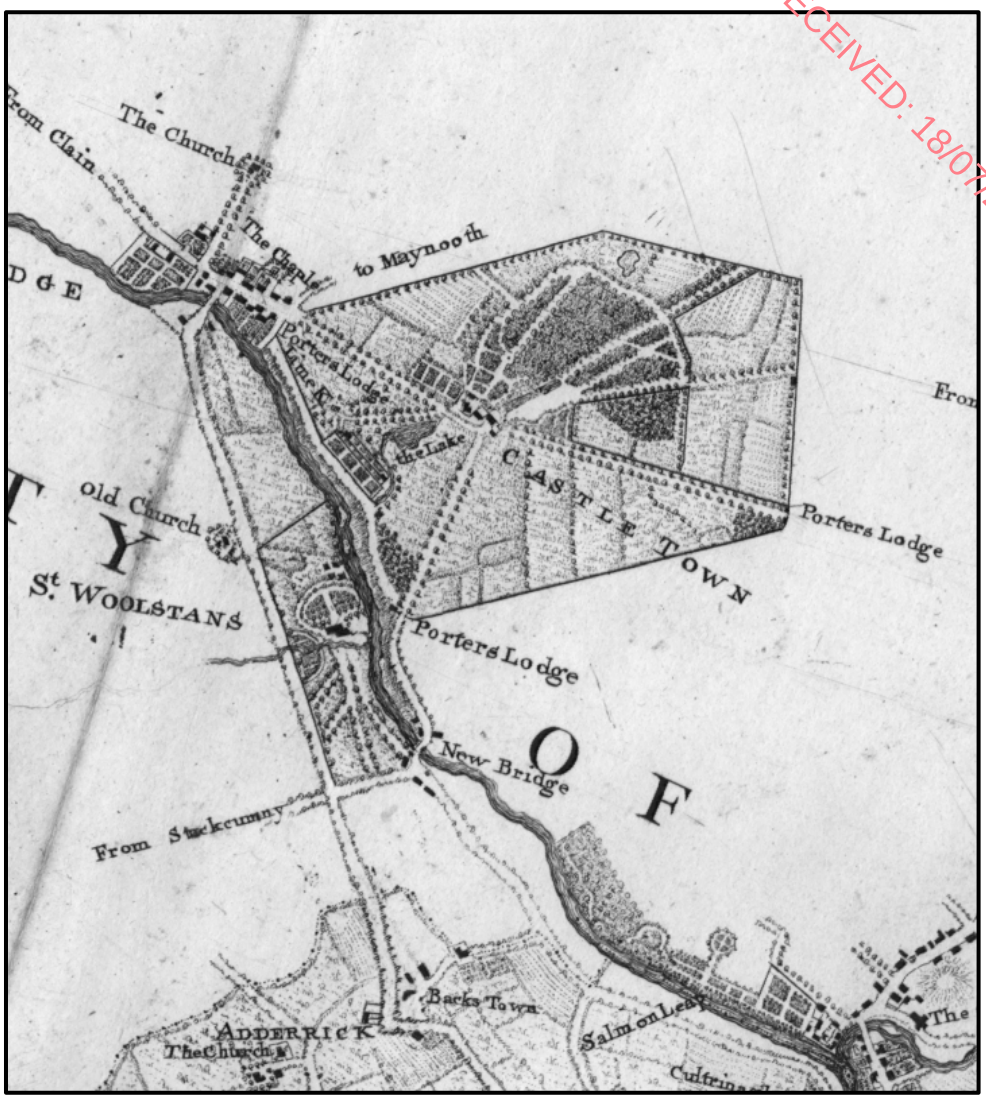


Figure 15.3: Detail from John Rocque's Map of County Dublin, 1760, showing the Castletown Demesne and it tree-lined allees. It is important to note that there is no allee shown running between the side gable of the main house and the Wonderful Barn. Such an allee would run from the house to the lower right corner of this image, and so it appears that this was not the case in 1760. Note that this map was published with north being approximately to the right, instead of straight up, as would be the common convention. (Source: https://www.dublinhistoricmaps.ie).

Alexander Taylor's Map of Kildare (1783)

Taylor, a Scotsman who held the rank of captain in the Corps of Engineers, was employed on a military survey of Ireland from 1781 to 1805, but produced his map of Kildare in a private capacity (Figure 15.4). The map details the landscaped grounds of Castletown, named 'Castletown Park', which included a walkway through a band of woodland on the eastern boundary with Parsonstown. The map records what may be generalised townland boundaries, with Parsonstown shown, but not the present boundaries of Rinawade Upper and Rinawade Lower. Taylor clearly records a watercourse, which formed the north-eastern townland boundary of both Rinawade Upper and Parsonstown. Taylor also records a new road to the

south-east side of Parsonstown, linking the 'New Bridge' to Leixlip, aligned around Leixlip Demesne, which represents the forerunner of the present Celbridge Road (R404). This road was built in the period post 1752. A focus of settlement remains on the River Liffey at the 'New Bridge' in Parsonstown, on present Cois Abhann road, with a mill wheel indicating the presence of a mill. The map is of interest in that it records landscaping through Parsonstown and New Barn, the latter annotating the Wonderful Barn (this placename replaces the earlier townland Loughnamony). The map shows orientation of estates to features in the landscape; a tree-lined 'avenue' is aligned to the north-east from Castletown to the New Barn ('Wonderful Barn') (but lacking trees through Parsonstown townland); a second tree-lined avenue also appears to be aligned between the Back Westown estate and the New Barn ('Wonderful Barn').

RECEIVED: 18/07/2023

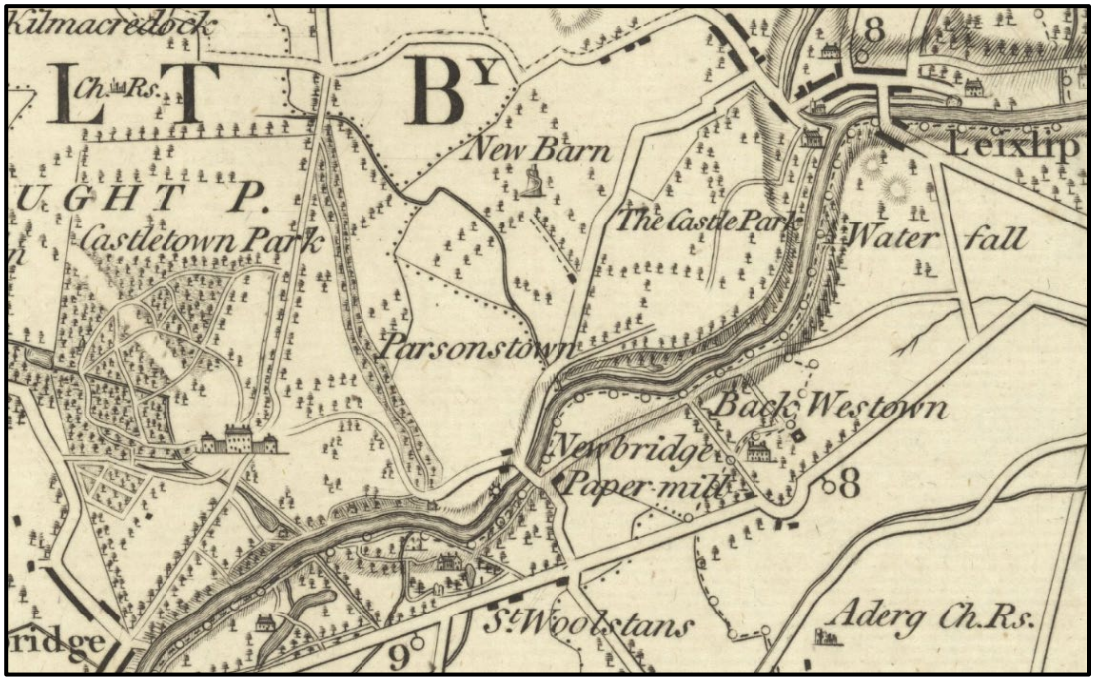


Figure 15.4: Extract from Taylor's Map of Kildare, 1783 (Source: https://digitalarchive.mcmaster.ca).

Ordnance Survey Maps

The first ever large-scale survey of Ireland was undertaken by the Ordnance Survey (OS) between 1829 and 1842, producing highly accurate maps at different scales. The KIC lands in Parsonstown, Barnhall, Rinawade Upper and Rinawade Lower townlands is depicted in detail for the first time on the first edition 6-inch Ordnance Survey (OS) map, Sheet KE011, surveyed 1836, published 1839 (Figure 15.5). Townland boundaries, early 19th century field boundaries and the residential property once situated in Parsonstown are depicted in detail. The latter, named Parsonstown, comprised a large, L-shaped house, with a single linear outbuilding to the rear; the main entrance avenue curved in a slight arch from a gate lodge on the Celbridge Road, having a secondary entrance from the south, which served both the front of the house - annotated Parsonstown – and a rear outbuilding and yard. Established pockets of woodland surrounded the gate lodge and bordered the main entry avenue. A potential walled garden, or at least small enclosed plots are sited to the north side of the house. Boundaries marking an 'avenue' aligned between Castletown and the Wonderful Barn, now depicted next to a residence annotated Barn Hall, are present in Parsonstown and Rinawade Upper townlands. The mill to the south of Parsonstown, on the north bank of the River Liffey, between Cois

Abhann road and the river, is annotated as the Newbridge Flour Mill, sited adjacent to a cluster of buildings on the approach to the south-east entrance to the Castletown estate.

RECEIVED: 18/07/2023

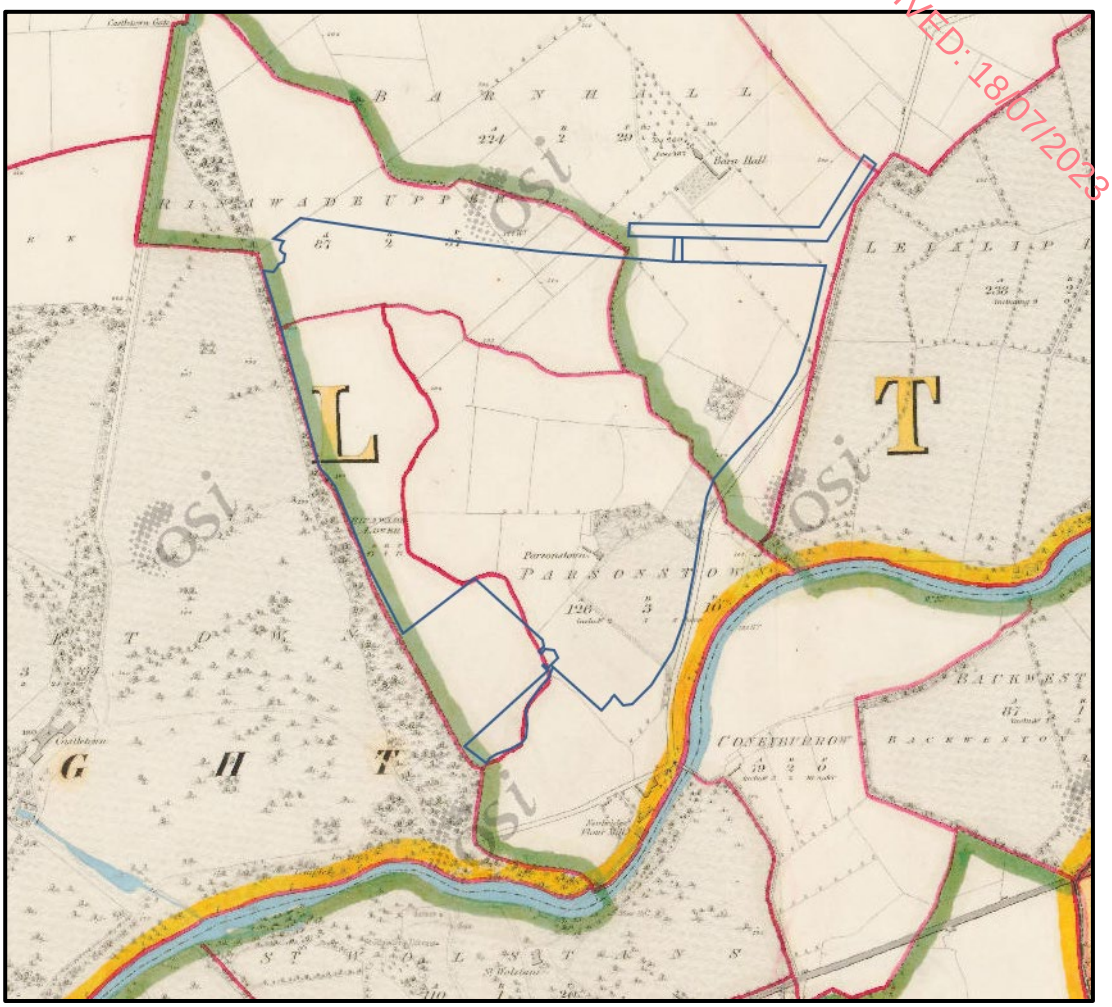


Figure 15.5: Extract from first edition 6-inch OS map, published 1839, with approximate location of KIC lands highlighted (*in blue*)
CYAL50313607© Ordnance Survey Ireland/Government of Ireland.

The revised 25-inch OS map, surveyed 1908, published 1910 (Figure 15.6) records an expansion of the residence in Parsonstown, now named Barn Hall, with the addition of three outbuildings, one a substantial rectangular structure, to the rear of the house. The main entrance has a curved entrance surround, and the gate lodge is enclosed within a yard in a pocket of woodland. Colgan (2005, 149) records that by 1894 William Ronaldson was the resident occupier of Barn Hall; Ronaldson may be responsible for the change in name and expansions undertaken at the residence.

A new large residence, Allan's Grove, is located directly opposite on the Celbridge Road. The layout of the Newbridge Corn Mill on the River Liffey, while now disused, is shown in more detail, its associated mill race extending from a weir in the river (opposite St. Wolstans) in a north-east direction to the mill. A developed building fronting the Castletown access road to the north of the mill, on present Cois Abhann road, is annotated 'Bridge Lodge'. No clear breaches are shown in the Castletown wall on the townland boundary with Rinawade Lower and Parsonstown to suggest and entry/exit in the wall. The boundaries, some of which are

tree-lined, marking an 'avenue' aligned between Castletown and the Wonderful Barn remain in Rinawade Upper and Barnhall townlands, but no evidence remains in Parsonstown.

RECEIVED: 18/07/2023

The cultural landscape remains relatively unchanged into the mid-20th century, at the publication of the last historic 6-inch OS map in 1942. This latter map pre-dated the modern developments that have led to the removal of the Parsonstown/ Barn Hall residence from Parsonstown townland.

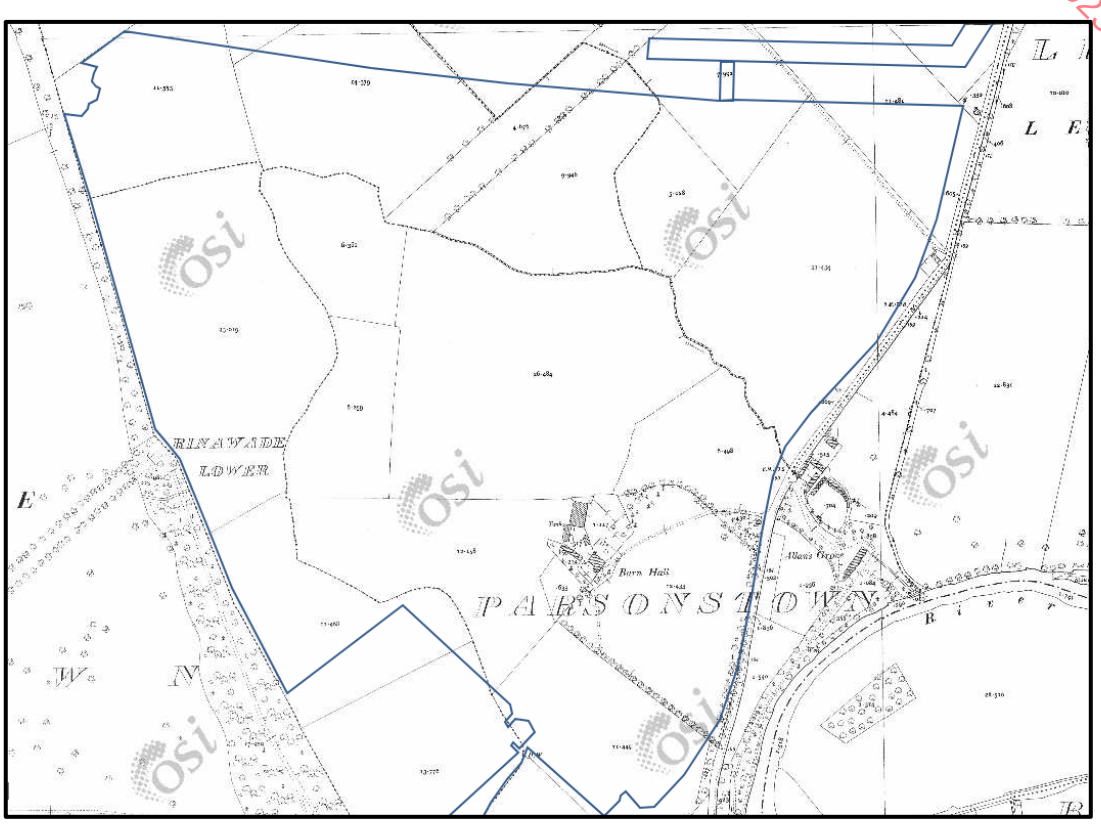


Figure 15.6: Extract from 25-inch edition OS map, published 1910, with approximate location of KIC lands highlighted (*in blue*)
CYAL50313607
© Ordnance Survey Ireland/Government of Ireland.

Previous Archaeological Investigations
The KIC lands, in consequence of the development of the Hewlett Packard Campus, have been subjected to significant archaeological and cultural heritage mitigation to date.

An Environmental Impact Statement (EIS) prepared in association with the Hewlett Packard Campus in 1995 was followed by archaeological testing of potential archaeological features identified in the EIS process. Archaeological testing of four features across the site was carried out by Valerie J Keeley Limited in August-September 1995 under excavation licence **95E0172** (Breen 1995; Figure 15.7). Shallow linear features cut into yellow subsoil containing pottery and glass artefacts of 18th-20th date were interpreted as modern features resulting from cultivation, ploughing or drainage; a clear stone filled field drain, of French drain type, was recorded. No features or deposits of archaeological significance were identified. Two archaeological artefacts were recovered from topsoil, a small mudstone axehead (to the southern part of the RIC lands in Parsonstown townland) and a worked flint flake (to the north-west part of the RIC lands in Rinawade Upper townland).

RECEIVED: 18/07/2023

Archaeological testing was followed by phased archaeological monitoring during construction of the Hewlett Packard Campus. Archaeological monitoring of topsoil stripping between 21st November 1995 and 8th January 1996 was carried out by Valerie J Keeley Limited under excavation licence **95E0264** (Gracie 1996a; Figure 15.7). Archaeological monitoring continued intermittently between 29th January and 14th May 1996 under the same licence. Sod and topsoil were stripped to approximately 0.4m below the surface throughout. Further modern drains, including stone filled drains of French drain type were recorded, along with the presence of modern pottery. No features or deposits of archaeological significance were identified during the period 21st November 1995 to 8th January 1996.

A spread of black soil and charcoal approximately 20m in diameter was identified near the entrance to the Campus off the Celbridge Road (R404), to the south-west side of the entry, during monitoring between 29th January and 14th May 1996. This area was subsequently fully investigated in May 1996 under excavation licence **95E0264** (Gracie 1996b), resolving the archaeology of the site. The archaeological remains comprised two main black silt or black clayey silt deposits containing burnt stone and occasional charcoal, which covered a series or pits, along with a number of smaller depressions or black clayey silt deposits. The remains were interpreted as a possible *fulacht fiadh*, a prehistoric cooking site, the pits possibly being used to boil water. No archaeological artefacts were recovered, although modern nails were found in upper layers. The remains were exposed to the north side (20m-30m) of a stream marking the townland boundary between Parsonstown and Barnhall, as well as the civil parish boundary between Donaghcumper and Leixlip. The excavation report also noted the site was located on what had been a turlough, where a natural pond or lake would have been formed through the seasonal rise in the water table (Gracie 1996b), thereby providing a natural source of water.

On-going archaeological monitoring at the Hewlett Packard Campus continued between September 29th and October 8th 1997 under excavation licence **96E0327** (Lynch 1998), with no further archaeological features, deposits or artefacts being recorded.

Associated infrastructural developments, including the provision of services/pipelines, both at the Hewlett Packard Campus and off-site, were subject to archaeological mitigation, as was a realignment of the Celbridge Road (R404) on the east boundary and an upgrade of the 'New Bridge' on the River Liffey.

Archaeological monitoring was carried out intermittently between 25th April and 11th June 1996 under excavation licence **96E0102** (Gracie 1996c). Topsoil stripping on two pipeline corridors (20m-30m wide strips), one extending from the Campus entrance to Leixlip Reservoir on the opposite side of the Celbridge Road (R404), the second extending from the M4, also to the east side of the Celbridge Road (R404), were monitored. Closest to the M4 it was noted that boulder clay had been redeposited to the south side of the motorway during construction. Monitoring of the removal of a hedge and pavement to the west side of the Celbridge Road was also monitored. No archaeological features, deposits or artefacts were recorded.

Archaeological assessment, including an underwater assessment, was carried out at the 'New Bridge' by Valerie J Keely Limited (Keely 1995, 1996). The assessment confirmed the 'New Bridge' is partially built on the remains of the original medieval bridge, built *c.* 1308. A pier and stone paving from the original medieval bridge lies in position below the central arch of

the reconstructed bridge. The underwater assessment extended 50m upriver of the bridge, involving a visual assessment, probing in the riverbed to a depth of 1m (or to bedrock level) and a remote sensing survey to locate metal objects. With the exception of a lead musket ball, recovered artefacts were modern in origin. Stone walls constructed in 1949 run along the sides of the river bed. Archaeological testing and monitoring under excavation licence **95E0178**, both underwater and on land areas to be affected by the upgraded bridge structure did not reveal any additional archaeological features, deposits or artefacts.

RECEIVED: 18/07/2023



Figure 15.7: Plan showing locations in KIC lands (*in blue*) that have been subject to archaeological resolution and areas of archaeological sensitivity (Source: Shanarc Archaeology).

Topsoil stripping on the M4 Celbridge Interchange was subject to archaeological monitoring in 2001 under excavation licence **01E0306**, including the slip road eastwards of the interchange that provides access to the KIC lands from the north-west (known as the Hewlett Packard Link). 18 potential archaeological sites were identified during monitoring, sited to Kilmacredock Upper, Castletown and Easton townlands. None of the identified archaeological features were located on the Hewlett Packard Link (slip road east of the interchange); the majority were identified and excavated on the interchange, and on the R449 northwards. Prehistoric/Bronze Age remains included a ring-ditch, enclosure ditches,

small pits and burnt hearth and a possible *fulacht fiadh*, with metalworking and habitation evidence; later remains was evidenced by Early-medieval corn-drying kilns. Some features are noted as having continued outside the road take, which will remain unexcavated outside the road network at the interchange. No records of archaeological investigations associated with the original construction of the M4 pre-2000 have been identified.

RECEIVED: 18/07/2023

To the south-west section of the KIC lands, and partially incorporating the KIC lands on this boundary, archaeological test excavation was carried out by Shanarc Archaeology Ltd. in October 2020 under excavation licence **20E0613** (Barry and Shanahan 2020) in advance of the DB Schenker development. The stratigraphy was described as a mid-brown silt topsoil above light brown clayey silt subsoil, with topsoil containing sherds of 19th/20th century pottery. No archaeological features, deposits or artefacts of significance were recorded. Stone filled drainage features consistent with modern use of the site were exposed. The topsoil layer was very thin in places, indicating that previous topsoil stripping or disturbance had occurred on site to the northern part of the tested area; disturbance was also demonstrated by the presence of modern construction related refuse in a similar area.

To the north side of the M4, the Wonderful Barn has been the focus of prior archaeological investigation. The grounds, inclusive of courtyards, a walled garden and an entrance courtyard were subject to a geophysical survey under licence **15R0086** and **15R0144**, to identify and map any remains of the formal layout and former structures associated with the site, to assist with reconstructing the nature of the garden. Geophysical survey was followed by archaeological excavation carried out in 2015 and 2016 on behalf of Kildare County Council under excavation licence **15E0324**. The combined works were carried out as a research exercise to inform future conservation and landscape restoration works around the Wonderful Barn (O Drisceoil & Fitzgibbon 2017). A picture of the 18th century landscape of Barn Hall, the original estate name prior to the use of the name 'Wonderful Barn', was compiled as a result of the investigations.

Approximately 19 hectares of ground enclosing the Wonderful Barn and its formal grounds from west to east was subject to a geophysical survey under licence **17R0132** and test excavation under excavation licence **17E0333** as mitigation in advance of a large residential housing development (Kildare County Council Planning Ref. 05/182). A circular enclosure interpretated as the remains of a ringfort settlement of early medieval date was recorded, with further potentially associated ditches to its north. The sub-surface remains were directly north-west of the Wonderful Barn, on the eastern edge of pre-existing housing on Rinawade Avenue/Rinawade Grove, and have been development under Planning Ref. 05/182.

Previous Archaeological Artefacts

No findspots of artefacts are provenanced in the topographical files of the National Museum of Ireland to Parsonstown, Rinawade Lower, Rinawade Upper or Barnhall townlands.

Archaeological investigations carried out at the KIC lands as part of the development of the Hewlett Packard Campus in the mid-1990s did result in the recovery of stray archaeological artefacts from topsoil at the site. The artefacts comprise a stone axe (in Parsonstown townland) and a flint blade (in Rinawade Upper townland), both of prehistoric date.

Aerial Photographs

An assessment of aerial images formed part of the archaeological assessment carried out for the Environment Impact Statement (EIS) prepared in association with the Hewlett Packard Campus development. Potential archaeological features identified as cropmarks on aerial

images were investigated in 1995 under excavation licence **95E0172** (Breen 1995; Figure 15.7), none of which proved to be archaeological in origin.

RECEIVED: 18/07/2023

The following aerial photographs available on the OSi Geohive Map Viewer were consulted during the preparation of this chapter: 1995, 1999-2003, 2004-2006, 2005-2012, digital globe 2011-2013 and 2013-2018. The images trace the development of the KIC lands from the era of the Irish Meat Packers facility (Figure 15.8) to the present Kildare Innovation Campus. While no cropmarks representing potential sub-surface archaeological features are discernible on the images, the images do clearly show parts of the KIC lands with surviving elements of the preceding enclosed agricultural landscape. Remnant field boundaries survive to the north-west and west parts of the KIC lands, on the boundary with Castletown; a number of the remnant sections represent the Rinawade Lower townland boundary with Rinawade Upper and with Parsonstown (Figure 15.7).



Figure 15.8: Extract from aerial image dated 1995 showing commencement of demolition works at the Irish Meat Packers as part of the Hewlett Packard Campus construction (Source: webapps.geohive.ie/mapviewer).

Aerial photographs taken during the development of the Hewlett Packard Campus from 1995 (Figure 15.9) show the extent of the former groundworks undertaken at the KIC lands.



Figure 15.9: Aerial photograph dated February 1996 showing extent of groundworks undertaken as part of the Hewlett Packard Campus development (Source: Tom Kavanagh, Estate Manager, Liffey Business Park).

National Monuments
No National Monument either in the ownership of the State or vested in Kildare County Council is located at, or within 1km of the KIC lands.

The closest National Monument, in State ownership, is the Connolly Folly, National Monument No. 681, sited in Barrogstown West townland approximately 2.8km north-west of the KIC lands.

Register of Historic Monuments (RHM)
No monument listed on the Register of Historic Monuments (RHM) is located at the KIC lands.

The closest monument listed on the Register is the medieval bridge site on the River Liffey on the Parstonstown, St Wolstans and Coneyburrow townland boundary, approximately 150m south-east of the KIC lands.

Sites and Monuments Record (SMR) and Record of Monuments and Places (RMP)
The site of a recorded monument, SMR KD011-062----, classed as a *fulacht fiadh*, is located at the KIC lands. This monument has been fully excavated and resolved as part of the development of the Hewlett Packard Campus, and is not scheduled for inclusion in the statutory RMP. Its location is represented by a red dot on Figure 15.10. No RMP sites are located at the KIC lands.

A total of 35 additional monuments are recorded within an approximate 1km radius of the KIC lands, the nature of which are described in the earlier section on the Archaeological and Historical Background. These monuments are listed in Table 15.6: distance measurements

RECEIVED: 18/07/2023

are taken from the boundary of the KIC lands to the outer edge of the monument's Zone of Notification (where one is recorded).

Zones of Notification, which are designated by the National Monuments Service, are provided to identify monuments that are scheduled for inclusion in the next issue of the statutory RMP, and to identify monuments for the purpose of notification under Section 12 of the 1994 National Monuments (Amendment) Act. These zones are shaded pink, as shown on Figure 15.10. SMR sites deemed to be archaeologically resolved or SMR sites not scheduled for inclusion in the statutory RMP are generally not shown with an associated Zone of Notification.



Figure 15.10: Location of KIC lands (*in blue*) relative to recorded monuments (*red dots*) and associated Zones of Notification (*shaded pink*)
CYAL50313607
© Ordnance Survey Ireland/Government of Ireland.

SMR No.	Class	Townland	ITM Easting	ITM Northing	Distance (m)
DU017-014----	Weir - fish	Backwestonpark	700397	735126	880m
DU017-087----	Bridge	Backwestonpark	700408	735118	880m
KD011-011----	Bridge	Coneyburrow (Donaghcumper Ed),Parsonstown (Celbridge Ed),St. Wolstans	699183	734154	110m
KD011-014----	Religious house - Augustinian canons	St. Wolstans	698686	733727	330m
KD011-017----	Bridge	Leixlip Demesne	700404	735112	880m
KD011-017001-	Weir - fish	Leixlip Demesne	700404	735112	880m
KD011-018----	Mound	Leixlip Demesne	700148	734760	825m

SMR No.	Class	Townland	ITM Easting	ITM Northing	Distance (m)
KD011-023----	Castle - unclassified	Castletown	697785	734091	800m
KD011-028----	House - 17th century	St. Wolstans	698861	733750	370m
KD011-031----	Redundant record	Barnhall	698599	735636	380m
KD011-032----	Field system	Kilmacredock Upper	697343	735652	870m
KD011-042----	Ring-ditch	Castletown	697625	735308	630m
KD011-042001-	Kiln - corn-drying	Castletown	697625	735311	630m
KD011-042002-	Enclosure	Castletown	697626	735306	630m
KD011-043----	Habitation site	Kilmacredock Upper	697652	735457	670m
KD011-044----	Habitation site	Kilmacredock Upper	697656	735474	700m
KD011-045----	Burnt mound	Kilmacredock Upper	697768	735466	650m
KD011-046----	Fulacht fiadh	Kilmacredock Upper	697812	735748	720m
KD011-047----	Burnt mound	Kilmacredock Upper	697915	735815	700m
KD011-048----	Habitation site	Kilmacredock Upper	697910	735856	730m
KD011-049----	Burnt mound	Kilmacredock Upper	698000	735957	765m
KD011-050----	Kiln - corn-drying	Kilmacredock Upper	697660	735366	665m
KD011-052----	Habitation site	Collinstown (Leixlip Ed)	698105	736142	900m
KD011-058----	Habitation site	Kilmacredock Upper	697707	735431	640m
KD011-059----	Metalworking site	Kilmacredock Upper	697624	735369	698m
KD011-060----	Burial mound	Castletown	697895	734195	675m
KD011-060001-	Pit-burial	Castletown	697895	734196	675m
KD011-060002-	Pit-burial	Castletown	697895	734196	675m
KD011-060003-	Pit-burial	Castletown	697895	734196	675m
KD011-060004-	Pit-burial	Castletown	697895	734196	675m
KD011-060005-	Pit-burial	Castletown	697895	734196	675m
KD011-060006-	Pit-burial	Castletown	697895	734196	675m
KD011-060007-	Pit-burial	Castletown	697895	734196	675m
KD011-062----	Fulacht fiadh	Parsonstown (Celbridge Ed)	699224	734794	0m
KD011-071----	Ring-ditch	Ballyoulster	699075	733426	830m
KD011-072----	Ring-ditch	Ballyoulster	699072	733375	860m

Table 15.6: Recorded monuments within a 1km radius of the KIC lands.

RECEIVED: 18/07/2023

Name	*RPS No*	*NIAH No*	*Location*	*Rating*	*Description of Special Interest*	*Description of Setting*	*Heritage Significance*
Castletown House, Batty Langley Lodge, Gatelodge, Entrance Gates and Avenue. Castletown Walled Gardens, Temple and Pedimented Arch	B 11-13 B 11-14	13618038	Castletown Estate, Celbridge, County Kildare	National	Erected starting in 1722, for William Conolly (1662-1729), Speaker of the Irish House of Commons. The original design of the palatial Palladian house is attributed to Italian architect Alessandro Galelei (1691-1737). After the external shell of the house was completed, the completion of its interior fell to the young Irish architect Edward Lovett Pearce (1699-1733). The house remained unfinished after Speaker Conolly's death, however his widow Katherine continued to improve the landscaping of the demesne and was responsible for the creation of both the Conolly Folly and the Wonderful Barn to provide employment during and after the Irish famine of 1740-41.	Castletown House is a large structure, having symmetrical flanking pavilions and curved links. The demesne included a large stableyard, farmyard and walled garden, several gate lodges, a chapel and school, ponds, fields and woodlands. Several tree-lined allees extended outward from the house towards distant entrance gates and towards the Conolly Folly and the Wonderful Barn. Despite the construction of a housing estate within the historic walled garden to the west of the house, a significant portion of its historic setting survives intact to give an excellent idea of its historic appearance.	Castletown House and its Demesne have National Significance, owing to its associations with nationally significant historical figures, widely renowned architects from the C18th and C19th, and extensive designed landscape. Castletown House, combined with its setting among many associated structures and landscape features has high significance.
The Wonderful Barn	B 11.15	11901102	Barnhall, Leixlip, County Kildare	National	Terrace of Three Two-bay, three-storey, red brick houses, c. 1830, incl railings and steps.	The Wonderful Barn stands beside Barnhall House, a two-storey stone farmhouse dating from the first half of the C18th. The barn forms one side of a large walled garden, whose corners include other similar but smaller round towers. Of particular importance is the location of the Wonderful Barn nearly precisely on axial alignment with the east	The Wonderful Barn is of National Significance, and is included on the Record of Protected Structures. Its association with Castletown House and its owners, as well as its unique architectural design, combine to give it high significance.

RECEIVED: 18/07/2023

						side elevation to Castletown House itself, a formal link that was further defined by the planting of parallel rows of hardwood trees to form a grand allee across the landscape.	

RECEIVED: 18/07/2023

Table 15.7: Structures listed in the Record of Protected Structures within a 1km radius of the KIC lands.

Site Inspection at KIC lands

A site inspection at the KIC lands verified the baseline scenario identified from desk-based research and evidence. It found that much of the lands are heavily built upon and/or landscaped as a consequence of the development of the original Hewlett Packard Campus. Greenfield to the northern boundary, between Barnhall Road and the M4, is under unmaintained grass and partially planted with trees, and the ground is at a higher elevation to the existing campus; the lands here may have been used for spoil deposition during the development of the original Hewlett Packard Campus. To the north side of the M4, at the location of the pedestrian and cycle route adjacent to the lands known as the Wonderful Barn Allotments, the ground has been subject to residential construction related disturbance (site compound, construction access road).

Components of the preceding agricultural landscape remain at the KIC lands to the north-west and west, largely as hedgerow field boundaries, which also function as physical townland boundary markers. Hedgerow survives on the Rinawade Upper, Rinawade Lower and Parsonstown townland boundaries to the north-west, with fragmented sections of the Rinawade Lower and Parsonstown townland boundary to the west and south-west (shown on Figure 15.7). East of the DB Schenker site, a remnant hedgerow field boundary and part of the former entrance alignment to the former Parsonstown (Barn Hall) residence, the latter used as an internal access road, remain (both bordered by a deep ditch) (Plate 15.1); these features border the north-west and north-east sides of an unused playing pitch.



Plate 15.1: Internal access road on alignment of access to former Parsonstown (Barn Hall) residence; hedgerow and ditch to left of image (Shanarc Archaeology 08.02.2022).

The former Parsonstown (Barn Hall) residence site, of which there is no surface trace, is situated between the internal access road and the existing drainage pond system, to the north-west side of a hardcore site compound. A small grove of remaining trees mark the location of part of the associated garden, which, containing fruit trees, is likely to have been part of an orchard (Plate 15.2). A mature deciduous tree nearby (to north-east of the grove) is also likely to have formed part of the designed landscape around the former house.

Greenfield to the south-east boundary, bordering the Celbridge Road (R404) is unmaintained grass, which forms a dense vegetation cover; peripheral greenfield to the north-west part of the site has been formerly used as allotments. No surface anomalies of archaeological interest were noted throughout.



Plate 15.2: Existing setting of site of former Parsonstown (Barn Hall) residence; trees in centre of image mark location of associated gardens (Shanarc Archaeology 08.02.2022).



Plate 15.3: Aerial view looking north-east, showing the alignment of the protected view corridor across the site of the proposed development at the centre. Castletown House is to the lower left, out of the photo, and the Wonderful Barn is approximately at the centre of the photo. The two rows of trees in the lower left quadrant of the photo are running across the

Renawade Lower fields, and were planted some time between 1837 and and 1860, according to the first and second editions of the Ordnance Survey of Ireland.

RECEIVED: 18/07/2023



Plate 15.4: Front elevation of Castletown House, the grand early Georgian country house of William Connolly. The windows in the upper floors in the side elevation of the main house enjoyed views across open fields to the Wonderful Barn, built in 1847 on an outlying farm that was part of the greater Castletown estate. The barn was built on a direct axis with side elevation of Castletown House.



RECEIVED: 18/07/2023

Plate 15.5: View showing the SE side elevation of Castletown, and the windows with the view towards the Wonderful Barn.



Plate 15.6: Recent photo looking towards the Wonderful Barn, from the NE edge of the Castletown House demesne. The mature rows of trees in this photo were not shown on the first edition 6-inch Ordnance Survey map, surveyed in 1837, but were in place on a subsequent 25-inch edition, surveyed in 1888.



Plate 15.7: Recent photo looking SW across the view corridor within the proposed development area, towards Castletown House in the far distance.



Plate 15.8: Recent photo looking NE showing the upper half of the Wonderful Barn, as seen in the distance along the protected view corridor within the KIC lands.



Plate 15.9: Photo showing the west elevation of the Wonderful Barn, the nationally significant grainary folly, built for the widow of William Connolly to provide employment during the famine of 1747.

Significance

The visual linkage between the side elevation of Castletown House and the Wonderful Barn is as much a symbolic linkage as it is an actual view. The grandly scaled designed historic landscape of the Castletown Demesne is of national significance, and represents the wealth and influence of William Connolly, one of Irelands most ambitious and influential citizens of the first half of the C18th. The designed landscape of the Demesne around his palatial Castletown House mansion made use of long vistas and tree-lined allees to reach out to the surrounding countryside. As depicted in *John Rocques Map of County Dublin, 1760s*, there was no tree-lined link between Castletown House and the Wonderful barn at that date, however a double row of trees had been planted over at least part of that alignment by the late C18th, as shown on Taylor's Map. The Wonderful Barn was commissioned by the widow of William Connolly to help create employment during the terrible famine of 1747, and its placement on the axis with the side eievation of the mansion must have been intentional, and the gradual planting of the wide allee of trees was likewise indicative of a clear intention to like the two structures across the countryside.

Sensitivity

RECEIVED: 18/07/2023

The location of the site of the proposed development would, if it had not already been subject to the development of the currently existing industrial park, be considered to be part of the historical setting of Castletown House. While most of the lands were not owned as part of the Castletown Estate, they contributed to the beautiful rural setting of the fine house and the designed landscape of its demesne.

Facilitation Works

GNI Gas Upgrade

The GNI upgrades will comprise a local upgrade of the gas network over a length of approximately 1.5km, extending from the R148 Station Road and following the Celbridge Road to the KIC lands.

The proposed alignment traverses 3 townlands: Barnhall, Leixlip and Leixlip Demesne in County Kildare.

Sites and Monuments Record (SMR) and Record of Monuments and Places (RMP)

No recorded monuments are located on, or within 100m of the indicative alignment. The Zone of Notification for the Historic Town of Leixlip (KD011-004001) is over 150m to the southeast of the proposed upgrade. (Figure 15.10).

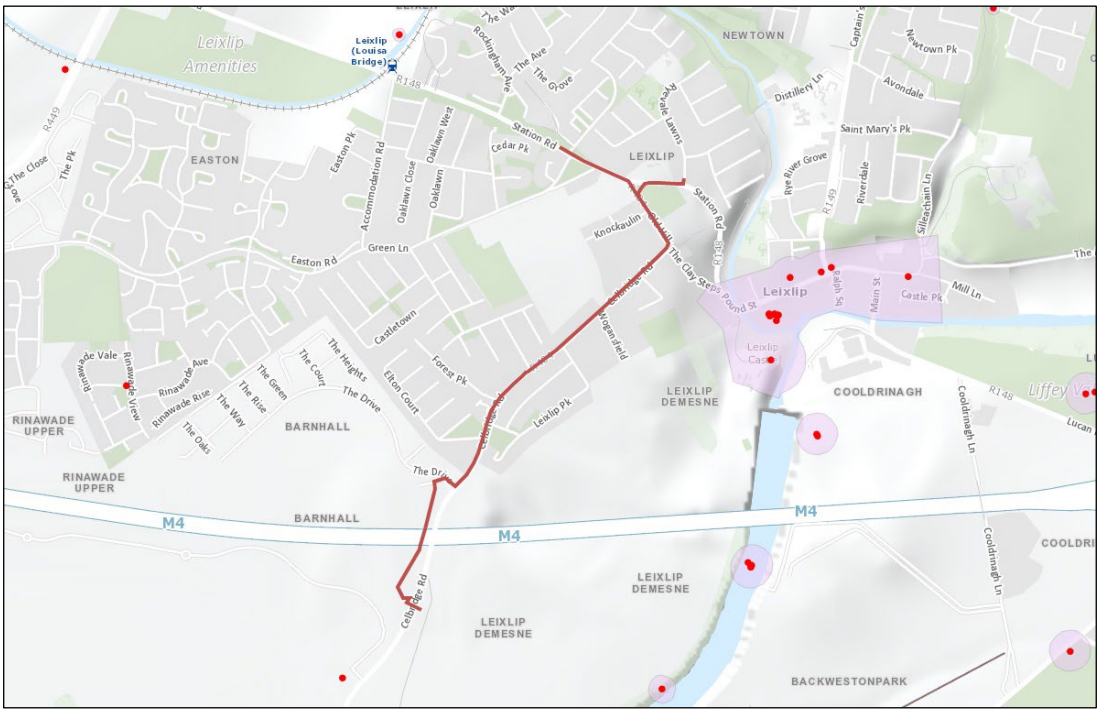


Figure 15.10: Indicative alignment of GNI gas transmission line (in red) relative to recorded monuments (red dots) and associated Zones of Notification (shaded pink)
CYAL50313607
© Ordnance Survey Ireland/Government of Ireland.

Previous Archaeological Investigations

The Excavations Bulletin and the Excavations Database (excavations.ie) list no previous archaeological investigations as having taken place within 100m of the indicative alignment.

RECEIVED: 19/07/2023

Previous Archaeological Artefacts
No findspots of artefacts are provenanced in the topographical files of the National Museum of Ireland to Barnhall, Leixlip or Leixlip Demesne townlands.

EirGrid Uprating
The staged uprating of existing overhead power lines will cover a linear distance of 115.2km, linking the replacement 110kV Rinawade substation to Derryiron/Maynooth and Dunfirth/Kinnegad. The existing lines traverse counties Kildare, Meath and Offaly, including land forming part of the extensive Bog of Allen. Uprating will involve potential groundworks on the existing lines relating to poleset or tower replacement and/or the provision of temporary access tracks or haul roads, involving heavy machinery use.

National Monuments
Existing overhead power lines in county Offaly, to the west of the village of Rhode, are aligned across Clonin Hill, which is the site of National Monument No. 532, comprising a ring-barrow OF011-001---- and a mass-rock OF011-011001-. National Monument No. 532 is in State ownership (Figure 15.12). In county Kildare, a mortuary chapel (KD008-001007-) in the graveyard at Carbury is a monument vested in the care of Kildare County Council.

Sites and Monuments Record (SMR) and Record of Monuments and Places (RMP)
52 recorded monuments are situated on, or within 50m of existing overhead power lines; 30 monuments in county Kildare, six monuments in county Meath and 16 monuments in county Offaly. These monuments are listed in Table 15.7.

The monuments include sub-surface cropmarks, ranging from single monuments (e.g. ring-ditch ME053-006---- in Meath) to complexes of monuments (e.g. barrow complex in Kilmurry townland in Kildare, KD003-041----, KD003-042----, KD003-043----) to relic field systems and deserted settlement a number of hectares in extent (e.g. deserted medieval settlement at Monasteroris in Offaly, OF011-009006-). The cropmarks associated with the deserted settlement at Monasteroris, situated to the north-west of the town at Edenderry, form part of a broader medieval era landscape containing visible earthworks around a Franciscan Friary (OF011-009001-) and a number of castles, including a motte castle (OF011-010003-) and manorial castle (OF011-011----) (Figure 15.13). Another upstanding complex includes that at Carbury, county Kildare, also the site of a manorial motte castle (KD008-011001-) and Anglo-Norman masonry castle (KD008-001002-) that overlook a parish church (KD008-001005-) and graveyard (KD008-001002-). These monuments are similarly surrounded by an array of cropmarks and earthworks associated with medieval era settlement at Carbury, which continue onto the adjacent Carbury Hill, which contains a number of prehistoric burial monuments.

Upstanding and visible monuments include the remnants of a medieval parish church (ME050-025----) within a rectangular graveyard defined by masonry walls (ME050-025001-) in Salestown, county Meath. A second medieval parish church (KD011-002003-) and graveyard (KD011-002004-) is situated in Kilmacredock Upper townland, county Kildare, although sited within a much larger and less visible sub-circular enclosure (KD011-002001-) representing a possible early monastic site; the existing overhead power line in Kilmacredock Upper townland is aligned within 50m of the north side of the ecclesiastical enclosure rather than the visible church and graveyard.

At Drehid, county Kildare, existing overhead power lines traverse a large expanse of bog containing records of unclassified togher roads (e.g. KD008-026----). Toghers are peatland

trackways or causeways constructed of wood that can range in date from prehistory to the medieval period, and survive owing to the special preservation conditions within peat. A second togher in Drehid, KD008-025----, may have run for *c.* 2,200m from dry ground in Drehid at the north-west, across the bog to Drumachon 'island' in Timahoe East townland to the south-east. In this scenario, the existing overhead power line crosses the line of the togher in Timahoe East townland (Figure 15.14). Areas of bogland traversed by the existing overhead power lines have inherent sub-surface archaeological potential. Bogland is also traversed at Carbury and Ardkill, part of Carbury Bog, county Kildare.

RECEIVED: 18/07/2023

SMR No	Class	Townland	ITM Easting	ITM Northing
KD002-006----	Ritual site - holy well	Grange West	661292	737099
KD002-016----	Enclosure	Kinnafad	662530	737002
KD003-017----	Castle - tower house	Clonagh (Cadamstown Ed)	672442	739006
KD003-017002-	Armorial plaque	Clonagh (Cadamstown Ed)	672434	739009
KD003-017003-	Architectural fragment	Clonagh (Cadamstown Ed)	672434	739009
KD003-041----	Enclosure	Kilmurry (Donadea Ed)	674808	738618
KD003-042----	Barrow - unclassified	Kilmurry (Donadea Ed)	674815	738556
KD003-043----	Barrow - unclassified	Kilmurry (Donadea Ed)	674886	738614
KD008-001001-	Castle - motte	Carbury	668590	735099
KD008-001002-	Castle - Anglo-Norman masonry castle	Carbury	668618	735097
KD008-001003-	House - fortified house	Carbury	668625	735099
KD008-001004-	Designed landscape feature	Carbury	668624	735082
KD008-001005-	Church	Carbury	668630	735002
KD008-001006-	Graveyard	Carbury	668627	734989
KD008-001007-	Mausoleum	Carbury	668627	734989
KD008-001008-	Wall monument	Carbury	668627	734990
KD008-001009-	Wall monument	Carbury	668627	734990
KD008-001010-	Wall monument	Carbury	668627	734990
KD008-017----	Enclosure	Ardkill	671365	734896
KD008-044----	Barrow – ditch barrow	Ardkill	670990	734981
KD008-025----	Road - unclassified togher	Drehid	674854	734147
KD008-026----	Road - unclassified togher	Drehid	674714	733717
KD009-037----	Barrow - unclassified	Donadea	684654	734242
KD011-002----	Ecclesiastical site	Kilmacredock Upper	697235	735853
KD011-002001-	Ecclesiastical enclosure	Kilmacredock Upper	697235	735853
KD011-002002-	Road - road/trackway	Kilmacredock Upper	697180	735819

SMR No	Class	Townland	ITM Easting	ITM Northing
KD011-002003-	Church	Kilmacredock Upper	697231	735837
KD011-002004-	Graveyard	Kilmacredock Upper	697232	735831
KD011-008----	Ringfort - rath	Ballygoran	694991	735079
KD011-009----	Ringfort - rath	Griffinrath	694943	734966
ME049-018----	Field system	Calgath	689241	741855
ME050-023----	Enclosure	Kilgraigue	696025	740779
ME050-025----	Church	Salestown	696925	740413
ME050-025001-	Graveyard	Salestown	696927	740421
ME052-001----	Ringfort - rath	Harristown (Moyfenrath Upper By.)	660552	739213
ME053-006----	Ring-ditch	Bogganstown (Dunboyne By.)	697945	739966
OF011-001----	Barrow - ring-barrow	Clonin	652592	733749
OF011-001001-	Mass-rock	Clonin	652574	733738
OF011-001002-	Barrow - ring-barrow	Clonin	652556	733827
OF011-008----	Ritual site - holy well	Monasteroris	660793	733309
OF011-009001-	Religious house - Franciscan friars	Monasteroris	660897	733293
OF011-009002-	Graveyard	Monasteroris	660902	733283
OF011-009003-	Headstone	Monasteroris	660897	733284
OF011-009004-	Headstone	Monasteroris	660894	733282
OF011-009005-	Headstone	Monasteroris	660898	733282
OF011-009006-	Settlement deserted - medieval	Monasteroris	660790	733227
OF011-009007-	Font	Monasteroris	660897	733293
OF011-010001-	Castle - motte	Monasteroris	660946	733449
OF011-010003-	Dovecote	Monasteroris	660944	733450
OF011-011----	Castle - unclassified	Monasteroris	661010	733417
OF011-055----	Barrow - ring-barrow	Ballymoran	655059	734277
OF012-001----	Castle - unclassified	Monasteroris	661129	733229

RECEIVED: 18/07/2023

Table 15.7: Recorded monuments within 50m of existing overhead power lines.



Figure 15.11: Existing overhead power line (*in pink*) relative to recorded monuments (*orange dots*) and associated Zones of Notification (*shaded yellow*) in Clonin townland near Rhode village, Offaly (50m radius to either side of power line shown *in green*).



Figure 15.12: Existing overhead power line (*in pink*) relative to recorded monuments (*orange dots*) and associated Zones of Notification (*shaded yellow*) associated with a deserted medieval settlement at Monasteroris near Edenderry, Offaly (50m radius to either side of power line shown *in green*).

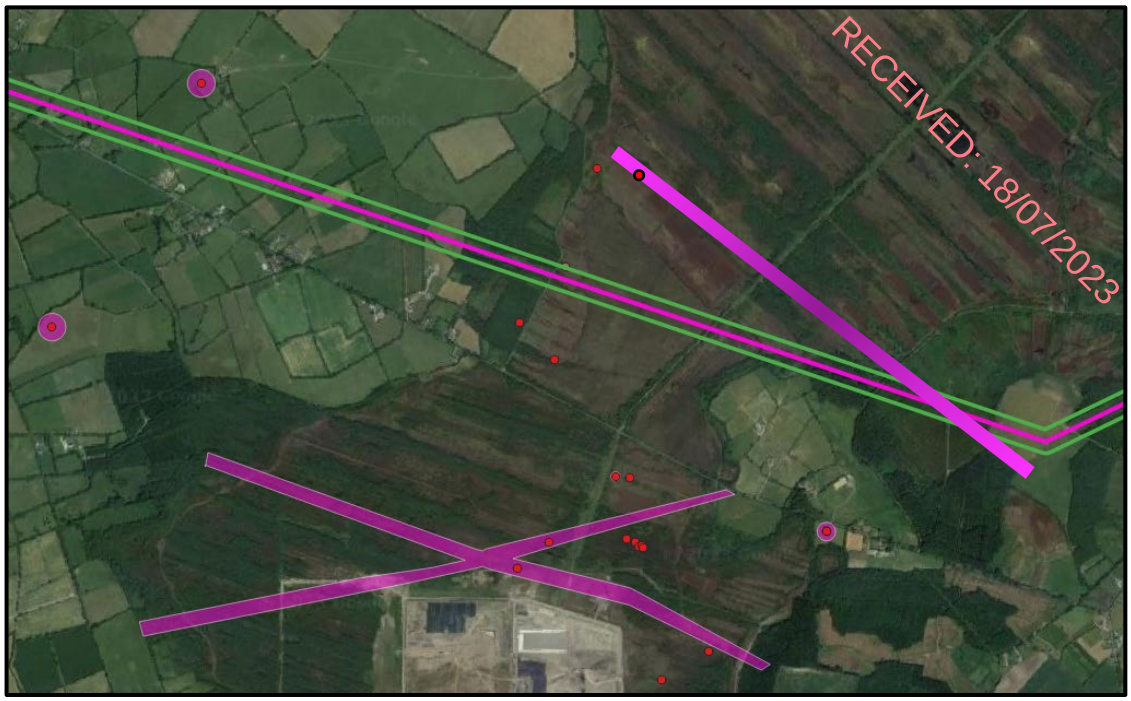


Figure 15.13: Existing overhead power line (*in pink*) relative to recorded togher monuments (*red dots*) and associated Zones of Notification (*shaded purple*) in bogland in Drehid and Timahoe East townlands, Kildare (50m radius to either side of power line shown *in green*).

15.4.2 Likely Future Receiving Environment ('Do Nothing' Scenario)

In the event of a 'Do Nothing' scenario, the site would remain in operation as an existing ICT campus. It is predicted that there would not be significant development or large scale bulk excavation at the KIC lands in the event of a Do Nothing Scenario, or any requirement for facilitation works related groundworks.

15.5 Likely Impacts of the Project

15.5.1 Construction Phase

Principal Works

The KIC lands are largely developed and landscaped lands, with existing buildings centrally focussed and surrounded by a greenfield periphery. A monument recorded in the SMR, *fulacht fiadh* KD011-062----, was exposed and removed by archaeological excavation as part of Hewlett Packard Campus development. The site of the monument is not on the statutory RMP and is not scheduled for inclusion in the next revision of the RMP. As such, the monument is not listed in Appendix 5, Record of Monuments and Places, of the Kildare County Development Plan 2023-2029. No other recorded monuments are present on the KIC lands, and no construction phase impact on recorded monuments or known archaeology is predicted.

The record of a previously unknown monument, *fulacht fiadh* KD011-062----, along with the recovery of stray archaeological artefacts - a stone axe and a flint blade - from topsoil at the site during archaeological mitigation as part of the Hewlett Packard Campus development

RECEIVED: 18/07/2023

demonstrates the potential for buried archaeology - particularly of prehistoric date - to survive *in-situ* below the ground. A probably Viking grave, which included human remains and grave goods, is also provenanced to Barnhall townland. While the Wonderful Barn has been cited as a tentative location for the burial, the exact location is not known. These factors, when combined with the proximity of the KIC lands to the 15th century landscape associated with the Dongan family castle (KD011-023----) in Castletown Demesne, and with the River Liffey, which will have acted as a focus of settlement related activities from prehistory, indicate that greenfield areas at the KIC lands that have not been subject to previous archaeological mitigation have archaeological potential. The construction phase will have a direct, negative impact on the inherent archaeological potential of the KIC lands. Greenfield areas have a low sensitivity rating and the effect on inherent archaeological potential is of slight significance.

Remnant elements of an agricultural land use that preceded the Hewlett Packard Campus development survive as partial enclosed fields, notably from the north-west to south-west side of the KIC lands. Hedgerow field boundaries also function as physical townland boundaries, with remnant sections of the Rinawade Upper, Rinawade Lower and Parsonstown townland boundaries surviving to the north-west, with more fragmented sections of the Rinawade Lower and Parsonstown townland boundary surviving to the west and south-west. The construction phase will have a direct, negative impact on townland boundaries on the KIC lands. As locally important elements of the cultural landscape, townland boundaries have a low sensitivity rating and a medium magnitude of change, so that the effect arising from development is of slight significance.

The KIC lands contained a late 18th/early 19th century residence, initially called Parsonstown and changed to Barn Hall, which was used as part of the Irish Meat Packer's complex and removed prior to the Hewlett Packard Campus development. There is no evidence that this element of the historic landscape was subject to mitigation as part of the Hewlett Packard Campus development. The site of the former residence is beneath the proposed Phase 2 A2 building, and the construction phase will have a direct, negative impact on potential below ground remains. In the absence of any evidence of known sub-surface archaeology associated with the former residence, the site has a low sensitivity rating and the effect on the archaeological potential of the site is of slight significance.

Facilitation Works

GNI Gas Upgrade

There are no recorded monuments on or within 100m of the enhanced gas connection alignment G, and no construction phase impact on recorded monuments or known archaeology is predicted.

EirGrid Uprating

52 recorded monuments are situated on, or within 50m of existing overhead power lines. Of these, existing polesets/towers are currently sited either on, or in the Zone of Notification of 12 monuments. In Salestown, county Meath, an existing poleset/tower is sited in the Zone of Notification for church ME050-025---- and graveyard ME050-025001-. In association with a deserted medieval settlement OF011-009006- at Monasteroris near Edenderry, Offaly polesets/towers are sited in the northern extent of the Zone of Notification. In Carbury, county Kildare a poleset/tower is sited in the centre of the Zone of Notification associated

with a complex of monuments that include Carbury Castle KD008-001002-. In Drehid, county Kildare, polesets/towers are sited in the Zone of Notification associated with a bogland togher KD008-025----. In Ballygoran townland, county Kildare, an existing tower is sited in ringfort KD011-008----. Potential direct, negative and significant impact may arise in the event of uprating groundworks at, or in proximity of a recorded monument.

RECEIVED: 18/07/2023

Bogland zones are highlighted as areas of inherent archaeological potential, owing to the special preservation conditions within peat. In county Kildare, existing overhead power lines traverse Carbury Bog in Carbury and Ardkill townlands, and a larger expanse of bogland through Drehid and Timahoe East townlands, parts of the once more extensive Bog of Allen. Potential direct, negative and significant impact may arise in the event of uprating groundworks in bogland.

As the required uprating works have yet to be established, a more definite statement of likely significant impacts is not possible.

15.5.2 Operational Phase

No likely impacts on archaeological and cultural heritage are predicted during the operational phase.

15.6 Mitigation Measures and Monitoring of Impacts

Mitigation measures are required to be undertaken in compliance with national policy guidelines and statutory provisions for the protection of archaeology and cultural heritage and in accordance with Codes of Practice agreed between the Minster (Department of Housing, Local Government and Heritage) and relevant State infrastructure providers. Mitigation methodologies shall be agreed in advance with the National Monuments Service (Department of Housing, Local Government and Heritage) and the National Museum of Ireland in accordance with archaeological licensing requirements. Archaeological mitigation will ensure the full recognition of, and proper excavation and recording of archaeological features, deposits and objects in the event any material remains are exposed in consequence of development. In respect of the KIC lands, mitigation shall apply to greenfield that has not been subject to previous archaeological mitigation; these areas are shown on Figure 15.7.

15.6.1 Construction Phase

Principal Works

To mitigate the inherent potential of greenfield at the KIC lands that have not been subject to prior archaeological mitigation as part of the Hewlett Packard Campus development, and in keeping with best archaeological practice, an archaeological geophysical survey shall be carried out in undeveloped greenfield pre-construction. Geophysical survey, which is a non-invasive investigative technique, allows for the early identification and further investigation of potential sub-surface archaeology. The survey, for example, would identify if any structural or other material remains associated with the former Parsonstown (re-named Barn Hall) residence are present at the site. The early identification and investigation of any archaeology will minimise any construction delays that may otherwise occur in the event of an

archaeological discovery. Geophysical survey shall be carried out under licence from the National Monuments Service and the National Museum of Ireland.

RECEIVED: 18/07/2023

Geophysical survey shall be followed by a programme of pre-construction archaeological test-excavation. Test-excavation involves the machine excavation of linear test trenches using a flat bladed bucket to the depth of either undisturbed natural subsoil or to the upper horizons of archaeological features or deposits (where present). Test-excavation will take place at locations chosen by a suitably qualified archaeologist, taking account of the results of the geophysical survey, and targeting any anomaly of potential archaeological origin. The chosen test trench array shall also target surviving hedgerow representing townland boundary alignments at the site. The aim of test-excavation is to identify the nature, depth, extent and significance of any archaeological remains. In the event of the discovery of archaeological features or deposits, the remains will be cleaned, recorded, photographed and left *in-situ* until a decision on any future mitigation is approved by the National Monuments Service and the National Museum of Ireland. Test-excavation shall be carried out under licence from the National Monuments Service and the National Museum of Ireland.

A requirement for construction phase groundworks monitoring at the KIC lands shall be subject to the outcome of the geophysical survey and test-excavation. In the event of archaeological monitoring, this work shall be carried out under licence from the National Monuments Service and the National Museum of Ireland.

With respect to Built Heritage, during the construction stage, there will be temporary fencing, hordings, temporary services, and creation of dust and noise during the actual construction activities. These impacts will be temporary, and will be a short term annoyance to residents of nearby houses and workers in nearby offices and workplaces.
During the construction phase, all existing trees that currently form the grand allee of the Protected View Corridor, will be protected by site fencing, to prevent damage from construction activities, and damage to the ground by compaction and damage to roots.

Facilitation Works

The Codes of Practice agreed between the Minister (Department of Housing, Local Government and Heritage) and the State infrastructure providers implementing the required facilitation works will be implemented, and the mitigation strategy for the facilitation works determined as part of this process. EirGrid will also carry out uprating requirements as per the Cultural Heritage Guidelines for Electricity Transmission Projects (2015). As per the guidelines (pg. 81) “Any works (including access tracks) that are located in a sensitive cultural heritage zone, or in proximity to a cultural heritage asset, will require monitoring by a suitably qualified archaeologist and consultation with the relevant authorities”.

Any consents required for the GNI Gas Upgrade and EirGrid Uprating will be sought by GNI and EirGrid and required detailed assessment of the consent application will be undertaken at that time.

15.6.2 Operational Phase

On completion of the proposed development, there will be an increased number of large commercial and industrial structures within the development area, including new roads, carparks, public services and cycleways. Compared to the current baseline situation, there

will be an increase of pedestrians and cyclists passing through and across the Protected View Corridor.

RECEIVED: 18/07/2023

During the operation phase of the project, when all roads, paths, external lighting and services have been installed, and when the primary structures have been built and occupied for use, a campus-wide plan for the maintenance of the landscaping assets will be followed. This plan will include maintenance and protection of the grant allee of trees that form the structure of the Protected View Corridor, and all landscaping that has been created to visually screen the proposed development's buildings and other man-made landscape features from view from the vantage points of the top of the Wonderful Barn and from the gable end windows in Castletown House.

No likely impacts on archaeological heritage are predicted during the operational phase, and subsequently, no mitigation measures are required in relation to archaeology and cultural heritage during the operational phase.

15.7 Likely Cumulative and Interaction Impacts of the Project

15.7.1 Cumulative Impacts

Construction groundworks associated with all permitted development can have an effect on hitherto unknown sub-surface archaeological material remains and on the preceding cultural landscape. If sub-surface archaeological remains are preserved by excavation and recording, or cultural landscape features such as physical townland boundaries are removed, the remains/features are permanently removed from the archaeological and cultural heritage landscape. The more extensive the area of ground to be disturbed as a result of permitted development, the greater the risk of exposing and negatively impacting sub-surface remains and the greater the modification of the cultural heritage landscape.

There is a potential incremental cumulative effect on sub-surface archaeological remains in consequence of the scale of the required excavations of the project. The predicted significance of the effect on potential sub-surface archaeological remains inherent in greenfield has been identified as slight.

There is an incremental cumulative effect on the cultural landscape, namely in the removal of hedgerow where it represents physical townland boundary alignments. Townland boundaries are an undesignated cultural heritage asset, and most of the northern and western alignment of the Parsonstown boundary has been removed in consequence of developments at the KIC lands since the mid-1990s. The current remaining physical townland boundary alignments at the KIC lands are shown on Figure 15.7. The predicted significance of the effect on townland boundaries has been identified as slight.

During the construction phase, the protection of the existing trees that are planted along the path of the protected view corridor will of paramount importance. Virtually all of these trees were planted approximately twenty years ago when the Hewlet Packard campus was originally developed. Some of those trees have not survived and others will no doubt require replacement due to natural loss poor growth. During the construction phase, it a programme of protection measures will be included in the contract documents, to prevent any enroachment into the root zone of the trees, to avoid damage to the roots or compaction of the ground.

RECEIVED: 28/07/2023

15.7.2 Interaction Impacts

No likely significant interaction effects in respect of archaeology and cultural heritage are predicted. There is no recorded monument or associated setting and amenity value which may interact with landscape and visual impacts.

15.8 Mitigation Measures and Monitoring of Cumulative and Interaction Impacts

15.8.1 Construction Phase

The maintenance of existing hedgerow where it represents physical townland boundary alignments should be maximised where possible at the KIC lands during the construction phase. The hedgerow alignments may be maintained as part of newly landscaped areas of the KIC lands. Townland boundary alignments will be subject to pre-construction archaeological test-excavation as previously outlined in Section 15.6.

There are no further requirements for mitigation measures and monitoring of cumulative and interaction impacts in respect of archaeology and cultural heritage during the construction phase.

15.8.2 Operational Phase

The on-maintenance of existing hedgerow where it represents physical townland boundary alignments should be undertaken during the operational phase.
During the operational phase of the project, a detailed landscape management plan will be prepared, to specify the care and maintenance of all of the trees and other vegetation along the alignment of the protected view corridor.

There are no further requirements for mitigation measures and monitoring of cumulative and interaction impacts in respect of archaeology and cultural heritage during the operational phase.

15.9 Major Accidents and/or Disasters

All archaeological and cultural heritage issues will be resolved at the pre-construction and construction phase, in advance of the operational phase. There is no predicted significant effect on the archaeological and cultural heritage in the event of a major accident and/or disaster.

A potential significant effect on the archaeological resource can arise in the event that unknown archaeology is identified below the ground during mitigation and is preserved *in-situ*. Sub-surface *in-situ* archaeology may be vulnerable or at risk in the event of a major accident and/or disaster.

RECEIVED: 18/07/2023

15.10 Mitigation Measures and Proposed Response to such Emergencies

The National Monuments Service at the Department of Housing, Local Government and Heritage can be contacted to agree an appropriate mitigation response in relation to vulnerable or at risk archaeology in the event of a major accident and/or disaster.

15.11 Residual Impacts

All archaeological and cultural heritage issues will be resolved at the pre-construction and construction phase, in advance of the operational phase. There is no predicted residual effect on the archaeological and cultural heritage resource.

15.12 Difficulties Encountered

No difficulties were encountered in gathering data and assessing archaeological and cultural heritage effects at the KIC lands.

Detail on the facilitation works required to support proposed development at the KIC lands, which are to be undertaken by the relevant statutory undertakers when required, are provided at a high level in this EIAR. In the absence of finalised design and construction detail relating to the provision of a gas transmission line by Gas Networks Ireland (GNI) to the site, the assessment of archaeological and cultural heritage effects in this EIAR could only be provided at a high level. As regards EirGrid uprating, where required works will be established at a future date, no definite statement on likely significant effects could be made in this EIAR. The assessment of effects has been confined to highlighting recorded monuments on, or within 50m of existing overhead power lines.

15.13 References

Barry, E. and Shanahan, S., 2020. Archaeological Impact Assessment, Barnhall Road, Leixlip, Co. Kildare, 20E0613. Unpublished report, Shanarc Archaeology Ltd.

Bradley, J., Halpin, A., and King, H.A. 1986. Urban Archaeological Survey - County Kildare (4 vols.). Unpublished report commissioned by the Office of Public Works, Dublin.

Breen, T., 1995. Archaeological Excavations at Leixlip, Co. Kildare, Proposed Hewlett Packard Development Site, 95E172. Unpublished report, Valerie J Keeley Ltd.

Colgan, J., 2005. Leixlip, County Kildare, Tyrconnell Press.

Courtney Deery Heritage Consultancy, 2015. Cultural Heritage Guidelines for Electricity Transmission Projects, A Standard Approach to Archaeological, Architectural and Cultural Heritage Impact Assessment of High Voltage Transmission Projects. EirGrid

Department of Arts, Heritage, Gaeltacht and the Islands, 1999. Framework and Principles for the Protection of the Archaeological Heritage. The Stationery Office, Dublin.

Gimson, H., Regan, D. & Hogan, C., 2015. Investigations into the North Courtyard, The Wonderful Barn, Leixlip, Co. Kildare 15R0086. Unpublished report, Earthsound Archaeological Geophysics.

Gracie, C. D., 1996a. Archaeological Monitoring, Hewlett Packard Development Site, Leixlip, Co, Kildare, 95E264. Unpublished report, Valerie J Keeley Ltd.

Gracie, C. D., 1996b. Archaeological Investigations, Hewlett Packard, Leixlip, Co, Kildare, 95E264. Unpublished report, Valerie J Keeley Ltd.

Gracie, C. D., 1996c. Archaeological Monitoring, Leixlip, Co, Kildare, 96E102. Unpublished report, Valerie J Keeley Ltd.

Harrison, S. H. and O Floinn, R., 2014. Viking Graves and Grave-Goods in Ireland, Medieval Dublin Excavations 1962-81, Ser. B, vol. II. National Museum of Ireland.

Keely, V. J., 1995. Underwater Archaeological Assessment of the 'Newbridge', Celbridge, Co. Kildare. Unpublished report, Valerie J Keeley Ltd.

Keely, V. J, 1996. Draft Report Archaeological Assessment Proposed Bridge Construction at the 'Newbridge' & Proposed Road at Celbridge, Co. Kildare. Unpublished report, Valerie J Keeley Ltd.

Leigh, J. M., 2017. Geophysical Survey Report, Barnhall, Leixlip, Co. Kildare 17R0132. Unpublished report, J. M. Leigh Surveys Ltd.

Lynch, P., 1998. Archaeological Monitoring, Hewlett Packard Development Site, Leixlip, Co, Kildare, 96E0327. Unpublished report, Valerie J Keeley Ltd.

O'Connell, A., 2017. Barnhall, Leixlip, Co. Kildare, Archaeological Assessment. Unpublished report, Archer Heritage Planning.

O Drisceoil, C. and Fitzgibbon, B., 2017. Archaeological Excavations 2015-16 at the Wonderful Barn, Leixlip, County Kildare 15E0324: Final Report. Kilkenny Archaeology.

O'Kane, F., 2004. Landscape Design in Eighteenth-Century Ireland – Mixing Foreign Trees with the Natives, Cork University Press.

Regan, D. & Gimson, H., 2015. Investigations into the South Courtyard, Entrance Court and Formal Walled Garden, The Wonderful Barn, Leixlip, Co. Kildare 15R0144. Unpublished report, Earthsound Archaeological Geophysics.

Electronic Sources

www.archaeology.ie	National Monument's Service
maps.archaeology.ie	Historic Environment Viewer
www.excavations.ie	Summary accounts of archaeological investigations
https://heritagemaps.ie	Heritage Council cultural heritage datasets
https://kildarecoco.ie	County Development and Local Area Plans
downsurvey.tchpc.tcd.ie	Historic maps
www.logainm.ie	Toponomy source
https://webapps.geohive.ie/mapviewer	Geohive (aerial photographs)
dcenr.maps.arcgis.com	Open Topographic Data Viewer
https://www.dublinhistoricmaps.ie	Historic maps
https://digitalarchive.mcmaster.ca	Historic maps
https://www.askaboutireland.ie	Griffith's Valuation
mubarnhall.com/history	MU Barnhall RFC history
https://intokildare.ie/arthurs-way	Arthur's Way Heritage Trail

RECEIVED: 19/07/2023

RECEIVED: 18/07/2023

16.0 Landscape and Visual Impact Assessment

16.1 Introduction

This chapter of the Environmental Impact Assessment Report has been prepared by AECOM Ireland Ltd. This chapter identifies and assesses the potential effects of the Proposed Development at the Kildare Innovation Campus (within the redline boundary), Leixlip, County Kildare on the landscape and visual resource of the study area. It identifies the mitigation and compensation measures that will be implemented to prevent, reduce or offset potential adverse landscape and visual effects or enhance potential beneficial effects, where possible. In the context of this project 'landscape' includes also sub-urban townscape.

The LVIA chapter is supported by the following documents:

- Appendix 16.1:
  Booklet of Planning Application Photomontages prepared by Innovision Media Ltd
- Appendix 16.2:
  Landscape Designations

Please note that references to landscape designation figure in the text will be made as 'Appendix 16.2'.

Facilitation works required to support proposed development at the KIC lands, namely the provision of an enhanced gas connection by Gas Networks Ireland (GNI) to the site and EirGrid uprating of existing overhead transmission lines to the site have also been considered in the assessment of effects.

16.2 Methodology

This section sets out the methodology for the Landscape and Visual Impact Assessment (LVIA) as a result of the Proposed Development.

16.2.1 Guidance and other Information used in the Landscape and Visual Impact Assessment

- The following sources and guidelines were used in the assessment:
- EPA 'Guidelines on the Information to be contained in Environmental Impact Statements', 2002;
- EPA 'Guidelines on the information to be contained in Environmental Impact Assessment Reports, May 2022;
- 'Guidelines for Landscape and Visual Impact Assessment' (GLVIA), 3rd Edition, 2013, Landscape Institute (UK) & IEMA;
- 'Visual Representation of Development Proposals', Landscape Institute, Technical Guidance Note 06/19, 17 September 2019
- National Parks and Wildlife Service (NPWS), http://www.npws.ie/;
- Sport Ireland: Find your Trails: http:// www.https://www.sportireland.ie/outdoors/find-your-trails; and
- Ordnance Survey Ireland, 1:50,000 Discovery Mapping;
- Kildare County Development Plan 2023-2029;
- Leixlip Local Area Plan 2020-2023; and
- South Dublin County Council Development Plan 2022-2028.

RECEIVED: 18/07/2023

16.2.2 Landscape and Visual Impact Assessment Criteria

This chapter has been prepared in accordance with the Environmental Protection Agency (EPA) guidance document 'Guidelines on the Information to be contained in Environmental Impact Assessment Reports, May 2022. Good practice guidance, such as the "Guidelines for Landscape and Visual Impact Assessment, 3rd Edition, 2013, Landscape Institute (UK) & IEMA" provide specific guidelines for landscape and visual impact assessments. Therefore, a combination of the EPA guidelines, the Landscape Institute guidelines and professional experience has informed the methodology for the assessment herein. The Landscape Institute guidelines require the assessment to identify, predict and evaluate the significance of potential effects to landscape characteristics and established views. The assessment is based on an evaluation of the sensitivity to change and the magnitude of change for each landscape or visual receptor. For clarity, and in accordance with best practice, the assessment of potential effects on landscape character and visual amenity, although closely related, are undertaken separately.

The assessment acknowledges that landscape and visual effects change over time as the existing landscape external to the Proposed Development evolves, and proposed planting establishes and matures.

The significance of an effect or impact is determined by two distinct considerations:

1. The **Nature** of the receptor likely to be affected, namely:
    - The value of the receptor;
    - The susceptibility of the receptor to the type of change arising from the Proposed Developments; and
    - The sensitivity to change is related to the value attached to the receptor.

2. The **Magnitude** of the effect likely to occur, namely:
    - The size and scale of the landscape and visual effect (for example, whether there is a complete or minor loss of a particular landscape element);
    - The geographical extent of the areas that will be affected; and
    - The duration of the effect and its reversibility
    - The quality of the effect – whether it is neutral, positive or negative

The table below provides the definition of the duration of both landscape and visual effects.

Duration	Description
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

Table 16.1: Definition of Duration of Effects

The quality of both landscape and visual effects is defined in the table below.

Quality of Effects	Description
Neutral	This will neither enhance nor detract from the landscape character or view
Positive (Beneficial)	This will improve or enhance the landscape character or view
Negative (Adverse)	This will reduce the quality of the existing landscape character or view

Table 16.2 Definition of Quality of Effects

RECEIVED: 18/07/2023

16.2.3 Assessment Process

The assessment is undertaken based on the following key tasks and structure:

- Establishment of the Baseline or receiving environment;
- Appreciation of the Proposed Development; and
- Assessment of effects.

16.2.4 Establishment of the Receiving Environment

A baseline study has been undertaken through a combination of desk based research and site appraisal in order to establish the existing conditions of the landscape and visual resources of the study area. Desk based research has involved a review of mapping and aerial photography, relevant planning and policy documents, the relevant Landscape Character Assessments and other relevant documents and publications.

16.2.5 Appreciation of the Proposed Development

In order to be able to accurately assess the full extent of likely effects on landscape character and visual amenity it is essential to develop a thorough and detailed knowledge of the Proposed Development. This includes a comprehensive understanding of its location, nature and scale and is achieved through a review of detailed descriptions of the Proposed Development and drawings (see Planning Application Drawings accompanying the application) and an on-site appraisal.

16.2.6 Assessment of Effects

The landscape and visual impact assessment seeks to identify, predict and evaluate the significance of potential effects to landscape characteristics and established views. The assessments are based on an evaluation of the sensitivity to change and the magnitude of change for each landscape or visual receptor.

The assessment acknowledges that landscape and visual effects change over time as the existing landscape internal and external to the Proposed Development evolves. The assessment therefore reports on potential effects during both construction/operation and completion of the Proposed Development. The prominence of the Proposed Development in the landscape or view will vary according to the existing screening effects of local topography, intervening existing vegetation and building structures.

16.2.7 Study Area

The extent of the principal study area comprises the Proposed Development excluding the facilitation works. It was initially informed by a desktop study, which was then verified on site during fieldwork surveys. This included reviews of published landscape character assessments and the wider landscape to identify landscape and visual receptors that have the potential to be affected by the Proposed Development. This process determined a principal study area of 2km from the boundary of the Proposed Development, defined as the extent in which the Proposed Development may result in significant landscape or visual effects.

RECEIVED: 18/07/2023

The facilitation works are at an early planning stage and linear in nature. They will affect existing gas and electricity infrastructure. A study area of up to 200m to either side of the indicative alignment of GNI enhancement works, and up to 500m to either side of the existing overhead lines subject to EirGrid uprating has been considered.

16.2.8 Consultation

Consultee and Date	Consultation matter	Issue Raised	Response / Action taken
Kildare County Council November 2019	Review of a selection of viewpoints for photomontages.	Additional viewpoint request at top of Wonderful Barn Additional viewpoint request at M4 Bridge	Additional viewpoints have been included in the assessment

Table 16.3: Consultation Overview

16.2.9 Temporal Scope

The type and duration of landscape and visual effects falls within two main stages as follows:

Construction (temporary and of short duration)

- Potential physical effects arising from construction of the development on the landscape resource within the development application boundary area;
- Potential effects to landscape character or visual amenity within the wider study area as a result of visibility of construction activities or the development during construction;
- Effects of temporary site infrastructure such as – site traffic; construction compounds; and
- Potential effects of partially built development in various stages of construction.

Operational

- Potential effects of the Proposed Development on landscape resources and landscape character, including the perceptual qualities of the landscape;
- Potential effects of the Proposed Development on views and visual amenity; and
- Potential cumulative effects of the development in combination with other planned and Proposed Developments of a similar type and scale upon the landscape and visual resource of the study area.

16.2.10 Effects Scoped out

The Proposed Development will become a permanent feature in the landscape following the completion and the implementation of landscape mitigation measures. The assessment takes account of this in the determination of residual landscape and visual effects.

16.2.11 Landscape Effects

Landscape effects describe the impact on the fabric or structure of a landscape or landscape character. The assessment of landscape effects firstly requires the identification of the components of the landscape. The landscape components are also described as landscape receptors and comprise the following:

- Individual landscape elements or features;
- Specific aesthetic or perceptual aspects; and

- Landscape character, or the distinct, recognisable and consistent pattern of elements (natural and man-made) in the landscape that makes one landscape different from another.

RECEIVED: 28/07/2023

The assessment will identify the interaction between these components and the Proposed Development during construction and operational phases. The condition of the landscape and any evidence of current pressures causing change in the landscape will also be documented and described.

Landscape Value

Landscape value is frequently addressed by reference to international, national, regional and local designations, determined by statutory and planning agencies. However, absence of such a designation does not necessarily imply a lack of quality or value. Factors such as accessibility and local scarcity can render areas of nationally unremarkable quality, highly valuable as a local resource. The quality and condition is also considered in the determination of the value of a landscape. The evaluation of landscape value is undertaken with reference to the definitions stated in the table below.

Landscape Value	Classification Criteria
High	Nationally designated or iconic, unspoilt landscape with few, if any, degrading elements.
Medium	Regionally or locally designated landscape, or an undesignated landscape with locally important landmark features and some detracting elements.
Low	Undesignated landscape with few if any distinct features or with several degrading elements.

Table 16.4: Landscape Value

Landscape Susceptibility

Landscape susceptibility relates to the ability of a particular landscape to accommodate the Proposed Development. Landscape susceptibility is appraised through consideration of the baseline characteristics of the landscape, and in particular the scale or complexity of a given landscape.

The evaluation of landscape susceptibility is undertaken with reference to a three-point scale, as outlined in the table below.

Landscape Susceptibility	Classification Criteria
High	Small scale, intimate or complex landscape considered to be intolerant of even minor change.
Medium	Medium scale, more open or less complex landscape considered tolerant to some degree of change.
Low	Large scale, simple landscape considered tolerant of a large degree of change.

Table 16.5: Landscape Susceptibility Criteria

RECEIVED: 18/07/2023

Landscape Sensitivity

Landscape sensitivity to change is determined by employing professional judgment to combine and analyse the identified landscape value, quality and susceptibility and is defined with reference to the scale outlined in the table overleaf.

Landscape Sensitivity	Classification Criteria
High	• Landscape characteristics or features with little or no capacity to absorb change without fundamentally altering their present character. • Landscape designated for its international or national landscape value or with highly valued features. • Outstanding example in the area of well cared for landscape or set of features that combine to give a particularly distinctive sense of place. • Few detracting or incongruous elements.
Medium-High	• Landscape characteristics or features with a low capacity to absorb change without fundamentally altering their present character. • Landscape designated for regional or county-wide landscape value where the characteristics or qualities that provided the basis for their designation are apparent or a landscape with highly valued features locally. • Good example in the area of a well-cared for landscape or set of features that combine to give a clearly defined sense of place.
Medium	• Landscape characteristics or features with moderate capacity to absorb change without fundamentally altering their present character. • Landscape designated for its local landscape value or a regional designated landscape where the characteristics and qualities that led to the designation of the area are less apparent or are partially eroded or an undesignated landscape which may be valued locally – for example an important open space. • An example of a landscape or a set of features which is relatively coherent, with a good but not exceptional sense of place - occasional buildings and spaces may lack quality and cohesion.
Medium-Low	• Landscape characteristics or features which are reasonably tolerant of change without determent to their present character. • No designation present or of little local value. • An example of an un-stimulating landscape or set of features; with some areas lacking a sense of place and identity.
Low	• Landscape characteristics or features which are tolerant of change without determent to their present character. • An area with a weak sense of place and/or poorly defined character /identity. • No designation present or of low local value or in poor condition. • An example of monotonous unattractive visually conflicting or degraded landscape or set of features.

Table 16.6: Landscape Sensitivity to Change Criteria

Magnitude of Landscape Change

Magnitude of change is an expression of the size or scale of change in the landscape, the geographical extent of the area influenced and the duration and reversibility of the resultant effect. The variables involved are described below:

- The extent of existing landscape elements that will be lost, the proportion of the total extent that this represents and the contribution of that element to the character of the landscape;

RECEIVED: 18/07/2023

- The extent to which aesthetic or perceptual aspects of the landscape are altered either by removal of existing components of the landscape or by addition of new ones;
- Whether the effect changes the key characteristics of the landscape, which are integral to its distinctive character;
- The geographic area over which the landscape effects will be felt (within the Proposed Development site itself; the immediate setting of the Proposed Development site; at the scale of the landscape type or character area; on a larger scale influencing several landscape types or character areas); and
- The duration of the effects (short term, medium term or long term) and the reversibility of the effect (whether it is permanent, temporary or partially reversible).

Changes to landscape characteristics can be both direct and indirect. Direct change occurs where the Proposed Development will result in a physical change to the landscape within or adjacent to the Proposed Development site. Indirect changes are a consequence of the direct changes resulting from the Proposed Development. They can often occur away from the Proposed Development site (for example, off-site construction staff parking) and may be a result of a sequence of interrelationships or a complex pathway (for example, a new road or footpath construction may increase public access and associated problems e.g. littering). They may be separated by distance or in time from the source of the effects. The magnitude of change affecting the baseline landscape resource is based on an interpretation of a combination of the criteria set out in the table below.

Magnitude of Landscape Change	Classification Criteria
None	• No change.
Negligible	• Little perceptible change.
Low	• Minor change, affecting some characteristics and the experience of the landscape to an extent; and • Introduction of elements that is not uncharacteristic.
Medium	• Noticeable change, affecting some key characteristics and the experience of the landscape; and • Introduction of some uncharacteristic elements.
High	• Noticeable change, affecting many key characteristics and the experience of the landscape; and • Introduction of many incongruous developments
Very High	• Highly noticeable change, affecting most key characteristics and dominating the experience of the landscape; and • Introduction of highly incongruous development.

Table 16.7: Magnitude of Landscape Change Criteria (Landscape Effects)

16.2.12 Visual Effects

Visual effects are determined by the extent of visibility and the nature of the visibility (i.e. how a development is seen within the landscape); for example, whether it appears integrated and balanced within the visual composition of a view or whether it creates a focal point.

Negative visual effects may occur through the intrusion of new elements into established views, which are out of keeping with the existing structure, scale and composition of the view.

Visual effects may also be beneficial, where an attractive focus is created in a previously unremarkable view or the influence of previously detracting features is reduced. The significance of effects will vary, depending on the nature and degree of change experienced and the perceived value and composition of the existing view.

RECEIVED: 18/07/2023

Receptors

For there to be a visual impact, there is the need for a viewer. Views experienced from locations such as settlements, recognised routes and popular vantage points used by the public have been included in the assessment. Receptors are the viewers at these locations. The degree to which receptors, i.e. people, will be affected by changes as a result of the Proposed Development depends on a number of factors, including:

- Receptor activities, such as taking part in leisure, recreational and sporting activities, travelling or working;
- Whether receptors are likely to be stationary or moving and how long they will be exposed to the change at any one time;
- The importance of the location, as reflected by designations, inclusion in guidebooks or other travel literature, or the facilities provided for visitors;
- The extent of the route or area over which the changes will be visible;
- Whether receptors will be exposed to the change daily, frequently, occasionally or rarely;
- The orientation of receptors in relation to the Proposed Development and whether views are open or intermittent;
- Proportion of the developments that will be visible (full, sections or none);
- Viewing direction, distance (i.e. short-, medium- and long-distance views) and elevation;
- Nature of the viewing experience (for example, static views, views from settlements and views from sequential points along routes);
- Accessibility of viewpoint (public or private, ease of access);
- Nature of changes (for example, changes in the existing skyline profile, creation of a new visual focus in the view, introduction of new man-made objects, changes in visual simplicity or complexity, alteration of visual scale, landform and change to the degree of visual enclosure); and
- Nature of visual receptors (type, potential number and sensitivity of viewers who may be affected).

Value of the View

Value of the view is an appraisal of the value attached to views and is often informed by the appearance on Ordnance Survey of tourist maps and in guidebooks, literature or art. Value can also be indicated by the provision of parking or services and signage and interpretation. The nature and composition of the view is also an indicator. The value of the view is determined with reference to the definitions outlined in the table below.

Value	Classification Criteria
High	Nationally recognised view of the landscape, with no detracting elements.
Medium	Regionally or locally recognised view, or unrecognised but pleasing and well composed view, with few detracting elements.
Low	Typical or poorly composed view often with numerous detracting elements.

Table 16.8: Value of the View

RECEIVED: 19/07/2023

Visual Susceptibility

The GLVIA guidelines identify that the susceptibility of visual receptors to changes in views and visual amenity is a function of:

- The occupation or activity of people experiencing the view at a particular location; and
- The extent to which their attention or interest may therefore be focused on the views and visual amenity they experience at particular locations.

For example, residents in their home, walkers whose interest is likely to be focused on the landscape or a particular view, or visitors at an attraction where views are an important part of the experience often indicate a higher level of susceptibility. Whereas receptors occupied in outdoor sport, where views are not important, or at their place of work, are often considered less susceptible to change. Visual susceptibility is determined with reference to the three-point scale and criteria outlined in the table below:

Susceptibility	Classification Criteria
High	Receptors for which the view is of primary importance and are likely to notice even minor change.
Medium	Receptors for which the view is important but not the primary focus and are tolerant of some change.
Low	Receptors for which the view is incidental or unimportant and is tolerant of a high degree of change

Table 16.9: Visual Susceptibility

Visual Sensitivity

Sensitivity to change considers the nature of the receptor; for example, a person occupying a residential dwelling is generally more sensitive to change than someone working in a factory unit. The importance of the view experienced by the receptor also contributes to an understanding of the susceptibility of the visual receptor to change as well as the value attached to the view.

A judgement is also made on the value attached to the views experienced. This takes account of:

- Recognition of the value attached to particular views, for example in relation to heritage assets, or through planning designations;
- Indicators of the value attached to views by visitors, for example through appearance in guidebooks or on tourist maps, provision of facilities for their enjoyment (sign boards, interpretive material) and references to them in literature or art; and
- Possible local value; it is important to note that the absence of view recognition does not preclude local value, as a view may be important as a resource in the local or immediate environment due to its relative rarity or local importance.
- The visual sensitivity to change is based on interpretation of a combination of all or some of the criteria outlined in the table overleaf.

RECEIVED: 18/07/2023

Visual Sensitivity	Classification Criteria
High	• Users of outdoor recreational facilities, on recognised national cycling or walking routes or in nationally designated landscapes. • Residential buildings.
Medium-high	• Users of outdoor recreational facilities, in highly valued landscapes or locally designated • landscapes or on local recreational routes that are well publicised in guidebooks. • Road and rail users in nationally designated landscapes or on recognised scenic routes, likely to be travelling to enjoy the view.
Medium	• Users of outdoor recreational facilities including public open space in moderately valued landscapes. • Users of primary transport road network, orientated towards the Proposed Development, likely to be travelling for other purposes than just the view.
Medium-Low	• People engaged in active outdoor sports or recreation and less likely to focus on the view. • Primary transport road network and rail users likely to be travelling to work with oblique views of the project or users of minor road network.
Low	• People engaged in work activities indoors, with limited opportunity for views of the Proposed Development.

Table 16.10: Sensitivity to Change Criteria

Magnitude of Visual Change

Visual effects are direct effects as the magnitude of change within an existing view will be determined by the extent of visibility of the Proposed Development. The magnitude of the visual effect resulting from the development at any particular viewpoint or receptor is based on the size or scale of change in the view, the geographical extent of the area influenced and its duration and reversibility. The variables involved are described below:

- The scale of the change in the view with respect to the loss or addition of features in the view and changes in its composition, including the proportion of the view occupied by the development;
- The degree of contrast or integration of any new features or changes in the landscape form, scale, mass, line, height, skylining, back-grounding, visual clues, focal points, colour and texture;
- The nature of the view of the Proposed Development, in relation to the amount of time over which it will be experienced and whether views will be full, partial or glimpses;
- The angle of view in relation to the main activity of the receptor, distance of the viewpoint from the development and the extent of the area over which the changes will be visible; and
- The duration of the effects (short term, medium term or long term) and the reversibility of the effect (whether it is permanent, temporary or partially reversible).

The magnitude of visual effect resulting from the development at any particular viewpoint or receptor is based on the interpretation of the above range of factors and is set out in the table overleaf.

RECEIVED: 18/07/2023

Magnitude of Visual Change	Classification Criteria
None	No change in the existing view.
Negligible	The development will cause a barely discernible change in the existing view.
Low	The development will cause very minor changes to the view over a wide area or minor changes over a limited area.
Medium	The development will cause modest changes to the existing view over a wide area or noticeable change over a limited area.
High	The development will cause a considerable change in the existing view over a wide area or a significant change over a limited area.
Very High	The development will cause significant changes in the existing view over a wide area or a change which will dominate over a limited area.

Table 16.11: Magnitude of Visual Change Criteria (Visual effects)

16.2.13 Significance Criteria

The objective of the assessment process is to identify and evaluate the potentially significant effects arising from the Proposed Development. The assessment will identify the residual effects likely to arise from the finalised design taking into account mitigation measures and the change over time.

The significance of effects is assessed by considering the sensitivity of the receptor and the predicted magnitude of effect in relation to the baseline conditions. In order to provide a level of consistency and transparency to the assessment and allow comparisons to be made between the various landscape and visual receptors subject to assessment, the assessment of significance is informed by pre-defined criteria as outlined in the table below. When assessing significance, individual effects may fall across several different categories of significance and professional judgement is therefore used to determine which category of significance best fits the overall effect to a landscape or visual receptor.

The significance of the effects can be adverse (negative) or beneficial (positive) according to the definitions set out in the table overleaf.

Significance Category	Description of Effect
Profound	An effect that obliterates sensitive characteristics within the landscape and/or visual environment.
Very Significant	An effect which, by its character, magnitude, duration, or intensity significantly alters most of a sensitive aspect of the landscape and/or visual environment.
Significant	An effect which, by its character, magnitude, duration, or intensity alters a sensitive aspect of the landscape and/or visual environment.
Moderate	An effect that alters the landscape in a manner that is consistent with existing and emerging baseline trends.
Slight	An effect which causes noticeable changes in the landscape and/or visual environment without affecting its sensitivities.

Not Significant	An effect which causes noticeable changes in the landscape and/or visual environment but without significant landscape and/or visual consequences.
Imperceptible	An effect capable of measurement but without significant landscape and/or visual consequences.

Table 16.12: Categories of Significance of Landscape and Visual Effects

RECEIVED: 18/07/2023

The significance of the effect is determined by considering the magnitude of the effect and the quality of the baseline environment affected by the Proposed Development. The basis for consideration of the significance of effects is included below.

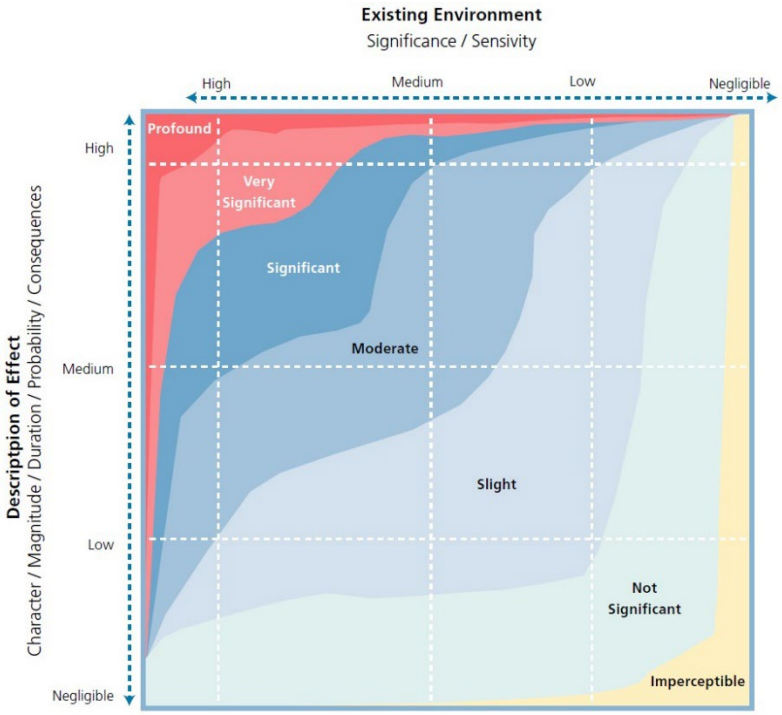


Image 16-1 *Basis for consideration of significance of effects*[1]

Effects will be assessed for all phases of the Proposed Development. Construction effects are considered to be temporary, short term effects which occur during the construction/decommission phase only. Operational/residual effects are those long term effects, which will occur as a result of the presence or operation of the development.
The quality of each effect is based on the ability of the landscape character or visual receptor to accommodate the Proposed Development, and the impact of the development within the receiving context. Once this is done, the quality of the effect is then assessed as being neutral, beneficial or adverse. A change to the landscape or visual resource is not considered to be adverse simply because it constitutes an alteration to the existing situation.

16.2.14 Cumulative Effects

In addition to townscape and visual effects, it is also important to consider potential cumulative effects. The approach used to determine cumulative effects has drawn on

[1] Environmental Protection Agency (EPA) 'Guidelines on the Information to be contained in Environmental Impact Assessment Reports', May 2022. Available online at https://www.epa.ie/publications/monitoring--assessment/assessment/guidelines-on-the-information-to-be-contained-in-environmental-impact-assessment.php

guidance on cumulative impact assessment published by the GLVIA3. Cumulative townscape and visual effects may result from additional changes to the baseline townscape or views as a result of the Proposed Development in conjunction with other developments of a similar type and scale.
The cumulative assessment includes developments that are consented but not constructed, that are the subject of undetermined applications, or are currently at scoping stage, and which are similar in type and scale to the Proposed Development.

RECEIVED: 18/07/2023

Magnitude of Cumulative Effects
The principle of magnitude of cumulative effects makes it possible for the proposed scheme to have major effects on a particular receptor, while having only minor cumulative effects in conjunction with other existing developments.

The magnitude of cumulative effects arising from the proposed scheme is assessed as **Very High, High, Medium, Low or Negligible**, with intermediate categories, based on interpretation of the following parameters:

- The additional extent, direction and distribution of existing and other developments in combination with the Proposed Development;
- The distance between the viewpoint, the Proposed Development and the cumulative developments; and
- The townscape setting, context and degree of visual coalescence of existing and Proposed Development and cumulative developments.

Significance of Cumulative Effects
As for the assessment of landscape and visual effects, the significance of any cumulative effects follows a same classification as illustrated in Image 16-1 - Basis for consideration of significance of effects, in Section 16.2.13 above, and will be assessed as **Profound, Very Significant, Moderate, Slight, Not Significant, Imperceptible**.

Limitations of Cumulative Effects
The cumulative assessment focuses on potential cumulative effects relating to the main permanent structure of each cumulative development. This is due to the uncertainty of the timing of construction activities for each of the identified developments. As a result, temporary structures and activity relating to construction have not been considered within the cumulative assessment.

16.2.15 Fieldwork
A site survey was carried out in October 2019, May 2020 and January 2023. The survey examined the potential visibility of the Proposed Development within the study area and the wider landscape, taking into account topography, existing screening vegetation and other localised factors. Facilitation works required to support the Proposed Development at the KIC lands, being at an early stage in planning, were not subject to an on-site survey.

16.2.16 Selection of Viewpoints
Viewpoint selection has been carried out according to the current good practice standards and the following industry guidelines:

- 'Guidelines for Landscape and Visual Impact Assessment' (GLVIA3), 3rd Edition, 2013, Landscape Institute (UK) & IEMA.

RECEIVED: 18/07/2023

It is not feasible to take photography from every possible viewpoint located in the study area. Photography has been taken from viewpoints, which are representative of the nature of visibility at various distances and in various contexts. Viewpoint photography is used as a tool to come to understand the nature of the potential residual effects. The selection process of viewpoint locations is as follows:

- The location of viewpoints within the study area is informed by desktop and site surveys;
- Identification and selection of representative viewpoints showing typical open or intermittent views within a local area, which will be frequently experienced by a range of viewers; and
- Identification and selection of specific viewpoints from key viewpoints in the landscape such as routes or locations valued for their scenic amenity, main settlements etc.

16.2.17 Photomontages

Photomontages are photorealistic visualisations produced using specialist software. They illustrate the likely future appearance of the Proposed Development from a specific viewing point. They are useful tools for examining the impact of the development from a number of critical viewpoint positions along the public road network within the study area.

However, photomontages in themselves can never provide the full picture in terms of potential effects, they can only inform the assessment process by which judgements are made. A visualisation can never show exactly what the Proposed Development will look like in reality due to factors such as; different lighting, weather and seasonal conditions which vary through time and the resolution of the image. As the photomontages are representative of viewing conditions encountered, some of them may show existing buildings or vegetation screening some or all parts of the developments. Such conditions are normal and representative.

The images provided give a reasonable impression of the scale of the development and the distance to the development but can never be 100% accurate. It is recommended that decision-makers and any interested parties or members of the public should ideally visit the viewpoints on site, where visualisations can be compared to the 'real life' view, and the full impact of the Proposed Development can be understood.

The landscape and visual impact assessment on site identified a range of viewpoints located within the study area at varying distances from the Proposed Development to show the effect of the development in key close, middle and distant views.

Viewpoints / Photomontages 1-17 show the Proposed Development including the following information for each:

- **Existing View** - Showing the baseline image; and
- **Photomontage** - Showing the Proposed Development including all visible components including landscape mitigation measures after 7-9 years;

A red wireline indicates non-visible elements of the Proposed Development where relevant.

Photomontage images have been produced with reference to best practice and the following industry guidelines:

RECEIVED: 18/07/2023

- 'Visual Representation of Development Proposals', Landscape Institute, Technical Guidance Note 06/19, 17 September 2019;
- Guidelines for Landscape and Visual Impact Assessment (GLVIA), Third Edition, Landscape Institute and Institute of Environmental Management and Assessment, IEMA, 2013; and
- Visual Representation of Wind Farms, Version 2.2, Scottish Natural Heritage, February 2017 (in relation to viewpoint selection, technical equipment, function and limitations of visualisations).

16.3 Project Description

The Davy Platform ICAV for and on behalf of the Liffey Sub-Fund intends intend to apply for a 10-year planning permission for development at this site of c. 72.23 hectares at Kildare Innovation Campus (KIC) (formerly known as the Hewlett Packard Campus) Barnhall Road, Leixlip, Co. Kildare, W23 X93P and including lands within the M4 and Barnhall Meadows. The overall development site includes lands in the ownership of Kildare County Council (c.1.93ha). The site is principally bounded by the M4 Motorway and Barnhall Meadows to the north; Celbridge Road to the east; Barnhall Rugby Football Club to the south; and by grounds associated with Castletown House to the west. The development will consist of:

- Demolition of existing Buildings No's 7, 8 and 9 (total gfa c. 84,838sqm).
- Existing Buildings No's 1 – 6 will be retained for deep tech and innovation related uses (total gfa c. 42,862sqm)
- Construction of 2 no. new deep tech buildings and 4 no. new data centre buildings, all including ancillary office spaces. The deep tech buildings will have an overall maximum height of c.16m and vary in size from 30,945sqm – 40,190sqm with a combined total gfa of c. 72,135 sqm. The data centres will be c.15 m in height to parapet and c.16.5m in height to top of roof plant screening. The data centres will vary in size from 13,225 sqm – 21,000 sqm with a combined total gfa of c. 76,225sqm. All buildings will be provided with Solar PV panels at roof level and green walls along selected elevations.
- The new deep tech buildings (A1 & A2) will be provided with service yard areas, loading docks, car parking, access roads, security fencing/gates and landscaping. The deep tech buildings will include rainwater harvesting tanks and green roofs over office areas.
- Each data centre (B1, C1, C2 & C3) will include data halls, admin blocks (comprising offices, breakroom, loading dock, storage, and ancillary areas) and a variety of mechanical and electrical plant areas/structures including battery storage rooms and mechanical rooms. Car parking, access roads, security fencing/gates, gate houses and landscaping will also be provided.
- B1 will include 14 no. fuel oil generators, MV rooms and associated mechanical flues. C1 – C3 will each include 22 no. fuel oil generators, MV rooms and associated mechanical flues (each c.18.6m high). Car parking, access roads, security fencing/gates, gate houses and landscaping will also be provided.
- 2 no. district heating pump house areas and inground piping for district heating system.
- Construction of a Replacement 110kV Gas Insulated Switchgear (GIS) Substation adjacent to the existing 110kV Rinawade Substation. The current Air Insulated

RECEIVED: 18/07/2023

Switchgear (AIS) substation known as the Rinawade 110kV sub is fed by 2 x 110kV Overhead lines. The new substation will connect to these overhead lines via short runs of underground cable. The replacement 110kV substation will include 6 No. transformers, with client control building and a 2 storey GIS substation building within a 2.4m high fenced compound.

- Decommissioning and removal of the existing 110kV Rinawade substation.
- Construction of an on-site energy centre to provide dispatchable power to the national electrical grid. The Energy Centre will include 9 no. gas powered combustion turbine generators (CTG's) and 9no. flues with a maximum height of c.15 metres. The turbines will be enclosed by a screen wall c.14m in height. The energy compound will include all required infrastructure including 2no. back-up fuel oil (HVO) tanks, an administration building, pump house, fire water tank, access roads, 14no. parking bays, security fencing etc.
- Provision of a Gas Networks Ireland (GNI) gas skid surrounded by a 2.4m high fence and access from Celbridge Road (R404). The GNI skid will replace the existing gas skid along Celbridge Road.
- Provision of a GNI AGI (Above Ground Installation) including 1no. kiosk building, c3.2m high, surrounded by a 2.4m high fence.
- Closure of the existing main entrance to the campus on Celbridge Road and reinstatement of the boundary.
- Construction of a new signalised entrance/exit on Celbridge Road c. 80metres north of the existing main entrance.
- Use of the existing secondary entrance/exit off Barnhall Road Roundabout in the south-east as a principal entry/exit.
- Construction of internal access roads, footpaths and cycle paths including a publicly accessible link road between Celbridge Road (R404) to the east and Barnhall Road (R449) to the west.
- Construction of a new pedestrian and cycle overpass across the M4 motorway and pedestrian/cycle path adjacent to lands known as The Wonderful Barn Allotments; the overpass will link the new publicly accessible link road within Kildare Innovation Campus to the entrance of Barnhall Meadows estate.
- Undergrounding and diversion of the existing overhead 10 kV/20 kV overhead line adjacent to the M4 motorway.
- The pedestrian and cycle route within the Kildare Innovation Campus will provide a link from the new public link road, along the protected view corridor (between Castletown Estate & Wonderful Barn) to the north-eastern boundary of Castletown Estate.
- The provision of a net increase of 678 new car spaces, resulting in a total of 2291 car spaces across the site (including a total of 244 EV car spaces).
- The provision of a new private EV Bus charging hub with parking for 10no. electric buses.
- The provision of a net increase of 310 new bicycle spaces, resulting in a total of 350 bicycle spaces across the site.
- The diversion of the c. 500 m stretch of an existing 1.5 m culvert, located to the north of the site along the existing loop road, southwest by c. 60 m; the diverted culvert will be located along the proposed link road.
- All associated site development works, drainage and services provision, landscaping, boundary treatments (including security fencing), and associated works.

The facilitation works are described in Chapter 2 of this EIAR and are included in the project but do not form part of the development for which consent is sought. Future consents for the

facilitation works will be required through EirGrid and GNI. A detailed description of the project is outlined in Chapter 2: Description of the Project.

RECEIVED: 18/07/2023

16.4 Baseline Scenario / Receiving Environment Analysis

16.4.1 Site Context

The subject site and adjacent area is situated in Leixlip, Co. Kildare within a generally flat to gently undulating landscape. Leixlip town is situated to the north and northeast, and Celbridge is located to the southwest. Leixlip is situated approximately 15km from Dublin City Centre. The town is bypassed by the M4 motorway with grade-separated interchanges on the motorway at the eastern and western end of the town (junctions 5 and 6, respectively). The R148 runs through the Main Street linking Leixlip to Maynooth to the west. This also links with the N4 dual carriageway to the east of the town, which in turn provides access to Lucan, the M50 and Dublin City Centre. The R149 runs north from Main Street, encompassing Captain's Hill and Cope Bridge (which operates on a one-way signalised system). The route continues eastwards across the county boundary with Dublin before heading northwards to Barnhill, Hansfield, Ongar, Clonee and the M3. Vehicular circulation within the town is influenced by a number of pinch points including Pound Street (and Rye Bridge), Captain's Hill, Cope Bridge, Main Street (incl. Leixlip Bridge). At the western periphery of the town the R449 links to the R148 (old N4) and is the main access from the M4 to Intel's facility in Leixlip.

The Kildare innovation Campus site is bound immediately by the M4 motorway to the north, Castletown House and surrounding demesne to the southwest, and the R404 to the east. Beyond the R404, the River Liffey corridor extends in a southwest to northeast alignment, swelling to form the Leixlip Reservoir. The Royal Canal is situated to the north of the study area, largely defining the footprint of residential buildings to the north of Leixlip. Castletown House and demesne forms a significant open green space within the study area, which contains a historically designed landscape which includes areas of open landscape with clusters of trees and axial views defined by tree lined avenues.

In addition, the surrounding landscape within the study area is characterised by agricultural fields enclosed by hedgerows, residential and commercial premises located along the local road network and the western fringes of Lucan, located within South County Dublin lands. Notable larger scale commercial developments within the study area include Backweston Airport and Backweston Laboratory Complex to the southeast, and Intel Irelands Leixlip Campus to the north. The Proposed Development site contains areas of mature tree vegetation and open grassland. Three drainage ponds are located within the site along the south-eastern boundary.

The location of GNI Gas Upgrade development extends from the R148 Station Road and follows the Celbridge Road to the KIC lands. The majority is located within a built-up suburban environment of Leixlip. It crosses the eastern extends of The Wonderful Barn curtilage before crossing the M4 motorway with its dense bands of woodland to either side and entering the KIC lands.

The locations of the EirGrid Uprating development cover in their majority a variety of agricultural land, Timahoe Bog as well as suburban areas of Leixlip / Kilmacredock and Edenderry.

16.4.2 Kildare County Development Plan 2023-2029 (KCDP)

KCDP contains a Landscape Character Assessment (prepared in 2004) which describes landscape character areas and strategies for the protection of specific landscape features. The CDP categorises the sensitivity of principal landscape character areas into 5 Classes.

RECEIVED: 18/7/2023

In broad terms, the study area lies within the following 2 landscape character areas (LCA):

- **Northern Lowlands**, which is considered a Class 1 – Low sensitivity landscape in the context of the county-wide assessment as shown in KCDP Map V1-13.1 – Landscape Character Areas and classified in Table 13.1 – Landscape Sensitivity Classification to Landscape Character Areas.
  Low sensitivity landscapes are described in the Landscape Character Assessment as "*Areas with the capacity to generally accommodate a wide range of uses without significant adverse effects on the appearance or character of the area". An exception to the low sensitivity rating, which characterises much of the study area, relates to the River Liffey corridor, which traverses from the southwest portion of the study area towards Leixlip to the northeast. Kildare County Development Plan 2023-2029, states that the river corridor is rated as Class 4 – Special Sensitivity, which is described as an area where "Significant adverse effects on the appearance or character of the landscape having regard to prevalent sensitivity factors*".

- **River Liffey**, which is considered a Class 4 – Special sensitivity landscape in the context of the county-wide assessment as shown in KCDP Map V1-13.1 – Landscape Character Areas and classified in Table 13.1 – Landscape Sensitivity Classification to Landscape Character Areas.

Scenic Routes and Viewpoints

As indicated on Map V1- 13.3, and described within Chapter 13, Table 13.7 of Kildare County Development Plan 2023-2029, the following views to be preserved within the study area include:

<u>RL – Views of the River Liffey from Bridges</u>

- RL1: Leixlip Bridge
- RL2: New Bridge
- RL3: Celbridge Bridge

<u>RC – Views to and from all bridges on the Royal Canal</u>

- RC2: Cope Bridge
- RC3: Louisa Bridge
- RC4: Deey Bridge
- RC12: Rye Water Aqueduct

Table 13.5 in the KCDP indicates Scenic Routes, which are described in Appendix 7. Relevant scenic routes located within the study area are listed below:

- **Scenic Route 28 – Views within the Carton Demesne Walls, to and from Carton House, the Lake and Woodland Areas**
  Location: Carton demesne

"*Views to the Carton House and Demesne are not available from the R148 Leixlip to Maynooth Regional Road (classified as part of the North Kildare Tourist Route) nor from any other local roads due to the height of the stonewall boundary. The existing lake and deciduous woodlands within the estate and the open landscape character of the environs contained within the Demesne can be described as having high landscape and scenic amenity value. Due to the hilltop location of Carton House, views to the surrounding open countryside are available*".

RECEIVED: 18/07/2023

- **Scenic Route 29 – Views of the River Liffey from the Main Avenue of Castletown House**
  Location: Castletown demesne
  "*Views towards the River Liffey are available from the main road within Castletown Demesne. Although the river corridor itself is not visible due to the mature vegetation growing along its banks, the quality of the vistas is of significance*".

Areas of High Amenity

KCDP identifies several Areas of High Amenity within the county, which overlap with sensitive landscapes. They are classified because of their outstanding natural beauty and/or unique interest value and are generally sensitive to the impacts of development. For the purposes of this assessment, the following Areas of High Amenity have been considered:

- **The River Liffey and the River Barrow Valleys**
  A section of The River Liffey corridor traverses from the southwest portion of the study area towards Leixlip to the northeast. The Leixlip Reservoir forms a swelling and larger open body of water along the river corridor and is located approximately fifty metres from the nearest part of the Proposed Development site. The following description is provided within the KCDP:

  "The River Liffey and the River Barrow valleys are of significance in terms of landscape and amenity value and as such are sensitive to development. The River Barrow is a designated Special Areas of Conservation (SAC). They are characterised by smooth terrain and low vegetation, with extensive upland views (i.e. the Chair of Kildare to the west and the Eastern Uplands to the east) and distant views including the neighbouring Wicklow Mountains. The topography is such that it allows vistas over long distances without disruption along the river corridor. As a result, development on the banks of the rivers can have a disproportionate visual impact, due to an inherent inability to be visually absorbed. However, the undulating topography occurring within the river valleys provides physical shielding and has the potential to visually enclose the built form within the river valley, where it does not break the skyline. Shelter vegetation exists along some stretches of the valleys with the presence of natural and native woodland that grows on the floodplains of the rivers, as well as by conifer plantation in adjacent lands. This vegetation has a shielding and absorbing quality in landscape terms. It can provide a natural visual barrier as well as adding to the complexity of a vista, breaking it up to provide scale and containment for built forms".

  "Many views of the river valleys are available from local roads and from viewing points located along the valleys. While river valleys represent potentially vulnerable linear landscape features, as they are often highly distinctive in the context of the general landscape, in certain circumstances landscape sensitivities may be localised or site-specific".

- **The Grand and Royal Canal Corridors**
  KCDP states that:
  "The Grand Canal and the Royal Canal are extensive water corridors that flow through the county. The Grand Canal flows in an east to south-west direction and divides at Sallins into the Naas and Corbally Branch and is further divided in three branches at Robertstown; the Milltown Feeder, the Barrow Line and the continuation of the Grand Canal into neighbouring County Offaly".

  "The Royal Canal flows in an east to west direction along the northern boundary of the county through Leixlip, Maynooth and Kilcock and continues into County Meath".

  "The canal corridors and their adjacent lands have been landscaped and enhanced along the sections where the canals flow through urban areas. Canal locks are distinctive features of these water corridors. The smooth terrain, generally gentle landform and low canal bank grassland that characterise the canal corridors allow vistas over long distances without disruption, where the canal flows in a straight-line direction. Consequently, development can have a disproportionate visual impact along the water corridor, and it can prove difficult for the existing topography to visually absorb development. The occurrence of natural vegetation, coniferous and mixed plantations adjacent to the water corridors can have shielding and absorbing qualities in landscape terms, by providing natural visual barriers".

  "Canal corridors are potentially vulnerable linear landscape features, as they are often highly distinctive in the context of the general landscape. In some cases, landscape sensitivities may be localised or site-specific".

RECEIVED: 18/07/2023

Walking Routes and Cycling - Permeability

The following walking routes are fully or partially located within the study area and are mapped in Appendix 16.2:

- The Royal Canal Way is located along the Royal Canal in the northern section of the study area;
- Arthur's Way Heritage Trail;
- Slí na Sláinte – Celbridge Kildare;
- Slí na Sláinte – Leixlip West;
- Slí na Sláinte – St. Catherine's Park Slí (Leixlip); and
- Slí na Sláinte – Leixlip Lucan Demesne.

Kildare County Development Plan 2023-2029 identifies various off-road pedestrian routes in / around Leixlip, many of which follow the Rye Valley, Royal Canal, Síleacháin Valley and within/around St Catherine's Park. This includes three Slí na Sláinte walking routes in or around the town which are identified above and mapped in Appendix 16.2.

Existing cycleways in Leixlip include the cycle path linking Castletown and Leixlip along the R449. Other cycle facilities along Station Road and sections of Green Lane (L5058) are immediately adjacent or incorporated into bus lanes. There are also informal cycle routes to Lucan via St Catherine's Park; and to Castletown via Parsonstown. The Greater Dublin Area (GDA) Cycle Network Plan identifies a network of intra-urban and urban cycle routes across the GDA. Leixlip is in the North Kildare Sector Town Cycle Network. The key routes proposed for this sector of relevance to Leixlip are:

- K1 Royal Canal Greenway
- LP1 R148 Main Street and Maynooth Road to Intel Plant cycle route;
- LP2 Barnhall Road to Celbridge via Castletown Demesne cycle route.

RECEIVED: 18/07/2023

16.4.3 Irelands Ancient East

The Castletown House Demesne is part of the network of this tourism trail with relevant signage located in the grounds.

16.4.4 Leixlip Local Area Plan (LAP) 2020-2023

The current Leixlip Local Area Plan 2020-2023 and has been extended to the 30th March 2026. The Leixlip LAP sets out an overall strategy for the proper planning and sustainable development of Leixlip in the context of the Kildare County Development Plan 2023-2029. The LAP includes the subject site within its boundary and has been consulted in the preparation of the LVIA.

Protected Views

The Leixlip LAP 2020-2023, Section 10.1.3, refers to protected views identified in Kildare County Development Plan 2023-2029 as follows:

"The Kildare County Development Plan includes views to be protected between The Wonderful Barn and Castletown House which affect some lands within the LAP. The design and siting of new development shall have regard to protected views in particular, any redevelopment of the Hewlett Packard site".

The Leixlip LAP 2020-2023 also indicates 'Views and Prospects to be Preserved' on the Leixlip Built Heritage and Archaeology Map 2. Please refer to Chapter 15 – Archaeology, Architecture & Cultural Heritage, for further details.

The Wonderful Barn Key Development Area (KDA)

The Leixlip LAP 2020-2023 identifies also key development areas. The Wonderful Barn KDA is located within the study area and defines guidelines and objectives in relation to new residential developments encircling The Wonderful Barn Complex. Building layouts will have regard to the protection of key views within the site and new residential developments should result in minimal visual impact.

The Wonderful Barn complex is also defined as a Neighbourhood Park in the open space strategy of Leixlip.

The proposed development will have no impact on The Wonderful Barn KDA and the open space strategy indicated for The Wonderful Barn complex.

Key Green Infrastructure Areas – Woodland and Mature Trees, and Hedgerows

The Leixlip LAP 2020-2023 defines Green Infrastructure planning *as "a proactive approach to maximising the benefits of the multi-functionality of nature that includes natural ecological processes, sustaining air and water quality and providing vital amenity and recreational spaces for communities*", [and] "*serves to provide an ecological framework for the social, economic and environmental health of an area*".

Green Infrastructure mapping forms part of the Leixlip LAP 2020-2023 and identifies key Local Biodiversity Areas as follows:

RECEIVED: 18/07/2023

- The Rye Water Valley/Carton SAC, River Liffey (including Liffey Valley pNHA), Royal Canal pHNA and Dublin – Sligo railway line which allow movement of both aquatic and terrestrial flora and fauna across the town.
- The woodlands, hedgerows, treelines, watercourses and extensive areas of grassland within the farmlands of Collinstown and Confey, in St. Catherine's Park, Leixlip Manor, Leixlip Castle Demesne, Barnhall and the surroundings of the commercial grounds of Intel and Hewlett Packard all provide excellent habitats which are interlinked and support widespread habitat connectivity across the Study Area and contribute to the GI network of Leixlip.
- It is recognised that the dominant environments within Leixlip are improved grassland (for agriculture) and urban, built land. It is a policy of Kildare County Council to maintain and increase the distribution of the Green Infrastructure network within the town.

Refer to Chapter 6 – Biodiversity, for further details on areas of ecological significance.

Walking & Cycling

The Leixlip LAP 2020-2023 recognises that overall permeability and connectivity of pedestrian and cycle routes in the town is poor primarily due to the limited number of crossing points over the Rye Valley, Royal Canal and railway line. Pinch points such as Captain's Hill also restrict permeability and connectivity.

16.4.5 South Dublin County Development Plan 2022-2028 (SDCDP)

A section of the study area to the east is located within South Dublin County Council jurisdiction, and as such is subject to the objectives and policies as set out within the current South Dublin County Development Plan 2022-2028. The landscape character areas are more relevant in the context of this assessment (refer to SDCDP, Appendix 9 Landscape Character Assessment, Figure 21). The study area contains sections of the following 3 landscape character areas and their associated landscape sensitivity (refer to SDCDP, Appendix 9 Landscape Character Assessment, Figure 37). The following landscape designations have been considered within this assessment:

Landscape Character Areas

The Landscape Character Assessment of SDCDP identifies five Landscape Character Areas. Each of the Landscape Character Areas is assessed against a set of criteria to determine the capacity of the landscape to accommodate change based on landscape sensitivity and landscape value. For the purposes of this assessment, the following three Landscape Character Areas are located partially within the principal study area:

- **LCA1 -Liffey Valley**
  Sensitivity: Medium-High
  Extent: From western boundary, along N4 corridor to county boundary close to Chapelizod;

- **LCA2-Newcastle Lowlands**
  Sensitivity: Medium
  Extent: From western boundary from N4 encompassing Grand Canal, south of Newcastle and extending eastwards to the R136; and

RECEIVED: 18/07/2023

- **LCA5-Suburban South Dublin**
  Sensitivity: Not defined
  Extent: The area extends east from Tallaght/Oldbawn to Rathfarnham, and north/northwest along the county boundary to Clondalkin.

Views and Prospects
There are no designated views and prospects within the principal study area.

16.4.6 Ecological Designations

While SAC's and pNHA's are ecological designations, they warrant inclusion in this chapter as they often represent intact landscapes which are of amenity value. There are three designated sites in proximity to the Kildare Innovation Campus, these are:

- The Rye Water Valley / Carton SAC (Site Code 001398)
- The Royal Canal pNHA (Site Code 002103)
- The Liffey Valley pNHA (Site Code 000128)

Please refer to Chapter 6 – Biodiversity for further details of areas of ecological significance.

Special Amenity Area Order
The Special Amenity Area (SAAO) for the Liffey Valley was made by Dublin City Council in 1990. The area lies between the administrative boundaries of South Dublin County Council and Fingal County Council. The area is subject to the following South Dublin County Council Development Plan 2022-2028 objective:

Policy NCBH7: Liffey River Valley and Special Amenity Area Order:
"*Protect and enhance the special amenity value of the Liffey Valley, including its landscape, visual, recreational, ecological, geological, and built heritage value, as a key element of the County's Green Infrastructure network and implement the provisions of the Liffey Valley Special Amenity Area Order (SAAO)*".

16.4.7 Facilitation works

GNI Gas Upgrade
The GNI upgrades will comprise a local upgrade of the gas network over a length of approximately 1.5km, extending from the R148 Station Road and following the Celbridge Road to the KIC lands as indicated in Figure 2.4, Chapter 2: Description of the Project. The proposed alignment traverses 3 townlands: Barnhall, Leixlip and Leixlip Demesne in County Kildare and is fully contained in the principal study area of 2km around the KIC lands as described above.

EirGrid Uprating
The staged uprating of existing overhead power lines will cover a linear distance of 115.2km, linking the replacement 110kV Rinawade substation to Derryiron/Maynooth and Dunfirth/Kinnegad. The existing lines traverse counties Kildare, Meath and Offaly, including land forming part of the extensive Bog of Allen. Uprating will involve potential groundworks on the existing lines relating to pole set or tower replacement and/or the provision of temporary access tracks or haul roads, involving heavy machinery use.

County Kildare:

Section of the existing overhead lines and substations are located in the following landscape character areas:

RECEIVED: 18/07/2023

- Northern Lowlands;
- Northern Hills;
- North-Western Lowlands; and
- Western Boglands.

The existing overhead line traverses the following scenic route:

Scenic Route 15 – Views of the Plains of Kildare and West Central Boglands, to and from Newtown Hills (including county roads L5027, L50281, L5028, L1007)
Location: Newtown, Grange, Nicholastown, Cappagh, Corocoranstown, Ballynakill, Ballyvoneen and Cloncurry.

"The county roads L5027, L50281, L5028, L1007 provides scenic viewpoints to the surrounding Newtown hills and lowland areas respectively. As the roads run along the ridgelines or hilltops, extensive views of the surrounding lowland rural lands are available at points where the occurring hedgerows are interrupted, and relatively large patches of deciduous woodlands can be seen. Small farms and deciduous trees along the low well-trimmed hedges occur along these scenic roads".

County Meath:

Sections of the existing overhead lines and substation are located in County Meath north and northwest of Maynooth, north of Kilcock and south of Kinnegad within sections of the following landscape character areas:

- 11 South East Lowlands; and
- 14 Royal Canal;
- 15 South East Lowlands.

No protected view & prospect is located within 500m of the uprating works.

County Offaly:

Sections of the existing overhead lines and substation are located within County Offaly. According to Offaly County Development Plan 2021-2027 it is an objective of the Council to prepare a County Landscape Character Assessment in accordance with all relevant legislation and guidance documents and following the forthcoming National and Regional Landscape Character Assessment.

No key scenic views or Areas of High Amenity are located within 500m of the uprating works.

16.4.8 Likely Future Receiving Environment ('Do Nothing' scenario)

All components of the baseline are constantly changing due to a combination of natural and human processes. When predicting likely direct and indirect effects it is important to remember that there are two available for comparison: the existing baseline environment and the future baseline environment without the implementation of the Proposed Development but considering natural changes only.

RECEIVED: 28/07/2023

In landscape terms, if the development did not go ahead, the Proposed Development site will remain as an established business campus comprised of light industrial buildings, road network and related ancillary infrastructure such as car parks, loading areas, lighting and vehicle barriers. The surrounding site will remain as soft landscape comprising of open grassland, tree and shrub planting, and open attenuation ponds.

In visual terms, the content in available views of the Proposed Development site will remain similar considering changes to existing vegetation due to maturing, pruning or natural decay.

16.5 Likely Impact of the Project

16.5.1 Landscape Effects at Construction

The Proposed Development (excluding facilitation works) is located within the Northern Lowlands Landscape Character Area, which has a low sensitivity according to the current Kildare County Landscape Character Assessment. The subject site and adjacent area are situated within a generally flat to gently undulating landscape. Leixlip is situated to the north and northeast, and Celbridge is located to the southwest. The site is immediately bound by the M4 motorway to the north, Castletown House and surrounding demesne to the southwest, and the R404 to the east. Beyond the R404, the River Liffey corridor extends in a southwest to northeast alignment, swelling to form the Leixlip Reservoir. Areas to the north include the infrastructure corridor of the M4 motorway. The Wonderful Barn and its surrounding area include allotments and remnants of a formerly designed landscape, which is bound by the M4 to the south and southwest and suburban housing estates to the east, north and west. The Royal Canal is situated to the north of the principal study area, largely defining the footprint of residential buildings to the north of Leixlip. Castletown House and demesne forms a significant and highly sensitive open green space within the principal study area, which contains a historically designed landscape which includes areas of open landscape with clusters of trees and axial views defined by tree lined avenues.
In addition, the surrounding landscape within the principal study area is characterised by agricultural fields enclosed by hedgerows, residential and commercial premises located along the local road network and the western fringes of Lucan, located within South County Dublin lands. Notable larger scale commercial developments within the principal study area include Backweston Airport and Backweston Laboratory Complex to the southeast, and Intel Ireland's Leixlip Campus to the north. The Proposed Development site contains areas of mature tree vegetation and open grassland. Three drainage ponds are located within the site along the south-eastern boundary.

The Proposed Development will result in localised changes to landform to accommodate the bridge and other buildings. Construction plant, including boring equipment and lifting machinery, will be introduced, and typical construction features such as fencing, access tracks and construction compounds will be laid out. The presence and activity of construction machinery and associated features will degrade the condition of this landscape character area locally. The introduction of these features relating to construction will be temporary, medium term and reversible. The magnitude of landscape effects will be medium. Combined with a low sensitivity, the significance / quality of effects will be moderate / adverse during construction.

Adjoining landscape character areas such as the River Liffey landscape character area will remain unaffected during the construction phase apart from construction traffic crossing the river bridges. The magnitude of landscape effects will be negligible. Combined with a special

sensitivity, the significance / quality of effects will be low / adverse during construction and temporary.

RECEIVED: 18/07/2023

Landscape Character Areas located within the wider study area in South Dublin, namely Liffey Valley, Urban, and Newcastle Lowlands will not be altered by the proposed construction works. While construction traffic will pass temporarily along existing transport corridors within these landscape character areas, the landscape character will not be affected resulting in no landscape effects.

16.5.2 Visual Effects at Construction

Areas experiencing visual effects during the construction stage will vary depending on the active construction phase. All groundworks, demolishing, refurbishment or the construction of the buildings, road network, bridge and landscape architecture will be mainly experienced locally from within the boundary of the Proposed Development site. Views outside the development boundary and within the principal study area include the M4 and associated over-bridges, The Wonderful Barn and adjoining allotments, residences of Barnhall Meadows housing estate facing towards the proposed development. Intervening building structures, topography and vegetation will quickly screen the site in distances of approximately 400m from the development boundary and beyond.

Construction effects will result in:

- Potential effects to the visual amenity within the locality as a result of the visibility of construction activities such as demolitions works, the construction / refurbishment of buildings, associated scaffolding and tall equipment such as cranes and containers; and
- Effects of temporary site infrastructure such as site traffic and construction compounds especially those located in areas adjacent to sensitive visual receptors.

Photomontages 1-17 supplementing this assessment illustrate the landscape and visual effects at operational stage only. The proposed phasing of the construction works does not allow for a meaningful illustration in photomontages as these can only show one particular snapshot in time, which will not capture the dynamic and complex nature of construction works comprehensively.

Visual effects will be highest within the site, from areas immediately adjacent to the site boundary, and within a principal visual zone of approximately 400m radius from the boundary of the Proposed Development site. Construction works of the proposed bridge will be visible along the M4 and the overbridges (R404 & Junction 6) for approximately 1.6km to the west and approximately 1km to the east although the existing bridge of the R404 will be more prominent on approach from the east. The visibility of construction works within the wider study area will be mainly limited to open areas where there are available views towards the site, that are unscreened by vegetation and intervening buildings.
Visual effects and their significance at construction stage will be temporary, adverse and range from Minor-Negligible (in the wider study area) to Major (within up to approximately 400m radius from the boundary of the Proposed Development site depending on the type of construction activities).

16.5.3 Facilitation Works at Construction

The **GNI Gas Upgrade** works are located within mainly suburban environments extending across infrastructure corridors (M4) and into commercial areas (KIC lands).

RECEIVED: 18/07/2023

The GNI Gas Upgrade works will not result in changes to the local landscape character. In terms of visual effects, the main receptor groups affected by construction works will be local residents, walker's along sections of the Arthur's Way Heritage Trail and the Celbridge Slí na Sláinte as well as vehicular traffic.

They will be highest along roads / footpaths along which the gas pipe travels, and within the immediate vicinity of the construction works. Principal views of construction works will likely be experienced within a radius of approximately up to 100m from the centre line of the Proposed gas pipe as well as from nearby residential dwellings facing the uprating works.

The sensitivity and susceptibility to visual change of residential receptors and walkers is considered high. The sensitivity and susceptibility to visual change of vehicular traffic is considered medium. The magnitude of visual effects for residential receptors and walkers is considered medium to high in close distance views. Their significance is considered moderate adverse and temporary.

The magnitude of visual effects for vehicular traffic is considered low and the resulting significance / quality is slight / adverse as the driver will concentrate on the road rather than on available views of the construction works. Traffic diversions may be in place during certain times of the laying of the pipe. The magnitude of visual effects for vehicular traffic is considered medium in relation to the pipe works and the resulting significance / quality is moderate / adverse and temporary.

The visibility of construction works beyond approximately 100m will be mainly limited by intervening vegetation and built structures. Visual effects from these areas are considered low, their significance / quality is not significant / neutral.

The **EirGrid Uprating** will not result in changes to the local landscape character. In terms of visual effects, the main receptor groups affected by construction works will be local residents and vehicular traffic including cyclists.

They will be highest along the existing OHL, within the immediate vicinity of the substations and of the construction works including along adjacent local roads. Principal views of construction works will likely be experienced within a radius of approximately up to 250m from the centre line of the existing OHL as well as from nearby residential dwellings facing the existing OHL alignment. The sensitivity and susceptibility to visual change of residential receptors is considered high. The sensitivity and susceptibility to visual change of vehicular traffic is considered medium. The magnitude of visual effects for residential receptors is considered medium to high in close distance views. Their significance is considered moderate-significant adverse and temporary.

The magnitude of visual effects for vehicular traffic is considered low in relation to the OHL works and the resulting significance / quality is slight / adverse and temporary as the driver will concentrate on the road rather than on available views of the construction works.

The visibility of construction works within the wider study area beyond approximately 250m will be limited to middle distance open and partial views mainly along the road corridors where there is sparse levels of vegetation and on higher ground, where poles and machinery can still be seen. Visual effects from these areas are considered low, their significance / quality is not significant / adverse. Long distance views are mainly fully screened by distance, intervening landform and vegetation. The magnitude of change in long distance views is

considered very low / negligible. The significance / quality is classified as ranging between not significant to imperceptible / neutral and temporary.

RECEIVED: 18/07/2023

16.5.4 Landscape effects at Operation

The Proposed Development will continue the established light industrial character on the site, which has served as a business campus in this location since the mid-1990's. The extension of the building footprint will intensify this existing use, while also offering opportunity to improve pedestrian and cycling permeability through the site, in particular due to the new pedestrian / cycle link north across the M4 motorway.

The following potential direct and indirect landscape effects have been identified, (along with their duration and nature) arising from the Proposed Development. Direct or indirect landscape effects on the fabric of the landscape and its receptors are closely related to the nature and extent of visibility.

In landscape terms, the existing Kildare Innovation Campus is an overall low density business campus with large open green areas. The alteration and transformation of the existing campus will intensify the inherent light industrial landscape character within the site, leading to an increase and densification of the light industrial buildings replacing sections of existing open green space.

Direct and long-term change or modification will occur locally where the proposed extension to the existing Kildare Innovation Campus will be physically located. Areas of existing tree planting and hedgerows will be removed to facilitate the Proposed Development. The magnitude of landscape change is considered medium and the resulting significance / quality is moderate / beneficial as the alteration and redesign of the open space will improve biodiversity and the overall strength of the landscape layout within the campus site. The proposed pedestrian / cycle bridge will increase the infrastructural elements in the principal study area but it will integrate into the existing character of the M4 motorway corridor due to its design and scale.

Indirect change will occur outside of the Proposed Development site boundary within a distance of up to 400m, where the visibility of the Proposed Development influences the perception of the character of the landscape. Considering the flat and low-lying nature of the existing landscape, in addition to the dense mature vegetation planting to the perimeter of the existing business campus site, indirect change in landscape character is largely limited to a short section of the R404 and from the existing campus entrance to the northwest of the site. These areas of open grass and tree planting will be replaced by new building units, generating an alteration by reinforcing the light industrial nature of the local landscape character. The magnitude of landscape change in these areas is considered low. The significance / quality of landscape effects on the landscape character in these areas is considered minor / beneficial at operation.

Indirect change and the significance / quality of landscape effects will reduce quickly to Imperceptible Neutral with increasing distance from the Proposed Development in the remaining principal study area (beyond approximately 400m from the Proposed Development). Adjoining landscape character areas such as the River Liffey landscape character area will remain unchanged during operation. The magnitude of landscape effects will be negligible. Combined with a special sensitivity, the significance / quality of effects will be imperceptible / neutral. Landscape Character Areas located within the wider study area in

South Dublin, namely Liffey Valley, Urban, and Newcastle Lowlands will not be affected by the Proposed Development resulting in no landscape effects.

RECEIVED: 18/07/2023

A summary of landscape effects on receptors located within the study area is provided in the table below.

Receptor	Susceptibility	Sensitivity	Magnitude of landscape change	Direct/ indirect Effects	Significance of landscape change / quality of effects
Landscape Character Area 'Northern Lowlands' (Co. Kildare) within the Proposed Development site	Low	Low	Medium	Direct	Moderate / Beneficial
Landscape Character Area 'Northern Lowlands' (Co. Kildare) outside the Proposed Development within approximately 400m of the Proposed Development site boundary	Low	Low	Low	Indirect	Minor / Beneficial
Landscape Character Area 'Northern Lowlands' (Co. Kildare) outside the Proposed Development beyond approximately 400m of the Proposed Development site boundary	Low	Low	Negligible	Indirect	Not Significant / Neutral
LCA 'River Liffey' (Co. Kildare)	High	High (Special)	Negligible	Indirect	Not Significant / Neutral
LCA 'Liffey Valley' (South Dublin)	High	Medium-High	None	Indirect	None
LCA 'Urban' (South Dublin)	Low	N/A	None	Indirect	None
LCA 'Newcastle Lowlands' (South Dublin)	Medium	Medium	None	Indirect	None
Historic Townscape	High	High	None	Indirect	None
Effect on existing vegetation (within the Proposed Development site)	High	High	Medium	Direct	Moderate / Beneficial

Receptor	Susceptibility	Sensitivity	Magnitude of landscape change	Direct / indirect Effects	Significance of landscape change / quality of effects
Green Open Space (as identified within the Leixlip LAP 2020-2023)	High	High	Negligible	Indirect	Not Significant / Neutral

RECEIVED: 18/07/2023

Table 16.13: Summary of Landscape Effects (at Operation)

16.5.5 Visual Effects

The Proposed Development is located in a generally gently undulating landscape and therefore even relatively low vegetation or intervening buildings will provide screening to receptors. The highest visual impacts tend to occur where there is no or little intervening vegetation between the viewer and the Proposed Development within the Proposed Development site, along its periphery (sections of the R404), or where the viewer is at an elevated position (refer to Photomontage 15 – top of Wonderful Barn). The majority of significant visual effects will occur from locations within the Proposed Development site or in close proximity to it (up to approximately 300m) as dense bands of woodland along the boundaries of the M4 (refer to Photomontage 8), the grounds of Castletown Demesne (refer to Photomontages 10 – 12), within the area around The Wonderful Barn, and publicly accessible locations along the River Liffey (refer to Photomontage 1) will screen the Proposed Development fully.

Views of the upper sections of the proposed Building A1 and the pedestrian / cycle bridge across the M4 can be experienced from the R404 road bridge crossing the M4 (refer to Photomontage 7), where the upper sections of additional building structures will become visible to already visible existing structures.

Open views of sections of the Proposed Development will be possible from the R404 / Celbridge Road. While roadside vegetation will screen considerable parts of the Proposed Development, views will be available at the vehicle entrance areas and where there are gaps in the roadside vegetation (refer to Photomontages 2, 3, 4, 6). View of the proposed pedestrian / bridge will be possible along the M4 (refer to Photomontages 7 & 8) as well as from the grounds of The Wonderful Barn (refer to Photomontages 14 – 17).

The existing protected viewing axis between Castletown House and The Wonderful Barn will not be altered and remain unaffected by the proposed development (refer to Photomontages 12 – 15).

In total, 17 photomontages have been prepared illustrating the nature of visibility of the proposals at key viewpoint locations. The detailed assessment of each view below should be viewed in conjunction with the photomontage booklet contained in Appendix 16.1, which also contain detailed viewpoint location information including the distance of each viewpoint to the Proposed Development.

Viewpoint / Photomontage 1: View northwest from R404 at eastern side of bridge crossing the River Liffey

View northwest from the New Bridge at Salmon Leap Canoe Club. This location is identified as a scenic viewpoint (RL 2) within the Kildare County Development Plan 2023-2029. Mature tree vegetation along the River Liffey embankment is visible in conjunction with an open stretch of the river corridor, adjacent to the canoe club building and launch area. There is currently no view of the existing Kildare Innovation Campus from this location, even during the winter photography, i.e. deciduous trees have lost most of the foliage intact.

RECEIVED: 19/07/2023

The value of this view is considered medium. Receptors are mainly pedestrians and vehicle drivers and are considered to have a high susceptibility to change. The visual sensitivity is medium-high.

The Proposed Development will be screened by intervening vegetation, existing buildings and topography from this location and as such, there will be no change in the existing view. The magnitude of visual change is None, and the resulting significance / quality of effects is Imperceptible / Neutral.

Viewpoint / Photomontage 2: View northwest from R404 roundabout at existing campus entrance

This viewpoint is positioned on the Roundabout along the R404, east of Barnhall Rugby Club. The view illustrates the southern entrance of the development site. Existing vegetation includes deciduous trees in the mid ground as part of the site boundary planting, which do not provide strong screening during the winter months. The view includes a number of direction signs, campus entrance signs, streetlights, and wooden fences. Sections of the existing building structures of the Kildare Innovation Campus are visible in the middle distance and background.

The value of the view is considered low. Receptors are vehicle users, workers and visitors to the Kildare Innovation Campus, and are considered to have a low susceptibility to change. The overall visual sensitivity is considered low.

The proposed A2 building will become visible from this viewpoint as well as the proposed tree planting of its surrounding carpark. The overall character of the view will remain similar to the existing baseline. The Proposed Development will be in-keeping with the existing layout and design. The magnitude of visual change is low, and the resulting significance / Quality of visual effects is considered minor / neutral.

Viewpoint / Photomontage 3: View northwest from R404 along campus boundary

This view is located along the R404 near the south-eastern corner of the existing campus. Existing buildings are located in the background while the fore- and middle ground are open grassland and remnants of a former hard standing area. The view represents a more open section of the site boundary, characterised by timber fencing and spaced tree planting, aligned along the boundary. The lack of understorey planting offers generally open views into the site from this location. The absence of foliage during the winter months opens up views into the site further.

The value of this view is considered low. Receptors are mainly pedestrians and vehicle drivers and are considered to have a low susceptibility to change. The sensitivity overall is low.

The Proposed Development will become a clearly noticeable change when compared to the existing view. The introduction of the A2 building complex, the associated car park and its proposed tree planting will formalise the view and structure the campus appearance in this view better. The additional proposed specimen treen planting along the site boundary will close gaps in the existing avenue tree planting along the R404. The alterations to the business campus are not visually uncharacteristic. The height and density of built structures increases the prominence of built structures in this view. However, the densification will improve the utilisation of the land and provide a better legible structure to the view. The magnitude of

visual change is considered medium. The significance / quality of visual effects is moderate / beneficial.

RECEIVED: 18/07/2023

Viewpoint / Photomontage 4: View north from R404 along campus boundary
This viewpoint is orientated to the northwest and taken from the R404. The existing boundary wall of the Kildare Innovation Campus is visible along the public footpath, together with a setback bus shelter, streetlights, boundary tree planting and undergrowth. Sections of the existing campus buildings are visible through the bare tree crown in the left of this view. Alensgrove Cottages, a commercial accommodation property, is located nearby but out of view, to the east of the R404. The existing view is well screened by the line of trees and shrub boundary along the roadside particularly during the summer season.

The value of this view is considered low. Receptors are mainly pedestrians and vehicle drivers and are considered to have a low susceptibility to change. The overall sensitivity is low.

The proposed new campus entrance will become visible in the foreground together with the associated removal of boundary wall and vegetation. The south-eastern façade of the proposed A1 building including sections of its green walls will become visible along the R404. Views also include the proposed planting along the new entrance road as well as the proposed planting around the new swale / attenuation pond. The existing boundary walls and vegetation to either side of the new entrance will be retained. Visibility of the Proposed Development will be higher during the winter months due to the absence of foliage. The magnitude of visual change is medium, and the resulting significance / quality of effects is moderate / beneficial.

Viewpoint / Photomontage 5: View north / northeast from access road within proposed development site
This viewpoint is located along Barnhall Road located within the Kildare Innovation Campus, approaching the car park to the right-hand side of the view. The M4 motorway is situated approximately 50m north of this viewpoint behind the tall tree belt running along the left side of this view. However, the M4 itself is not visible but audible. The view is defined by Barnhall Road and associated streetlights as well as trees and hedgerows associated with the car park on the right in this view. On the left, groups of deciduous trees and a grassed embankment shape the view including the prominent tree belt along M4, which is separated from the campus by a green wire and post fence.

The value of the view is considered low. Receptors are mainly vehicle drivers and car park users. These receptors are considered to have a low susceptibility to change. The overall visual sensitivity is considered low.

The Proposed Development will considerably alter the focus in the existing view. The proposed A1 building will become a new and prominent focus point in the background. The reshaping of the grassed embankment along the M4 tree belt will require the removal of existing trees to facilitate new ramp of the proposed pedestrian / cycle bridge. Its railings will be become visible on the left of the view. The existing green post and wire fence will be removed and not replaced. A stepped grassed embankment with scattered groups of trees will be introduced instead. Barnhall Road will be slightly re-aligned and comprise footpaths and cycle lanes to either side. The Proposed Development will structure and formalise the view better than the current situation which is an underutilised zone between the M4 and Barnhall Road. It will integrate the north-eastern corner of the site into the overall campus. The magnitude of

change is considered high the resulting significance / quality of visual effects is Significant / Beneficial.

RECEIVED: 18/07/2023

Viewpoint / Photomontage 6: View southeast from roundabout along access road near the north-western boundary of proposed development site

This viewpoint is located near the existing roundabout along the north-western boundary of the campus, at the gated threshold into the site. Beyond the carriageway and adjacent lighting and footpath, the site is predominantly planted with stands of trees and open grassland. The existing welcome sign, flanked by three flag poles on the right-hand side of the road, is a noticeable element in the existing view. A section of green chain-link fencing, topped with barbed wire, is visible beyond the grassed area to the right of the view. This viewpoint is located within the Proposed Development site.

The value of the view is considered low. Receptors are pedestrians and vehicle drivers entering or leaving the campus. They are considered to have a Low susceptibility to change. The overall visual sensitivity is considered low.

The Proposed Development will retain the majority of existing vegetation in the foreground and middle-distance. The addition of new footpaths and cycle lanes along the entrance road is noticeable. Additional screen planting in the middle distance will thicken up the green belt along the entrance area. The proposed B2 building will be noticeable through the bare crowns of intervening vegetation during the winter months and will otherwise be screened by foliage. The proposed 110 kV substation in the background on the right of this view will not be visible and fully screened. The overall character of the view will remain similar. The magnitude of change is considered low and the resulting significance / quality of visual effects is not significant / neutral.

Viewpoint / Photomontage 7: View west from M4 overbridge

This elevated viewpoint is located on the R404 bridge crossing the M4. The motorway is visible in the centre right of the view at a lower level to the viewer. Barriers along the side of the bridge are composed of mesh grating and vertical and horizontal posts. To the left, the existing view of the Kildare Innovation Campus is mostly screened by belt of coniferous trees, some deciduous trees and the bridge structure itself. Upper sections of the existing buildings, within the business campus are slightly visible beyond the bridge structure and above roadside tree planting. The motorway contains prominent gantries with direction information.

The value of this view is considered low. Receptors are mainly pedestrians and vehicle drivers and are considered to have a low susceptibility to change. The overall sensitivity is low.

The Proposed Development will create a perceivable change in the existing view, intensifying the existing light industrial character of the site by increasing the overall perceived height of the development when viewed from this location, due to the partial visibility of the upper sections of Building A1. The proposed pedestrian and cycle bridge will be visible beyond the existing gantry in the background. While noticeable, it will not be a prominent structure considering the existing features of the view. It will integrate well in its setting from this location. The immediate carriageway and associated infrastructure will continue to define the underlying character within this view. The magnitude of visual change is low, and the resulting significance / quality of visual effects is minor / neutral.

Viewpoint / Photomontage 8: View east along M4 from overbridge at Junction 6

This elevated and open viewpoint is located at the junction 6 roundabout above the M4 motorway. The road corridor, access ramps and associated motorway infrastructure are the primary focus in this view. Beyond the roadway, mature tree vegetation defines much of the content in available views, with distant ridgelines visible to the right extent from this location. The upper most sections of existing buildings located within Kildare Innovation Campus are visible but barely discernible above sections of existing vegetation in the middle distance.

RECEIVED: 18/07/2023

The value of the view is considered low. Receptors are mainly vehicle drivers. These are considered to have a low susceptibility to change. The visual sensitivity is considered low.

In winter views, apart from the new bridge, the Proposed Development will be screened by intervening vegetation. Any upper most sections of roof structures of proposed buildings will not be discernible through the bare trees. The proposed pedestrian and cycle bridge crossing the M4 will be partially discernible in the background. The ramps to either side will be screened by intervening vegetation, so that only the section crossing the laneways will be visible. The proposed bridge will integrate in the view and will not change the character of the view. It will add another piece of infrastructure to the overall setting without becoming a new focus point. The magnitude of visual change will be low and the resulting significance / quality of visual effects is considered to be not significant / neutral.

Viewpoint / Photomontage 9: View east from northern access / entrance road to Castletown House

This viewpoint is located south of Barnhall Road along the northern access road to the car park of Castletown House. The viewpoint is located approximately 780m north of the Castletown House at a layby. The view represents an open view across fields towards the wooded western boundary of the Kildare Innovation Campus. This thick belt of trees along the boundary is fully screening the existing campus apart from one overhead line transmission mast and wires associated to the existing Rinawade 110kV substation. An existing low voltage power line on wooden poles runs across the field in the middle distance.

The value of the view is considered medium. Receptors are mainly vehicle drivers, including cyclists, and pedestrians, and these are considered to have a medium susceptibility to change as they are approaching a high quality landscape associated with Castletown House. The visual sensitivity at this viewpoint, is considered medium.

The majority of Proposed Development will be screened by intervening vegetation along the site boundary. Sections of Buildings B2 and B3 will be recognisable through the bare crowns of trees and a small gap in the tree belt in the background. They will be screened during the summer months due to foliage. The character of the view will not change either in winter or in summer. The visibility of sections of the proposed Buildings B1 and B3 will not detract from the view or undermine the character of the view. The existing overhead line transmission mast will remain the most prominent built structure in this view. The magnitude of visual change is Negligible and the resulting significance / quality of visual effects is not significant / neutral.

Viewpoint / Photomontage 10: View northeast from Castletown House forecourt

This viewpoint is located within the forecourt of Castletown House. Mature tree vegetation, clipped yew trees, hedges and areas of open grass are visible within the immediate envelope of the view. The historic demesne landscape is largely intact, with no significantly detracting elements visible.

RECEIVED: 18/07/2023

The value of this view is considered high given the historical sensitivity of the site. Receptors are pedestrians, tourists and staff working on the estate and are considered to have a high susceptibility to change. The visual sensitivity is high.

The Proposed Development will be fully screened by the existing intervening vegetation close to Castletown House as well as the existing tree belt between the campus and the Castletown House estate. There will no visual change resulting in any visual effects.

Viewpoint / Photomontage 11: View northeast from Castletown House Parkland
This viewpoint is located within the open parkland of Castletown demesne. This view is characteristic of available views from this part of the site within the viewing arc from northeast to southeast, which is contained by a dense area of mature tree planting, forming a visual buffer between the Castletown estate lands and the Proposed Development site.

The value of this view is considered high. Receptors are pedestrians, tourists and staff working on the estate and are considered to have a high susceptibility to change. The visual sensitivity is high.

The Proposed Development will be fully screened by the existing intervening woodland belt between the campus and the Castletown House estate. There will no visual change resulting in any visual effects.

Viewpoint / Photomontage 12: View northeast from Castletown House
(View aligned along historical axis / vista near the north-eastern façade of main building)
This view forms part of a protected viewing corridor as identified within the Kildare County Development Plan 2023-2029 and the Leixlip Local Area Plan 2020-2023. The originally designed view, orientated northeast from Castletown House to The Wonderful Barn, is currently not possible, however, the axial tree lined avenue is still legible in this view.

The value of the view is considered high. Receptors are considered to have a high susceptibility to change and are mainly pedestrians, tourists and staff working on the estate. The visual sensitivity is considered high.

The Proposed Development will not be visible from this location and as such, there will be no change in the existing view. It should be noted that photography used for this assessment is based on winter conditions, i.e. deciduous trees are without foliage. In winter views, there is still not any visibility of the Proposed Development. There will no visual change resulting in any visual effects.

Viewpoint / Photomontage 13: View northeast within proposed development site
(Accessible views along historical axis / vista from within development site)
This view forms part of a protected viewing corridor from Castletown House to The Wonderful Barn, as identified within the Kildare County Development Plan 2023-2029 and the Leixlip Local Area Plan 2020-2023. The upper section of the corkscrew building structure that forms part of The Wonderful Barn is visible in the far distance. The view is channelled between an existing avenue of trees and along grassland located within the Proposed Development site.

The value of the view is considered high as it forms part of a designated viewing corridor. These lands are privately owned and form part of the existing Kildare Innovation Campus. This area of the site does not form part of the pedestrian circulation on the campus at present and

receptors are mainly limited to staff maintaining the grounds. Receptor susceptibility is considered low. The visual sensitivity is high.

RECEIVED: 18/07/2023

The landscape proposals along the retained and improved (to replace failed trees) avenue of trees pointing towards The Wonderful Barn will include a formalisation of the grassed areas with the introduction of low and long stretched mounds and wildflowers enclosing a meandering footpath along the avenue and viewing axis. Additional proposed buildings will not become visible through the trees. The introduction of a new access road in the left of the view beyond the avenue of trees will be discernible but not detract from the overall view.
The view straight ahead to The Wonderful Barn will remain unaltered. The proposed access for pedestrians will allow this view to be experienced and provides an accessible open green space. The magnitude of visual change is low, and the resulting significance / quality of visual effects is considered minor / beneficial.

Viewpoint / Photomontage 14: View southwest from ground floor level in front of The Wonderful Barn (View aligned along viewing historical axis / vista)
This viewpoint is related to Viewpoint 15 but located at the base of The Wonderful Barn. The view is oriented south and is closely aligned to the historic axial view towards Castletown House. The immediate foreground comprises an open grassed area, contained by hedgerows and coniferous tree planting. Screen planting located along the M4 road alignment terminates the view in the background. The overall vegetation pattern is unfocused and contains remnants of a former more concerted layout.

The value of this view is considered medium as it forms part of a designated axial view towards Castletown House. Receptors are likely to be pedestrians, tourists and workers and are considered to have a high susceptibility to change. The overall sensitivity is considered medium-high.

The majority of the Proposed Development is screened by existing intervening vegetation during the winter months. Sections of proposed Building A1 will be seen through the crowns of trees in the background. Sections of the proposed pedestrian and cycle bridge are discernible through gaps in intervening coniferous trees in the middle ground. Outlines of proposed Buildings C1-C3 can be recognised through the bare crowns of vegetation along the M4 in the background. Apart from the bridge, all other proposed structures will be screened during the summer months. The character of the view will not change despite features of the Proposed Development becoming partially discernible in the distance during the winter months. The magnitude of visual change is therefore considered low. The significance / quality of visual effects is not significant / neutral.

Viewpoint / Photomontage 15: Panoramic view south / southwest from the top of The Wonderful Barn

RECEIVED: 18/07/2023

This elevated and open viewpoint (although currently not publicly accessible) is located at the top of The Wonderful Barn. This Georgian Building, with distinctive corkscrew shape, was a former granary on the Castletown House Estate and forms a local landmark in Leixlip town and the surrounding environs. This viewing location provides an overview of the existing Kildare Innovation Campus, albeit partially screened by existing vegetation, which illustrates the local adjacent landscape setting to the south. The landscape is generally flat, with the Wicklow Mountains visible in the far distance. The surrounding landscape has a substantial tree cover. The M4 is, apart from a short section, mostly screened by intervening vegetation although audible. The existing campus is a large light industrial feature and focus point in this view. This south facing view is closely aligned to the historic axial view towards Castletown House, which is partially intact and visible as a tree lined avenue to the far right of this view.

The value of this view is considered medium as it forms part of a designated axial view towards Castletown House. This view is not publicly accessible at present and receptors are limited to workers who may be intermittently accessing the building for tasks not related to the view. Receptor susceptibility to change is considered medium. Should this location become publicly accessible in the future, receptors will likely be visitors and tourists to The Wonderful Barn. The sensitivity at present is considered medium.

The expansion of the existing business campus footprint will be legible from this elevated location. The most noticeable additional building mass is that of Building A1 to the left of the view as well as that of Buildings A2 and C3 in the middle distance, with mid to upper sections of the buildings visible above existing tree vegetation or other building lines. Additionally, the change in roofscape due to the alterations to existing buildings and the introduction of Buildings C1- 3 and the associated clearance of vegetation is also noticeable. The footprint of the overall built up area increases while the building heights remain similar. The Proposed Development will not break the skyline in this view, it remains low and matches the existing business park. The light industrial character of the campus increases in prominence slightly but it does not change the character of the overall view. The historic axial view between The Wonderful Barn and Castletown House will remain unchanged apart from the discernible introduction of the meandering footpath along the avenue located within the Kildare Innovation Campus.
The addition of the bridge across the M4, situated in the mid-ground of the view, will be clearly visible including the associated northern ramp. Sections of existing vegetation to either side of the M4 will need to be removed to facilitate the bridge. While discernible, the new bridge does not look out of character when seen in conjunction with the motorway and the Kildare Innovation Campus. The magnitude of visual effects is considered medium, due to the development causing modest changes to the existing view over a wide area or noticeable change over a limited area. Overall, the significance /quality of visual effects is moderate / adverse as the prevalence of built structures intensifies but without altering the overall composition of the view.

Viewpoint / Photomontage 16: View southwest from curtilage of The Wonderful Barn

The viewpoint is positioned approximately 95m southwest from The Wonderful Barn. The foreground shows a small scale, open grass field. Along the left-hand side there is a row of deciduous trees which form part of the overall fragmented avenue planting between Castletown House and The Wonderful Barn. Scrubby undergrowth and unmaintained grassland form the middle ground until reaching the mixed tree planting along the M4

motorway corridor. The view also includes a low voltage overhead line as well as road gantries associated with the M4 and metal fencing.

RECEIVED: 18/07/2023

The value of this view is considered medium as it forms part of a designated axial view towards Castletown House. Receptors are likely to be pedestrians, tourists and workers and are considered to have a high susceptibility to change. The overall sensitivity is considered medium.

Visibility of the Proposed Development concentrates on two features, first the proposed Building A1, which becomes discernible on the let of the view through the crowns of trees during the winter months. Secondly, on the proposed pedestrian and cycle bridge including the retaining wall and railings supporting the northern ramp, which will become visible and a new point of focus in the middle distance. The remaining sections of the Proposed Development will be screened by intervening vegetation. Particularly the introduction of the bridge will partially alter the character of the view and introduce a new layer of infrastructure. The historical viewing axis towards Castletown House will remain unaltered. The magnitude of change is considered medium and the resulting significance / quality of visual effects is moderate / adverse.

Viewpoint / Photomontage 17: View southwest from access road to The Wonderful Barn across allotments

This viewpoint is located at the allotments, near The Wonderful Barn. The foreground is made up of the different public allotment plots to the left and right, contained with post and wire fences. A public grass footpath sits in the middle of the view. Temporary construction machinery is apparent in the background to the left-hand side and associated with the nearby construction of a housing estate bordering along the curtilage of The Wonderful Barn. The existing vegetation in the background terminates the view from visibility of the M4 and the existing Kildare Innovation Campus beyond. An existing low voltage overhead transmission lines cross the view in the middle distance. A gantry associated with the M4 is visible in the background.

The value of the view is considered low. Receptors are pedestrians, workers, minders of the allotments, and visitors to The Wonderful Bar. These receptors are considered to have a medium susceptibility to change. The overall visual sensitivity is considered medium-low.

The proposed Building A1 will become visible through the crowns of trees on the left hand side of the view during the winter months. The proposed pedestrian and cycle bridge, however, is clearly visible in the background with its ramp running along the length of the view in the middle distance. The bridge and the ramp in particular will become a new point of focus in this view altering partially the character of the view. The magnitude of visual change is medium, and the resulting significance is considered moderate / adverse.

A summary of visual effects for each photomontage is included in the table overleaf.

RECEIVED: 18/07/2023

Receptor	Susceptibility	Sensitivity	Magnitude of visual effects	Significance / Quality of Effects
Photomontage 1	High	Medium-High	None	Imperceptible / Neutral
Photomontage 2	Low	Low	Low	Minor / Neutral
Photomontage 3	Low	Low	Medium	Moderate / Beneficial
Photomontage 4	Low	Low	Medium	Moderate / Beneficial
Photomontage 5	Low	Low	High	Significant / Beneficial
Photomontage 6	Low	Low	Low	Not Significant / Neutral
Photomontage 7	Low	Low	Low	Minor / Neutral
Photomontage 8	Low	Low	Low	Not Significant / Neutral
Photomontage 9	Medium	Medium	Negligible	Not Significant / Neutral
Photomontage 10	High	High	None	None
Photomontage 11	High	High	None	None
Photomontage 12	High	High	None	None
Photomontage 13	Low	High	Low	Minor / Beneficial
Photomontage 14	High	Medium-High	Low	Not Significant / Neutral
Photomontage 15	Medium	Medium	Medium	Moderate / Adverse
Photomontage 16	High	Medium	Medium	Moderate / Adverse
Photomontage 17	Medium	Medium-Low	Medium	Moderate / Adverse

Table 16.14: Summary of Visual Effects (at Operation)

16.5.6 Visual effects on designated Scenic Routes and Points of View

Designated scenic routes and points of view have been listed in Sections 16.4.2 & 16.4.4 above. An assessment of visual effects is included below:

RL – Views of the River Liffey from bridges:

- RL 1: Leixlip Bridge – No visibility towards the Proposed Development resulting in no visual effects
- RL2: New Bridge – Refer to Photomontage 1, No visibility towards the Proposed Development resulting in imperceptible visual effects.
- RL3 Celbridge Bridge – No visibility towards the Proposed Development resulting in no visual effects

RC – Views to and from all bridges on the Royal Canal:

- RC2: Cope Bridge – No visibility towards the Proposed Development resulting in no visual effects.
- RC3: Louisa Bridge – No visibility towards the Proposed Development resulting in no visual effects
- RC4: Deey Bridge – No visibility towards the Proposed Development resulting in no visual effects
- RC12: Rye Water Aqueduct – No visibility towards the Proposed Development resulting in no visual effects

RECEIVED: 18/07/2023

Scenic Route 28 – Views within the Carton Demesne Walls, to and from Carton House, the Lake and Woodland Areas

The Proposed Development will not result in visual effects due to the orientation of views away from the development site and intervening screening.

Scenic Route 29 – Views of the River Liffey from the Main Avenue of Castletown House

The Proposed Development will not result in visual effects due to the orientation of views away from the development site and intervening screening.

16.5.7 Visual effects on walking routes

Visual effects on the following walking routes have been identified as follows from locations within the principal study area:

- The Royal Canal Way: No visual effects due to intervening screening provided by vegetation, existing built structures and topography.
- Arthur's Way Heritage Trail: Sections of this walking route are located along the boundary of the Proposed Development (refer to Photomontages 1-4 & 7). Sections of the Proposed Development will become visible as well as changes to the existing planting the introduction of additional proposed planting. The significance / quality of visual effects range from none to moderate / beneficial.
- Slí na Sláinte – Celbridge Kildare: Sections of this walking route share the same route as Arthur's Way Heritage Trial and are located along the boundary of the Proposed Development (refer to Photomontages 1-4 & 7). Sections of the Proposed Development will become visible as well as changes to the existing planting the introduction of additional proposed planting. The significance / quality of visual effects range from none to moderate / beneficial.
- Slí na Sláinte – Leixlip West: No visual effects due to intervening screening provided by vegetation, existing built structures and topography.
- Slí na Sláinte – St. Catherine's Park Slí (Leixlip): No visual effects due to intervening screening provided by vegetation, existing built structures and topography.
- Slí na Sláinte – Leixlip Lucan Demesne: No visual effects due to intervening screening provided by vegetation, existing built structures and topography.

16.5.8 Visual effects on Irelands Ancient East tourism routes

The Castletown House Demesne will not be affected by the Proposed Development as illustrated in Photomontages 9 – 12.

16.5.9 Areas of High Amenity

The Proposed Development will not result in landscape and visual effects within the following areas of high amenity, which are located within the principal study area:

- The River Liffey and the River Barrow Valleys

- The Grand and Royal Canal Corridors

RECEIVED: 28/07/2023

16.5.10 Facilitation Works at Operation

The **GNI Gas Upgrade** works will not result in landscape effects at operation. The majority of the proposed gas pipe alignment will be located within existing road corridors. No visual effects are anticipated following the completion of construction works as existing road surfaces and open ground will be reinstated to match existing conditions.

Changes to the existing OHL network due to the **EirGrid Uprating** will be barely perceptible or appear similar to existing structures. Visual effects are therefore considered negligible and their significance / quality imperceptible or not significant / neutral.

16.5.11 Cumulative landscape and visual effects

A large number of proposed and permitted projects located within the principal study area have been reviewed to determine their location, scale and the potential relevance to the Proposed Development. Cumulative landscape and visual effects may result from additional changes to the baseline landscape or views as a result of the Proposed Development being seen in conjunction with other developments similar in scale, type and nature. A list of cumulative schemes that have planning consent or are in the planning process is enclosed below. Developments that are currently under construction are considered to be part of the landscape and visual baseline.

Planning reference	Proposal	Status	Location in relation to proposed development	Relevance to this assessment
20307223/0	Strategic Housing Development Leixlip Gate, Kilmacredock, Leixlip, Co. Kildare	Permission granted	Within approximately 650m northwest of the Proposed Development site	The permitted development is large scale housing development located within the study area.

Table 16.15: Relevant cumulative developments

Cumulative effects with Strategic Housing Development (SHD) at Leixlip Gate, Kilmacredock, Leixlip, Co. Kildare

There will be no intervisibility and therefore no cumulative landscape and visual effects arising between the permitted SHD and the Proposed Development due to topography, intervening vegetation and existing built structures such as the M4.

16.6 Mitigation Measures

Mitigation is a term used to describe the measures or actions that may be taken to minimise environmental effects. The purpose of mitigation is to avoid, reduce and where possible remedy or offset, any significant adverse direct and indirect effects on the environment arising from the Proposed Development.

The principal mitigation for the Proposed Development is inherent in the design of its architecture and open space design, which has evolved through an iterative process of assessment and consultation. There are no operational management measures required in respect of landscape and visual issues.

RECEIVED: 18/07/2023

The proposed mitigation measures have been developed in tandem with the landscape masterplan, as a result of collaboration between the multi-disciplinary design team throughout preliminary stages of this project and comprises of the following avoidance, reduction and remediation measures. The main goals are described below:

16.6.1 Avoidance Measures

The site selection process and alternatives considered is set out in Chapter 4 – Key Alternatives Considered.

The main avoidance measures are the retention and protection of the existing mature woodland belts along the site boundaries to the north, south and east. Existing trees to be retained will be protected during the construction stage in accordance with recommendations of the Arboricultural Assessment and the BS 5837: 2012. Prior to commencement of construction, existing trees which are to be retained will be protected by erection of timber post and wire fence according to BS 5837:2012 to ensure no works are carried out under each of their canopies. Unstable trees should be removed under direction of the arborist.

16.6.2 Reduction Measures

- The height and scale of the Proposed Development will align with the existing prevailing building format on the site;
- The Proposed Development will be fenced off during the construction phase to reduce the visual impact of the works;
- Vehicles exiting site during the construction stage should be subject to wheel wash facilities or road sweepers shall be used in order to maintain clean roads;
- Any lighting used during the construction process should be kept to a minimum, providing for site safety only and shall be directed into the site and away from adjacent residential properties. Lighting shall be shielded to avoid light spill onto adjacent properties and roads; and
- Disturbance of existing vegetation will be minimised where possible. Proposed planting will help integrating the Proposed Development into the surrounding landscape, provide screening where needed, and minimise the effect on the landscape character of the area.

16.6.3 Remediation Measures

- Enhancement of site tree cover by introduction of additional tree and woodland planting;
- Provide a permeable design by creating connections for pedestrians and cyclists through and around the site;
- Landscape works to be carried out as per associated Landscape Masterplan;
- A mix of both native and non-native plant species to be used throughout the scheme;
- Landscape management and maintenance plan to be drawn up and approved up by qualified professional;
- Ensure that ongoing landscape maintenance and debris cleaning is carried out during the operational period within the site; and
- Ensure that ongoing maintenance and replacement of failing or failed plant material.

The review of photomontages allowed for the assessment of how effective the proposed mitigation will be in regard to residual landscape and visual effects arising from the development.

RECEIVED: 18/07/2023

While the site is generally well screened from surrounding receptors and landscape sensitivities, the aim of the proposed landscape mitigation measures is to integrate the Proposed Development into the existing site while also reducing the visual effects on identified receptors within the principal study area. The landscape mitigation will complement the space by adding new landscape elements helping to integrate the Proposed Development into its existing environs over time. The overarching design intention is to propose a network of connected open spaces to improve pedestrian and cyclist permeability across the site, while also generating a strong sense of place and identity for the upgraded business campus. The protected axial view from Castletown House to The Wonderful Barn has been incorporated into the overall site layout and is emphasised by a newly introduced walking route along the tree lined avenue on the site in addition to the setback of building facades along the viewing corridor. Ecological enhancements such as bird and bat boxes, bug hotels, scrapes along with significant habitat creation from woodland planting to wildflower meadows will ensure the site maintains its biodiversity for local wildlife.

16.7 Residual Effects

Following the completion of construction works and the implementation of the proposed landscape mitigation measures, the development will become a long-term feature extending the building footprint of Kildare Innovation Campus.

Effective execution and establishment of the proposed landscape mitigation / green infrastructure will have a positive impact and help to 'soften' landscape and visual effects associated with the Proposed Development, particularly from areas where the development will become visible such as sections of the R404 and the curtilage of The Wonderful Barn. In the medium to long term, the perception of adverse landscape and visual effects will reduce in tandem with the maturing of the proposed planting.

16.7.1 Residual Landscape Effects

Long term residual landscape effects will arise locally where the proposed extension to the existing Kildare Innovation Campus and the proposed pedestrian / cycle bridge will be physically located. The alteration and transformation of the existing campus will intensify the inherent light industrial landscape character within the site, leading to an increase and densification of the light industrial buildings replacing sections of existing open green space and lead to the addition of infrastructural elements in the curtilage of The Wonderful Barn area. The magnitude of landscape change is considered medium and the resulting significance / quality is moderate / beneficial. The alteration and redesign of the open space, and the proposed screen planting will improve biodiversity and the overall strength of the landscape layout as the vegetation matures, which will reduce the significance of landscape effects to minor / neutral.

Outside of the Proposed Development site boundary within a distance of up to 400m, where the visibility of the Proposed Development influences the perception of the character of the landscape, change in landscape character is largely limited to a short section of the R404, from the existing campus entrance to the northwest of the site and a section at the curtilage of The Wonderful Barn area. The magnitude of landscape change in these areas is considered low. The significance / quality of landscape effects on the landscape character in these areas is considered minor / beneficial at operation. Following the establishment of landscape mitigation measures, the significance and quality of landscape effects will reduce further to not significant / neutral.

The table overleaf lists the residual landscape effects.

Receptor	Susceptibility	Sensitivity	Magnitude of landscape change	Direct / indirect Effects	Significance of landscape change / quality of effects
Landscape Character Area 'Northern Lowlands' (Co. Kildare) within the Proposed Development site	Low	Low	Low	Direct	Minor / Neutral
Landscape Character Area 'Northern Lowlands' (Co. Kildare) outside the Proposed Development within approximately 400m of the Proposed Development site boundary	Low	Low	Low	Indirect	Not Significant / Neutral
Landscape Character Area 'Northern Lowlands' (Co. Kildare) outside the Proposed Development beyond approximately 400m of the Proposed Development site boundary	Low	Low	Negligible	Indirect	Not Significant / Neutral
LCA 'River Liffey' (Co. Kildare)	High	High (Special)	Negligible	Indirect	Not Significant / Neutral
LCA 'Liffey Valley' (South Dublin)	High	Medium-High	None	Indirect	None
LCA 'Urban' (South Dublin)	Low	N/A	None	Indirect	None
LCA 'Newcastle Lowlands' (South Dublin)	Medium	Medium	None	Indirect	None
Historic Townscape	High	High	None	Indirect	None
Effect on existing vegetation (within the Proposed Development site)	High	High	Low	Direct	Minor / Beneficial
Green Open Space (as identified within the Leixlip LAP 2020-2023)	High	High	Negligible	Indirect	Not Significant / Neutral

Table 16.16: Summary of Residual Landscape Effects

RECEIVED: 18/07/2023

16.7.2 Residual Visual Effects

RECEIVED: 28/07/2023

Residual visual effects will concentrate along the adjacent road network to the east and south (R404) and in available views from the area around The Wonderful Barn where the proposed pedestrian / cycle bridge will be visible, as well as from the elevated viewing location at the top of The Wonderful Barn. The proposed landscape mitigation measures will integrate the Proposed Development into its setting reducing the significance of residual visual effects. This includes the view from the top of The Wonderful Barn where the proposed extensive new planting within the Kildare Business Park will reduce views of sections of buildings as the planting matures. The overall character of the view from the top of The Wonderful Barn will remain similar.

A summary of residual visual effects from individual viewpoints is included in the table below.

Receptor	Susceptibility	Sensitivity	Magnitude of visual effects	Significance / Quality of Effects
Photomontage 1	High	Medium-High	None	Imperceptible / Neutral
Photomontage 2	Low	Low	Low	Not Significant / Neutral
Photomontage 3	Low	Low	Medium	Minor / Beneficial
Photomontage 4	Low	Low	Medium	Minor / Beneficial
Photomontage 5	Low	Low	High	Moderate / Beneficial
Photomontage 6	Low	Low	Low	Not Significant / Neutral
Photomontage 7	Low	Low	Low	Minor / Neutral
Photomontage 8	Low	Low	Low	Not Significant / Neutral
Photomontage 9	Medium	Medium	Negligible	Not Significant / Neutral
Photomontage 10	High	High	None	None
Photomontage 11	High	High	None	None
Photomontage 12	High	High	None	None
Photomontage 13	Low	High	Low	Minor / Beneficial
Photomontage 14	High	Medium-High	Low	Not Significant / Neutral
Photomontage 15	Medium	Medium	Medium	Minor-Moderate / Neutral
Photomontage 16	High	Medium	Medium	Minor-Moderate / Neutral
Photomontage 17	Medium	Medium-Low	Medium	Minor-Moderate / Neutral

Table 16.17: Summary of Residual Visual Effects

15.1 Difficulties Encountered

No difficulties were encountered in gathering data and assessing landscape and visual effects at the KIC lands.

RECEIVED: 18/07/2023

Details on the facilitation works required to support the proposed development at the KIC lands, which are to be undertaken by the relevant statutory undertakers when required, are provided at a high level in this EIAR. In the absence of finalised design and construction detail relating to the provision of a gas transmission line by Gas Networks Ireland (GNI) to the site, the assessment of landscape and visual effects in this EIAR could only be provided at a high level.

16.8 Conclusion

Seventeen photomontages have been prepared illustrating the nature of visibility at key viewpoint locations within the 2km principal study area. The assessment should be viewed in conjunction with the photomontage booklet contained in Appendix 16.1 and landscape designation mapping contained in Appendix 16.2.

16.8.1 Construction Effects

Areas experiencing landscape and visual effects during the construction stage will vary depending on the active construction phase of the Proposed Development. All groundworks, demolishing works, vegetation removal, refurbishment of buildings or the construction of new buildings including the pedestrian / cycle bridge and associated ramps, road network and landscape architecture will be mainly experienced locally from within the boundary of the Proposed Development site and from areas outside within approximately 400m where available views exist. Construction works of the proposed bridge will be visible along the M4 and the overbridges (R404 & Junction 6) for approximately 1.6km to the west and approximately 1km to the east although the existing bridge of the R404 will be more prominent on approach from the east.

Landscape and visual effects, in areas within approximately 400m where open or partial views of the construction works are available, are considered to be significant and adverse but temporary.

Landscape and visual effects in the wider study area, beyond approximately 400m, from the site boundary are not considered significant as the development will not introduce uncharacteristic features to the existing landscape and visual character. Intervening vegetation, topography and built structures will quickly screen the construction works of the Proposed Development. The landscape character of Castletown House demesne will not be affected by construction works.

16.8.2 Landscape Effects at operation

The Proposed Development is located within the Northern Lowlands Landscape Character Area, which is considered a Class 1 – Low sensitivity landscape in the context of the county-wide assessment, as defined within the Landscape Character Assessment of County Kildare. The existing Kildare Innovation Campus is an overall low density business campus with large open green areas. The Proposed Development will intensify the inherent light industrial landscape character within the site, leading to an increase and densification of the light industrial buildings replacing sections of existing open green space. The proposed pedestrian / cycle bridge will increase the infrastructural elements in the principal study area but it will integrate into the existing character of the M4 motorway corridor due to its design and scale.

Direct and long-term modification will occur locally where the proposed alterations to the existing Kildare Innovation Campus will be physically located. Sections of existing tree planting and hedgerows will be removed to facilitate the Proposed Development resulting in significant landscape effects due to the partial removal of vegetation and loss of open space. However, the alteration and redesign of the open space, and the proposed planting will improve biodiversity and the overall strength of the landscape layout within the campus site.

RECEIVED: 18/07/2023

Indirect change will occur outside of the Proposed Development site boundary within a distance of up to 400m, where the visibility of the Proposed Development influences the perception of the character of the landscape. Considering the flat and low-lying nature of the existing landscape, in addition to the dense mature vegetation planting to the perimeter of the existing campus site, indirect alterations to the landscape character can be recognised largely along short sections of the R404 along the eastern campus boundary and from the curtilage of the Wonderful Barn. Landscape effects are considered beneficial and not significant.

Landscape effects will reduce further quickly to imperceptible and neutral with increasing distance from the Proposed Development in the remaining study area (beyond approximately 400m from the Proposed Development). Adjoining landscape character areas such as the River Liffey landscape character area and the character of the Castletown House demesne will remain unchanged during operation. Landscape Character Areas located within the wider study area in South Dublin, namely Liffey Valley, Urban, and Newcastle Lowlands will not be affected by the Proposed Development resulting in no landscape effects.

16.8.3 Visual Effects at operation

Considering the flat and low-lying nature of the existing landscape, in addition to the dense mature vegetation planting to the perimeter of the Kildare Innovation Campus and along the M4, visibility of the Proposed Development is generally limited to areas within 400m of the site boundary. Longer distance views of the proposed pedestrian / cycle bridge crossing the M4 are possible when traveling along the M4 and from overbridges (R404 & Junction 6) for approximately 1.6km to the west and approximately 1km to the east although the existing bridge of the R404 will be more prominent on approach from the east.

Significant visual effects will occur within the Proposed Development site and tend to occur where there is no or little intervening vegetation between the viewer and the Proposed Development as well as along its periphery (sections of the R404), or where the viewer stands in sections of the curtilage of The Wonderful Barn or at the top of it.

Dense bands of woodland and trees belts along the boundaries of the Kildare Innovation Campus and along the M4, the grounds of Castletown Demesne, within sections of the curtilage of The Wonderful Barn, and publicly accessible locations along the River Liffey will confine visual effects locally (within approximately 400m from the site boundary) and screen the Proposed Development fully in the wider study area apart from sections of the M4 as stated above.

The existing protected viewing axis between Castletown House and The Wonderful Barn as well as views within the demesne itself will not be altered and remain unaffected by the proposed development. Designated scenic roads and points of views as well as signposted walking routes, and areas of high amenity will not experience significant visual effects.

16.8.4 Cumulative Effects

The following relevant project may result in cumulative landscape and visual effects when seen together with the Proposed Development:

Strategic Housing Development Leixlip Gate, Kilmacredock, Leixlip, Co. Kildare
(located approximately 650m northwest of the Proposed Development site)
There will be no intervisibility and therefore no cumulative arising landscape and visual effects between the permitted SHD and the Proposed Development due to topography, intervening vegetation and existing built structures such as the M4.

RECEIVED: 18/07/2023

RECEIVED: 18/07/2023

RECEIVED: 18/07/2023

17.0 CHAPTER 17 – MAJOR ACCIDENTS AND DISASTERS

17.1 Introduction

This chapter of the Environmental Impact Assessment Report has been prepared by Matthew Michie a Senior Environmental Consultant at AWN Consulting Limited. Matthew holds an MChem and a MSc (Physical Chemistry). Matthew has 5 years' experience in the field of environmental sciences and has been involved in numerous EIARs for a range of projects including commercial, residential, industrial, pharmaceutical and data centre developments.

This chapter is an assessment of the potential for the project to cause major accident hazards and the vulnerability of the project to natural disasters based on the engineering design, drawings and documentation. Where the project is likely to cause major accidents or is vulnerable to impact by natural disasters, the likely significant environmental impacts of such major accidents and disasters in regard to issues such as soils, geology and hydrogeology, hydrology, air quality, noise and vibration, human health and biodiversity are addressed in detail within the following EIAR chapters:

- Chapter 5 – Population and Human Health
- Chapter 6 - Biodiversity
- Chapter 7 - Land, Soils, Geology and Hydrogeology
- Chapter 8 - Hydrology
- Chapter 9 - Air Quality
- Chapter 10 - Noise and Vibration

17.2 Project Description

The Principal works is an integrated masterplan proposal that includes for the expansion of the existing campus, allowing for a mix of Deep Tech, ICT and Innovation uses. The Principal works will include for the demolition of some of the existing buildings on site and construction of new buildings, an energy centre and replacement substation. The proposal will include significant public infrastructure including a new signalised intersection on Celbridge Road (R404), a new Public Link Road through the campus (between Barnhall Road and the new signalised intersection), a pedestrian/cycle overpass of the M4, pedestrian and cycle links through the site and along the designated protected view corridor and supporting infrastructure.

The project to which this EIAR relates includes inter-alia replacing the existing 110 kV Air Insulated Switchgear (AIS) Substation with a 100 kW Gas Insulated Switchgear (GIS). The replacement 110kV substation will include 6 No. transformers, with client control building and a 2 storey GIS substation building within a 2.4m high fenced compound. The project to which this EIAR relates also include facilitation works required to support the development, which do not form part of the development consent, are being sought from Kildare County Council. The facilitation works include a mix of works that will be required to be undertaken for or on behalf of statutory undertakers such as Gas Networks Ireland and EirGrid and are described in Chapter 2 of this EIAR.

The development site which is subject to the application for consent measures c. 72.23 ha and is principally bounded by: the M4 Motorway to the north; Cellbridge Road to the east; Barnhall Rugby Football Club to the south; and by grounds associated with Castletown House to the west.

RECEIVED: 18/07/2023

The site comprises the existing Kildare Innovation Campus, which was formerly the Hewlett Packard Campus originally permitted in 1995 under KCC Reg. Ref 95923. The development site also encompasses lands with the jurisdiction of Kildare County Council (KCC).

Refer to Chapter 2 and 3 of this EIAR for a more detailed description of the site's location and context.

17.3 Methodology

Alongside the legislation, policy, and guidance outlined in Chapter 1, the following relevant legislation, policy, and guidance has informed the preparation of this chapter:

- EPA 'Guidelines on the Information to be contained in Environmental Impact Assessment Reports' (2022),
- EPA 'Advice Notes on Current Practice in the Preparation of Environmental Impact Statements' (2018),
- Health and Safety Authority Guidance on Technical Land-Use Planning Advice, for planning authorities and COMAH establishment operators (2023)
- Chemicals Act (Control of Major Accident Hazards Involving Dangerous Substances) Regulations 2015

The EPA Guidelines, 2022, state that:

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

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

17.3.1 Background to Control of Major Accident Hazards Involving Dangerous Substances (COMAH) Regulations

The Seveso III Directive (2012/18/EU) requires Member States to apply land-use or other relevant policies to ensure that appropriate distances are maintained between residential areas, areas of substantial public use and the environment, including areas of particular natural interest and sensitivity and hazardous establishments. For existing establishments, Member States are required to implement, if necessary, additional technical measures so that the risk to persons or the environment is maintained at an acceptable level.

RECEIVED: 18/07/2023

The HSA is the Competent Authority in Ireland as defined by Chemicals Act (Control of Major Accident Hazards Involving Dangerous Substances) Regulations 2015, (COMAH Regulations 2015) which implement the Seveso III Directive in Ireland. The HSA is responsible for ensuring that the impacts of facilities which fall within the remit of this legislation are taken into account with respect to land use planning. This is achieved through the provision of technical advice to planning authorities.

A Land Use Planning assessment has been carried out by AWN Consulting Ltd., as part of this planning application in accordance with the Guidance on Technical Land Use Planning Advice (HSA, 2023) and includes a Major Accident to the Environment (MATTE) assessment (CDOIF, 2017). This assessment provides detailed analysis of these major accident scenarios.

The land use planning assessment has been carried out in accordance with the HSA's Guidance on technical land-use planning advice (HSA, 2023). This approach involves delineating three zones for land use planning guidance purposes, based on the potential risk of fatality from major accident scenarios resulting in damaging levels of thermal radiation (e.g., from pool fires), overpressure (e.g., from vapour cloud explosions) and toxic gas concentrations (e.g., from an uncontrolled toxic gas release).

The process for determining the distances to the boundaries of the inner, middle and outer zones is outlined as follows:

- Determine the consequences of major accident scenarios using the modelling methodologies described in the HSA's Guidance on technical land-use planning advice (HSA, 2023).
- Determine the severity (probability of fatality) using the Probit functions specified by the HSA.
- Determine the frequency of the accident (probability of event) using data specified by the HSA.
- Determine the individual risk of fatality as a product of Frequency and Severity

Refer to the Land Use Planning Assessment prepared by AWN and submitted with the application for further detail. The Land Use Planning assessment concluded that the level of individual risk for the proposed Principal works is below the threshold set by the Health and Safety Authority (HSA); therefore, the level of risk is acceptable.

17.3.2 Baseline Scenario/Likely Future Receiving Environment Analysis Methodology

The EPA Guidelines on the Preparation of an EIAR (EPA, May 2022) state that:

> *"It is important to demonstrate that correct methodologies and experts have been used. It is also important that the methodology used in establishing the baseline scenario is documented to permit replicable future monitoring so that the later results can be properly compared (where required). Standard recognised methods should be applied where available and appropriate."*

The baseline/future receiving environment analysis for this Chapter has been undertaken in accordance with the EPA Guidelines on the Preparation of an EIAR (EPA, May 2022) and all other documents outlined above.

A desktop study has been completed to establish the baseline environment for which the proposed risk assessment. This will influence both the likelihood and impact of a major accident or natural disaster.

RECEIVED: 18/07/2023

17.3.3 Impact Assessment Methodology

The analysis of the predicted impacts of the proposed development on human health and the environment during construction and operation are presented in this Chapter. The risk assessment identifies and quantifies risks focusing on unplanned, but plausible events occurring due to the proposed development. The approach to identifying and quantifying risks associated with the proposed development by means of a sites specific risk assessment is derived from the EPA *Guidelines on the Preparation of an EIAR* (EPA, May 2022) and all other documents outlined above.

Assessment methods quantify and predict the magnitude and significance of impacts.

The methods employed for assessment and evaluation of the environmental topics for this Chapter have been:

1. Risk assessment following Schedule 6 of the Planning and Development Regulations, 2001, as amended:

   "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".

2. Expert Opinion

3. Review of Strategic Environmental Assessment prepared for the *Kildare County Development Plan 2023-2029* (including a review of the Development Plan itself). According to the EPA Guidelines, 2022, this can reduce the number of cumulative effects that need to be considered in an EIAR.

4. Geospatial Analysis (cumulative impacts only – used to identify planning permissions/applications within a 5 km radius).

5. Land Use Planning Assessment following the Health and Safety Authority Guidance on Technical Land-Use Planning Advice (2023), for planning authorities and COMAH establishment operators, report reference MM.237501.0007RR01.

6. Flood Risk Assessment following The Planning System and Flood Risk Management Guidelines for Planning Authorities published by the OPW in 2009 (OPW Guidelines).

RECEIVED: 18/07/2023

17.3.4 Site Specific Risk Assessment Methodology

The site-specific risk assessment identifies and quantifies risks focusing on unplanned, but plausible events occurring due to the proposed development. The approach to identifying and quantifying risks associated with the proposed development by means of a sites specific risk assessment is derived from the EPA Guidelines on information to be contained in EIAR (EPA, 2022).

The criteria for categorising impact are derived from the EPAs Guidance on Assessing and Costing Environmental Liabilities (2014). In this guidance, the risk assessment methodology commences with the establishment of risk classification criteria followed by risk analysis based on these criteria. Risk classification tables are required in order to evaluate and rank the risks compared with each other. They form the basis for rating the likelihood of an event occurring and the consequence of impact if the event occurs. The likelihood and consequence ratings are combined to form a risk score for risk evaluation.

Rating	Category	Description
1	Very low	Very low chance of hazard occurring
2	Low	Low chance of hazard occurring
3	Medium	Medium chance of hazard occurring
4	High	High chance of hazard occurring
5	Very high	Very high chance of hazard occurring

Table 17. 1 Risk Classification – Likelihood

Rating	Category	Description
1	Trivial	No impact of negligible change to the environment
2	Minor	Minor impact/localised or nuisance occurring
3	Moderate	Moderate impact to environment or human health
4	Major	Severe impact to environment or human health
5	Massive	Massive impact to a large area

Table 17. 2 Risk Classification - Consequence

The risks are then ranked according to their own risk score (1-5) in a colour coded matrix table which allows risks to be easily displayed and prioritised. The colour codes are as follows and indicated in Table 17.3 below:

- Red – high level risks requiring priority action (overall risk scores of 15-25).
- Yellow – medium-level risks requiring action, but not as critical as red-coded risks (overall risk scores of 8-12); and

- Green (light and dark) – low-level risks requiring continuing awareness and monitoring on a regular basis (overall risk scores of 1-6).

RECEIVED: 18/07/2023

		Consequence →				
		Trivial	Minor	Moderate	Major	Massive
Likelihood ↑	Very High	Low	Medium	High	High	High
	High	Low	Medium	Medium	High	High
	Medium	Low	Low	Medium	Medium	High
	Low	Low	Low	Low	Medium	Medium
	Very Low	Low	Low	Low	Low	Low

Table 17. 3 Example Risk Matrix

17.3.5 Difficulties Encountered

No particular difficulties were encountered in preparing the major accident assessment.

There are uncertainties in relation to assessing impacts on individuals or communities due to the lack of individual health data and the difficulty in predicting effects, which can only be based on general guidance and assumptions.

Forecasting methods and methodology, if any, are set out within the specialist chapters that this assessment relies upon.

17.4 Baseline Scenario/Future Receiving Environment Analysis

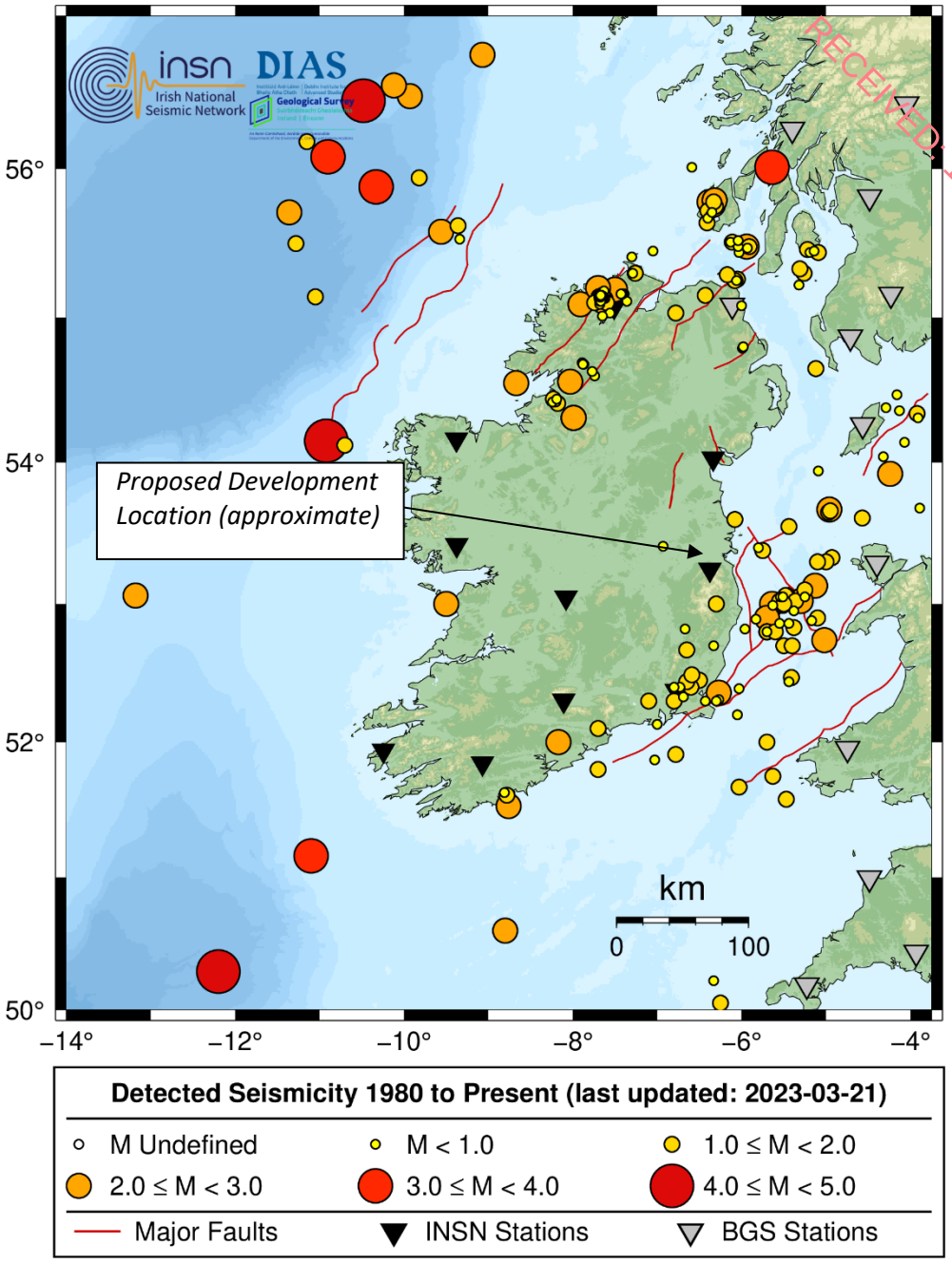
17.4.1 Current State of the Environment (Baseline Scenario)

The EIA Directive requires the following to be described relating to the baseline scenario:

> *"A description of the relevant aspects of the current state of the environment (baseline scenario)".*

17.4.2 Seismic Activity

In Ireland, seismic activity is recorded by the Irish National Seismic Network. The Geophysics Section of the School of Cosmic Physics, Dublin Institute for Advanced Studies, has been recording seismic events in Ireland since 1978 (www.dias.ie). This network consists of several seismometers that are located throughout Ireland. Figure 17.1 illustrates historical and recorded seismic events since 1980.



RECEIVED: 18/07/2023

Figure 17. 1 Ireland Seismic Activity Map

Seismic activity and earthquake risk in Ireland are generally considered to be low. This is because Ireland is located on the western edge of the Eurasian Plate, which is a tectonic plate that is not known for its seismic activity.

However, earthquakes can still occur in Ireland, although they are typically small and have little impact.

It can be seen in Figure 17. 1 that there is no significant seismic activity recorded in the vicinity of the proposed development. Therefore, the likelihood of seismic activity initiating a major accident at the proposed development is negligible; therefore, **not significant.**

Further detail is provided in Chapter 7 (Land, Soils, Geology and Hydrogeology).

17.4.3 Landslides

RECEIVED: 18/07/2023

Much of the Earth's surface is covered by unconsolidated sediments which can be especially prone to instability. Water often plays a key role in lubricating the slope failure. Instability is often significantly increased by man's activities in building houses, roads, drainage and agricultural changes. Landslides, mud flows, bog bursts (in Ireland) and debris flows are a are a natural hazard that can occur. These can cause damage to property, infrastructure, and the natural environment, and can also pose a risk to human life.

In general, risk of landslides in Ireland is considered to be low, as the country is not located in a region with high seismic activity or large mountain ranges. Landslides are more common in unconsolidated material than in bedrock, and where the sea constantly erodes the material at the base of a cliff landslides and falls lead to recession of the cliffs. Landslides have occurred in Ireland in recent years in upland peat areas due to disturbance of peat associated with construction activities.

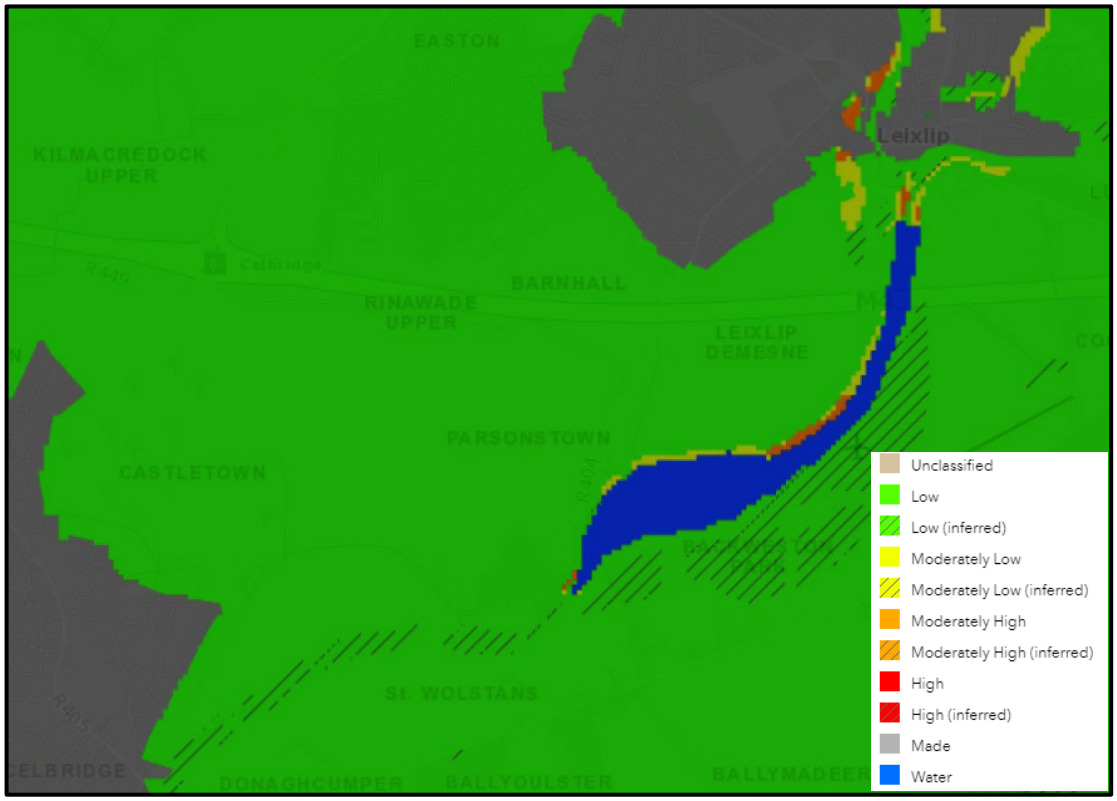


Figure 17. 2 Landslide Susceptibility Map (GSI Ireland)

The landslide susceptibility map identifies areas which are subject to landslides and is measured from low to high. The landslide susceptibility map considers the location of landslides and what causes them (slope, soil type and the impact of the flow of water). It can be seen in Figure 17. 2 that the area surrounding the proposed development has a low susceptibility of landslides. Therefore, the likelihood of a landslide initiating a major accident at the proposed development is negligible and the likelihood of the project initiating a landslide is considered negligible; therefore, **not significant**.

Further detail is provided in Chapter 7 (Land, Soils, Geology and Hydrogeology).

17.4.4 Flood Risk

RECEIVED: 18/07/2023

As stated in Chapter 7 of this EIA Report, a Flood Risk assessment (FRA) was carried out, by Clifton Scannell Emerson Associates. This FRA was completed following The Planning System and Flood Risk Management Guidelines for Planning Authorities published by the OPW in 2009 (OPW Guidelines). It was concluded that the proposed development is located within Flood Zone C/ and is not subject to flood in the 1:1000-year event (0.1% Annual Exceedance Probability). Therefore, the likelihood of a flood initiating a major accident at the proposed development is negligible and the likelihood of the proposed project causing a flood is negligible; therefore, **not significant.**

Further detail is provided in Chapter 8 (Hydrology).

17.4.5 Metrological

The climatic conditions were assessed using data obtained from the Met Eireann Meteorological database and the Casement Aerodrome Synoptic Station between 1991 - 2021 (Casement Aerodrome being the closest Meteorological Station).

Precipitation

- The annual mean total rainfall was 806mm and the greatest 24-hour total was 109.8mm

Wind

- The maximum annual gust over the 30-year period was 50 knots.

Temperature

- The maximum temperature was 30.3^{o}C and the minimum temperature was -15.3^{o}C.

The hydrogenated vegetable oil storage tanks, ammonium hydroxide tanks and turbines are not considered to be at risk during storms or during extreme heat or cold event, any more so than other significant buildings or structures. Therefore, the likelihood of extreme weather initiating a major accident at the proposed development is negligible; therefore, **not significant.**

17.4.6 Major Accident Hazards

There are currently no COMAH / SEVESO sites in proximity to the proposed development site.

Following the completion of the development, the site will a sub-COMAH site as the quantum of hazardous substances will not exceed Lower Tier thresholds, as such is not subject to the provisions of the Chemicals Act (Control of Major Accident Hazards Involving Dangerous Substances) Regulations (2015).

A Risk Assessment following the methodology set out by the HSA's *Guidance on Technical Land Use Planning Advice* (HSA, 2023), has been carried out for the Principal Works, by AWN Consulting Ltd., as part of this planning application in accordance with the Guidance on Technical Land Use Planning Advice (HSA, 2023) and includes a Major Accident to the Environment (MATTE) assessment (CDOIF, 2017). The Land Use Planning assessment

concluded that the level of individual risk for the proposed Principal Works is below the threshold set by the Health and Safety Authority (HSA); therefore, the level of risk is acceptable.

RECEIVED: 18/07/2023

17.4.7 Likely Future Receiving Environment ('Do Nothing' Scenario)

The EIA Directive requires the following to be described relating to the future receiving environment (the 'Do Nothing' scenario):

> *"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".*

In the event of a 'Do Nothing' scenario, the site would remain in operation as an existing ICT campus.

17.5 Likely Impacts of the Project

The main potential impacts on population and human health from the proposed development are potential for spills/leaks, air emissions, noise, visual, and traffic impacts. The baseline environment, pollution pathways, relevant mitigation measures and residual impacts have been assessed in greater detail within the corresponding specialist chapters; Chapter 5 – Population and Human Health, Chapter 6 – Biodiversity, Chapter 7 - Land, Soils, Geology and Hydrogeology, Chapter 8 – Hydrology, Chapter 9 - Air Quality, Chapter 10 - Noise and Vibration.

The major accident hazards for the proposed development are presented in Table 17. 4 and the natural disaster hazards are presented in Table 17. 5. In the scoping phase for this EIAR the potential for impacts to human health and impacts to the environment were assessed.

RECEIVED: 18/07/2023

Major Accident Scenario	Phase	Impact	Consequence Rating	Basis of Consequence	Unmitigated Likelihood Rating	Basis of Unmitigated Likelihood	Unmitigated Risk Score	Mitigated Likelihood Rating	Basis of Mitigated Likelihood	Mitigated Risk Score
Fire: Flash fire or Jet fire following natural gas release at natural gas pipeline	Operation of the Principal Works	Human Health	4	There is potential for harm to persons on-site in the vicinity of the pipeline. The thermal radiation impacts do not extend off-site.	2	The natural gas pipeline is below ground and will be installed to Irish Installation Standard I.S. 813. The natural gas above ground installation (AGI) will be secured by fencing and will be regularly maintained by Gas Networks Ireland.	8	1	The land use planning assessment determined the likelihood of a jet fire or flash fire at the proposed development to be very low. The pipeline will have a slam shut valve that will close in the event of a sudden pressure drop (which occurs in the event of a leak or rupture), preventing the continuous outflow of natural gas.	4
Vapour Cloud Explosion: VCE following natural gas release at one of the turbines and delayed ignition	Operation of the Principal Works	Human Health	3	There is potential for harm to persons on-site in the vicinity of the energy centre; however, these areas are not typically occupied. The overpressure impacts do not extend off-site.	3	The natural gas pipeline will be installed to Irish Installation Standard I.S. 813.	9	2	The land use planning assessment determined the likelihood of a VCE at the proposed development to be low. The turbine enclosures will have natural gas detectors that will alert personnel of a leak, and if the leak continues, will trip the incoming gas supply to prevent the build up of an explosive atmosphere.	6
Major Accident to the Environment following release of ammonium hydroxide or diesel.	Construction / Operation of the Principal Works	Biodiversity, soils and geology, hydrology and hydrogeology	3	In order to mitigate potential impacts during the construction phase, best practice construction methods will be implemented in order to prevent water (surface water and groundwater) pollution. In order to mitigate potential impacts during the operational phase, the following has been implemented: - SuDS measures incorporated. - A flow control device will be installed to restrict the outflow into the existing network.	3	The construction phase of the proposed development will be carried out in accordance with good practice construction methodologies, all relevant health and safety guidance and legislation, as well as the provisions of the CEMP, as detailed in this EIAR.	9	2	The land use planning assessment determine the likelihood of a loss of containment of hazardous material, resulting in a MATTE to be low. The proposed project will have petrol interceptors and silt traps at the outflow. These devices would have to fail in order for there to be a release to the surrounding environment.	6
Fire: Flash fire or Jet fire following natural gas release at natural gas pipeline	Operation of the Facilitation Works	Human Health	4	The pipeline route is through residential areas. There is potential for harm to persons in the vicinity of the pipeline.	2	The natural gas pipeline is below ground and will be installed to Irish Installation Standard I.S. 813. The proposed pipeline will be a below ground pipeline; therefore, it is concluded that the likelihood of a leak or rupture is very low.	8	1	The land use planning assessment determined the likelihood of a jet fire or flash fire at the proposed development to be very low. The pipeline will have a slam shut valve that will close in the event of a sudden pressure drop (which occurs in the event of a leak or rupture), preventing the continuous outflow of natural gas.	4

Table 17. 4 Assessment of Major Accidents

RECEIVED: 19/07/2023

Natural Disaster	Phase	Impact	Consequence Rating	Basis of Consequence	Unmitigated Likelihood Rating	Basis of Unmitigated Likelihood	Unmitigated Risk Score	Mitigated Likelihood Rating	Basis of Mitigated Likelihood	Mitigated Risk Score
Extreme heat or cold weather resulting in result structural damage and/or pollution to soils, groundwater or surface waters	Construction / Operation	Human health, biodiversity, soils and geology, hydrology and hydrogeology	2	The proposed development will be constructed, and operated in accordance with all relevant planning, building and environmental licencing codes.	2	The oil storage tanks, and ammonium hydroxide tanks are not considered to be at risk during storms or during extreme heat or cold event, any more so than other significant buildings or structures.	4	1	All construction activities will be suspended during extreme weather events. The diesel oil storage tanks will be double-skinned tanks with leak detection. The ammonium hydroxide tanks will be constructed in a bund with connection to the surface water drainage system.	2
Storm events resulting in structural damage and/or pollution to groundwater and surface waters	Construction / Operation	Human health, biodiversity, soils and geology, hydrology and hydrogeology	2	As above	2	As above	4	1	As above	2
Flooding	Construction / Operation	Flooding	2	A Flood Risk Assessment was prepared in accordance with 'The Planning System and Flood Risk Management - Guidelines for Planning Authorities' issued by the Department of Environment, Heritage and Local Government in November 2009.	2	The Flood Risk Assessment concluded that the proposed development is within Flood Zone C.	4	1	The flood risk assessment concluded that a regularly maintained drainage system would ensure the network remains effective should a large pluvial storm occurs.	2
Pollution to soils / groundwater / surface waters	Construction / Operation	Human health, biodiversity, soils and geology, hydrology and hydrogeology	2	Best practice construction methods will be implemented in order to prevent water (surface water and groundwater) pollution. The following has been implemented: - SuDS measures incorporated. - A flow control device will be installed to restrict the outflow into the existing network.	2	The construction phase of the proposed development will be carried out in accordance with good practice construction methodologies, all relevant health and safety guidance and legislation.	4	1	Implementation of CEMP during demolition/construction, and EIAR conditions during operations. The proposed project will have petrol interceptors and silt traps at the outflow. These devices would have to fail in order for there to be a release to the surrounding environment.	2

Table 17. 5 Assessment of Natural Disasters

17.5.1 Construction Phase

RECEIVED: 28/07/2023

The following scenarios have been identified that could impact the construction phase of the project:

- Extreme heat or cold weather resulting in result structural damage and/or pollution to soils, groundwater or surface waters.
- Storm events resulting in structural damage and/or pollution to groundwater and surface waters.
- Flooding
- Pollution to soils / groundwater / surface water

The impact and likelihood of these scenarios is assessed in Table 17. 5. There are no likely impacts on the project or to off-site receptors during the construction phase in relation to major accidents and disasters.

17.5.2 Operational Phase

The potential hazards associated with substances stored and process at for the proposed Principal works which have the potential to cause a major accident are summarised in the following section. All hazards identified require a loss of containment to occur, such as, catastrophic damage or failure of pipework and/or storage tanks.

Fire:

- Flash Fire: A flash fire can occur following a loss of containment of natural gas from the natural gas pipeline, which results in a flame which passes through the mixture at less than sonic velocity such that explosion overpressures are negligible. A flash fire may be caused by releases at high or low pressure into an open, unconfined area which contacts an active source of ignition.
- Jet Fire: A jet fire can occur following a loss of containment of natural gas from the natural gas pipeline, via a source such as a leak or failure of flanged pipework joints, pipework or another asset which contacts an active source of ignition.

Explosion:

- Vapour Cloud Explosion (VCE): A loss of containment of natural gas, within a turbine enclosure, which does not ignite immediately may form a cloud of flammable material depending on the conditions of the release. If this cloud contacts an active source of ignition, a VCE can result and generate potentially harmful overpressures.

Major Accident to the Environment (MATTE):

- A loss of containment of liquids, such as fuel oils, which are accidentally released to water, land and/ or groundwater in significant quantities can cause harm to the environment.

The impact and likelihood of these scenarios is assessed in Table 17. 4. In keeping with EIA guidance these results are a summary of the Land Use Planning Assessment (report reference: MM.237501.0007RR01). There are no likely impacts to off-site receptors, as a result of the proposed Principal works, during the operational phase in relation to major accidents and disasters. The level of risk on-site is acceptable.

RECEIVED: 18/07/2023

The Land Use Planning assessment has determined the risk zones for the proposed Principal works. Section 8.0 of the assessment illustrates the Land Use Planning risk contours for the proposed Principal works. The assessment concluded that the risk contours do not extend off-site; therefore, there are no impacts to off-site receptors.

The potential hazards associated with substances stored and process at for the proposed Facilitation works which have the potential to cause a major accident are summarised in the following section. All hazards identified require a loss of containment to occur, such as, catastrophic damage or failure of pipework.

Fire:

- Flash Fire: A flash fire can occur following a loss of containment of natural gas from the natural gas pipeline, which results in a flame which passes through the mixture at less than sonic velocity such that explosion overpressures are negligible. A flash fire may be caused by releases at high or low pressure into an open, unconfined area which contacts an active source of ignition.
- Jet Fire: A jet fire can occur following a loss of containment of natural gas from the natural gas pipeline, via a source such as a leak or failure of flanged pipework joints, pipework or another asset which contacts an active source of ignition.

The impact and likelihood of these scenarios is assessed in Table 17. 4. There are no likely impacts on the project or to off-site receptors during the operation phase in relation to major accidents and disasters associated with the Facilitation works.

17.6 Likely Cumulative and Interaction Impacts of the Project

17.6.1 Cumulative Impacts

The nearest Seveso site is the Intel Ireland Ltd. Site *ca*. 1.5km to the north of the proposed development. The proposed development is outside the Consultation Distance of Intel Ireland Ltd.; therefore, this site does not have the potential to initiate a major accident at the proposed development.

The cumulative residual and operational impacts of the proposed development have been assessed and, in regard to screening of major accidents and risks, cumulative impacts are considered imperceptible and neutral as there is no risk to off-site receptors in relation to a major accident.

17.7 Mitigation Measures and Proposed Response to such Emergencies

The proposed development has been designed in line with good industry practice, and, as such, mitigation against the risk of major accidents and/or disasters is embedded through the design and in accordance with planning and legislative requirements.

17.8 Residual Impacts

The residual effects are the final predicted or intended effects which occur after the proposed mitigation measures have been implemented. It will not always be possible or practical to mitigate all adverse effects.

This assessment has identified the potential for major accident hazards to occur. These scenarios can have significant consequences; however, the likelihood of these events occurring is low due to engineering and operational safeguards that will be implemented at the development. The Land Use Planning Assessment concluded that the risk contours do not extend off-site; therefore, there are no impacts to off-site receptors and the level of individual risk on-site is acceptable. It can be concluded that the risk of major accidents and disasters associated with the proposed project are **not significant.**

Refer to the Land Use Planning Assessment prepared by AWN and submitted with the application for further detail.

RECEIVED: 18/07/2023

17.9 References

RECEIVED: 18/07/2023

Health and Safety Authority Guidance on Technical Land-Use Planning Advice, for planning authorities and COMAH establishment operators (2023)

CDOIF (2017), Guideline Environmental Risk Tolerability for COMAH Establishments, v2.0

Chemicals Act (Control of Major Accident Hazards Involving Dangerous Substances) Regulations, 2015 (COMAH Regulations 2015)

Site Specific Flood Risk Assessment Kildare Innovation Campus (2023), Clifton Scannell Emerson Associates (File Name: 21_048-CSE-00-XX-RP-C-002)

Land Use Planning Risk Assessment, AWN Consulting (2023), report reference MM.237501.0007RR01

RECEIVED: 18/07/2023

18.0 INTERACTIONS AND CUMULATIVE EFFECTS

18.1 Introduction

This section of the EIAR has been prepared by Brian Minogue (BSc in Spatial Planning), Tom Philips + Associates and deals with likely interactions between effects predicted as a result of the proposed project.

In addition to the requirement under the Planning and Development Regulations 2001 (as amended) to describe the likely significant effects of the proposed development on particular aspects of the environment, it is also required to consider the interaction of those effects. These are assessed below.

This section addresses the intra project significant effects (i.e. those occurring between environmental topics within the project). Inter project effects (i.e. those which are likely to occur as a result of the likely impacts of the proposed project interacting with the impacts of other projects in the locality) have also been considered.

We have reviewed a number of planned and permitted projects that have the potential to interact with either the construction or operational phases of the proposed development. The projects considered most likely to interact with the proposed development are identified in Chapter 3 with a more comprehensive list of planned or permitted projects outlined in Appendix 1.1.

Further detail relevant to the interaction of impacts may be found in the earlier chapters of the EIAR.

18.2 Methodology

The EIAR has considered and assessed the interactive effects and cumulative effects arising from the construction and operation of the proposed project based on best scientific knowledge. The relevant interactions and interdependencies between specific environmental aspects have been summarised in the matrix set out in Table 18.1.

Interactive effects (or interactions), specifically refer to any direct or indirect effects caused by the interaction of environmental factors as outlined in Article 3 (1) of the amended EIA Directive;

"*The environmental impact assessment shall identify, describe and assess in an appropriate manner, in the light of each individual case, the direct and indirect significant effects of a project on the following factors:*

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

Annex IV of the amended Directive states that a description of impacts should include:

"…the direct effects and any indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative effects of the project"

RECEIVED 18/07/2023

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 (as amended) as well as the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018.

The EPA Guidance in turn references: *Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions, European Commission, 1999. I*n terms of interactions, the guidelines state the following:

> *"careful consideration of pathways – direct and indirect – that can magnify effects through the interaction or accumulation of effects – for instance the potential for cumulative significant effects to arise from multiple non-significant effects."*

In terms of Cumulative effects, Annex Iv(5) of the EIA Directive requires:

> *"A description of the likely significant effects of the proposed project on the environment resulting from, inter alia…*
> *(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;…"*

We have reviewed a number of planned and permitted projects that have the potential to interact with either the construction or operational phases of the proposed development. The projects considered most likely to interact with the proposed development are identified in Chapter 3 with a more comprehensive list of planned or permitted projects outlined in Appendix 1.1.

18.3 Inter-Relationships/ Interactions

In practice many potential impacts from various sources have slight or subtle interactions with other sources of impact. However, the EIAR concludes that most inter-relationships are neutral in impact when the mitigation measures proposed in each chapter are incorporated into the operation of the proposed development.

18.3.1 Interactions between Population & Human Health and Air

Potential interactions between population and human health and air quality are outlined in Chapters 5 & 9 of the EIAR. In order to reduce the risk to health from poor air quality, National and European statutory bodies have set limit values in ambient air for a range of air pollutants.

An adverse impact due to air quality in either the construction or operational phase of the proposed project has the potential to cause human health and dust nuisance issues. The mitigation measures that will be put in place at the proposed project will ensure that the impact complies with all ambient air quality legislative limits and, therefore, that the predicted residual impact is short-term, negative and imperceptible during the construction phase, and long-term, neutral and imperceptible during the operational phase.

18.3.2 Interactions between Population & Human Health and Noise and Vibration

RECEIVED 19/07/2023

There is potential for interactions between population and human health and noise and vibration during both the construction and operational stages of the proposed project that have been assessed in Chapter 11. The highest potential for noise and vibration impacts of the proposed project will occur during the construction phase due to the operation of various plant and machinery used to construct the development and heavy goods vehicles movement to, from and around the site.

Chapter 11 sets out a number of mitigation measures to be implemented during the construction phase, as well as best practice mitigation measures relating to building services & plant for the development once operational. No mitigation measures are required for the additional traffic on the surrounding roads once operational as changes to traffic flows will not result in a perceptible increase in noise level in the surrounding environment.

Predicted increases in noise levels from the operation of the facility at various locations are predicted to range between not significant to slight moderate.

18.3.3 Interactions between Population & Human Health and Waste

The implementation of the mitigation measures outlined in chapter 12 will ensure that targeted rates of reuse, recovery and recycling are achieved at the site of the Proposed project during the construction and operational phases. It will also ensure that European, National and Regional legislative waste requirements with regard to waste are met and that associated targets for the management of waste are achieved.

Other developments in the area, and the indicative future masterplan development, will be required to manage waste in compliance with national and local legislation, policies and plans which will minimise/mitigate any potential cumulative effects associated with waste generation and waste management. With mitigation measures described in chapter 12 in place, the predicted effects on human health due to waste will be **long-term, imperceptible and neutral.**

18.3.4 Interactions between Population & Human Health and Traffic and Transportation

During the construction stage of the project the potential impacts to population and human health will primarily be from onsite (plant and vehicle movement) and the increase in offsite plant and traffic movements. A Construction and Environmental Management Plan has been prepared by Clifton Scannell Emerson Associates, as part of the planning application which incorporates a range of integrated control measures and associated management activities with the objective of minimising the effects of construction activities associated with the development. Chapter 13 also sets out a number of mitigation measures. Provided the proposed mitigation measures and management procedures are incorporated during the construction phase, the impact on human health of the local receiving environment will be **negative, slight and short-term.**

With the mitigation measures in place, the effect of the proposed project on traffic and transport is envisaged to be slight, likely in probability and long-term. The proposed project is located within an area with well-integrated walking infrastructure to encourage sustainable travel choices to and through the proposed project. The Mobility Management Plan initiatives

RECEIVED: 18/07/2023

are likely to result in lower volumes of car traffic than that assumed in the modelling assessment.

Prior to mitigation, the assessment of potential operational traffic impact already demonstrates that no significant effects are expected to arise from operational traffic associated with the proposed project.

Notwithstanding this, a Mobility Management Plan will be implemented as a 'best practice' measure which will seek to minimise car-based trips, particularly single-occupancy car trips, through the proposed measures (refer to Section 9.9.3) to discourage car use and encourage sustainable transport options. As such, the predicted impact during the operational phase is considered to have a **negligible and 'not significant' long-term** effect.

The introduction of new pedestrian / cycle overpass of the M4 and through the KIC site is expected to encourage sustainable forms of travel and will have a **moderate positive** long term effect on human health.

18.3.5 Interactions between Population & Human Health and Landscape and Visual Impact

The potential interactions between Landscape, Visual impact and Human Health relate largely to the health benefits of green infrastructure. Green Infrastructure planning aims to maximising the benefits of the multi-functionality of nature that includes natural ecological processes, sustaining air and water quality and providing vital amenity and recreational spaces for communities. It also serves to provide an ecological framework for the social, economic and environmental health of an area. The enhancement of local green infrastructure therefore has knock on benefits for human health outcomes.

18.3.6 Interactions between Biodiversity and Land, Soils and Groundwater

The development of new hardstanding, i.e. buildings and artificial surfaces, during the construction phases will have a **permanent slight negative impact** on habitats and flora, particularly on the more semi-natural grassland and hedgerow/treeline habitats.

The planting regime for the proposed development site will replace the 9,200 m^2 of woodland habitat that will permanently removed as part of the construction phase of the proposed development and will result in the creation of an additional 13,300m^2 of woodland habitat. The planting regime will also require the planting of 1,370 specimen trees, which replaces the 533 trees permanently removed (and those additional trees lost in the tree groups) resulting in a net gain in trees for the proposed development site.

In the long term, with proper maintenance over the lifetime of the proposed development, it is expected that the proposed landscape planting will result in a **moderate positive** impact on habitats and flora during the operational phase.

18.3.7 Interactions between Biodiversity and Hydrology

The existing foul water drainage system will continue to service Kildare Innovation Campus and will service the welfare facilities located within the temporary construction site compound. For the same reasons as outlined in Section 6.5.1, the potential impacts arising from surface-water run-off/foul water drainage to the aquatic habitats within and

immediately downstream of the proposed development site during the construction phase are considered to be **neutral** in the **short-term**.

RECEIVED: 19/07/2023

As outlined in Chapter 6, the proposed development will include for the installation of 1 no. permanent retention pond (11,797.7m3) and 4 no. attenuation wetland areas (5,636.1m3 total), as well as the retention of the 3 no. existing retention ponds. The proposed attenuation areas will result in the creation of habitats of higher ecological value where habitat of lower ecological value (*i.e.*, amenity grassland, dry meadows and grass verges, *etc.*) currently exists. This will result in a **Long-term moderate positive impact** on habitats and flora during the operational phase and lifetime of the proposed development.

The potential for impacts arising from surface-water run-off to the aquatic habitats within and immediately downstream of the proposed development site during the construction phase are considered to be **neutral** to **not-significant positive** in the **long-term**. In addition, Leixlip WWTP has adequate capacity (WWTP Remaining PE 11888) to facilitate the treatment of foul water drainage from the proposed development site (proposed development PE 2080) and is currently compliant with the ELV's in the wastewater discharge licence (Irish Water, 2021). Therefore, the potential impacts to the aquatic habitats downstream of the proposed project site are considered to be **neutral** in the **long-term**.

18.3.8 Interactions between Biodiversity and Noise and Vibration

The potential impacts to Biodiversity and from Noise and Vibration are discussed in detail in chapters 6 and 11 of the EIAR. In terms of interactions, as outlined in chapter 6, during the construction phase of each phase of the development, there is likely to be a certain amount of disturbance to fauna occurring on/near the site. The construction phase will be Construction Environmental Management Plan (CEMP) which will include mitigation. As a result of the proposed development, there will be an increase of 171,641.88m2 in hard standing (i.e., artificial habitat - Buildings and artificial surfaces (BL3)) within the boundary of the proposed development site which will have a **permanent slight negative impact** on habitats and flora.

In terms of the operational phase, the larger footprint of the built areas on site and associated increases in site traffic (and associated noise and lighting) is likely to be offset by the maturing landscape features in the long term leading to **slight positive** impacts on the diversity and abundance on non-volant mammals present in the area.

18.3.9 Interactions between Biodiversity and Traffic and Transportation

The potential interactions between Biodiversity and Traffic and Transportation are similar to those outlined in section 18.3.9 above (Interactions between Biodiversity and Noise and Vibration). Construction traffic and associated visual and other sensory disturbance effects have the potential to cause localised temporary to short-term displacement and disturbance impacts upon non-volant mammal species. Increased traffic can lead to an increase in road fatalities for non-volant mammals. Proposed mitigation measures are outlined in Chapter 6 Biodiversity.

18.3.10 Interactions between Biodiversity and Material Assets (Waste)

RECEIVED 19/07/2023

The incorrect management of waste during both construction and operation phases has the potential to have effects on local biodiversity. As outlined in chapter 6, improperly discarded waste has the potential to disrupt the existing mammal community by promoting conditions which are more favourable for certain species e.g. scavengers. For instance, all edible and putrescible waste (e.g. improperly discarded food) has the potential to attract scavengers and to potentially disrupt the existing non-volant mammal community.

The following mitigation measures are proposed in Chapter 6 to minimise the potential of the above effects.

- All edible and putrescible wastes will be stored and disposed of in an appropriate manner. Similarly, all construction materials will be stored and stockpiled at prescribed locations and all waste materials will be disposed of to licensed facilities.
- All edible and putrescible wastes will be stored and disposed of in an appropriate manner. Similarly, all construction materials will be stored and stockpiled according to the CEMP.

18.3.11 Interactions between Land, Soils and Groundwater and Hydrology

Construction Phase

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

Taking into account the design and mitigation measures set out in Chapter 6 and 7 of this EIA Report, there is a residual negative interaction between land, soil, and hydrology during the construction phase. The interaction is considered to be neutral, not significant, and short term.

Operational Phase

Taking into account the design and mitigation measures set out in 6 (Hydrology) and Chapter 7 (Land, Soils and Hydrogeology) of this EIA Report there are no potentially significant interactions identified between land, soils and hydrogeology, and hydrology during the operational phase.

18.3.12 Interactions between Land, Soils and Groundwater and Air Quality and Climate

Construction Phase

Demolition and construction phase activities such as land clearing, excavations, stockpiling of materials etc. have the potential for interactions between air quality and land and soils and the water environment (hydrology) in the form of dust emissions. With the proposed mitigation measures to prevent fugitive dust emissions, it is predicted that interactions between air quality and land and soils and hydrology will be **short-term and imperceptible**.

RECEIVED: 18/07/2023

Operational Phase

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

18.3.13 Interactions between Land, Soils and Groundwater and Biodiversity

Construction Phase

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

Taking into account the design and mitigation measures outlined in this Section 7.6.2, there still remains a residual negative interaction between land, soils, geology and hydrogeology and biodiversity during the construction phase. The interaction is considered to be negative, not significant, and short term.

Operational Phase

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

18.3.14 Interactions between Land, Soils, Traffic and Transportation and Waste

Construction Phase

There are no potentially significant interactions identified between land, soils and hydrogeology, and material assets during the construction phase.

Operational Phase

The proposed project will follow the SuDS and surface water management strategy; utilising an innovative natural based SuDS components to provide the necessary processes to control runoff frequency, flow rates and volumes. The use of SuDS during operations will mean that the runoff will discharge from the proposed bioretention and attenuation systems before out falling to the existing pond system and existing monitoring regime on-site resulting in a reduction of surface water discharge from the development site. This will have a net positive result on the downstream surrounding areas as the potential for flooding will be reduced and the overall discharged runoff will have an improved water quality due to the proposed SuDS upgrades. The SuDs features have been designed to provide sufficient capacity to contain and convey all surface water runoff associated with the 1 in 100-year event plus an additional allowance of 30% for climate change and 10% urban creep. This is as per Kildare County Council Water Services Department draft guidance on Drainage and SuDS Strategy.

Attenuation measures include bio retention areas, attenuation ponds, swales, filter drains, permeable paving and hydrocarbon interceptors. The interaction is considered to be ***negative, not significant*, and *long-term***.

RECEIVED: 18/07/2023

18.3.15 Interactions between Land, Soils Geology & Hydrogeology and Waste

During the construction phase, excavated soil and stone (c. 264,505 m^3) will be generated from the excavations required to facilitate site levelling, construction of new foundations and installations of site services. It is estimated that 239,809 m^3 of the excavated material will need to be removed off-site with the remaining balance being reused on site. Where material cannot be reused onsite it will be taken off-site, it will be taken for reuse or recovery, where practical, with disposal as a last resort. Adherence to the mitigation measures in Chapter 14 and the requirements of the RWMP (Appendix 14.1), will ensure the effect is ***long-term, imperceptible*** and ***neutral.***

18.3.16 Interactions between Traffic and Transportation and Waste

Local traffic and transportation will be impacted by the additional vehicle movements generated by removal of waste from the Site during the demolition, construction and operational phases of the proposed project. The increase in vehicle movements as a result of waste generated during the construction phase will be *temporary* in duration. There will be an increase in vehicle movements in the area as a result of waste collections during the operational phase but these movement will be imperceptible in the context of the overall traffic and transportation increase. Traffic-related impacts during the construction and operational phases are addressed in Chapter 13 (Traffic). Provided the mitigation measures detailed in Chapter 12 and Chapter 13 are adhered to, the predicted effects are ***short to long-term, imperceptible*** and ***neutral.***

18.3.17 Interactions between Population and Human Health and Waste

The potential impacts on human beings are in relation to incorrect management of waste during construction and / or operation, which could result in littering and presence of vermin – with associated potential for negative impacts on human health and residential amenity. A carefully planned approach to waste management and adherence to the project specific RWMP (Appendices 12.1), and the mitigation measures in Chapter 12, will ensure appropriate management of waste and avoid any negative impacts on the local population. The effects should be ***long-term, imperceptible*** **and** ***neutral****.*

18.3.18 Interactions between Air Quality and Traffic and Transportation

Interactions between Air and Traffic are outlined in Chapter 9 and Chapter 13 of the EIAR. There is the potential for traffic emissions to impact air quality over the construction phase. Construction traffic accessing the site will emit air pollutants during transport in addition to onsite construction machinery air emissions.

Trip generation and resultant traffic flow contribution on the local network impacts on the performance of the road network (in terms of network delays), air quality and noise in the local environment. The impacts on the performance of the transport network are addressed in this EIAR and the Traffic and Transport Assessment report produced by SYSTRA.

18.3.19 Interactions between Noise & Vibration and Traffic and Transportation

Noise and Vibration Effects interact with Traffic and Transport Effects; assessment of the noise effects noise of construction traffic is included in Section 11.5.1.1 and operational traffic are included in Section 11.5.2.2.

RECEIVED 18/07/2023

18.3.20 Interactions between Waste and Traffic and Transportation

Interactions between Traffic and Waste are outlined in Chapters 12 and 13. Local traffic and transportation will be impacted by the additional vehicle movements generated by removal of waste from the site during the construction and operational phases of the development.

Provided the mitigation measures detailed in Chapter 13 and the requirements of the CEMP are adhered to, the effects should be short to long term, slight adverse.

18.3.21 Interactions between Major Accidents and Disasters and other Disciplines

The likely significant interactions of impacts with regard to major accidents and disasters would be with areas such as soils, geology and hydrogeology, hydrology, air quality, noise and vibration, human health and biodiversity and these are addressed in the respective chapters as required.

RECEIVED: 18/07/2023

	Matrix of Interactions																							
	Cultural Heritage		Population & Human Health		Biodiversity		Land, Soils, Geology & Hydrogeology		Hydrology		Air		Climate		Noise & Vibration		Landscape & Visual Impact		Traffic		Waste		Site Services		Major Accidents and Disasters	
	Con	Op	Con	Op	Con	Op	Con	Op	Con	Op	Con	Op	Con	Op	Con	Op	Con	Op	Con	Op	Con	Op	Con	Op	Con	Op
Cultural Heritage																										
Population & Human Health											x				x	x		x	x	x	x	x			x	x
Biodiversity							x		x						x				x		x	x			x	x
Land, Soils, Geology & Hydrogeology															x				x		x	x			x	x
Hydrology																									x	x
Air																			x	x						
Climate																			x	x						
Noise & Vibration																			x	x					x	x
Landscape & Visual Impact																										
Traffic																					x					
Waste																										
Site Services																										
Major Accidents and Disasters																										

Table 18.1: Matrix of Potential Interactions Between Environmental Factors

RECEIVED 19/07/2023

18.4 Cumulative Effects

18.4.1 Population and Human Health

The Strategic Environmental Assessment prepared for the Kildare County Development Plan 2023-2029 has assessed the likely evolution of the County during the course of the Development Plan and the likely impacts. We have reviewed that assessment and conclude that it has reasonably assessed the likely evolution of the County through the implementation of the Development Plan. That assessment has *inter alia* considered predicted results from development of zoned land (including the subject principal site, which is zoned for redevelopment regardless of the project going ahead) in the county.

Regarding Population (and human health), the Strategic Environmental Assessment prepared for the Kildare County Development Plan 2023-2029 states that:

> *"The delivery of the Settlement Strategy in County Kildare is likely to result in an overall positive effect on population and human health through the accommodation of an additional 25,146 people. The stipulation in the Core Strategy that development be delivered in a sustainable and compact way is likely to result in a neutral environmental effect as development will be focused within the existing built-up footprint on suitably zoned, previously developed land insofar as possible. This discourages urban sprawl, reduces traffic movements, enhances the public realm and encourages more sustainable transport methods.*
>
> *The successful implementation of the policies and objectives relating to a resilient economy and job creation are likely to result in a general, overall positive effect on population and human health through the provision of job opportunities, educational opportunities, tourism opportunities and subsequent economic growth in the County.*
>
> *Similarly, the provision of high-quality transport systems and sustainable transport in County Kildare is likely to result in a positive effect on population and human health through the facilitation of movement through the county and increased opportunities for movement and exercise. However, the development of new transport infrastructure has the potential to result in negative environmental effects."*

The cumulative impact on population and human health for the construction and operation phases is anticipated to be **Long-Term, Neutral and Not Significant.**

18.4.2 Biodiversity

Cumulative effects are defined by EPA Guidance (2017) as; '*the addition of many minor or significant effects, including the effects of other projects, to create larger, more significant effects*'. An assessment of plans and projects occurring in within the proposed development site boundary and within the wider landscape were evaluated in combination with the project. A review of permitted developments in the wider area was completed (see **Chapter 3 - Planning and Development Context** and Appendix 3.1), and the potential for any significant cumulative and in combination effects on the receiving environment were considered for the construction and operational phases of the proposed development below.

RECEIVED 18/07/2023

The plans and projects that have been proposed or implemented in recent years were considered as part of the assessment of potential cumulative and in combination effects. For instance, the current Kildare County Development Plan (2023-2029) was adopted in December 2022. In addition, the Leixlip Local Area Plan (2020-2023) and the Celbridge Biodiversity Action Plan (2021 – 2025) were also considered in relation to the local ecology and planned actions for the protection and restoration of local biodiversity.

There are several mechanisms by which projects in general may act in concert with each other to impact on the local flora, fauna and habitats in a given area. The scale at which these impacts may be felt depends greatly on the nature of these projects and the type of species and habitats in the receiving environment. Loss of habitat associated with a particular project may be exacerbated by multiple similar losses of habitat occurring in the wider area. Increases in noise or lighting from one project can have greater impact if the loss of screening vegetation associated with a neighbouring development allows for a wider cumulative 'spill' of impacts into the wider environment. Similarly, if pressures arising from the connection to wastewater services by multiple projects being developed means that the capacity of local wastewater treatment infrastructure is overwhelmed, the potential for downstream cumulative impacts must be considered. There are also potential positive cumulative effects that can be associated with the delivery of unrelated projects. For instance, if these projects cumulatively increase the amounts of a certain habitat attractive for species of importance and through their own landscaping commitments help improve the ecological connectivity through the wider area.

There are several developments that have either been submitted for planning permission or have been granted permission within and in close proximity to the proposed development site. The client, The Davy Platform ICAV, received planning permission for the development of 4 no. 20 kV ESB double substations at four sites within the proposed development site (planning ref: 22/1096). The location of these substations is within habitats considered to be of low ecological value (Buildings and artificial surfaces (BL3), *etc*.) and cover a total floor area of 591m^2. Given the location of the substations, the scale of the works required and the type/condition of the habitats in which the substations will be located, no significant impacts in combination with the project are expected. Barnhall Rugby club received permission (Planning Ref. 21/730) for the construction of a new vehicle access and all ancillary works. The site is directly adjacent and overlaps in places, with the proposed development site boundary to the south. In combination effects between this development and the proposed development are not expected to result in significant impacts. Glenveagh Development (Planning Ref 23/513), a large scale residential development is located northeast of the proposed development site, opposite the entrance to the Barnhall Meadows estate. The site primarily comprises agricultural grassland bounded by hedgerows and treelines that provide commuting corridors for various species to habitats in the wider environment. A Screening for Appropriate Assessment and the Biodiversity chapter of the EIAR completed by Enviroguide Consulting (2023) found that "*no significant negative impact to any valued habitats, designated sites or individual or group of species as a result of the proposed development*".

As outlined in **Chapter 3 - Planning and Development Context**, the Wonderful Barn lands are likely to be the subject of a regeneration project including the restoration of the main features of the complex and its historical landscape by Kildare County Council in the foreseeable future. The Wonderful Barn is directly adjacent to and overlapping with the lands north of the M4 within the proposed development site boundary. Given the estimated time period in which the different stages of the proposed development are going to be completed, there is

RECEIVED: 18/07/2023

potential for in-combination effects on the habitats and flora between this project and the proposed development. This project will require the submission of a Screening Assessment report in support of the Appropriate Assessment process and the submission of an Environmental Impact Assessment.

There are a number of large-scale developments in the wider area that have the potential to interact with the project, resulting in in-combination and/or cumulative impacts in the receiving environment. Several of the notable projects are discussed below.

Intel Ireland Limited were granted planning permission for the revised design of their manufacturing facility in May 2017 (Planning Ref: 16/1229 amended under reg. ref. 1991). The facility is located *c.*1.5km north of Kildare Innovation Campus, and the granted revised design is currently under construction. The original Natura Impact Statement completed by Environmental Impact Services (2016), found that wastewater discharged to Leixlip WWTP would remain inside the licensed limits for the facility and have a negligible impact on the River Liffey. The Natura Impact Statement submitted for the amended planning application (Planning Ref: 1991) takes into account the environmental protection policies outlined in the Kildare County Development Plan 2017-2023 and Leixlip Local Area Plan 2017 – 2023 and states that "*the proposed development itself will not have any effects on the conservation objectives of any European sites*" (Scott Cawley, 2019). The Intel campus has been developed over a number of phases and has had to implement stringent design and environmental controls, particularly as it is located directly adjacent to the Rye Water Valley/Carton SAC. These include management of surface water and wastewater in accordance with EPA licence requirements, as outlined. Several development projects at this facility have been subject to the Appropriate Assessment process. Having considered the location and design of the Intel facility, no interactions resulting in significant cumulative effects upon the receiving environment in relation to the Intel development and the proposed development are expected. We have also considered the potential for cumulative effects arising between the Intel Facility and the proposed facilitation works *i.e.,* the proposed Eirgrid uprating works and the proposed GNI upgrade works, that will be required as part of the current project. While the overhead transmission lines traverse the Intel facility, the uprating works are highly localised, temporary and of a nature that no potential for significant cumulative effects upon the receiving environment in relation to the Intel development and the proposed development are expected.

Irish Water have applied for permission to upgrade Leixlip WWTP which would involve the demolition of the existing workshop and activated carbon building, and the construction of a new Sulphuric Acid Storage and Dosing Facility (Planning Ref: SD21A/0272). The site of the proposed works is located in proximity to the River Liffey, on the opposite bank to the proposed development site, less than 1km form the proposed development site. There were no interactions between the proposed works and any designated Natura 2000 site identified (Ryan Hanley, 2021). No interactions resulting in significant cumulative effects upon the receiving environment in relation to this WWTP upgrade and the proposed development are expected. With regard to the facilitation works *i.e.,* the proposed Eirgrid uprating works and the proposed GNI upgrade works, we have considered the information provided on the proposed facilitation works, including the nature, location and scale of the GNI upgrade and Eirgrid uprating. Based on this information, no interactions resulting in significant cumulative effects upon the receiving environment in relation to the Leixlip WWTP upgrades and the facilitation works are expected.

A 10-year planning permission was granted for a c. 47.44 ha Solar Farm development (Planning Ref: 18250) in Killeenlea, Co. Kildare, located to the southwest of the proposed development site. The Screening report in support of the AA process completed by Scott Cawley (2018) stated that there is no pathway linking to designated sites upstream. Given this and the distance of this site from the proposed development site, no interactions resulting in significant cumulative effects upon the receiving environment in relation to this solar farm development and the proposed development are expected. With regard to the facilitation works *i.e.,* the proposed Eirgrid uprating works and the proposed GNI upgrade works, we have considered the information provided on the proposed facilitation works, including the nature, location and scale of the GNI upgrade and Eirgrid uprating. Based on this information, no interactions resulting in significant cumulative effects upon the receiving environment in relation to this solar farm and the facilitation works are expected.

RECEIVED: 18/07/2023

The DART+ West project (ABP ref: NA29S.314232) is seeking permission to significantly increase rail capacity on the Maynooth & M3 Parkway lines. The route of this project passes to the southeast of the proposed development site, opposite the Leixlip Reservoir. The Natura Impact Statement completed by IDOM and ROD on behalf of CIÉ (2022) found that "*given the full and proper implementation of the mitigation prescribed in this NIS, the proposed development, either individually or in combination with other plans or projects, will not adversely affect the integrity of the Rye Water Valley/Carton SAC, the South Dublin Bay and the River Tolka Estuary SPA, the North Bull Island SPA or any other European site*". Having considered the nature and scale of the Dart+ West project and the environmental commitments provided for in the EIAR and NIS, we conclude that there is no potential for interaction resulting in significant cumulative effects with the current proposed KIC development. We have also considered the potential for cumulative effects arising between this project and the proposed facilitation works *i.e.,* the proposed Eirgrid uprating works and the proposed GNI upgrade works, that will be required as part of the current project. The overhead transmission lines that form part of the Eirgrid uprating route traverse the Dart+ upgrade route. For the same reasons as outlined above, no potential for significant cumulative effects upon the receiving environment in relation to the Intel development and the proposed development are expected.

There are several large residential developments that have been granted permission in the wider environment of the proposed development (See Appendix 3.1). These developments and other active sites in the wider area are to be seen in the context of a well-developed urban infrastructure with appropriate planning, monitoring, and licensing in place.

18.4.3 Land, Soils, Geology and Hydrogeology

Construction Phase

In relation to the potential cumulative effects on the geological or hydrogeological environment during the construction phases, the key engineering works which would have additional impacts above are:

- Construction works will require additional removal of topsoil and subsoil cover and will further increase the vulnerability of the underlying bedrock. Although this is minimised due to the underlying clayey overburden. Capping of significant areas of the sites by hardstand/ buildings following construction and installation of drainage will minimise the potential for contamination of groundwater.

RECEIVED: 18/07/2023

Operational Phase

In relation to the potential cumulative impacts from the operational stages, the following would apply:

- Overall increase in hardstanding: Cumulatively these developments will result in localised reduced recharge to ground and increase in surface run-off. The aquifer underlying the site is a locally important aquifer which is moderately productive only in local zones. The proposed development will have a relatively small footprint in comparison to the underlying aquifer size. As such, the impact is considered to be Low.
- Accidental releases from fuel storage/unloading could contaminate groundwater or soil environments unless mitigated adequately. Localised accidental discharge of hydrocarbons could occur in car parking areas and along roads unless diverted to surface water drainage system with petrol interceptors. However, all developments are required to ensure they do not have an impact on the receiving water environment in accordance with the relevant legislation (primarily the Local Government (Water Pollution) Act, 1977 and 1990 as amended and Groundwater Threshold Value (Groundwater Directive S.I. No. 9 of 2010 and amendment; S.I. No. 366 of 2016) and EPA Interim Guidelines for groundwater where available) such that they would be required to manage runoff and fuel leakages.
- There will be a further loss of greenfield area locally however, the area of development is small in the context of the overall agricultural land available in the region. It is likely that the land use will change over time based on the current zoning of the proposed land in the vicinity as EE. The site is an existing underdeveloped business campus, zoned for 'Industry and Warehousing' in *the Leixlip Local Area Plan 2020-2023 (extended to 2026).*
- The residual cumulative effect on land, soils, geology and hydrogeology for the construction and operation phases are anticipated to be long-term, neutral in terms of quality and of not significant, once the appropriate mitigation measures (as outlined in Chapter 7) are put in place for each development.

18.4.4 Hydrology

The anticipated cumulative effect of the Proposed project with any/all relevant other planned or permitted developments as outlined in Chapter 2 and 3 are discussed in below for construction and operational phases respectively.

Construction Phase

In relation to the potential cumulative effect on hydrology during the construction phase, the construction works which would have potential cumulative effects include:

- Surface water run-off during the construction phase may contain increased silt levels or become polluted from construction activities. Run-off containing large amounts of silt can cause damage to surface water systems and receiving watercourses.

- Contamination of local water sources from accidental spillage and leakage from construction traffic and construction materials unless project specific CEMPs are put in place for each development and complied with.

RECEIVED: 18/07/2023

Operational Phase

In relation to the potential cumulative effect on hydrology during the operational phase, operational works which would have potential cumulative effects include:

- Increased hard standing areas (171,641.88 m^2) will reduce local recharge to the ground and increase surface water run-off potential if not limited to the green field run-off rate from the site.
- Increased risk of accidental releases from fuel storage/delivery unless mitigated adequately i.e. bunded tank.
- Increased risk of accidental discharge of hydrocarbons from car parking areas and along roads and unless diverted to surface water system with petrol interceptor; and
- Any additional foul discharges should be treated where appropriate and/or diverted to the foul sewer system and not directly to ground.

All developments will be required to manage any discharges to water and operate in compliance with relevant legislation (European Communities Environmental Objectives (Surface Waters); Regulations, 2009 (S.I. No. 272 of 2009 as amended by SI No. 77 of 2019). As such there will be no likely cumulative impact on water quality.

Increase in wastewater loading and water supply requirement is an impact of all developments: Each development will require approval from the IW confirming available capacity in the water and wastewater infrastructure. The surface water and foul drainage infrastructure and water supply requirements for the proposed project has been designed and assessed to accommodate the requirements of the proposed project.

Development will result in an increase in hard standing which will result in localised reduced recharge to ground and increase in run-off rate. However, each permitted development is required by the Local Authority and IW to comply with the Greater Dublin Strategic Drainage Strategy (GDSDS) and Local Authority and IW requirements by providing suitable attenuation on site to ensure greenfield run-off rates and ensure that there is no increase in offsite flooding as a result of development.

The residual cumulative impact on hydrology for the construction and operation phases is anticipated to be ***Long-Term, Neutral*** in terms of quality and ***Not Significant***, once recommended mitigation measures (outlined in Chapter 8 - Hydrology) to manage water quality runoff in compliance with legislative requirement are put in place for each development.

18.4.5 Air Quality

Construction Phase

When the dust mitigation measures detailed in the mitigation section of chapter 9 are implemented, cumulative fugitive emissions of dust and particulate matter from the site and

nearby facilities undergoing construction will be ***neutral***, ***short-term*** and ***not significant*** in nature, posing no nuisance at nearby receptors.

RECEIVED: 18/07/2023

Operational Phase

There are no nearby sources with emissions of NO_2/NO_x of sufficient magnitude to overlap with site emissions from the proposed facility and thus therefore no offsite cumulative effects are anticipated. With mitigation measures, as outlined in chapter 9, in place it is not predicted that any cumulative effects will occur during the combined construction and operational phase due to NO_2/NO_x impacts.

18.4.6 Climate

In relation to climate, all global cumulative GHG sources are relevant to the effect on climate change. As a result, the effects of GHG emissions from specific cumulative projects therefore in general should not be individually assessed. This is due to the fact that there is no basis for selecting any particular (or more than one) cumulative project that has GHG emissions for assessment over any other (IEMA, 2022).

18.4.7 Noise and Vibration

Facilitation Works – GNI Gas Upgrades

Chapter 2 provides details of the GNI Gas Upgrades which are to support the proposed project and include replacement of approximately 1.5 km of underground gas pipeline.

In respect of construction noise the main noise-generating activities are the excavation of trenches and the generator associated with horizontal directional drilling. The construction activities are expected to be similar to regular road works are not expected to give rise to significant cumulative noise or vibration effects.

Facilitation Works – Eirgrid Uprating

Similarly, Chapter 2 provides details of the uprating of existing lines proposed as part of the Facilitation Works. These works involve replacing the overhead electric cables, retaining the existing pylons, therefore no new foundation works or concrete pouring are envisaged. Consequently, the noise generated during these works will be minimal and will progress along the route. These works are not expected to give rise to significant cumulative noise or vibration effects.

Unrelated Developments

A list of developments for assessment of potential cumulative effects was prepared by Tom Phillips and Associates. Their locations in relation to the proposed project is shown in **Figure 18.1**

In respect of noise, the following comments are made:

300606 refers to a housing development currently under construction. It is included in the assessment of the proposed project as NSL15;

19998 refers to works at the Canoe Club along the river front, where predicted noise levels due to the proposed project are of the order of 44 dB L_{Aeq}.

By their nature, neither of these developments is expected to generate noise or vibration which could give rise to a significant cumulative effect.

All other developments are at sufficient distance so as not to give rise to cumulative noise or vibration effects with the proposed project.

RECEIVED: 18/07/2023

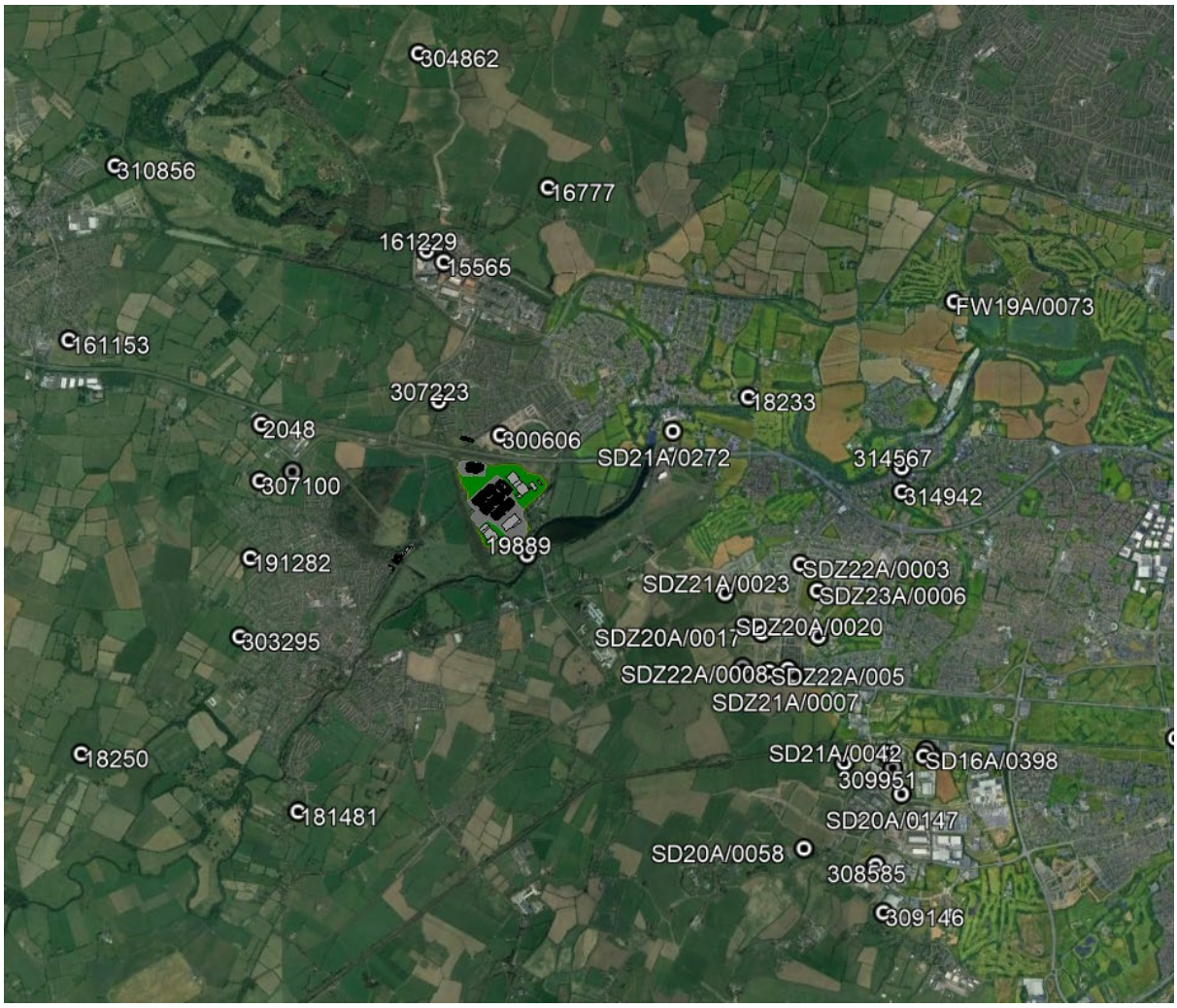


Figure 18.1 Other planning applications for assessment of potential cumulative impact

18.4.8 Material Assets – Waste Management

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

RECEIVED: 18/07/2023

Construction Phase

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

Developments that potentially could overlap during the construction phase of can be found in Chapter 3, along with descriptions.

Due to the high number of waste contractors in the Kildare region and Ireland there would be sufficient contractors available to handle waste generated from many these sites simultaneously, if required. The National Waste Collection Permit Office can be contacted to obtain a list of waste contractors and waste collection permit details. Similar waste materials would be generated by all the developments.

Other developments in the area will be required to manage waste in compliance with national and local legislation, policies and plans which will mitigate against any potential cumulative effects associated with waste generation and waste management. As such the effect will be **short-term, not significant and neutral.**

Operational Phase

There are existing residential and commercial developments close by, along with the multiple permissions remaining in place. All of the current and potential developments will generate similar waste types during their operational phases. Authorised waste contractors will be required to collect waste materials segregated, at a minimum, into recyclables, organic waste and non-recyclables. An increased density of development in the area is likely improve the efficiencies of waste collections in the area.

Other developments in the area, and the indicative future masterplan development, will be required to manage waste in compliance with national and local legislation, policies and plans which will minimise/mitigate any potential cumulative effects associated with waste generation and waste management. As such the effect will be a **long-term, imperceptible and neutral.**

18.4.9 Material Assets – Site Services

The anticipated cumulative effect of the proposed project with any/all relevant other planned or permitted developments as outlined in Chapter 2 and 3 are discussed in below for construction and operational phases respectively.

Construction Phase

The proposed project and other surrounding development will require site clearance, excavations and levelling which will generate localised requirement for soil removal and/or import, power and water supply and wastewater discharge. However, provided standard mitigation measures set out in the EIA Reports for these developments or where EIA does not apply, provided that planning conditions are implemented, the cumulative effect will be ***short-term, negative*** and ***not significant.***

RECEIVED 19/07/2023

Operational Phase

The proposed project and all permitted developments considered are required to engage with GNI, KCC, Uisce Éireann and ESB to ensure that there is sufficient capacity to cater for the increase in water and wastewater and electricity requirements. Based on known current and known future developments there is adequate capacity of supply available within the local environs. GNI have confirmed that subject to local upgrades (Facilitation Works) there is sufficient gas supply to cater for the proposed project, similarly a connection agreement is in place with Eirgrid for the initial phase (16MW). Uprates (Facilitation Works) have been identified as being required by the project team to facilitate the full build out of the campus. Subject to the uprates sufficient capacity has been confirmed through the *Network Demand Capability Analysis* by TNEI & H&MV. Furthermore, the proposed grid connection for the full build out will be supported by dispatchable power via the proposed energy centre to ensure that the proposed project will not unduly impact on power supply. Eirgrid as the national authority for grid has the requirement to ensure that future connections will not impact or reduce the capacity within the local network to support the neighbouring area.

Irish Water have previously confirmed that there is sufficient wastewater capacity available with a response to an updated PCE pending. Furthermore, as set out in Chapter 8 (Hydrology), the maximum proposed allowable discharge rate for the site is 149.75 l/s (12,938.4m3/day). Leixlip WWTP has a maximum capacity of 33,745m3/day. Therefore Leixlip WWTP has sufficient capacity for the proposed project site. There will be no increase in stormwater flow off the site as a result of the development. The location of the proposed project has access to existing utilities and, through confirmation by utilities suppliers the final development will not have an impact on capacity off-site for the development. Therefore, there will be no potential for cumulative effects with any other development within the study area.

In developing long term plans for security of supply, these National Authorities for water and energy supply are required to develop resources in compliance with sustainable environmental planning. Based on the availability of on-site electricity & gas for power supply and the energy centre, there is a ***short-term, neutral***, and ***not significant*** effect on power supply during the operational phase of the proposed project.

18.4.10 Material Assets – Traffic and Transportation

Regarding the construction phase, the CTMP will ensure coordination with any known nearby construction. The strict routing for HGVs to the nearby M4 and mitigation measures outlined in the CTMP will ensure impact is slight and short-term.

The road network analysis undertaken accounts for a robust background growth in traffic and known developments, within close proximity to the site, as outlined in Chapters 2 and 3 of this EIAR The results of the analysis conclude that with signals installed at the interchange junction and the link road full operational, that the network operated within capacity.

18.4.11 Archaeology and Cultural Heritage

Construction groundworks associated with all permitted development can have an effect on hitherto unknown sub-surface archaeological material remains and on the preceding cultural landscape. If sub-surface archaeological remains are preserved by excavation and recording,

RECEIVED: 18/07/2023

or cultural landscape features such as physical townland boundaries are removed, the remains/features are permanently removed from the archaeological and cultural heritage landscape. The more extensive the area of ground to be disturbed as a result of permitted development, the greater the risk of exposing and negatively impacting sub-surface remains and the greater the modification of the cultural heritage landscape.

There is a potential incremental cumulative effect on sub-surface archaeological remains in consequence of the scale of the required excavations of the project. The predicted significance of the effect on potential sub-surface archaeological remains inherent in greenfield has been identified as slight.

There is an incremental cumulative effect on the cultural landscape, namely in the removal of hedgerow where it represents physical townland boundary alignments. Townland boundaries are an undesignated cultural heritage asset, and most of the northern and western alignment of the Parsonstown boundary has been removed in consequence of developments at the KIC lands since the mid-1990s. The current remaining physical townland boundary alignments at the KIC lands are shown on Figure 15.7. The predicted significance of the effect on townland boundaries has been identified as slight.

During the construction phase, the protection of the existing trees that are planted along the path of the protected view corridor will of paramount importance. Virtually all of these trees were planted approximately twenty years ago when the Hewlet Packard campus was originally developed. Some of those trees have not survived and others will no doubt require replacement due to natural loss poor growth. During the construction phase, it a programme of protection measures will be included in the contract documents, to prevent any encroachment into the root zone of the trees, to avoid damage to the roots or compaction of the ground.

18.4.12 Landscape and Visual Impact Assessment

The following relevant project may result in cumulative landscape and visual effects when seen together with the proposed project:

Strategic Housing Development Leixlip Gate, Kilmacredock, Leixlip, Co. Kildare
(located approximately 650m northwest of the proposed development site).There will be no intervisibility and therefore no cumulative arising landscape and visual effects between the permitted SHD and the proposed project due to topography, intervening vegetation and existing built structures such as the M4

18.4.13 Major Accidents and Disasters

The nearest Seveso site is the Intel Ireland Ltd. Site *ca*. 1.5km to the north of the proposed development site. The proposed development site is outside the Consultation Distance of Intel Ireland Ltd.; therefore, this site does not have the potential to initiate a major accident at the proposed development site.

The cumulative residual and operational effects of the proposed project have been assessed and, in regard to screening of major accidents and risks, cumulative effects are considered

imperceptible and neutral as there is no risk to off-site receptors in relation to a major accident.

RECEIVED: 18/07/2023

RECEIVED: 18/07/2023

19.0 Mitigation and Monitoring

19.1 Introduction

The chapters contained within this EIAR have been ordered in a grouped format by their relevant topic. This chapter summarises all mitigation measures proposed in order to provide a comprehensive overview of the full range of mitigation measures discussed within each chapter.

Paragraph 2(d) of Schedule 6 to the Planning and Development Regulations 2001, as amended by S.I. No. 30/2018 - Planning and Development (Amendment) (No. 2) Regulations 2018, provides that the following information must be contained in an EIAR:

> *"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."*

19.2 Population and Human Health

19.2.1.1 Construction Phase

No negative significant impacts on the population have been identified in relation to the construction of the proposed works.

A construction and environmental management plan has been prepared by CSEA and submitted as part of this application.

That plan will be adhered to during construction, as well as the mitigation measures proposed within this EIAR.

As such, no further mitigation measures are required.

19.2.1.2 Human Health

No negative significant impacts on human health have been identified in relation to the construction of the proposed works.

The potential impacts on human health, as outlined above have been identified and assessed in the various chapters of the EIAR as prepared by the various Design consultants. Appropriate mitigation measures have been proposed in relation to Air, Noise and Vibration, Climate, Hydrology, Major Accidents etc.

Mitigation measures are outlined in each respective chapter as well as in Chapter 19 of the EIAR.

RECEIVED: 19/07/2023

19.2.2 Operational Phase

19.2.2.1 Population

No negative significant impacts on the population have been identified in relation to the operation of the proposed works and, as such, no mitigation measures are required.

19.2.2.2 Human Health

In the absence of appropriate mitigation, there is potential for significant impacts on human health during the construction phase of the project.

These potential impacts on human health, as outlined above have been identified and assessed in the various chapters of the EIAR as prepared by the various Design consultants. Appropriate mitigation measures have been proposed in relation to Air, Noise and Vibration, Climate, Hydrology, Major Accidents etc.

Mitigation measures are outlined in each respective chapter as well as in Chapter 19 of the EIAR. Effects to Human Health arising from the construction phase are expected to be neutral provided mitigation measures referred to above are adhered to.

19.3 Biodiversity

The following mitigation measures will be applied to minimise the potential impacts identified on the receiving and wider environment.

- A suitably qualified Ecological Clerk of Works will be appointed for each phase of the construction of the project to ensure the full and proper implementation of the mitigation strategy.

- There will be no tree or hedgerow removal within the bird breeding season (1st March to 31st March inclusive).

- Any areas where vegetation removal or construction activity is due to commence will be subject to a pre-works survey by a suitably qualified ecologist. In the event that there are any protected species present works will only be permitted to proceed on the advice of the ecologist and with any required derogation licensing in place.

- All trees judged to have moderate or high roost potential for bats will be subject to a detailed inspection, including as appropriate tree-climbing (and/or roost emergence surveys) in the weeks prior to planned felling. In the event that there is evidence of a presence a roosting bats no felling will take place without a derogation licence. A bat specialist will liaise with the licensing unit and local NPWS staff and implement an agreed management protocol ahead of the commencement of felling. The bat specialist will be present during any subsequent felling and will inspect the felled trees before they are logged or removed.

- Areas where construction is scheduled will be surveyed in advance to check for the presence of Invasive Plant Species. In the event that any Third Schedule Invasive Plant

species are present an Invasive Species Management Plan will be prepared and implemented ahead of the removal of vegetation from the affected area.

RECEIVED: 18/07/2023

- All soil removed from the site will be disposed of at approved licenced facilities.
- All environmental controls described in the CEMP and elsewhere in the EIAR will be integrated into a live CEMP which will be regularly reviewed and updated as appropriate during the construction phase.
- Root protection zones will be marked and appropriate exclusion of vehicles and personnel will be in place to ensure that disturbance to habitats adjoining construction sites is minimised.
- The proposed Landscaping Plan (AECOM 2023) will be implemented in full.
- If soil is imported to the site for landscaping, infilling or embankments, the contractor shall gain documentation from suppliers that it is free from invasive species.
- Construction operations will take place during the hours of daylight for the most part to minimise disturbances to roosting birds or any active crepuscular/nocturnal bird species.
- A Toolbox Talk will be prepared and incorporated as part of the construction phase site induction. A wildlife register will be maintained by the environmental site staff during the construction phase. Site staff will be encouraged to report any wildlife sightings of note made during the construction phase and this information will be logged by the environmental site staff. The site manager will continue to maintain a wildlife register throughout the operational phase.
- The construction footprint will not be lit at night (with the exception of low-level switchable safety lighting). All lighting systems will be designed to minimise nuisance through light spillage. Shielded, downward directed lighting will be used wherever possible and all non-essential lighting will be switched off during the hours of darkness.
- Where possible all light fittings will be LED, have asymmetrical projection i.e. directional, and with colour temperature of 2700K (warm spectrum preferred by bats). The radiation will be above 500nm to avoid the blue or UV light, most disturbing to bats.
- All edible and putrescible wastes will be stored and disposed of in an appropriate manner. Similarly, all construction materials will be stored and stockpiled at prescribed locations and all waste materials will be disposed of to licensed facilities.
- All edible and putrescible wastes will be stored and disposed of in an appropriate manner. Similarly, all construction materials will be stored and stockpiled according to the CEMP.
- Areas where spoil is to be stored temporarily, or permanently, will be checked in advance for the presence of Frogs (and spawn) or other protected species. Any areas with pooled surface water, shall be checked in advance for the presence of Frogs (and

RECEIVED: 18/07/2023

spawn). If protected species are present, the environmental staff will translocate these, if possible (under licence if applicable). The same measure should be applied for any drains or areas of standing water forded by construction machinery. These areas will be checked on an ongoing basis by the ECoW and any areas with breeding frogs, spawn or tadpoles will be mapped and if possible fenced off temporarily to allow Frogs to metamorphose. If such areas cannot be avoided by site traffic the environmental staff will translocate the frogs (adults/young) under licence if applicable.

- If other taxa such as other species of Lepidoptera, Common Lizard etc. are recorded within or adjacent to the site these sightings will be logged on a wildlife register.

- All excavations, or areas with pooled water will be checked regularly by the ECoW. Access/egress boards will be provided in the event that any excavations are to be left open or accessible to fauna for any prolonged period. A protocol for dealing with any trapped or injured wildlife will be developed as part of the construction phase environmental management plan including information regarding local veterinary care and local NPWS staff. The ECoW will prepare information on treatment of wildlife and emergency procedures which will be included as part of the site induction process.

- Any newly installed perimeter fencing will have a gap of c. 200mm at the base, or regular mammal gates (at maximum 150m intervals), to allow the free passage of terrestrial mammals through the site.

19.4 Land, Soils, Geology and Hydrogeology

In order to reduce impacts on the soils, geological and hydrogeological environment, a number of mitigation measures will be adopted as part of the construction works on site.

19.4.1 Construction Phase

This section describes a range of mitigation measures designed to avoid or reduce any potential adverse geological and hydrogeological impacts identified.

19.4.1.1 Construction Environment Management Plan

A Construction & Environmental Management Plan (CEMP) has been prepared in respect of the proposed development (refer to CSEA's CEMP). It contains best practice measures and protocols to be implemented during the construction phase of the proposed development to avoid/minimise environmental impacts.

To ensure the CEMP remains fit for purpose, it will be regarded as a live document. The appointed contractor will be responsible for updating the CEMP, as required; e.g. to reflect the publication of relevant new or revised guidelines and / or new statutory requirements. The full schedule of environmental commitments (i.e. all mitigation measures set out in the CEMP, Environmental Impact Assessment Report and Natura Impact Statement submitted as part of the planning application, as well as any applicable conditions of development consent) will be included in the CEMP by the appointed contractor.

RECEIVED: 18/07/2023

The CEMP was formulated in accordance with best international practice including but not limited to:

- CIRIA, (2001), Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors;
- Construction Industry Research and Information Association (CIRIA) Environmental Good Practice on Site (C650), 2005;
- BPGCS005, Oil Storage Guidelines;
- Eastern Regional Fisheries Board, (2016), Guidelines on protection of fisheries during construction works in and adjacent to waters
- CIRIA 697, The SUDS Manual, 2007;

19.4.1.2 Control of Soil Excavation

Site preparation, excavations and levelling works required to facilitate construction of foundations, access roads and the installation of services will require imported material.

- Suitable soils will be reused on site as backfill in the grassed areas, where possible.
- Contractors shall be required to submit and adhere to a method statement indicating the extent of areas likely to be affected and demonstrating that this is the minimum disturbance necessary to achieve the required works.
- Temporary storage of soil will be carefully managed in such a way as to prevent any potential negative impact on the receiving environment and the material will be stored away from any open surface water drains. No soil storing will be allowed within 30 m of any open water including the existing retention ponds which is likely achievable given the size of the site, and is in line with Inland Fisheries Ireland guidelines.
- Movement of material will be minimised in order to reduce degradation of soil structure and generation of dust.
- Although there is no evidence of historical contamination in the proposed development area, all excavated materials will be visually assessed for signs of possible contamination such as staining or strong odours. Should any unusual staining or odour be noticed, samples of this soil will be analysed for the presence of possible contaminants in order to ensure that historical pollution of the soil has not occurred. Should it be determined that any of the soil excavated is contaminated, this will be disposed of by a licensed waste disposal contractor.
- Stockpiles have the potential to cause negative impacts on air and water quality. Stockpiles will be formed within the proposed development site boundary and the contractor will ensure that there are no direct links or pathways from stockpiles to any surface water body.
- Overburden material will be protected from exposure to wind by storing the material in sheltered parts of the site, where possible

19.4.1.3 Sources of Fill & Aggregates

All fill and aggregate for the proposed development 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 proposed development;

RECEIVED: 18/09/2023

- Environmental management status; and
- Regulatory and legal compliance status of the company.

19.4.1.4 Fuel & Chemical Handling

To minimise any impact on the underlying subsurface strata from material spillages, all oils, solvents and paints used during construction will be stored within temporary bunded areas. Oil and fuel storage tanks shall be stored in designated areas, and these areas shall be bunded to a volume of 110% of the capacity of the largest tank/container within the bunded area(s) (plus an allowance of 30 mm for rainwater ingress). Drainage from the bunded area(s) shall be diverted for collection and safe disposal.

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

Where feasible, all ready-mixed concrete will be brought to site by truck. A suitable risk assessment for wet concreting will be completed prior to works being carried out, which will include measures to prevent discharge of alkaline wastewaters or contaminated storm water to the underlying subsoil. Wash down and washout of concrete transporting vehicles will take place at an appropriate facility off-site.

In the case of drummed fuel or other chemical which may be used during construction, containers should be stored in a dedicated internally bunded chemical storage cabinet and labelled clearly to allow appropriate remedial action in the event of a spillage.

Emergency response procedures will be outlined in the CEMP. All personnel working on the site will be suitably trained in the implementation of the procedures.

19.4.1.5 Control of Water during Construction

There shall not be any discharge of ***untreated***, silty, or contaminated water from the works to any watercourse or stormwater network.

The implementation of industry best practice and full adherence to the mitigation measures set out in the CEMP can largely mitigate against the risk of discharge from contaminated soils to receiving surface and ground waterbodies.

The discharge of ***treated*** construction water (i.e. water free from silt and other pollutants) from rainfall into excavated areas, or from any localised dewatering may be required during the construction phase. The treated water will discharge to the existing Leixlip Reservoir.

Pre-treatment and silt reduction measures on site will include a combination of silt fencing, settlement measures (silt traps, 20 m buffer zone between machinery and watercourses, refuelling of machinery off site) and hydrocarbon separator. These specific measures will

provide protection to the receiving soil and water environments during the construction phase.

RECEIVED: 18/07/2023

19.4.2 Operational Phase

A number of design measures will be put in place to minimise the likelihood of any spills entering the groundwater environment. An existing bypass petrol interceptor is located upstream of the outfall from the site, and it is proposed to retain this interceptor. Furthermore, it is a requirement for car parking areas with 10 spaces or more as outlined in Section 20.1 of the Greater Dublin Regional Code of Practice.

There is potential for surface water and condensate to accumulate in the exhaust stacks which serve the generators. Gullies which serve the exhaust stacks will discharge to a dedicated surface water drainage pipe which will be connected to a Class 1 full retention separator. Two full retention interceptors will be required, per data centre building, to serve the exhaust stacks. In the event of an accidental leakage of oil from the parking areas, this will be intercepted by the drainage infrastructure proposed.
The following mitigation measures will be undertaken at the operational stage to manage any leaks from vehicles resulting in soil and/or groundwater quality impacts:

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

19.5 Hydrology

The design of the Proposed Development has taken account of the potential impacts of the development and the risks to the water environment specific to the areas where construction is taking place as described in Section 8.5 above.

The proposed development has a direct hydrological connection with Leixlip Reservoir via the surface water drainage network and an indirect connection to the River Liffey and Liffey Valley pNHA. Caution will be taken to mitigate the potential effects on the local water environment. These measures seek to avoid or minimise potential effects in the main through the implementation of best practice construction methods and adherence to all relevant legislation.

19.5.1 Construction Phase

19.5.1.1 Construction Environmental Management Plan (CEMP)

An Outline Construction Management Plan (CSEA, 2023) has been prepared for planning which details project-specific construction methodologies. A project-specific CEMP will be prepared and maintained by the appointed contractors during the construction phase of

RECEIVED: 18/01/2023

the proposed project. The CEMP will cover all potentially polluting activities and include an emergency response procedure. All personnel working on the site will be trained in the implementation of the CEMP. At a minimum, the manual will be formulated to the standard best international practice including, but not limited, to:

- CIRIA, (2001), *Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors, (C532)* Construction Industry Research and Information Association;
- CIRIA (2002) *Control of water pollution from construction sites: guidance for consultants and contractors (SPI56)* Construction Industry Research and Information Association;
- CIRIA (2005), *Environmental Good Practice on Site* (C650); Construction Industry Research and Information Association;
- BPGCS005, *Oil Storage Guidelines*;
- CIRIA 697 (2007), *The SUDS Manual*; and

19.5.1.2 Surface Water Run-off

Run-off water containing silt will be contained on site via settlement tanks and treated to ensure adequate silt removal. Silt reduction measures on site will include a combination of silt fencing, settlement measures (silt traps, silt sacks and settlement ponds).

Should any discharge of construction water be required during the construction phase, the discharge will be treated using sediment traps as required.

The temporary storage of soil will be carefully managed. Stockpiles will be tightly compacted to reduce runoff and graded to aid in runoff collection. This will prevent any potential negative impact on the storm water drainage and the material will be stored away from any surface water drains. Movement of material will be minimised to reduce the degradation of soil structure and generation of dust. Excavations will remain open for as little time as possible before the placement of fill. This will help to minimise the potential for water ingress into excavations.

Weather conditions will be considered when planning construction activities to minimise the risk of run-off from the site through the excavation works required to facilitate the local extension upgrades of the gas transmission. The suitable distance of topsoil piles from surface water drains will also be maintained.

19.5.1.3 Fuel and Chemical Handling

The following mitigation measures will be taken at the construction stage in order to prevent any spillages of fuels and prevent any resulting impacts to the surface water system;

- Designation of a bunded refuelling areas on the site;
- Provision of spill kit facilities across the site;
- Where mobile fuel bowsers are used the following measures will be taken:
    - Any flexible pipe, tap or valve will be fitted with a lock and will be secured when not in use;
    - The pump or valve will be fitted with a lock and will be secured when not in use;

RECEIVED: 18/09/2023

- All bowsers to carry a spill kit and operatives must have spill response training; and
- Portable generators or similar fuel containing equipment will be placed on suitable drip trays.

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

- Secure storage of all containers that contain potential polluting substances in a dedicated internally bunded chemical storage cabinet unit or inside concrete bunded areas. The containment measures planned will minimise the risk of release of solid/ liquid material spillages to the water environment. Containment measures will include storage of fuels on site in bunded containers or compartments. The design of all bunds will conform to standard bunding specifications - BS EN 1992-3:2006, *Design of Concrete Structures – Part 3: Liquid retaining and containment measures*;
- Clear labelling of containers so that appropriate remedial measures can be taken in the event of a spillage;
- All drums to be quality approved and manufactured to a recognised standard;
- If drums are to be moved around the site, they should be done so secured and on spill pallets; and
- Drums to be loaded and unloaded by competent and trained personnel using appropriate equipment.

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

19.5.1.4 Accidental Releases

Emergency response procedures will be outlined in the site CEMP and are set out in the draft CMP included with the application. All personnel working on the site will be suitably trained in the implementation of the procedures.

19.5.1.5 Soil Removal and Compaction

Temporary storage of soil will be carefully managed in such a way as to prevent any potential negative impact on the receiving environment. The material will be stored away from any surface water drains (see Surface Water Run-off section above). Movement of material will be minimised to reduce degradation of soil structure and generation of dust. No soil storage will occur within 30 m of any of the open surface water features including the existing retention ponds. Given the size of the site where sufficient working areas are available within the site boundaries this is achievable. All soil storage and removal practices during the construction phase will be in accordance with Inland Fisheries Ireland guidelines (Guidelines on protection of fisheries during construction works in and adjacent to waters, 2016).

Site investigations carried out at the site by IGSL in December 2019 found no residual contamination on site. Nonetheless, all excavated materials will be visually assessed for signs of possible contamination such as staining or strong odours. Should any unusual

staining or odour be noticed, samples of this soil will be analysed for the presence of potential contaminants to ensure that historical pollution of the soil has not occurred. Should it be determined that any of the soil excavated is contaminated, this will be segregated and appropriately disposed of by a suitably permitted/licensed waste disposal contractor.

RECEIVED: 18/07/2023

19.5.2 Operational Phase

19.5.2.1 Environmental Procedures

The Operator of the proposed data centre buildings implements an Environmental Management System at each of its facilities. Prior to operation of the Proposed Development, a comprehensive set of operational procedures will be established (based on those used at other similar facilities) which will include site-specific mitigation measures and emergency response measures as outlined below, similar procedures will be developed for the DeepTech buildings and energy infrastructure:

19.5.2.2 Fuel and Chemical Handling

The containment measures planned will minimise the risk of release of solid/ liquid material spillages to the water environment. Containment measures will include storage of fuels on site in bunded containers or compartments. The design of all bunds will conform to standard bunding specifications - BS EN 1992-3:2006, *Design of Concrete Structures – Part 3: Liquid retaining and containment measures.*

19.5.2.3 Storm and Foul Water Drainage

The proposed development will provide a significant improvement to the local drainage as it is proposed to provide full attenuation for increase in hardstand area (c. 171,641.88 m2) in compliance with the requirements of the Greater Dublin Strategic Drainage Study.

A number of attenuation measures will be implemented to minimise the likelihood of any spills entering the water environment to include the design of attenuation techniques such as Swales, Tree pits, Green roofs, Filter drains, Permeable paving, Rainwater Harvesting system, Bio-Retention ponds, Hydrocarbon interceptors, Silt Traps and Attenuation facilities will protect from on-site and off-site flooding which is in compliance with Kildare County Development Plan 2023-2029 that requires the use of sustainable drainage systems (SuDS) to minimise and limit the extent of hard surfacing and paving and require the use of sustainable drainage techniques where appropriate, for new development or for extensions to existing developments, in order to reduce the potential impact of existing and predicted flooding risks.

As a result, the proposed development will result in a reduction of surface water discharge from the development site. This will have a net positive result on the downstream surrounding areas as the potential for flooding is reduced and the overall discharged runoff will have an improved water quality. Refer to CSEA's Engineering Services Report Drainage and Water Services for further information.

The proposed foul and surface water network will be designed in accordance with the Uisce Éireann Code of Practice for Wastewater.

RECEIVED: 18/07/2023

19.5.2.4 Water Supply

A pre-connection enquiry (PCE) form was submitted to Uisce Éireann which addressed water and wastewater demand for the development. A response to the Pre-Connection Enquiry is awaited. There is an existing 150mmø water main located in the site which spurs from Celbridge Road. Uisce Éireann are proposing updates to the network which will serve the development. It is proposed to connect a 150mmø watermain to this existing line within the Celbridge Road to provide connections from the 150mmø incoming water supply main to the admin area of the data centre buildings, the water treatment plant room, the sprinkler storage tanks, the substation, and the Deep Technology Buildings.

The Data Centres will require an annual water demand of 6097.5m3 resulting from the peak summer months only. This water will be stored on-site such that no water is required from Uisce Éireann during the peak summer months. In order to facilitate the tanks, the development will be required to fill up these tanks during the colder/winter periods at a very slow rate. It is proposed to fill up these tanks over a two-week period during the colder/winter periods in an attempt to reduce the water demand of Uisce Éireann network during the summer months.

19.6 Air

19.6.1 Construction Phase - Air Quality

The objective of dust control at the site is to ensure that no significant nuisance occurs at nearby sensitive receptors. In order to develop a workable and transparent dust control strategy, the following management plan has been formulated by drawing on best practice guidance from Ireland, the UK and the USA based on the following publications:

- 'Guidance on the Assessment of Dust from Demolition and Construction' (IAQM, 2014);
- 'Planning Advice Note PAN50 Annex B: Controlling The Environmental Effects Of Surface Mineral Workings Annex B: The Control of Dust at Surface Mineral Workings' (The Scottish Office, 1996);
- 'Controlling the Environmental Effects of Recycled and Secondary Aggregates Production Good Practice Guidance' (UK Office of Deputy Prime Minister, 2002);
- 'Controlling Particles, Vapours & Noise Pollution From Construction Sites' (BRE, 2003);
- 'Fugitive Dust Technical Information Document for the Best Available Control Measures' (USEPA, 1997); and
- 'Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition' (periodically updated) (USEPA, 1986).

19.6.1.1 Site Management

The aim is to ensure good site management by avoiding dust becoming airborne at source. This will be done through good design and effective control strategies.

At the construction planning stage, the siting of activities and storage piles will take note of the location of sensitive receptors and prevailing wind directions in order to minimise the potential for significant dust nuisance (see Figure 9.1 for the windrose for Casement

RECEIVED: 18/07/2023

Aerodrome). As the prevailing wind is predominantly westerly to south-westerly, locating construction compounds and storage piles downwind (to the east or north-east) of sensitive receptors will minimise the potential for dust nuisance to occur at sensitive receptors.

Good site management will include the ability to respond to adverse weather conditions by either restricting operations on-site or quickly implementing effective control measures before the potential for nuisance occurs. When rainfall is greater than 0.2mm/day, dust generation is generally suppressed (UK Office of Deputy Prime Minister (2002), BRE (2003)). The potential for significant dust generation is also reliant on threshold wind speeds of greater than 10 m/s (19.4 knots) (at 7m above ground) to release loose material from storage piles and other exposed materials (USEPA, 1986). Particular care should be taken during periods of high winds (gales) as these are periods where the potential for significant dust emissions are highest. The prevailing meteorological conditions in the vicinity of the site are favourable in general for the suppression of dust for a significant period of the year. Nevertheless, there will be infrequent periods where care will be needed to ensure that dust nuisance does not occur. The following measures shall be taken in order to avoid dust nuisance occurring under unfavourable meteorological conditions:

- The Principal Contractor or equivalent will monitor the contractors' performance to ensure that the proposed mitigation measures are implemented, and that dust impacts and nuisance are minimised;

- During working hours, dust control methods will be monitored as appropriate, depending on the prevailing meteorological conditions;

- The name and contact details of a person to contact regarding air quality and dust issues shall be displayed on the site boundary, this notice board will also include head/regional office contact details;

- Community engagement shall be undertaken before works commence on site explaining the nature and duration of the works to local residents and businesses;

- A complaints register will be kept on site detailing all telephone calls and letters of complaint received in connection with dust nuisance or air quality concerns, together with details of any remedial actions carried out;

- It is the responsibility of the contractor at all times to demonstrate full compliance with the dust control conditions herein;

- The procedures put in place will be reviewed at regular intervals and monitoring conducted and recorded by the principal contractor. It is recommended that reviews are conducted on a monthly basis as a minimum.

The dust minimisation measures shall be reviewed at regular intervals during the works to ensure the effectiveness of the procedures in place and to maintain the goal of minimisation of dust through the use of best practice and procedures. In the event of dust nuisance occurring outside the site boundary, site activities will be reviewed and satisfactory procedures implemented to rectify the problem. Specific dust control measures to be employed are described below.

RECEIVED: 18/07/2023

19.6.1.2 Site Roads / Haulage Routes

Movement of construction trucks along site roads (particularly unpaved roads) can be a significant source of fugitive dust if control measures are not in place. The most effective means of suppressing dust emissions from unpaved roads is to apply speed restrictions. Studies show that these measures can have a control efficiency ranging from 25 to 80% (UK Office of Deputy Prime Minister, 2002).

- A speed restriction of 20 km/hr will be applied as an effective control measure for dust for on-site vehicles using unpaved site roads;
- Access gates to the site shall be located at least 10m from sensitive receptors where possible;
- Bowsers or suitable watering equipment will be available during periods of dry weather throughout the construction period. Research has found that watering can reduce dust emissions by 50% (USEPA, 1997). Watering shall be conducted during sustained dry periods to ensure that unpaved areas are kept moist. The required application frequency will vary according to soil type, weather conditions and vehicular use; and
- Any hard surface roads will be swept to remove mud and aggregate materials from their surface while any unsurfaced roads shall be restricted to essential site traffic only.

19.6.1.3 Land Clearing / Earth Moving

Land clearing / earth-moving works during periods of high winds and dry weather conditions can be a significant source of dust.

- During dry and windy periods, and when there is a likelihood of dust nuisance, watering shall be conducted to ensure moisture content of materials being moved is high enough to increase the stability of the soil and thus suppress dust; and
- During periods of very high winds (gales), activities likely to generate significant dust emissions shall be postponed until the gale has subsided.

19.6.1.4 Storage Piles

The location and moisture content of storage piles are important factors which determine their potential for dust emissions;

- Overburden material will be protected from exposure to wind by storing the material in sheltered regions of the site. Where possible storage piles should be located downwind of sensitive receptors;
- Regular watering will take place to ensure the moisture content is high enough to increase the stability of the soil and thus suppress dust. The regular watering of stockpiles has been found to have an 80% control efficiency (UK Office of Deputy Prime Minister, 2002); and

RECEIVED: 18/07/2023

- Where feasible, hoarding will be erected around site boundaries to reduce visual impact. This will also have an added benefit of preventing larger particles from impacting on nearby sensitive receptors.

19.6.1.5 Site Traffic on Public Roads

Spillage and blow-off of debris, aggregates and fine material onto public roads will be reduced to a minimum by employing the following measures:

- Vehicles delivering or collecting material with potential for dust emissions shall be enclosed or covered with tarpaulin at all times to restrict the escape of dust;

- At the main site traffic exits, a wheel wash facility shall be installed. All trucks leaving the site must pass through the wheel wash. In addition, public roads outside the site shall be regularly inspected for cleanliness, as a minimum on a daily basis, and cleaned as necessary.

19.6.1.6 Summary of Dust Mitigation Measures

The pro-active control of fugitive dust will ensure that the prevention of significant emissions, rather than an inefficient attempt to control them once they have been released, will contribute towards the satisfactory performance of the contractor. The key features with respect to control of dust will be:

- The specification of a site policy on dust and the identification of the site management responsibilities for dust issues;

- The development of a documented system for managing site practices with regard to dust control;

- The development of a means by which the performance of the dust minimisation plan can be regularly monitored and assessed; and

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

19.6.2 Operational Phase

The stack heights of the CTGs at 15m above local ground level and back-up generators at a stack height of 18m above local ground level have been designed in an iterative fashion to ensure that an adequate height was selected to aid dispersion of the emissions and achieve compliance with the EU ambient air quality standards at all off-site locations (including background concentrations). No additional mitigation measures are proposed for the operational phase of the development.

A green wall will be installed within the campus which will trap 838.5kg of dust and produce 11.0kg of oxygen every year.

RECEIVED: 18/07/2023

19.7 Climate

19.7.1 Construction Phase

The objective of the mitigation measures outlined below is to ensure that GHG emissions are minimized wherever possible during the demolition and construction phase of the proposed development. The measures will include:

- All vehicles will be required to switch off engines when stationary (no idling);
- All vehicles will be serviced and maintained to ensure emissions are minimised;
- Embodied carbon will be investigated at detailed design stage;
- Where practicable, materials will be reused within the extent of the Proposed Development; and
- Where practicable, materials will be sourced locally to reduce the embodied emissions associated with transport.

19.7.2 Operational Phase

The CTGs and diesel generators will be regularly serviced to ensure that they operate to their maximum efficiency whilst the fuel used to power the back-up generators will be HVO which has a substantially lower GHG footprint than diesel. Further mitigation measures which will reduce GHG emissions, as outlined in Section 2.7 of the EIAR include:

- Passive Solar Design to minimise solar gain to reduce cooling energy requirements,
- The building fabric of the new development will be designed and constructed to limit heat loss and where appropriate, limit heat gains through the fabric of the building,
- The mechanical HVAC strategy is to minimise energy associated with space conditioning through the use of high efficiency systems, heat recovery and the efficient control of both ventilation rates and of heating and / or cooling supply,
- High Efficiency Electrical Systems including low energy lighting solutions and power factor correction,
- Sustainable Energy Initiatives including waste heat recovery,
- Data Processing Area Electrical Design Elements (transformers, emergency back-up generators, high efficiency external and internal lighting,
- Data Processing Area Mechanical Design Elements (Water demand reduction and rainwater harvesting, data storage room environmental design, use of direct evaporative Air Handling Units (AHUs) and use of an electronic building management system for air handling,
- Offices & ancillary Areas Mechanical & Electrical design elements including high efficiency air conditioning, energy efficient heat recovery units for air ventilation systems, efficient low energy LED lighting and control systems, PV panels, electric vehicle charging infrastructure).

As outlined in Section 2.7 of the EIAR, KIC is committed to a future of carbon neutrality for the entire campus through a range of mechanisms. The developer and data centre end user are committed to continued renewables additionality nationally and investment in new generation, repowering or otherwise increasing in-country renewable energy capacity. In this regard the proposed development will have a Maximum Import Capacity (MIC) of 170MW once fully developed (c.2034/2035). The development will be delivered

RECEIVED: 18/07/2023

in phases over a 10-year period, as such the data centre energy demand will ramp up over a significant period of time. It is proposed to proportionally match the impact of the forecasted energy demand through a mix of renewables on site and CPPA's.

On site commitments include:

- Provision of significant Solar PV installations with c.8,560 panels being proposed across the 4no. data centre buildings and the 2no. Deeptech buildings.
- Use of Hydrotreated Vegetable Oil (HVO) as back-up fuel source for the Energy Centre upon full build out rather than diesel.
- Implement District Heating system, which will use recaptured heat produced from the data centres to provide recycled heat the existing campus buildings being retained as well as the new buildings A1 and A2. Further to this, the district heating system has been designed to provide export heat to surrounding community uses.

The applicant and future data centre end user will commit to entering into arrangements which are capable of underpinning new renewable energy generation calculated to offset the energy consumed by the proposed development from the electricity grid. It is proposed that these arrangements would ramp up overtime in line with the operation of the data centre use and would be secured in the in the form of CPPAs between the applicant's group and the data centre end user and provide for the establishment of new renewable energy generation projects by the applicant's group or data centre end user which demonstrates that the energy consumed by the data centre development on site is offset with renewable energy generation. The agreements shall confirm:

- That the new renewable will not be supported by government or consumer subsidies,
- The new renewable projects will be located in Ireland,
- The new renewable energy projects will be provided by the owners of the Kildare Innovation Campus or the data centre end user,
- The new renewable energy generation shall relate to energy that is not being generated as the date of which the proposal is permitted.

Kildare Innovation Campus will commit to similar CPPA's for the supply of as much renewable gas as is available in the market (i.e. biomethane as is available in the market, via CPPAs) to meet the required demand. In addition, it is anticipated that contracted renewable gas supplies for the proposed development would ultimately be inserted into / transported via GNI's network.

Furthermore, as the Proposed Development is over 20 MW thermal input, a greenhouse gas emission permit will be required for the facility which will be regulated under the EU-wide Emission Trading System (ETS) which necessitates operating under a "cap and trade" scheme. Thus, the proposed development will operate under a system where carbon emissions will become increasingly costly and will encourage the least-cost pathway to GHG emission reductions.

In addition, as outlined in the Regulation (EU) 2018/842, any new electricity provider (including the Proposed Development) will be treated as a "new entrant" under Phase IV of the ETS (i.e. an electricity generator or site obtaining a GHG emissions permit for the first time after 30th June 2018). The new electricity provider will be required to purchase allocations in the same manner as existing players in the market using the European Energy Exchange. EU leaders have also decided that during Phase IV (2021-2030) 90% of the

RECEIVED: 18/01/2023

revenue from the auctions will be allocated to the Member States on the basis of their share of verified emissions with 10% allocated to the least wealthy EU member states. The revised EU ETS Directive has enshrined in law the requirement that at least 50% of the auctioning revenues or the equivalent in financial value should be used for climate and energy related purposes. Any fossil-fuel related GHG emissions related, directly or indirectly, to energy generation for the proposed development will be continue to be controlled, increasingly stringently, by the ETS which is the subject of Directive 2003/87/EC (as amended). On an EU-wide basis, where the ETS market in 2021 was approximately 1,307 million tonnes CO2eq and is scheduled to reduce to 691 million tonnes CO2eq by 2030, the impact of the emissions associated with the Proposed Development will be no more than 0.090% of the total EU-wide ETS market in 2030 which is imperceptible.

In reference to Principle 2 of IEMA Guidance (IEMA, 2022), and as outlined above, an extensive range of mitigation measures will be employed which are in line with "best practice" as outlined in the IEMA guidance (IEMA, 2022) including the installation of Solar PV panels, waste heat recovery and passive solar design. Additionally, 2 no. district heating pump house areas and inground piping for district heating system will be installed.

In reference to Principle 3 of IEMA Guidance (IEMA, 2022), it is the intention of the applicant that measures will be implemented in line with "best practice" as outlined in the IEMA guidance (IEMA, 2022). The data centre end user and the developer group are committed to Ireland's 2023 Climate Action Plan to meet 80% of electricity demand from renewable sources by 2030. As noted above, the applicant intends to undertake a Corporate Power Purchase Agreement which will offtake 100% of the power from renewable projects.

19.8 Noise & Vibration

19.8.1 Construction Phase

With regard to construction activities, best practice control measures for noise and vibration from construction sites are found within BS 5228-1. Whist construction noise and vibration impacts are expected to vary during the construction phase depending on the distance between the activities and noise sensitive buildings, the contractor will ensure that all best practice noise and vibration control methods will be used, as necessary in order to ensure impacts at off-site noise sensitive locations are minimised. The best practice measures set out in BS 5228-1 and BS 5228-2 include guidance on several aspects of construction site mitigation measures, including, but not limited to:

- selection of quiet plant;
- noise control at source;
- screening;
- hours of work, and;
- liaison with the public.

Detailed comment is offered on these items in the following paragraphs. Noise control measures that will be considered include the selection of quiet plant, enclosures and screens around noise sources, limiting the hours of work and noise and vibration monitoring, where required.

RECEIVED 18/07/2023

19.8.1.1 Selection of Quiet Plant

The potential for any item of plant to generate noise will be assessed prior to the item being brought onto the site. The least noisy item will be selected wherever possible. If a particular item of plant already on the site is found to generate high noise levels, the first action will be to identify whether said item can be replaced with a quieter alternative.

19.8.1.2 Noise Control at Source

If replacing a noisy item of plant is not a viable or practical option, options to noise control "at source" will be implemented. This refers to the modification of an item of plant or the application of improved sound reduction methods in consultation with the supplier. For example, resonance effects in panel work or cover plates can be reduced through stiffening or application of damping compounds; rattling and grinding noises can often be controlled by fixing resilient materials in between the surfaces in contact. Referring to the potential noise generating sources for the works under consideration, the following best practice migration measures should be implemented as needed:

- The lifting of bulky items, dropping and loading of materials will be restricted to normal working hours.
- Mobile plant should be switched off when not in use and not left idling.
- For piling plant, noise reduction can be achieved by enclosing the driving system in an acoustic shroud.
- For concrete mixers, control measures will be employed during cleaning to ensure no impulsive hammering is undertaken at the mixer drum.
- For all materials handling ensure that materials are not dropped from excessive heights, lining drops chutes and dump trucks with resilient materials.
- Demountable enclosures can also be used to screen operatives using hand tools and will be moved around site as necessary.
- All items of plant will be subject to regular maintenance. Such maintenance can prevent unnecessary increases in plant noise and can serve to prolong the effectiveness of noise control measures.

19.8.1.3 Screening

Screening is an effective method of reducing the noise level at a receiver location and can be used successfully as an additional measure to all other forms of noise control. Where required, the use of temporary hoarding or mobile screens will be used to aid in reducing noise levels from potential high levels of construction activity. The use of screening is recommended when works are occurring in proximity to noise sensitive dwellings, equine holdings, or high amenity areas during high noise activities. This can be undertaken using standard site hoarding or using mobile / demountable screens around noisy items of plant or works. Standard 2.4m hoarding will be provided on boundaries opposite sensitive residential receptors; in this instance at the boundary with the NSL08a and NSL08b, these being the Montessori and the Rugby Club school.

RECEIVED: 19/07/2023

19.8.1.4 Liaison with the Public

A designated environmental liaison officer will be appointed to site during construction works. Any noise complaints will be logged and followed up in a prompt fashion by the liaison officer. In addition, where a particularly noisy construction activity is planned or other works with the potential to generate high levels of noise, or where noisy works are expected to operate outside of normal working hours etc., the liaison officer will inform the nearest noise sensitive locations of the time and expected duration of the noisy works.
Project Programme

The phasing programme will be arranged so as to control the amount of disturbance in noise and vibration sensitive areas at times that are considered of greatest sensitivity. While high noise generating works are in progress on a site at the same time as other works of construction that themselves may generate significant noise and vibration, the working programme will be phased so as to prevent unacceptable disturbance at any time.
Hours of Works

Construction works will be undertaken within the times below, taken from the Construction Environmental Management Plan:

- Monday to Friday: 07:00 to 18:00hrs
- Saturday: 08:00 to 13:00hrs
- Sunday and Public Holidays No noisy work on site.

However, it may be necessary for some construction operations to be undertaken outside these times, for example, to facilitate connections to public service systems or utilities. Such works will be agreed in advance with the local authority.

19.8.2 Operational Phase

19.8.2.1 Fixed Plant at Data Centres and Energy Centre

The mitigation measures in respect of building service are as summarised here and are included in the design of the proposed development:

- Adherence to the maximum sound power levels for each item, as presented in Appendix 11.3;
- A 14 m high acoustic barrier around the energy centre, with an acoustically absorptive inner face;
- At the data centre buildings, screens around Extract Fan areas to a height of 7 m, with an acoustically absorptive inner face;
- Reverberation Time of no more than 1 s in DAHU hall, north and south, by way of application of acoustically absorptive material to ceiling;
- Acoustic treatment to include the ceiling of the plenum area over electrical room;
- DAHU hall louvres on north facades (in combination with the additional acoustic treatments inside the louvre) to achieve minimum sound reduction index values as in Table 11.20 and;
- Tonal components and low-frequency components to be avoided at NSLs.

RECEIVED: 28/07/2023

Element	Sound Reduction Index, dB at Octave Band Centre Frequency, Hz.							
	63	125	250	500	1000	2000	4000	8000
DAHU Louvre (B Buildings)	4	5	8	9	12	9	7	6
DAHU Louvre (C Buildings)	4	5	5	5	5	5	5	5

Table 11.20 Louvre Sound Reduction Index (SRI)

The effects of these mitigation measures are included in the figures presented earlier in Section 11.5.2.1.

19.8.2.2 Additional Vehicular Traffic on Public Roads

During the operational phase of the development, noise mitigation measures with respect to the (outward) impact of traffic from the development are not deemed necessary.

19.9 Waste

This section outlines the measures that will be employed in order to reduce the amount of waste produced, manage the wastes generated responsibly and handle the waste in such a manner as to minimise the effects on the environment.

The concept of the 'waste hierarchy' is employed when considering all mitigation measures. The waste hierarchy states that the preferred option for waste management is prevention and minimisation of waste, followed by preparing for reuse and recycling / recovery, energy recovery (i.e. incineration) and, least favoured of all, disposal.

19.9.1 Construction Phase

As previously stated, a project specific RWMP has been prepared in line with the requirements of the requirements of The EPA, Best Practice Guidelines for the Preparation of Resource and Waste Management Plans for Construction & Demolition Projects' (2021) and is included as Appendix 12.1. The mitigation measures outlined in the RWMP will be implemented in full and form part of the mitigation strategy for the site. The mitigation measures presented in this RWMP will ensure effective waste management and minimisation, reuse, recycling, recovery and disposal of waste material generated during the excavation and construction phases of the proposed development.

- Prior to commencement, the appointed Contractor(s) will be required to refine / update the RWMP (Appendix 12.1) in agreement with KCC and in compliance with any planning conditions, or submit an addendum to the RWMP to KCC, detailing specific measures to minimise waste generation and resource consumption, and provide details of the proposed waste contractors and destinations of each waste stream.

- The Contractor will implement the RWMP throughout the duration of the proposed excavation and construction phases.

RECEIVED: 18/07/2023

A quantity of topsoil and sub soil will need to be excavated to facilitate the proposed development. The project engineers have estimated that c.250,634m3 of material from site preparation / levelling will need to be removed off-site. Correct classification and segregation of the excavated material is required to ensure that any potentially contaminated materials are identified and handled in a way that will not impact negatively on workers as well as on water and soil environments, both on and off-site.

In addition, the following mitigation measures will be implemented:

- Building materials will be chosen to 'design out waste';
- On-site segregation of waste materials will be carried out to increase opportunities for off-site reuse, recycling and recovery. The following waste types, at a minimum, will be segregated:
    - Concrete rubble (including ceramics, tiles and bricks);
    - Plasterboard;
    - Metals;
    - Glass; and
    - Timber.

- Left over materials (e.g. timber off-cuts, broken concrete blocks / bricks) and any suitable construction materials shall be re-used on-site, where possible; (alternatively, the waste will be sorted for recycling, recovery or disposal);
- All waste materials will be stored in skips or other suitable receptacles in designated areas of the site;
- Any hazardous wastes generated (such as chemicals, solvents, glues, fuels, oils) will also be segregated and will be stored in appropriate receptacles (in suitably bunded areas, where required);
- A Resource Manager will be appointed by the main Contractor(s) to ensure effective management of waste during the excavation and construction works;
- All construction staff will be provided with training regarding the waste management procedures;
- All waste leaving site will be reused, recycled or recovered, where possible, to avoid material designated for disposal;
- All waste leaving the site will be transported by suitably permitted contractors and taken to suitably registered, permitted or licenced facilities; and
- All waste leaving the site will be recorded and copies of relevant documentation maintained.
- Nearby sites requiring clean fill material will be contacted to investigate reuse opportunities for clean and inert material, if required. If any of the material is to be reused on another site as by-product (and not as a waste), this will be done in accordance with Regulation 27 of the EC (Waste Directive) Regulations (2011-2020). EPA approval will be obtained prior to moving material as a by-product.

These mitigation measures will ensure that the waste arising from the construction phase of the proposed development is dealt with in compliance with the provisions of the Waste Management Act 1996, as amended, associated Regulations and the Litter Pollution Act 1997, and the EMR Waste Management Plan 2015 – 2021. It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved and will promote more sustainable consumption of resources.

RECEIVED: 18/07/2023

19.9.2 Operational Phase

The following mitigation measures will be implemented during the operational phase of the proposed development:

- All waste materials will be segregated into appropriate categories and will be temporarily stored in appropriate bins, skips or other suitable receptacles in a designated, easily accessible areas of the site.
- The Operator / Buildings Manager of the Site during the operational phase will be responsible for ensuring – allocating personnel and resources, as needed – for the production, updating and implementation of an Operational Waste Management Strategy, ensuring a high level of recycling, reuse and recovery at the Site of the proposed Development.
- The Operator / Buildings Manager will regularly audit the onsite waste storage facilities and infrastructure, and maintain a full paper trail of waste documentation for all waste movements from the site.
- The following mitigation measures will be implemented:
- The Operator will ensure on-site segregation of all waste materials into appropriate categories, including (but not limited to):
- Packaging Waste
- General Non-Hazardous Waste
- Mixed Dry Recycling
- General Non-Hazardous Waste
- Organic
- Glass
- Non-Haz and Haz WEEE
- Landscaping waste
- Lightbulbs
- Waste Oil
- (Wet) Batteries
- (Dry) Batteries.

- The Operator will ensure that all waste materials will be stored in colour coded bins or other suitable receptacles in designated, easily accessible locations. Bins will be clearly identified with the approved waste type to ensure there is no cross contamination of waste materials;
- The Operator will ensure that all waste collected from the Site of the proposed development will be reused, recycled or recovered, where possible, with the exception of those waste streams where appropriate facilities are currently not available; and
- The Operator will ensure that all waste leaving the Site will be transported by suitable permitted contractors and taken to suitably registered, permitted or licensed facilities.

These mitigation measures will ensure the waste arising from the proposed project is dealt with in compliance with the provisions of the *Waste Management Act 1996*, as amended, associated Regulations, the *Litter Pollution Act 1997*, the *EMR Waste Management Plan (2015 - 2021)* and the KCC waste bye-laws. It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved.

RECEIVED: 18/07/2023

19.10 Traffic and Transportation

19.10.1 Incorporated Design Mitigation

There are measures which have been included from the outset in the design of the development to reduce any potential negative effects on the local transport network arising from additional traffic generated by the development.

The most significant measure is the provision of pedestrian and cycle infrastructure across the M4 and linking to surrounding cycle routes.

19.10.2 Construction Phase

This assessment concludes that the proposed development will not have a significant effect on the local road network during the construction phase. Notwithstanding this, a Construction Traffic Management Plan has been prepared as a 'best practice' measure which identifies measures that aim to minimise the effect of construction traffic on the surrounding road network with respect to potential temporary changes to vehicular traffic and pedestrian movements. The CTMP measures include the following:

- Construction Staff will be encouraged to arrive before 07:30 and leave after 18:00 (i.e. avoiding network peak periods);
- Appropriate level of cycle and vehicle parking on site for staff, with staff encouraged to travel by sustainable means;
- Parking provided to prevent overspill onto surrounding network;
- Appointment of Construction Site Manager/Community Liaison Officer by the Principal Contractor to manage the implementation of the CTMP and act as the main point of contact for staff, contractors, KCC and general public;
- Construction staff Travel Plan to be developed by appointed Contractor;
- Sufficient cycle parking, storage and drying areas will be provided on site to meet the needs of all construction staff;
- KCC agreed haulage routes along designated HGV routes;
- Minimising HGV deliveries during the peak hours (generally 08:00-09:00 and 17:00-18:00);
- On-site wheel wash facilities;
- HGVs carrying soil to be fully sheeted;
- HGVs inspected for dirt and mud before exiting onto public road network;
- Road cleaning and sweeping along sections of roads adjacent to the site;
- Construction signage at all entrances and exits;
- Control and timing of deliveries where possible;
- Entrances and exits manned during deliveries.

A more detailed and comprehensive CTMP will be produced by the contractor for specific phases of the development construction post-planning consent.

CTMPs will be prepared prior to commencement of all associated facilitation works. These will be reviewed and agreed to KCC.

RECEIVED: 18/07/2023

19.10.3 Operational Phase

The site specific Mobility Management Plan, prepared by SYSTRA Ltd ,the improved access for pedestrian and cyclists, including the provision of new M4 overpass, and the provision of EV charging hub are the key operational mitigation measures.

The aim of the Mobility Management Plan is to further reduce the proportion of car trips, from an already low baseline, by promoting sustainable travel by future residents of the development. These mobility measures will also support and enable those residents who may be living 'car-free' providing them with a range of sustainable mobility options and negating the need to own a car.

The measures in the Mobility Management Plan comprise1:

- Appointment of Mobility Manger (by the campus management company) who will market and promote the Mobility Management Plan to residents of the site, and monitor the progress of the Mobility Management Plan;
- A Welcome Travel Pack will be provided to occupants with details of local transport network, maps of local amenities, detail of on-site facilities, incentives for sustainable travel use;
- Marketing and Travel information and Personalised Travel Planning will be provided by Mobility Manager to inform occupants and visitors of the sustainable travel options available, this will include for business travel and commuting;
- Walking and Cycling Challenges and promotion events.

Refer to the Mobility Management Plan prepared by SYSTRA Ltd and submitted with the application for further detail.

19.11 Material Assets: Site Services & Energy Demand

19.11.1 Construction Phase

Construction of the proposed development will require connections to water supply and drainage infrastructure, power, and telecommunications. Ongoing consultation with Gas Networks Ireland, KCC, Uisce Éireann , EirGrid and ESB Networks and other relevant service providers within the locality and compliance with any requirements or guidelines they may have will ensure a smooth without disruption to local and business community. The works contractor will be obliged to put best practice measures in place to ensure that there are no interruptions to utilities considered above, unless this has been agreed in advance.

19.11.1.1 Electricity Supply

The power demand for the construction phase will be relatively minor and the connection works are entirely within proposed site boundaries, so it is not anticipated that this would have any significant potential offsite impact. As such, no remedial or mitigation measures are required in relation to power supply for the construction phase.

RECEIVED: 18/09/2023

19.11.1.2 Surface Water

During the construction phase, any surface water run-off collecting in excavations or from exposed soil will likely contain a high sediment load. This will be diverted for appropriate settlement and will not be allowed to directly discharge directly to the existing ditches on site. Measure for protection of receiving waters are outlined in the CEMP provided with planning.

19.11.1.3 Foul Drainage

Portable toilets will be provided for construction staff and a temporary connection will be established for each phase of development. Foul drainage for the proposed development will be in accordance with the Building Regulations Technical Guidance Document H for design and construction. Strict quality control measures will be undertaken while laying pipes to minimise or eradicate infiltration and ex-filtration.

19.11.1.4 Water Supply

A connection will be put in place for the construction of the proposed development. The works contractor will be obliged to put best practice measures in place to ensure that there are no interruptions to the water supply, unless this has been agreed in advance. Strict quality control measures will be undertaken while laying pipes to minimise or eradicate infiltration and ex-filtration.

19.11.2 Operational Phase

19.11.2.1 Surface Water

The stormwater system has been designed to collect rainwater runoff from the impermeable areas of the site, roofs and road/car park and directed to an appropriate SuDS and attenuation system. The allowable greenfield runoff rate has been established by the project engineers, using the methodology set out in the Engineering Services Report.

Three different types of pollution control elements will be implemented as part of surface water infrastructure in the development as following:

A. It is proposed to provide a Class 1 full retention separators (Klargestor Model No. NSFA015 or equivalent) downstream of any used in high-risk spillage areas in accordance with Section 20 of the Greater Dublin Regional Code of Practice. The full retention separator is designed to treat the full design flow that can be delivered in the drainage system, which is normally equivalent to the flow generated by a rainfall intensity of 50mm/hour. This is provided in the vicinity of the existing loading dock area.
B. An existing bypass petrol interceptor is located upstream of the outfall from the site, and it is proposed to retain this interceptor. Furthermore, this is a requirement for car parking areas with 10 spaces or more as outlined in Section 20.1 of the Greater Dublin Regional Code of Practice.
C. There is potential for surface water to accumulate in the exhaust stacks which serve the generators. Gullies which serve the exhaust stacks will discharge to a dedicated surface water drainage pipe which will be connected to a Class 1 full retention

separator. Two full retention interceptors will be required, per data centre building, to serve the exhaust stacks. Details of the full retention separator proposed are provided in the supporting layouts.

RECEIVED: 18/07/2023

The design of the surface water system has incorporated attenuation within the design to ensure that there is no potential for off site flooding as a result to the proposed increase in hardstanding area. If this was not included in the design of the campus there could be potential impact in off site flooding as storm water flows would not be attenuated on site and may result in overflows to the existing retention ponds on site in excess of the existing capacity.

19.11.2.2 Foul Drainage and Water Supply

The overall wastewater discharge associated with the proposed development has previously been agreed with Uisce Éireann by letter dated 12 July 2022 confirming that there are no upgrades required to the network by Uisce Éireann. The wastewater discharge rate agreed with Uisce Éireann is in accordance with the discharge rates outlined in the PCE (ref CDS23003038) submitted to Uisce Éireann for the Proposed Development. No mitigation measures are required in relation to foul drainage infrastructure.

Water storage tanks are to be provided as part of the proposed development; pumps will supply water to the proposed A buildings for irrigation use and the B and C buildings for cooling requirements. The storage tanks will be used for rainwater harvesting and will be topped up by mains supply during off-peak months to reduce overall demand on public mains supply. A pre-connection enquiry (PCE) form was submitted to Uisce Éireann which addressed water and wastewater demand for the development. A response to the final Pre-Connection Enquiry is awaited. Any required local enhancement of the network will be required to be undertaken prior to operation commencing.

19.11.2.3 Power Supply

A connection agreement to supply phase 1 (16MW) of the proposed development is in place with Eirgrid. Phase 1 of the power requirement is accounted for as it is existing power supplied to the campus. to accommodate the full build out of the KIC Masterplan and maximise the new 110kV substation capabilities future uprating/line replacements of the existing overhead lines into the site will be required. TNEI & H&MV on behalf of the developer has undertaken an analysis of the required uprating / line replacements to increase the overall power supply to the campus (Refer to Network Demand Capability Analysis by TNEI & H&MV). The analysis concludes that four total uprates and a 150 MVA STATCOM (on-site), is required to accommodate a connection mode of 170MW. The uprates relate to the Overhead Lines (OHLs) between Maynooth – Rinawade, Dunfirth tee – Kinnegad – Rinawade, Derryiron – Maynooth and Derryiron – Kinnegad. With the identified uprates a capacity of 170 MW is possible with no thermal overloads or voltage violations being detected. The overhead lines to be uprated are identified in Chapter 2. The uprates outlined do not form part of the application for which consent is sought. Further engagement with Eirgrid will occur following grant of permission for the proposed development.

As detailed in Chapter 2 (Description of the Project) and the Sustainability and Energy Statement by Ethos, a number of sustainability measures have been incorporated into the design of the proposed development including an installation of an array of photovoltaic

RECEIVED: 18/07/2023

panels on the roofs of Buildings A1, A2, B1, C1, C2 and C3. The photovoltaic (PV) array will consist of 8,560 modules yielding a total yielding a total peak power generated of 2859.19kWp to offset the lighting and IT electrical power requirements during the peak summer months for the administration section of the buildings. The installation significantly exceeds that required for code compliance under NZEB.

The Sustainability and Energy Statement also describes how the proposed waste heat system included with the application for development can be utilised to provide waste heat to adjoining community uses as well as potentially a wider future district heating system developed by KCC or others in the future.

19.11.2.4 Gas Supply

To supply the energy centre with natural gas a local upgrade to the network will be required as outlined in Chapter 2. The upgrade will ensure that there is no negative effect to gas supply within the area as a result of the proposal.

Operation of the energy centre will be undertaken in compliance with Gas Networks Ireland (GNI) and EirGrid requirements. The CTGs will be capable of running on biofuel and hydrogen once supply is available in the future (and HVO in the event of interruption to the gas supply to the site). Energy reduction measures have been undertaken throughout the design and are described in the Energy and Sustainability report (Ethos 2022) provided with planning.

19.12 Cultural Heritage incl. Archaeology

Mitigation measures are required to be undertaken in compliance with national policy guidelines and statutory provisions for the protection of archaeology and cultural heritage and in accordance with Codes of Practice agreed between the Minster (Department of Housing, Local Government and Heritage) and relevant State infrastructure providers. Mitigation methodologies shall be agreed in advance with the National Monuments Service (Department of Housing, Local Government and Heritage) and the National Museum of Ireland in accordance with archaeological licensing requirements. Archaeological mitigation will ensure the full recognition of, and proper excavation and recording of archaeological features, deposits and objects in the event any material remains are exposed in consequence of development. In respect of the KIC lands, mitigation shall apply to greenfield that has not been subject to previous archaeological mitigation; these areas are shown on Figure 15.7.

19.12.1 Construction Phase

19.12.1.1 Principal Works

To mitigate the inherent potential of greenfield at the KIC lands that have not been subject to prior archaeological mitigation as part of the Hewlett Packard Campus development, and in keeping with best archaeological practice, an archaeological geophysical survey shall be carried out in undeveloped greenfield pre-construction. Geophysical survey, which is a non-invasive investigative technique, allows for the early identification and further investigation of potential sub-surface archaeology. The survey, for example, would identify if any structural or other material remains associated with the former Parsonstown (re-

RECEIVED: 18/01/2024

named Barn Hall) residence are present at the site. The early identification and investigation of any archaeology will minimise any construction delays that may otherwise occur in the event of an archaeological discovery. Geophysical survey shall be carried out under licence from the National Monuments Service and the National Museum of Ireland.

Geophysical survey shall be followed by a programme of pre-construction archaeological test-excavation. Test-excavation involves the machine excavation of linear test trenches using a flat bladed bucket to the depth of either undisturbed natural subsoil or to the upper horizons of archaeological features or deposits (where present). Test-excavation will take place at locations chosen by a suitably qualified archaeologist, taking account of the results of the geophysical survey, and targeting any anomaly of potential archaeological origin. The chosen test trench array shall also target surviving hedgerow representing townland boundary alignments at the site. The aim of test-excavation is to identify the nature, depth, extent and significance of any archaeological remains. In the event of the discovery of archaeological features or deposits, the remains will be cleaned, recorded, photographed and left *in-situ* until a decision on any future mitigation is approved by the National Monuments Service and the National Museum of Ireland. Test-excavation shall be carried out under licence from the National Monuments Service and the National Museum of Ireland.

A requirement for construction phase groundworks monitoring at the KIC lands shall be subject to the outcome of the geophysical survey and test-excavation. In the event of archaeological monitoring, this work shall be carried out under licence from the National Monuments Service and the National Museum of Ireland.

With respect to Built Heritage, during the construction stage, there will be temporary fencing, hordings, temporary services, and creation of dust and noise during the actual construction activities. These impacts will be temporary, and will be a short term annoyance to residents of nearby houses and workers in nearby offices and workplaces.

During the construction phase, all existing trees that currently form the grand allee of the Protected View Corridor, will be protected by site fencing, to prevent damage from construction activities, and damage to the ground by compaction and damage to roots.

19.12.1.2 Facilitation Works

The Codes of Practice agreed between the Minister (Department of Housing, Local Government and Heritage) and the State infrastructure providers implementing the required facilitation works will be implemented, and the mitigation strategy for the facilitation works determined as part of this process. EirGrid will also carry out uprating requirements as per the Cultural Heritage Guidelines for Electricity Transmission Projects (2015). As per the guidelines (pg. 81) “Any works (including access tracks) that are located in a sensitive cultural heritage zone, or in proximity to a cultural heritage asset, will require monitoring by a suitably qualified archaeologist and consultation with the relevant authorities”.

Any consents required for the GNI Gas Upgrade and EirGrid Uprating will be sought by GNI and EirGrid and required detailed assessment of the consent application will be undertaken at that time.

RECEIVED: 18/07/2023

19.12.2 Operational Phase

No likely impacts on archaeological and cultural heritage are predicted during the operational phase, and subsequently, no mitigation measures are required in relation to archaeology and cultural heritage during the operational phase.

19.13 LVIA

19.13.1 Construction Phase

The proposed mitigation measures have been developed in tandem with the landscape masterplan, as a result of collaboration between the multi-disciplinary design team throughout preliminary stages of this project and comprises of the following avoidance, reduction and remediation measures. The main goals are described below:

19.13.1.1 Avoidance Measures

The site selection process and alternatives considered is set out in Chapter 4 – Key Alternatives Considered.
The main avoidance measures are the retention and protection of the existing mature woodland belts along the site boundaries to the north, south and east. Existing trees to be retained will be protected during the construction stage in accordance with recommendations of the Arboricultural Assessment and the BS 5837: 2012. Prior to commencement of construction, existing trees which are to be retained will be protected by erection of timber post and wire fence according to BS 5837:2012 to ensure no works are carried out under each of their canopies. Unstable trees should be removed under direction of the arborist.

19.13.1.2 Reduction Measures

- The height and scale of the Proposed Development will align with the existing prevailing building format on the site;
- The Proposed Development will be fenced off during the construction phase to reduce the visual impact of the works;
- Vehicles exiting site during the construction stage should be subject to wheel wash facilities or road sweepers shall be used in order to maintain clean roads;
- Any lighting used during the construction process should be kept to a minimum, providing for site safety only and shall be directed into the site and away from adjacent residential properties. Lighting shall be shielded to avoid light spill onto adjacent properties and roads; and
- Disturbance of existing vegetation will be minimised where possible. Proposed planting will help integrating the Proposed Development into the surrounding landscape, provide screening where needed, and minimise the effect on the landscape character of the area.

19.13.1.3 Remediation Measures

- Enhancement of site tree cover by introduction of additional tree and woodland planting;

RECEIVED: 19/07/2023

- Provide a permeable design by creating connections for pedestrians and cyclists through and around the site;
- Landscape works to be carried out as per associated Landscape Masterplan;
- A mix of both native and non-native plant species to be used throughout the scheme;
- Landscape management and maintenance plan to be drawn up and approved up by qualified professional;
- Ensure that ongoing landscape maintenance and debris cleaning is carried out during the operational period within the site; and
- Ensure that ongoing maintenance and replacement of failing or failed plant material.

The review of photomontages allowed for the assessment of how effective the proposed mitigation will be in regard to residual landscape and visual effects arising from the development.

While the site is generally well screened from surrounding receptors and landscape sensitivities, the aim of the proposed landscape mitigation measures is to integrate the Proposed Development into the existing site while also reducing the visual effects on identified receptors within the study area. The landscape mitigation will complement the space by adding new landscape elements helping to integrate the Proposed Development into its existing environs over time. The overarching design intention is to propose a network of connected open spaces to improve pedestrian and cyclist permeability across the site, while also generating a strong sense of place and identity for the upgraded business campus. The protected axial view from Castletown House to The Wonderful Barn has been incorporated into the overall site layout and is emphasised by a newly introduced walking route along the tree lined avenue on the site in addition to the setback of building facades along the viewing corridor. Ecological enhancements such as bird and bat boxes, bug hotels, scrapes along with significant habitat creation from woodland planting to wildflower meadows will ensure the site maintains its biodiversity for local wildlife.

19.14 Major Accidents and Disasters

The proposed development has been designed in line with good industry practice, and, as such, mitigation against the risk of major accidents and/or disasters is embedded through the design and in accordance with planning and legislative requirements.

TOM PHILLIPS ASSOCIATES
PLANNING FOR THE FUTURE

JULY 2023

RECEIVED: 18/07/2023

ENVIRONMENTAL IMPACT ASSESSMENT REPORT VOLUME 3 – NON- TECHNICAL SUMMARY (NTS)

KILDARE INNOVATION CAMPUS AT BARNHALL ROAD, LEIXLIP, COUNTY KILDARE.



PREPARED FOR:

THE DAVY PLATFORM ICAV FOR AND ON BEHALF OF THE LIFFEY SUB-FUND
DAVY HOUSE
49 DAWSON STREET
D02 PY05

PREPARED BY:

TOM PHILLIPS + ASSOCIATES
80 HARCOURT STREET
DUBLIN 2
D02 F449

RECEIVED: 18/07/2023

Table of Contents

1.0 INTRODUCTION 2
2.0 DESCRIPTION OF THE PROJECT 10
3.0 PLANNING AND DEVELOPMENT CONTEXT 12
4.0 EXAMINATION OF ALTERNATIVES 16
5.0 POPULATION AND HUMAN HEALTH 18
6.0 BIODIVERSITY 21
7.0 LAND, SOILS, GEOLOGY & HYDROGEOLOGY 25
8.0 HYDROLOGY 33
9.0 AIR QUALITY 42
10.0 CLIMATE 44
11.0 NOISE & VIBRATION 47
12.0 MATERIAL ASSETS – WASTE MANAGEMENT 48
13.0 MATERIAL ASSETS: TRAFFIC AND TRANSPORTATION 51
14.0 MATERIAL ASSETS: SITE SERVICES 55
15.0 ARCHAEOLOGY AND CULTURAL HERITAGE 59
16.0 LANDSCAPE AND VISUAL IMPACT ASSESSMENT 62
17.0 MAJOR ACCIDENTS AND DISASTERS 68
18.0 INTERACTIONS AND CUMULATIVE EFFECTS 71
19.0 MITIGATION AND MONITORING 75

1.0 INTRODUCTION

RECEIVED: 18/07/2023

This is the Non-Technical Summary (NTS) of an Environmental Impact Assessment Report (EIAR) that accompanies a planning application for the development of an integrated masterplan proposal that includes for the phased expansion of the existing campus, allowing for a mix of Deep Tech, ICT and Innovation uses. The proposed development, the subject of the planning application, will include for the demolition of some of the existing buildings on site and construction of new buildings, an energy centre and replacement substation, significant public infrastructure including a new signalised intersection on Celbridge Road (R404), a new Public Link Road through the campus (between Barnhall Road and the new signalised intersection), a pedestrian/cycle overpass of the M4, pedestrian and cycle links through the site and along the designated protected view corridor, and supporting infrastructure. The project to which this EIAR relates also includes facilitation works which comprise uprating of existing 110kV power lines to the site and enhancement of the local gas network and connection to the site. The facilitation works which are described and assessed as part of the project in accordance with the requirement of the EIA Directive, do not form part of the development for which planning consent is sought. Future consents for the facilitation works will be required through EirGrid and GNI.

The development site which is subject to the application for consent measures c. 72.2 ha and is principally bounded by: the M4 Motorway and Barnhall Meadows to the north; Cellbridge Road to the east; Barnhall Rugby Football Club to the south; and by grounds associated with Castletown House to the west.

The site comprises the existing Kildare Innovation Campus, which was formerly the Hewlett Packard Campus originally permitted in 1995 under KCC Reg. Ref 95923. The development site also encompasses lands within the jurisdiction of Kildare County Council (KCC) and Transport Infrastructure Ireland (TII)

This NTS has been prepared by Tom Philips and Associates Town Planning Consultants in conjunction with a multi-disciplinary EIA team for the Davy Platform ICAV for and on behalf of the Liffey Sub Fund, (referred to as the Applicant throughout).

As per the requirements of the Directive, the NTS comprises an easily accessible summary of the EIAR, using non-technical language. It is formulated to be understandable to those without a prior background to the Project or particular environmental expertise.

1.1 EIA Process

The requirement for an environmental impact assessment (EIA) derives from, and is governed by, Directive 2011/92/EU of the European Parliament and Council of the 13th December 2011 on the assessment of the effects of certain public and private projects on the environment as amended by Directive 2014/52/EU of the European Parliament and Council of the 16th April 2014 (EIA Directive). The primary objective of the EIA Directive is to ensure that certain public and private projects that are likely to have significant effects on the environment by virtue of their nature, size or location are subjected to an assessment of their likely impacts prior to development consent being given.

Where a proposed project is of a type identified in the EIA Directive an EIA forms part of the planning consent process and is carried out by the planning authority. An EIAR is prepared by

/ on behalf of a Developer in respect of a project seeking planning consent. The EIAR thus becomes an integral informing element in the planning authority's EIA. Directive 2014/52/EU introduced strict requirements in respect of the competency of experts responsible for the preparation of the EIAR (see Section 1. below for details on the experts involved in the preparation of this document).

RECEIVED: 18/07/2023

The EIA Directive was transposed into national legislation through the European Union (Planning and Development) (Environmental Impact Assessment) Regulations, 2018. These Regulations amended the Planning and Development Act, 2000 with the insertion of a new part, Part X, into the Act, and the Planning and Development Regulations 2001 with the insertion of a new part, Part 10.

Section 171A of the Planning and Development Act, 2000, as amended, defines an EIA as follows:

> *'environmental impact assessment' means a process—*
>
> *(a) consisting of—*
>
> *(i) the preparation of an environmental impact assessment report by the applicant in accordance with this Act and regulations made thereunder,*
>
> *(ii) the carrying out of consultations in accordance with this Act and regulations made thereunder,*
>
> *(iii) the examination by the planning authority or the Board, as the case may be, of—*
>
> *(I) the information contained in the environmental impact assessment report,*
>
> *(II) any supplementary information provided, where necessary, by the applicant in accordance with section 172(1D) and (1E), and*
>
> *(III) any relevant information received through the consultations carried out pursuant to subparagraph (ii),*
>
> *(iv) the reasoned conclusion by the planning authority or the Board, as the case may be, on the significant effects on the environment of the proposed development, taking into account the results of the examination carried out pursuant to subparagraph (iii) and, where appropriate, its own supplementary examination, and*
>
> *(v) the integration of the reasoned conclusion of the planning authority or the Board, as the case may be, into the decision on the proposed development, and*
>
> *(b) which includes—*
>
> *(i) an examination, analysis and evaluation, carried out by the planning authority or the Board, as the case may be, in accordance with this Part and regulations made thereunder, that identifies, describes and assesses, in an appropriate manner, in the light of each individual case, the direct and indirect significant effects of the proposed development on the following:*
>
> *(I) population and human health;*

RECEIVED: 18/09/2023

(II) biodiversity, with particular attention to species and habitats protected under the Habitats Directive and the Birds Directive;

(III) land, soil, water, air and climate;

(IV) material assets, cultural heritage and the landscape;

(V) the interaction between the factors mentioned in clauses (I) to (IV),

and

(ii) as regards the factors mentioned in subparagraph (i)(I) to (V), such examination, analysis and evaluation of the expected direct and indirect significant effects on the environment derived from the vulnerability of the proposed development to risks of major accidents or disasters, or both major accidents and disasters, that are relevant to that development;

The EIA process involves a number of steps which may be summarised as follows:

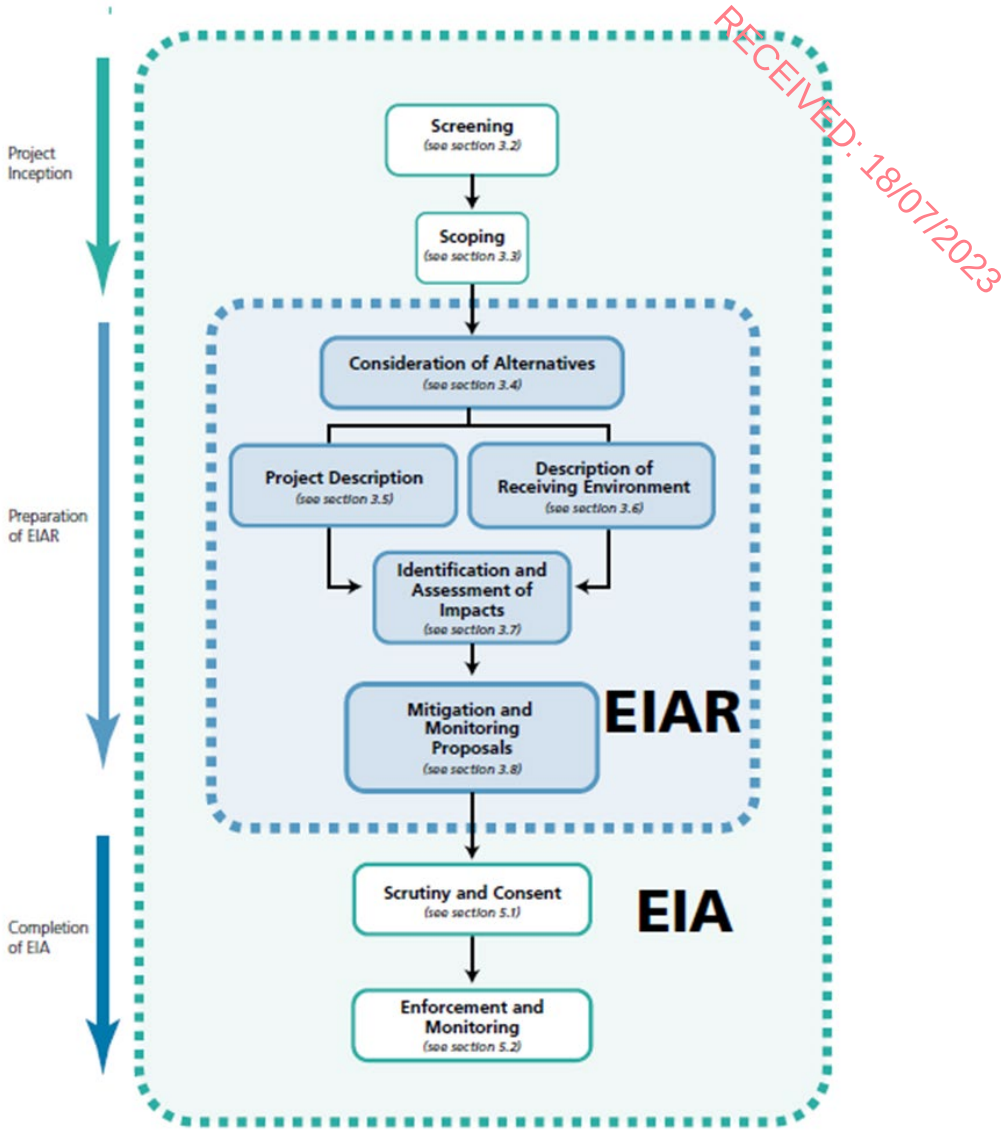
1. Screening – Is an EIA required?

2. Scoping – If an EIA is required, what aspects of the environment are likely to be significantly affected and should therefore be considered?

3. Preparation of an EIAR.

4. EIAR informs the EIA (as part of the consent process).

RECEIVED: 18/07/2023



1.2 Need for EIAR

The EIA Directives list those projects for which an EIA is mandatory (Annex I) and those projects for which member states must provide a process to determine if it is likely to have significant effects on the environment (Annex II). This process may involve a case-by-case examination, the establishment of objective thresholds or other criteria, or a combination of these.

Annex I projects are listed in Part 1 of Schedule 5 of the *Planning and Development Regulations 2001* (as amended) ("the Regulations").

The project, the subject of this EIA, is not of a type listed within Part 1 of Schedule 5 of the Regulations and therefore a mandatory EIA is not required in this instance.

Annex II projects are set out in Part 2 of Schedule 5, together with specified thresholds above which a project must be subject to an EIA. The following class of project listed in Part 2 of Schedule 5 is relevant to the present project [OR Project]:

RECEIVED: 18/07/2023

Class 10(b)(iv):

> *"Urban development which would involve an area greater than 2 hectares in the case of a business district, 10 hectares in the case of other parts of a built-up area and **20 hectares elsewhere**."*
>
> [Our emphasis.]

Having regard to the overall site area of the Project which is in excess of 73.95 ha, an EIA of the Project is therefore required.

1.3 Purpose of the Environmental Impact Assessment Report

An EIAR's purpose is to predict and assess likely significant effects (direct and indirect), if any, that the proposed project, if carried out, would have on the environment, on its own and in combination with other existing and /or approved projects. It is used during the consent process to inform EIA.

Article 5(1) and Annex IV of the EIA Directive, specifies the information to be provided in an EIAR. These requirements have been transposed into Irish law through Article 94 and Schedule 6 of the Planning and Development Regulations, 2001 (as amended).

This EIAR has been prepared in accordance with the requirements of Article 5(1) and Annex IV of the EIA Directive as implemented in Ireland through Article 94 and Schedule 6 of the Planning and Development Regulations, 2001 (as amended).

1.4 EIAR Methodology and Format

In addition to the 2014 Directive, the subject EIAR has been informed by:

- Guidelines on the Information to be contained in Environmental Impact Statements (EPA, 2022);
- Advice Notes on Current Practice in the Preparation of Environmental Impact Statements (EPA, 2003);
- Draft Guidelines On The Information To Be Contained In Environmental Impact Assessment Reports (EPA, draft August 2017);
- Draft Advice Notes for Preparing Environmental Impact Statements, Draft, (EPA draft September 2015a);
- Draft Revised Guidelines on the Information to be Contained in Environmental Impact Statements (EPA draft September 2015b);
- Environmental Impact Assessment of Projects: Guidance on Screening (European Commission, 2017);
- Environmental Impact Assessment of Projects: Guidance on Scoping (European Commission, 2017);
- Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (European Commission, 2017);
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment, (August 2018);
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports, May 2022;

RECEIVED: 18/07/2023

- Guidance of Integrating Climate Change and Biodiversity into Environmental Impact Assessment (European Commission, 2013);
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Environment, Community and Local Government 2013);
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Government of Ireland, 2018);
- Key Issues Consultation Paper on the Transposition of 2014 EIA Directive (2014/52/EU) in the Land Use Planning and EPA Licencing Systems (Department of Housing, Planning, Community and Local Government 2017);
- Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions (European Commission, 1999);
- Implementation of Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment (European Commission, 2003);
- Circular PL 05/2018 -Transposition into Planning Law of Directive 2014/52/EU amending Directive 2011/92/EU on the effects of certain public and private projects on the environment (the EIA Directive) And Revised Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Planning and Local Government, 2018)

The above is not a fully exhaustive list. The EIAR contributors have referred to heading-specific legislation, policy, and/or guidelines within each in individual EIAR Chapter.

EIARs require 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. To allow for ease of presentation, and consistency when considering the various environmental factors considered, a systematic structure is used for the main body of the Report. The structure of the EIAR Chapters is outlined below.

1.5 EIAR Study Team and Competency

This Environmental Impact Assessment Report was completed by a project team led by Tom Phillips + Associates, who also prepared a number of the chapters.

In accordance with EIA Directive 2014/52/EU, we confirm that the experts involved in the preparation of this EIAR are fully qualified and competent in their respective fields. Each has extensive proven expertise in the relevant field concerned, thus ensuring that the information provided herein is complete and of high quality.

Chapter	Aspects of the Environment Considered	Contributor	Person Responsible
Chapter 1	Introduction and Methodology	Tom Phillips + Associates (TPA)	Brian Minogue
Chapter 2	Site Location and Context	TPA	Brian Minogue
Chapter 3	Description of the Proposed Development	TPA	Brian Minogue
Chapter 4	Key Alternatives Considered	TPA	Brian Minogue

Chapter 5	Population and Human Health	TPA	Gavin Lawlor
Chapter 6	Biodiversity	Ecology Ireland	Gavin Fennessy Maire Kearns
Chapter 7	Land, Soils and Ground Water & Hydrogeology	AWN	Teri Hayes Alan Wilson
Chapter 8	Hydrology	AWN	Teri Hayes Alan Wilson
Chapter 9	Air	AWN	Dr. Edward Porter
Chapter 10	Climate	AWN	Dr. Edward Porter
Chapter 11	Noise and Vibration	AWN	Mike Simms
Chapter 12	Material Assets – Waste (Construction and Demolition)	AWN	Chonaill Bradley
Chapter 13	Material Assets –Traffic and Transportation	SYSTRA	Sheelagh McGuinness
Chapter 14	Material Assets – Site Services incl Energy Demand	TPA, CSEA, MDM Engineering, Ethos Engineering & H&MV Engineering	Brian Minogue
Chapter 15	Archaeology, Architecture & Cultural Heritage	Shanarc Archaeology & Mesh Architecture	Sean Shanahan / Tom McGimsey
Chapter 16	Heritage, Townscape, Landscape Visual Impact Assessment	AECOM	Joerg Schulze
Chapter 17	Major Accidents & Disasters	AWN	Matthew Michie
Chapter 18	Interactions and Cumulative Impacts	TPA	Brian Minogue
Chapter 19	Mitigation	TPA	Brian Minogue
	Non – Technical Summary	All Contributors outlined above - compiled by TPA	All Contributors outlined above - compiled by TPA

Table 1.2: EIAR Chapter Headings and Contributors

RECEIVED: 18/07/2023

1.6 EIAR Team - Qualifications

Brian Minogue, (*TPA Town Planning Consultants)*
Qualifications: BSc in Spatial Planning.

Gavin Lawlor, (*TPA Town Planning Consultants)*
Qualifications: Master of Regional and Urban Planning – University College Dublin

Gavin Fennessy, *(Ecology Ireland Wildlife Consultants Ltd.)*
Qualifications: (BSc PhD MCIEEM)

RECEIVED: 18/07/2023

Dr. Edward Porter, *(AWN Consulting Limited)*
Qualifications: BSc from the University of Sussex (Chemistry), and a PhD in Environmental Chemistry (Air Quality) in UCD

Mike Simms, *(AWN Consulting Limited)*
Qualifications: BE MEngSc MIOA MIET

Teri Hayes, *(AWN Consulting Limited)*
Qualifications: BSc MSc PGeol EurGeol

Chonaill Bradley, *(AWN Consulting Limited)*
Qualifications: BSc

Sheelagh McGuinness, *(SYSTRA Ltd.)*
Qualifications: B.Eng (hons) MBA

Grace Fegan, (Shanarc Archaeology Ltd)
Qualifications: B.A. Archaeology, M.A. Museum Studies

Tom McGimsey, *(Mesh Architecture)*
Qualifications: BArch, MSc Historic Preservation, RIAI Conservation Grade 1

Joerg Schulze, *(AECOM)*
Qualifications: MChem and a MSc (Physical Chemistry)

Matthew Michie, *(AWN Consulting Limited)*
Qualifications: MChem and a MSc (Physical Chemistry)

RECEIVED: 28/07/2023

2.0 DESCRIPTION OF THE PROJECT

2.1 Characteristics of the Project

This chapter of the *Environmental Impact Assessment Report* has been prepared by Brian Minogue (BSc in Spatial Planning), Tom Phillips + Associates in conjunction with the project team. In accordance with Directive 2011/92/EU of the European Parliament and Council of the 13th December 2011 on the assessment of the effects of certain public and private projects on the environment as amended by Directive 2014/52/EU of the European Parliament and Council of the 16th April 2014 (EIA Directive), it provides a detailed description of the project, together with details of the existing environment surrounding the site.

2.2 Characteristics of the Project

The project, subject to this EIAR includes two separate but interrelated streams of proposed works:

A. The 'principal' works subject to the development consent being sought from Kildare County Council, i.e. the proposed development; and
B. 'Facilitation works' required to support the development which do not form part of the development consent being sought from Kildare County Council. The facilitation works include a mix of works that will be required to be undertaken for or on behalf of statutory undertakers such as Gas Networks Ireland and EirGrid.

The principal works include the proposed expansion of the existing innovation campus and all those works included within the redline boundary and described on the statutory notices accompanying the application. The facilitation works are those known works that are required to facilitate the proposed development over the life of the permission being sought.

Further details relating to both the 'Principal' and 'Facilitation' works can be found in Chapter 2 of the Main EIAR.

2.3 Location of the Project Site

2.3.1 Principal Works Site (Works within Planning Application Red Line Boundary)

The development site is located in County Kildare close to the border with County Dublin and measures approximately 72.2 ha, inclusive of 1.83 ha of lands within the ownership of KCC.

The campus is principally bounded by: the M4 Motorway (and Barnhall Meadows and Wonderful Barn lands) to the north; Cellbridge Road to the east; Barnhall Rugby Football Club and recently completed DB Schenker logistics facility to the south; and by grounds associated with Castletown House to the west.

The site comprises the existing Kildare Innovation Campus, which was formerly the Hewlett Packard Campus originally permitted in 1995 under KCC Reg. Ref 95923.

2.3.2 Facilitation Works Site (Works outside Planning Application Red Line Boundary)

RECEIVED: 18/07/2023

'Facilitation works' have been identified as being required to support the development consent being sought from Kildare County Council. The planning application to KCC does not encompass a request for development consent in relation to the facilitation works.

The facilitation works include a mix of works that will be required to be undertaken for or on behalf of statutory undertakers such as Gas Networks Ireland and EirGrid. The location of the facilitation works are described as follows:

GNI Gas Upgrades

The GNI upgrades will be delivered through a local upgrade of the gas network over a length of approximately 1.5km through predominantly residential areas. The route of the upgrades will be along Ryevale Lawns along Station Road, Old Hill and Celbridge Road (R404) up to the entrance of Barnhall Meadows(Figure 2.4, Chapter 2). The pipe will run under the existing road pavement. The route will run along Celbridge Road to Station Road running adjacent to entrances to Barnhall Meadows, Leixlip Park, Elton Ct., Sycamore Avenue, Forest Park, Castletown, Wogansfield, Highfield Park, Knockaulin, Ryevale lawns and Cedar Park residential areas. Celbridge road also serves Barnhall Shopping Centre, Maxol garage, Colaiste Chiarain school and Scoil Chearbhaill Uí Dhálaigh. It will also run under Station Road which serves Leixlip Garda station. At the entrance to Barnhall Meadows, the pipe will run underground through the Barnhall Meadows lands (adjacent to the existing haul road, east of the Wonderful Barn allotments) and will then cross the M4 Motorway through Horizontal Directional Drilling and enter the Kildare Innovation Campus then connecting to the proposed Gas Skid. The route will not pass through any environmental features. The nearest watercourse to the route is the river Liffey which runs parallel to the route approx. 860m to the east and joins Leixlip Reservoir which is located approx. 320m to the south of the pipeline.

EirGrid Uprating

Upon completion of Phase 1 of the KIC Masterplan, including the development of the proposed replacement 110kV Substation, uprating of existing overhead lines (OHLs) from the replacement 110kV Rinawade substation to Derryiron/Maynooth and Dunfirth/Kinnegad will be required to facilitate commencement of Phase 3 of the KIC Masterplan. The uprating will be carried out to existing lines along established wayleaves primarily traversing agricultural lands.

RECEIVED: 18/07/2023

3.0 PLANNING AND DEVELOPMENT CONTEXT

3.1 Introduction

This chapter of the Environmental Impact Assessment Report has been prepared by Brian Minogue (BSc in Spatial Planning), Tom Phillips + Associates. In accordance with Directive 2014/52/EU, this chapter addresses the Planning Policy Context of the Project and the plans and projects which have the potential to act in cumulation with the project.

3.2 Project Site and Surrounding Land Zoning Objective

3.2.1 Principal Works Site

The Principal Works site is zoned 'H' - Industry and Warehousing – in the Leixlip LAP and, accordingly, the County Development Plan. The provision of employment generating uses on land zoned for development and within an existing business campus is strongly supported by the County Development Plan and the LAP.

The development has been designed ensuring that the proposed building will complement the existing campus buildings as well and tying in with the future vision for the surrounding environs.

The Proposal adheres to the land use zoning objectives identified in the LAP, including *inter alia* protecting views, and introducing link roads and pedestrian connections from Leixlip to Celbridge.

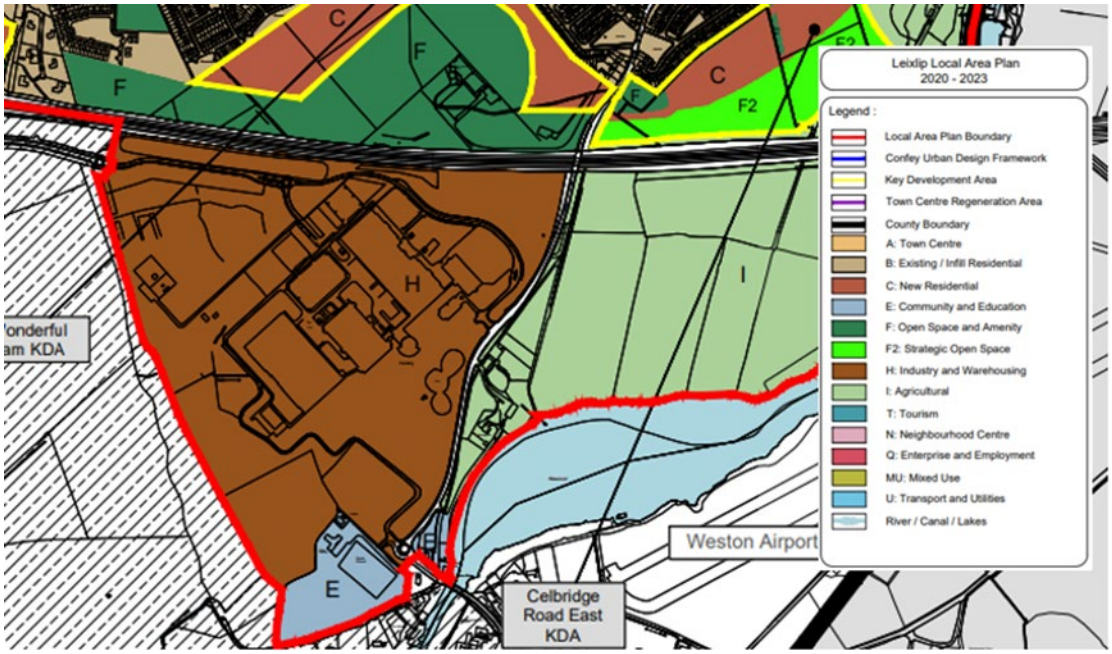


Figure 3.1: Extract Map Ref 4 Land Use Zoning Objectives Map, Leixlip LAP.

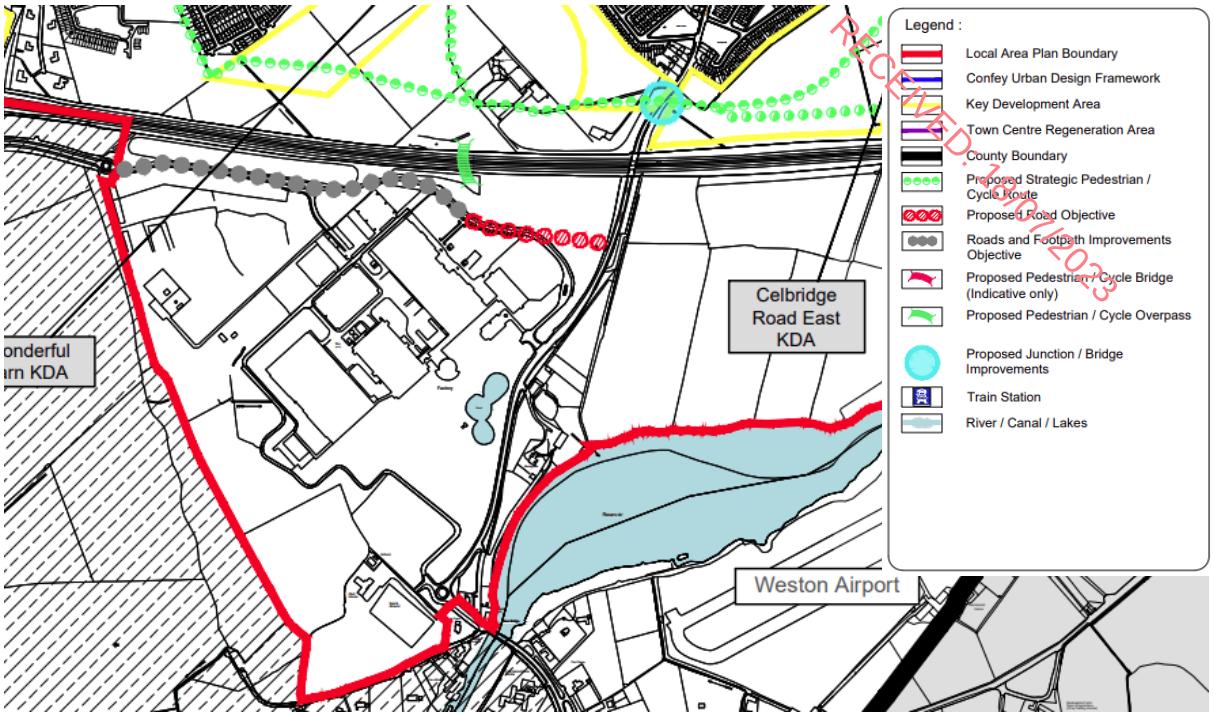


Figure 3.2: Extract Map Ref 4 Land Use Zoning Objectives Map, Leixlip LAP.

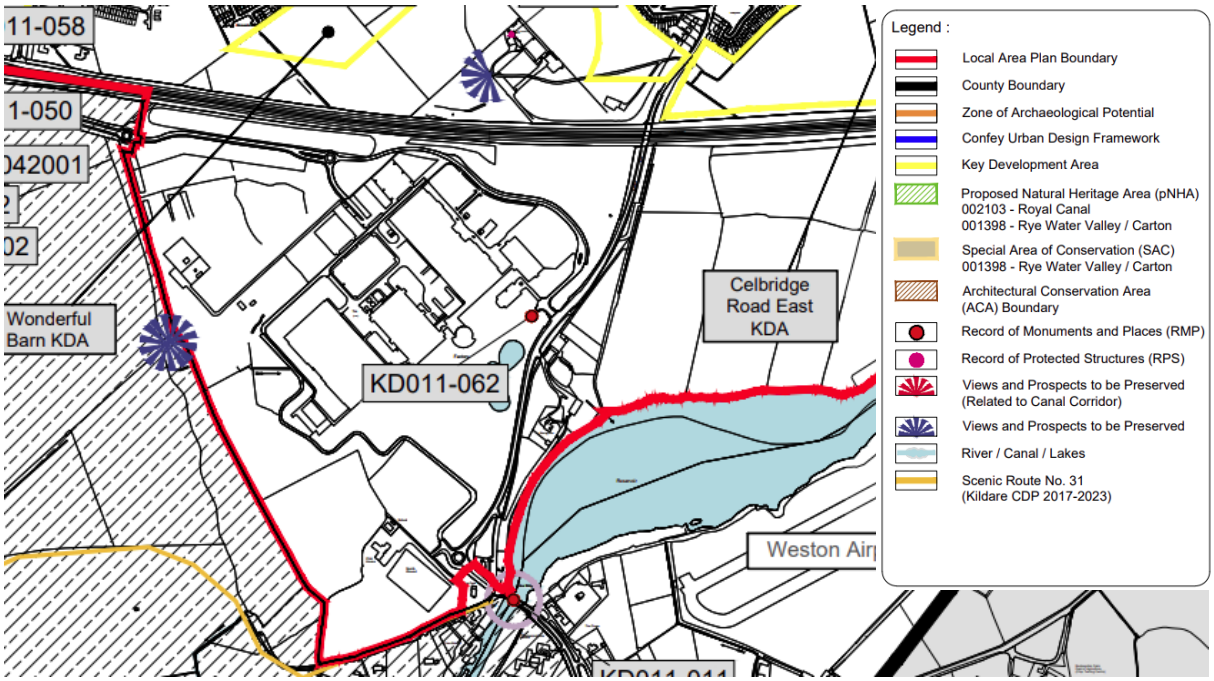


Figure 3.3: Extract Map Ref 4 Land Use Zoning Objectives Map, Leixlip LAP.

3.2.2 Facilitation Works Site

GNI Gas Upgrades

The pipeline works are all located within the Kildare County Council administrative area, the works will be within lands covered by the Leixlip LAP. The majority of the works will be under road and the lands are unzoned.

RECEIVED: 18/07/2023

Prior to the pipeline entering the principal site, the works will enter the Barnhall Meadows Lands which are zoned 'F: Open Space and Amenity' under the Leixlip LAP which has the land-use zoning objective *"to protect and provide for open space, amenity and recreation provision".* The gas upgrade works would not contravene the applicable land use zoning objective as while they constitute works, they have no effect of changing the current or any future potential land use. Furthermore, 'utility structures' are 'open for consideration' within the above zoning.

EirGrid Uprating

The works will primarily occur within unzoned – 'default agricultural' – land, which generally considers utilities and public service works as 'open for consideration' uses. The works will involve uprating of existing lines, which will mean that any prospective land use objective – if within the path of the works – will unlikely be impinged by its operation.

3.3 Relevant Objectives & Policies

3.3.1 National Planning Framework (NPF)

The aims and objectives of the NPF with regard to the Eastern and Midland region are clear in their focus on the importance of sustainable employment provision.

3.3.2 Regional Spatial & Economic Strategy (RSES)

The *Regional Spatial & Economic Strategy (RSES)* for the Eastern and Midland Region outlines the Strategic Vision for the region which is:

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

3.3.3 Kildare County Development Plan 2023-2029

At a county and local level, the lands are governed by the Kildare County Development Plan 2023-2029, complemented by the Leixlip LAP 2020-2023 (extended to 2026).

The subject Hewlett Packard site is identified as a "Strategic Development Area", identified as an important area specifically zoned for knowledge-based economy focusing on high tech/biotechnology, research and development, ICT and manufacturing.

3.3.4 Leixlip LAP (extended to 2026)

The Leixlip LAP came into effect on 5th February 2020 and sets out an overall strategy for the proper planning and sustainable development of Leixlip in the context of the Kildare County Development Plan 2017-2023 (now the 2023-2029 Plan).

3.4 Projects for Cumulative Assessment

Cumulative effects consider the impacts of other undeveloped permitted or planned projects within the vicinity and context of the project. This will include other projects planned by the developer, and any known permitted or planned projects by third parties. The following

section details the process followed to identify those plans or projects with the potential to result in significant cumulative effects when considered in combination with the proposed Project.

RECEIVED: 18/07/2023

The cumulative impact of the planned projects on site, the project and the potential future development of the surrounding environment has been considered in Chapter 18 (Interactions & Cumulative Impact), to the extent possible having regard to the nature of the relevant plans and projects.

TPA have used GIS planning application data to obtain a list of all projects within 5 km of the site that have been granted planning permission in the last 10 years and which either are unbuilt and have extant permission or are under construction. The list has been filtered down to exclude minor projects that are unlikely to interact with the Project to any level of significance. The final list provided to each consultant is included as Appendix 1.1.

RECEIVED: 28/07/2023

4.0 EXAMINATION OF ALTERNATIVES

4.1 Introduction

This chapter of the *Environmental Impact Assessment Report* was prepared by Tom Phillips + Associates and examines the alternative development options that were considered for the subject site during the design development process.

The requirement to consider alternatives within an EIAR is set out in Annex IV (2) of the EIA Directive (2014/52/EU) and in Schedule 6(1)(d) of the *Regulations,* which require the following information to be included:

> "*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 options chosen, taking into account the effects of the proposed development on the environment*".
>
> [Our emphasis.]

Reasonable alternatives may relate to project design, technology, location, size and scale which were studied in the preparation of the EIAR relevant to the proposed development and its particular characteristics, together with an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.

4.2 Alternatives Studied

EIA legislation and prevailing guidelines and best practice require that Environmental Impact Assessment Reports consider the following aspects for EIA projects with regard to their environmental effects;

- Do Nothing alternative;
- Alternative project locations;
- Alternative designs/layouts;
- Alternative processes;
- Alternative mitigation measures.

The main alternatives studied during the development of the project comprise alternative site layouts and design solutions (as well as processes) for the redevelopment of the former HP lands to provide *inter alia* employment development on the site, in accordance with national, regional and local planning policy.

4.3 "Do-Nothing" Alternative

In the "Do-Nothing" scenario, the former HP lands would continue to operate as an innovation campus and the potential to maximise development opportunities for the site to provide for *inter alia* a strengthened employment base for North Kildare, in accordance with national, regional and local planning policy, would not be realised. The "Do-Noting" alternative would not meet the projects objective to provide for the redevelopment/regeneration of an underutilised business and innovation campus to encourage Foreign Direct Investment and

employment generation in Ireland and Kildare, was not considered a reasonable alternative and was not therefore considered further.

RECEIVED: 18/07/2023

4.4 Alternative Site Location

The developers are primarily property investors who invested in KIC for its existing portfolio of tenants and to improve and expand the potential of the site, encourage investment and the maximisation of the economic return.

Prior to the purchase of the site by the current landowners a wide variety of general environmental and economic criteria were considered, the key criteria for the location of the proposed development were;

- Availability of a high-quality telecommunications fibre network;
- Accessibility to the natural gas network (to provide dispatchable energy in line with government policy);
- Availability of a high-quality and existing electricity network (to provide direct connection to the national grid and mix of renewables);
- Availability of a suitably large site with suitable development zoning;
- A site in proximity to existing high density of US and global tech companies;
- Existing campus development with potential to expand with high-tech and ICT uses;
- Low natural disaster risk particularly in relation to flooding.

Given the project comprises the redevelopment of the former HP lands and an existing campus, which national, regional and local planning policy specifically promotes as being ripe for redevelopment, the further consideration of alternative locations for employment generating uses is not considered relevant in this instance.

4.5 Alternative Site Layout and Land Use

Prior to the purchase of the site by the existing landowner, the then project team commenced a master planning process, so that the future development of the campus could be delivered in an integrated manner. The master planning process has been one that has evolved over several years and one that has involved numerous meetings and discussions with relevant stakeholders including the local planning authority.

4.6 Alternative Designs

In addition to the above iterative process for site layout design, alternative building designs were considered by the project team through the evolution of the masterplan.

4.7 Conclusion

Having examined various reasonable alternative designs, layouts, uses, and processes, it is considered that the project is the preferred option in terms of the sustainable development of the subject site.

RECEIVED: 19/07/2023

5.0 POPULATION AND HUMAN HEALTH

5.1 Introduction

This chapter of the Environmental Impact Assessment Report has been prepared by Gavin Lawlor of Tom Phillips + Associates and examines the likely impacts of the proposed development on population and human health.

Gavin Lawlor is a Director of Tom Phillips + Associates. He holds a BA (Social Science) from University College Dublin, where he graduated in 1995 with a Masters in Regional and Urban Planning (MRUP) Degree and is a Full Member of the Irish Planning Institute (IPI) with 25 years' experience.

The scope of the work includes an evaluation of the likely direct and indirect effects on population and human health (the impacts on human health has been assessed, by proxy, through the other chapters of this EIAR that are likely to impact on human health).

5.2 Methodology

5.2.1 Population

The method employed for scoping and identification of the relevant environmental topics for this Chapter has been based off our professional town planning and sociological knowledge/expertise.

The headings and/or topics scoped into this Chapter's population assessment are:

1. Economy
   a. National economy
   b. Local economy

2. Employment
   a. Jobs
   b. Commuter patterns

3. Housing
   a. Current housing stock
   b. Future housing stock

4. Social infrastructure and amenities

The above headings were chosen because they represent the aspects of the environment likely to have possible significant impacts caused by the project: the Economy is likely to be impacted inter alia by the increased FDI and the increased demand for products and services from third party local suppliers once the scheme is operational; employment is likely to be impacted inter alia by the construction and the establishment of multinational companies, which will require employees to run operations; housing is likely to be impacted inter alia by the increased number of employees in the area; and social infrastructure and amenities are likely to be positively impacted inter alia by the provision of a pedestrian and cyclist overpass

over the M4 connecting Leixlip to the campus and its internal amenities and providing a pedestrian and cyclist route to Celbridge.

RECEIVED: 18/07/2023

5.2.2 Human Health

The EPA Guidelines, 2022, state 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..**"*
>
> [Our emphasis.]

As such, the scoping of headings/topics is based off other environmental factors impacts on human health addressed in this EIAR.

Therefore, the headings and/or topics scoped into this Chapter's human health assessment are:

1. Air
2. Climate
3. Noise and Vibration
4. Land and Soils
5. Water
6. Traffic
7. Visual Impact
8. Major accidents and/or disasters

For gathering a baseline for human health in Ireland, we used the headings of life expectancy, mortality, and perceived health status; for baselines of the above headings, please see each individual Chapter, respectively.

5.3 Baseline scenario Analysis Methodology

5.3.1 Population

In order to assess the likely significant impacts of the proposed development on population, for both the principal works and facilitation works, an analysis of the baseline (the current state of the environment) was first performed. Data relating to the economic, demographic and social characteristics of the Local Authority (LA) area, within which the subject sites are located, were examined.

5.3.2 Human Health

The baseline for human health was gathered from a review of the Department of Health's latest policy report *Health in Ireland: Key Trends 2022* provides statistical analysis on health in Ireland over the last 10 years and deals specifically with issues such as life expectancy, mortality, and perceived health status within the country. For baselines of the headings outlined in section 5.3.1.2, please see each individual Chapter, respectively. Census figures were also gathered to provide a breakdown of the 'general health' of the local population.

5.4 Impact Assessment Methodology

RECEIVED: 18/07/2023

5.4.1 Population

The analysis of the predicted impacts of the proposed development on population during construction and operation are presented in this Chapter. The assessment considered population features, identified in Section 5.3.1, above, within the project site and the surrounding vicinity in accordance with the methodology outlined above and below, to determine the significance of the impacts. Where likely significant impacts are highlighted, mitigation and monitoring are proposed, and any residual impacts are assessed.

The impact assessment for this Chapter has been undertaken in accordance with the *EPA Guidelines on the Preparation of an EIAR* (EPA, May 2022) and all other documents outlined above. Assessment methods quantify and predict the magnitude and significance of impacts.

To predict the impact of the proposed development on the baseline environmental headings/topics, we have *inter alia*: reviewed the Grant Thornton *Economic Impact Assessment*, dated April 2023 (prepared in association with this EIAR) to determine the overall economic impact of the project; calculated the number of jobs likely to be generated by the project using the Homes & Communities Agency's (UK Government Agency) (2015) *Employment Density Guide (3rd Edition)*; calculated the housing demand likely to be generated from the permanent employment increase; and identified the social infrastructure and amenities provided or impinged by the project. In addition, we have used our professional town planning and sociological knowledge/expertise and inductive reasoning to assess/evaluate the significance of those predicted impacts.

Regarding the cumulative impacts resulting from other developments in the surrounding area, we have reviewed the Strategic Environmental Assessment prepared for the *Kildare County Development Plan 2023-2029* (including a review of the Development Plan itself). According to the EPA Guidelines, 2022, this can reduce the number of cumulative effects that need to be considered in an EIAR.

We have also utilised the list of planning permissions/applications within a 5 km radius (listed in the appendices of Chapter 1), identified using Geospatial Analysis, and have assessed whether those developments, in combination with the project, are likely to have significant impacts on the population.

5.4.2 Human Health

The impacts recorded within other Chapters of this EIAR associated with Human Health, for both the principal works and facilitation works, and have been collated within this Chapter.

The methodologies for those individual environmental factor impact assessments can be found in each relevant Chapter of this EIAR.

6.0 BIODIVERSITY

RECEIVED: 18/07/2023

The Biodiversity Chapter of the Environmental Impact Assessment Report (EIAR) was prepared by Ecology Ireland Wildlife Consultants Ltd (Ecology Ireland). It describes the habitats, flora and fauna present in the receiving environment and presents an assessment of potential impacts arising from the project, with consideration given to appropriate mitigation measures to minimise and/or avoid potential negative impacts. The project comprises both the proposed development which is subject to the development consent being sought from Kildare County Council, and the proposed facilitation works *i.e.,* the uprating of existing Eirgrid transmission lines and the GNI upgrade works.

The studies included detailed desktop reviews and field surveys to inform the assessment of the potential ecological impacts. The project will be delivered over several stages over a prolonged period. Field surveys included botanical studies and habitat mapping, breeding and winter season bird surveys, non-volant mammal and bat studies (including ground-level roost potential assessments and emergence checks).

The existing surface-water drainage network servicing Kildare Innovation Campus flows into the retention ponds before discharging to the Leixlip Reservoir and the River Liffey. There are no uncovered watercourses within the proposed development site. The Kilmacredock Stream flows beneath the site along a diverted path through a 1.5m culvert before entering Leixlip Reservoir. The existing surface-water drainage network discharges to the ponds and does not discharge directly to the culverted Kilmacredock Stream. Discharge from the ponds is released following confirmation of water quality through electronic monitoring mechanisms inclusive of shut-off valves, upstream of the existing Retention Ponds near the existing site entrance off the Celbridge Road. For the proposed development, the surface-water drainage network will be re-designed in order to accommodate the increase in hardstanding area. For the proposed surface-water drainage system, the proposed development site has been divided into four catchment areas where the surface-water run-off from each catchment is attenuated within its own pond and/or wetland area. Each catchment will release water to the two existing retention ponds, and the surface-water drainage network for the proposed development will continue to discharge from these ponds to Leixlip Reservoir and the River Liffey.

There are no new requirements for new foul connections outside of the overall landholding. There are no proposed process water emissions as part of the operational phase of the proposed development. Leixlip WWTP discharges treated wastewater at the primary emission point into the River Liffey, upstream of the proposed development site and Leixlip Reservoir. Therefore, there is a hydrological link between the proposed development and the aquatic environment downstream of Leixlip WWTP primary emissions point.

The proposed development site is not located within any designated Natura 2000 sites or nationally designated conservation sites. There are two Natura 2000 sites and ten pNHA sites located within 15km of the proposed development site boundary. There are an additional four Natura 2000 sites located outside of the 15km buffer but with a distant hydrological connection to the proposed development site.

No legally protected or red-listed plant species have been previously recorded in the NBDC database for the 2km grid square (N93X) within which the study area is located. No habitats listed on Annex I of the EU Habitats Directive, or botanical species protected under the Flora

RECEIVED: 28/07/2023

(Protection) Order 2022, listed in Annex II or IV of the EU Habitats Directive (92/43/EEC), or Red listed in Ireland were recorded within the project study area.
The campus section of the study area consists of an existing group of industrial buildings that form the Kildare Innovation Campus and associated car parking and access roads (BL3). The areas immediately surrounding these built areas consist of formal landscaping such as amenity grassland (GA2), ornamental shrubbery (WS3), ornamental hedges (WL1) and treelines (WL2). Scattered trees and parkland (WD5) with amenity grassland beneath was also recorded. A series of ornamental ponds (FL8) are also located nearby. The campus is surrounded by semi-mature, landscaping of mixed broadleaved woodland (WD1) and treelines (WL2) which provides screening from adjacent roadways. A number of areas of unmanaged dry meadow and grassy verge (GS2) semi-natural grassland areas are located around the site where immature trees and scrub (WS1) are developing. Smaller areas of wet grassland (GS4) were also recorded.

Eleven confirmed non-volant mammal species were recorded during ecological surveys and by the trail cameras. No setts or holts were recorded within the proposed development site. Otters were not recorded on site at any time and there were few records of Badger occurring within the KIC site.

From the analysis of the bat call registrations recorded by passive detectors, the presence of five bat species was confirmed at the site. Soprano Pipistrelle, Leisler's Bat and Common Pipistrelle were the most commonly recorded species, with Soprano Pipistrelle accounting for 40% of all registrations. No confirmed bat roosts were identified in natural or man-made features at the site. The buildings to be demolished to facilitate the development are not attractive for, or used by, roosting bats. All trees scheduled to be felled as part of the proposed project were subject to assessment. 56 no. trees were assessed as having 'Moderate' to 'High' roosting suitability for bats and were located throughout the campus, particularly within the more semi-natural hedgerow and treeline habitats to the west and northwest. These trees were typically mature/over-mature deciduous species such as Oak, Lime and Beech, characterised by the presence of multiple PRFs, often quite pronounced, such as wounds, tear-outs, pruning cuts, cracks and/or strong ivy cover often partially detached from the trunk in places.

A total of 55 bird species were recorded during breeding and winter bird survey transects, 48 of which were recorded during the breeding survey period and 43 that were recorded during the winter survey period. These included five Red-Listed species, Kestrel, Meadow Pipit, Redwing, Snipe and Swift.

A range of invertebrate fauna was also recorded on site over the course of field surveys in 2022 and 2023.

The potential impacts on designated sites, flora, fauna and habitats are considered. The potential for impacts in the absence of appropriate environmental controls and monitoring is first considered. A Screening for Appropriate Assessment (AA) was prepared and accompanies the EIAR. It is objectively concluded that there is no likelihood of significant effects on any of the Natura 2000 located in the wider area.

A number of habitats that occur within the study area are considered to be common and widespread throughout Ireland, contain low botanical diversity and are considered to be of little to no ecological value to protected flora and fauna. As a result of the proposed development, there will be an increase in hard standing areas (*i.e.*, artificial habitat - Buildings and artificial surfaces (BL3)) within the boundary of the proposed development site which will

RECEIVED: 19/07/2023

have a permanent slight negative impact on habitats and flora, particularly on the more semi-natural grassland and hedgerow/treeline habitats. The removal of trees, a proportion of these mature broadleaved trees, will result in a permanent significant negative impact on habitats and flora during the construction phase.

The proposed development site contains habitats with ecological importance of lower to higher value for a range of protected faunal species. The phased construction of the entire facility will mean that works will be staged over a prolonged period and ongoing construction related disturbance across the development area has the potential to cause localised disturbance, displacement and mortality effects to the faunal species that occur locally.

The construction and associated habitat clearance will permanently decrease the areas with the site that are available to burrowing and foraging non-volant mammals. The non-volant mammal community at the existing site is not particularly diverse or abundant, but it is important in a local context. In the absence of adequate mitigation and biodiversity enhancement measures it is likely that the proposed development would have a significant negative impact on the non-volant mammal community present at the site. However, the impact is likely to be highly localised in extent and occur in the short-to-medium term.

The loss of hedgerows and trees will also decrease the amount of available attractive habitat for many of the species that were recorded at the site (including birds and mammals). In the absence of mitigation, the vegetation clearance associated with the construction of the project has the potential to disturb, displace and cause mortality of breeding and roosting mammals and birds. The vegetation clearance is likely to reduce the foraging, breeding and roosting potential of the site for many of the species that currently use the site. The hedgerow and tree removal must be seen in the context of the retention of large numbers of trees on the campus and the availability in the wider area of similar suitable nesting habitat.

The project includes a detailed and comprehensive landscaping plan and maturing landscape features including 1,400m of linear hedgerow and 22,500m^2 of woodland will provide cover for fauna species. The larger footprint of the built areas on site and associated increases in site traffic (and noise and lighting) is likely to be offset by the maturing landscape features in the long-term. However, in the absence of appropriate mitigation the loss of mature trees had the potential to disturb, displace or cause mortalities of species such as bats that may use these trees from time to time.

Through an iterative design process opportunities to reduce the potential for impacts on the local biodiversity were explored. This included reducing the number of mature higher value trees to be removed insofar as possible and seeking to implement tree protection measures as part of the CEMP. Direct impacts on areas where there are existing bird and bat boxes within the campus were successfully avoided. The lighting design has also taken the guidance on impacts of artificial lighting on bats into account.

The Biodiversity Chapter describes detailed mitigation and monitoring commitments to address the potential impacts on flora, fauna and habitats identified in relation to the proposed development. This includes for the appointment of a suitably qualified Ecological Clerk of Works for each phase of the construction of the project to ensure the full and proper implementation of the mitigation strategy. Biodiversity enhancement measures are also presented including for the installation of bird nest boxes including those for Swifts and Barn Owls. In addition, a nesting raft will be installed on one of the water attenuation ponds at the site. Bat boxes will be installed and maintained throughout the lifetime of the project. A biodiversity audit of the site will be carried out every five years and the findings will inform a

Biodiversity Management Plan for the site for the following 5-year period. This will capture the elements of the landscaping and ecological mitigation, monitoring and enhancement (including the measures undertaken as part of the All-Ireland Pollinator Plan) and set goals and objectives for the next plan. The audit will examine the biodiversity on site and the progress towards previously stated objectives. The BMP and biodiversity audit will be published and feedback will be welcomed.

RECEIVED: 28/07/2023

With the implementation of the environmental controls, mitigation and landscaping commitments it is likely that the overall impacts on biodiversity at the site will be locally slight to moderate negative in the short to medium term but that with the maturation of the landscaping measures and ongoing commitment to biodiversity management that it is predicted that the longer term impacts on local biodiversity arising from the proposed development will be locally moderate positive.

RECEIVED: 28/07/2023

7.0 LAND, SOILS, GEOLOGY & HYDROGEOLOGY

This chapter of the Environmental Impact Assessment Report (EIAR) has been prepared by AWN Consulting and assesses and evaluates the potential for significant impacts on the on the land, soil, geological and hydrogeological aspects of the site and surrounding area associated with the proposed development.

This assessment considers the following:

A. The 'principal' works subject to the development consent being sought from Kildare County Council, i.e. the proposed development; and
B. 'Facilitation works' required to support the development which do not form part of the development consent being sought from Kildare County Council. The facilitation works include a mix of works that will be required to be undertaken for or on behalf of statutory undertakers such as Gas Networks Ireland and EirGrid.

The principal works include the proposed expansion of the existing innovation campus and all those works included within the redline boundary and described on the statutory notices accompanying the application. The facilitation works are those known works that are expected to be required to facilitate the proposed development over the life of the permission being sought.

In assessing likely impacts, account is taken of both the importance of the existing land, soils, geological and hydrogeological attributes and the predicted scale and duration of the likely impacts.

7.1 Receiving Environment

The receiving environment is discussed in terms of land geology, soils, hydrogeology, and site history including potential for existing and historical contamination. The principal site, Kildare Innovation Campus (KIC), is located in north east Kildare, in the administrative district of Kildare County Council. The site is an existing underdeveloped business campus, zoned for 'Industry and Warehousing' in *the Leixlip Local Area Plan 2020-2023 (extended to 2026).* Leixlip town is located 4km to the north and Dublin city centre is located approximately 21km to the east.

7.2 Principal Works

The site is principally bounded by: the M4 Motorway to the north; Cellbridge Road to the east; Barnhall Rugby Football Club to the south; and by grounds associated with Castletown House to the west. The River Liffey flows in a north-easterly direction on the opposing side of Celbridge Road to the east of the site where the Liffey Reservoir is also located. To the immediate west and east of the site agricultural lands are located - refer to Figure 8.1 below.

The site has an overall area of c. 72.23 ha. The planning application site covers the majority of the existing business campus, with a 5.7-hectare parcel of land known as the DB Schenker (DBS) site being excluded as it has recently been developed in accordance with a separate planning permission (KCC Reg. Ref:. 20-873). The planning application site also includes a portion of Celbridge Road along the eastern boundary of the site which will cater for a new access to the campus.

RECEIVED: 18/07/2023

7.3 Facilitation Works

The facilitation works include a mix of works that will be required to be undertaken for or on behalf of statutory undertakers such as Gas Networks Ireland and EirGrid.

GNI Upgrades

The GNI upgrades will be delivered through a local upgrade of the gas network over a length of approximately 1.5km through predominantly residential areas. The route of the upgrades will be along Ryevale Lawns along Station Road, Old Hill and Celbridge Road for a distance of approximately 1.5km up to the entrance of Barnhall Meadows running underground through the Barnhall Meadows lands (adjacent to the existing haul road) before crossing the M4 Motorway through Horizontal Directional Drilling and enter the Kildare Innovation Campus then connecting to the proposed Gas Skid.

EirGrid Uprating

Upon completion of Phase 1 of the KIC Masterplan, including the development of the proposed replacement 110kV Substation, uprating of existing overhead lines from the replacement 110kV Rinawade substation to Derryiron/Maynooth and Dunfirth/Kinnegad will be required to facilitate commencement of Phase 3 of the KIC Masterplan. The uprating will be carried out to existing lines along established wayleaves primarily traversing agricultural lands.

Due to the nature of the proposed EirGrid works being minimal and comprising only minor line and structural replacement, they have been scoped out of this assessment as the interaction between land, soils, geology and hydrogeology with the proposed works is negligible.

> The surrounding environment for both the principal and facilitation works can be described as a mix of agricultural and residential. The site location map for the proposed development is presented in presented in Figure 8.1 below.

A detailed description of the project is outlined in Chapter 2 of this EIAR.

7.4 Likely Impacts of the Proposed Development

Construction Phase

In absence of mitigation measures, the construction phase would present potential impacts associated to the following activities:

- Excavations for foundations, services and landscaping; and
- Accidental spills and leaks.

The magnitude of the impact for the construction phase without mitigation and design measures will likely have a **negative**, **short-term** and **moderate** impact.
However, with the implementation of design and mitigation measures for the Proposed Development site the impact of the construction phase is ***short-term*** in duration with an ***Imperceptible*** effect rating.

RECEIVED: 18/07/2023

Operational Phase

In absence of mitigation measures, the construction phase would present potential impacts associated to the following activities:

- Increase in hardstanding; and
- Fuel and other accidental spills.

Without the consideration of mitigation measures, the operational phase of the proposed development will likely have a **Neutral**, **Long-Term** and **Slight** impact.

The residual cumulative impact on land, soils, geology and hydrogeology for the construction and operation phases is anticipated to be ***Long-Term, Neutral*** in terms of quality and ***Not Significant***, once appropriate mitigation measures are implemented in accordance with the CEMP and in compliance with the legislative requirements for each development.

7.5 Mitigation Measures and Monitoring of Impacts

Construction Phase

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

- Implementation of a Construction & Environmental Management Plan (CEMP);
- Sources of fill and aggregates for the Proposed Development;
- Fuel and chemical handling, transport and storage; and
- Control of water during construction.

Operational Phase

A number of design measures will be put in place to minimise the likelihood of any spills entering the groundwater environment. An existing bypass petrol interceptor is located upstream of the outfall from the site, and it is proposed to retain this interceptor. Furthermore, it is a requirement for car parking areas with 10 spaces or more as outlined in Section 20.1 of the Greater Dublin Regional Code of Practice.

There is potential for surface water and condensate to accumulate in the exhaust stacks which serve the generators. Gullies which serve the exhaust stacks will discharge to a dedicated surface water drainage pipe which will be connected to a Class 1 full retention separator. Two full retention interceptors will be required, per data centre building, to serve the exhaust stacks. In the event of an accidental leakage of oil from the parking areas, this will be intercepted by the drainage infrastructure proposed.
The following mitigation measures will be undertaken at the operational stage to manage any leaks from vehicles resulting in soil and/or groundwater quality impacts:

- Provision of spill kit facilities and training of operatives in use of same;
- Where mobile fuel bowsers are used the following measures will be taken:
  - Any flexible pipe, tap or valve will be fitted with a lock and will be secured when not in use;

RECEIVED: 18/07/2023

- The pump or valve will be fitted with a lock and will be secured when not in use;
- All bowsers to carry a spill kit;
- Operatives must have spill response training; and
- Portable generators or similar fuel containing equipment will be placed on suitable drip trays.

No further mitigation measures are to be required during the operational phase.

7.6 Likely Cumulative and Interaction Impacts of the Proposed Development

Construction Phase

In relation to the potential cumulative impact on the geological or hydrogeological environment during the construction phases, the key engineering works which would have additional impacts above are:

- Construction works will require additional removal of topsoil and subsoil cover and will further increase the vulnerability of the underlying bedrock. Although this is minimised due to the underlying clayey overburden. Capping of significant areas of the sites by hardstand/ buildings following construction and installation of drainage will minimise the potential for contamination of groundwater.

Operational Phase

In relation to the potential cumulative impacts from the operational stages, the following would apply:

- Overall increase in hardstanding: Cumulatively these developments will result in localised reduced recharge to ground and increase in surface run-off. The aquifer underlying the site is a locally important aquifer which is moderately productive only in local zones. The proposed development will have a relatively small footprint in comparison to the underlying aquifer size. As such, the impact is considered to be Low.
- Accidental releases from fuel storage/unloading could contaminate groundwater or soil environments unless mitigated adequately. Localised accidental discharge of hydrocarbons could occur in car parking areas and along roads unless diverted to surface water drainage system with petrol interceptors. However, all developments are required to ensure they do not have an impact on the receiving water environment in accordance with the relevant legislation (primarily the Local Government (Water Pollution) Act, 1977 and 1990 as amended and Groundwater Threshold Value (Groundwater Directive S.I. No. 9 of 2010 and amendment; S.I. No. 366 of 2016) and EPA Interim Guidelines for groundwater where available) such that they would be required to manage runoff and fuel leakages.
- There will be a further loss of greenfield area locally however, the area of development is small in the context of the overall agricultural land available in the region. It is likely that the land use will change over time based on the current zoning of the proposed land in the vicinity as EE. The site is an existing underdeveloped business campus, zoned for 'Industry and Warehousing' in *the Leixlip Local Area Plan 2020-2023 (extended to 2026).*

The residual cumulative effect on land, soils, geology and hydrogeology for the construction and operation phases are anticipated to be **long-term**, **neutral** in terms of quality and of **not significant**, once the appropriate mitigation measures are put in place for each development.

RECEIVED: 18/07/2023

7.7 Interaction Impacts with Hydrology

Construction Phase

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

Taking into account the design and mitigation measures set out in Chapter 6 and 7 of this EIA Report, there is a residual negative interaction between land, soil, and hydrology during the construction phase. The interaction is considered to be ***neutral***, ***not significant***, and ***short term***.

Operational Phase

Taking into account the design and mitigation measures set out in 6 (Hydrology) and Chapter 7 (Land, Soils and Hydrogeology) of this EIA Report there are no potentially significant interactions identified between land, soils and hydrogeology, and hydrology during the operational phase.

7.8 Interaction Impacts with Biodiversity

Construction Phase

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

Taking into account the design and mitigation measures outlined in this Section 7.6.2, there still remains a residual negative interaction between land, soils, geology and hydrogeology and biodiversity during the construction phase. The interaction is considered to be ***negative***, ***not significant***, and ***short term***.

Operational Phase

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

7.9 Interaction Impacts with Air Quality and Climate

Construction Phase

Demolition and construction phase activities such as land clearing, excavations, stockpiling of materials etc. have the potential for interactions between air quality and land and soils and the water environment (hydrology) in the form of dust emissions. With the appropriate

mitigation measures to prevent fugitive dust emissions, it is predicted that interactions between air quality and land and soils and hydrology will be ***short-term*** and ***imperceptible***.

RECEIVED: 18/07/2023

Operational Phase

There are no potentially significant interactions identified between land, soils and hydrogeology, and air quality and climate during the operational phase

7.10 Interaction Impacts with Noise and Vibration

Construction Phase

There are no potentially significant interactions identified between land, soils and hydrogeology, and noise and vibration during the construction phase.

Operational Phase

There are no potentially significant interactions identified between land, soils and hydrogeology, and noise and vibration during the operational phase.

7.11 Interaction Impacts with Landscape and Visual Impacts

Construction Phase

There are no potentially significant interactions identified between land, soils and hydrogeology, and landscape and visual impacts during the construction phase.

Operational Phase

There are no potentially significant interactions identified between land, soils and hydrogeology, and landscape and visual impacts during the operational phase.

7.12 Interaction Impacts with Archaeological, Architectural and Cultural Heritage

Construction Phase

There are no potentially significant interactions identified between hydrology, and archaeological, architectural and cultural heritage during the construction phase.

Operational Phase

There are no potentially significant interactions identified between land, soils and hydrogeology, and archaeological, architectural and cultural heritage during the operational phase.

7.13 Interaction Impacts with Material Assets, including Utilities, Waste, and Transport

Construction Phase

There are no potentially significant interactions identified between land, soils and hydrogeology, and material assets during the construction phase.

Operational Phase

There are no potentially significant interactions identified between land, soils and hydrogeology, and material assets during the operational phase.

RECEIVED: 18/07/2023

7.14 Mitigation Measures and Monitoring of Impacts

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

There are no relevant other permitted or proposed developments within the immediate vicinity of the proposed development site.

Construction Phase

During construction phase the following monitoring measures will be implemented:

- Implementation of a Construction & Environmental Management Plan (CEMP);
- Sources of fill and aggregates for the Proposed Development;
- Fuel and chemical handling, transport and storage; and
- Control of water during construction.

As a result, there will be minimal cumulative potential for change in the natural geological and hydrogeological regime. The cumulative impact is considered to be ***short-term***, ***neutral*** and ***imperceptible***.

Operational Phase

A number of design measures will be put in place to minimise the likelihood of any spills entering the groundwater environment. An existing bypass petrol interceptor is located upstream of the outfall from the site, and it is proposed to retain this interceptor. Furthermore, it is a requirement for car parking areas with 10 spaces or more as outlined in Section 20.1 of the Greater Dublin Regional Code of Practice.

There is potential for surface water and condensate to accumulate in the exhaust stacks which serve the generators. Gullies which serve the exhaust stacks will discharge to a dedicated surface water drainage pipe which will be connected to a Class 1 full retention separator. Two full retention interceptors will be required, per data centre building, to serve the exhaust stacks. In the event of an accidental leakage of oil from the parking areas, this will be intercepted by the drainage infrastructure proposed.
The following mitigation measures will be undertaken at the operational stage to manage any leaks from vehicles resulting in soil and/or groundwater quality impacts:

- Provision of spill kit facilities and training of operatives in use of same;
- Where mobile fuel bowsers are used the following measures will be taken:
  - Any flexible pipe, tap or valve will be fitted with a lock and will be secured when not in use;
  - The pump or valve will be fitted with a lock and will be secured when not in use;

- All bowsers to carry a spill kit;
- Operatives must have spill response training; and
- Portable generators

RECEIVED: 18/07/2023

7.15 Residual Impacts

The proposed development with mitigation will have no significant impact on the natural groundwater regime either qualitatively or quantitatively.

Construction Phase

Following the implementation of mitigation measures detailed in Section 5.6.1 above, the predicted impact on the geological and hydrogeological environment during the construction phase is ***neutral, imperceptible*** and ***short-term,*** the magnitude of impact is considered ***negligible***.

Operational Phase

Following the implementation of mitigation measures detailed in Section 5.6.2 above, the predicted impact on the geological and hydrogeological environment during the construction phase is ***neutral, imperceptible*** and ***long-term,*** the magnitude of impact is considered ***negligible***.

RECEIVED: 18/07/2023

8.0 HYDROLOGY

This chapter of the Environmental Impact Assessment Report (EIAR) has been prepared by AWN Consulting and assesses and evaluates the potential for significant impacts on the surrounding hydrological environment associated with the proposed development.

This assessment considers the following:

A. The 'principal' works subject to the development consent being sought from Kildare County Council, i.e. the proposed development; and
B. 'Facilitation works' required to support the development which do not form part of the development consent being sought from Kildare County Council. The facilitation works include a mix of works that will be required to be undertaken for or on behalf of statutory undertakers such as Gas Networks Ireland and EirGrid.

The principal works include the proposed expansion of the existing innovation campus and all those works included within the redline boundary and described on the statutory notices accompanying the application. The facilitation works are those known works that are expected to be required to facilitate the proposed development over the life of the permission being sought.

In assessing likely impacts, account is taken of both the importance of the existing hydrological attributes and the predicted scale and duration of the likely impacts.

8.1 Receiving Environment

The receiving environment is discussed in terms of hydrology, flood risk and water quality. The principal site, Kildare Innovation Campus (KIC), is located in north east Kildare, in the administrative district of Kildare County Council. The site is an existing underdeveloped business campus, zoned for 'Industry and Warehousing' in *the Leixlip Local Area Plan 2020-2023 (extended to 2026).* Leixlip town is located 4km to the north and Dublin city centre is located approximately 21km to the east.

8.2 Principal Works

The site is principally bounded by: the M4 Motorway to the north; Cellbridge Road to the east; Barnhall Rugby Football Club to the south; and by grounds associated with Castletown House to the west. The River Liffey flows in a north-easterly direction on the opposing side of Celbridge Road to the east of the site where the Liffey Reservoir is also located. To the immediate west and east of the site agricultural lands are located - refer to Figure 8.1 below.

The site has an overall area of c. 72.23 ha. The planning application site covers the majority of the existing business campus, with a 5.7-hectare parcel of land known as the DB Schenker (DBS) site being excluded as it has recently been developed in accordance with a separate planning permission (KCC Reg. Ref:. 20-873). The planning application site also includes a portion of Celbridge Road along the eastern boundary of the site which will cater for a new access to the campus.

RECEIVED: 18/07/2023

8.3 Facilitation Works

The facilitation works include a mix of works that will be required to be undertaken for or on behalf of statutory undertakers such as Gas Networks Ireland and EirGrid.

GNI Upgrades

The GNI upgrades will be delivered through a local upgrade of the gas network over a length of approximately 1.5km through predominantly residential areas. The route of the upgrades will be along Ryevale Lawns along Station Road, Old Hill and Celbridge Road for a distance of approximately 1.5km up to the entrance of Barnhall Meadows running underground through the Barnhall Meadows lands (adjacent to the existing haul road) before crossing the M4 Motorway through Horizontal Directional Drilling and enter the Kildare Innovation Campus then connecting to the proposed Gas Skid.

EirGrid Uprating

Upon completion of Phase 1 of the KIC Masterplan, including the development of the proposed replacement 110kV Substation, uprating of existing overhead lines from the replacement 110kV Rinawade substation to Derryiron/Maynooth and Dunfirth/Kinnegad will be required to facilitate commencement of Phase 3 of the KIC Masterplan. The uprating will be carried out to existing lines along established wayleaves primarily traversing agricultural lands.

Due to the nature of the proposed EirGrid works being minimal and comprising only minor line and structural replacement, they have been scoped out of this assessment as the interaction between land, soils, geology and hydrogeology with the proposed works is negligible.

> The surrounding environment for both the principal and facilitation works can be described as a mix of agricultural and residential. The site location map for the proposed development is presented in presented in Figure 8.1 below.

A detailed description of the project is outlined in Chapter 2 of this EIAR.

8.4 Likely Impacts of the Proposed Development

Construction Phase

In absence of mitigation measures, the construction phase would present potential impacts associated to the following activities:

- Increased sediment loading in run-off;
- Excavations for foundations, services and landscaping; and
- Accidental spills and leaks.

The magnitude of the impact for the construction phase without mitigation and design measures is ***Temporary*** in duration with ***Slight*** effect rating to the hydrological environment present.

RECEIVED: 18/07/2023

However, with the implementation of design and mitigation measures for the Proposed Development site the impact of the construction phase is ***short-term*** in duration with an ***Imperceptible*** effect rating.

Operational Phase

In absence of mitigation measures, the construction phase would present potential impacts associated to the following activities:

- Increase in hardstanding;
- Surface water run-off; and
- Fuel and other accidental spills.

Without the consideration of mitigation measures, the operational phase of the proposed development will likely have a **Neutral**, **Long-Term** and **Slight** impact.

With the implementation of the appropriate mitigation measures outlined in Section 8.6.2, the operational phase of the proposed development will likely be ***Long-Term, Neutral*** in terms of quality and ***Not Significant.***

8.5 Mitigation Measures and Monitoring of Impacts

Construction Phase

In order to reduce impacts on the hydrological environment, a number of mitigation measures will be adopted as part of the construction works on site.

- Implementation of a Construction & Environmental Management Plan (CEMP);
- Surface water management during construction;
- Fuel and chemical handling; and
- Soil removal and compaction.

Operational Phase

A number of design measures will be put in place to minimise the likelihood of any spills entering the groundwater environment. In the event of an accidental leakage of oil from the site, this will be intercepted by the drainage infrastructure proposed.

The proposed surface water drainage system comprises infiltration areas which operate at a feasible rate. A number of design measures will be put in place. A number of attenuation measures will be implemented to minimise the likelihood of any spills entering the water environment to such as Swales, Tree pits, Green roofs, Filter drains, Permeable paving, Rainwater Harvesting system, Bio-Retention ponds, Hydrocarbon interceptors, Silt Traps and Attenuation facilities.

The Operator of the proposed data centre buildings implements an Environmental Management System at each of its facilities. Prior to operation of the Proposed Development, a comprehensive set of operational procedures will be established (based on those used at other similar facilities) which will include site-specific mitigation measures and emergency

response measures as outlined below, similar procedures will be developed for the DeepTech buildings and energy infrastructure

No further mitigation measures are to be required during the operational phase.

RECEIVED: 18/07/2023

8.6 Likely Cumulative and Interaction Impacts of the Proposed Development

Construction Phase

In relation to the potential cumulative impact on hydrology during the construction phase, the construction works which would have potential cumulative impacts include:

- Surface water run-off during the construction phase may contain increased silt levels or become polluted from construction activities. Run-off containing large amounts of silt can cause damage to surface water systems and receiving watercourses.
- Contamination of local water sources from accidental spillage and leakage from construction traffic and construction materials unless project-specific CEMPs are put in place for each development and complied with.

Operational Phase

In relation to the potential cumulative impact on hydrology during the operational phase, operational works which would have potential cumulative impacts include:

- Increased hard standing areas (171,641.88 m^2) will reduce local recharge to the ground and increase surface water run-off potential if not limited to the green field run-off rate from the site.
- Increased risk of accidental releases from fuel storage/delivery unless mitigated adequately i.e. bunded tank.
- Increased risk of accidental discharge of hydrocarbons from car parking areas and along roads and unless diverted to surface water system with petrol interceptor; and
- Any additional foul discharges should be treated where appropriate and/or diverted to the foul sewer system and not directly to ground.

All developments will be required to manage any discharges to water and operate in compliance with relevant legislation (European Communities Environmental Objectives (Surface Waters); Regulations, 2009 (S.I. No. 272 of 2009 as amended by SI No. 77 of 2019). As such there will be no likely cumulative impact on water quality.

Increase in wastewater loading and water supply requirement is an impact of all developments: Each development will require approval from the IW confirming available capacity in the water and wastewater infrastructure. The surface water and foul drainage infrastructure and water supply requirements for the proposed development has been designed and assessed to accommodate the requirements of the proposed development.

Development will result in an increase in hard standing which will result in localised reduced recharge to ground and increase in run-off rate. However, each permitted development is required by the Local Authority and IW to comply with the Greater Dublin Strategic Drainage Strategy (GDSDS) and Local Authority and IW requirements by providing suitable attenuation

on site to ensure greenfield run-off rates and ensure that there is no increase in offsite flooding as a result of development.

RECEIVED: 28/7/2023

The residual cumulative impact on hydrology for the construction and operation phases is anticipated to be ***Long-Term, Neutral*** in terms of quality and ***Not Significant***, once appropriate mitigation measures to manage water quality runoff in compliance with legislative requirement are put in place for each development.

8.7 Interaction Impacts with Biodiversity

Construction Phase

Dust emissions have the potential to settle on plants causing impacts to local ecology. Mitigation measures during the construction phase of the proposed development will ensure that dust generation is minimised and the effect on biodiversity will be short term, imperceptible and neutral.

There is potential for impacts to biodiversity associated with uncontrolled discharges to surface waters. In this instance the site discharges its surface water runoff directly into the Leixlip Reservoir via an outfall pipe following confirmation of water quality through electronic monitoring mechanisms inclusive of shut off valves, upstream of the existing retention ponds near the existing site entrance off the Celbridge Road.

There is an indirect hydrological connection with a number of nationally and internationally important habitats located within Dublin Bay. However due to the hydrological distance of removal and volume, there are no adverse effects anticipated (c. 22km to the east). The use of standard demolition and construction control measures as provided in the CEMP and the standard sustainable urban drainage systems implemented on-site will result in no potential for impact on biodiversity downstream of the site. The impact upon biodiversity from hydrological impacts would be long-term and neutral.

Taking into account the design and mitigation measures set out in Chapter 6 of this EIA Report, there remains a residual negative interaction between hydrology, and biodiversity during the construction phase. The interaction is considered to be ***negative***, ***not significant***, and ***short term***.

Operational Phase

There is potential for impacts to biodiversity associated with uncontrolled discharges to surface waters. In this instance the site discharges its surface water runoff directly into the Leixlip Reservoir via an outfall pipe following confirmation of water quality through electronic monitoring mechanisms inclusive of shut off valves, upstream of the existing retention ponds near the existing site entrance off the Celbridge Road.

There is an indirect hydrological connection with a number of nationally and internationally important habitats located within Dublin Bay. However due to the hydrological distance of removal and volume, there are no adverse effects anticipated (c. 22km to the east). The use of standard demolition and construction control measures as provided in the CEMP and the standard sustainable urban drainage systems implemented on-site will result in no potential for impact on biodiversity downstream of the site. The impact upon biodiversity from hydrological impacts would be long-term and neutral.

RECEIVED: 18/07/2023

Taking into account the design and mitigation measures set out in Chapter 6 of this EIA Report, the interaction between hydrology, and biodiversity during the operational phase is considered to be ***neutral***, and ***long term***.

8.8 Interaction Impacts with Air Quality and Climate

Construction Phase

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

Mitigation measures implemented during the construction phase will ensure that the deposition of dust is minimised. With the appropriate mitigation measures to prevent fugitive dust emissions, it is predicted that there will be no significant interactions between air quality and hydrology.

The interaction is considered to be ***negative***, ***not significant***, and ***short term***. There are no potentially significant interactions identified between hydrology, and climate during the construction phase.

Operational Phase

There are no potentially significant interactions identified between hydrology, and air quality during the operational phase. Climate change has the potential to lead to increased rainfall in future years which may result in flood impacts and interactions between Hydrology and Land, Soils and Geology.

A detailed Site Specific Flood Risk Assessment (SSFRA) was carried out for the proposed development which states that the site is located in Flood Zone C with an annual probability of flooding (fluvial) of less than 0.1%.
The site is divided up into five catchment areas. These areas are defined by the topographical characteristics of the site and the proposed finish levels of the development. Each catchment collects the surface runoff and attenuates it within a pond up to the 1:100 year event. A flow control device will be installed within each catchment to slowly releases the water into the existing ponds. The SuDs features have been designed to provide sufficient capacity to contain and convey all surface water runoff associated with the 1 in 100-year event plus an additional allowance of 30% for climate change and 10% urban creep.

Therefore it can be determined that there is no significant risk to the proposed development as a result of increased rainfall and climate. No significant interactions between climate, hydrology and land, soils and ecology is predicted.

8.9 Noise and Vibration

Construction Phase

There are no potentially significant interactions identified between hydrology, and noise and vibration during the construction phase.
Operational Phase

RECEIVED: 18/07/2023

There are no potentially significant interactions identified between hydrology, and noise and vibration during the operational phase.

8.10 Landscape and Visual Impacts

Construction Phase

There are no potentially significant interactions identified between hydrology, and landscape and visual impacts during the construction phase.

Operational Phase

There are no potentially significant interactions identified between hydrology, and landscape and visual impacts during the operational phase.

8.11 Archaeological, Architectural and Cultural Heritage

Construction Phase

There are no potentially significant interactions identified between hydrology, and archaeological, architectural and cultural heritage during the construction phase.

Operational Phase

There are no potentially significant interactions identified between hydrology, and archaeological, architectural and cultural heritage during the operational phase.

8.12 Material Assets, including Utilities, Waste, and Transport

Construction Phase

There are no potentially significant interactions identified between hydrology, and material assets during the construction phase.

Operational Phase

The proposed development will follow the SuDS and surface water management strategy; utilising an innovative natural based SuDS components to provide the necessary processes to control runoff frequency, flow rates and volumes. The use of SuDS during operations will mean that the runoff will discharge from the proposed bioretention and attenuation systems before out falling to the existing pond system and existing monitoring regime on-site resulting in a reduction of surface water discharge from the development site. This will have a net positive result on the downstream surrounding areas as the potential for flooding will be reduced and the overall discharged runoff will have an improved water quality due to the proposed SuDS upgrades. The SuDs features have been designed to provide sufficient capacity to contain and convey all surface water runoff associated with the 1 in 100-year event plus an additional allowance of 30% for climate change and 10% urban creep. This is as per Kildare County Council Water Services Department draft guidance on Drainage and SuDS Strategy.

Attenuation measures include bio retention areas, attenuation ponds, swales, filter drains, permeable paving and hydrocarbon interceptors. The interaction is considered to be ***negative***, ***not significant***, and ***long-term***.

RECEIVED: 18/07/2023

8.13 Mitigation Measures and Monitoring of Cumulative and Interaction Impacts

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

There are no relevant other permitted or proposed developments within the immediate vicinity of the proposed development site.

Construction Phase

Every development will have to incorporate SuDS measures to protect water quality in compliance with legislative standards for receiving water quality (European Communities Environmental Objectives (Surface Water) Regulations (S.I. 272 of 2009 and S.I. 77 of 2019).

During construction phase the following monitoring measures will be implemented:

- Regular inspection of surface water run-off and sediments controls (e.g., silt traps);
- Soil sampling to confirm disposal options for excavated soils in order to avoid contaminated run-off; and
- Regular inspection of construction / mitigation measures (e.g., concrete pouring, refuelling, etc).

As a result, there will be minimal cumulative potential for change in the natural hydrological regime. The cumulative impact is considered to be ***short-term***, ***neutral*** and ***imperceptible***.

Operational Phase

All the operational cumulative developments are required to manage discharges in accordance with S.I 272/2009 and 77/2019 amendments. As such there will be no cumulative impact to surface water quality and therefore there will be no cumulative impact on the Surface Waterbody Status.

During operational phase the following monitoring measures will be implemented:

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

The operation of the proposed development is concluded to have a ***long-term***, ***imperceptible*** significance with a ***neutral*** impact on surface water quality.

8.14 Residual Impacts

The residual effects are the final predicted or intended effects which occur after the proposed mitigation measures have been implemented. It will not always be possible or practical to mitigate all adverse effects.

This assessment has identified the potential for major accident hazards to occur. These scenarios can have significant consequences; however, the likelihood of these events occurring is low due to engineering and operational safeguards that will be implemented at the development. The Land Use Planning Assessment concluded that the risk contours do not extend off-site; therefore, there are no impacts to off-site receptors.

RECEIVED: 18/07/2023

In the case of the Proposed development, there will be no significant residual impacts; the potential impact on surface water during operation and closure (following the EPA Draft EIA Report Guidelines (2017) will be l***ong term, imperceptible*** and ***neutral*** i.e. an impact capable of measurement but without noticeable consequences.

9.0 AIR QUALITY

RECEIVED: 18/07/2023

This chapter of the EIA Report evaluates the impacts which the Proposed Development may have on air quality.

In terms of the existing air quality environment, baseline data and data available from similar environments indicates that levels of nitrogen dioxide, are generally well below the National and European Union (EU) ambient air quality standards.

Construction Phase

During the construction phase there is the potential for dust emissions to impact nearby sensitive receptors resulting in potential dust soiling and human health impacts. Best practice mitigation measures have been proposed for the construction phase of the Proposed Development in order to mitigate potential dust impacts. Provided the mitigation measures outlined within Chapter 9 are implemented construction dust impacts will be ***short-term, localized*** and ***neutral*** at nearby sensitive receptors.

Operational Phase

Air dispersion modelling of operational phase emissions from the Proposed Development was carried out using the United States Environmental Protection Agency's regulatory model AERMOD. The aim of the study was to assess the contribution of operational emissions of NO_2 from the Proposed Development to off-site levels of this pollutant. Both the methodologies of the USEPA and UK Environment Agency were included within the assessment as per guidance issued by the Irish EPA. Modelling was conducted for the flowing three scenarios:

- **Do Nothing Scenario:** Under the Do Nothing Scenario no air emissions will take place. The ambient air quality at the site will remain as per the baseline and will change in accordance with trends within the wider area, changes in road traffic, etc.). Therefore, this scenario can be considered ***neutral*** in terms of air quality.
- **Proposed Development Scenarios:** The Do Something Scenario comprises the continuous operation of the CTGs as a worst-case although in reality they will not operate more than 330 days per year. In addition, the operation of the backup generators for 250 hours per year which involves the emergency operation of 72 of the 80 generators (the remaining generator serving as a "catcher" generator) has also been modelled in the same modelling run in order to capture the impact of both the CTGs and the back-up generators. The scenario also included weekly testing of all 80 generators at 25% load for 30 minutes and load bank testing at 90% load of all generators for one hour four time per year.
- **Cumulative Impact:** There are no nearby sources with emissions of NO_2/NO_x of sufficient magnitude to overlap with site emissions from the proposed facility and thus therefore no offsite cumulative impacts are anticipated. With appropriate mitigation measures it is not predicted that any cumulative impacts will occur during the combined construction and operational phase due to NO_2/NO_x impacts

<u>USEPA Methodology</u>

The modelling assessment has found that ambient NO_2 concentrations as a result of the operation of the CTGs and the emergency operations and scheduled testing of the standby diesel generators are in compliance with the relevant ambient air quality limit values at all locations at or beyond the site boundary under all scenarios modelled.

Based on the operation of the CTGs on a continuous basis, as a worst-case, and the operation of the backup generators for 250 hours per year in addition to the scheduled weekly and load banking testing of all back-up generators, the results indicate that the ambient ground level concentrations are within the relevant air quality standards for NO_2. For the maximum year modelled, emissions from the site lead to an ambient NO_2 concentration (including background) which is 63% of the maximum ambient 1-hour limit value (measured as a 99.8th percentile) and 94% of the annual limit value at the maximum off-site receptor. Concentrations decrease with distance from the site boundary.

RECEIVED: 18/07/2023

UK EA Methodology

The results indicate that in the maximum year, the emergency generators for the Proposed Development can operate for up to 345 hours per year in addition to the continuous operation of the CTGs, as a worst-case, before there is a likelihood of an exceedance of the ambient air quality standard (at a 98th percentile confidence level).

However, the UK guidance recommends that there should be no running time restrictions placed on these generators which (aside from testing) are only used to provide power on site only during an emergency scenario.

Human Health

The best practice dust mitigation measures that will be put in place during construction of the Proposed Development will ensure that the impact of the development complies with all EU ambient air quality legislative limit values which are based on the protection of human health. Therefore, the impact of construction of the Proposed Development is likely to be short-term and imperceptible with respect to human health.

As demonstrated by the dispersion modelling results, pollutant concentrations with the Proposed Development operations are compliant with all National and EU ambient air quality limit values and, therefore, will not result in a significant impact on human health.

Mitigation Measures

A dust management plan will be implemented during the construction phase of the Proposed Development to ensure that no significant dust nuisance occurs outside the site boundary.

With regards to the operational phase, provided each stack is built to the minimum heights determined by the air dispersion modelling, no further mitigation measures are required.

Residual Impacts

Once the mitigation measures outlined in Section 8.6 are implemented, the residual impacts on air quality from the construction of the proposed development, based on the EPA EIAR Guidelines (EPA, 2022), will be ***short-term*** and ***neutral*** and for the operational phase of the proposed development will be ***long-term, negative*** and ***slight.*** Thus, in terms of air quality, both the construction phase and operational phase will be ***not significant***.

10.0 CLIMATE

RECEIVED: 28/07/2023

This chapter of the EIA Report evaluates the impacts which the Proposed Development may have on climate. In terms of baseline data, provisional national total emissions (including LULUCF) for 2021 are 69.29 Mt CO_2eq, these have used 23.5% of the 295 Mt CO_2eq Carbon Budget for the five-year period 2021-2025. This leaves 76.5% of the budget available for the succeeding four years, requiring an 15.4% average annual emissions reduction from 2022-2025 to stay within budget.

Do Nothing Scenario – Construction Phase

Under the Do Nothing Scenario no construction works will take place and the impacts of GHG emissions from equipment and machinery will not occur. Therefore, this scenario can be considered ***neutral*** in terms of climate.

Construction Phase

Based on the scale and temporary nature of the construction works, the potential impact on climate change from the construction of the Proposed Development is deemed to be ***short-term*** and ***imperceptibly negative*** in relation to Ireland's obligations under the EU ETS 2030 target and the National Carbon Budget for the period 2021-2025.

Impact of Climate Change on the Construction Phase

Appropriate flood risk measures and extreme weather events have been considered as part of the construction planning. However, the potential for changes to long-term seasonal averages as a result of climate change are not considered to be as significant. Thus, the likelihood of extreme weather and flooding is assessed to be of either very low or low likelihood and with a moderate adverse effect leading to a finding of low risk and thus a non-significant impact.

Do Nothing Scenario – Operational Phase

Under the Do Nothing Scenario no GHG emissions will take place. The site will remain as per the baseline and will change in accordance with trends within the wider area, (changes in road traffic, etc.). Therefore, this scenario can be considered ***neutral*** in terms of climate.

Operational Phase

The proposed development has the potential, in the absence of mitigation, to release significant quantities of GHG emissions during the operational phase of the project. However, as the proposed development is over 20 MW, a greenhouse gas emission permit will be required for the facility which will be regulated under the EU-wide Emission Trading System (ETS) which necessitates operating under a "cap and trade" scheme.

The direct (due to onsite natural gas and diesel usage) and indirect CO_2 emissions from electricity to operate the facility has been assessed below in the context of Ireland's national annual CO_2 emissions.

The project's GHG emissions for each scenario has been compared to the 2030 Emission Trading System budget and to the Electricity 2030 Sectoral Emission Ceiling based on the

approach set out in IEMA guidance (IEMA, 2022). The assessment is presented both prior to and post mitigation. The impact of the project prior to mitigation would be deemed to be a moderate, significant, adverse impact. Although the project prior to mitigation is better than the "do-nothing" scenario of enterprise computers, the impact would still be significant in the absence of appropriate mitigation.

RECEIVED: 18/07/2023

Through a series of measures including project replacement, a reduction in residual emissions through best practice and the implementation of a series of adaptive design measures, the net impact of the proposed development is not significant. The applicant intends to undertake a Corporate Power Purchase Agreement (CPPA) which will provide a percentage of renewable gas for power generation to the Irish grid. The CPPAs will be between the applicant's group and the data centre end user and provide for the establishment of new renewable energy generation projects by the applicant's group or data centre end user which demonstrates that the energy consumed by the data centre development on site is offset with renewable energy generation.

Given that the use of natural gas and electricity to power the facility will achieve net zero by 2050 and the facility will use CPPAs as outlined above, the predicted impact to climate, after mitigation, is deemed to be ***long-term, negative*** and ***minor adverse***.

Impact of Climate Change on the Operational Phase

Climate change has the potential to alter weather patterns and increase the frequency of rainfall in future years. As a result of this there is the potential for flooding related impacts on site in future years. Chapter 8 (Hydrology & Hydrogeology) has investigated the likelihood of flooding and has found that there is no current or predicted flood risk (either fluvial, pluvial or coastal) for the Site. Thus, the likelihood of extreme weather and flooding was assessed to be of low likelihood and with a moderate adverse effect leading to a finding of low risk and thus a non-significant impact.

Mitigation Measures

Construction Phase

The objective of the mitigation measures outlined below is to ensure that GHG emissions are minimized wherever possible during the construction phase. The measures will include:

- All vehicles will be required to switch off engines when stationary (no idling);
- All vehicles will be serviced and maintained to ensure emissions are minimised;
- Where practicable, materials will be reused within the extent of the Proposed Development; and
- Where practicable, materials will be sourced locally to reduce the embodied emissions associated with transport.

Operational Phase

The CTGs and diesel generators will be regularly serviced to ensure that they operate to their maximum efficiency. In addition, the data centre will be designed to minimize energy use including the use of passive solar design, natural ventilation and incorporating the following features:

- Provision of significant Solar PV installations with c.8,560 panels being proposed across the 4no. data centre buildings and the 2no. Deeptech buildings.
- A green wall will be installed within the campus which will be the equivalent of 322 medium sized trees in terms of carbon sequestration.
- Use of Hydrotreated Vegetable Oil (HVO) as back-up fuel source for the Energy Centre upon full build out rather than diesel.
- Implement District Heating system, which will use recaptured heat produced from the data centres to provide recycled heat the existing campus buildings being retained as well as the new buildings A1 and A2. Further to this, the district heating system has been designed to provide export heat to surrounding community uses.

RECEIVED: 28/07/2023

The facility is committed to running the data centre in the most environmentally friendly way possible with a long-term goal to power the facility using 100% renewable energy where feasible.

Residual Impacts

The Institute of Air Quality Management document '*Guidance on the Assessment of Dust from Demolition and Construction'* (IAQM, 2014) states that site traffic and plant is unlikely to make a significant impact on climate. Based on the scale and temporary nature of the construction works and the intermittent use of equipment, the predicted impact on climate change from the proposed development, after mitigation, is deemed to be ***short-term, neutral*** and ***not significant*** in relation to Ireland's obligations under the EU Effort Sharing Agreement 2030 target.

Once the mitigation measures outlined in Section 10.7 are implemented, the residual impacts on climate from the operational phase of the proposed development will be ***long-term, negative*** and ***minor adverse.***

Thus, in terms of climate, both the construction phase and operational phase will be ***not significant***.

11.0 NOISE & VIBRATION

RECEIVED: 28/07/2023

The baseline noise environment has been established through an environmental noise surveys conducted at the site in order to quantify the existing noise environment. The survey was conducted in accordance with ISO 1996: 2017: Acoustics – Description, measurement and assessment of environmental noise.

Construction Phase

There is no published statutory Irish guidance relating to the maximum permissible noise level that may be generated during the construction phase of a project. Local authorities or An Bord Pleanála normally control construction activities by imposing limits on the hours of operation and/or applying noise limits for construction noise at noise-sensitive locations.

Reference has been made to BS 5228 2009+A1 2014 Code of practice for noise and vibration control on construction and open sites. Part 1 to set appropriate construction noise limits for the development site. Construction noise contours have been prepared on this basis using computer-based noise modelling.

Construction noise levels predicted at nearest sensitive properties are predicted to be below the threshold for significant impact during the general construction phase. The application of binding noise limits, hours of operation, along with implementation of appropriate noise and vibration control measures, will ensure that noise and vibration impact are minimised.

At noise sensitive locations in the surrounding area potential negative, not significant and short-term effects are likely.

Operational Phase

The primary sources of outward noise in the operational context are long term and will comprise noise from the generators in the energy centre, the cooling and ventilation plant serving the data centres.

The proposed development also includes emergency generators for use when a power outage or issue with supply from the national grid has occurred and is required to keep the data centres operation. It should be noted that such an event is an extremely rare occurrence.

Detailed computer-based noise modelling of the site shows that the noise levels at noise-sensitive locations are within the noise criteria taking the energy centre, the data centres and the substation into account. Similarly, the predicted noise levels for the emergency generators, combined with the energy centre and data centre plant, are within the criteria for emergency operations.

In the context of the surrounding road network the proposed development will not generate significant additional traffic noise.

The overall effect is therefore negative, not significant to moderate and long-term.

RECEIVED: 19/07/2023

12.0 MATERIAL ASSETS – WASTE MANAGEMENT

12.1 Introduction

AWN Consulting Ltd. carried out an assessment of the potential impacts associated with waste management during the construction and operational phases of the proposed development. The receiving environment is largely defined by Kildare County Council (KCC) as the local authority responsible for setting and administering waste management activities in the area through regional and development zone specific policies and regulations.

12.2 Methodology

The assessment of the impacts of the Proposed Development, arising from the consumption of resources and the generation of waste materials, was carried out taking into account the methodology specified in relevant guidance documents, along with an extensive document review to assist in identifying current and future requirements for waste management, including national and regional waste policy, waste strategies, management plans, legislative requirements and relevant reports. A summary of the documents reviewed, and the relevant legislation is provided in the Resource & Waste Management Plan (RWMP) Appendix 12.1 and section 12.6 of the chapter.

12.3 Baseline Environment

The Project is an integrated masterplan proposal that includes for the expansion of the existing campus, allowing for a mix of Deep Tech, ICT and Innovation uses.

There will be waste materials generated from the from the demolition (Buildings No's 7, 8 and 9 and renovation (Building No's 1-6) of the existing buildings and hardstanding areas on site to accommodate the new development.

There is currently a quantity of waste generated and managed at the proposed development site from the operation of the existing buildings. This waste will cease to be generated if the proposed development is approved as the buildings will either be demolished or renovated.

12.4 Potential Impacts of the Proposed Development

The proposed development will generate a range of non-hazardous and hazardous waste materials during the site demolition, construction, and operational phases. If waste material is not managed, stored or disposed of correctly, it is likely to lead to negative impacts via unnecessary landfill use, litter and pollution issues at the proposed development site on a local and regional level.

Construction Phase

During the demolition and construction phase (inc excavations), the mismanagement of waste, including the inadequate storage of waste, inadequate handling of hazardous waste, the use of inappropriate or insufficient segregation techniques, and the use of non-permitted waste contractors, would likely lead to negative impacts such as waste unnecessarily being diverted to landfill, litter pollution which may lead to vermin, runoff pollution from waste and illegal dumping of waste. In the absence of mitigation, the effect on the local and regional environment is likely to be **long-term, significant and negative**.

RECEIVED 19/07/2023

Operational Phase

The potential impacts on the environment during the operational phase of the proposed development would be caused by improper, or lack of waste management. These impacts may arise in the form a segregation system which is not fit for purpose and may lead to waste unnecessarily being diverted to landfill. Inappropriately designed waste storage areas may also lead to litter pollution and potential fly tipping, which may have knock on effects such as the presence of vermin in the affected areas. Similarly, to the construction phase, the use of non-permitted waste contractors or insufficient collections may lead to negative environmental impacts or pollution. In the absence of mitigation, the effect on the local and regional environment is likely to be **long-term, significant and negative**.

12.5 Mitigation and Residual Effects (Post-Mitigation)

Construction Phase

During the demolition and construction phase, typical construction waste materials will be generated which will be source segregated on-site into appropriate skips/containers, within designated waste storage areas and removed from site by suitably permitted waste contractors as required, to authorised waste facilities, by appropriately licensed waste contractors. While the accurate keeping of waste records will be undertaken. All waste leaving the site will be recorded and copies of relevant documentation maintained.

Where possible, materials will be reused on-site to minimise raw material consumption or reuse of materials under Regulation 27 and Regulation 28 will be investigated for reuse on other sites. Source segregation of waste materials will improve the re-use/recycling opportunities of recyclable materials off-site. This will all be overseen by the main contractor, who will appoint a construction phase Resource Manager to ensure effective management of waste during the excavation and construction works. All construction staff will be provided with training regarding the waste management procedures on site.

A carefully planned approach to waste management and adherence to the site-specific Resource and Waste Management Plan (Appendix 12.1) and chapter 12 during the construction phase, this will ensure that the effect on the environment will be **short-term, neutral and imperceptible**.

Operational Phase

During the operational phase, waste will be generated by the operators and staff. Dedicated waste storage areas (WSAs) have been allocated throughout the development for the use of staff. The WSAs have been appropriately sized to accommodate the estimated waste arisings from the development. The WSAs have been allocated to ensure a convenient and efficient management strategy with source segregation a priority. Waste will be collected from the designated waste collection areas by permitted waste contractors and removed off-site for re-use, recycling, recovery and/or disposal.

An Operational Waste Management Plan or Strategy will be prepared by the operator (s) prior to occupation which will provide a strategy for segregation (at source), storage and collection of wastes generated within the development during the operational phase including packaging waste, general non-hazardous waste, non-hazardous WEEE canteen/kitchen waste, packaging, landscaping waste, hazardous WEEE, waste filters, lube oil and other spares and waste batteries. The plan complies with all legal requirements, waste policies and best practice guidelines and demonstrates that the required storage areas have been incorporated into the design of the development. This Plan will be made available to all staff from first

occupation of the development i.e. once the first unit is occupied. This Plan will be supplemented, as required, by the operator as required with any new information on waste segregation, storage, reuse and recycling initiatives that are subsequently introduced.

Provided the mitigation measures outlined in chapter 12 are implemented and a high rate of reuse, recycling and recovery is achieved, the predicted effect of the operational phase on the environment will **be long-term, neutral and imperceptible**.

RECEIVED: 18/07/2023

12.6 Cumulative Impact of the Proposed Development

Construction Phase

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

Due to the high number of waste contractors in the KCC region, as provided from the National Waste Collection Permit Office and the EPA, there would be sufficient contractors available to handle waste generated from a large number of these sites simultaneously, if required. Similar waste materials would be generated by all of the developments.

Other developments in the area will be required to manage waste in compliance with national and local legislation, policies and plans which will mitigate against any potential cumulative effects associated with waste generation and waste management. As such the cumulative effect will be **short-term, imperceptible and neutral**.

Operational Phase

There are existing residential and commercial developments close by, along with the multiple permissions remaining in place. All of the current and potential developments will generate similar waste types during their operational phases. Authorised waste contractors will be required to collect waste materials segregated, at a minimum, into recyclables, organic waste and non-recyclables. An increased density of development in the area is likely improve the efficiencies of waste collections in the area.

Other developments in the area will be required to manage waste in compliance with national and local legislation, policies and plans which will mitigate any potential cumulative impacts associated with waste generation and waste management. As such the cumulative effect will be a **long-term, imperceptible and neutral**.

13.0 MATERIAL ASSETS: TRAFFIC AND TRANSPORTATION

RECEIVED: 18/07/2023

Chapter 13 of the EIAR assess the likely effects on traffic and transport arising from the Proposed Development on the surrounding environment.

13.1 Receiving Environment

The site is strategically located southeast of the M4 junction 6 interchange. The site is bounded by the M4 to the north which separates it from Leixlip urban area. Located to the southwest is Castletown House, and beyond that, the town of Celbridge. the current Kildare Innovation Campus occupies the site, with access from the R404 to the east and Barnhall Road to the west. Internal road and path network are currently private.

Footways and segregated cycle lanes are provided in both directions on the Barnhall Road and on the R449 which is the primary access route to the site. This high standard of footway and segregated cycle lanes is maintained along the R449 and R405 which link the development site with the towns of Leixlip and Celbridge.

To the east of the site, the R404 provides a footway in both directions, however no cycle facilities are available along this route. Internally there are a total of 50 cycle parking spaces for the existing site users.

There are facilities within the site for staff including canteen and gym which limit the need to travel offsite during the working day. The site benefits from bus links and is within close proximity to train stations.

13.2 Predicted Effects of the Proposed Development

The assessment focuses on predicted impacts in relation to traffic and transportation. The assessment relates to impacts occurring during both the construction and operational phases of the development.

Do Nothing
The site, under previous occupants Hewlett Packard, employed up to 3,000 staff. Current occupancy is understood to be 800 staff. Kildare County Council's Local Area Plan (LAP) 2020-2026 recognises that, given the size and scale of the site, it is important to work with all stakeholders to ensure the site can be redeveloped and remain a key employment hub, both for Leixlip, and for the wider Dublin Metropolitan Area. The site is currently zoned for category H: Industry and Warehousing.

It is likely that in the absence of this proposal that a development of a similar nature will be brought forward to fulfil the above aspirations of Kildare County Council.

Construction Phase
The construction phase will be short-term in nature relative to the operational phase with the construction taking place across three phases of development. All HGV traffic will be routed to and from the site to the west to junction 6 on the M4. Temporary car and cycle parking facilities for construction vehicles and staff will be provided within the site boundary.

RECEIVED: 28/07/2023

As the application progresses it will be possible to make a more informed assumption of staff traffic during construction periods. This will be agreed with the road section of Kildare County Council.

Construction traffic associated with the known facilitation works will be managed by GNI and ESB / Eirgrid, through traffic management plans.

Operational Phase
The operational assessment has been undertaken in line with Transport Infrastructure Ireland (TII's) Traffic and Transport Assessment Guidelines using microsimulation VISSIM model to assess the surrounding network. Traffic surveys undertaken in October 2022 informed the traffic assessments.

In total, it is anticipated that the development will generate a net increase of 178 two-way pcu movements during the AM peak and 36 during the PM peak. This is the total operational traffic following the demolition of existing buildings on site.

Trips are primarily distributed in accordance with background traffic patterns recorded during the traffic surveys. The development traffic has been distributed onto the surrounding road network based upon the existing east west split of those currently accessing the site and as per the existing turning movements on the surrounding road network. All HGVs routing to and from the Site are assumed to access and egress via the M4 Junction 6 roundabout and Site Link Road.

An AADT increase assessment indicates a maximum traffic contribution of 36.6% on Barnhall Road is anticipated with lesser impacts experienced on the wider network, varying from 0.5% to 7% on surrounding assessed links.

The effect of the proposed development is envisaged to be not significant, likely, and long term.

13.3 Mitigation Measures

This section highlights the mitigation measures proposed for the construction and operation stages of the proposed development to mitigate potential impacts to the near and wider environment.

Construction Phase

A planning phase Construction Environmental Management Plan (CEMP) submitted under separate cover has been developed as part of the planning process. Mitigation measures have been identified for the construction stage to limit the potential effects. This includes provision for the completion of CEMP and Construction Traffic Management Plan prior to construction commencement. The implementation and monitoring of the CEMP will be managed by the appointed Construction Manager. This process will be repeated for all facilitation works by the associated undertaking companies.

RECEIVED: 18/07/2023

Operational Phase

There are measures which have been included from the outset in the design of the development to reduce any potential negative effects on the local transport network arising from additional traffic generated by the development.

The provision of high-quality walking and cycling access infrastructure, and its integration with the surrounding road network, has the potential to encourage sustainable trip making to the site and its surrounding environs. In particular, the M4 overpass for pedestrian and cyclists provides a more direct route to Leixlip Town Centre and local community facilities and will allow those travelling north and south of the site to traverse the site using dedicated paths. Dedicated crossing facilities are provided to facilitate safe and convenient access for users.

The provision of a bus EV parking hub will provide public transport providers with an opportunity to connect and route from the R404 to Barnhall Road. The provision of the link road, connecting from the R404 to Barnhall Road, will potentially allow existing traffic to shorten their traffic journeys and route away from residential areas such as those on the R404 north of the site.

The assessment concludes that the proposed development will not have a significant effect on the local road network during the operational phase. Notwithstanding this, a Mobility Management Plan has been prepared by SYSTRA (as part of the planning application submission), as a 'best practice' measure, to accompany the planning application. The aim of the Mobility Management Plan is to further reduce the proportion of car trips, from an already low baseline, by promoting sustainable travel by future residents of the development. These mobility measures will also support and enable those residents who may be living 'car-free' providing them with a range of sustainable mobility options and negating the need to own a car.

13.4 Monitoring

Construction Phase
The construction phase will be monitored by the appointed site manager and regular progress reports will be prepared. The manager will ensure the mitigation measures outlined will be implemented and adhered to.

Operational Phase
A Mobility Manager will be appointed from within the management company to ensure the implementation of the Mobility Management Plan. They will act as a point of contact for residents for all mobility and access related issues.

13.5 Residual Effects

Construction phase

The effect of the construction phase in terms of traffic and transport will be imperceptible and short-term in nature. The measures outlined in the CEMP, will help alleviate the effect of the additional traffic and limit the effect to outside the busier peak hours. The measures, including wheel washing and dust mitigation, will also ensure the standard of the public road network is maintained in terms of dust and dirt from construction traffic.

RECEIVED: 18/07/2023

Operational Phase

With the mitigation measures in place, the effect of the proposed development on traffic and transport is envisaged to be slight, likely in probability and long-term. The proposed development will have well-integrated walking and cycling infrastructure to encourage sustainable travel choices to and through the proposed development. The Mobility Management Plan initiatives and design of the campus and its accessibility improvements, including the M4 overpass, re likely to result in lower volumes of car traffic than that assumed in the modelling assessment

13.6 Reinstatement

Following the construction phase, all excavations will be made good, and all hard and soft landscaped areas will be delivered in accordance with the Landscape.

13.7 Interactions and Potential Cumulative Effects

Interactions

Trip generation and resultant traffic flow contribution on the local network impacts on the performance of the road network (in terms of network delays), air quality and noise in the local environment. The impacts on the performance of the transport network are addressed in this EIAR and the Traffic and Transport Assessment report produced by SYSTRA.

The impacts on air quality and noise and vibration are addressed in Chapter 9 Air Quality and Climate (AWN), and Chapter 10 Noise and Vibration (AWN) respectively. The combined impact on Population and Human Health is addressed in Chapter 5 (TPA).

13.8 Potential Cumulative Impacts

Regarding the construction phase, the CTMP will ensure coordination with any known nearby construction. The strict routing for HGVs to the nearby M4 and mitigation measures outlined in the CTMP will ensure impact is slight and short-term.

The road network analysis undertaken accounts for a robust background growth in traffic and known developments, within close proximity to the site, as outlined in Chapters 2 and 3 of this EIAR The results of the analysis conclude that with signals installed at the interchange junction and the link road full operational, that the network operated within capacity.

RECEIVED: 18/07/2023

14.0 MATERIAL ASSETS: SITE SERVICES

14.1 Introduction

This chapter describes the existing material assets (site services) for the foul and surface drainage, potable water, power, gas, heating & telecom aspects of the proposed development site. An assessment is made of the likely impact arising during the construction and operational phases of the proposed development on these elements.

14.2 Foul drainage

Two existing foul pumping stations will be retained and upgraded to accommodate the new developments on the site. Upgrading shall include consideration of the pumps and automated pumping controls upgrade/updating/replacement etc. The station operation data signals etc shall be connected to the new location for the campus facilities management building etc. Underground 24-hour storage tanks shall be provided at each of the existing stations. A new, additional pumping facility shall be provided to service areas of development outside the catchments of the existing stations.

It is not expected that there will be new requirements for new foul connections outside of the overall landholding. The wastewater discharged from the site will ultimately discharge to the Waste Water Treatment Plant at Leixlip. There are no proposed process water emissions.

The wastewater discharge rate previously agreed with Uisce Éireann is in accordance with the discharge rates outlined in the PCE (ref CDS23003038) submitted to Uisce Éireann for the Proposed Development. Foul water drainage is presented in CSEA drawings No 21_048-CSE-ZZ-ZZ-DR-C-2200 and 21_048-CSE-ZZ-ZZ-DR-C-2210 to 21_048-CSE-ZZ-ZZ-DR-C-2218.

14.3 Surface water drainage

The proposed surface water networks for the proposed development collect runoff from roofs, roads and other hard standing areas in a combination of SuDS systems and sealed system of pipes and gullies. The SuDS and surface water management strategy will utilise innovative natural based SuDS components to provide the necessary processes to control runoff frequency, flow rates and volumes. There are five separate surface water drainage networks in the proposed development which are proposed to flow to new surface water attenuation basins (Refer to Drawing No's 21_048-CSE-00-XX-DR-C-2111 to 21_048-CSE-00-XX-DR-C-2118) from which attenuated flows are discharged, via carrier drains, to the existing retention ponds within the site. Each catchment collects the surface runoff and attenuates it within a pond up to the 1:100 year event. A flow control device will be installed within each catchment to slowly releases the water into the existing ponds and monitoring regime on-site which includes an automatic shut off valve in the event of contaminants being detected, from there the water will discharge to the Leixlip Reservoir. The portion of the site on the north side of the M4 will drain into small swales and landscaping and infiltrate to ground. No attenuation or piped infrastructure will be required in this area.
Rainwater runoff from the roof areas of the proposed building will be utilised to reduce water demand. Rainwater harvesting will be utilised from the roof of each data centre throughout the year for the water to be available during those hottest periods during summer months when adiabatic cooling may be needed. Rainwater harvesting from Deep Tech buildings will provide irrigation for green walls across the site. The harvested rainwater will be utilised to offset the demand from Uisce Éireann.

The runoff will discharge from the proposed retention and attenuation systems before outfalling to the existing pond system and monitoring regime on-site which includes an automatic shut off valve in the event of contaminants being detected. The existing outfall from the existing ponds to the Liffey Reservoir is to be retained. Refer to CSEA's *Engineering Services Report Drainage and Water Services* and Ethos *Energy & Sustainability Statement* for further detail.

RECEIVED: 28/07/2023

14.4 Water supply

The existing watermain network for the development areas shall be retained where possible and diverted, where necessary to accommodate the new development areas – refer to CSEA drawings (*Drawing No 21_048-CSE-ZZ-ZZ-DR-C-2300 and Drawing's No 21_048-CSE-ZZ-ZZ-DR-C-2310 – 2318*). The new buildings & road developments shall be serviced from the existing incoming 250mm and 150mm main supply with fire hydrants etc. The Energy Compound, 110kV Substation and Deep Tech Buildings do not have an industrial water demand. General potable supply for drinking and sanitary facilities will be provided from mains supply with rainwater harvesting also proposed to reduce overall water demand. The energy compound will include a Firewater Tank which will be provided from mains supply.
The Data Centres will use the water supplied by Uisce Éireann for domestic and evaporative cooling. The design philosophy will be to limit the evaporative cooling process to peak summer months only. The water used during these peak summer months will be supplied by on-site industrial water storage only. The industrial storage will be filled during the winter months (Dec - Jan - Feb). Using historic weather data it is estimated that evaporative cooling utilizing process water will only commence during peak summer temperatures. For all temperatures below the peak summer days, the cooling system will operate on direct air only and thus the process water usage will be zero (0 l/s). To confirm, no water demand is required during the winter period. The peak industrial water demand for the proposed data centre element of the development is estimated at 5.05 l/s per the submitted PCE (CDS23003038).

14.5 Power supply

The power requirements for the proposed KIC Masterplan will be provided from the 110kV replacement substation that will be provided on site. The new replacement substation will connect to the existing overhead lines via short runs of underground cable. The existing Maynooth – Rinawade 110kV overhead circuit which enters the site in the north-west corner will be retained and diverted to the new replacement substation. The existing Rinawade-Dunfirth/Kinnegad overhead circuit that enters the site in the north-west corner will also be retained and diverted to the new replacement substation. Upon completion of the replacement substation, the existing Rinawade AIS substation will be decommissioned and removed. A diversion of the existing 110kV power line that runs along the north side of the M4 is also required to accommodate the proposed pedestrian and cycle overpass.
The proposed substation will replace the existing Rinawade 110kV substation and will utilise the existing grid connection into the site. On completion of the 110kV replacement substation sufficient power will be available to power the initial Data Centre B1 (16MW) and a connection agreement is in place with EirGrid[1] for the initial supply. The initial Deep Tech Building A1 will be provide sufficient power through existing site connection from Adamstown via the existing 20kv substation on site. The new substation will also be sufficient to cater for the entire build out of the proposed development and meet its power requirements (170MW). A connection agreement is in place with Eirgrid for the first 16MW of power required. However, to accommodate the full build out of the KIC Masterplan and maximise the new 110kV substation capabilities future uprating/line replacements of the existing overhead lines into the site will

RECEIVED: 18/07/2023

be required. TNEI & H&MV on behalf of the developer has undertaken an analysis of the required uprating / line replacements to increase the overall power supply to the campus (Refer to *Network Demand Capability Analysis* by TNEI & H&MV). The analysis concludes that four total uprates and a 150 MVA STATCOM (on-site), is required to accommodate a connection of 170MW. The uprates relate to the Overhead Lines (OHLs) between Maynooth – Rinawade, Dunfirth – Kinnegad – Rinawade, Derryiron – Maynooth and Derryiron – Kinnegad. With the identified uprates a capacity of 170 MW is possible with no thermal overloads or voltage violations being detected.

The proposed development will include its own energy centre to be built out over the life of the permission. The Energy Centre will include 9no. combustion turbine generator's (CTG's) to ensure equal power can be replaced within the grid to alleviate any potential constraints to the electrical transmission system arising from the data centre usage. Further to this, the CTG's will also provide reinforcement to grid if and when required. The Energy Centre will never provide power to the data centres or site in general.
In the event of a loss of power supply to the site (i.e. temporary grid blackout), fuel oil powered back-up generators will be activated. Building B1 will have 14no. fuel oil generators and Buildings C1-C3 will each have 22no. fuel oil generators. These generators are designed to automatically activate and provide power to the data cente component of the proposed development pending restoration of the main power supply. Based on experience of the future operator, the back-up generators will rarely be used other than for routine testing.
The connection agreement for the first and second phase of development will utilise power already allocated to the site through the existing 110kV Rinawade Substation and 20kV Substation connection adjacent to the DBS facility. In line with EirGrid's Data Centre Connection Offer Process and Policy further connection agreements with EirGrid for the full development can only be reached once planning consent is in place.
A number of sustainability measures have been incorporated into the design of the proposed development including an installation of an array of photovoltaic panels on the roofs of Buildings A1, A2, B1, C1, C2 and C3. The photo voltaic (PV) array will consist of 8,560 modules yielding a total yielding a total peak power generated of 2859.19kWp to offset the lighting and IT electrical power requirements during the peak summer months for the administration section of the buildings. The installation significantly exceeds that required for code compliance under NZEB.

14.6 Gas supply

As referenced above under Power Supply the proposed development will include its own energy centre to ensure equal power can be replaced within the grid to alleviate any potential constraints to the electrical transmission system arising from the data centre usage. The energy centre will be supplied by GNI's enhancement of the existing supply to the site to support the proposal (identified above under 'Facilitation Works' and Chapter 2 'Project Description'). GNI have confirmed that sufficient gas supply is available subject to the enhancement of the existing supply.
The CTGs will be primarily fuelled by natural gas/bio-gas supplied by Gas Networks Ireland (GNI) via their existing high-pressure network that runs close to the site (subject to upgrade). The upgrade works are described in Chapter 2 of this EIAR and will delivered through a local upgrade of the gas network over a length of approximately 1.5km through predominantly residential areas. The route of the upgrades will be along Ryevale Lawns along Station Road, Old Hill and Celbridge Road for a distance of approximately 1.5km up to the entrance of Barnhall Meadows. The pipe will run under the existing road pavement. At the entrance to Barnhall Meadows, the pipe will run underground through the Barnhall Meadows lands

(adjacent to the existing haul road) and will then cross the M4 Motorway through Horizontal Directional Drilling and enter the Kildare Innovation Campus then connecting to the proposed Gas Skid.

RECEIVED: 18/07/2023

It is envisaged that the energy centre will aim to use as much renewable gas as is commercially available in the market secured through Corporate Power Purchase Agreements (CPPAs). With some modifications, the CTGs are capable of operating on at least a mix of hydrogen should this be available in the future.

Further to this, the developer has entered into a continuous supply agreement for renewable diesel (HVO) which will be the back-up fuel for the energy centre in the event that there is a gas supply outage. MDM Engineering have advised that there has never been a gas block out or interruption of supply in the history of the state, as such, the requirement for the CTGs to operate of HVO is considered extremely low.

14.7 Heating supply

As the activities of the data centres generate a significant amount of excess heat, the concept of heat recapture and district heating was chosen as the heating approach for the campus replacement of the centralised heating system.
Through studies by Ethos Engineering, it has been estimated that c. 18 MW of energy could be provided to the campus, community, and surrounding area through recaptured heat and the implementation of district heating from the overall development.
It is proposed to include district heating as part of Phase 1 to supply the deep tech buildings on site, the existing campus buildings to be retained as well potential to supply Barnhall RFC, Salmon Leap Canoe Club, Castletown Estate as well as the future residential zoned lands known as Celbridge East KDA. As set out in the *Energy and Sustainability Statement* by Ethos, the heat available from the Phase 1 development, assuming an average dwelling heat load of 5 kW, is estimated at being able to benefit 580 dwellings. Phase 3, which is the balance of the data centres (Buildings C1 – C3), could further provide for additional community buildings and schools in Leixlip, one a wider district heating network is developed by KCC.

14.8 Telecommunications

A fibre optic cable distribution network is in place on the site and will be extended and enhanced for the proposed development. No works outside the redline boundary are required for connection. There is sufficient capacity in the network for the proposed development.

14.9 Residual Impacts

The implementation of mitigation measures detailed in Chapter 14 will ensure that the predicted impacts on the material assets – site services will be ***short-term, negative*** and ***not significant*** for construction and ***long-term, neutral*** and ***not-significant*** for the operational phase.

RECEIVED: 18/07/2023

15.0 ARCHAEOLOGY AND CULTURAL HERITAGE

15.1 Introduction

This chapter was prepared by Shanarc Archaeology Ltd. with respect to archaeology and MESH Architects with respect to architectural and landscape heritage. It assesses the impacts, if any, as a result of the proposed project, on the archaeological, architectural and landscape heritage within, and close to, the application site.

15.2 Methodology

The chapter was informed by relevant legislation, policy, guidance and codes of practice and includes a desk-based study, a detailed documentary and cartographical review and a field inspection of the KIC lands. The methodology in relation to the gas transmission line and EirGrid uprating alignment was at a higher level, based on SMR and RMP records held by the National Monuments Service.
Consideration has been given to the effects of the proposed development on recorded archaeological and cultural heritage resources, on unknown or undesignated archaeological heritage resources and areas of archaeological potential or sensitivity.
Upstanding heritage assets that will be affected, or are likely to be affected, by the proposed development, were identified and characterised in relation to their heritage value.

15.3 Baseline Environment

The site of the proposed development stands adjacent lands historically associated with the highly significant Castletown Estate, home of William Connolly, and largely development during the C18th as one of Ireland's grandest and most extensive examples of Georgian architectural and landscape design. The site of the proposed development consisted of a separately owned estate, adjacent to the formally laid out parkland and demesne containing Castletown House proper. While visible from some rooms in the grand house, and from some vantage points within its surrounding parkland, the site of the proposed development was not the subject of large scaled plantings or other designed landscape exercises, but existed as an adjacent rural agricultural landscape. However, there did exist a long view from the side elevation of Castletown House across the subject site, towards another outlying property that was owned by the greater Castletown Estate, to a large folly structure known as The Wonderful Barn.

The planting of rows of trees along portions of this view corridor, close to Castletown House and The Wonderful Barn, is believed to have occurred during the late C18 and early C19th, but there is no evidence that such a grand allee was previously in existence across the fields included in the Parsonstown or Renawade Lower lands, now included within the proposed development. During the late C20th, when the initial stages of development of the Hewlett Packard Industrial Park were planned and begun, additional lines of trees were planted within the development site along the same alignment as the view corridor, and the importance of the view corridor was acknowledged and given a presence across lands that were not historically included in the grand landscape designs.

The Architectural Heritage Assets that have been identified as having specific significance, and are susceptible to change by the Proposed Development, are as follows:

RECEIVED: 18/07/2023

- Castletown House and Demesne. This is one of Ireland's most impressive and significant early Georgian Country Houses, of National Significance, and standing within its historic parkland setting.

- The Wonderful Barn. This unusual granary was commissioned by the owner of the Castletown Estate to provide work relief during the Irish Famine of the early 1740s. It was located on an outlying farm that was owned as part of the greater Castletown estate, and has a formal relationship with Castletown House, due to its axial alignment with the side elevation of Castletown House itself.

- The Protected View Corridor.A grandly scaled allee currently links the eastern side elevation of Castletown House and the Wonderful Barn, consisting of rows of hardwood trees. While not specifically included in the Record of Protected Structures, this corridor provides an unbroken line of sight connection between Castletown House and the Wonderful Barn.

The KIC lands at Barnhall Road are largely developed and landscaped lands containing the re-branded Liffey Business Campus (formerly known as the Hewlett Packard Campus), which was preceded by the Irish Meat Packers facility, which in turn incorporated the site of a large residence once named Parsonstown.

The existing archaeological record demonstrates that the KIC lands and surrounding area was a focus of settlement in the prehistoric period. This was probably owing to the area's proximity to the River Liffey, and to nearby fording points. The record also demonstrates that the area was densely settled throughout the medieval period (5th century to *c*. 1550-1600).

As part of the development of the Hewlett Packard Campus in the mid-1990s, the KIC lands produced prehistoric evidence in the form of a polished-stone axe (in Parsonstown townland), a flint blade (in Rinawade Upper townland) and a *fulacht fiadh* (KD011-062----) (in Barnhall townland), which was fully excavated at the time.

15.4 Potential Impacts of the Proposed Project

In relation to the Architectural Heritage Assets, the proposed development has the potential to impact several important historic structures. Briefly summarized, those impacts are likely to consist of the following:

- Castletown House and Demesne. This is one of Ireland's most impressive and significant early Georgian Country Houses, of National Significance, and standing within its historic parkland setting. The Proposed Development will add large new structures to the existing industrial estate, which have the potential to be visible from within the Castletown parkland. The extent of the impact will depend on how well the new development is buffered by the dense woodland screening, and whether the highest elements in the proposed development will be visible from the most sensitive areas to the front and rear of Castletown House.

- The Wonderful Barn. This unusual granary was commissioned by the owner of the Castletown Estate to provide work relief during the Irish Famine of the early 1740s. It was located on an outlying farm that was owned as part of the greater Castletown estate, and has a formal relationship with Castletown House, due to its axial alignment with the side elevation of Castletown House itself.

- The Protected View Corridor. A grandly scaled allee currently links the eastern side elevation of Castletown House and the Wonderful Barn, consisting of rows of hardwood trees. While not specifically included in the Record of Protected Structures, this corridor provides an unbroken line of sight connection between Castletown House and the Wonderful Barn.
- Historic Setting for Protected Structuresin the general vicinity of the development area of the proposed development. Due to the effective screening provided by mature woodlands around the perimeter of the development site, and the presence of the N4 Motorway, there will be virtually no visual impact to the setting of any of the Protected Structures in the general vicinity of the Proposed Development.

RECEIVED: 18/07/2023

In relation to Archaeological Heritage, the excavation of a *fulacht fiadh* KD011-062----, along with the recovery of stray artefacts during a previous development demonstrate the potential for buried archaeology to survive *in-situ* below the ground at the KIC lands. The construction phase will have a direct, negative impact on the inherent archaeological potential of the KIC lands.

15.5 Mitigation Measures

Pre-construction, an archaeological geophysical survey shall be carried out in undeveloped greenfield areas of the KIC lands. This survey will allow for the early identification and further investigation of potential sub-surface archaeology. This will be followed by a programme of pre-construction archaeological test-excavation to identify the nature, extent and significance of any archaeological remains.

Archaeological monitoring of construction phase groundworks at the KIC lands shall be subject to the outcome of the geophysical survey and test-excavation. All survey and excavation work will be done under licence from the National Monuments Service and the National Museum of Ireland who will be consulted in relation to the results.

During the construction phase, all existing trees that currently form the grand allee of the Protected View Corridor, will be protected by site fencing, to prevent damage from construction activities, and damage to the ground by compaction and damage to roots.

15.6 Residual Impacts (post-mitigation)

With mitigation measures applied:

- The Protected View Corridor will be strengthened through sensitive hard and soft landscaping.
- The construction of a new pedestrian bridge across the N4 will provide a permanent and publically accessible link from the Castletown Demesne to the Wonder Barn. This will be a very positive impact on the Castletown Demesne, the Wonderful Barn, and the Protected View Corridor.

All archaeological and cultural heritage issues will be resolved at the pre-construction and construction phase, in advance of the operational phase. There is no predicted residual effect on the archaeological and cultural heritage resource.

RECEIVED: 18/07/2023

16.0 LANDSCAPE AND VISUAL IMPACT ASSESSMENT

16.1 Introduction

The objective of the Landscape and Visual Impact Assessment process is to identify and evaluate the likely significant effects on the landscape character and the visual amenity arising from all elements the Proposed Development. The assessment identifies the residual effects arising from the finalised design considering landscape mitigation measures and their development over time. The assessment describes landscape and visual effects which are a result of the impact of the Proposed Development. Landscape effects are the result of physical changes to the fabric of the landscape. Visual effects relate closely to landscape effects but concern changes in views.

The landscape and visual impact assessment is accompanied by mapping indicating landscape and visual designations as well as 17 photomontages taken at representative viewpoints. The views and accompanying photomontages capture a range of views at different distances.

Facilitation works required to support proposed development at the KIC lands, namely the provision of an enhanced gas connection by Gas Networks Ireland (GNI) to the site and EirGrid uprating of existing overhead transmission lines to the site have also been considered in the assessment of effects.



Image 161 *Photomontage locations and direction of viewpoints*

RECEIVED: 28/07/2023

16.2 Baseline overview / Landscape context

The Kildare Innovation Campus site is bound immediately by the M4 motorway to the north, Castletown House and surrounding demesne to the southwest, and the R404 to the east. Beyond the R404, the River Liffey corridor extends in a southwest to northeast alignment, swelling to form the Leixlip Reservoir. The Royal Canal is situated to the north of the study area, largely defining the footprint of residential buildings to the north of Leixlip. Castletown House and demesne forms a significant open green space within the study area, which contains a historically designed landscape which includes areas of open landscape with clusters of trees and axial views defined by tree lined avenues. In addition, the surrounding landscape within the study area is characterised by agricultural fields enclosed by hedgerows, residential and commercial premises located along the local road network and the western fringes of Lucan, located within South County Dublin lands.

The location of GNI Gas Upgrade development extends from the R148 Station Road and follows the Celbridge Road to the KIC lands. The majority is located within a built-up suburban environment of Leixlip. It crosses the eastern extends of The Wonderful Barn curtilage before crossing the M4 motorway with its dense bands of woodland to either side and entering the KIC lands. The locations of the EirGrid Uprating development cover in their majority a variety of agricultural land, Timahoe Bog as well as suburban areas of Leixlip / Kilmacredock and Edenderry.

16.3 Study Area

The extent of the principal study area comprises the Proposed Development excluding the facilitation works. It was initially informed by a desktop study, which was then verified on site during fieldwork surveys. This included reviews of published landscape character assessments and the wider landscape to identify landscape and visual receptors that have the potential to be affected by the Proposed Development. This process determined a principal study area of 2km from the boundary of the Proposed Development, defined as the extent in which the Proposed Development may result in significant landscape or visual effects.

The facilitation works are at an early planning stage and linear in nature. They will affect existing gas and electricity infrastructure. A study area of up to 200m to either side of the indicative alignment of GNI enhancement works, and up to 500m to either side of the existing overhead lines subject to EirGrid uprating has been considered.

16.4 Likely Landscape and Visual Effects

1. Construction Effects

Temporary, significant, and adverse landscape effects during construction will occur locally due to changes to the landform to accommodate the proposed bridge and other buildings. Construction plant, including boring equipment and lifting machinery, will be introduced, and typical construction features such as fencing, access tracks and construction compounds will be laid out. The presence and activity of construction machinery and associated features will degrade the condition of this landscape character area locally.

Adjoining landscape character areas such as the River Liffey landscape character area will remain unaffected during the construction phase apart from construction traffic crossing the river bridges. Landscape Character Areas located within the wider study area in South Dublin, namely Liffey Valley, Urban, and Newcastle Lowlands will not be altered by the proposed construction works. While construction traffic will pass temporarily along existing transport

RECEIVED: 28/07/2023

corridors within these landscape character areas, the landscape character will not be affected resulting in no landscape effects.
Temporary, significant, and adverse visual effects during construction will be highest within the site, from areas immediately adjacent to the site boundary, and within a principal visual zone of approximately 400m radius from the boundary of the Proposed Development site. Construction works of the proposed bridge will be visible along the M4 and the overbridges (R404 & Junction 6) for approximately 1.6km to the west and approximately 1km to the east although the existing bridge of the R404 will be more prominent on approach from the east. The visibility of construction works within the wider study area will be mainly limited to open areas where there are available views towards the site, that are unscreened by vegetation and intervening buildings.

Facilitation Works at Construction

The **GNI Gas Upgrade** works will not result in changes to the local landscape character. In terms of visual effects, the main receptor groups affected by construction works will be local residents and pedestrians as well as vehicular traffic. Temporary, significant, and adverse visual effects will be highest along roads / footpaths along which the gas pipe travels, and within the immediate vicinity of the construction works. Principal views of construction works will likely be experienced within a radius of approximately up to 100m from the centre line of the Proposed gas pipe as well as from nearby residential dwellings facing the uprating works.

The **EirGrid Uprating** will not result in changes to the local landscape character. In terms of visual effects, the main receptor groups affected by construction works will be local residents and vehicular traffic including cyclists. Temporary, significant, and adverse visual effects will be along the existing OHL, within the immediate vicinity of the substations and of the construction works including along adjacent local roads. Principal views of construction works will likely be experienced within a radius of approximately up to 250m from the centre line of the existing OHL as well as from nearby residential dwellings facing the existing OHL alignment.

2. Operational Effects

16.5 Landscape Effects

Long-term change or modification will occur locally where the proposed extension to the existing Kildare Innovation Campus will be physically located. Significant and beneficial landscape effects will arise as the proposed alteration and redesign of the open space will improve biodiversity and the overall strength of the landscape layout within the campus site. The proposed pedestrian / cycle bridge will increase the infrastructural elements in the principal study area but it will integrate into the existing character of the M4 motorway corridor due to its design and scale.
Landscape change outside of the Proposed Development site boundary will occur within a distance of up to approximately 400m, where the visibility of the Proposed Development influences the perception of the character of the landscape. Considering the flat and low-lying nature of the existing landscape, in addition to the dense mature vegetation planting to the perimeter of the existing business campus site, change in landscape character is largely limited to a short section of the R404 and from the existing campus entrance to the northwest of the site. Landscape change is not considered to be significant. The Proposed Development will continue the established light industrial character on the site, which has served as a business campus in this location since the mid-1990's. The extension of the building footprint will intensify this existing use, while also offering opportunity to improve pedestrian and cycling

permeability through the site, in particular due to the new pedestrian / cycle link north across the M4 motorway.
Landscape effects will reduce quickly to imperceptible with increasing distance from the Proposed Development in the remaining principal study area (beyond approximately 400m from the Proposed Development). Adjoining landscape character areas such as the River Liffey landscape character area will remain unchanged during operation. Landscape Character Areas located within the wider study area in South Dublin, namely Liffey Valley, Urban, and Newcastle Lowlands will not be affected by the Proposed Development resulting in no landscape effects.

RECEIVED: 18/07/2023

16.6 Visual Effects

Significant visual effects will occur where there is no or little intervening vegetation between the viewer and the Proposed Development within the Proposed Development site, along its periphery (sections of the R404), or where the viewer is at an elevated position (Top of Wonderful Barn). They will be experienced from locations within the Proposed Development site or in close proximity to it (up to approximately 300m) as dense bands of woodland along the boundaries of the M4, the grounds of Castletown Demesne, within the area around The Wonderful Barn, and publicly accessible locations along the River Liffey will screen the Proposed Development fully.
Views of the upper sections of the proposed Building A1 and the pedestrian / cycle bridge across the M4 can be experienced from the R404 road bridge crossing the M4, where the upper sections of additional building structures will become visible to already visible existing structures. Open views of sections of the Proposed Development will be possible from sections of the R404 / Celbridge Road. While roadside vegetation will screen considerable parts of the Proposed Development, views will be available at the vehicle entrance areas and where there are gaps in the roadside vegetation. Views of the proposed pedestrian / bridge will be possible along the M4 as well as from the grounds of The Wonderful Barn.

The existing protected viewing axis between Castletown House and The Wonderful Barn will not be altered and remain unaffected by the proposed development.

Other designated scenic routes and points of view located within the study area will not be affected by the Proposed Development.

Sections of Arthur's Way Heritage Trail and the Slí na Sláinte – Celbridge Kildare are located along the eastern boundary (R404 / Celbridge Road) of the Proposed Development. Significant and beneficial visual effects will be limited to gaps in the boundary vegetation where open or intermittent views will become available as well as changes to the existing planting and additional planting.

The Castletown House Demesne will not be affected by the Proposed Development.

The Proposed Development will also not result in landscape and visual effects within the following areas of high amenity, which are located within the principal study area:

- The River Liffey and the River Barrow Valleys
- The Grand and Royal Canal Corridors

RECEIVED: 18/07/2023

Facilitation Works at Operation

The **GNI Gas Upgrade** works will not result in landscape effects at operation. The majority of the proposed gas pipe alignment will be located within existing road corridors. No visual effects are anticipated following the completion of construction works as existing road surfaces and open ground will be reinstated to match existing conditions.

Changes to the existing OHL network due to the **EirGrid Uprating** will be barely perceptible or appear similar to existing structures. Visual effects are therefore considered not significant.

16.7 Landscape Mitigation

The principal mitigation for the Proposed Development is inherent in the design of its architecture and open space design, which has evolved through an iterative process of assessment and consultation.

While the site is generally well screened from surrounding receptors and landscape sensitivities, the aim of the proposed landscape mitigation measures is to integrate the Proposed Development into the existing site while also reducing the visual effects on identified receptors within the principal study area. The landscape mitigation will complement the space by adding new landscape elements helping to integrate the Proposed Development into its existing environs over time. The overarching design intention is to propose a network of connected open spaces to improve pedestrian and cyclist permeability across the site, while also generating a strong sense of place and identity for the upgraded business campus. The protected axial view from Castletown House to The Wonderful Barn has been incorporated into the overall site layout and is emphasised by a newly introduced walking route along the tree lined avenue on the site in addition to the setback of building facades along the viewing corridor. Ecological enhancements such as bird and bat boxes, bug hotels, scrapes along with significant habitat creation from woodland planting to wildflower meadows will ensure the site maintains its biodiversity for local wildlife.

16.8 Residual Effects

Following the completion of construction works and the implementation of the proposed landscape mitigation measures, the development will become a long-term feature extending the building footprint of Kildare Innovation Campus.

Effective execution and establishment of the proposed landscape mitigation / green infrastructure will have a positive impact and help to 'soften' landscape and visual effects associated with the Proposed Development, particularly from areas where the development will become visible such as sections of the R404 and the curtilage of The Wonderful Barn. In the medium to long term, the perception of adverse landscape and visual effects will reduce in tandem with the maturing of the proposed planting.

Significant, beneficial, and long term residual landscape effects will arise locally where the proposed extension to the existing Kildare Innovation Campus and the proposed pedestrian / cycle bridge will be physically located. The alteration and transformation of the existing campus will intensify the inherent light industrial landscape character within the site, leading to an increase and densification of the light industrial buildings replacing sections of existing open green space and lead to the addition of infrastructural elements in the curtilage of The Wonderful Barn area. The alteration and redesign of the open space, and the proposed screen planting will improve biodiversity and the overall strength of the landscape layout as the vegetation matures. Residual landscape effects outside of the Proposed Development site are not significant following the establishment of landscape mitigation measures.

Residual visual effects outside of the Proposed Development will be not significant and concentrate along the adjacent road network to the east and south (R404) and in available

views from the area around The Wonderful Barn where the proposed pedestrian / cycle bridge will be visible, as well as from the elevated viewing location at the top of The Wonderful Barn. The proposed landscape mitigation measures will integrate the Proposed Development into its setting reducing the significance of residual visual effects. This includes the view from the top of The Wonderful Barn where the proposed extensive new planting within the Kildare Business Park will reduce views of sections of buildings as the planting matures. The overall character of the view from the top of The Wonderful Barn will remain similar.

RECEIVED: 18/07/2023

17.0 MAJOR ACCIDENTS AND DISASTERS

RECEIVED: 18/07/2023

This chapter is an assessment of major accident hazards and disasters based on the engineering design, drawings and documentation. The likely significant impacts of major accidents and disasters in regard to issues such as soils, geology and hydrogeology, hydrology, air quality, noise and vibration, human health and biodiversity are addressed in detail within the respective chapters.

17.1 Methodology

Alongside the legislation, policy, and guidance outlined in Chapter 1, the following relevant legislation, policy, and guidance has informed the preparation of this chapter:

- *EPA 'Guidelines on the Information to be contained in Environmental Impact Assessment Reports' (2022),*
- *EPA 'Advice Notes on Current Practice in the Preparation of Environmental Impact Statements' (2018),*
- *Health and Safety Authority Guidance on Technical Land-Use Planning Advice, for planning authorities and COMAH establishment operators (2023)*
- *Chemicals Act (Control of Major Accident Hazards Involving Dangerous Substances) Regulations 2015*

Construction Phase

The following scenarios have been identified that could impact the construction phase of the project:

- Extreme heat or cold weather resulting in result structural damage and/or pollution to soils, groundwater or surface waters.
- Storm events resulting in structural damage and/or pollution to groundwater and surface waters.
- Flooding
- Pollution to soils / groundwater / surface water

There are no likely impacts on the project or to off-site receptors during the construction phase in relation to major accidents and disasters; therefore, the risk of major accidents and disasters associated with the construction phase are **not significant.**

Operational Phase

The potential hazards associated with substances stored and process at for the proposed development, which have the potential to cause a major accident, are summarised in the following section. All hazards identified require a loss of containment to occur, such as, catastrophic damage or failure of pipework and/or storage tanks.

RECEIVED: 18/07/2023

Fire:

- Flash Fire: A flash fire can occur following a loss of containment of natural gas from the natural gas pipeline. A flash fire may be caused by releases at high or low pressure into an open, unconfined area which contacts an active source of ignition.
- Jet Fire: A jet fire can occur following a loss of containment of natural gas from the natural gas pipeline, via a source such as a leak or failure of flanged pipework joints, pipework or another asset which contacts an active source of ignition.

Explosion:

- Vapour Cloud Explosion (VCE): A loss of containment of natural gas, within a turbine enclosure, which does not ignite immediately may form a cloud of flammable material depending on the conditions of the release. If this cloud contacts an active source of ignition, a VCE can result and generate potentially harmful overpressures.

Major Accident to the Environment (MATTE):

- A loss of containment of liquids, such as fuel oils, which are accidentally released to water, land and/ or groundwater in significant quantities can cause harm to the environment.

In keeping with EIA guidance these results are a summary of the Land Use Planning Assessment (report reference: MM.237501.0007RR01). It was concluded, there are no likely impacts to off-site receptors, as a result of the proposed development, during the operational phase, in relation to major accidents and disasters. **The level of risk is acceptable.**

17.2 Mitigation Measures

The proposed development has been designed in line with good industry practice, and, as such, mitigation against the risk of major accidents and/or disasters is embedded through the design and in accordance with planning, best practice and legislative requirements.

17.3 Cumulative Impacts

The cumulative residual and operational impacts of the proposed development have been assessed and, in regard to screening of major accidents and risks, cumulative impacts are considered **imperceptible and neutral** as there is no risk to off-site receptors in relation to a major accident.

17.4 Residual Impacts

The residual effects are the final predicted or intended effects which occur after the proposed mitigation measures have been implemented. It will not always be possible or practical to mitigate all adverse effects.

This assessment has identified the potential for major accident hazards to occur. These scenarios can have significant consequences; however, the likelihood of these events occurring is low due to engineering and operational safeguards that will be implemented at the development. The Land Use Planning Assessment concluded that the risk contours do not extend off-site; therefore, there are no impacts to off-site receptors and the level of individual

risk on-site is acceptable. It can be concluded that the risk of major accidents and disasters associated with the proposed project are **not significant.**

RECEIVED: 18/07/2023

RECEIVED: 28/07/2023

18.0 INTERACTIONS AND CUMULATIVE EFFECTS

18.1 Introduction

This section of the EIAR has been prepared by Brian Minogue (BSc in Spatial Planning), Tom Philips + Associates and deals with likely interactions between effects predicted as a result of the proposed project.

In addition to the requirement under the Planning and Development Regulations 2001 (as amended) to describe the likely significant effects of the proposed development on particular aspects of the environment, it is also required to consider the interaction of those effects. These are assessed below.

This section addresses the intra project significant effects (i.e. those occurring between environmental topics within the project). Inter project effects (i.e. those which are likely to occur as a result of the likely impacts of the proposed project interacting with the impacts of other projects in the locality) have also been considered.

We have reviewed a number of planned and permitted projects that have the potential to interact with either the construction or operational phases of the proposed development. The projects considered most likely to interact with the proposed development are identified in Chapter 3 with a more comprehensive list of planned or permitted projects outlined in Appendix 1.1.

Further detail relevant to the interaction of impacts may be found in the earlier chapters of the EIAR.

18.2 Methodology

The EIAR has considered and assessed the interactive effects and cumulative effects arising from the construction and operation of the proposed project based on best scientific knowledge. The relevant interactions and interdependencies between specific environmental aspects have been summarised in the matrix set out in Table 18.1.

Interactive effects (or interactions), specifically refer to any direct or indirect effects caused by the interaction of environmental factors as outlined in Article 3 (1) of the amended EIA Directive;

"*The environmental impact assessment shall identify, describe and assess in an appropriate manner, in the light of each individual case, the direct and indirect significant effects of a project on the following factors:*

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

Annex IV of the amended Directive states that a description of impacts should include:

"…the direct effects and any indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative effects of the project"

RECEIVED: 28/07/2023

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 (as amended) as well as the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018.

The EPA Guidance in turn references: *Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions, European Commission, 1999. I*n terms of interactions, the guidelines state the following:

> *"careful consideration of pathways – direct and indirect – that can magnify effects through the interaction or accumulation of effects – for instance the potential for cumulative significant effects to arise from multiple non-significant effects."*

In terms of Cumulative effects, Annex Iv(5) of the EIA Directive requires:

> *"A description of the likely significant effects of the proposed project on the environment resulting from, inter alia…*
> *(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;…"*

We have reviewed a number of planned and permitted projects that have the potential to interact with either the construction or operational phases of the proposed development. The projects considered most likely to interact with the proposed development are identified in Chapter 3 with a more comprehensive list of planned or permitted projects outlined in Appendix 1.1.

18.3 Inter-Relationships/ Interactions

In practice many potential impacts from various sources have slight or subtle interactions with other sources of impact. However, the EIAR concludes that most inter-relationships are neutral in impact when the mitigation measures proposed in each chapter are incorporated into the operation of the proposed development.

RECEIVED: 18/07/2023

	Matrix of Interactions																									
	Cultural Heritage		Population & Human Health		Biodiversity		Land, Soils, Geology & Hydrogeology		Hydrology		Air		Climate		Noise & Vibration		Landscape & Visual Impact		Traffic		Waste		Site Services		Major Accidents and Disasters	
	Con	Op	Con	Op	Con	Op	Con	Op	Con	Op	Con	Op	Con	Op	Con	Op	Con	Op	Con	Op	Con	Op	Con	Op	Con	Op
Cultural Heritage																										
Population & Human Health											x				x	x		x	x	x	x	x			x	x
Biodiversity							x		x						x				x		x	x			x	x
Land, Soils, Geology & Hydrogeology															x				x		x	x			x	x
Hydrology																									x	x
Air																			x	x						
Climate																			x	x						
Noise & Vibration																			x	x					x	x
Landscape & Visual Impact																										
Traffic																					x					
Waste																										
Site Services																										
Major Accidents and Disasters																										

Table 18.1: Matrix of Potential Interactions Between Environmental Factors

18.4 Cumulative Effects

Chapter 18 includes a compiled list of all cumulative effects as described in each of the preceding chapters.

RECEIVED: 18/07/2023

19.0 MITIGATION AND MONITORING

RECEIVED: 28/07/2023

The chapters contained within this EIAR have been ordered in a grouped format by their relevant topic. This chapter summarises all mitigation measures proposed in order to provide a comprehensive overview of the full range of mitigation measures discussed within each chapter.

Paragraph 2(d) of Schedule 6 to the Planning and Development Regulations 2001, as amended by S.I. No. 30/2018 - Planning and Development (Amendment) (No. 2) Regulations 2018, provides that the following information must be contained in an EIAR:

> *"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."*

Chapter 19 includes a compilation of all mitigation and monitoring measures as outlined in the preceding chapters.