Intended for
Vantage Data Centers DUB11 Limited

Date
February 2022

Project Number
1620012232-003

KILCARBERY SUBSTATION AND TRANSMISSION LINES

VOLUME 1: MAIN ENVIRONMENTAL IMPACT ASSESSMENT REPORT

RAMBØLL

Volume 1: Main Environmental Impact Assessment Report
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1 INTRODUCTION

Introduction

1.1 This Environmental Impact Assessment Report (EIAR) has been prepared for Vantage Data Centers Dublin 11 Limited (the 'Applicant') – in accordance with the statutory procedures set out in the Planning and Development Regulations 2001 (as amended)[1] – to accompany an application (the 'application') seeking permission (also known as 'full permission') for the proposed development known as Kilcarbery Substation and Transmission Lines in Profile Park, Dublin (the 'site').

1.2 Since the adoption of Directive 85/337/EEC (on 27 June 1985) on the assessment of the effects of certain public and private projects on the environment, both the law and EIA practices have evolved significantly. The 1985 Directive was amended by Directives 97/11/EC , 2003/35/EC and 2009/31/EC , and the Directive and its amendments were codified in 2011 by Directive 2011/92/EU. The current Directive 2014/52/EU amends the 2011 codified Directive but does not replace it. The European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018, transpose the requirements of the 2014 Directive into existing planning consent procedures.

1.3 The proposed development constitutes a strategic infrastructure development (SID) application under Section 182A of the Planning & Development Act 2000 (as amended) as the development includes high voltage (110kv or more) electricity transmission lines and interconnectors. Therefore, the development provides the potential for significant effects on the environment and the Applicant has decided to undertake an EIAR on this basis.

1.4 The EIAR comprises the following:

- Non-Technical Summary (NTS);
- Volume 1: Main Environmental Impact Assessment Report (this document);
- Volume 2: Landscape and Visual Impact Assessment (LVIA) and Cultural Heritage Assessment; and
- Volume 3: Technical Appendices.

1.5 EIA is a formal process in which the likely significant effects of certain types of development projects on the environment are identified, assessed and reported upon. For certain types of development, the process must be followed in order for such effects to be taken into account before a decision is made on whether planning permission should be granted.

1.6 This EIAR presents the results of the EIA that has been undertaken of the proposed development. In accordance with the Regulations, the EIAR reports on the potential environmental impacts and likely significant environmental effects of the proposed development during the construction stage and operation stage.

1.7 The EIA has taken into account mitigation measures that are being proposed by the Applicant, including those measures that have been integrated into the planning and design of the proposed development (i.e. 'embedded mitigation') and 'additional mitigation' to prevent and, where prevention is not possible, reduce and/or mitigate likely significant adverse effects. It then evaluates the significance of the residual effects.

1.8 Further information on how the scope of the EIA was formulated and on the structure of this EIAR, is provided in Chapter 2: EIA Process and Methodology of this Volume.

1.9 ABP is the 'relevant planning authority' for the purposes of the Regulations and will determine the application taking into account the likely significant environmental effects of the proposed development and other relevant planning and sustainable development issues as determined through the EIA process.

1.10 This chapter provides a general description of the site, the relevant planning context, planning application details, as well as the content and structure of the EIAR. More detailed information on the application site is provided in the technical assessment chapters (6-15) of this Volume, as well as the landscape, visual and heritage assessments in Volume 2.

1.11 A description of the proposed development is provided in Chapter 4: Proposed Development Description and details of the construction works are provided in Chapter 5: Construction Environmental Management of this Volume.

Development Context

Site Location and Context

1.12 The site is located at Irish grid reference O 03647 30493, within Profile Park, as shown in Figure 1.1.

1.13 Geographically, the site is located in Profile Park, approximately 10 kilometres (km) to the south-west of Dublin city centre, within South Dublin County.

1.14 The site is an irregular parcel of land, extending to approximately 3.19 ha in area and is predominately occupied by agricultural fields with areas of hardstanding comprising roads and paths associated with roads within Profile Park.

1.15 The site's surrounding context is characterised by a mix of industrial and agricultural development with a fragmented mixture of commercial, industrial and residential uses. This is predominantly industrial to the north and west, with commercial and residential properties and Grange Castle Golf Club to the east, and agricultural fields to the south (refer to Figure 1.2).

1.16 In terms of public transport, the closest railway station to the site is at Clondalkin/Fonthill approximately 3 km to the north-east from which frequent commuter services to/from Dublin city centre can be accessed. Citywest Campus Luas Tram Stop is approximately 4 km to the south-east of the site from which frequent tram services to Dublin city and beyond can be accessed.

1.17 Bus stops are located in northeast and northwest within 600 metres (m) of the site from which frequent routes operate between the site and Dublin city centre.

1.18 The pedestrian and cycle environment in the vicinity of the site is of a high standard, with wide, well-lit lengths of dedicated and segregated off-road cycle and pedestrian routes.

[1] Government of Ireland, 2001-2019. Planning and Development Regulations 2001 (as amended). S.I. No. 600 of 2001. ISB.

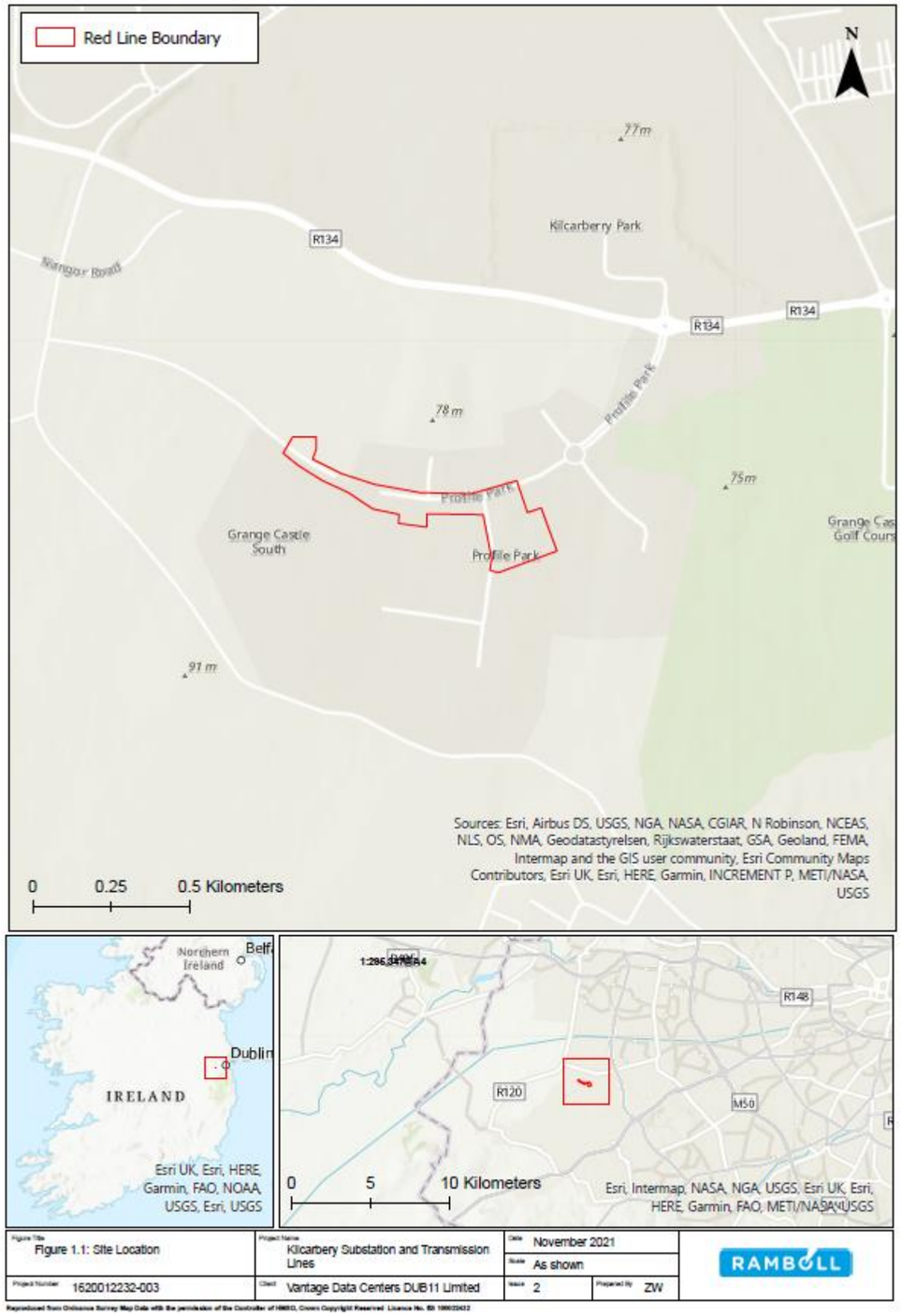


Figure 1.1: Site Location

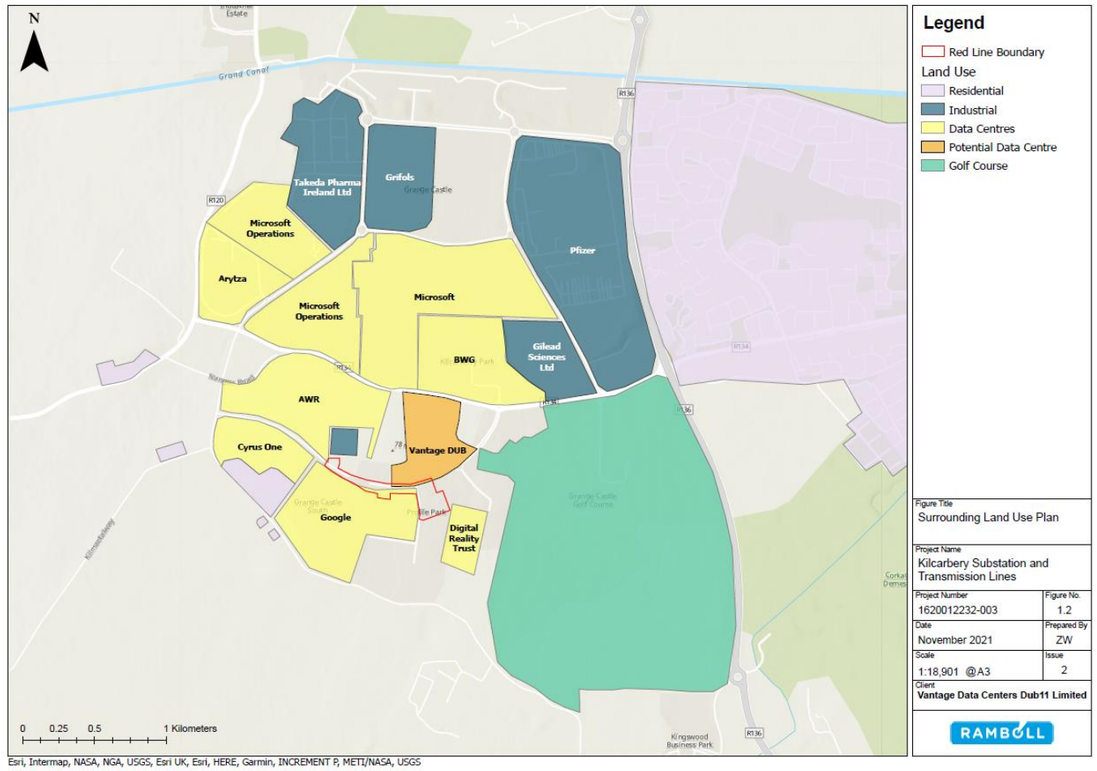


Figure 1.2: Surrounding Land Uses Plan

Site Description

1.19 The site boundaries are defined by:

- Falcon Avenue along the northern boundary, beyond which is undeveloped land, proposed to be developed into a Data Center by Vantage (under planning reference SD21A/0241, subject to an additional information request from SDCC);
- Agricultural fields to the east, beyond which is Grange Castle Golf Club;
- Barnakyle Substation to the southwest and Digital Reality Profile Park to the southeast, beyond which lies Casement Aerodrome; and
- A data centre development on agricultural fields to the northwest and Castlebaggot Substation.

1.20 The site is an irregular parcel of land, extending to approximately 3.19 ha in area and is predominately occupied by agricultural fields with areas of hardstanding comprising roads and paths associated with roads within Profile Park.

1.21 As shown in the representative photographs of the site (Figure 1.3), the site is currently occupied by agricultural fields.

1.22 The site is accessed from one access/egress point from Falcon Avenue to the north, which leads to a roundabout on the R134 New Nangor Road.

View at the north-western corner of the Site facing east on Falcon

View of the Site facing

View of the Site facing southeast

Figure 1.3: Site Photographs

Environmental Sensitivity

1.23 The environmental sensitivity's surrounding the site are presented in Figure 1.4.

1.24 The site is located within an established mixed-use wider area, comprising both industrial and agricultural land uses. The proposed development would be built upon former agricultural land that forms part of the Profile Park Business Campus. However, the land is not actively being used for agriculture. Under the South Dublin County Development Plan 2016-2022 the site is allocated within Zone EE: Enterprise and Employment[2]. The stated aim is to provide for enterprise and employment related uses. The proposed use is a permitted use under this zoning. Significant precedent exists for the establishment of this use on other EE zoned lands in the area. EE zoned areas are established economic industrial areas running essentially in an arc northward from City West to Grange and Grange Castle.

1.25 The site benefits from good road network structure within Profile Park connecting to the local road network. The site is directly bordered to the north by Falcon Avenue.

1.26 The Baldonnel Stream runs approximately east to west approximately 150m north of the site. Further surface water features are present within the Grange Castle Golf Club situated approximately 300m east of the site.

1.27 The Grand Canal is located approximately 2 km directly north of the site and is classified as a proposed Natural Heritage Area (NHA). No other ecologically protected sites such as Special Protection Areas (SPA), Special Areas of Conservation (SAC), National Parks or Nature Reserves are located within 1 km of the site.

1.28 There are no structures included in the statutory Register of Protected Structures or assets on the Record of Monuments and Places or the Register of Historic Monuments within the site. The closest statutory designated heritage asset is Kilbride Castle.

1.29 A scheme of test trenching in June 2021, further described in Volume 2, EIAR, Chapter 2: Cultural Heritage, revealed the remains of an oval/circular enclosure approximately 40m in diameter in the study area, as well as two linear ditch features likely to be former field boundaries.

1.30 The location of the site is within a range of land types which contributes to its fragmented character. Its proximity to the urban area of Dublin gives the area an 'urban fringe' or 'transitional' character as you move from the urban to limestone farmland character type.

[2] SDCC (2016) South Dublin County Council Development Plan 2016-2022 Index Map. Available online at: south-dublin-county-council-development-plan-2016-2022-index-map.pdf (sdcc.ie)

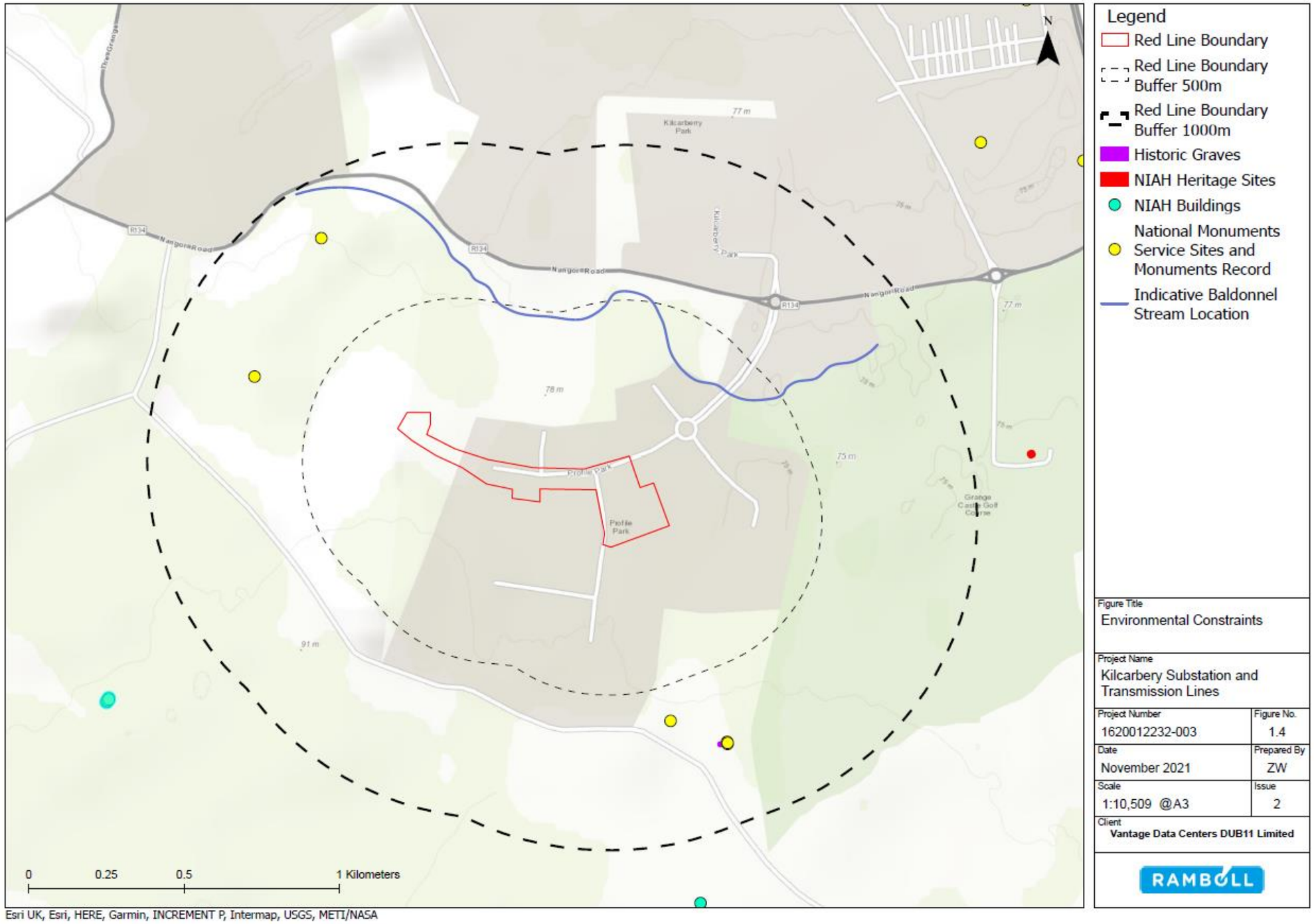


Figure 1.4: Environmental Constraints

Planning Context

Planning Policy Context

1.31 It is necessary to consider the proposed development against relevant policies and guidance at national, regional and local levels.

National Planning Policy

National Planning Framework (2018)

1.32 At the national level, planning policy is contained within the National Planning Framework (NPF) 2018[3]. The Department of Housing Planning and Local Government, on behalf of the Government of Ireland, published the NPF in February 2018 and is the Government's high-level strategic plan for shaping the future growth and development of our country out to the year 2040.

National Development Plan 2018-2027 (2018)

1.33 Additionally, the National Development Plan 2018-2027 (NDP)[4] sets out the investment priorities that will underpin the implementation of the NPF, through a total investment of approximately €116 billion.

1.34 Finalisation of the NPF alongside the ten-year NDP will culminate one plan to guide strategic development and the infrastructure investment at the national level.

National Climate Action Plan (2021)

1.35 The National Climate Action Plan[5] for Ireland, published in November 2021, sets a roadmap for taking decisive action to halve the nation's emissions by 2030 and reach net zero no later than 2050. Implementation of the Climate Action Plan will create jobs, new economic opportunities and protect people and the planet. The Climate Action Plan is materially relevant to this EIAR and will be considered within the relevant technical assessments.

Regional Planning Policy

Regional Spatial and Economic Strategy for the Eastern and Midlands Regional Assembly (2019)

1.36 The Regional Spatial and Economic Strategy (RSES) for the Eastern and Midlands Regional Assembly (EMRA)[6] includes Regional Policy Objective (RPO) 10.19 through 10.23 which states the following:

- RPO 10.19: Support roll-out of the Smart Grids and Smart Cities Action Plan enabling new connections, grid balancing, energy management and micro grid development.
- RPO 10.20: Support and facilitate the development of enhanced electricity and gas supplies, and associated networks, to serve the existing and future needs of the Region and facilitate new transmission infrastructure projects that might be brought forward in the lifetime of this Strategy.
- RPO 10.21: Support an Integrated Single Electricity Market (I-SEM) as a key priority for Ireland.
- RPO 10.22: Support the reinforcement and strengthening of the electricity transmission and distribution network to facilitate planned growth and transmission/distribution of a renewable energy focused generation across the major demand centres to support an island population of 8 million people.
- RPO 10.23: Support EirGrid's Implementation Plan 2017-2022 and Transmission Development Plan (TDP) 2016 and any subsequent plans prepared during the lifetime of the RSES that facilitate the timely delivery of major investment projects subject to appropriate environmental assessment and the outcome of the planning process.

1.37 The site is therefore considered to be an appropriate location for the development of a substation and transmission lines under this Strategy.

Local Planning Policy

South Dublin County Council Corporate Plan 2020-2024

1.38 The SDCC Corporate Plan 2020-2024[7] identified SDCC's objectives and strategies for each of the councils principal activities. The plan builds in flexibility to meet the demands of a changing environment over the plan period.

South Dublin County Council (SDCC) Development Plan 2016-2022 (2016)

1.39 The relevant statutory development plan for the site is the SDCC Development Plan 2016-2022[8], adopted in May 2016. The core strategy, included within the Development Plan, provides an overarching strategy for the spatial development of the County over the medium to longer term and will form the basis for policies and objectives throughout the Development Plan. It translates the strategic planning framework set out in the NSS and the Regional Planning Guidelines for the Greater Dublin Area (2010), to County level.

1.40 As outlined in the Development Plan, the site is classified under Objective EE: to provide for enterprise and employment uses.

Draft South Dublin County Development Plan 2022-2028 (Ongoing)

1.41 It should be noted that SDCC commenced a review of the SDCC Development Plan 2016-2022[9] on the 31 of July 2020 and will create a new Development Plan for the period 2022 to 2028. The review is currently understood to be completed in August 2022.

1.42 For the purposes of this EIAR, the EIA has not considered this emerging plan further as it is not a material consideration in terms of planning until adopted.

Planning History

1.43 There are no relevant historical planning applications at the site in the last 5 years. The site proposed for the associated new data center to the north of Falcon Avenue has an extant permission dated November 2020 under SD20A/0124. This permission was for the demolition of an existing single storey dwelling and construction of a distribution warehouse building comprising warehousing with support offices, car parking, cycle parking, landscaping and boundary treatments, including all associated site development and services works.

1.44 However, this extant permission, will not be built out. Instead, the site is proposed to be developed into a data center by the Applicant under planning reference SD21A/0241 dated August 2021. The scheme proposed under SD21A/0241 comprises the demolition of the existing single-story dwelling and outbuilding, (approximately 206 sqm), erection of the two data centers along with associated emergency generators and flues with a gross floor area of approximately 40,589sqm, provision of 144 car parking

[3] Government of Ireland, 2018. National Planning Framework (NPF) – Ireland 2040 Our Plan (February 2018) [online]. Available at: https://npf.ie/wp-content/uploads/Project-Ireland-2040-NPF.pdf [Accessed on 28/06/2021].
[4] Government of Ireland, 2020. National Development Plan 2018-2027 (last updated 26 November 2020) [online]. Available at: https://www.gov.ie/pdf/?file=https://assets.gov.ie/37937/12baa8fe0dcb43a78122fb316dc51277.pdf#page=null [Accessed on 28/06/2021].
[5] Government of Ireland, 2021. Climate Action Plan. Department of the Environment, Climate and Communications
[6] Eastern & Midland Regional Assembly, 2019. Regional Spatial & Economic Strategy 2019-2031 [online]. Available at: https://emra.ie/dubh/wp-content/uploads/2020/05/EMRA_RSES_1.4.5web.pdf [Accessed on 20/07/2021]

[7] SDCC, 2020. South Dublin County Council Corporate Development Plan 2020-2024, [online]. Available at: corporate-plan-2020-24.pdf (sdcc.ie) [accessed on 30/11/2021]
[8] SDDC, 2016. South Dublin County Council Development Plan 2016-2022 [online]. Available at: https://www.sdcc.ie/en/services/planning/development-plan/plan-2016-2022/ [Accessed on 28/06/2021].
[9] South Dublin County Council, 2021. South Dublin County Development Plan 2022-2028 [online]. Available at: https://consult.sdublincoco.ie/en [Accessed 19/07/2021]

spaces and 66 bicycle parking spaces provision, construction of a gas-powered generation plant, and realignment of the Baldonnel Stream. The application is currently subject to a further information (FI) request by SDCC. It is understood that in the instance that SD21A/0241 does not come forward the Applicant would not build out the extant permission and the site would remain vacant.

1.45 The proposed development described herein would support the power demand for the data center proposed under SD21/0241 which is considered cumulatively as part of this EIAR.

Application Details

1.46 The description of the proposed development as stated on the application form is:

"The proposed development primarily comprises the provision of two no. 110kV underground transmission lines and a 110kV Gas Insulated Switchgear (GIS) substation compound along with associated and ancillary works and is described as follows:

- *The proposed 110kV GIS Substation Compound is to be located on lands to the south of those that are subject of an application for 2 no. data centres under South Dublin County Council Reg. Ref. SD21A/0241 and to the south of Falcon Avenue within Profile Park, and within an overall landholding bound to the north by Falcon Avenue, Profile Park; to the west by Casement Road, Profile Park; and to the east and south by undeveloped lands; and partly by the Digital Reality complex to the south-east within Profile Park, Clondalkin, Dublin 22. The site of the proposed development has an area of c. 3.19 hectares.*
- *The proposed 110kV Gas Insulated Switchgear (GIS) Substation Compound includes the provision of a two storey GIS Substation building (with a gross floor area of 1,477sqm) (known as the Kilcarbery Substation), three transformers with associated ancillary equipment and enclosures, a single storey Client Control Building (with a gross floor area of 51.5sqm), lightning masts, car parking, associated underground services and roads within a 2.6m high fenced compound and all associated construction and ancillary works.*
- *One proposed underground single circuit 110kV transmission line will connect the proposed Kilcarbery 110kV GIS Substation to the existing 110kV Barnakyle Substation to the west. The proposed transmission line covers a distance of approximately 274m within the townlands of Aungierstown and Ballybane, and Kilbride and will pass under the internal road network within Profile Park to where it will connect into the Barnakyle substation.*
- *One proposed underground single circuit 110kV transmission line will connect the proposed Kilcarbery 110kV GIS Substation to the existing 110kV underground Castlebaggot - Barnakyle circuit to the west within the Grange Castle South Business Park. The proposed transmission line covers a distance of approximately 492m within the townlands of Aungierstown and Ballybane, and Kilbride and will pass both under, and to the north of the internal road network within Profile Park and Grange Castle Business Park South where it will connect into the Castlebaggot - Barnakyle circuit at a proposed new joint bay.*

The development includes the connections to the two substations (existing and proposed) as well as to the Castlebaggot - Barnakyle circuit, associated underground services, and all associated construction and ancillary works."

Applicant

1.47 The Application is submitted on behalf of the following entity:

Vantage Data Centers DUB11 Limited,

1-2 Victoria Buildings,

Haddington Road,

Dublin 4,

Dublin,

Ireland.

Project Team

1.48 The Applicant has appointed a consultant team to assist in the development of the application and concurrently appointed an EIA team to undertake the EIA and prepare this EIAR in accordance with Regulations aforementioned. The team members and their respective roles are presented in Table 1.2: Design and EIA Team.

Table 1.2: Design and EIA Team

Company	Role
Vantage Data Centers	Development Manager/Project Manager
H&MV Engineering	Design and Build Consultant
Kavanagh Tuite Architects	Lead Architect
Clifton Scannell Emerson Associates (CSEA)	Civil and Structural Engineers
Marston Planning Consultancy	Planning Consultant
Ramboll	Environmental Permitting; EIA Project Manager and Coordinator; Environmental Consultants for Population and Health, Transport, Air Quality, Noise and Vibration, Water Resources and Flood Risk, Ground Conditions, Climate Change, Waste, Material Assets and Landscape and Visual Assessment.
Neo Environmental	Ecology Consultant
Terence O'Rourke	Cultural Heritage Consultant

1.49 The EIA has been carried out by Ramboll UK Limited ('Ramboll') and a number of technical specialists. The technical specialists appointed are regarded as being competent experts within their relevant fields.

Structure of the Environmental Impact Assessment Report

1.50 The EIAR comprises the following documents:

- Non-Technical Summary (NTS);
- Volume 1: Main Environmental Impact Assessment Report, comprising the following chapters:
  - Table of Contents, List of Figures, List of Tables
  - Chapter 1: Introduction
  - Chapter 2: EIA Process and Methodology
  - Chapter 3: Alternatives and Design Evolution
  - Chapter 4: Proposed Development Description
  - Chapter 5: Construction Environmental Management

  - Chapter 6: Population and Human Health
  - Chapter 7: Transport and Accessibility
  - Chapter 8: Air Quality
  - Chapter 9: Noise and Vibration
  - Chapter 10: Water Resources and Flood Risk
  - Chapter 11: Ecology
  - Chapter 12: Ground Conditions
  - Chapter 13: Climate Change
  - Chapter 14: Waste
  - Chapter 15: Material Assets
  - Chapter 16: Cumulative Effects
  - Chapter 17: Residual Effects and Mitigation
  - Glossary of Terms and Abbreviations
- Volume 2: Landscape and Visual Impact Assessment and Cultural Heritage Assessment
- Volume 3: Technical Appendices
  - Technical Appendix 1.1: IEMA Quality Mark Checklist
  - Technical Appendix 7.1: Traffic Flow and Distribution Diagrams;
  - Technical Appendix 7.2: Accident Data;
  - Technical Appendix 7.3: Cumulative Schemes Daily Traffic Flow Diagrams;
  - Technical Appendix 7.4: Proposed Development Trip Generation;
  - Technical Appendix 8.1: Air Quality Dust Risk Assessment Methodology;
  - Technical Appendix 9.1: Glossary of Noise and Vibration Terminology;
  - Technical Appendix 9.2: Preliminary Construction Noise Assessment;
  - Technical Appendix 10.1: Engineering Planning Report;
  - Technical Appendix 10.2: Flood Risk Assessment;
  - Technical Appendix 11.1: Ecological Impact Assessment Report;
  - Technical Appendix 11.2: Appropriate Assessment Screening Report;
  - Technical Appendix 12.1: Ground Investigation Report; and
  - Technical Appendix 12.2: Contaminated Land Interpretative Report.

Environmental Impact Assessment Report

Content of the EIAR

1.51 The required content of the EIAR is set out in Schedule 6 of the Regulations (2001 to 2021) as presented in Table 1.3 indicating where in this EIAR the requirements have been met.

Table 1.3: Information which is required in an EIAR (Schedule 6 of the Planning and Development Regulations (2001 to 2021)

Required Information		Section of EIAR
1	Description of the project, including in particular: (a) a description of the location of the project; (b) a description of the physical characteristics of the whole project, including, where relevant, and the land-use requirements during the construction and operational phases; (c) a description of the main characteristics of the operational phase of the project (in particular any production process), for instance, energy demand and energy used, nature and quantity of the materials and natural resources (including water, land, soil and biodiversity) used; (d) an estimate, by type and quantity, of expected residues and emissions (such as water, air, and soil and subsoil pollution, noise, vibration, light, heat, radiation, etc.) and quantities and types of waste produced during the construction and operation phases.	Volume 1: EIAR Chapter 1: Introduction, EIAR Chapter 4: Proposed Development Description, EIAR Chapter 5: Construction Environmental Management. EIAR Chapters 6-15, Volume 1 EIAR Volumes 2 and 3
2	A description of the reasonable alternatives (for example in terms of project design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.	Volume 1: EIAR Chapter 3: Design Evolution,
3	A description of the relevant aspects of the current state of the environment (baseline scenario) and an outline of the likely evolution thereof without implementation of the project as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge.	Volume 1: EIAR Chapter 1: Introduction, EIAR Chapter 4: Proposed Development Description, EIAR Construction EIAR Chapters 16 and 17, Volume 1. EIAR Volumes 2 and 3.
4	A description of the factors specified in Article 3(1) likely to be significantly affected by the project: population, human health, biodiversity (for example fauna and flora), land (for example land take), soil (for example organic matter, erosion, compaction, sealing), water (for example hydromorphological changes, quantity and quality), air, climate (for example greenhouse gas emissions, impacts relevant to adaptation), material assets, cultural heritage, including architectural and archaeological aspects, and landscape	EIAR Chapters 6-15, Volume 1
5	A description of the likely significant effects of the proposed project on the environment resulting from, inter alia: (a) the construction and existence of the project, including, where relevant; (b) the use of natural resources, in particular land, soil, water and biodiversity, considering as far as possible the sustainable availability of these resources; (c) the emission of pollutants, noise, vibration, light, heat and radiation, the creation of nuisances, and the disposal and recovery of waste; (d) the risks to human health, cultural heritage or the environment (for example due to accidents or disasters); (e) the cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to	EIAR Chapters 6-15, Volume 1 Volume 1: EIAR Chapter 16: Intra-Cumulative Effects Volume 1: EIAR Chapter 17: Summary of Residual Effects

Table 1.3: Information which is required in an EIAR (Schedule 6 of the Planning and Development Regulations (2001 to 2021)

Required Information		Section of EIAR
	areas of particular environmental importance likely to be affected or the use of natural resources; (f) the impact of the project on climate (for example the nature and magnitude of greenhouse gas emissions) and the vulnerability of the project to climate change; (g) the technologies and the substances used. The description of the likely significant effects on the factors specified in Article 3(1) should cover the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium- term and long-term, permanent and temporary, positive and negative effects of the project. This description should take into account the environmental protection objectives established at Union or Member State level which are relevant to the project.	
6	A description of the forecasting methods or evidence, used to identify and assess the significant effects on the environment, including details of difficulties (for example technical deficiencies or lack of knowledge) encountered compiling the required information and the main uncertainties involved.	Volume 1: EIAR Chapter 2: EIA Process and Methodologies EIAR Chapters 6-15, Volume 1
7	A description of the measures envisaged to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment and, where appropriate, of any proposed monitoring arrangements (for example the preparation of a post-project analysis). That description should explain the extent, to which significant adverse effects on the environment are avoided, prevented, reduced or offset, and should cover both the construction and operational phases.	EIAR Chapter 4: Proposed Development Description, EIAR Chapter 5: Construction Environmental Management EIAR Chapters 6-15, Volume 1
8	A description of the expected significant adverse effects of the project on the environment deriving from the vulnerability of the project to risks of major accidents and/or disasters which are relevant to the project concerned. Relevant information available and obtained through risk assessments pursuant to Union legislation such as Directive 2012/18/EU of the European Parliament and of the Council or Council Directive 2009/71/Euratom or relevant assessments carried out pursuant to national legislation may be used for this purpose provided that the requirements of this Directive are met. W here appropriate, this description should include measures envisaged to prevent or mitigate the significant adverse effects of such events on the environment and details of the preparedness for and proposed response to such emergencies.	EIAR Chapter 4: Proposed Development Description, EIAR Chapter 5: Construction Environmental Management EIAR Chapters 6-15, Volume 1
9	A non-technical summary of the information provided under points 1 to 8.	Non-technical Summary
10	A reference list detailing the sources used for the descriptions and assessments included in the report.	EIAR Volume 1 and 2, all chapters EIAR Volume 3, all technical appendixes.

Good Practice

1.52 As with EIA, good practice in the preparation of the EIAR is defined in a number of sources, with more specific issues covered by EIAR review checklists. Many of these checklists are very detailed and go to some length. In terms of widely applicable and practical guidance, the recent IEMA Quality Mark indicator check has been referenced in producing this EIAR as described in Appendix 1.1: IEMA Quality Mark Checklist. Ramboll UK Ltd is a Registrant on the IEMA Quality Mark. Accordingly, as part of Ramboll's QA procedures and Quality Mark Commitments, this EIAR and EIA has been undertaken to meet the Quality Mark Commitments as set out in Appendix 1.1: IEMA Quality Mark Checklist. Additional detail on relevant guidance is provided within Volume 1, EIAR, Chapter 2: Process and Methodology.

2 EIA PROCESS AND METHODOLOGY

Introduction

2.1 This chapter of the EIAR sets out the general approach to the process and to the methodology that is adopted when undertaking an EIA. It describes the legislative framework in which the EIA for the proposed development has been undertaken and identifies the key guidance that was considered. The EIA scoping and consultation process that was adopted to identify the key environmental topics for inclusion in the EIA is outlined, as well as the overall EIA methodology adopted.

2.2 While the approach and methodology to the EIA are described in this chapter, further detail on how the methodology was tailored to each technical aspect of the EIA is presented in the relevant technical assessment chapters of the EIAR. Other supporting assessments for environmental aspects that were scoped out of the EIA are included as technical appendices to this EIAR.

Environmental Impact Assessment

2.3 Since the adoption of Directive 85/337/EEC[1] (on 27 June 1985) on the assessment of the effects of certain public and private projects on the environment, both the law and EIA practices have evolved significantly. The 1985 Directive was amended by Directives 97/11/EC[2], 2003/35/EC[3] and 2009/31/EC[4], and the Directive and its amendments were codified in 2011 by Directive 2011/92/EU[5]. The current Directive 2014/52/EU[6] amends the 2011 codified Directive but does not replace it. The European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018[7,8] transpose the requirements of the 2014 Directive into existing planning consent procedures.

2.4 EIA provisions in relation to planning development consents are contained in the Planning and Development Act 2000 (as amended)[9] (the 'Act') and in the Planning and Development Regulations 2001 (as amended)[10] (the 'Regulations').

2.5 The Regulations set out the statutory process and minimum requirements for EIA and the contents of the EIAR. Specifically, they prohibit the grant of planning permission for developments likely to have significant effects on the environment (defined in the Regulations as 'EIA development') unless information on those effects is considered by the relevant planning authority in reaching its decision on a planning application. That information includes both the EIAR, which is the Applicant's own assessment, and any other information provided by consultees, the public, and any other persons about the proposal's environmental effects. This EIAR has been prepared pursuant to (and in accordance with) the Regulations.

2.6 In addition to the Regulations, there is guidance available on EIA and the application of the Regulations that has been considered in undertaking this EIA, including:

- Environmental Protection Agency's (EPA) Guidelines on Information to be Contained in an Environmental Impact Statement (2002)[11];
- EPA's Advice Notes on Current Practice in the Preparation of Environmental Impact Statements (2003)[12];
- EPA's Advice Notes on Current Practice in the Preparation of Environmental Impact Statements (2015)[13];
- EPA's Draft Guidelines on the information to be contained in Environment Impact Assessment Reports (2017)[14];
- European Commission's (EC) Environmental Impact Assessment of Projects – Guidance on the Preparation of the Environmental Impact Assessment Report (2017)[15];
- EC's Environmental Impact Assessment of Projects – Guidance on Scoping (2017)[16]; and
- Department of Housing, Local Government and Heritage's Guidelines for Planning Authorities and An Board Pleanála on carrying out Environmental Impact Assessment (2018)[17].

2.7 Guidance of relevance to individual technical assessments have been set out in Chapters 6-15 of this EIAR Volume, as well as in Volume 2.

2.8 In accordance with the Regulations, this EIA has been undertaken based on the proposed development as described in Chapter 4: Proposed Development Description and details of the construction works in Chapter 5: Construction Environmental Management of this EIAR Volume.

EIA Process

2.9 EIA is a process that identifies the likely significant environmental effects (both positive and negative) of a proposed development. The process aims to avoid, off-set and/or reduce any significant negative environmental effects, where these are identified, and to enhance any positive effects. Proposed developments to which EIA is applied (i.e. 'EIA development') are those that are likely to have significant effects on the environment by virtue of factors such as their nature, size or location.

2.10 The process and outcomes of the EIA are presented in an EIAR. The contents of an EIAR are prescribed by the Regulations and should be a clear and concise summary of a proposed development and its likely environmental effects (including direct, indirect and cumulative effects) on the natural, built and human environments. The EIAR is submitted to a relevant planning authority to accompany an application for planning permission. In this way, the aim of EIA is to protect the environment by ensuring that a local planning authority, when deciding whether to grant planning permission for a project which is likely to have significant effects on the environment, does so in the full knowledge of the project's likely significant effects and takes this into account in the decision making process. Alongside this, an EIA's objective is

[1] European Union, 1985. Council Directive 85/337/EEC of 27 June 1985 on the assessment of the effects of certain public and private projects on the environment. Document 31985L0337.
[2] European Union, 1997. Council Directive 97/11/EC of 3 March 1997 amending Directive 85/337/EEC on the assessment of the effects of certain public and private projects on the environment. Document 31997L0011.
[3] European Union, 2003. Directive 2003/35/EC of the European Parliament and of the Council of 26 May 2003 providing for public participation in respect of the drawing up of certain plans and programmes relating to the environment and amending with regard to public participation and access to justice Council Directives 85/337/EEC and 96/61/EC - Statement by the Commission. Document 32003L0035.
[4] European Union, 2009.Directive 2009/31/EC of the European Parliament and of the Council of 23 April 2009 on the geological storage of carbon dioxide and amending Council Directive 85/337/EEC, European Parliament and Council Directives 2000/60/EC, 2001/80/EC, 2004/35/EC, 2006/12/EC, 2008/1/EC and Regulation (EC) No 1013/2006 (Text with EEA relevance). Document 32009L0031.
[5] European Union, 2011. Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment Text with EEA relevance Official Journal of the European Union. Document 32011L0092.
[6] European Union, 2014. Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment Text with EEA relevance. Official Journal of the European Union. Document 32014L0052.
[7] Government of Ireland, 2018. European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018. S.I. No. 296/2018. ISB.
[8] Later amended to: Government of Ireland, 2018. European Union (Planning and Development) (Environmental Impact Assessment) (Amendment) Regulations 2018. S.I. No. 646/2018. ISB.
[9] Government of Ireland, 2000. Planning and Development Act 2000 (as amended). S.I. No. 30/2000. ISB.
[10] Government of Ireland, 2001-2019. Planning and Development Regulations 2001 (as amended). S.I. No. 600 of 2001. ISB.
[11] Environmental Protection Agency, 2002. Guidelines on the information to be contained in Environmental Impact Statements
[12] Environmental Protection Agency, 2003. Advice Notes on Current Practice in the preparation of Environmental Impact Statements
[13] Environmental Protection Agency, 2015. Advice Notes on Current Practice in the Preparation of Environmental Impact Statements Draft
[14] Environmental Protection Agency, 2017. Draft Guidelines on the information to be contained in Environmental Impact Assessment Report (EIAR)
[15] European Commission, 2017. Environmental Impact Assessment of Projects, Guidance on the preparation of the Environmental Impact Assessment Report.
[16] European Commission, 2017. Environmental Impact Assessment of Projects, Guidance on Scoping
[17] Government of Ireland, 2019. Guidelines for Planning Authorities and An Bord Pleanala om carrying out Environmental Impact Assessment 2018 (last updated 19 December 2019)

also to ensure that the public and statutory consultees are given early and effective opportunities to participate in decision making procedures and to enable the grant of required licences.

Screening

2.11 EIA Screening is the term in the Regulations used to describe the process by which the need for EIA is considered in respect of a proposed development. Some developments require a mandatory EIA by reason of their size, nature and effects. These projects, known as 'Schedule 1 developments', include mainline railways, airports, waste facilities and large power stations. The proposed development is not such a Schedule 1 development.

2.12 The need for an EIA for all other projects is determined on the basis of the following set criteria:

- The development is within one of the classes of development stated in Schedule 5 of the Regulations; AND
- EITHER it meets or exceeds the size threshold for that class of development in Schedule 2; OR a part of the project is in a sensitive area; AND
- It is likely to have significant effects on the environment by virtue of factors such as its nature, size, or location.

2.13 These are known as 'Schedule 5 developments'. The proposed development is below the 15 ha threshold under Part 2 of Schedule 5 of the Regulations. However, the proposed development constitutes a SID application under Section 182A of the Planning & Development Act 2000 (as amended) as the development includes high voltage (110kv or more) electricity transmission lines and interconnectors. Therefore the development provides the potential for significant effects on the environment and the Applicant has decided to undertake an EIAR on this basis. Accordingly, a formal EIA Screening exercise with ABP was not deemed necessary.

Scoping and Consultation

2.14 EIA Scoping is the term used in the Regulations whereby an applicant can request a formal 'scoping opinion' from the relevant local planning authority on the content of an EIAR and the extent of the information to be considered in the assessments. The purpose of EIA Scoping is to focus the EIA on the environmental issues and potential impacts which need the most thorough attention; to identify those which are unlikely to need detailed study; and to provide a means to discuss methods of impact assessment so as to reach agreement on the most appropriate.

2.15 The Applicant submitted a pre-application consultation request to ABP on 27 July 2021 and prepared a formal EIA Scoping Opinion Request Report (the 'EIA Scoping Report'), which was presented to ABP at the pre-application meeting on 14 October 2021. The EIA Scoping Report set out a description of the then emerging proposed development; the potential key environmental impacts and likely effects to be considered as part of the EIAR; as well as the proposed approach that would be adopted for the EIAR including the proposed scopes and assessment methodologies to predict the scale of effects and to assess the significance in each case.

2.16 A pre-application meeting was held on 14 October 2021 in which ABP, the client and the project planning consultant attended. The purpose of this meeting was to discuss the scope of the project and to confirm that an EIA would be undertaken. Overall, ABP confirmed their agreement on the approach. The EIA has been undertaken on the basis of the EIA Scoping Report.

2.17 Additionally, ABP confirmed on 25 November 2021 that the proposed development falls within the scope of section 182A of the Planning and Development Act, 2000 as amended, and that the proposed development would be strategic infrastructure within the meaning of section 182A of the above, and that an application for such development should be made directly to ABP. This EIAR has been prepared to support that application.

Scope of EIA

Non-Significant Issues

2.18 The aim of the EIA Scoping process is to ensure that the EIA is proportionate and focussed only on the likely significant environmental effects of the proposed development. Appraisals for each technical topic were undertaken as part of the EIA Scoping process to determine the existing baseline conditions and as a result, the potential for significant effects to arise.

2.19 Accordingly, the EIA Scoping process identified that the proposed development is unlikely to give rise to significant environmental effects in respect of the following environmental aspects and therefore would not need to be scoped in as discrete technical assessment chapters within the EIAR:

- Daylight, Sunlight, Overshadowing and Wind Microclimate; and
- Major Accidents and Disasters.

2.20 Whilst significant environmental effects in respect of Major Accidents and Disasters is unlikely, consideration has been given to this topic within the following technical chapters in this EIAR:

- Chapter 4: Proposed Development Description;
- Chapter 5: Construction Environmental Management;
- Chapter 10: Water Resource and Flood Risk; and
- Chapter 13: Climate Change.

2.21 Standard best practice, mitigation and enhancement measures identified during the course of preparing these chapters were integrated into the proposed development as described in Chapter 4: Proposed Development Description and in Chapter 5: Construction Environmental Management of this EIAR Volume.

Potentially Significant Issues

2.22 The potentially significant environmental issues that were identified during the EIA Scoping process and that have been addressed within discrete technical assessment chapters are as follows:

- Population and Human Health (Chapter 6, EIAR Volume 1);
- Transport and Accessibility (Chapter 7, EIAR Volume 1);
- Air Quality (Chapter 8, EIAR Volume 1);
- Noise and Vibration (Chapter 9, EIAR Volume 1);
- Water Resources and Flood Risk (Chapter 10, EIAR Volume 1);
- Ecology (Chapter 11, EIAR Volume 1);
- Ground Conditions (Chapter 12, EIAR Volume 1);
- Climate Change (Chapter 13, EIAR Volume 1);
- Waste (Chapter 14, EIAR Volume 1);
- Material Assets (Chapter 15, EIAR Volume 1); and
- Landscape, Visual and Cultural Heritage (EIAR Volume 2).

EIA Approach

Consideration of Alternatives

2.23 The Regulations require that an applicant provides a summary description of reasonable alternatives studied and to provide a description of their specific characteristics, as well as an indication of the main reasons for selecting the preferred option, including a comparison of the environmental effects. The Regulations do not define the term 'alternative' and EIA practice tends to consider alternative design proposals and to explain the process through which the proposed development has evolved.

2.24 Chapter 3: Design Evolution and Alternatives of this EIAR Volume explores the objectives of the proposed development and describes how the development proposals have evolved in response to environmental and planning opportunities and constraints, as well as consultation comments.

2.25 For the proposed development, the following alternatives have been considered:

- The 'Do-Nothing' alternative where the existing site condition remains in its underutilised state with no redevelopment; and
- Alternatives considered in the course of the design process (such as layouts, underground cable routes and design) taking into account environmental and other relevant planning and design constraints as part of the design evolution.

Baseline

2.26 The purpose of the EIA is to predict how environmental conditions may change as a result of a proposed development and to specify any investigative measures to be taken and/or required. This requires that the current environmental conditions and those in the future, are established. This is referred to as the 'baseline' and is usually established through a combination of desk-based research, site surveys and empirical studies and projections. Together, these describe the existing and future character of a site and the value and vulnerability of key environmental resources and receptors, against which any changes or effects resulting from a proposed development can be identified, understood and assessed.

2.27 For the EIA of the proposed development, the existing baseline represents the existing environmental conditions of the site and the surrounding study areas at the time of the assessments as described in Chapter 1: Introduction of this EIAR Volume. The technical assessments in EIAR Volume 1 (6-15), EIAR Volume 2 (1 and 2) and EIAR Volume 3 provide a description of topic specific existing baseline conditions against which the proposed development has been assessed.

2.28 The proposed development has also been assessed against future baseline conditions as follows:

- For the air quality, traffic and transport and noise and vibration assessments, consideration has been given to two projected environmental conditions in the future:
  - 2022, the year of the most intensive construction works, in terms of the number of traffic flows; and
  - 2023, the projected year of completion of the proposed development, when the proposed development would become operational and would give rise to environmental effects.

2.29 The baseline conditions have been characterised by means of desk studies, site visits, surveys and modelling. As a result of the restrictions associated from the COVID-19 pandemic, alternative methods have been used to collect representative data, with more reliance placed on desk-based studies, which are considered equally robust.

Receptors

2.30 Receptors that may be sensitive to potential environmental impacts as a result of the proposed development, can be summarised as follows, with further detail provided in respective technical assessments:

- Existing underlying geology and hydrogeology;
- Existing soils;
- Existing water resources, in particular ground water, surface water features and public potable water supplies;
- Existing utilities;
- Existing ecological receptors;
- Future maintenance workers of the site;
- Future users of the surrounding study area;
- Future pedestrians around the proposed development;
- Existing community facilities in proximity to the site;
- Existing landscape character areas;
- Existing visual receptors and local and strategic views from publicly accessible locations such as roads, footpaths and open spaces;
- Existing above ground heritage assets such as archaeology and built heritage;
- Potential existing buried heritage assets on-site;
- Existing transport facilities, such as Nangor Road; and
- Construction workers.

Impact Assessment

Basis of the EIAR

2.31 In accordance with the Regulations, the EIA has been undertaken based on the:

- Site, as shown and described in Chapter 1: Introduction, as well as the individual technical assessments (Chapters 6-15) of this EIAR Volume and EIAR Volume 2; and
- Proposed development and proposed construction works, as shown and described in Chapter 4: Proposed Development Description and Chapter 5: Construction Environmental Management, respectively, of this EIAR Volume.

2.32 The proposed development has been assessed in the EIAR, as defined by the following documents and materials:

- Detailed planning application drawings;
- Design Statement;
- Engineering Planning Report; and
- 3D model.

Sources of Proposed Development Information

2.33 In addition to the above, information on the proposed development has been drawn from the following application documents, as appropriate:

- Application form;
- Letters of consent;
- Newspaper notice;
- Site notice;
- Planning report;
- Architectural drawings;
- Design Statement;
- Screening Report for Appropriate Assessment;
- Landscape masterplan and drawings;

- Proposed Grid Connection Route and Proposed Grid Connection Route Plan and Typical Sections;
- Engineering Planning Report;
- Outline Construction and Environment Management Plan;
- Flood Risk Assessment;
- Engineering Drawings; and
- Environmental Impact Assessment Report, Appendices and Non-technical Summary.

Assessment Methodology

General

2.34 The aim of the EIAR is not to assess the proposed development's compliance/performance against planning policy as this is considered within the Planning Statement that accompanies the application. Instead, reference has been made to national, regional and local policy (where appropriate) to inform the scope of the technical assessments, assessment methodologies applied and existence of any sensitive receptors to be considered. Detailed methodologies for the assessment of each of the environmental aspects scoped into the EIA as discrete technical assessment chapters are provided within each technical chapter of this EIAR Volume and EIAR Volume 2; however, in general terms, the assessments have been based upon the following approach:

- Review of the existing conditions at and surrounding the site for the environmental topic area under consideration via various sources of existing information, data and reports;
- Desk-top studies;
- Site surveys;
- Consideration of relevant legislation;
- Consideration of relevant planning policies (national, regional and local), guidance and standards;
- Consultations with stakeholders and consultees as appropriate;
- Consideration of potentially sensitive receptors that could be affected by the proposed development;
- Use of published technical guidance and best practice;
- Use of quantitative and qualitative assessment methods, professional judgement and expert opinion;
- Identification of potential environmental impacts and likely effects, with an evaluation of their likely duration, magnitude and scale, taking into consideration embedded mitigation (where relevant); and
- Recommendation for additional mitigation and/or enhancement measures, followed by an assessment of the significance of the residual effects.

2.35 How the proposed development might affect the environment relies on predictions about what impact a certain action would have. Some predictions can be made using mathematical or simulation models, particularly where there are well known relationships between cause and effect. For example, the degree to which noise levels may increase as a result of additional traffic flows can be predicted using a mathematical equation; or the level of air pollution from a known traffic flow can also be predicted from a computer-based simulation model; or the visibility of a building can be predicted by accurately superimposing its outline and position over a photograph. Other impacts are less easy to predict in quantitative terms; for example, whilst the extent of a loss of a habitat on the abundance of individual species is more difficult to predict. In such cases, the EIA attempts to quantify the anticipated scale of impact using empirical experience, literature and professional judgement.

2.36 In all cases, the overall approach and specific methods of predicting the likely nature and magnitude of impact, as well as the scale of effect is set out in each of the technical assessments. Where used, recognised specific predictive methods are referenced. Any assumptions or limitations to knowledge are stated. In either case, the thought process leading to the conclusions is based on reasonably reliable data and so is considered to be prudent and robust.

2.37 Where detailed information on the proposed development has not been available, reasonable assumptions have been made, and clearly set out, based on experience of other developments of similar type and scale to enable assessment of likely significant effects.

2.38 The proposed development has not yet been approved so the conditional tense ('would') has been used to describe the development proposals, situations, potential impacts and likely effects that could/would arise from the introduction of the proposed development, as well as the mitigation measures that would be delivered or would be required upon approval of the proposed development. This approach does not lessen the Applicant's commitment to deliver the proposed development as presented within this EIAR. Furthermore, each technical assessment (and in particular summary tables at the conclusion of each chapter) clearly sets out the means by which any required mitigation measures relied upon, would be secured.

Proposed Development Stages

2.39 The EIA considers the following stages of the proposed development:

- Construction stage (i.e. the proposed development being built out, with ongoing construction works on the site);
- Operation stage (i.e. when the proposed development is built out and operational in its entirety).

Assessment Scenarios

2.40 As noted earlier, the assessment of the proposed development has been carried out against the existing baseline conditions as described in Chapter 1: Introduction of this EIAR Volume, technical assessment chapters and supplemented by relevant existing and updated surveys.

2.41 However, in accordance with standard practice, Chapter 8: Air Quality and Chapter 9: Noise and Vibration of this EIAR Volume have carried out their assessments against 'future baseline' scenarios for the construction stage and operation stage.

Construction Stage

2.42 The future baseline for the construction stage is the year of the most intensive construction works, in terms of the number of traffic flows, as set out in Chapter 5: Construction Environmental Management of this EIAR Volume.

2.43 Accordingly, the following assessments scenarios have been considered:

- Scenario 1: Existing Baseline (2021);
- Scenario 2: Future Baseline (Q4 2022) Year of Peak Construction of Proposed Development; and
- Scenario 3: Future Baseline (Q4 2022) Year of Peak Construction of Proposed Development + Cumulative Development.

Operation Stage

2.44 The future baseline for the operation stage comprises the year in which the proposed development would be fully completed, occupied and operational.

2.45 Accordingly, the following assessment scenarios have been considered:

- Existing Baseline 2021;
- Construction Baseline (2022 'Do Nothing');
- Construction Baseline (2022 'Do Nothing') + cumulative development;
- Operational Year Baseline (2023 'Do Nothing') + cumulative development; and
- Operational Year Baseline (2023 'Do Nothing') + cumulative development + proposed development (2023 'Do Something').

2.46 The 'Do Nothing' scenario refers to the instance where the proposed development is not built out.

2.47 The 'Do Something' scenario refers to the scenario where the proposed development is built out and operational in its entirety.

Mitigation

2.48 Mitigation is the term used to refer to the process of avoiding where possible and, if not, reducing, controlling and/or off-setting the likely significant negative effects of a development. Mitigation measures relate to the design stage; the construction stage; or the activities associated with the operation stage.

2.49 As part of the EIA, an iterative approach has been adopted where significant environmental effects have been avoided where possible in the first instance through the design refinements and iterations (referred to as 'embedded' mitigation'), as reported upon within Chapter 3: Alternatives and Design Evolution of this EIAR Volume. Where negative environmental effects were identified through early assessment work, opportunities to reduce or control impacts and effects, or in some cases, to compensate for impacts and effects, were identified and incorporated into the proposed development. In addition, opportunities to enhance the positive environmental effects of the proposed development have also been sought and incorporated into the proposed development.

2.50 Within each technical chapter of this EIAR, the assessment of the effects that are likely to arise as a consequence of a potential impact/change to environmental receptors from the proposed development is initially presented. If any 'additional mitigation' measures are required, further to that already embedded into the proposed development throughout its design evolution, these are proposed, and the proposed development is reassessed to ascertain the likely residual effects and the likely significant environmental effects. This is reported on within each technical assessment chapter of the EIAR.

2.51 In all cases, mitigation measures are presented as embedded, specific commitments or statements of fact. It is anticipated that the implementation of mitigation identified throughout the EIAR, would be secured by means of approval of the planning drawings, appropriately worded planning conditions or planning obligations. Where the need for mitigation is identified, each assessment confirms how the mitigation will be secured.

Impacts and Effects

2.52 Unless otherwise required by published assessment guidance, the EIA has made distinction between:

- **Impacts**: the change or action; and
- **Effects**: the result/consequence/outcome of the change.

2.53 As a general rule, the EIA assesses the effects that are likely to arise as a consequence of a potential impact/change to environmental receptors following the application/consideration of embedded mitigation measures.

2.54 The quality, magnitude and duration or potential effects are defined in accordance with EPA Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports. These are summarised below.

Table 2.1: Description of Effects

Effect Characteristic	Description
Quality	
Positive	A change which improves the quality of the environment (for example, by increasing species diversity; or the improving reproductive capacity of an ecosystem, or by removing nuisances or improving amenities).
Neutral	No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
Negative	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).
Significance	
Imperceptible	An effect capable of measurement but without significant consequences.
Not significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
Significant	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.
Profound	An effect which obliterates sensitive characteristics.
Duration of Effects	
Momentary	Effects lasting from seconds to minutes.
Brief	Effects lasting less than a day.
Temporary	Effects lasting less than a year.
Short term	Effects lasting one to seven years.
Medium term	Effects lasting seven to fifteen years.
Long term	Effects lasting fifteen to sixty years.
Permanent	Effects lasting over sixty years.
Reversible	Effects that can be undone, for example through remediation or restoration.
Probability of Effects	
Likely	The effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented.
Unlikely	The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.
Type of Effects	
Indirect effects	Impacts on the environment, which are not a direct result of the project, often produced away from the project site or because of a complex pathway.
Cumulative effects	The addition of many minor or significant effects, including effects of other projects, to create larger, more significant effects.
'Do-nothing' effects	The environment as it would be in the future should the subject project not be carried out.
'Worst case' effects	The effects arising from a project in the case where mitigation measures substantially fail.
Indeterminant effects	When the full consequences of a change in the environment cannot be described.
Irreversible effects	When the character, distinctiveness, diversity or reproductive capacity of an environment is permanently lost.

Table 2.1: Description of Effects	
Effect Characteristic	**Description**
Residual effects	The degree of environmental change that will occur after the proposed mitigation measures have taken effect.
Synergistic effects	Where the resultant effect is of greater significance than the sum of its constituents, (e.g. combination of SOx and NOx to produce smog).

2.55 There are some exceptions to the conventions and terminology described above for certain topic specific assessments. This is set out in the relevant technical assessment chapter.

2.56 The scale of effects is typically determined through the use of the terminology above and the application of professional judgement and discretion of the particular technical specialist. Accordingly, a fixed/set/generic matrix has not been adopted for the EIA as a whole.

2.57 The specific benchmarks have been established by the project team using available national, regional and local policy together with other relevant guidance, recognised best practice and expert judgement. The development of these benchmarks is explained in more detail in each assessment or technical appendix.

2.58 Throughout the EIAR, residual effects have been predicted as either '**Significant**' or '**Not Significant**'. Significant effects are considered material to the planning decision process. Residual effects of moderate, significant, very significant and profound are typically considered **'Significant'**, but would be dependent on the relevant technical assessment, as well as the existence of published assessment guidance. Where published assessment guidance is not definitive in respect of categorising/determining significant environmental effects, professional judgement has been applied, taking into account the duration, extent and context of the effect, to determine significant effects.

Cumulative Assessment

2.59 The Regulations require that all likely significant effects of a development are taken into account, including cumulative effects.

2.60 There is no prescriptive guidance on the methodology for the assessment of cumulative effects in Ireland. However, the Institute of Environmental Management & Assessment (IEMA) Guidelines[18] identifies two types of cumulative effects:

- Type 1 – **Intra-Project Effects**: Combined effects of different types of impact or 'impact interactions', for example the multiplying effects arising from noise, dust and visual impacts during the construction of the proposed development on a particular sensitive receptor; and
- Type 2 – **Inter-Project Effects**: Combined or additive effects generated from the proposed development together with other planned or likely foreseeable developments and also referred to as 'in-combination effects'. These other developments may generate their own individually insignificant effects but when considered together could amount to significant cumulative effects, for example, combined transport and accessibility impacts from two or more (proposed) developments. Additive effects were considered where relevant.

2.61 As Stated in Table 3.3 of the EPA Guidance, under 'Describing the Types of Effects' synergistic effects should be considered. Synergistic effects are considered within the inter-project cumulative effects, also known as additive effects. Where the proposed development would likely result in additive effects, these will be identified within the relevant EIAR chapter.

Intra-Project Cumulative Effects

2.62 As mentioned above, there is no established EIA methodology for assessing and quantifying the intra-project cumulative effects of individual effects on sensitive receptors. Therefore, Ramboll has developed an approach which uses the defined residual effects of the proposed development to determine the potential for effect interactions and so the potential for intra effects of individual effects.

2.63 Intra-project cumulative effects from the proposed development itself on existing off-site and future on-site sensitive receptors during the construction stage and operation stage have been considered. It is possible, however, that depending on the predicted individual 'completed developments' effects, only the construction stage effects would actually be considered as often they generate the greatest likelihood of interactions occurring and hence significant effects. Indeed, construction stage effects are usually more negative (albeit on a temporary basis) than effects as a result of the operation stage.

2.64 Dependent on the relevant sensitive receptors, the assessment focusses either on key individual receptors or on groups considered to be most sensitive to potential interacting effects. The criteria for identifying those receptors which are considered to be potentially sensitive include existing land uses, proximity to the construction works and the site, and likely duration of exposure to impacts.

2.65 It should be noted that only residual effects that are minor, moderate or major in scale have been considered within this assessment, as negligible effects are, by definition, imperceptible in their nature. Due to the 'cross-boundary' and 'overlapping' nature of these effects across various environmental topics, and the assessment approach adopted, the results of intra-project cumulative effects are holistically presented within a discrete assessment chapter (Chapter 16: Cumulative Effects of this EIAR Volume) and not within each of the technical assessment chapters. This avoids unnecessary duplication and repetition and presents a proportionate approach.

2.66 With regard to the potential for cumulative effects to occur, it is anticipated that standard mitigation measures as detailed in Chapter 5: Construction Environmental Management of this EIAR Volume can be applied to prevent temporary significant effects from the interaction of effects occurring on-site. It is also anticipated that a site-specific Construction Environmental Management Plan (CEMP) would be secured by means of an appropriately worded planning condition.

Inter-Project Cumulative Effects

2.67 The Regulations require an assessment of potentially significant cumulative effects of a proposed development along with other 'existing and/or approved projects'. There are no legislative or policy requirements which set out how an inter-project cumulative impact assessment should be undertaken.

2.68 Accordingly, inter-project effects arising from the proposed development in combination with, or in addition to, 'cumulative development' during the construction stage and operation stage, have been considered in the EIA.

2.69 Each technical EIAR chapter presents the assessment of combined effects of the proposed development with certain other cumulative developments. Schedule 6 of the Regulations states that only developments which are existing and/or approved should be considered, i.e. developments built or under construction or with a planning permission.

2.70 Spatial considerations and scale of development criteria has been developed based on professional judgement to determine whether cumulative developments have the potential for cumulative effects when combined with the proposed development's effects. The criteria applied to the cumulative developments are those which are either:

- Data centres that are consented/approved or have resolution to grant or are currently at early stage of construction; and
- are within 1km of the application site.

[18] IEMA, 2004. Guidelines for Environmental Impact Assessment. IEMA.

2.71 The cumulative developments have been quantitatively assessed on a topic by topics basis, subject to the availability of development information in the public domain. Where information is not available, or cumulative developments do not comply with the above criteria, qualitative approaches have been adopted based on professional judgement.

2.72 The location of the cumulative developments considered in the EIAR is shown in Figure 2.1 overleaf and the description of each cumulative developments, is summarised in Table 2.3.

2.73 Where possible, the status of cumulative developments' construction works have been taken into account. For example, where construction has progressed to a material degree, such as to affect local views, traffic flows and air quality, such schemes have been considered as part of the existing baseline.

Table 2.3: Cumulative Development Descriptions

No.	Address [Application Reference]	Planning Application Description	Application Status
1	Vantage – townlands of Ballybane & Kilbride within Profile Park, Clondalkin, Dublin 22 [SD21A/0241]	Demolition of the abandoned single storey dwelling and associated outbuilding (206sqm); construction of 2 two storey data centers with plant at roof level of each facility and associated ancillary development which will have a gross floor area of 40,589sq.m.	Due to be decided
2	Centrica Business Solutions – Profile Park, Baldonnel, Dublin 22 [SD21A/0167]	Construction of a gas fired power plant with an electrical output of up to 125 MW with associated balance of plant, equipment and buildings.	Due to be decided
3	Digital Reality Trust - Profile Park, Baldonnel, Dublin 22, D22 TY06 [SD17A/0377]	Revisions and alterations of the permitted development of a data processing facility under planning Ref: SD12A/0002 on a 3.85 hectare site. The revised application consists of alterations to the DUB14 (previously DUB12) data centre/warehouse structure, granted in the previous application. The alterations to the DUB14 (Previously DUB12) include: (i) 2 data halls 2137 sq.m (increase of 180sq.m), (ii) offices/reception 478sq.m (decrease of 190 sq.m), (iii) support space/staff facilities and internal plant with a floor area of 953sq.m (increase of 84sq.m), (iv) external plant of 1,777sq.m (footprint increase of 35sq.m).	Grant Permission – 15/12/2017 Constructed
4	Equinix (Ireland) Ltd – Plot 100, Profile Park, Nangor Road, Clondalkin, Dublin 22 [SD21A/0186]	Construction of a 3 storey (part 4 storey) data centre known as 'DB8' to include data halls, electrical/plant rooms including internal generators, offices, lobbies, ancillary staff areas including break rooms and toilets, stores, stair/lift cores throughout and photovoltaic panels at roof level m.	Request for additional information – 30/08/2021
5	UBC Properties -Grange Castle South Business Park, Dublin 22 [An Bord Pleanála Reference – 308585]	Clutterland 110kV GIS Substation building and 2 underground single circuit transmission lines.	Approved 07/05/21
6	UBC Properties - Townlands within Grange Castle South Business Park, Baldonnel, Dublin 22 [SD20A/0121]	The development will consist of the demolition of the existing two storey dwelling of Ballybane and associated farm buildings (565sq.m) and the construction of 3 two storey data centres with mezzanine floors at each level of each facility and associated ancillary development that will have a gross floor area of 80,269sq.m on an overall site of 16.5hectares.	Grant Permission – 09/09/2020 Construction in progress
7	Cyrus One - Grange Castle Business Park, Clondalkin, Dublin 22 [SD18A/0134]	Demolition of the existing single storey house of 'Erganagh' and the construction of a two storey data centre and delivery bays with associated three storey office block and services that will have a gross floor area of 35,426sq.m on an overall site of 9.2 hectares.	Grant Permission – 24/09/2018.
8	Cyrus One Townlands within Grange Castle South Business Park, Baldonnel, Dublin 22 [SD20A/0295]	Amendments and modifications to the permitted data centre development granted under Reg. Ref. SD18A/0134 - ABP Ref. ABP-302813-18 and the temporary substation	Permission granted under SD19A/0300
9	Cyrus One - Grange Castle South Business Park, Baldonnel, Dublin 22 [An Bord Pleanála Ref - 309146]	2 no. 110kV transmission lines and a 110kV Gas Insulated Switchgear (GIS) substation	Due to be decided

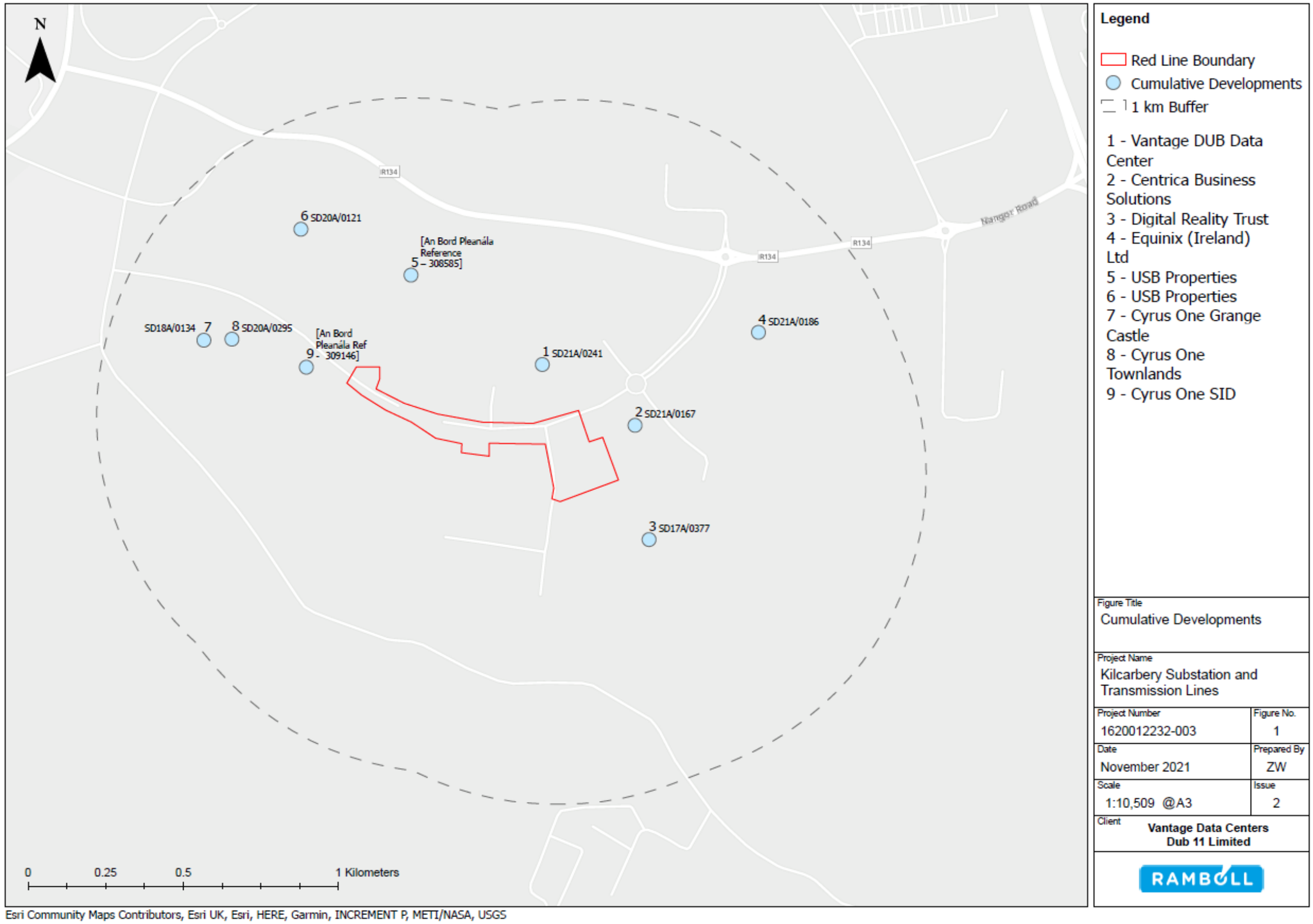


Figure 2.1: Cumulative Development Locations.

Assumptions and Limitations

2.74 The principal assumptions that have been made, and any limitations that have been identified, in undertaking the EIA are set out below. Assumptions specifically relevant to each environmental topic have been set out in each technical assessment of the EIAR.

- Baseline conditions have been established from a variety of sources, including historical data, but due to the dynamic nature of certain aspects of the environment, conditions at the site and surrounding land uses may change.
- The assessments contained within each of the technical assessments of this EIAR Volume and within EIAR Volume 2 are based on the current legislative and policy framework, having regard to emerging policies and legislative changes.
- It is assumed that information received from third parties is accurate, complete and up to date.
- The assessments contained within each of the technical assessments of EIAR Volume 1 and within EIAR Volume 2 are based upon the application drawings submitted.
- The assessments contained within each of the technical chapters are based on the assumption that embedded mitigation measures set out in the application drawings, through regulatory regimes or via the management controls as set out in Chapter 4: Proposed Development Description and Chapter 5: Construction Environmental Management of this EIAR Volume are implemented.
- The assessments contained within the Chapter 8: Air Quality and Chapter 9: Noise and Vibration of this EIAR Volume are based on industry-average specifications for construction, mechanical and services plant as project-specific details would be finalised during the construction planning and procurement stages.
- Construction works across the site would take place substantially in accordance with the phasing and programme of works described in Chapter 5: Construction Environmental Management of this EIAR Volume.
- Cumulative developments would be implemented substantially in accordance with information that is publicly available or that has been provided to the Applicant, and subject to the same regulatory regimes and good practice management controls.
- Assessments have assessed the existing baseline conditions at the time of EIAR preparation (mid-late-2021) unless otherwise stated in the technical assessment chapter. The majority of baseline survey work was undertaken during the COVID-19 pandemic; therefore, where relevant, pre-COVID-19 data has been used to compare and supplement collected data. In respect of transport, the data presented is the best information available, given traffic surveys were not possible because of the 2021 COVID lockdown restrictions, derived by adopting the following approach:
  - Baseline Traffic Flows have been taken from surveys undertaken to inform the Traffic Impact Assessment for submitted Grange Castle Business Park South, Baldonnel, Dublin 22 (Ref SD20A/0121).
  - Information has been derived from the engineering design team for the projected operation and construction vehicle movements.
- While it is widely acknowledged the COVID-19 pandemic has seen an increased prevalence of home-working and reduced traffic, noise and emissions, this is expected to gradually reverse when lockdown is lifted. It is not possible to predict what may change in the future, so it is considered that assessments based on or supplemented by pre-COVID-19 baseline assessments are reasonable and representative. In actual fact, the main difference would be to traffic flows, where pre-COVID19 baselines are worse, and therefore the assessments are based on reasonable worst-case scenarios.
- The EIAR does not include assessment of the decommissioning stage effects of the proposed development due to the long design life of the proposed development. It is assumed that an appropriate assessment of the potential decommissioning effects, and relevant mitigation proposed, would be undertaken prior to such works progressing.

Technical Assessment Chapters

2.75 A consistent approach to the presentation of EIA findings in the EIAR has been adopted for each of the technical assessments, including:

- explanation of the information gathering and assessment methodology, including a review of policy and legislative requirements of relevance to the specific technical area;
- description of the baseline conditions;
- description of mitigation that has been embedded into the proposed development's design;
- the identification and assessment of the potential impacts and likely effects arising during the construction and operation of the proposed development taking into account any embedded mitigation measures;
- description of additional opportunities for mitigation or enhancement to reduce the significance of any negative environmental effects, including the requirements for post-development monitoring; and
- assessment of the residual environmental effects and an evaluation of their significance against defined criteria.

2.76 Each environmental topic considered in the EIA has been assigned a separate chapter in EIAR Volume 1 (Chapter 6-15) with the exception of the landscape, visual and cultural heritage impact assessment which is presented separately in EIAR Volume 2. Within each technical chapter the assessment is presented and reported in the following format:

- Introduction – a brief introduction to the assessment;
- Methodology – an overview and review of policy and legislative requirements of relevance to the specific technical area, an outline of the technical, spatial and temporal scope of the assessment, a description of the methods undertaken to characterise the baseline, as well as an explanation of the approach to defining the significance of likely environmental effects;
- Baseline Conditions – a description of the baseline conditions;
- Assessment of Effects – an assessment of the likely significant effects of the proposed development and an evaluation of their significance against defined criteria taking into account embedded mitigation;
- Assessment of Residual Effects – a description of the additional mitigation, if required and then an assessment of the likely residual effects of the proposed development;
- Summary of Residual Effects – tabulated summary of the residual effects;
- Cumulative Effects – cross reference to the intra-cumulative effects assessment in Chapter 16: Cumulative Effects (of this EIAR Volume) and an assessment of inter-project cumulative effects; and
- Summary of Assessment– brief summary of the technical assessment.

3 ALTERNATIVES AND DESIGN EVOLUTION

Introduction

3.1 The European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018[1,2] requires that information provided by the developer in an EIAR shall include a description of the reasonable alternatives studied by the developer[3]. These are reasonable alternatives which are relevant to the project and its specific characteristics (e.g. in terms of design, technology, location, size and scale), studied by the Applicant and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.

3.2 This chapter of the EIAR therefore explores the objectives of the proposed development, its design evolution and the reasonable alternatives considered. In doing so, the chapter considers the analysis of the site and existing environmental conditions which informed the design evolution of the proposed development.

3.3 The following three alternatives were considered:

- The 'Do-Nothing' alternative;
- Alternative locations and uses; and
- Alternative design/layouts of the proposed development.

3.4 Further details can be found in the Design Statement which accompanies the application.

Development Objectives

3.5 The proposed development aims to develop the existing low grade agricultural land to meet development aspirations set out within local and regional policies.

3.6 The specific development objectives for the proposed development are to:

- Provide the primary source of power to the adjacent data centre development proposed by the Applicant under application Ref SD21A/0241; and
- Increase capacity and resilience of the local grid network.

Development Considerations

Policy Considerations

3.7 The development considerations for the site are set out in the following planning policy and guidance documents at national, regional and local levels:

- National Planning Framework (NPF) (2018)[4];
- National Development Plan (NDP) 2018-2027 (2018)[5];
- South Dublin County Council (SDCC) Corporate Plan 2020-2024[6];
- Regional Spatial and Economic Strategy (RSES) for the Eastern and Midlands Regional Assembly (EMRA)[7] – in particular Regional Policy Objective (RPO) 10.19 through 10.23 which involve supporting the roll-out of the Smart Grids and Smart Cities Action Plan, facilitating the development of enhanced electricity and gas supplies, supporting an Integrated Single Electricity Market (I-SEM), supporting the reinforcement and strengthening of the electricity transmission and distribution network, and supporting EirGrid's Implementation Plan 2017-2022 and Transmission Development Plan (TDP) 2016 and any subsequent plans; and
- South Dublin County Council (SDCC) Development Plan 2016-2022[8] – in particular Objective EE: *"To provide for enterprise and employment related uses"*; and
- Commission for Regulation of Utilities (CRU) Direction to the System Operators related to Data Centre grid connection processing (2021).

3.8 The proposed development has had consideration for the following emerging policy and guidance:

- SDCC South Dublin County Development Plan 2022-2028[9].

Site Considerations

3.9 The following site considerations informed the design process:

- Sensitive receptors in the vicinity of the site (including residential properties to the north and south of the site);
- Site allocations under aforementioned planning policies; and
- On-site environmental features, such as buried archaeology and the limited vegetation on the site.

Environmental Considerations

3.10 The design has given consideration to the following primary environmental constraints:

- Sensitive receptors in the vicinity of the site (in particular with adverse air quality and noise);
- Visual impacts to the public;
- Land ownership boundaries; and
- Built services adjacent to and in the vicinity of the site.

Consultation

3.11 As part of the design process, a pre-application consultation request was submitted to ABP on 27 July 2021 and a pre-application meeting was held with ABP on 14 October 2021 during which no significant design or environmental issues were raised. Following this ABP confirmed on 25 November 2021 that the proposed development falls within the scope of Section 182A of the Planning and Development Act, 2000

[1] Government of Ireland, 2018. European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018. S.I. No. 296/2018. ISB.
[2] Later amended to: Government of Ireland, 2018. European Union (Planning and Development) (Environmental Impact Assessment) (Amendment) Regulations 2018. S.I. No. 646/2018. ISB.
[3] See Article 5(1)(d) of Directive. See Schedule 6(1)(d) to the Regulations.
[4] Government of Ireland, 2018. National Planning Framework (NPF) – Ireland 2040 Our Plan (February 2018) [online]. Available at: https://npf.ie/wp-content/uploads/Project-Ireland-2040-NPF.pdf [Accessed 28/06/2021].
[5] Government of Ireland, 2020. National Development Plan 2018-2027 (last updated 26 November 2020) [online]. Available at: https://www.gov.ie/pdf/?file=https://assets.gov.ie/37937/12baa8fe0dcb43a78122fb316dc51277.pdf#page=null [Accessed 28/06/2021].
[6] SDCC, 2020. South Dublin County Council Corporate Development Plan 2020-2024, [online]. Available at: corporate-plan-2020-24.pdf (sdcc.ie) [accessed on 30/11/2021].
[7] Eastern & Midland Regional Assembly 2019. Regional Spatial & Economic Strategy 2019-2031 [online]. Available at: https://emra.ie/dubh/wp-content/uploads/2020/05/EMRA_RSES_1.4.5web.pdf [Accessed 20/07/2021].
[8] SDDC, 2016. South Dublin County Council Development Plan 2016-2022 [online]. Available at: https://www.sdcc.ie/en/services/planning/development-plan/plan-2016-2022/ [Accessed 28/06/2021].
[9] South Dublin County Council, 2021. South Dublin County Development Plan 2022-2028 [online]. Available at: https://consult.sdublincoco.ie/en [Accessed 19/07/2021].

as amended and that the proposed development would be strategic infrastructure within the meaning of Section 182A of the above, and that an application for such development should be made directly to ABP.

3.12 This EIAR has been prepared to support that application. Further consultation with the ABP and the public would be undertaken post submission.

Alternatives

Do-Nothing Alternative

3.13 The 'Do Nothing' scenario is a hypothetical alternative conventionally considered, albeit briefly, in EIA as a basis for comparing the development proposal under consideration.

3.14 For the purposes of the EIAR, the 'Do Nothing' scenario is where no development occurs on the site and therefore remains vacant and unchanged.

3.15 When considering the 'Do-Nothing' alternative, the following is noted:

- The site consists of largely unused agricultural land and the site needs to be re-purposed;
- The site is located within Profile Park, on current agricultural land, which is designated in the SDCC Development Plan 2016-2022: Objective EE to provide for enterprise and employment uses. This gives the encouragement for development which seeks to provide alternative uses to those that have recently occupied the site;
- The site has been identified for strategic infrastructure development by EirGrid; and
- Furthermore, within the Development Plan mentioned above, the proposed Kilcarbery substation would support RPO 10.19 through to RPO 10.23 to support Ireland's need for a secure and resilient supply of energy.

3.16 In the event the proposed development at the site, or any other development, did not come forward, a number of negative effects and lost opportunities would result:

- Loss of investment in infrastructure at the site to support future development at Profile Park;
- Loss of opportunity to maximise the productive use of the site;
- Loss of opportunity for further economic and employment growth associated with the data center the proposed development would support; and
- Loss of opportunity to further establish Profile Park and the surrounding area as a data center hub.

3.17 The Applicant has therefore not considered the 'Do Nothing' alternative further.

Alternative Sites

3.18 No alternative sites have been considered by the Applicant for the following reasons:

- The site has been procured by the Applicant and the Applicant has received letters of consent from neighbouring landowners who have their land crossed by the transmission lines;
- EirGrid specified that the Applicants transformer compound must sit next to the EirGrid GIS substation that was identified for this site;
- The site sits within an area that allows it to be used by potential future customers (i.e. doesn't sit within the same land parcel as the adjacent data center development proposed by the Applicant under application reference SD21A/0241), and therefore other developments, most likely other future data centers, may be able to use the substation in the future;
- The site is located within an area identified in SDCC's Development Plan 2016-2022 as an area for enterprise and employment uses (as previously stated);
- There is a long-standing agreement for an EirGrid substation to be located on the site; and
- There is no evidence of site contamination on the site making it suitable for redevelopment.

Alternative Land Uses

3.19 The proposed land use has been informed by prevailing local and regional policy (as previously stated) and there is a long-standing agreement for an EirGrid substation to be located on the site. Accordingly, no other land uses were considered outside of the proposed development.

Alternative Layouts, Designs and Design Evolution

3.20 The following sub-sections of this chapter describe the design evolution process undertaken by the Applicant's design team. A series of site layout options are presented and described. Commentary has been provided where changes have been informed by (e.g.) pre-application consultation and/or environmental considerations.

3.21 A series of options were explored throughout the design development process. These sought to define the most appropriate design response for the site.

Site Arrangement

3.22 As part of the initial design process, the design team carried out a 'test-fit' exercise to assess the layout of the transformer compound and substation (within the confines of the standard specification requirements of EirGrid) and the design of the grid route, including the cabling route and potential connection points, as shown below in Table 3.1 to Table 3.3. The design submitted to ABP as part of the planning application is the outcome of this exercise.

3.23 Table 3.1 describes the evolution process of the standard EirGrid substation design for a 100kV 8 Bay substation with Table 3.2 outlining the layout evolution within the site boundary. Table 3.3 summarises the evolution of the proposed grid route and connection points to Barnakyle and Castlebaggot substations.

3.24 Within each table a description of the proposed development layout and its evolution is provided, and, where appropriate, a concluding statement summarising the design's suitability for the site.

Table 3.1: Test-fit Exercise for Standard EirGrid Design for a 110kV Eight-bay Substation

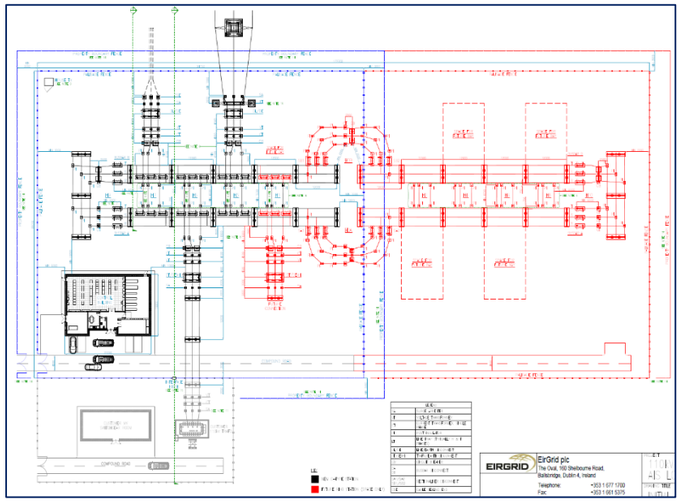
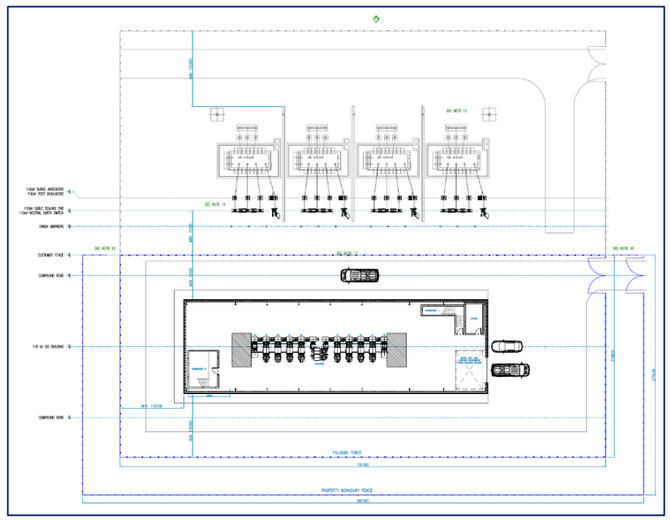
Step	Layout	Description	Suitability
1 Standard EirGrid design for a 110kV eight-bay AIS (Air Insulated Switchgear) Substation		AIS substations occupy a large area and have a significant visual impact as all equipment is visible to the public when compared to alternative GIS substations. They are generally constructed in rural locations, away from population centres and where land is less expensive.	These types of substations are more suited to wind and solar farm developments and as such, were **deemed unsuitable** for this development.
2 Standard EirGrid design for a 110kV eight-bay GIS (Gas Insulated Switchgear) Substation		GIS substations occupy a smaller footprint and are fully contained within industrial style buildings common to business parks etc.	Due to the smaller footprint and visual similarity to data halls found within data centre campuses this option was **deemed suitable**.

Table 3.2: Test-fit Exercise for Substation

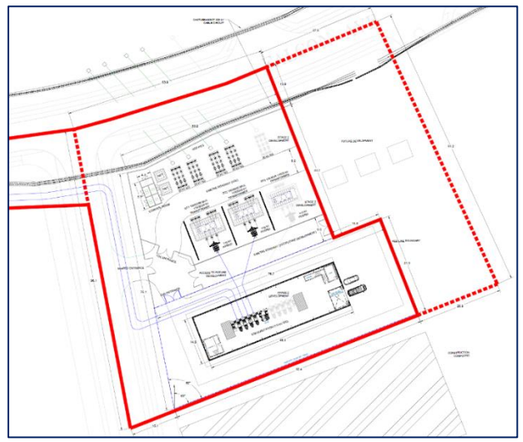
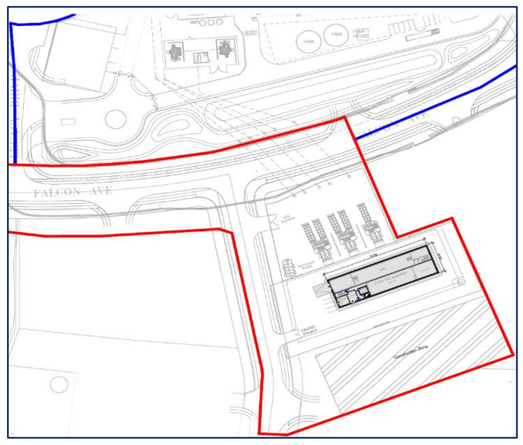
Step	Layout	Design Evolution Explanation
1 Initial Concept Drawing		The initial concept drawing was based on the application of the EirGrid standard GIS layout (seen in Table 3.1) within the site boundary. The Applicants requirements were also incorporated in the transformer compound in the north of the site.
2 Refined Compound Layout		Design evolution through detailed design with the roadways between the transformer and EirGrid compounds were removed as they did not align with the standard EirGrid requirements.

Table 3.2: Test-fit Exercise for Substation

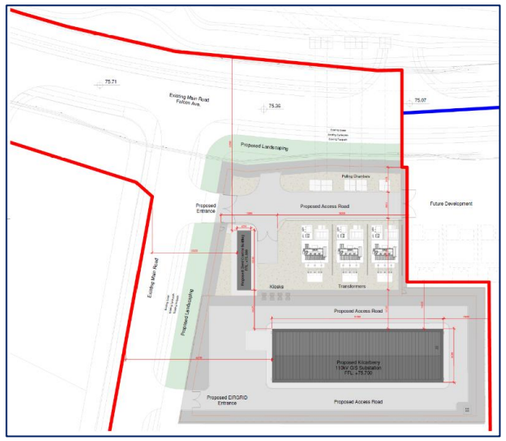
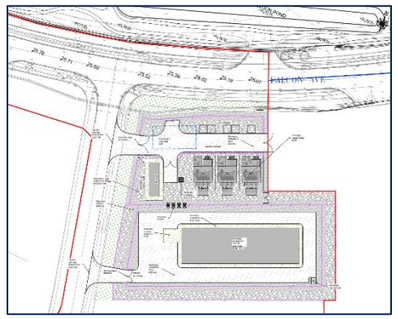
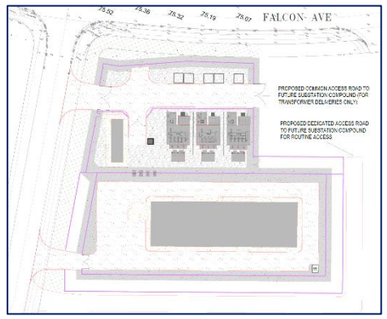
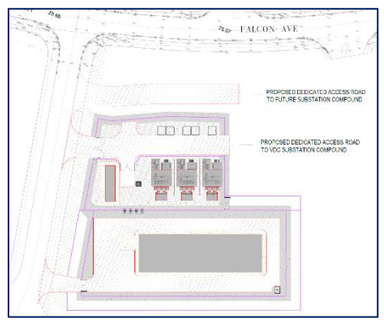
3 Further Refined Compound Layout		The layout continued to be refined with a common access roadway to the adjacent land to the east added and AIS equipment in the compound was removed due to spatial constraints.
4 Access Layout Refinements	 Option 1  Option 2  Option 3	Three discussion layouts were developed to reach agreement with adjacent landowners regarding access to adjacent sites. Option 3 was agreed as the preferred layout.

Table 3.2: Test-fit Exercise for Substation

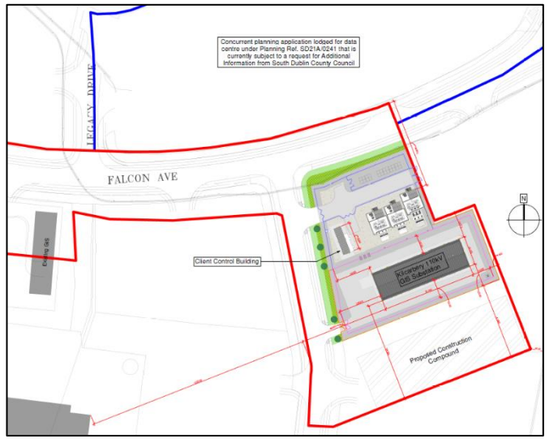
5 Confirmed Compound Layout Plan		Based on the above agreement and final minor design revisions the layout was refined and confirmed for submission to ABP.

Table 3.3: Test-fit Exercise for Grid Route

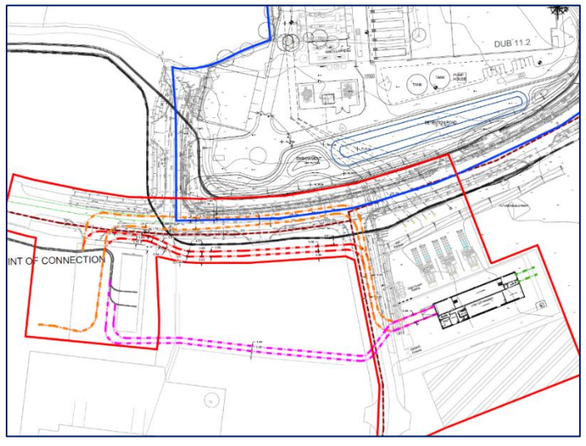
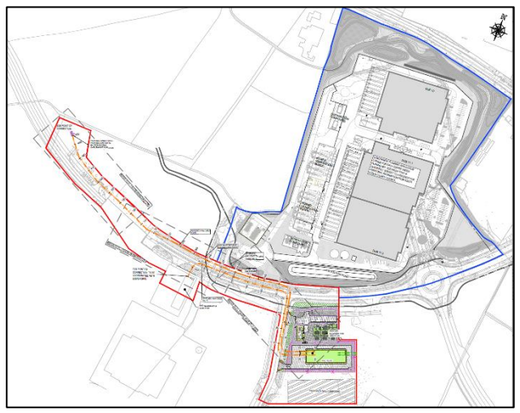
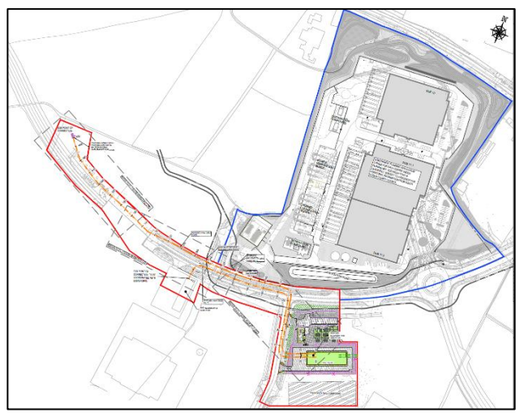
Step	Layout	Design Evolution Explanation
1 Initial Three Options		The Applicant has obtained a Connection Agreement from EirGrid stating that they are to connect to Barnakyle and Castlebaggot Substations. Three options for the grid connection route were explored and are shown on this drawing in orange (Option 1), red (Option 2) and purple (Option 3).

Table 3.3: Test-fit Exercise for Grid Route

2 Refinement of Options 1 and 2		Option 3 was discounted after an assessment of land ownership constraints. Options 1 & 2 were refined based on further information obtained from ground investigations, as built services information, and internal discussions within the design team. EirGrid also advised that a connection point to Castlebaggot Substation was required further to the west which caused an extension to the red line boundary.
3 Agreed Grid Route		Connection points to Castlebaggot and Barnakyle Substations were refined with EirGrid and the routing design was confirmed for submission to ABP.

Site Access

3.25 Due to the requirement for the GIS substation to be designed to EirGrid standard specifications there has been limited potential for significant design evolution at the site. The main area of evolution has been in the site access arrangements; the layout of the site has been developed to allow segregated access for construction works and site maintenance workers to the Applicants transformer compound, and for EirGrid to the GIS substation. These individual access points are from the service road that connects to a single access road from Profile Park. A further access route has been incorporated within the transformer compound to provide access to land adjacent to the eastern boundary of the site.

4 PROPOSED DEVELOPMENT DESCRIPTION

Introduction

4.1 This chapter of the Environmental Impact Assessment Report (EIAR) provides a description of the proposed development for the purposes of identifying and assessing the potential environmental impacts and likely environmental effects of the proposed development in the technical assessments of EIAR Volume 1 (Chapters 6-15) and EIAR Volume 2.

4.2 In accordance with the Regulations, this chapter sets out the physical characteristics of the built development, the proposed access arrangements, the proposed underground cabling route, and the proposed connection points.

4.3 A general description of the site is provided in Chapter 1: Introduction, with more detailed descriptions provided in each technical assessment within EIAR Volume 1 and EIAR Volume 2 and is therefore not repeated here.

4.4 Further detailed information on the proposed development can be found within the following application documents:

- Design Statement;
- Planning Report;
- Architectural Drawings;
- Landscape Masterplan and Drawings;
- Engineering Planning Report;
- Energy Statement;
- Site Lighting Plan; and
- Flood Risk Assessment.

Planning Application

4.5 As indicated in EIAR Chapter 1: Introduction, the Applicant is submitting a full planning application for the proposed development, described as follows in the application form:

"The proposed development primarily comprises the provision of two no. 110kV underground transmission lines and a 110kV Gas Insulated Switchgear (GIS) substation compound along with associated and ancillary works and is described as follows:

- *The proposed 110kV GIS Substation Compound is to be located on lands to the south of those that are subject of an application for 2 no. data centres under South Dublin County Council Reg. Ref. SD21A/0241 and to the south of Falcon Avenue within Profile Park, and within an overall landholding bound to the north by Falcon Avenue, Profile Park; to the west by Casement Road, Profile Park; and to the east and south by undeveloped lands; and partly by the Digital Reality complex to the south-east within Profile Park, Clondalkin, Dublin 22. The site of the proposed development has an area of c. 3.19 hectares.*
- *The proposed 110kV Gas Insulated Switchgear (GIS) Substation Compound includes the provision of a two storey GIS Substation building (with a gross floor area of 1,477sqm) (known as the Kilcarbery Substation), three transformers with associated ancillary equipment and enclosures, a single storey Client Control Building (with a gross floor area of 51.5sqm), lightning masts, car parking, associated underground services and roads within a 2.6m high fenced compound and all associated construction and ancillary works.*
- *One proposed underground single circuit 110kV transmission line will connect the proposed Kilcarbery 110kV GIS Substation to the existing 110kV Barnakyle Substation to the west. The proposed transmission line covers a distance of approximately 274m within the townlands of Aungierstown and Ballybane, and Kilbride and will pass under the internal road network within Profile Park to where it will connect into the Barnakyle substation.*
- *One proposed underground single circuit 110kV transmission line will connect the proposed Kilcarbery 110kV GIS Substation to the existing 110kV underground Castlebaggot - Barnakyle circuit to the west within the Grange Castle South Business Park. The proposed transmission line covers a distance of approximately 492m within the townlands of Aungierstown and Ballybane, and Kilbride and will pass both under, and to the north of the internal road network within Profile Park and Grange Castle Business Park South where it will connect into the Castlebaggot - Barnakyle circuit at a proposed new joint bay.*

The development includes the connections to the two substations (existing and proposed) as well as to the Castlebaggot - Barnakyle circuit, associated underground services, and all associated construction and ancillary works."

4.6 In summary, the proposed development would comprise the following:

- 1 no Indoor Gas Insulated Switchgear (GIS) two storey building equipped with four 110kV bays and rated for the system voltage of 110 kV;
- Two 110 kV underground cables which would connect the proposed substation development to the existing transmission system;
- Three no oil-filled step-down 110/20 kV power transformers positioned within bunded enclosures (height approximately 6 m);
- Lightning protection masts (height approximately 8m);
- Single storey buildings used for control and ancillary (height approximately 4.2m);
- Internal access roads;
- A 2.6-metre-high palisade fence;
- Drainage infrastructure; and
- All associated and ancillary site development works including localised alterations to the landscape berms.

4.7 The application redline boundary is shown in Figure 1.1 Chapter 1: Introduction. The site is an irregular parcel of land, extending to approximately 3.19 ha in area and is predominately occupied by agricultural fields with areas of hardstanding comprising roads and paths associated with roads within Profile Park.

4.8 The Applicants compound area and the GIS substation would occupy an area of approximately 0.6 ha.

4.9 The detailed layout, scale, and extent of the proposed development and the proposed cable route are described within this chapter.

4.10 Accordingly, the figures that accompany the application are outlined in Table 4.1 and are presented in Figures 4.1 – 4.10.

Table 4.1: Schedule of Figures

Figure No.	Name	Description
4.1	Proposed Compound Layout	Figure showing the layout of the Proposed Development.
4.2	Proposed Overall Route Layout Plan	Figure showing the routes of the proposed underground cables.
4.3	Contiguous Elevation South	Figure showing the elevation of the Proposed Development from the south.
4.4	Contiguous Elevation West	Figure showing the elevation of the Proposed Development from the north.
4.5	Contiguous Elevation North	Figure showing the elevation of the Proposed Development from the south.
4.6	Contiguous Elevation East	Figure showing the elevation of the Proposed Development from the north.
4.7	GIS Substation elevation, material palette and façade detailing	Figure showing the elevation, material palette and façade of the GIS substation.
4.8	Client Control Building elevation, material palette and façade detailing	Figure showing the elevation, material palette and façade of the Client Control Building.
4.9	Foul Water Drainage	Figure showing the existing and proposed foul water drainage layout.
4.10	Surface Water Drainage	Figure showing the existing and proposed surface water drainage layout.

Proposed Development

4.11 The site layout, detailing the layout of the substation, is presented in Figure 4.1, overleaf.

4.12 As illustrated in Figure 4.1, the proposed substation includes the provision of three transformers, a client control building and a two storey GIS substation building within a 2.6 m high fenced compound. The substation would be accessible through an entrance to be constructed off the unnamed service road to the west of the site. This unnamed service road is located to the south of Falcon Avenue.

Client Control Building and Transformer Bays

4.13 The northern part of the site would be occupied by the unmanned client control building, three oil-filled step-down 110/20 kV power transformers, MV switchgear and the pulling chambers for the MV circuit and connections to the data center buildings to the north.

GIS Substation

4.14 The two storey GIS substation would be located in the southern part of the site and has been designed to meet EirGrid's standard specifications.

4.15 Both the client control building and GIS substation would predominately comprise powder coated profiled metal cladding panels and all service/escape doors would be finished to match the cladding. The approach to materials is to use good quality materials in a restrained way with a limited palette of colours and finishes.

4.16 The elevation, material palette and façade detailing of the GIS substation and client control building is presented in Figures 4.5 -4.8.

Underground Transmission Cables

4.17 The substation would be connected via two underground cable feeders. The 110 kV underground cable feeders would comprise a 110 kV circuit installed underground in HDPE ducting. The 110 kV cables would be a standard XLPE (cross-linked polyethylene) copper cable.

4.18 The cable installations are anticipated to extend from the proposed substation to the existing Castlebaggot 220 kV Substation and Barnakyle 110 kV Substation, approximately 400 m and 175 m from the location of the proposed substation respectively.

4.19 The proposed development is designed to provide the primary source of power to the adjacent data center development proposed by the Applicant under application reference SD21A/0241.

4.20 The design of the rural supply (49 kVA) underground cable would comprise a looped MV circuit installed underground in HDPE ducting. The MV cables would be a standard XLPE (cross- linked polyethylene) aluminium cable, which would run from the site within the roadbed of Falcon Avenue to the rural supply connection point. Where the rural supply cable route runs outside of the application site boundary it is expected that it would be delivered by ESB Networks and as such is not considered further as part of this EIAR.

Cable Routing

4.21 The route of the 110 kV circuit comprises 2 no. underground cables, as follows:

- Circuit 1 - Kilcarbery to Barnakyle; and
- Circuit 2 - Kilcarbery to Castlebaggot.

4.22 As illustrated in Figure 4.2, the first underground transmission cable circuit (Kilcarbery to Barnakyle) is anticipated to proceed from the proposed substation to the west, along Falcon Avenue. At the end of this road, the circuit turns south and enters the existing Barnakyle 110 kV Substation. This circuit would cover a distance of approximately 274 metres.

4.23 The other underground transmission cable circuit (Kilcarbery to Castlebaggot) would also proceed from the proposed substation to the west but continue on from the end of Falcon Avenue across an allotment and onto Castlebaggot 220 kV Substation located within Grange Castle Business Park South. This circuit would cover a distance of approximately 492 metres.

4.24 The first circuit (Kilcarbery to Barnakyle) would terminate within Barnakyle 110 kV Substation while the second (Kilcarbery to Castlebaggot) would terminate in an underground cable joint bay located outside Castlebaggot 220 kV / 110kV Substation.

Land Use

Area Schedule

4.25 The summary floorspace schedule for the proposed development is presented in Table 4.2.

Table 4.2: Floorspace Schedule

Use	Gross External Area (GEA) m^2
Client Control Building	57.8
Two Storey GIS Substation Building	836
Total	893.8

Built Form, Height and Massing

4.26 The scale and massing of the proposed development seeks to respond to its surrounding context, in particular the existing surrounding data centers and agricultural land.

4.27 The ground level of the site is approximately 75.70 m AOD.

4.28 The maximum overall height of the finished floor level (FFL) for the GIS substation would be 75.70 m and 76.28 m for the proposed client control building.

4.29 Table 4.3 summarises the maximum heights of the proposed development components within the application site which are also shown overleaf in Figures 4.3 – 4.6.

Table 4.3: Maximum Heights

Proposed Development Component	Height Above Ground Level (m)	Maximum Height (m AOD)
GIS Substation	15.0	90.70
Client Control Building	4.2	80.08

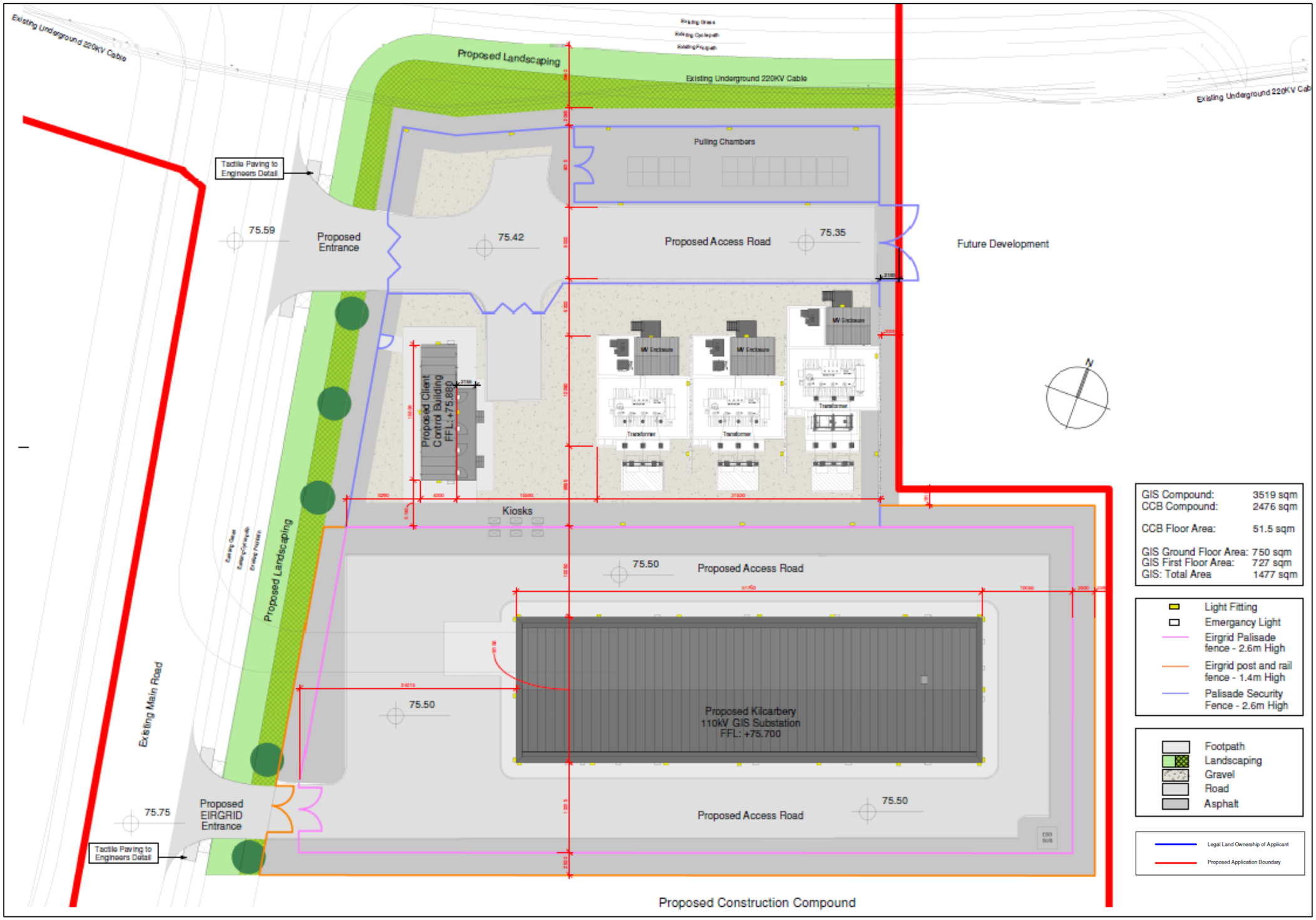


Figure 4.1: Proposed Compound Layout (Source KTA)

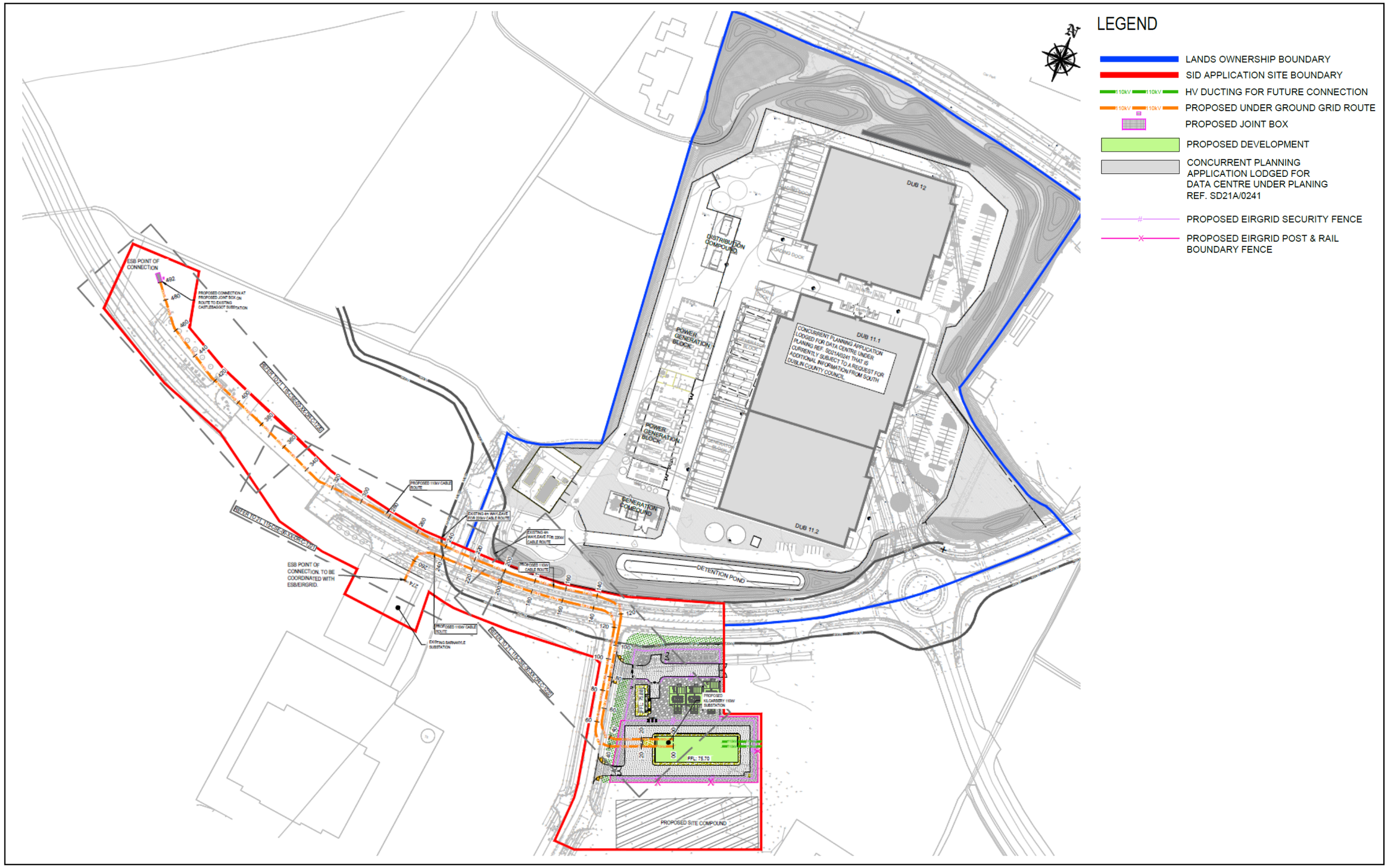


Figure 4.2: Proposed Overall Route Layout Plan (Source CSEA)

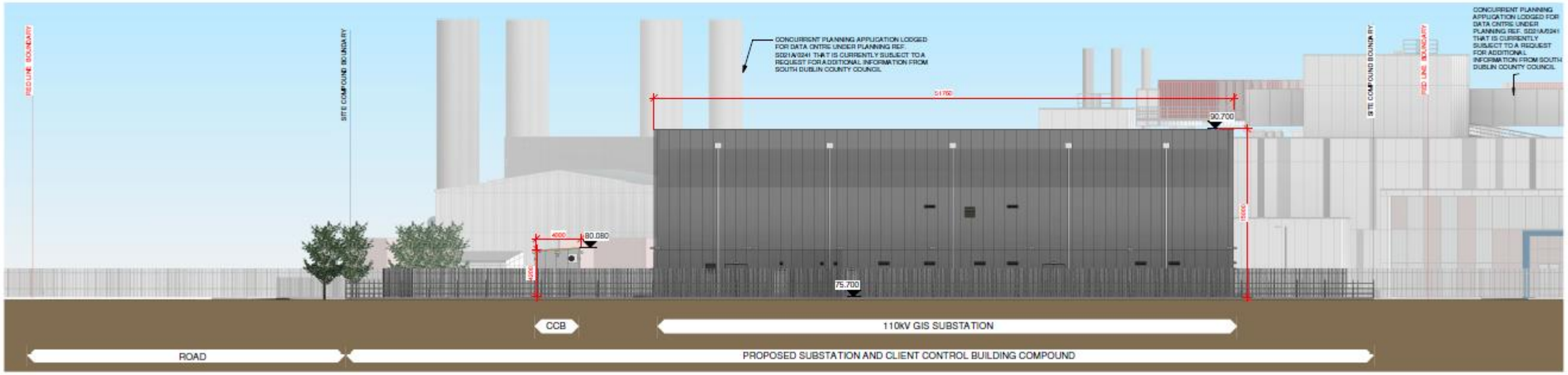


Figure 4.3: Contiguous Elevation South (Source KTA)

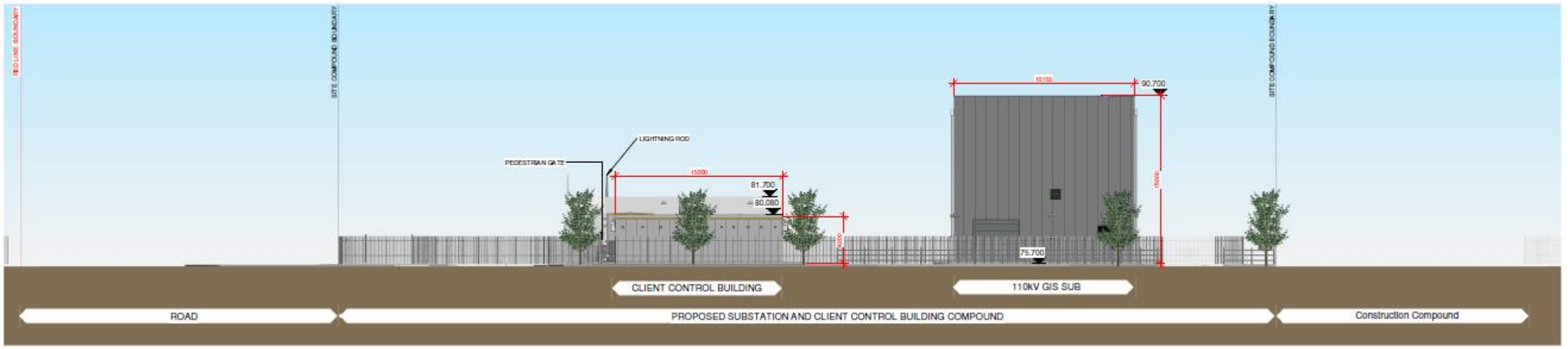


Figure 4.4: Contiguous Elevation West (Source KTA)

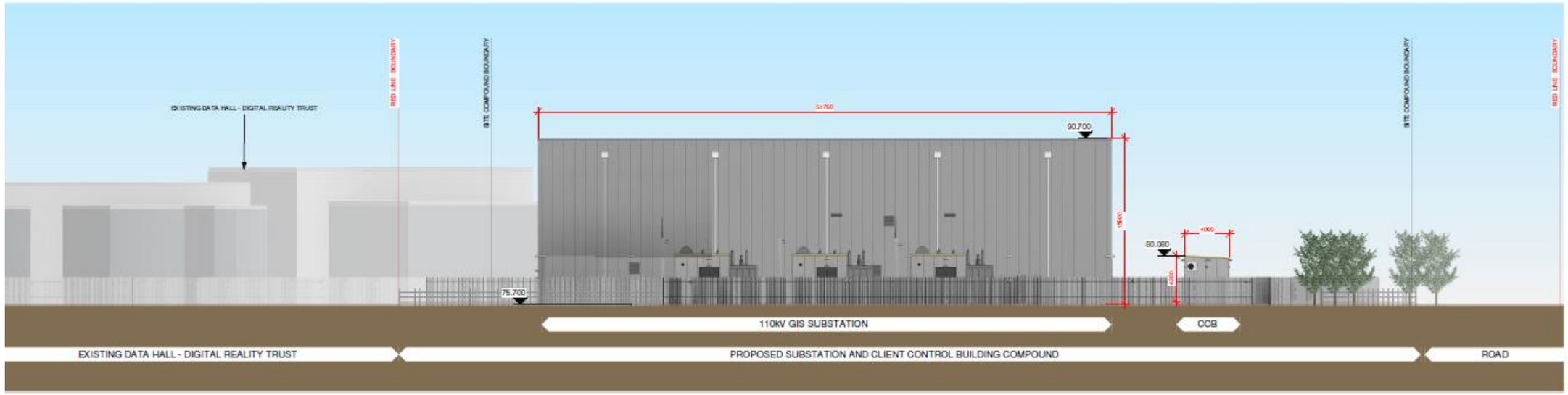


Figure 4.5: Contiguous Elevation North (Source KTA)

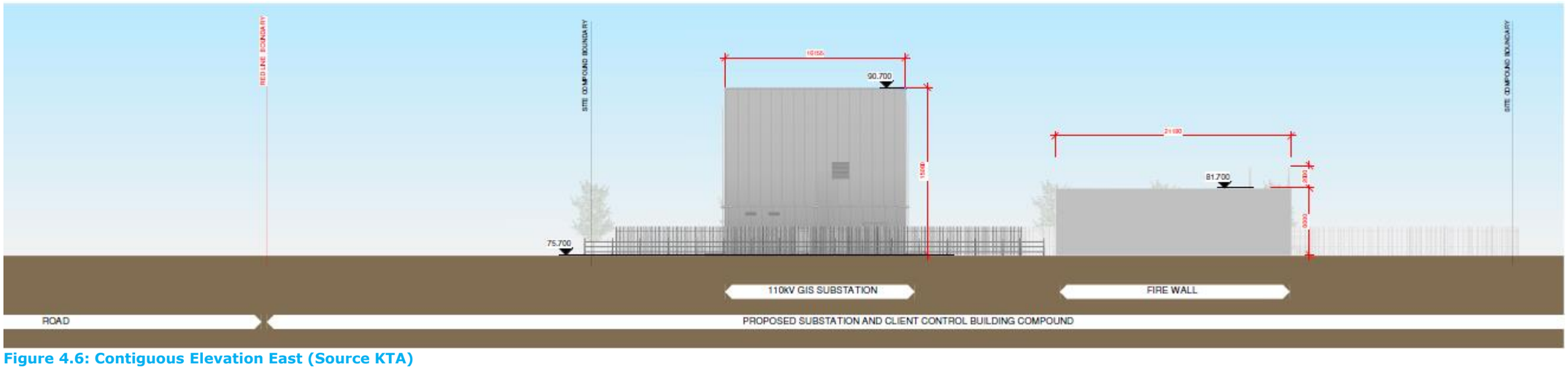


Figure 4.6: Contiguous Elevation East (Source KTA)

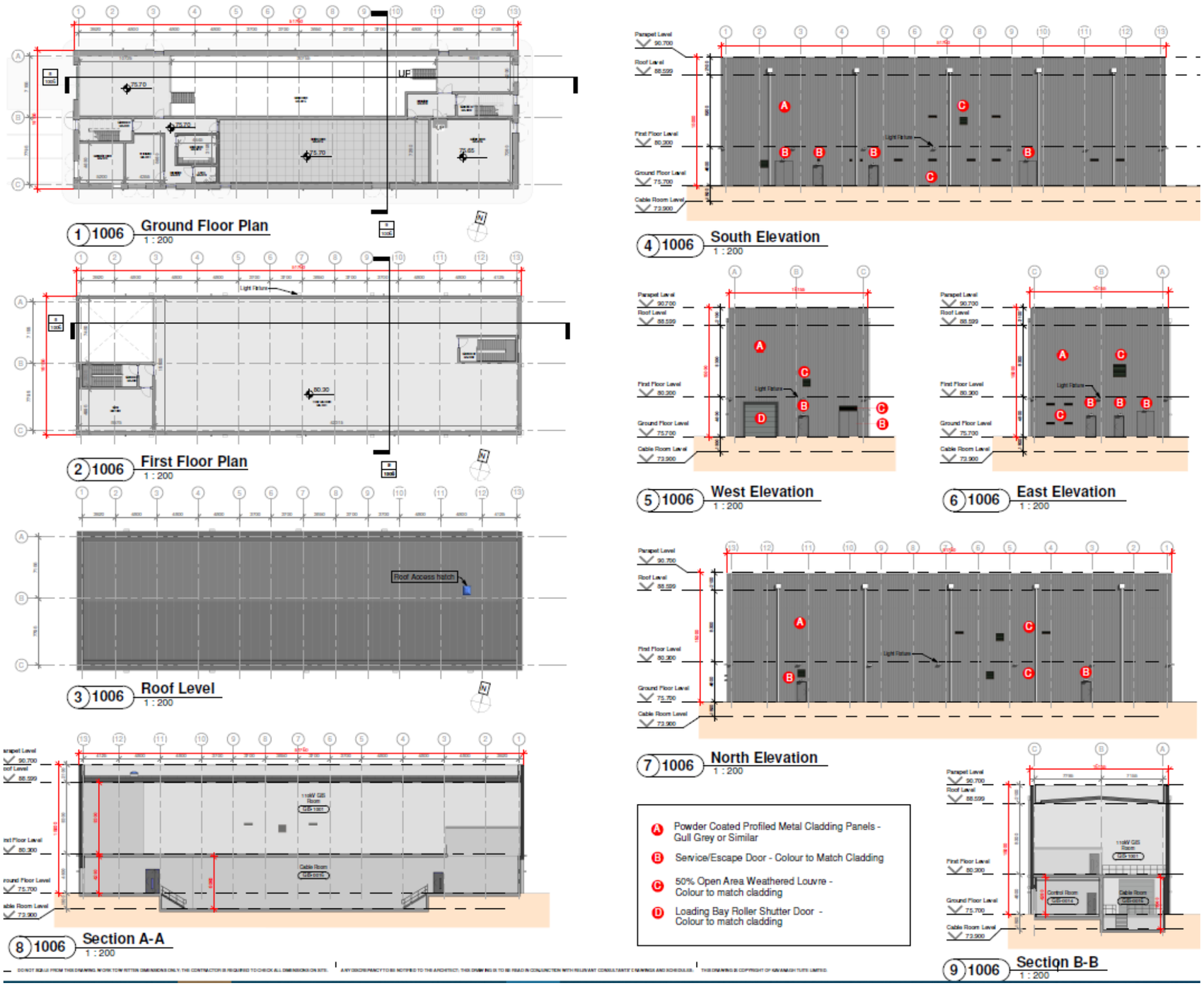
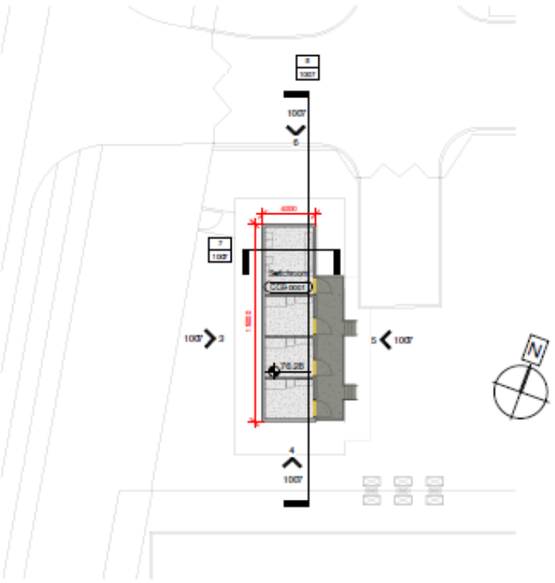
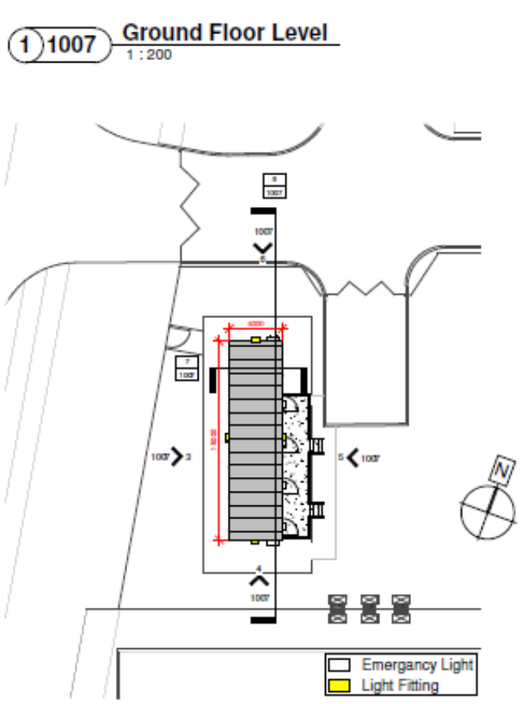


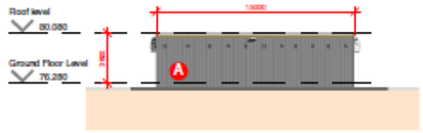
Figure 4.7: GIS Substation sections showing Material Palette and Façade Detailing (Source KTA)



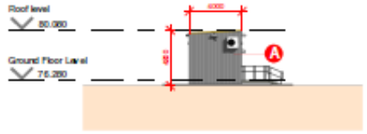
1 1007 Ground Floor Level
1 : 200



2 1007 Roof level
1 : 200

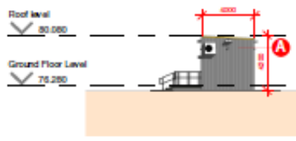


3 1007 West Elevation
1 : 200

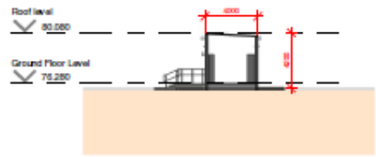


4 1007 South Elevation
1 : 200

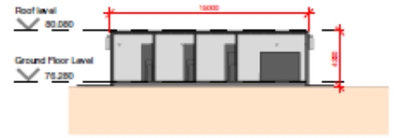
5 1007 East Elevation
1 : 200



6 1007 North Elevation
1 : 200



7 1007 Section AA
1 : 200



8 1007 Section BB
1 : 200

A Powder Coated Profiled Metal Cladding Panels - Gull Grey or Similar

B Service/Escape Door - Colour to Match Cladding

C 50% Open Area Weathered Louvre - Colour to Match Cladding

Figure 4.8: Client Control Building section showing Material Palette and Façade Detailing (Source KTA)

Landscaping

4.30 The proposed landscaping design has been driven by the standard specification requirements of EirGrid.

4.31 As presented in Figure 4.1, a section of landscaping would be located to the south of Falcon Avenue, directly north of the pulling chambers on site. Another section of landscaping would be situated to the west of the proposed client control building, along the unnamed service road. The landscaping is anticipated to comprise amenity grass at existing ground level with a small number of trees.

4.32 The proposed development is anticipated to retain the existing grass, cycle path and footpath which runs along the west of the main road.

Access Arrangements

Vehicular Access

4.33 During construction and operation, the traffic accessing the site would approach and access through an entrance to be constructed off the unnamed service road to the west of the site, illustrated on Figure 4.1. A maximum speed limit of 10km/hour would be in place on the access road.

4.34 The proposed development would be an un-manned facility with very few vehicle trips anticipated during the operation stage of the proposed development; vehicle trips would only consist of weekly site visits by two vehicles only for maintenance. Access gates to the site would be unmanned and from segregated access points for each part of the site from the unnamed service road.

Internal and Emergency Access

4.35 The internal roads and maintenance areas would provide access for maintenance and emergency vehicles to both parts of the site.

Servicing and Deliveries

4.36 The proposed development is an un-manned facility that would be subject to maintenance inspections on a weekly basis by two staff. The visit would consist of two vehicles only and would access the substation through an entrance to be constructed off the unnamed road adjacent to the development.

Waste Management

4.37 The primary waste stream would come from the use of toilets within the GIS substation by weekly maintenance staff.

4.38 Other operational waste generation would be associated with maintenance activities. These wastes may include organic/food waste, dry mixed recyclables (wastepaper, newspaper, plastic bottles, packaging, aluminium cans, tins and Tetra Pak cartons) and non-recyclable waste. Waste fuels/oils, waste printer/toner cartridges, waste electrical and electronic equipment (WEEE) and waste batteries may also be generated infrequently.

4.39 The waste materials generated on site would be removed by the operatives.

4.40 Refer to EIAR Volume 1, Chapter 14: Waste, for further information regarding waste generation volumes.

Utilities

Electricity

4.41 The proposed 110 kV GIS substation, 110 kV cable circuits and 49 kVA cable installation would be designed to support power demand for the proposed data center to the north of the application site.

4.42 Further to this, the 49 kVA cable installation is intended to provide a house power supply to the proposed GIS substation.

Gas

4.43 The Business Park is served by the Gas Networks Ireland network, which is a natural gas network. No gas supply is anticipated to be required for the proposed development.

Water

4.44 Detailed information regarding water can be found within the engineering report, which accompanies the planning application submission.

Potable Water

4.45 Water would be required for the welfare facilities at the GIS substation. It is understood that sufficient water and wastewater capacity is available to serve the proposed development. It is proposed to take a 100 mm connection from the external watermain to the north of the site to provide adequate water services for the proposed development.

4.46 The underground 110 kV cable circuits and 49 kVA cable installation would not require any water supply.

Foul Water

4.47 Domestic effluent arising from the welfare facilities at the GIS substation would be collected in a newly constructed foul drainage network within the site. The proposed foul water drainage network would collect domestic foul water from the buildings within the substation compound. The proposed foul water network would connect to the existing drainage network via the foul manhole (Ø300mm pipe) in Falcon Avenue, illustrated in Figure 4.9. A sump pump would be fitted to the transformer bund, which pumps water into the foul water network on the site.

4.48 Rainfall which passes through the transformers would also be collected in the foul water network, which passes through a treatment unit before connecting to the main foul water network.

4.49 The proposed foul pipe network would have pipe sizes of Ø100mm and Ø225mm.

4.50 The underground 220kV cable circuits connecting to the 220 kV transmission line and the 75 kVA cable installation would not require any foul drainage infrastructure.

Surface Water Management

4.51 The proposed surface water is designed in accordance with the requirements of the Greater Dublin Strategic Drainage Study (GDSDS). All surface water works including connections would be carried out in accordance with the Code of Practice for Development Works – Drainage.

4.52 The surface water proposals include measures to attenuate and provide extensive treatment of surface water prior to discharge from the site. The measures include slit traps, separation filters and oil separators to ensure the highest quality of surface water discharge in both the construction and operation phase of the proposed development.

4.53 The proposed connection point for positive drainage serving the 110kV GIS substation would be to the permitted manholes which are located in Falcon Avenue, via an underground attenuation tank as shown

in Figure 4.10. The catchment area of the transformers would be excluded from discharge to the proposed surface water network and would be connected to the proposed foul network.

4.54 Asphalt/tarmacadam strips for earthing purposes, positioned under the proposed lightning masts and along fence lines, would discharge to ground via the adjacent stone fill and gravel areas.

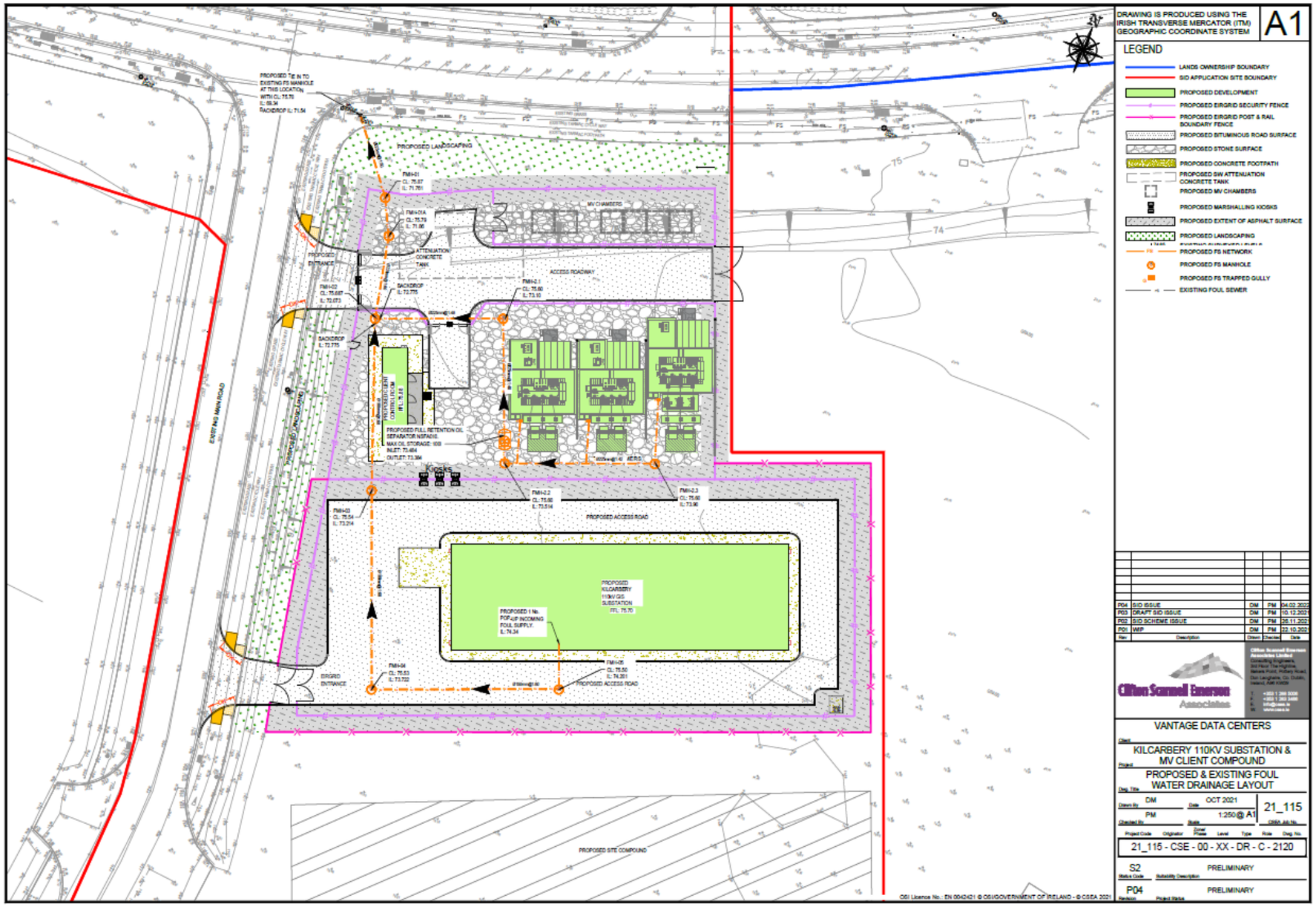


Figure 4.9: Foul Water Drainage (Source CSEA)

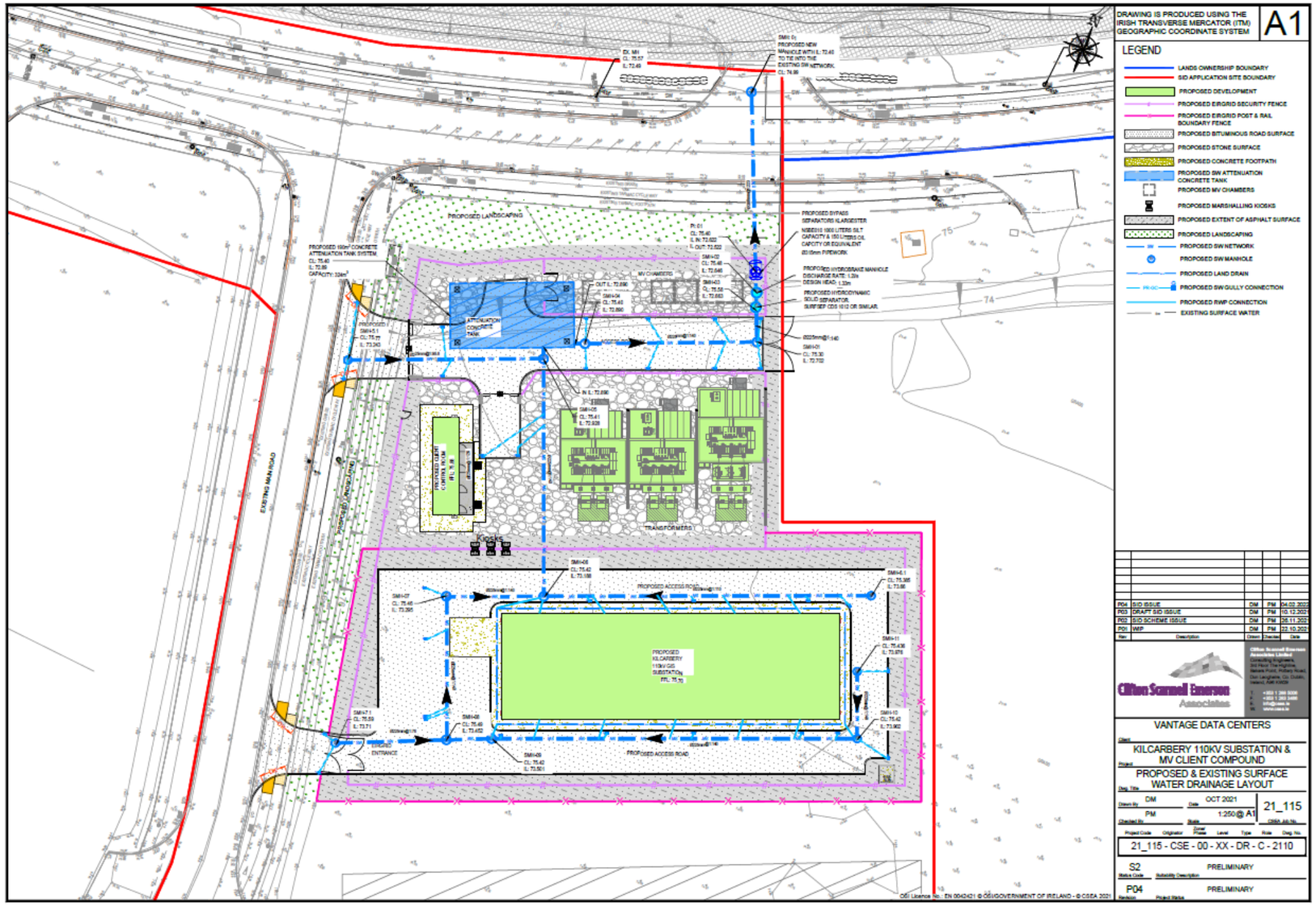


Figure 4.10: Surface Water Drainage (Source CSEA)

Telecommunications

4.55 The telecommunications network used at the main data site to the north of the application site would be extended to the GIS substation. The connection to the regional network would be implemented by the statutory network operator.

Resources, Emissions and Residues

Resource Use

Energy & Sustainability

4.56 EirGrid and ESB Networks are committed to running their businesses in the most environmentally friendly way possible. ESB Networks is a subsidiary within ESB Group. The ESB Group has identified energy efficiency as a strategic priority within its Brighter Future strategy.

4.57 ESB Group is a commercial semi-state-owned company (95% state-owned) and is committed to supporting and being exemplar in the delivery of Ireland's 2020 public sector targets. These targets, outlined in the fourth National Energy Efficiency Action Plan[1], include an energy efficiency target of 33% for the public sector.

Emissions

To Air

4.58 The potential exists for dust deposition and increased particulate matter concentrations to occur during the construction stage. The main air pollutants of concern are dust and particulate matter with an aerodynamic diameter of less than 10 µm (PM10), typically generated during construction activities, and nitrogen dioxide (NO2) typically generated by road traffic.

4.59 During operation, the proposed development would be unmanned and inspected weekly by up to two personnel entering/exiting via a van.

4.60 Please refer to EIAR Volume 1, Chapter 8: Air Quality for more detail.

To Water

4.61 A new surface water drainage network would be designed and installed to serve the proposed development as detailed above and as presented within a separate Engineering Report. Therefore, surface water runoff within the proposed development would be managed such that internal or vulnerable areas of the site are at low risk of flooding from pluvial sources.

4.62 The surface water proposals include measures to attenuate surface water prior to discharge from the site. The catchment area of the transformers is excluded from discharge to the surface water network and would be connected to the proposed foul network.

To Sewers

4.63 Domestic effluent arising from the welfare facilities and discharge from the transformer area would be collected in a newly constructed foul drainage network within the site and discharged to the foul drainage network within Profile Park. The foul drainage is anticipated to be treated at the Dublin City Wastewater Treatment plant at Ringsend.

Operational Management Controls

Operational Management

4.64 Once 'live' the proposed development would operate 24 hours a day and would be an unmanned facility.

4.65 The only operational staff on site would be those associated with maintenance inspections on a weekly basis. These inspections would be conducted by two staff members.

Security & Lighting

4.66 A 2.6m high security fence would be constructed around the perimeter of the site. The lighting design (both security and environmental lighting) has been assessed and optimised for the site, to ensure no obtrusive glare, light spillage or other light nuisance on neighbouring business users.

Firewater System

4.67 A dedicated fire water ring main would be installed as part of the data center to the north of the site. This fire water ring main would be extended to the GIS Substation, if required, to provide firefighting water to hydrants in the event of a fire.

Major and Accidents and Disasters

4.68 To address unforeseen or unplanned effects the EPA Draft EIA Report Guidelines 2017[2] 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.*"

4.69 It is considered that the proposed development would not give rise to significant environmental effects in relation to Major Accidents and Disasters as the site is not located within a geographical region that has historically been subject to natural disasters.

4.70 Flood risk is considered within Volume 1, Chapter 10: Water Resource and Flood Risk of this Volume, where best-practice mitigation measures are outlined.

4.71 The site does not lie within the consultation zones of the COMAH Establishment and there are no Control of Major Accident and Hazard (COMAH) establishments within 2.5km of the site. The only substance stored on site controlled under Seveso/COMAH would be diesel for the backup generator for the GIS substation and the amounts proposed do not exceed the relevant thresholds of the Seveso directive. Therefore, there is no need to consult with the Health and Safety Authority (HSA) regarding the proposed development.

4.72 It is considered that no further assessment in respect of natural disasters is necessary.

[1] IEA (2019) National Energy Efficiency Action Plan 2017-2020. Available Online at: https://www.iea.org/policies/7983-national-energy-efficiency-action-plan-2017-2020

[2] EPA (2017) EPA Draft EIA Report Guidelines 2017 (Draft). Available Online at: https://www.epa.ie/publications/monitoring--assessment/assessment/EPA_EIAR_Guidelines.pdf

5 CONSTRUCTION ENVIRONMENTAL MANAGEMENT

Introduction

5.1 This chapter sets out the construction works of the proposed development and the key activities that would be undertaken during the works. This chapter also describes the management controls that form part of the development proposals that would be implemented to avoid, minimise and where not possible, mitigate the magnitude of potential environmental impacts.

5.2 Impacts arising during the construction processes are generally temporary to short-term and intermittent. Nevertheless, they can be sources of potentially significant effects on environmental resources and residential amenity.

5.3 It is not possible to predict in detail the specific environmental impacts and effects that may arise from the proposed development's construction works as detailed construction method statements and specifications have not yet been prepared and construction contractors not yet appointed. However, it is possible to establish the potential broad environmental impacts associated with the proposed development's construction works and to determine a framework for the management of these impacts to ensure that significant adverse effects are avoided. The framework would form the basis for a Construction Environmental Management Plan (CEMP) to be implemented during the works and is supplemented by the Outline Construction Environmental Management Plan[1] that accompanies the application. It is anticipated that the CEMP would be secured by means of an appropriately worded planning condition.

5.4 The CEMP would be prepared in accordance with standard industry practice and regulatory requirements and would include a construction management plan (CMP), as well as a Site Waste Management Plan (SWMP). More specifically, the CEMP would set out policies, legislative requirements, thresholds/limits, procedures, roles and responsibilities relevant to the implementation of environmental and management controls throughout the duration of the works. The CEMP would be discussed and agreed with ABP and other regulators such as SDCC in advance of works commencing on-site.

5.5 An outline of the anticipated environmental issues and necessary management controls that would be included within the CEMP is provided within this Chapter.

5.6 It is standard practice to allow the appointed principal contractor (or equivalent) substantial input into documents such as the CEMP, traffic management plan and SWMP; however, at this stage of planning, contractors have not yet been appointed and detailed method statements have not yet been prepared. Nevertheless, the likely content of such documents can be reasonably predicted. As such it is considered that the identification and assessment of likely environmental effects is still achievable in the EIA.

5.7 It is important to note that while this Chapter does not assess the magnitude of potential impacts, nor the significance of likely effects during the construction works, as this is dealt with in individual technical assessments within this EIAR Volume (Chapters 6 to 15) and EIAR Volume 2 (Chapters 1 to 2). Controls set out in this Chapter are considered within the 'Embedded Mitigation' and 'Mitigation' sections of each technical assessment to enable the assessment of residual construction effects within a particular technical assessment.

[1] Clifton Scannell Emerson Associates (2021) Outline Construction Environmental Management Plan. CSEA Reference, RPT-21_115-003.

Programme of Works

5.8 A detailed development programme has not yet been prepared; however, to enable assessment of likely environmental effects within this EIAR, an indicative, but feasible, programme has been developed by the Applicant based on a number of assumptions. These assumptions have been informed by an understanding of current and future projected market conditions, technical considerations and professional experience, all of which are considered to be reliable.

5.9 Based on the assumption that planning consent is secured in Quarter 2/3 (Q2/Q3) 2022, the construction works would commence in Q3 2022. The works are anticipated to be undertaken over an eight to 10 month period (excluding commissioning), with a completion targeted of Q2/Q3 2023.

5.10 For the purposes of the EIAR, it is assumed that 2022 would be the peak year for the construction works as this would include the majority of the ground and civil works and would result in: the noisiest works; majority of waste generation (such as from site clearance and levelling works) and imports associated with cut and fill; and associated heavy good vehicles (HGV) trips.

Description of Works

Background

5.11 Once a contractor is appointed, early discussions would be held with ABP and other relevant statutory consultees on site logistics, management, access and egress and hoarding arrangements.

5.12 Prior to work starting on-site, the CEMP, CMP and SWMP would be produced and agreed with ABP and other relevant statutory consultees. This would include roles and responsibilities, details on the control measures and actions to be taken to minimise the potential environmental impacts of the proposed development. Monitoring and record-keeping requirements would also be addressed in the CEMP.

5.13 In addition to the above, a key aspect of the successful management of the proposed development would be the maintenance of good relations with the site neighbours and the general public. The Applicant would consider other developments that may proceed at the same time and ensure close liaison with the other parties to co-ordinate and minimise potential impacts from the construction works during a single phase of works.

Site Enabling Works

Site Preparation

5.14 It is proposed that the access and haul roads for vehicles, the contractors' compound and fencing would be established for the proposed development utilising the existing unnamed service road from Falcon Avenue as the primary construction entrance for this development.

5.15 The construction compound would be located to the south of the proposed development and the Applicant has received a letter of consent from the landowner to utilise the land for the contraction compound. The construction compound would facilitate offices, portable welfare facilities, equipment storage, parking etc for contractors. The compound would be used for the duration of the construction works.

5.16 The primary activities that would be required during the site preparation phase of the development would include site clearance, excavations and levelling of the site to the necessary base level for construction, surveying and setting out for structures and rerouting of services/connections to services.

5.17 A combination of excavators, trucks and other soil shifting plant would commence the main site clearance and levelling aspects.

Levelling/Cut and Fill

5.18 It is predicted that the majority of the cut material generated during site preparation/levelling (2,829m^3), which would mainly consist of topsoil, would be disposed of offsite.

5.19 Approximately 10,800m^3 of fill would be required to facilitate construction of the proposed roads, car parks, buildings and landscaping berms

5.20 Contractors would be required to submit and adhere to a method statement (including the necessary risk assessments) and indicate the extent of the areas likely to be affected and demonstrate that this is the minimum disturbance necessary to achieve the required works.

5.21 Any temporary storage of spoil required would be managed to prevent accidental release of dust and uncontrolled surface water run-off which may contain sediment etc.

Site Offices/Welfare Facilities and General Site Access

5.22 The site office and welfare facilities would be situated on site at an agreed location within the construction compound.

5.23 Welfare facilities (canteens, toilets etc) would be available within the construction compound on site. Temporary connections to the existing estate services in the existing estate road would be utilised to provide service and utilities subject to relevant applications and approvals.

5.24 All the sub-contractors as well as the main contractor and project managers would occupy offices in the same area. The site parking for staff, contractors and visitors would also be in this area.

Excavation Works

5.25 Ground works would be required to clear the site and to facilitate construction of building foundations, access roads, the installation of utilities and landscaping. The Ground Conditions Chapter of this Volume (Chapter 12) details the existing ground conditions at the site and provides a summary of the anticipated stratigraphy of the soil beneath the site.

5.26 Any surplus material that requires removal from site for off-site reuse, recovery and/or disposal and any potentially contaminated material (in the unlikely event that it is encountered), would 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 would 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.

5.27 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.

Temporary Works

5.28 Some temporary works would be necessary during the development works, to protect the public and ensure the structural integrity of the works as they progress. These would range from propping of hoardings to scaffold protection fans and other temporary structures such as loading platforms. In all cases these works would comply with legislation and would be designed and managed by the principal contractor.

Substructure Works

Foundations and Structure

5.29 Following the completion of enabling works. All structures would require foundations to structural engineer specifications. The building structures are likely to comprise either pre case concrete elements or a standard structural steel frame.

5.30 Foundations would likely be formed of pads or strips. Based upon investigations of the site (Chapter 12: Ground Conditions of this EIAR Volume), there is a low potential for soil and groundwater contamination on-site. It is currently envisioned that the majority of soil/stones arising on the site would be taken off site.

Superstructure Works

5.31 It is anticipated that the proposed development buildings would be constructed of either pre-cast concrete elements or a steel frame with reinforced concrete floor slabs.

Fit-out

5.32 The Applicant's compound fit out would include that within the switch rooms, MV switch gear, lightning protection masts and works associated with the transformers.

5.33 Internal fit out within the GIS substation would include works within the cable room, control room, generator room, workshops, battery room, the 110kV GIS room, along with associate utility works.

5.34 Typically, the contractors would build from the inside out.

Landscaping Works

5.35 Landscaping associated with the proposed development (amenity grass) would be constructed upon substantial completion of construction works to minimise potential plant material loss.

5.36 It is currently envisioned that the majority of soil/stones arising on the site would be taken off site rather than being reused on site.

Utilities and Service Installation

Underground Transmission Lines

5.37 Ancillary site development works would include the drilling and laying of ducts and cables under the site, connecting the GIS substation to the existing substations via two underground cable feeders.

5.38 The 110kV underground cable feeders would comprise a 110kV circuit installed underground in HDPE ducting. The 110kV cables would be a standard XLPE (cross-linked polyethylene) copper cable. The design of the rural supply (49 kVA) underground cable would comprise a looped MV circuit installed underground in HDPE ducting. The MV cables would be a standard XLPE (cross- linked polyethylene) aluminium cable, located within the roadbed of Falcon Avenue to the connection point. Where the rural supply is outside of the site boundary it is expected that it would be delivered by ESB Networks and is not considered further herein.

5.39 The cable installations are anticipated to extend from the proposed substation to the existing Castlebaggot 220 kV Substation and Barnakyle 110 kV Substation, approximately 400 m and 175 m from the location of the proposed substation respectively.

Cable Routing

5.40 The route of the 110kV circuit comprises two underground cables, as follows:

- Circuit 1 - Kilcarbery to Barnakyle; and
- Circuit 2 - Kilcarbery to Castlebaggot.

5.41 The first underground transmission cable circuit (Kilcarbery to Barnakyle) would proceed from the proposed substation to the west, along Falcon Avenue. At the end of this road, the circuit turns south and enters the existing Barnakyle 110kV Substation. This circuit would cover a distance of approximately 274m.

5.42 The other underground transmission cable circuit (Kilcarbery to Castlebaggot) would also proceed from the proposed substation to the west but continue on from the end of Falcon Avenue across an allotment and onto Castlebaggot 220kV Substation located within Grange Castle Business Park South. This circuit would cover a distance of approximately 492m.

5.43 The first circuit (Kilcarbery to Barnakyle) would terminate within Barnakyle 110kV Substation while the second (Kilcarbery to Castlebaggot) would terminate in an underground cable joint bay located outside Castlebaggot 220kV Substation. The cable routes would be co-ordinated to avoid impact on other utility assets present within Falcon Avenue.

5.44 During construction, welfare facilities (canteens, toilets, etc) would be available within the construction compound on site. Temporary connections to the existing estate services in the existing estate road would be utilised to provide service and utilities subject to relevant applications and approvals.

Vehicles and Plant

Access and Vehicle Trips

5.45 During construction, construction traffic would travel to and from the site via the construction site access located from the unnamed service road access from Falcon Avenue. It is expected that the origins and destinations of construction traffic would continue to match the distribution of traffic currently using the surrounding road network with the majority of construction traffic via the N7 National Road. Construction traffic would consist of the following:

- Private vehicles belonging to site construction staff;
- Private vehicles belonging to site security staff;
- Occasional Private vehicles belonging to professional staff (i.e. design team, utility companies);
- Construction material delivery; and
- Excavation plant and dumper trucks used for site development works.

5.46 It is anticipated that the worst case construction traffic impact for the proposed development would occur in Q4 2022, with a peak number of cars entering/exiting site per day (LV) assumed to be 30 two-way trips. Peak HGV's entering/exiting site per day is assumed to be 10 two way trips.

5.47 The following measures would be put in place during the construction works:

- The contractor would be required to provide wheel cleaning facilities, and regular cleaning of the main access road;
- Temporary car parking facilities for the construction workforce would be provided within the site and the surface of the car park would be prepared and finished to a standard sufficient to avoid mud spillage onto adjoining roads;
- Monitoring and control of construction traffic would be ongoing during construction works. CTM would minimise movements during peak hours; and
- Construction traffic routes minimising traffic impact on surrounding residential development would be used by construction vehicles.

5.48 All employees working on the site would also be required to have a Safe Pass Card (or similar approved Construction Health and Safety card), manual handling training and the necessary certificates to operate machinery, as required. The details of training required, records maintained, and induction procedures would be outlined in the Main Contractor's Health and Safety Plan(s).

5.49 Security fencing would be established around the construction compound. Site access would be restricted by dedicated security personnel who would check all incoming and outgoing vehicles and workers.

Traffic Queueing

5.50 Material deliveries and collections from site would be planned, scheduled, and staggered to avoid any unnecessary build-up of construction works related traffic.

Typical Construction Plant and Machinery

5.51 The types of plant and machinery that are likely to be used on-site per development works activity are provided in Table 5.2.

Table 5.2: Typical Plant and Machinery to be Used

Plant	Site Preparation Works	Substructure	Superstructure	Internal works/Fit-out	External Works
Excavator (wheeled and tracked)	✓	✓			✓
Dumper	✓	✓			✓
Hydraulic cutters. breaker	✓	✓	✓		✓
Loading lorries	✓				
Scaffold construction	✓				
Generator	✓	✓	✓	✓	✓
Electric drills	✓		✓	✓	
Metal cutter	✓		✓		
Electric bolter	✓		✓		
Road sweeper	✓	✓	✓		✓
Lorries	✓	✓	✓	✓	
Dozer					
Pneumatic breaker					
Compressor					✓
Wheeled loader					
Hand-held breaker		✓			
Forklift		✓	✓		✓
Water pump		✓			✓
Air compressor		✓	✓		
Lorry-mounted concrete pump		✓	✓	✓	✓
Hydraulic vibratory compactor		✓			
Scabbler		✓			
Crane		✓	✓		
Hydraulic access platforms			✓		
Welding plant			✓		
Motor batching plant				✓	
Hydraulic bender					✓
Breakers and crunchers					✓

Construction and Contracting Strategy

5.52 The principal contractor (or equivalent) would be responsible for a number of sub-contractors (e.g. foundations, concrete, cladding) and ultimately for the environmental management during the construction process.

Construction Employment

5.53 The construction stage of the proposed development would generate employment; a proportion of the employment is expected to be generated on-site, with the rest being elsewhere in the construction supply chain, possibly including modular unit production facilities.

5.54 It is anticipated that, on average, there would be 30 construction staff on site during the construction stage.

Hours of Work

5.55 Construction of the proposed development would take place over a period of approximately eight to 10 months from the commencement of construction for site development works.

5.56 Majority of works are to be done off-road within the site boundary, except for service connections which would be done under licence from the local authority and utility providers.

5.57 During the off-road section of works, construction staffing personnel would arrive prior to 07:00 to mitigate against traffic peak. Site development and building works shall be carried out between the hours of 08:00 to 19:00 Mondays to Fridays only, between 08:00 to 14:00 on Saturdays.

5.58 Deviation from these times would only be allowed in exceptional circumstances where prior written approval has been received from the relevant authority. Such approval may be given subject to conditions pertaining to the circumstances being set by SDCC.

Health and Safety

5.59 All works on-site would be undertaken in accordance with relevant health and safety regulations and a dedicated health and safety coordinator would be appointed by the Applicant to work with the Project Team and principal contractor to ensure compliance with these regulations.

5.60 All method statements would incorporate regulatory safety matters and a Health and Safety File would be maintained on-site for inspection by the Health and Safety Authority, SDCC and others as appropriate.

5.61 If in the unlikely event that any temporary stopping-up notices are required on the surrounding roads, specific applications would be made to relevant authority relating to road closures and would be implemented by the principal contractor in accordance with all statutory notice periods.

Visitor Management

5.62 Visitors would only be allowed to enter the main site compound from the main construction access point. A dedicated, secured footpath to the security office would be established at the gate for registration and PPE would be obtained prior to entering the site. A log would be maintained by security to control access to the site. Visitors would be required to attend a site-specific induction to allow access to the site unless being accompanied by an inducted member of the site team.

5.63 Visitors would then be taken by an inducted member of the construction team to the required area of the site.

Materials Management

Material Selection

5.64 Construction materials would be selected following the BRE 'Green Guide to Specification'. These include the following:

- Minimising embodied energy content (the energy used in manufacture);
- Using recyclable materials where they have high embodied energy; and
- Maximising the recycled content of the material, ease of maintenance, appropriate sourcing of materials and totally excluding deleterious and hazardous materials.

Materials Storage and Handling

5.65 Key materials would include, steel structure, concrete, cladding, ducting and piping. A 'Just in Time' delivery system would operate to minimise storage of materials, the quantities of which are unknown at this stage.

5.66 Where possible it is proposed to source general construction materials from the surrounding area to minimise transportation distances.

5.67 Aggregate materials such as sands and gravels would be stored in clearly marked receptacles in a secure compound area within the contractors' compound on site. Liquid materials would be stored within temporary bunded areas, doubled skinned tanks or bunded containers (all bunds would conform to standard bunding specifications) to prevent spillage.

5.68 Construction materials would be brought to site by road. Construction materials would be transported in clean vehicles. Lorries/trucks would be properly enclosed or covered during transportation of friable construction materials and spoil to prevent the escape material along the public roadway.

5.69 Most construction waste materials generated would be soil from excavation works. Soil requiring removal off-site would be removed from site regularly to ensure there is minimal need for stockpiling.

Materials Waste Volumes and Management

5.70 Table 5.3 presents the estimated excavation and construction waste and end destination.

Table 5.3: Estimated Construction and Excavation Waste and End Destination

Waste Type	Estimated Quantities	Waste Arisings		Recycle/ Recovery		Disposal	
	Tonnes	%	Tonnes	%	Tonnes	%	Tonnes
Mixed C&D Waste	-	-	71.53	90	64.38	10	7.15
Timber	273	8	21.8	90	19.62	10	2.18
Plasterboard	6.6	22.5	1.5	90	20.25	10	0.15
Metals	550	3	16.52	100	16.52	0	0
Concrete	492	4	19.67	0	0	0	0
Other (including cabling, ducting, conduits, packaging, and plastic)	-	-	14.91	80	11.95	20	2.96
Topsoil	1,056	100	1,056	100	1,056	0	0
Excavated materials	3,169	100	3,169	100	3,169	0	0
Total	**5,547**	**-**	**4,370**	**-**	**133**	**-**	**12.5**

5.71 As outlined above, it is predicated that approximately 2,892m³ of cut material would be generated during site preparation/levelling. It is currently proposed that all excavated material would be taken off-site.

5.72 Approximately 10,800m³ of fill would be required to facilitate construction of the proposed roads, carparks, buildings and landscaping berms.

Sensitive Receptors

5.73 A review of the site and study area has identified the following receptors that would be sensitive to potential construction impacts:

- Existing residential occupants in proximity to the site;
- Existing industrial and commercial properties in proximity of the site; and
- Local air quality.

Potential Environmental Impacts

5.74 A review of the potential environmental impacts associated with the construction works has been undertaken to proactively inform the development proposals and agree appropriate mitigation measures. Potential impacts can arise from day to day works or from individual instances of accidents, poor operation or management. They are, however, largely dependent on the implementation of effective controls (e.g. the employment of dust suppression methods, use of a well trained workforce and properly maintained plant).

5.75 A summary of the potentially significant environmental impacts that could arise during the construction stage and mitigation measures which are integral to the development proposals are provided in Table 5.4. Further detail and assessment of these likely impacts are provided in Chapters 6-15 in this EIAR Volume and EIAR Volume 2.

5.76 Construction plant specifications have been defined allowing noise and other implications to be assessed. Potential impacts in many areas are largely dependent on attention to management control (e.g. watering to control dust, use of noise attenuated plant), which would be under the control of the contractor(s) required, by tender requirements, to adhere to management controls and measures detailed in the CEMP.

Table 5.4: Summary of Potential Environmental Impacts during Construction

Receptor	Potential Impacts	CEMP Mitigation
Below ground Heritage Assets (archaeology)	Damage to potential in situ archaeological remains (if present).	Undertake an archaeological excavation of an area in order to preserve by record the identified oval/circular enclosure in advance of construction works commencing.
Transport and Pedestrian Infrastructure	Temporary traffic disruption caused by site traffic and an increase in HGV movements	• Implementation of a CMP. • Use of approved access points and routes to the site, with deliveries outside peak hours where possible

Table 5.4: Summary of Potential Environmental Impacts during Construction

Receptor	Potential Impacts	CEMP Mitigation
		(and abnormal loads at quiet times, subject to agreement with relevant authority).
	Transfer of mud and materials from vehicles onto public highways causing the potential for pollution hazards.	• On-site wheel washing facilities.
	Temporary disruption to pedestrian access and routes within the locality of the site.	• Implementation of a CMP. • Maintenance of footpaths around the site, where possible, ensuring access is maintained for all.
Noise and Vibration	• Temporary increased noise levels at surrounding residential, industrial and commercial properties, from HGV vehicle movements and construction activities (e.g. breaking out, crushing, foundation installation, cutting, etc). • Vibration impacts on local buildings, due to e.g. increased vibration from foundations and use of HGVs within the site.	• All works on site shall comply with BS 5228 2009+ A1 2014 (Parts 1 and 2). • Avoid unnecessary revving of engines and switch off equipment when not required. • Keep internal haul roads well maintained and avoid steep gradients. • Minimise drop height of materials. • Start-up plant sequentially rather than all together. • Noise complaints would be logged and investigated. • Appointment of a designated noise liaison. • Appropriate siting of plant. • Use of silenced and well-maintained plant conforming with the relevant EU directives relating to noise and vibration. • Hours are limited during which site activities likely to create high levels of noise and vibration are carried out. • A site representative responsible for matters relating to noise and vibration would be appointed prior to construction on site. • Minimise drop height of materials. • The Contractor shall liaise with the operators of the Dog's Trust site to the north in order to manage impacts during the construction phase.
Air Quality	Windblown dust generated from (e.g.) earthworks, stockpiles, construction vehicle movements on unpaved surfaces and crushing.	• Dust suppression techniques, such as damping down, use of temporary hoarding and covering of stockpiles. • Complaint registers. • Equipment and vehicles used on site kept in good condition. • Pre-start checks on equipment.

Table 5.4: Summary of Potential Environmental Impacts during Construction

Receptor	Potential Impacts	CEMP Mitigation
		• The Principal Contractor or equivalent would monitor the contractors' performance. • During working hours, dust control methods would be monitored as appropriate. • The name and contact details of a person to contact regarding air quality and dust issues shall be displayed on the site boundary. • Community engagement shall be undertaken before works commence on site. • The procedures put in place would 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. • In the event of dust nuisance occurring outside the site boundary, site activities would be reviewed, and satisfactory procedures implemented to rectify the problem. • Apply speed restrictions on site access routes. • During periods of very high winds (gales), activities likely to generate significant dust emissions should be postponed until the gale has subsided. • 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. • Overburden material would be stored in sheltered parts of the site, located downwind of sensitive receptors. • There would be no storage of soil along the cable route. • Wheel wash at main site traffic exists.
Soil, Groundwater and Surface Water	Pollution incident through spill of fuels or chemicals, or discharge of sediment laden water and runoff.	• Appropriate storage of fuels and potentially hazardous construction materials within a secure site compound. • Provision of on-site pollution control kits. • Use of settlement system prior to discharge. • Refuelling of construction equipment and the addition of hydraulic oil or lubricants to vehicles/ equipment would take place in designated bunded areas where possible.
	Siltation and contamination of surface water runoff and ground water.	• Surfaces shall be designed with adequate drainage, falls and profile to control run-off and prevent ponding and flowing.

Table 5.4: Summary of Potential Environmental Impacts during Construction

Receptor	Potential Impacts	CEMP Mitigation
		• Use of settlement tanks, bunding and street sweeping to prevent contamination of the stormwater system.
	Potential for soil contamination.	• All exposed soil surfaces would be within the main excavation site which limits the potential for any off-site impacts. • Site investigations that have been undertaken have identified a low potential for soil and groundwater contamination at the application site. In the event that contamination is found, soil would be managed and an appropriate Remedial Strategy developed in conjunction with the relevant authority and the EPA.
Ecology	Disturbance to perimeter habitats.	• All lights that are pole mounted would be directional and/or cowled to ensure that light is directed downward and inwards. Lights would be programmed or otherwise to be off unless required.
Natural Resource Use	Waste generation and disposal of materials to landfill.	• Preparation and implementation of an SWMP. • Waste minimisation at source, with segregation and recycling of waste generated. • A waste manager would be appointed by the main contractor(s) to ensure effective management of waste during the excavation and construction works. • All construction staff would be provided with training regarding the waste management procedures. • All waste leaving the site would be transported by suitable permitted contractors and taken to suitably registered, permitted or licenced facilities; and • All waste leaving the site would be recorded and copies of relevant documentation maintained.
	Use of natural resources.	• Preparation and implementation of an SWMP. • Materials would be ordered on an 'as needed' basis to prevent over supply. • Materials would be correctly stored and handled to minimise the generation of damaged materials. • Materials would be ordered in appropriate sequence to minimise materials stored on site. • Sub-contractors would be responsible for similarly managing their wastes. • All wood waste generated by site works would be inspected and examined and would be segregated as re-useable wood and scrap wood waste.
Local Amenity	• Temporary visual intrusion for nearby residents,	• Installation of 2.4m site hoarding. • Standard, good site housekeeping. • Appropriate construction site layout.

Table 5.4: Summary of Potential Environmental Impacts during Construction

Receptor	Potential Impacts	CEMP Mitigation
	occupiers of other land uses, pedestrians and passers-by. • Temporary visual intrusion of construction works on views into and out of the application site. • Temporary increases in road noise and vibration generated from construction vehicles. • Temporary increases in noise and vibration levels generated from the use of site plant and machinery. • Temporary generation of wind-blown dust nuisance from ground surfaces, stockpiles, vehicles, work faces and cutting and grinding of materials. • Temporary generation of exhaust emissions from lorries and plant delivering and removing materials including dust and particulates which may impact upon local air quality.	• On-site wheel washing facilities. • Dust management. • CMP. • Agreement of working hours with the relevant authority and careful selection of quiet plant, appropriate siting and regular maintenance, use of temporary acoustic barriers around specific activities etc. • Setting of noise and vibration limits with associated monitoring during the works.

Mitigation and Scope of Environmental Management Controls

5.77 The following mitigation controls would be committed to and delivered pursuant to either planning conditions, obligations contained in a legal agreement and supported as necessary by contractual obligations between the Applicant and the main contractor(s), or regulatory provisions in force from time-to-time.

Proposed Site Management Controls

Construction Environmental Management Plan (CEMP)

5.78 A CEMP would be prepared, to include a CMP and SWMP, and submitted for review and approval by the relevant authority prior to commencement of works on-site. It would include:

- A commitment to environmental protection (all consultants and trade contractors would be invited to declare their support for this at tender stage);
- Documentation of measures to comply with environmental aspects of any planning conditions;

- Detailed control measures and activities to be undertaken to minimise likely environmental impacts, as well as associated roles and responsibilities;
- Target criteria for environmental issues, where practical, such as water and energy consumption;
- Any requirements for monitoring and record keeping;
- A dedicated point of contact during normal working hours and in emergencies with responsibility to deal with environmental issues if they arise; and
- A review and monitoring regime of on-site performance against the CEMP provisions by the project team and regular environmental audits of its implementation.

5.79 The CEMP would provide the necessary level of management and control of construction practices. This includes advance notice of operations and duration of work that may cause noise, disruption to access, or other effects.

5.80 The CEMP would form part of tender documentation and contractors would be required to demonstrate how they would work within these provisions, identify communication channels for exchange of information and set out programmes for monitoring and auditing of environmental control systems.

5.81 Where departures from the CEMP are inevitable, prior identification is required, such that other mitigation measures can be considered.

Considerate Constructors

5.82 All contractors would seek to register the site under the relevant Considerate Constructors Scheme.

Principal Contractor (or equivalent) and Management of Subcontractors

5.83 All contractors would have responsibility for monitoring any subcontractors' environmental performance; acting as a point of contact for consultation and feedback and for developing mechanisms to solve on-site issues as and when required.

Environmental and Communication/Liaison Strategy

5.84 The Applicant would be expected to nominate a manager who would act as the Project Environmental Manager (PEM) (or equivalent), who would be named at all site entrances, with a contact telephone number. The contact's name and details would be provided to all the relevant stakeholders by the Applicant prior to the start of the construction works.

5.85 The PEM would have primary responsibility for dealing with the relevant authority and other stakeholders on environmental matters, and all key stakeholders would be notified whenever a change of responsibility occurs for the PEM role. The PEM would keep neighbours, other relevant parties and relevant authorities informed of the nature of the on-going works, their duration and programme to establish and maintain good relationships with them.

5.86 It is anticipated that regular meetings would take place between the PEM and the relevant authority to review progress and to agree any necessary actions. The PEM would also deal with enquiries from the general public, including any complaints. Any complaints would be logged and reported to the relevant individual within the relevant authority (and vice versa) as soon as practicable.

5.87 The PEM would coordinate responses to queries and address issues in a timely and satisfactory manner.

Emergencies and Environmental Incidences

5.88 Protocols to be implemented on-site in instances of emergencies and environmental incidents would be set out within the CEMP for approval by the relevant authority.

Housekeeping and General Site Management

5.89 Hoardings/security fencing would be erected around the site to provide a clear and secure demarcation between operational activities and other areas and to provide information regarding the proposed development and its progress. Particular attention would be paid to locations supporting high volumes of pedestrian movement and construction routes, access gates and security arrangements.

5.90 A 'clean site' policy would be maintained, and contractors and their subcontractors would be expected to maintain a tidy site. A street sweeper would be employed as required during the foundation, and excavation periods of the construction programme to make sure that the streets around the site would be kept clean during the works.

Nearby Residential Properties and Other Neighbours

5.91 The following mitigation and environmental controls would collectively limit potential visual, noise, vibration, traffic and dust impacts associated with the proposed development's construction works:

- Maintaining aesthetically appropriate site hoardings/fencing;
- Agreeing working hours with the relevant authority;
- Undertaking regular road sweeping;
- Arranging and locating potentially high impact site activities and plant away from neighbouring residential receptors;
- Selecting quiet plant and regularly maintaining plant;
- Implementing good site housekeeping measures;
- Directing site lighting away from sensitive receptors;
- Turning site lighting off outside of normal working hours;
- Screening scaffolding and active construction activities above hoarding levels, where practical;
- Implementing construction traffic management measures as agreed with the relevant authority;
- Implementing and monitoring dust management measures;
- Implementing and monitoring noise and vibration measures; and
- Using temporary acoustic barriers around potentially noisy activities.

Population and Human Health

5.92 If feasible, and available, it is encouraged that the applicant considers using local suppliers for goods and services, for example construction stage jobs created should be advertised and made available in the local area initially in order to maximise this opportunity. This would result in a more positive effect on local employment and the local economy.

Archaeology

5.93 There would be a direct construction effect on the oval/circular enclosure and associated linear ditches during construction works.

5.94 It is recommended and necessary to undertake an archaeological excavation of an area measuring 50m by 50m in order to preserve by record the identified oval/circular enclosure in advance of construction

works commencing. Such work would need to be undertaken by a licenced eligible archaeologist working under licence from the Department of Housing, Local Government and Heritage in consultation with the National Museum of Ireland.

Contaminated Soil

5.95 The following management and control measures would be included in the CEMP in order to control ground contamination:

- Excavation works would be carefully monitored by a suitably qualified person to ensure any potentially contaminated soil is identified and segregated from clean/inert soil. In the unlikely event that any potentially contaminated soils are encountered, the soil should be tested and classified as hazardous or non-hazardous in accordance with the EPA's Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous'[2] publication, HazWasteOnline tool[3] or similar approved method. The material would then need to be classified as inert, non-hazardous, stable non-reactive hazardous or hazardous in accordance with EC Decision 2003/33/EC[4]. It should then be removed from site by a suitably permitted waste contractor to an authorised waste facility.
- The effects of soil stripping and stockpiling would be mitigated against through the implementation of an appropriate earthworks handling protocol during construction within the CEMP. It is anticipated that any stockpiles would be formed within the boundary of the site and there would be no direct link or pathway from this area to any surface water body.
- Dust suppression measures (e.g. damping down during dry periods), vehicle wheel washes, road sweeping, and general housekeeping would ensure that the surrounding environment is free of nuisance dust and dirt on roads.
- EPA agreement would be obtained before re-using the spoil as a by- product. However, it is not currently anticipated that any excavated material would be removed off-site or imported onto the site for reuse as a by-product. Where material cannot be reused off site it would be sent for recovery or disposal at an appropriately authorised facility.
- All fill and aggregate for the proposed development would be sourced from reputable suppliers. All suppliers would 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.
- In order to prevent any spillages to ground of fuels and prevent any resulting soil and/or groundwater quality impacts:
  - 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 would be taken:
    - Any flexible pipe, tap or valve would be fitted with a lock and would be secured when not in use;
    - The pump or valve would be fitted with a lock and would be secured when not in use;
    - All bowsers to carry a spill kit;
    - Operatives must have spill response training; and
    - Drip trays used on any required mobile fuel units.
- In the case of drummed fuel or other potentially polluting substances which may be used during the construction stage the following procedures would be adopted:
  - Secure storage of all containers that contain potential polluting substances in a dedicated internally bunded chemical storage cabinet unit or inside a concrete bunded area;
  - 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 would be secured and on spill pallets; and
  - Drums to be loaded and unloaded by competent and trained personnel using appropriate equipment.
- Run-off from excavations/earthworks cannot be prevented entirely and is largely a function of prevailing weather conditions. Earthwork operations would be carried out with adequate drainage, falls and profile to control run-off and prevent ponding and flowing. Correct management, as set out in the CEMP, would ensure that there would be minimal inflow of shallow/perched groundwater into any excavation.
- Care would be taken to ensure that exposed soil surfaces are stable to minimise erosion. All exposed soil surfaces would be within the main excavation site which limits the potential for any off-site impacts. All run-off would be prevented from directly entering into any water courses or drainage ditches.
- Should any discharge of construction related water be required, discharge would be to foul sewer. Pre-treatment and silt reduction measures on-site would include a combination of silt fencing, settlement measures (e.g. silt traps, 20m buffer zone between machinery and watercourses, off-site refuelling of machinery) and use of hydrocarbon interceptors. Active treatment systems such as Siltbusters or similar may be required depending on turbidity levels and discharge limits.

Water Resources

5.96 To ensure that no contaminant-pathway-receptors pathways are created and to reduce the potential for contamination to occur during the construction stage, all site activities would be undertaken in accordance with the relevant pollution control requirements and guidance. The Applicant would also be responsible for obtaining all necessary consents and ensuring compliance with the conditions of the consents.

5.97 The following procedures would be included in the CEMP in order to prevent any spillages of fuels to the groundwater, and to prevent any resulting water quality impacts:

- 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 would be taken:

[2] EPA, 2018. Waste Classification List of Waste & Determining if Waste is Hazardous or Non-hazardous. July 2018 EPA.

[3] HazWasteOnline, 2012. Waste Assessment Tool [online]. Available at: https://www.hazwasteonline.com/ [Accessed 28/07/2021].

[4] European Union, 2003. 2003/33/EC: Council Decision of 19 December 2002 establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 of and Annex II to Directive 1999/31/EC. Document 32003D0033.

- Any flexible pipe, tap or valve would be fitted with a lock and would be secured when not in use;
- Pumps or valves would be fitted with a lock and would be secured when not in use;
- All bowsers to carry a spill kit;
- Operatives must have spill response training; and
- Drip trays used on any required mobile fuel units.

- In the case of drummed fuel or other potentially polluting substances which may be used during the construction stage the following procedures would be adopted:
  - Secure storage of all containers that contain potential polluting substances in a dedicated internally bunded chemical storage cabinet unit or inside a concrete bunded area;
  - 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 would be secured and on spill pallets; and
  - Drums to be loaded and unloaded by competent and trained personnel using appropriate equipment.

5.98 A temporary connection to the mains water supply would be established for the construction phase. The water demand during the construction phase would not be significant enough to affect existing pressures. It is understood that there is adequate capacity within the existing watermain network and foul water drainage network to supply the proposed development.

5.99 Wherever possible, the Applicant would minimise the amounts of wastewater discharged from the site. The Applicant would ensure that all potentially contaminated water, e.g. dewatering effluent, is disposed of in accordance with relevant pollution control requirement and guidance.

5.100 An Emergency Incident Plan would be in place for the site to deal with potential spillages and/or pollution incidents. This would include the provision of on-site equipment for containing spillages, such as emergency booms and chemicals to soak up spillages.

5.101 Any pollution incidents would be reported immediately to the relevant authority and the regulatory bodies such as the EPA.

Ecology

5.102 A total of four habitat types were noted during the habitat survey undertaken in August 2021. The main habitat types recorded within the Application Site are Improved Agricultural Grassland (GA1) and Buildings and Artificial Surfaces (BL3).

5.103 Earthwork operations would be carried out such that surfaces, as they are being raised, shall be designed with adequate drainage, falls and profile to control run-off and prevent ponding and flowing. Correct management would ensure that there would be minimal inflow of shallow/perched groundwater into any excavation.

5.104 Care would be taken to ensure that exposed soil surfaces are stable to minimise erosion. All exposed soil surfaces would be within the main excavation site which limits the potential for any off-site impacts.

5.105 All excavations are to be securely covered or closed off at the end of each working day to prevent the accidental trapping of badgers. Where this is not possible, a means of escape (for example a ramp) would be included to allow safe exit from the excavation. Checks of any open excavations should be performed by site staff prior to each day's works. The proposed security fencing would have mammal gates or a gap of at least 10cm at the bottom to allow free movement of badgers through the site.

5.106 It is considered unlikely that birds would be nesting within the Application Site, due to the lack of suitable habitat. However, should any bird roosting or nesting be observed within the Application Site during the development phase, works should stop immediately, and a suitably qualified and experienced ecologist should be contacted for advice.

5.107 Dust generated from construction works would be managed by means of 2.4m high site hoarding and dust suppression measures, such as the use of water sprays, dampening down of roads and covering of storage areas, such that the potential for adverse dust generation is reduced.

5.108 Construction drainage, air quality and noise management controls would be actively implemented at the site to minimise potential construction impacts.

5.109 All lighting would appropriately be aimed, controlled and switched off when the site is not operational (where practicable).

Landscape and Visual

5.110 The construction site would be surrounded by 2.4m high hoarding to reduce negative visual impacts from the activities.

Transport

5.111 A CMP would be prepared by the contractor, when appointed, that would require construction traffic including both construction plant and materials deliveries, to be programmed to avoid peak traffic periods on the surrounding local and strategic road network. The CMP would be reviewed and updated in line with the construction programme and would typically include details of the following:

- preferred hours of deliveries and removals (out of peak hours);
- agreed construction traffic routing and site access points;
- road cleaning facility provisioning;
- temporary traffic control measures;
- temporary and permanent access to the works – for personnel/vehicles;
- off-loading and storage areas;
- traffic management procedures for waste disposal vehicles;
- personnel and vehicle segregation;
- equipment e.g. temporary fencing, signage etc;
- temporary and permanent closures and diversions of footpaths; and
- site inductions.

5.112 Wheel cleaning facilities with adjoining hard standings would be located at the access and egress points of the site. These wheel cleaning facilities would be supplemented by regular road cleaning during the excavation and would have appropriate catchment areas.

Vehicle Routing

5.113 Vehicles making deliveries to the application site or removing spoil material would travel via designated routes which would be agreed with the relevant authority as required. The principal contractor would liaise with the relevant authority to provide directional signage on the principal routes on the highway network surrounding the application site, if required, in order to improve navigation.

5.114 Where possible vehicle movements would be scheduled out of peak hours (i.e. 08:00-09:00 and 17:00-18:00 during the weekdays).

5.115 Vehicles coming to the site would have specific timeslots booked. It would be the responsibility of the driver and company to ensure they arrive on site at the designated time.

5.116 The construction sequence for the site would be programmed to minimise the need for road closures. However, there may be instances when they are unavoidable. Where this is the case, road closures would be requested weeks in advance and authorised by the relevant authority.

5.117 The principal contractor would co-ordinate all deliveries and collections to/from the site, and ensure that as far as possible that:

- all delivery and collection vehicles are aware of the proposed routing;
- prior to a delivery or collection, haulers would notify the relevant authorities;
- liaison would be undertaken with occupants of adjacent buildings to avoid delays to service deliveries due to construction vehicles; and
- deliveries would be made on a 'just in time' basis.

5.118 Larger vehicle movements would be scheduled to avoid peak hours on the local road network if at all possible. If an alternative construction traffic route is required, this would first be agreed with the relevant authority.

5.119 Suppliers would be encouraged to consolidate deliveries where feasible. Where possible all deliveries would be made to designated areas within the application site. If for any reason it is necessary to load and unload outside site boundaries, the details and procedure for this would be agreed in advance with the relevant authority.

5.120 There would be no waiting areas for site vehicles in the roads around the site.

HGV Management

5.121 It is assumed that HGV construction traffic would be spread evenly over an 8 hour long working day (to avoid peak periods), although there may be slight peaks.

5.122 Loading and unloading of vehicles, dismantling of equipment such as scaffolding or moving equipment or materials around the site would be conducted in such a manner as to minimise noise impacts to existing surrounding residential properties.

Parking Management and Staff Travel

5.123 A key aspect of the construction process would be the management of construction worker travel to and from the site. Construction workers would be encouraged to access the site by public transport, walking and cycling in order to reduce the potential impact of vehicle traffic during this temporary period.

5.124 A series of measures would be implemented to encourage workers to travel using sustainable modes, which would form part of the traffic management plan. These may include:

- Cycle parking would be provided and this would be covered and secure;
- Facilities for changing and storing cycling clothes would be provided;
- The Applicant would investigate the provision of public transport vouchers to encourage workers to travel to the site by public transport;
- The contractor would encourage workers to car share where possible and would set up a car sharing database to identify where matches could be made;
- Incentives such as a free breakfast once a week for those walking, cycling, car sharing or using public transport would be provided; and
- Travel information packs would be provided to all workers. These would be provided in either paper form or electronically and would include public transport timetables and information on cycling routes.

5.125 Parking provision would be provided on-site, however this would be limited and spaces would be managed.

5.126 Vehicle movements would be managed to avoid queuing outside the site access point.

Noise and Vibration

5.127 Effective co-ordination and time management of construction activities would be used to avoid adverse effects from noise and vibration to surrounding areas. Early and helpful communications with the surrounding and on-site receptors would assist in managing any complaints arising during the construction works of the proposed development.

5.128 Contractors would be required to ensure that works are carried out in accordance with best practicable means. A full explanation of measures to control construction noise would be incorporated within the CEMP and detailed in all construction method statements.

5.129 As set out in Chapter 9: Noise and Vibration, noise levels from the construction of the proposed development have been predicted at noise-sensitive properties in close proximity to the site and the impact of the noise assessed. Noise levels likely to be generated by the construction works have been predicted based on the type and number of plant likely to be in operation.

5.130 The CEMP would include the following Best Available Techniques (BAT):

- Use of plant conforming with relevant Irish standards, directives or recommendations on noise or vibration;
- Works would only be carried out within agreed working hours. Restricted working hours (including Monday to Friday: 08:00 to 19:00, Saturday: 08:00 to 14:00, and no working on Sundays or Bank Holidays). Planning of working hours to take account of the effects of noise and vibration upon persons in areas surrounding site operations and upon persons working on site;
- Construction plant would be maintained in good condition with regards to minimising noise output and workers exposed to harmful noise and vibration;
- All drivers to site, including deliveries, would drive vehicles in a considerate manner in accordance with the specified speed limits with any failure to comply addressed as per infringements of the contractor's Project Health and Safety Plan;
- Construction plant would be operated and maintained appropriately, having regard to the manufacturer's written recommendations and maintenance programmes;
- Starting-up plant and vehicles sequentially rather than all together. Plant, equipment and site vehicles would be switched off when not in use;
- Construction traffic would only use the designated routes as per the construction traffic management plan as outlined in Chapter 5: Construction Environmental Management Plan;
- The transport of construction materials, spoil and personnel would be programmed and routed to reduce the risk of increased noise and vibration impacts;
- Adoption of quiet working methods, using plant with lower noise emissions, where reasonably practicable;
- Use of silenced and well-maintained plant conforming with the relevant Irish directives relating to noise and vibration. Vehicle and mechanical plant used for the purpose of the works would be fitted with effective exhaust silencers and/or mufflers, maintained in good working order and operated in such a manner as to minimise noise emissions;

- Construction plant and activities would be positioned to minimise noise at sensitive locations;
- Equipment that breaks concrete by munching or similar, rather than by percussion, would be used as far as is practicable;
- Mufflers would be used on pneumatic tools;
- Avoiding breaking out hard surfaces using percussive techniques, where reasonably practicable. Where practicable, rotary drills actuated by hydraulic or electrical power would be used for excavating hard materials;
- Adoption of working methods that minimise vibration generation, where reasonably practicable;
- Locating plant away from noise and vibration sensitive receptors, where feasible;
- Use of site hoarding, assumed 2.4m high, and acoustic screening for static items of plant and work areas, where feasible;
- Avoiding unnecessary revving of engines and switch off equipment, when not required;
- Keeping internal haul routes well maintained and avoid steep gradients;
- Use of rubber linings for chutes and dumpers to reduce impact noise;
- Minimisation of drop height of materials
- Carrying out regular inspections of noise mitigation measures to ensure integrity is maintained at all times;
- Providing briefings for all site-based personnel so that noise and vibration issues are understood, and mitigation measures are adhered to;
- Management of plant movement to take account of surrounding noise sensitive receptors, as far as is reasonably practicable; and
- Carrying out compliance monitoring of on-site noise and vibration levels to ensure that the agreed limits are being adhered to.

5.131 An appropriate community awareness campaign would be undertaken to provide information to people residing in properties in the vicinity of the construction works, to reduce the likelihood of negative impacts on the public which could result in complaints. The level of engagement will vary depending upon the expected effects experienced by individual receptors due to the construction works.

5.132 It is envisaged that the public awareness campaign would provide local residents with the following items of information:

- The nature of the works being undertaken;
- The expected duration of the works;
- The contractor's working hours;
- Mitigation measures that have been adopted to minimise noise and vibration, as detailed in the CEMP; and
- Contact details in the event of a noise disturbance.

5.133 If work is required to extend into periods beyond the agreed hours, separate authorisation would be secured with the relevant authority via the CEMP or other agreement process.

5.134 BAT as defined in Section 7 of the Protection of the Environment Act would be implemented as part of the working methodology as detailed in the CEMP. This will serve to minimise the noise and vibration effects at receptors in the vicinity of the construction works. The reduction in noise levels provided through the implementation of BAT varies depending on the nature of the works; however, values in excess of 5dB can be expected through a combination of appropriate measures and the use of site hoardings for noise screening.

Air Quality

5.135 Dust and emission control and mitigation at the application site would be particularly important during site preparation works and dry weather periods. To minimise adverse effects due to dust, the site-specific best practice measures described in Table 5.5 would be implemented by the principal contractor.

Table 5.5: Dust Mitigation Measures for Medium Risk Sites

Phase	Mitigation Measure
Communications	Develop and implement a stakeholder communications plan that includes community engagement before work commences on site Display name and contact details of responsible person for dust issues on the site boundary (e.g. hoarding) in addition to head/regional office contact information. Display the head or regional office contact information.
Dust Management Plan	Develop and implement a Dust Management Plan (DMP) which is included as part of the CEMP.
Site Management	Record all complaints and incidents in a site log. Take appropriate measures to reduce emissions in a timely manner, and record the measures taken within the log. Make the complaints log available to the Local Authority if requested. Record any exceptional dust incidents on- or off-site. Hold regular liaison meeting with other high-risk construction sites within 500m.
Monitoring	Undertake daily on and off-site visual inspections where there are nearby receptors. Carry out regular inspections to ensure compliance with the DMP and record results in the site logbook. Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.
Preparing and Maintaining the Site	Plan site layout to locate dust generating activities as far as possible from receptors. Use solid screens around dusty activities and around stockpiles. Avoid site runoff of water and mud. Fully enclose the site or specific operations where there is a high potential for dust production and the site is active for an extensive period. Keep site fencing barriers and scaffolding clean using wet methods. Remove dusty materials from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below Minimise emissions from stockpiles by covering, seeding, fencing, or damping down.
Operating Vehicle/Machinery and Sustainable Travel	Enforce an on-site speed limit of 15mph on surfaced roads and 10mph on unsurfaced areas. Ensure vehicles switch off engines when stationary. Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable. Produce a Construction Logistics Plan (CLP) to manage the sustainable delivery of goods and materials. Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).

Table 5.5: Dust Mitigation Measures for Medium Risk Sites	
Operations	Only undertake cutting, grinding, or sawing equipment with suitable dust suppression equipment or techniques. Ensure adequate water supply for effective dust and particulate matter suppression. Use enclosed chutes, conveyors, and covered skips. Minimise drop heights of materials. Ensure suitable cleaning material is available at all times to clean up spills.
Waste Management	Avoid bonfires. Avoid explosive blasting using appropriate manual or mechanical techniques. Bag and remove any biological debris.
Measures Specific to Construction	Ensure aggregates are stored in bunded areas and are not allowed to dry out. Avoid concrete scabbling where possible. Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos. For smaller supplies of fine powder materials ensure bags are sealed after use and stored appropriately to prevent dust.
Measures Specific to Trackout	Use water-assisted dust sweepers to clean access and local roads. Avoid dry sweeping of large areas. Ensure vehicles entering and leaving the site are appropriately covered. Record inspections of haul roads in site log, including any remedial action taken. Implement a wheel washing system. Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit. Access gates to be located at least 10m from the receptors where possible.
Measures Specific to Earthworks	Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable. Use hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil. Only remove the cover in small areas during work and not all at once.

5.136 The Applicant would give detailed dust control protocols as part of their contracts for the site.

Waste Management

5.137 As a principal waste mitigation measure, during the proposed development's construction, the principal contractor would prepare an SWMP at the site, which would be secured by an appropriately worded planning condition.

5.138 The scope of the SWMP would cover the following:

- All excavations would be carefully monitored by a suitably qualified person to ensure that potentially contaminated soil is identified and segregated, if encountered. If any potentially contaminated material is encountered, it would be segregated from clean/inert material, tested, and classified as either non-hazardous or hazardous and further classified as clean, inert, non-hazardous, or hazardous in accordance with the EC Council Decision 2003/33/EC5, which establishes the criteria for the acceptance of waste at landfills. All excavated material would be used;
- Waste materials generated at the site compound would be stored in suitable receptacles in designated areas of the site compound;
- It is anticipated that the following waste types, at a minimum, would be segregated on site: made ground, soils and stones and trees/shrubbery. In addition, the following wastes would be segregated at the site compound: organic (food) waste, packaging (paper/card/plastic), mixed dry recyclables and mixed non-recyclable waste;
- All waste contractors collecting waste from the site would hold a valid collection permit to transport waste, which is issued by the National Waste Collection Permit Office (NWCPO);
- Construction wastes would be taken to suitably registered/permitted/licenced waste facilities for processing and segregation, recycling, recover and/or disposal. As stated in the baseline section, there are numerous licensed waste facilities in the local region that have sufficient capacity to accept both hazardous and non-hazardous waste materials and could manage C&D waste from the proposed development;
- All waste leaving the site would be transported by suitable permitted contractors and taken to suitably registered, permitted, or licenced facilities;
- All waste leaving the site would be recorded and copies of relevant documentation maintained;
- Any hazardous wastes generated (such as chemicals, solvents, glues, fuels, oils) would also be segregated and would be stored in appropriate receptacles (in suitably bunded areas, where required);
- A waste manager would be appointed by the main contractor to ensure effective management of waste during the excavation and construction works;
- All construction staff would be provided with training regarding the waste management procedures; and
- The waste from delivers into the two-bay truck loading bay would be compacted on-site.

5.139 In particular the following measures would be proposed in the SWMP to minimise waste generation on-site:

- Ordering the quantity of materials required for the job, thus reducing over-ordering;
- Determining when and where materials are required and requesting 'just in time' deliveries;
- Returning damaged goods or incomplete deliveries;
- Requesting suppliers to minimise packaging and to guarantee a take-back service, especially for pallets;
- Ordering materials that are cut to size, rather than standard sizes;
- Where possible and appropriate to do so, using prefabrication off-site;
- Having appropriate storage areas ready - these should be covered to protect against rain and ideally have a hard standing surface;
- Determining where special handling is required;
- Securing the site to avoid theft and vandalism; and
- Ensuring good on-site segregation of wastes.

[5] European Union, 2003. 2003/33/EC: Council Decision of 19 December 2002 establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 of and Annex II to Directive 1999/31/EC. Document 32003D0033.

5.140 Any waste that is not re-used on-site and therefore requires off-site disposal would be dealt with in accordance with the Waste Hierarchy, the requirements of the EPA and in line with relevant legislation.

Recycling

5.141 Segregation (on-site or off-site) and recycling of cardboard, timber, metal, plastics, plasterboard and gypsum-based products would be required by the project team. The segregation of polythene film waste from other plastics would also be considered and local collections investigated.

5.142 It is proposed that waste would be segregated and stored for collection on-site.

5.143 Where standard sized pallets are used for material storage, then regular collections would be organised for removal and for re-use rather than disposal in timber skips.

5.144 Where on-site segregation of waste is not deemed possible due to spatial constraints at the application site, the waste carriers would be required to ensure off-site segregation for waste and diversion from landfill is undertaken.

Disposal

5.145 All construction materials that cannot be re-used or recycled or would be disposed of at appropriately licensed disposal facilities. The destination of all waste or other materials from the application site would be notified to the relevant authority for approval.

5.146 No burning of construction waste would take place on-site.

Climate

5.147 The embedded mitigation measures for climate, relevant to the construction stage of the proposed development, have been presented in Table 5.6.

Table 5.6: GHG Mitigation Measures during Construction Stage

Mitigation Measure	Mitigation Detail	Method of Reduction
Excavation of materials	Material excavated during construction would be processed for use in the works wherever possible to reduce the amount of material disposed of off-site as well as imported from other sources, and associated GHG emissions. Possible uses of excavated materials include general fill and other graded materials. Processing of material would take place on-site.	Reduce
Sustainable materials	Using sustainability sourced, recycled or secondary materials with lower embedded GHG emissions and water consumption; e.g. Specifying products with a high recycled content and (e.g. Pulverised Fuel Ash (PFA) replacement for up to 30% of the cementitious material (i.e. as replacement for Portland cement); Using recycled crushed concrete in granular sub-base materials in pavements sourced from existing pavements on site to be demolished as part of the works;	Reduce
Reporting	Energy consumption and materials use would be recorded and reported on an ongoing basis during the construction phase of the development;	Reduce
Equipment	Using low-emissions or electric construction plant, including the potential for portable PV for use in powering temporary compound and equipment;	Reduce
Procurement	Procuring materials with Environmental Product Declarations (EPD) to allow for the most informed procurement choices; and procuring materials from suppliers that offer take back schemes, where possible;	Reduce
Reuse	Reusing the materials from the construction process, wherever possible.	Avoid/ prevent
Minimising waste during construction	Following measures would be proposed in the SWMP to minimise waste generation on-site; ordering the quantity of materials required for the job, thus reducing over-ordering.	Reduce

5.148 Other potential opportunities to reduce GHG emissions during the construction stage include the following:

- Specification of concrete with increased cement replacement – 40% of none-critical structural elements as a minimum;
- Specification of reinforcement steel with 100% recycled content of non-critical structural elements;
- Aluminium windows frames with recycled content >35% or replace with Wood Alu windows frames;
- Use of glass with recycled content, where available;
- Substitute raised access floor with timber flooring or RAF with recycled content;
- Specify aluminium with 20% to 35% recycled content;
- Specify plasterboard with 95% recycled content or substitute with gypsum fibreboard; and
- MEP service elements with recycled content where feasible.

Cumulative Impacts

5.149 Site preparation and construction activities, when undertaken at the same time, have the potential to give rise to combined (cumulative) impacts and effects. Although temporary, these combined impacts, if not managed can give rise to potentially adverse effects on sensitive receptors in proximity to the site, i.e. existing residential, industrial, commercial, community and open space receptors.

5.150 Such impacts are typically restricted to temporary to short term periods of time. Even then, not all receptors would experience impact interactions during this time depending on phasing and proximity to the sensitive receptor. The majority of interactions are likely to arise from activities such as noise and vibration from construction plant and vehicles, dust from plant and vehicles, the visual impacts of the work and passing HGVs.

5.151 In terms of residential amenity, construction works would typically be carried out outside of those hours when residents could reasonably expect quiet enjoyment of their properties. Construction works would typically be carried out between the hours of 08:00 to 19:00 Monday to Friday and between 08:00 and 14:00 on Saturday. There would be no works carried out on Sundays or Bank Holidays. As such, residents would not be subjected to unreasonable impacts during daytime works periods.

5.152 Impact interactions that are likely to occur would generally be of a temporary and short-term nature and would be carefully co-ordinated to ensure minimal disruption to sensitive receptors.

5.153 It is anticipated that the stringent management controls set out in this Chapter would ensure that the potential construction of the proposed development would be kept to a minimum and as such, would limit the potential for further predicted impacts when considered in conjunction with the development proposals in the surrounding area. It is expected that other schemes in the area would also adopt similar stringent management controls.

5.154 The CEMP, to be secured by an appropriately worded planning condition, would be implemented during the construction works and would provide a framework within which activities on-site would be managed 'at source' to minimise impacts on all sensitive receptors.

Summary

5.155 Based on the assumption that planning consent is secured in Quarter 2/3 (Q2/Q3) 2022, the construction works would commence in Q3 2022. The works are anticipated to be undertaken over an 8 to 10 month period (excluding commissioning) with a completion target of Q2/Q3, 2023.

5.156 Construction works have the potential to cause environmental impacts, from noise, wastes, surface water runoff, and emissions to air. Measures to control potential environmental impacts would be set out within the CEMP (including a CMP and SWMP) to be secured by an appropriately worded planning condition.

6 POPULATION AND HUMAN HEALTH

Introduction

6.1 This chapter of the Environmental Impact Assessment Report (EIAR) reports on the likely significant population and human health effects to arise from the construction and operation of the proposed development.

6.2 The chapter describes the population and human health policy context; the methods used to assess the potential impacts and likely effects; the baseline conditions at and surrounding the site; the likely population and human health taking into consideration embedded mitigation; the need for additional mitigation and enhancement; the significance of residual effects; and inter-project cumulative effects.

6.3 There are no technical appendices associated with this chapter.

Methodology

6.4 The assessment has been informed by the following legislation, policies and published guidance:

- International Legislation:
  - Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (2017)[1];
- National Legislation and Policy:
  - Healthy Ireland Framework: A framework for improved health and wellbeing (2013-2025)[2];
- National guidance and industry standards:
  - Health in Environmental Impact Assessment: A primer for a proportionate approach (2017)[3]; and
  - PubMed MEDLINE database of biomedical and life sciences journal literature[4].

6.5 The EC guidance on the preparation of an EIAR states that:

> *"Human health is a very broad factor that would be highly Project dependent. The notion of human health should be considered in the context of the other factors in Article 3(1) of the EIA Directive and thus environmentally related health issues (such as health effects caused by the release of toxic substances to the environment, health risks arising from major hazards associated with the Project, effects caused by changes in disease vectors caused by the Project, changes in living conditions, effects on vulnerable groups, exposure to traffic noise or air pollutants) are obvious aspects to study. In addition, these would concern the commissioning, operation, and decommissioning of a Project in relation to workers on the Project and surrounding population."*

6.6 This assessment follows the EC guidelines, and examines the health effects relevant to the proposed development as they relate to a relevant, defined study area.

6.7 Further consideration for this assessment is given to the findings of the other technical chapters of this EIAR, in particular in relation to air quality, noise and vibration, transport and accessibility, and landscape and visual impact assessment.

Assessment Scope

6.8 Health, or what constitutes 'good' health, is difficult to define and measure in all its aspects for a population because perceptions regarding health and expectations of good health vary. This chapter therefore applies the World Health Organization (WHO) definition[5], which states: "Health is a *state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity"*.

6.9 The focus of this assessment is on community health[6] and wellbeing and not on occupational health and safety[7]. The terms 'health', 'human health', 'population health' and 'health and wellbeing' are used interchangeably.

Technical Scope

6.10 The technical scope of the assessment has considered the following effects during the construction stage:

- Generation of construction related employment; and
- Effects from increased traffic, noise and dust on amenity and health.

6.11 The following effects during the operation stage of the proposed development have been considered:

- Effects on amenity.

Spatial Scope

6.12 The site lies within the functional area of South Dublin County, which is sub-divided into Electoral Divisions and Small Areas. The site is located within the western end of Clondalkin Village Electoral Division (ED) and is within the Clondalkin Village Small Area (SA) (Ref Sa2017_267053001), as displayed in Figure 6.1. This Clondalkin Village SA excludes almost all of the residential areas of Clondalkin, with the exception of part of the estate of St Johns off the Fonthill Road South, and primarily covers the employment zoning and wider area to the west of Clondalkin.

Temporal Scope

6.13 In line with EPA guidance, as outlined in Volume 1, Chapter 2: EIA Process and Methodology of this EIAR Volume, the duration of effects has been classified using the following: Momentary (seconds to minutes), Brief (<one day), Temporary (<one year), Short-term (one to seven years), Medium-term (seven to 15 years), Long-term (15 to 60 years), Permeant (>60 years). The assessment has considered impacts arising during the construction stage (eight to 10 months) which would be expected to be temporary in nature and from the operation stage which would be expected to be long-term to permeant.

[1] European Commission, 2017. Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (Directive 2011/92/EU as amended by 2014/52/EU). EU. 2017.
[2] Department of Health, 2013. Healthy Ireland Framework. A framework for improved health and wellbeing 2013-2025. Government of Ireland.
[3] Cave B, Fothergill J, Pyper R, Gibson G, Saunders P, 2017. Health in Environmental Impact Assessment: a primer for a proportionate approach. IEMA, Faculty of Public Health and Ben Cave Associates Ltd, Lincoln, England.
[4] PubMed MEDLINE database of biomedical and life sciences journal literature.
[5] WHO, 1948. WHO remains firmly committed to the principles set out in the preamble to the Constitution [online]. Available at: https://www.who.int/about/governance/constitution [Accessed 06/07/2021].
[6] The health and wellbeing of those communities in the study area who have the potential to experience effects associated with the proposed development.
[7] This refers to the health and safety of workers employment by the proposed development, either during construction or operation.

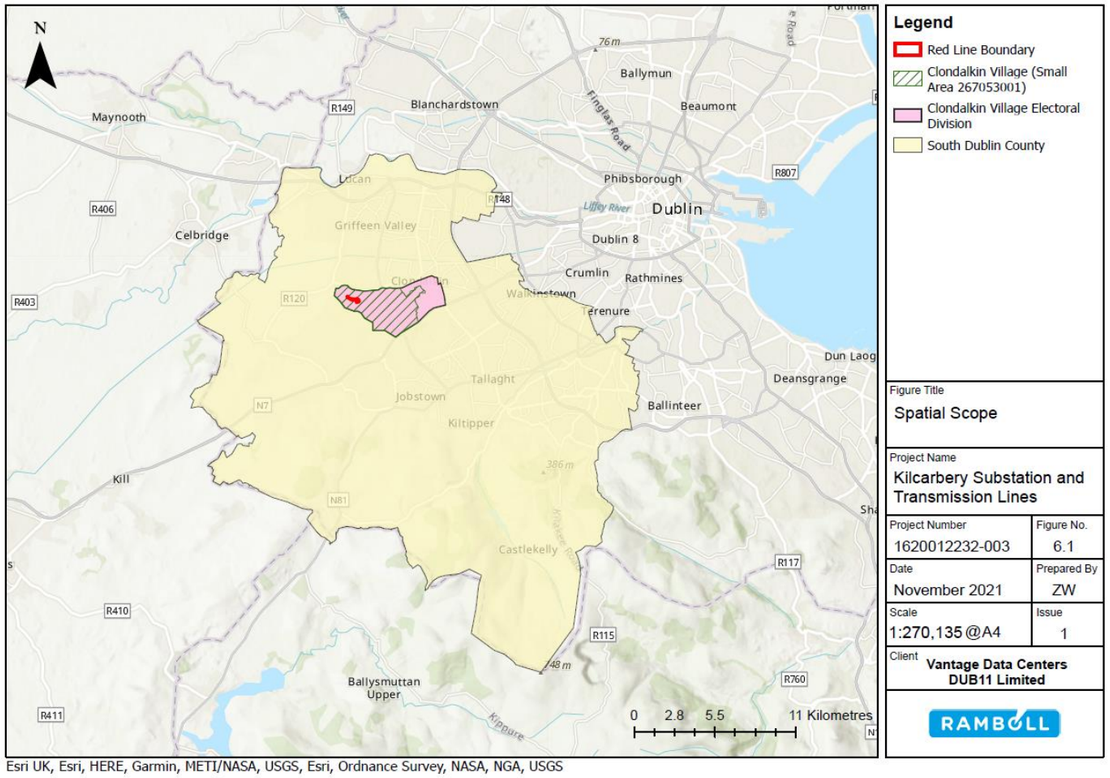


Figure 6.1: Spatial Designations in South Dublin County

Baseline Characterisation Method

Desk Study

6.14 In order to establish baseline population and human health conditions in the study area, relevant data was reviewed and assessed. Data was obtained from a review of demographic characteristics of the area, ascertained from Census of Population data and other statistics released by the Central Statistics Office (CSO), comprising:

- Central Statistics Office, South Dublin County Council, 2016[8];
- Central Statistics Office, Clondalkin Village ED, 2016[9]; and
- Central Statistics Office, Clondalkin Village SA, 2016[10].

Field Study

6.15 A field study was not required as the data provided by other sources was deemed to be adequate and representative of the site conditions.

Assessment Method

Methodology

6.16 Health at the population level (all the persons inhabiting a defined location) is influenced by a number of determinants of health (non-medical factors that influence health outcomes). Many of these are socio-economic in nature. Those determinants of health commonly thought to be important are:

- employment;
- income;
- access to services;
- transport;
- housing;
- education;
- crime and fear of crime;
- social capital; and
- the physical environment.

6.17 To determine the potential population and human health impacts of the proposed development on nearby residents, the assessment needs to consider the pathways by which the proposed development might affect the determinants of health and by how much. For example, a development that creates new employment opportunities could contribute positively to health. However, if a development causes degradation in air quality, this could have a negative impact for health.

6.18 In terms of assessing the potential human health impacts associated with the proposed development, outputs of the landscape and visual, transport and accessibility, air quality, and noise and vibration chapters have been reviewed and any significant impacts identified in these chapters are considered in terms of their potential implications on population and human health.

6.19 The assessment methodology applied to the population and human health assessment is outlined below.

Assessment Criteria

6.20 The assessment of significance of effect with regards to population and human health is based on professional judgement of the sensitivity of the receptor and the magnitude of effect.

6.21 This is determined by consideration of the sensitivity of the receptor, magnitude of impact and scale of the effect. In considering the significance of an effect, consideration has been given to the duration of the effect, the geographical extent of the effect and the application of professional judgement.

Receptor Sensitivity/Value Criteria

6.22 There is no specific guidance in relation to sensitivity of receptors with regards to population and human health. The baseline below outlines the key population and health vulnerabilities in the study area; however, due to the baseline being desk-based and without in-depth stakeholder engagement at the community level, it is not possible to assign an overall sensitivity classification to the population in the study area. Therefore, the precautionary principle has been adopted for this assessment, which assumes that the population within the study area is of a medium to high sensitivity.

[8] Central Statistics Office, 2016. South Dublin County Council [online]. Available at: https://census.cso.ie/sapmap2016/Results.aspx?Geog_Type=CTY31&Geog_Code=2AE1962914A113A3E055000000000001#SAPMAP_T13_1301 [Accessed 09/07/2021].

[9] Central Statistics Office, 2016. Census 2016 Sapmap Area: Electoral Division Clondalkin-Village ED [online]. Available at: https://census.cso.ie/sapmap2016/Results.aspx?Geog_Type=ED3409&Geog_Code=2AE196291D0213A3E055000000000001#SAPMAP_T14_1401 [Accessed 09/07/2021].

[10] Central Statistics Office, 2016. Census 2016 Sapmap Area: Small Area Sa2017_267053001 [online]. Available at: https://census.cso.ie/sapmap2016/Results.aspx?Geog_Type=SA2017&Geog_Code=4c07d11e-0d56-851d-e053-ca3ca8c0ca7f#SAPMAP_T14_1401 [Accessed 09/07/2021].

Impact Magnitude Criteria

6.23 The magnitude of impact has been classified as low, medium, or high, in accordance with the criteria set out in Table 6.1.

Table 6.1: Impact Magnitude Criteria

Magnitude of Impact	Criteria
Low	Change in an environmental and/or socio-economic factor(s) as a result of the proposed development which would result in a minor change to existing baseline conditions (negative or positive).
Medium	Change in an environmental and/or socio-economic factor(s) as a result of the proposed development which would result in a moderate change to existing baseline conditions (negative or positive).
High	Change in an environmental and/or socio-economic factor(s) as a result of the proposed development which would result in a major change to existing baseline conditions (negative or positive).

Scale of Effect Criteria

6.24 Impacts have been assessed on the basis of the value/sensitivity of receptors against the magnitude of impact to determine the scale of effect as presented in Table 6.2.

Table 6.2: Scale of Effect Criteria

Magnitude	Sensitivity of Receptors		
	Low	Medium	High
Low	None	Imperceptible	Not Significant - Slight
Medium	None - Imperceptible	Not Significant - Slight	Moderate - Significant
High	Not Significant - Slight	Moderate - Significant	Very Significant - Profound

6.25 Based on Environmental Protection Agency's (EPA) Draft Guidelines on the information to be contained in Environment Impact Assessment Reports[11] (2017), as described in Volume 1, Chapter 2: EIA Process and Methodology, effects ranging from 'moderate' to 'profound' are considered **significant** in EIA terms.

Nature of Effect Criteria

6.26 The nature of the effect has been described as either negative, neutral or positive as follows:

- Positive – An advantageous effect to a receptor;
- Neutral – An effect that on balance, is neither positive nor negative to a receptor; or
- Negative – A detrimental effect to a receptor.

Assumptions and Limitations

6.27 The assessment has relied on baseline data from the CSO which is now five years old but still the most reliable source.

[11] Environmental Protection Agency, 2017. Draft Guidelines on the information to be contained in Environmental Impact Assessment Report (EIAR).

Baseline Conditions

Existing Baseline

Land Use

6.28 The surrounding context of the site is largely industrial and agricultural. The closest industrial areas (Google Data Center Campus and Digital Reality Profile Park) are located to the south and east of the site boundary. Surrounding land uses are illustrated in Volume 1, Chapter 1: Introduction, Figure 1.2.

6.29 The site is also surrounded by numerous residential properties. A large proportion of these are no longer in residential use due to the extension of Grange Castle Business Park (located approximately 500m west) and road improvement in recent years. The closest residential receptor is located approximately 280m south of the site.

6.30 The site is located in Profile Park industrial estate and within the functional area of South Dublin County. Under the South Dublin County Council's (SDCC) Development Plan 2016-2022[12], the site is allocated under Objective EE: Employment and Enterprise. The stated aim is to provide for enterprise and employment related uses. The proposed land use of a substation is a permitted use under this zoning. Significant precedent exists for the establishment of this use on other EE zoned lands in the area. EE zoned areas are established economic industrial areas running essentially in an arc northward from City West to Grange and Grange Castle.

6.31 The current land use on the site is agricultural.

Population

6.32 At the time of the 2016 Census[12], the total resident population of South Dublin County was 278,767.

6.33 Table 6.3 presents the 2016 Census population data for the study area in 2016. The data shows population at County, Electoral Region, and Small Area level. The Small Area, where the site is located, represents the local area Clondalkin Village SA, which had a decline in population by 13 people between 2011 to 2016.

Table 6.3: Study Area Population (2016)

Area	Total Population
Clondalkin Village SA	257
Clondalkin Village ED	9,152
South Dublin County	278,767

6.34 The population age ranges at study area are presented in Table 6.4. The data shows that Clondalkin Village SA has a lower-than-average younger population (0 to 19 years old) compared to the electoral region and county average and a significantly higher elderly population (65 to 84 years old). The overall averages for Clondalkin Village ED align with the South Dublin County average.

Table 6.4: Population Age Ranges (2016)

Area	Percentage of Population (%)					
	0-19	20-24	25-44	45-64	65-84	85 and over
Clondalkin Village SA	20.23	3.89	26.46	31.52	17.51	0.39
Clondalkin Village ED	27.80	5.40	31.81	26.31	8.02	0.66
South Dublin County	29.46	5.78	31.40	22.27	10.23	0.86

[12] SDDC, 2016. South Dublin County Council Development Plan 2016-2022 [online]. Available at: https://www.sdcc.ie/en/services/planning/development-plan/plan-2016-2022/ [Accessed 28/06/2021].

6.35 Ethnicity in the study area is presented in Table 6.5. According to the 2016 Census, 77.77% of the county population are White Irish, compared to 72% in Clondalkin Village SA. Clondalkin Village ED and SA both have a higher than county level of those stating Other White as their ethnicity and a lower percentage of Black or Black Irish, White Irish Traveller, Asian or Asian Irish and other residents compared to South Dublin County as a whole.

Table 6.5: Population Ethnicity (2016)

Ethnicity	Percentage of Ethnicity (%)		
	Clondalkin Village SA	Clondalkin Village ED	SDCC
White Irish	72.00	77.75	77.77
White Irish Traveller	0.00	0.39	0.80
Other White	14.40	11.69	9.31
Black or Black Irish	1.20	2.43	3.31
Asian or Asian Irish	3.20	2.04	4.11
Other	1.60	1.42	1.91
Not stated	7.60	4.28	2.79

6.36 The general health of the population is presented in Table 6.6. General health is a self-assessment of a person's general state of health. Within the 2016 Census, people were asked to assess whether their health was very good, good, fair, bad, or very bad. Within South Dublin County 60% of people rated their overall health as very good compared to 56.82% and 52.14% for Clondalkin Village ED and Clondalkin Village SA respectively. In addition, Clondalkin Village SA has a significantly higher percentage of those stating their health as fair compared to Clondalkin Village ED and South Dublin County.

Table 6.6: Population General Health (2016)

Area	General Health Category					
	Not Stated (%)	Very Bad Health (%)	Bad Health (%)	Fair Health (%)	Good Health (%)	Very Good Health (%)
Clondalkin Village SA	7.39	0.00	1.95	12.06	26.46	52.14
Clondalkin Village ED	5.54	0.30	1.19	7.67	28.48	56.82
South Dublin County	3.70	0.29	1.26	7.38	27.23	60.14

Employment

6.37 The percentage of employment by industry is presented in Table 6.7. Within Clondalkin Village SA there is a higher proportion of employment within the agriculture, forestry and fishing industry, and building and construction industry compared with Clondalkin Village ED and South Dublin County as a whole. In comparison only 21% of employed individuals within Clondalkin Village SA work within the commerce and trade industry compared with the 27.94% in South Dublin County as a whole.

Table 6.7: At Work by Industry (2016)

Industry	Percentage of Employment (%)		
	Clondalkin Village SA	Clondalkin Village ED	South Dublin County
Agriculture, Forestry and Fishing	4.10	0.21	0.20
Building and Construction	8.20	5.48	5.10
Manufacturing Industries	8.20	10.12	8.80
Commerce and Trade	21.30	26.42	27.94
Transport and Communications	9.02	11.21	10.57
Public Administration	6.56	5.99	5.82
Professional Services	22.95	19.38	23.12
Other	19.67	21.19	18.45

Community Facilities

Residential Dwellings

6.38 Residential dwellings are primarily located to the north, east and south of the site. The closest occupied residential dwelling is located approximately 280m south of the site. The two next nearest existing residential properties are located between 300-350m north of the site, one of which is occupied and the other vacant. Two, currently occupied, residential properties are situated approximately 350m southwest of the site. Further residential properties are positioned along the Baldonnel Road to the south of the site, of which the closest property is located approximately 360m.

Schools

6.39 The population in the surrounding areas of the site (i.e. Clondalkin, Newcastle, Lucan, Tallaght and Rathcode), is serviced by various junior and secondary schools.

6.40 The Junior Genius Creche is located in Castlebaggot, approximately 580m southwest. Numerous junior schools are located in the wider site area, namely, Nano Junior National School, Our Lady Queen of Apostles, Sacred Heart National School and Scoil Mhuire located approximately: 2.3km northwest, 3.0km northwest, 3.1km east, and 3.3km east respectively.

6.41 The wider site area contains numerous National Schools. Talbot Senior National School, Sacred Heart National School and St Johns National School are 2.3km northwest, 2.9km and 3.4km east, respectively.

Healthcare Facilities

6.42 The nearest health centre is the Deansrath Health Centre, located approximately 1.6km northwest. Nangor Medical Center and Clondalkin Medical Center are located approximately 2.1km and 2.4km east respectively.

6.43 The nearest hospital to the site is located approximately 5km southeast at the Adelaide and Meath Hospital incorporating the National Children's Hospital, Tallaght, Dublin 24.

Sensitive Receptors

6.44 The focus of this assessment is on community health and wellbeing; therefore, all those who are likely to experience population and health effects (positive, neutral or negative) associated with the proposed development are considered sensitive receptors. The main sensitive receptor that this assessment will focus on is the Clondalkin Village SA community, as this is where the development is located. The community receptors that have been considered within this assessment include:

- Local residents (including vulnerable groups such as children and the elderly within the population);
- Local economy;
- Pedestrians, cyclists, and drivers; and
- Vulnerable groups (children and elderly population).

Assessment of Effects

Construction Effects

Employment Generation

6.45 The construction stage of the proposed development would create employment opportunities; however, levels of employment for the construction stage are estimated to be in the region of 30 direct workforce jobs.

6.46 Increased employment opportunities can have a positive influence on health through increasing social contact, involvement in a collective effort or activity and by forming social relationships. All of these contribute to wellbeing. In addition, those with insecure employment are likely to have poorer mental health than those with secure employment.

6.47 Construction jobs often have a related multiplier effect, creating additional indirect employment in business, which in turn benefit from increased spending by local construction workers. Procurement of goods and services may have the potential to create additional short-term employment opportunities, which in turn may potentially increase people's incomes and have a positive impact on their health. The extent of these benefits would be determined by the level of local procurement. Most of the procurement would be spread across the national economy due to the nature of the goods; this combined with the temporary nature of the construction stage would limit any health benefits.

6.48 The impact magnitude of employment generation on human health is considered to be low on a receptor of medium sensitivity; therefore, health effects associated with employment generation during the construction stage would be **imperceptible**, **positive** in nature and **not significant** in terms of EIA.

Air Quality Effects

6.49 There would be air quality impacts from the construction stage activities in terms of dust impacts and on-site vehicle emissions.

6.50 The air quality assessment, as reported in Chapter 8 of the EIAR volume, concludes that construction dust and on-site vehicle emissions effects in the study would be neutral, short term and imperceptible.

6.51 Air quality effects have the potential to affect health in a variety of ways, in particular targeting vulnerable groups such as children, the elderly and those with respiratory problems. However, embedded mitigation and standard good practice measures would be implemented to reduce dust emissions and vehicle emissions, through the Construction Environmental Management Plan (CEMP).

6.52 The impact magnitude of air quality effects on human health is considered to be low due to the implementation of the CEMP. Local residents and vulnerable groups are all considered to be of high sensitivity; therefore, health effects associated with dust and on-site vehicle emissions during the construction stage would be **not significant to slight, negative** in nature and **not significant** in terms of EIA.

Noise Effects

6.53 There would be noise impacts from construction stage activities and associated traffic that have the potential to cause effects to human health.

6.54 The noise and vibration assessment in Chapter 9: Noise and Vibration of this EIAR Volume reports that, based on the predicted mitigated noise levels and distanced to receptors, construction stage works are likely to give a rise in noise levels that are considered slight, negative in nature and not significant in terms of EIA.

6.55 The noise assessment also reports that noise associated construction stage traffic would not exceed the construction noise limit of 65dB L_{Aeg} and is therefore considered slight negative and not significant in terms of EIA.

6.56 Noise has the potential to affect health in a variety of ways. Some negative effects can be auditory (i.e. damage to the ear) and occur as a direct impact of noise (i.e. at levels higher than considered here and in excess of statutory acoustic limiting values) whilst others are non-auditory; such as annoyance, night-time effects (e.g. sleep disturbance) and mental health impacts and may be associated with exposure to excessive noise.

6.57 Annoyance is the most reported non-auditory health effect associated with noise with sleep disturbance also being common with certain vulnerable groups (such as the elderly, new-borns and shift workers).

6.58 The impact magnitude of noise effects on human health is considered to be low due to noise levels not exceeding construction noise limits. Residential receptors in close proximity to the site are considered to have a high sensitivity to change in the noise environment; therefore, any auditory and non-auditory health effects during the construction stage would be **not significant to slight, negative** in nature and **not significant** in terms of EIA.

Transport and Accessibility Effects

6.59 The transport assessment in Chapter 7: Transport and Accessibility of this EIAR Volume reports that during the construction period (in 2022) there would be a maximum additional 140 vehicle movements per day (of which 20 would be heavy goods vehicle (HGV) movements and all highway links assessed would have an increase in vehicle movements of 10% or less. This increase in vehicle movements is reported to create no discernible environmental effect (imperceptible) and not significant in EIA terms in relation to pedestrian severance, delay, amenity, fear, and intimidation, driver delay and accidents and safety.

6.60 Vulnerable groups in society would be affected most by the small increase in traffic levels during construction. Those such as young children and the elderly may experience negative health impacts. The elderly may experience annoyance from increased noise, whereas young children are at higher risk of road accidents and health impacts associated with potential air pollution.

6.61 Cyclists and pedestrians using the local road network may experience increased fear of accidents and injuries. Any increase in traffic also increases the risk of accidents resulting in injuries and potentially death of road users, especially for more vulnerable road users, such as the young and the elderly.

6.62 The impact magnitude of traffic and transport effects on human health is considered to be low due to no significant effects being reported in the transport chapter. Road users, pedestrians and cyclists are all considered to be of high sensitivity; therefore, health effects associated with increased traffic during the construction stage would be **not significant to slight, negative** in nature and **not significant** in terms of EIA.

Amenity Effects

6.63 The landscape and visual impact assessment (LVIA) in EIAR Volume 2, Chapter 1: Landscape and Visual Impact Assessment reports that the site is located in an area that has had successive recent developments of a similar scale to the proposed development. Landscape and visual effects during construction are generally reported as imperceptible or slight, negative in nature and not significant in EIA terms.

6.64 Visual disturbances can become a focus for concern and anxiety. The built environment can impact on public health and the way that people utilise their environment. The built environment can also influence physical activity which, in turn, can cause health impacts. The natural environment is known to have a restorative function in that it reduces stress and anxiety levels.

6.65 Light pollution from the built environment can also have a negative health impact through annoyance, discomfort and loss of visual environment and visibility.

6.66 Residents may experience feelings of decreased quality of life during the construction stage that can cause anxiety and concern as well as decreased wellbeing; however, as the area has undergone a period of change, transitioning from an agricultural to an industrial and commercial area, it is thought nearby residents would be considered to be less susceptible to change.

6.67 In terms of amenity effects on population and human health, the magnitude of effect is considered to be low on a receptor of medium sensitivity; therefore, the effect would be **imperceptible, negative** in nature and **not significant** in terms of EIA.

Operation Effects

Amenity Effects

6.68 The LVIA in EIAR Volume 2, Chapter 1: Landscape and Visual Impact Assessment reports that on completion, the proposed development would be a new feature within the landscape, relatively small in size compared to the scale of surrounding developments although of a similar commercial and industrial character. The size, scale and operation of the buildings are consistent with surrounding land uses of the Profile Park area and would not be out of context with the commercial, urban fringe character of the landscape. The landscape and visual impacts during operation of the proposed development are judged to be low, neutral in nature and not significant in EIA terms.

6.69 Residents may experience feelings of decreased quality of life which can cause anxiety and concern as well as decreased wellbeing; however, as the current immediate visual environment is composed of building of similar character and of a larger scale to that of the proposed development, it is judged that nearby residents would be considered to be less susceptible to changes in visual amenity.

6.70 Therefore, in terms of amenity effects on population and human health the magnitude of effect is considered to be low on a receptor of medium sensitivity; therefore, the effect would be **imperceptible, negative** in nature and **not significant** in terms of EIA.

Assessment of Residual Effects

Additional Mitigation

Construction Stage

6.71 Given no significant effects are identified, no additional mitigation measures are proposed.

Operation Stage

6.72 Given no significant effects are identified, no additional mitigation measures are proposed.

Enhancement Measures

6.73 A number of mitigation measures are proposed in Volume 1, Chapter 7: Transport and Accessibility, Chapter 8: Air Quality, and Chapter 9: Noise and Vibration Landscape, as well as Volume 2, Chapter 1: Landscape and Visual Impact Assessment, which may help minimise any negative impacts to health, and maximise positive impacts.

6.74 In addition, it is proposed that the procurement of local employment wherever possible is encouraged. If feasible, and available, local suppliers should also be used for goods and services. Jobs created should be advertised and made available in the local area initially in order to maximise this opportunity. This would result in a more positive effect on local employment and the local economy.

Construction Residual Effects

6.75 As no additional mitigation would be required, the residual construction effects remain as reported in the assessment of effects section:

- Employment Generation: **imperceptible** (**positive**), **not significant** in EIA terms.
- Air quality effects: **not significant to slight** (**negative**), **not significant** in EIA terms;
- Noise effects: **not significant to slight** (**negative**), **not significant** in EIA terms;
- Transport effects: **not significant to slight** (**negative**), **not significant** in EIA terms; and
- Amenity effects: **imperceptible** (**negative**), **not significant** in EIA terms.

Operation Residual Effects

6.76 As no additional mitigation would be required, the residual operation effects remain as reported in the assessment of effects section:

- Amenity effects: **imperceptible** (**negative**), **not significant** in EIA terms.

Summary of Residual Effects

6.77 Table 6.7 provides a tabulated summary of the outcomes of the population and human health assessment of the proposed development.

Table 6.7: Summary of Residual Population and Human Health Effects

Receptor	Description of Residual Effect	Additional Mitigation	Scale and Significance of Residual Effect **	Nature of Residual Effect*				
				+ -	L U	D I	R IR	M B T St Mt Lt P**
Construction								
Local Residents and Economy	Creation of Employment	None required	Imperceptible	+	L	D/I	R	T
Local residents	Air quality effects	None required	Not Significant – Slight	-	U	D	R	T
Local residents	Noise effects	None required	Not Significant – Slight	-	L	D	IR	T
Local residents	Transport effects	None required	Not Significant – Slight	-	L	D	IR	T
Local residents	Amenity	None required	Imperceptible	-	L	D	R	T
Operation								
Local residents	Amenity	None required	Imperceptible	-	L	D	IR	Lt

Notes:

* - = Negative/ + = Positive / +/- = Neutral; R = Reversible, IR = Irreversible; D = Direct, ID = Indirect;

L= Likely, U = Unlikely; M = Momentary, B = Brief, T= Temporary, St = Short-term, Mt = Medium-term, Lt = Long-term, P = Permanent, R = Reversible

** Imperceptible, Not Significant, Slight, Moderate, Significant, Very Significant, Profound

Cumulative Effects

Intra-Project Effects

6.78 As explained in Volume 1, Chapter 2: EIA Process and Methodology, intra-project cumulative effects are discussed in Volume 1, Chapter 16: Intra Cumulative Effects.

Inter-Project Effects

6.79 Table 6.8 provides a summary of the likely cumulative effects resulting from the proposed development and the cumulative developments.

Table 6.8: Inter-Project Cumulative Effects

Cumulative Development	Construction		Operation	
	Cumulative Effects Likely?	Reason	Cumulative Effects Likely?	Reason
Vantage – townlands of Ballybane & Kilbride within Profile Park, Clondalkin, Dublin 22 [SD21A/0241]	Yes	There would be overlap between construction of both developments	Yes	Construction would be ongoing during operational stage of proposed development.
Centrica Business Solutions – Profile Park, Baldonnel, Dublin 22 [SD21A/0167]	Yes	There would be a potential for overlap with the site's development works. Scheme anticipated to employ dust mitigation techniques as the proposed development.	Yes	Construction period 2023-2025 – to be considered in operational stage.
Digital Reality Trust - Profile Park, Baldonnel, Dublin 22, D22 TY06 [SD17A/0377]	No	The cumulative scheme has already been constructed.	No	The proposed amendments to the cumulative scheme would not generate additional effects.
Equinix (Ireland) Ltd – Plot 100, Profile Park, Nangor Road, Clondalkin, Dublin 22 [SD21A/0186]	Yes	There would be a potential for overlap with the site's development works. Scheme anticipated to employ dust mitigation techniques as the proposed development.	Yes	Construction period 2023-2025 – to be considered in operational stage.
UBC Properties - Townlands within Grange Castle South Business Park, Baldonnel, Dublin 22 [SD20A/0121]	Yes	Construction would overlap with the construction stage of the proposed development.	Yes	Construction traffic would overlap with the operational stage of the proposed development. The opening year of the cumulative scheme is 2028.
UBC Properties - Grange Castle South Business Park, Dublin 22 [ABP Ref 308585]	No	The opening year of this cumulative scheme is anticipated to be 2021; therefore, the construction stage would not overlap with the construction stage of the proposed development.	No	The cumulative scheme would be operational at the same time as the proposed development; however the air quality, noise and transport assessments have reported no significant operational cumulative effects.
Cyrus One - Grange Castle Business Park, Clondalkin, Dublin 22 [SD18A/0134]	Yes	Operation stage would overlap with the construction stage of the proposed development.	Yes	Operation stage would overlap with the opening year of the proposed development. Considered to be in close proximity to the application site.
Cyrus One Townlands within Grange Castle South Business Park, Baldonnel, Dublin 22 [SD20A/0295]	No	The cumulative scheme construction works should be complete.	No	The proposed amendments to the cumulative scheme would not generate additional effects.
Cyrus One - Grange Castle South Business Park, Baldonnel, Dublin 22 [ABP Ref 309146]	Yes	There would be a potential for overlap with the site's development works.	Yes	Construction phase 2021-2022. However, due to delay in planning decision, assumed construction phase would be 2022/ 2023.

6.80 Overall, there would be six likely construction and operation cumulative effects.

Construction Cumulative Effects

6.81 Construction cumulative effects would arise from the following developments:

- Vantage – townlands of Ballybane & Kilbride within Profile Park [SD21A/0241] in respect of air quality and transport and accessibility;
- Centrica Business Solutions – Profile Park [SD21A/0167] in respect of air quality and transport and accessibility;
- Equinix (Ireland) Ltd – Plot 100, Profile Park [SD21A/0186] in respect of air quality and transport and accessibility;
- UBC Properties - Townlands within Grange Castle South Business Park [SD20A/0121] in respect of air quality and transport and accessibility;
- Cyrus One - Grange Castle Business Park [SD18A/0134] in respect of transport and accessibility; and
- Cyrus One - Grange Castle South Business Park [ABP Ref 309146] in respect of transport and accessibility.

6.82 Significant construction cumulative air quality effects are unlikely to occur, as all cumulative developments within 350m of the site boundary are anticipated to employ similar dust mitigation techniques such that the individual construction stage effects are not significant, alone or in combination.

6.83 To reduce cumulative transport and accessibility effects, the appointed construction contractor(s) and the Applicant would consult neighbouring schemes on the programme and local effects of the construction works, such as pedestrian routes, for example. In addition, collaboration around the scheduling of vehicle movements would be undertaken so that if works coincide with other construction activity already taking place within the immediate vicinity of the application site, the cumulative effect of construction traffic is considered not significant and can be minimised.

Operation Cumulative Effects

6.84 Operation cumulative effects would arise from the following development:

- Vantage – townlands of Ballybane & Kilbride within Profile Park [SD21A/0241] in respect of transport and accessibility;
- Centrica Business Solutions – Profile Park [SD21A/0167] in respect of transport and accessibility;
- Equinix (Ireland) Ltd – Plot 100, Profile Park [SD21A/0186] in respect of transport and accessibility;
- UBC Properties - Townlands within Grange Castle South Business Park [SD20A/0121] in respect of transport and accessibility;
- Cyrus One - Grange Castle Business Park [SD18A/0134] in respect of transport and accessibility; and
- Cyrus One - Grange Castle South Business Park [ABP Ref 309146] in respect of transport and accessibility.

6.85 All cumulative schemes that overlap with the operation stage of the proposed development and that may generate additional traffic on the local highway network, are considered. The traffic flows from these developments have been included within the 'Do Nothing' baseline of the transport and accessibility assessment and are therefore not considered to be significant.

Summary of Assessment

Background

6.86 This chapter has detailed the potential population and human health effects associated with the construction and operation stage of the proposed development. The assessment has been undertaken considering the relevant national and local guidance and regulations.

6.87 The baseline assessment has been made using publicly available information from the 2016 South Dublin County Census, within which three areas were examined: South Dublin County, Clondalkin Village Electoral Division and Clondalkin Village SA. For the purpose of this population and human health assessment census data for Clondalkin Village SA was compared against the census data for Clondalkin Village ED and South Dublin County.

6.88 At the time of the 2016 Census, the Clondalkin Village SA population was 257. In terms of the population breakdown, Clondalkin Village has a lower-than-average younger population (0 to 19) and a significantly higher elderly population compared with Clondalkin Village SA and South Dublin County. When assessing population health, Clondalkin Village has a lower percentage of residents rating their health as good compared with Clondalkin Village ED and South Dublin County. The highest proportion of employment in Clondalkin Village SA is within the agriculture, forestry and fishing sector, and the building and construction industry, compared with Clondalkin Village ED and South Dublin County as a whole.

Construction Effects

6.89 Construction stage effects for population and human health were considered in terms of employment generation, air quality, noise, transport and accessibility and amenity effects.

6.90 Overall, it is considered that the construction of the proposed development would result in a **negative** effect on population and human health receptors and would **not give rise to significant effects** on population and human health in EIA terms.

Operation Effects

6.91 Operation effects for population and human health were considered in terms of amenity effects.

6.92 Overall, it is considered that the operational development would result in a **negative** effect on population and human health receptors and would **not give rise to significant effects** on population and human health in EIA terms.

Cumulative Effects

6.93 The cumulative effects of the proposed development has been considered for Population and Human Health.

6.94 Whilst there would be cumulative effects arising from both the construction and operation stage, overall, there are no significant effects anticipated and therefore no mitigation is proposed.

7 TRANSPORT AND ACCESSIBILITY

Introduction

7.1 This chapter of the EIAR reports on the likely significant Transport and Accessibility effects to arise from the construction stage and the operation stage of the proposed development.

7.2 The chapter describes the Transport and Accessibility policy context; the methods used to assess the potential impacts and likely effects; the baseline conditions at and surrounding the site; the likely Transport and Accessibility effects taking into consideration embedded mitigation; the need for additional mitigation and enhancement; the significance of residual effects; and inter-project cumulative effects.

7.3 The chapter is supported by the following technical appendices in EIAR Volume 3:

- Appendix 7.1: Traffic Flow and Distribution Diagrams;
- Appendix 7.2: Accident Data; and
- Appendix 7.3: Cumulative Schemes Daily Traffic Flow Diagrams.

Methodology

7.4 The assessment has been informed by the following legislation, policies and published guidance:

- International Legislation:
  - National Planning Framework (NPF) 2019[1]
- Regional Policy:
  - South Dublin County Council Development Plan 2016-2022[2]
- National guidance and industry standards:
  - IEMA Environmental Assessment for Road Traffic, 1993[3]
  - EPA – Guideline on the Information to be contained in Environmental Impact Assessment Reports DRAFT, August 2017[4]

National Planning Framework (NPF) 2019

7.5 The National Planning Framework (NPF) was published in February 2018, and updated in January 2019, setting out a vision for Ireland in land use and planning terms to 2040. The NPF replaced the National Spatial Strategy once it was adopted as the long term land use and planning vision for Ireland.

7.6 National Strategic Outcome 6 of the NPF relates to the creation of "A Strong Economy Supported by Enterprise, Innovation and Skills". This strategic outcome is underpinned by a range of objectives relating to job creation and the fostering of enterprise and innovation. The following objective, relating to Information and Communications Technology (ICT) infrastructure is included under National Strategic Outcome 6:

"Promotion of Ireland as a sustainable international destination for ICT infrastructures such as data centres and associated economic activities".

7.7 The NPF also states that:

"Ireland is very attractive in terms of international digital connectivity, climatic factors and current and future renewable energy sources for the development of international digital infrastructures, such as data storage facilities. This sector underpins Ireland's international position as a location for ICT and creates added benefits in relation to establishing a threshold of demand for sustained development of renewable energy sources."

7.8 National Strategic Outcome 4 relates to sustainable mobility and the main targets includes the following

"to expand attractive public transport alternatives to car transport to reduce congestion and emissions and enable the transport sector to cater for the demands associated with longer term population and employment growth in a sustainable manner through the following measures:

- *Deliver the key public transport objectives of the Transport Strategy for the Greater Dublin Area 2016-2035;*
- *Provide public transport infrastructure and services to meet the needs of smaller towns, villages and rural areas; and*
- *Develop a comprehensive network of safe cycling routes in metropolitan areas to address travel needs and to provide similar facilities in towns and villages where appropriate."*

South Dublin County Council Development Plan 2016-2022

7.9 The South Dublin County Development Plan 2016-2022[2] has been prepared in accordance with the requirements of the Planning and Development Act 2000 (as amended) and sets out an overall strategy for the proper planning and sustainable development of the County.

7.10 One of the major challenges facing the County during the life of this Plan is the need to promote and provide for sustainable transport options, whilst maintaining the effectiveness of the County's road network.

IEMA Environmental Assessment for Road Traffic, 1993

7.11 IEMA methodology has been used for the appraisal of traffic impacts for the proposed development. It should be noted that Republic of Ireland forms part of the IEMA Regional Network.

7.12 The purpose of the IEMA Guidelines is to provide the basis for a systematic, consistent and comprehensive coverage for the appraisal of traffic impacts for a wide range of development projects.

7.13 The EIA process should be a continuous activity running throughout the planning and design stages of a project.

7.14 To ensure the comprehensive coverage of the environmental impacts arising from changes in traffic levels, the IEMA Guidelines identify a check list of potential impacts such as driver severance and delay, pedestrian severance and delay, pedestrian amenity, accidents and safety, hazardous and dangerous roads etc.

7.15 According to the IEMA Guidelines the assessment of the environmental impacts of traffic requires the following stages:

[1] National Planning Framework, 2018
https://www.gov.ie/en/publication/daa56-national-planning-framework-ireland-2040-our-plan-npf-2018/
[2] South Dublin County Council Development Plan, 2016-2022
https://sdcc.ie/en/download-it/publications/south-dublin-county-council-development-plan-2016-2022-written-statement.pdf
[3] IEMA Environmental Assessment for Road Traffic, Institute of Environmental Assessment, 1993
[4] Environmental Protection Agency, August 2017, Guidelines on the Information to be contained in Environmental Impact Assessment Reports

- Determination of existing and forecast traffic levels and characteristics;
- Determining the time period suitable for assessment;
- Determining the year of assessment; and
- Identifying the geographical boundaries of assessment.

7.16 Further to the above, the study area would be defined by identifying any link or location where it is considered that significant environmental effects may occur as a result of the proposed scheme.

7.17 The IEMA Guidelines state two rules to be considered when assessing the impact of development traffic on a highway link:

- Include highway links where traffic flows would increase by more than 30% (or the number of heavy goods vehicles (HGVs) would increase by more than 30%); and
- Include any other specifically sensitive areas where traffic flows would increase by 10% or more.

7.18 Less than a 30% increase is considered to result in imperceptible changes in the environmental effects of traffic. The IEMA Guidelines considered that projected changes in traffic flows of less than 10% create no discernible environmental effect.

7.19 Specifically, sensitive areas referred to above may include accident 'black spots', conservation areas, hospitals or links with high pedestrian flows.

EPA Guidelines on the Information to be contained in Environmental Impact Assessment Reports, 2017

7.20 The Guidelines have the primary objective of improving the quality of EIARs. The guidance presents the terminology of effects which has been applied to this report, where appropriate.

Assessment Scope

7.21 The IEMA Environmental Assessment for Road Traffic Guidance (1993)[3] has been followed for the assessment. The EPA terminology has been applied where appropriate.

Technical Scope

7.22 The technical scope of the assessment has considered the potential impacts of the traffic generation during the construction stage and the operation stage.

7.23 The assessment would consider the potential impacts of operation and construction traffic generation on relevant receptors.

Spatial Scope

7.24 In accordance with the IEMA Guidelines, the study area has been defined by identifying any link or location where it is considered that significant environmental effects could occur as a result of the proposed development.

7.25 The local highway network study area has been informed by the following two rules, as set out in IEMA Guidelines in 7.17 of this Chapter.

7.26 The assessment has been undertaken when the perceived environmental impact is at its greatest during the construction stage, in 2022 and during the operation stage in 2023. The assessment has considered the 'Do Nothing scenario', which assumes no proposed development, against the 'Do Something' scenario, which includes the same baseline traffic as the 'Do Nothing' but also includes proposed development traffic.

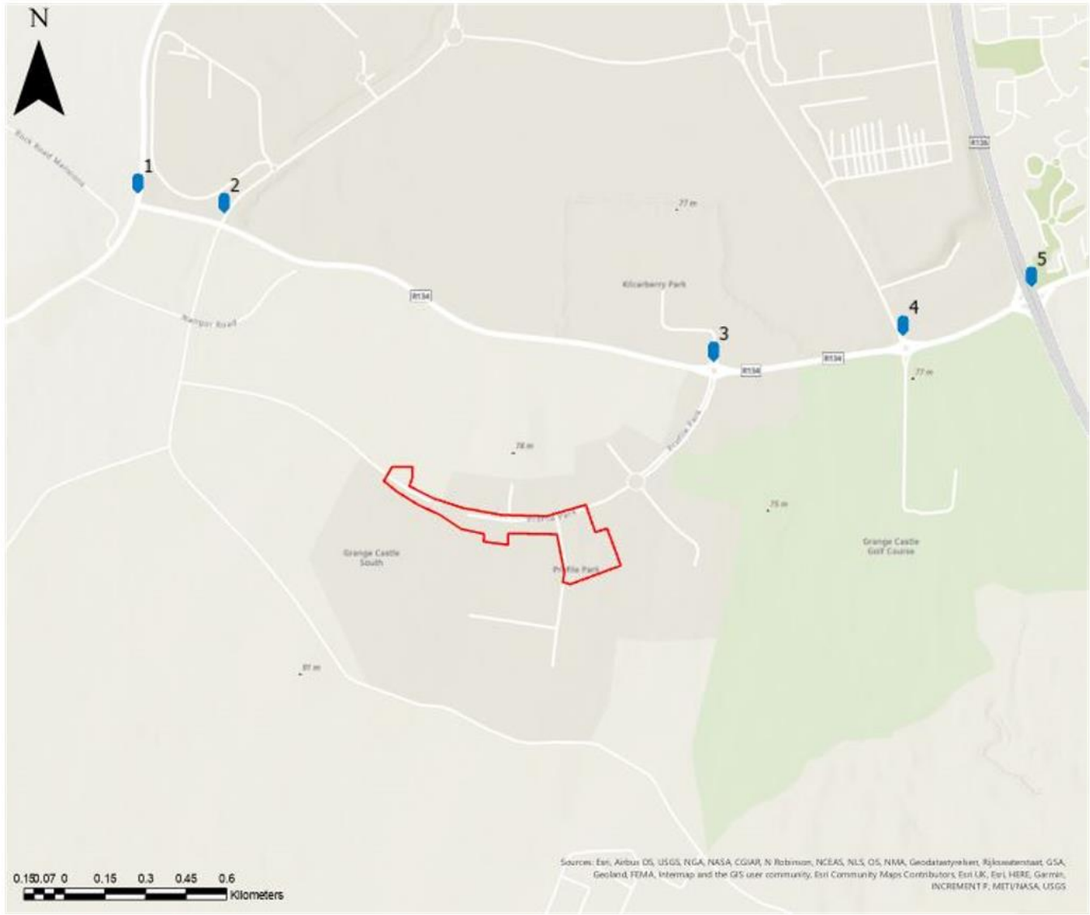


Figure 7.1: Study Area and Junction Location

7.27 The study area (Figure 7.1) incorporates new and existing sensitive receptors on each arm of the following junctions along the R134 New Nangor Road:

- Junction 1: Adamstown Road (R120) / Nangor Road (R134);
- Junction 2: Nangor Road (R134) / Baldonnel Rad (L2001);
- Junction 3: Nangor Road (R134) / Kilcarbery Park / Profile Park;
- Junction 4: Nangor Road (R134) / Grange Castle Business Park North / Grange Castle Gold Course; and
- Junction 5: Grange Castle Road (R136) / Nangor Road (R134).

Temporal Scope

7.28 In line with EPA guidance, as outline in Volume 1, Chapter 2: EIA Process and Methodology the duration of effects has been classified using the following: Momentary (seconds to minutes), Brief (<1 Day), Temporary (<1 Year), Short-term (1 to 7 years), Medium-term (7 to 15 years), Long-term (15 to 60 years), Permeant (>60 years). The assessment has considered impacts arising during the construction stage (8 to 10 months) which would be expected to be temporary to short-term in nature and from the operation stage which would be expected to be long-term to permeant.

7.29 The assessment would consider the future years at which the peak construction traffic of the development occurs and when the proposed development is built out and fully operational. It has been assumed that the peak construction traffic would occur in 2022 and would be fully operational in 2023. The assessment scenarios are anticipated to be:

- Existing Baseline 2021;
- Construction Baseline (2022 'Do Nothing');
- Construction Baseline (2022 'Do Nothing') + cumulative development + construction traffic;
- Operational Year Baseline (2023 'Do Nothing') + cumulative development; and
- Operational Year Baseline (2023 'Do Nothing') + cumulative development + proposed development (2023 'Do Something').

Baseline Characterisation Method

Desk Study

7.30 In order to establish baseline Transport and Accessibility conditions in the study area, relevant data was reviewed and assessed. Data was obtained from the following sources:

- The approved SD20A/0121 Traffic Impact Assessment[5];
- Google Maps; and
- Road Safety Authority.

Field Study

7.31 Specific traffic surveys have not been undertaken for this assessment due to the current COVID-19 pandemic leading to significantly reduced and therefore non-representative traffic flows on the local highway network. As an alternative, it is considered that the traffic data contained within the recently submitted Grange Castle Business Park South, Baldonnel, Dublin 22 Traffic Impact Assessment (Ref SD20A/0121) enables this EIAR to proceed in accordance with the agreed EIAR scope of assessment.

7.32 A Manual Classified Turning Count was undertaken on Tuesday the 17 December 2019 by Irish Traffic Surveys (ITS) between 07:00 and 19:00. The weekday peak hour background traffic flows have been found to occur at:

- AM Peak (07:30 - 08:30); and
- PM Peak (16:30 and 17:30).

7.33 The junctions where traffic surveys were carried out and are within the study area are the following:

- Junction 1: Adamstown Road (R120) / Nangor Road (R134);
- Junction 2: Nangor Road (R134) / Baldonnel Road (L2001);
- Junction 3: Nangor Road (R134) / Kilcarbery Park / Profile Park;
- Junction 4: Nangor Road (R134) / Grange Castle Business Park North / Grange Castle Gold Course; and
- Junction 5: Grange Castle Road (R136) / Nangor Road (R134).

[5] Proposed Data Centres, Grange Castle Business Park South, Baldonnel, Dublin 22 Traffic Impact Assessment, prepared by CS CONSULTING GROUP for UBC Properties, May 2020

Assessment Method

Methodology

7.34 In the case of the proposed development the sensitive receptors have been considered to be pedestrians and cyclists, road users and the local highway network. The study area includes links and junctions which provide the most direct access routes to the application site and are, therefore, most likely to be affected by traffic arriving and departing the site. Any links that do not meet defined selection criteria, have not been considered as part of the study area and have been excluded from further analysis in the assessment of significance of effect section.

Assessment Scenarios

Construction Stage

7.35 The construction traffic assessment has been limited to the roads immediately adjacent to the application site and any roads further afield where the 30% increase in traffic threshold is breached. Potential construction traffic impacts from the proposed development have been assessed based upon the number of vehicle movements provided by the Project Team. The construction routing has assumed to be consistent with that proposed for both the SD20A/0121 and VA06S.308585 applications.

7.36 The assessment focuses on the most intensive year in terms of the number of construction vehicle movements, which has been considered against the 2021 Baseline. It has been assumed that the most intensive year during the construction phase in terms of vehicle movements would be 2022.

Operation Stage

7.37 The proposed development is anticipated to be completed and fully operational in 2023, when all occupants would be on-site. The assessment would consider the full quantum of development at this future year.

7.38 Estimated trip generation for the proposed development was provided for the assessment.

7.39 Trips were distributed onto the local highway network based upon the directional splits from the 2019 traffic survey data that was used in support of the SD20A/0121 and VA06S.308585 applications.

Pedestrian Severance, Delay, Amenity, Fear and Intimidation

7.40 Pedestrian severance, delay, amenity, fear and intimidation has been assessed by considering baseline traffic flows, future year traffic flows, as well as the potential impact of the proposed development in terms of change in traffic flows on each link within the study area. Consideration has been given to daily traffic flows (24-hour Annual Average Daily Traffic (AADT)) in respect of pedestrian severance, amenity, fear and intimidation for the construction stage and the operation stage.

Driver Delay

7.41 The assessment considers the duration of delays or benefits occurring to road users on the local highway network based upon the estimated increase in traffic resulting from the proposed development for the construction stage and the operation stage.

Accidents and Safety

7.42 The likely increase or decrease in the number of accidents resulting from the changes in traffic flows and composition for the construction stage and the operation stage has been considered. Personal Injury Accident (PIA) data has been obtained from the Road Safety Authority website for the five-year period 2011-2016. It should be noted that 2016 is the latest year when accident data is available.

Cumulative Stage

7.43 A review of cumulative schemes and their potential impacts on traffic flows on the local highway network has been undertaken. Predicted traffic flows generated by each of the following cumulative schemes have been considered:

- Vantage – Townlands of Ballybane and Killbride within Profile Park, Clondalkin, Dublin 22 (SA21A/0241);
- Centrica Business Solutions, Profile Park, Baldonnel, Dublin 22 (SD21A/0167);
- Digital Reality Trust - Profile Park, Baldonnel, Dublin 22, D22 TY06 (SD17A/0377);
- Equinix (Ireland) Ltd, Plot 100 Profile Park, Nangor Road, Clondalkin, Dublin 22 (SD21A/0186);
- UBC Properties - Townlands within Grange Castle South Business Park, Baldonnel, Dublin 22 (SD20A/0121);
- UBC Properties -Grange Castle South Business Park, Dublin 22 (VA06S.308585);
- Cyrus One - Grange Castle Business Park, Clondalkin, Dublin 22 (SD18A/0134);
- Cyrus One Townlands within Grange Castle South Business Park, Baldonnel, Dublin 22 (SD20A/0295 - amendment to SD18A/0134); and
- Cyrus One - Grange Castle South Business Park, Baldonnel, Dublin 22 (VA06S.309146).

7.44 All the aforementioned cumulative schemes are located in close proximity to the site.

7.45 The traffic data associated with the selected cumulative developments has been sourced from their respective Traffic Impact Assessment reports on the SDCC and ABP planning portals.

Assessment Criteria

7.46 The EPA and IEMA Guidelines were reviewed in order to identify appropriate significance criteria applicable to the assessment.

7.47 Paragraph 4.5 of the IEMA Guidelines states that: *"For many effects there are no simple rules or formulae which define thresholds of significance and there is, therefore, a need for interpretation and judgement on the part of the assessor, backed-up by data or quantified information wherever possible".*

7.48 Under EPA guidelines quality effects are described as either:

- Positive – a change which improves the quality of the environment (such as reduction of traffic, travel time or patronage, or provision of a new service, access or facility);
- Neutral – no effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error; and
- Negative – a change which reduces the quality of the environment (such as increase of traffic, travel time, patronage or loss of service or facility).

7.49 The significance of pedestrian severance, delay, amenity, fear and intimidation effects has been determined by considering future baseline traffic flows obtained from the traffic surveys, as well as the potential impact of the proposed development in terms of change in traffic flows on each link within the study area by reference to the IEMA Guidelines and applying professional judgment.

Pedestrian Severance

7.50 The IEMA Guidelines acknowledge that the measurement and prediction of severance is extremely difficult and that the correlation between the extent of severance and the physical barrier of a road is not clear. It notes that there are no predictive formulae which give simple relationships between traffic factors and levels of severance. However, the IEMA Guidelines do accept that in general, marginal changes in traffic flows are, by themselves, unlikely to create or remove severance.

7.51 Factors which need to be considered when determining severance comprise road width, traffic flows, speed of traffic, the presence of pedestrian crossing facilities and the number of pedestrian movements across the affected route.

7.52 The IEMA Guidelines suggest that:

- Changes in flow of up to 30% would produce slight changes in severance;
- Changes in flow of up to 60% would produce moderate changes in severance; and
- Changes in flow of up to 90% would produce substantial changes in severance.

7.53 It is recognised that these are guidelines only and are highly dependent on existing ambient traffic levels. They are not considered to be definitive measures of severance and should be used with care and regard paid to specific local conditions. The guidelines have been used to inform impact magnitude criteria for the assessment. Professional judgment has been applied to identify the likely scale of effects.

Pedestrian Delay

7.54 The IEMA Guidelines note that changes in the volume, composition and or speed of traffic may affect the ability of people to cross-roads. Typically, increases in traffic levels result in increased pedestrian delay, although increased pedestrian activity itself also contributes. The IEMA Guidelines do not set any thresholds for absolute or actual changes in delay, recommending instead that assessors use their judgment to determine the significance of the impact.

7.55 The IEMA Guidelines refer to a report published by the Transport Research Laboratory (TRL) as providing a useful approximation for determining pedestrian delay. The TRL research[6] concludes that the mean pedestrian delay was found to be eight seconds at flows of 1,000 vehicles per hour, and below 20 seconds at 2,000 vehicles per hour for various types of crossing condition.

7.56 A two-way flow of 1,400 vehicles per hour has been adopted as a lower threshold for assessment (equating to a mean 10 second delay for a link with no pedestrian facilities) in the TRL report. Below this flow, pedestrian delay is unlikely to be a significant factor. This is deemed a robust starting point for narrowing down the modelled routes within the study area and ensuring the routes selected exceeded the suggested threshold of analysis in IEMA Guidelines. It should be noted that for controlled forms of pedestrian crossing the pedestrian delays are less.

7.57 As a result, any road with a two-way flow of less than 1,400 vehicles is deemed to have a negligible effect. Roads above this are assessed on the basis of professional judgment.

Pedestrian Amenity

7.58 IEMA Guidelines define pedestrian amenity as the relative pleasantness of a journey and may be influenced by fear and intimidation if they are relevant. As with pedestrian delay, pedestrian amenity is considered to be affected by traffic volumes and composition along with pavement width and pedestrian activity. The IEMA Guidelines suggest that a tentative threshold for judging the significance of changes in pedestrian amenity would be where the traffic flows are halved or doubled.

7.59 The Guidelines have been used to inform impact magnitude criteria for the assessment. Professional judgment has been applied to identify the likely scale of effects.

Pedestrian Fear and Intimidation

7.60 A number of factors are considered relevant in determining changes in the level of fear and intimidation experienced by pedestrians and cyclists including volume of traffic; percentage of HGVs; speed of traffic; proximity to people; and the availability and quality of pedestrian infrastructure.

[6] Transport Research Laboratory, 1991. The Estimation of Pedestrian Numbers.

7.61 The IEMA Guidelines sets out the criteria in Table 7.1 for measuring the effects of fear and intimidation.

Table 7.1: Pedestrian Fear and Intimidation Criteria

Degree of Hazard	Average Traffic Flow over 18hr day (vehicles per hour)	Total 18-hr HGV Flow	Average Speed (mph)
Extreme	1,800+	3,000+	20+
Great	1,200–1,800	2,000–3,000	15-20
Moderate	600–1,200	1,000–2,000	10-15

7.62 The IEMA Guidelines stress the need for professional judgment when applying the above criteria. Accordingly, the guidelines have been used to inform impact magnitude criteria for the assessment. Professional judgment has been applied to identify the likely scale of effects.

Driver Delay

7.63 IEMA Guidelines note that driver delay can occur at several points on the network, although the effects are only likely to be significant when the traffic on the highway network is predicted to be at or close to the capacity of the system. Professional judgment has been applied to determine the significance of residual effects.

Accidents and Safety

7.64 There is no formal published guidance for the assessment of accidents and safety. Therefore, professional judgment has been applied to assess the implications of local circumstances and the proposed development's likely effect which may increase or decrease the risk of accidents.

Receptor Sensitivity/Value Criteria

Highway Network

7.65 The potential receptors are the users of transport networks within the relevant study area. The sensitivity of a road can be defined by the vulnerability of the user groups who are likely to use it, i.e. the elderly or children. A sensitive area may be where pedestrian activity is high, near a school, or an accident black spot. it also takes into account the existing nature of the road, i.e. an existing residential area is likely to be more sensitive than an A road.

7.66 Professional judgement has been used to define the value of receptors in accordance with LA 1047 Section 3.1.

7.67 The sensitivity of receptors has been classified as low, medium or high, in accordance with the criteria set out in Table 7.2.

Table 7.2: Receptor Sensitivity Criteria

Sensitivity	Criteria
High	Receptors of greatest sensitivity to traffic flow: schools, colleges, playgrounds, accident clusters, retirement homes, roads without footways that are used by pedestrians.
Medium	Receptors of moderate sensitivity to traffic flow: congested junctions, doctors' surgeries, hospitals, shopping areas with roadside frontage, roads with narrow footways, recreation facilities.
Low	Receptors with some sensitivity to traffic flow: places of worship, public open space, tourist attractions and residential areas with adequate footway provision.
Very Low	Receptors with very low sensitivity to traffic flows and those sufficiently distant from affected roads and junctions.

Impact Magnitude Criteria

7.68 The magnitude of impact has been classified as low, medium or high, in accordance with the criteria set out in Table 7.3.

Table 7.3: Impact Magnitude Criteria

Impact	Assessment Criteria			
	Low	Medium	High	Very High
Severance	Increase in total traffic flows of 30% or under	Increase in total traffic flows of 30% – 60%	Increase in total traffic flows of 60%-90%	Increase in total traffic flows of 90% and above
Pedestrian Severance, Delay, Amenity, Fear and Intimidation	This has been assessed on a case by case basis using professional judgement subject to the sensitivity and vulnerability of the receptor. Threshold for judging the significance of changes to pedestrian amenity where the traffic flows is halved or doubled.			
Driver Delay	This has been assessed on a case by case basis using professional judgement subject to the sensitivity and vulnerability of the receptor. Impacts are only likely to be significant when the traffic on the network surrounding the development is already at, or close to, the capacity of the system.			
Accidents and Safety	Accident data for the local area have been reviewed and professional judgement have been applied to assess the implications of potential increase/decrease in traffic.			

Scale of Effect Criteria

7.69 Impacts have been assessed on the basis of the value/sensitivity of receptors against the magnitude of impact to determine the scale of effect as presented in Table 7.4. The matrix has been informed by the EPA Guidelines.

Table 7.4: Scale of Effect Criteria

Magnitude	Sensitivity of Receptors			
	Very Low	Low	Medium	High
Low	Imperceptible	Not Significant	Slight	Slight
Medium	Not Significant	Slight	Slight	Moderate-Significant
High	Slight	Slight	Moderate-Significant	Very Significant
Very High	Slight	Moderate-Significant	Very Significant	Profound

7.70 The criteria used to assess whether an effect is significant or not, are given in the EPA Guidelines 2017, and are set out in Table 2.1 in Chapter 2: EIA Process and Methodology. The significance of effects is determined by consideration of the sensitivity of the receptor, the magnitude of impact and scale of the effect. In assessing the significance of an effect, consideration has been given to the quality, duration, probability and type of the effect, and its geographical extent, and the application of professional judgement.

[7] LA 104 Environmental assessment and monitoring, Rev 01, DMRB, July 2019

7.71 Based on professional judgement, moderate-significant, very significant and profound effects are considered **significant** in EIA terms.

7.72 Where the existing baseline HGV or total traffic flows are very minor, a small increase in vehicles would produce a large change in magnitude whereas in real terms the increase in traffic may still be considered to be negligible or slight. In these instances, appropriate professional and experienced judgements have been made.

Nature of Effect Criteria

7.73 The nature of the effect has been described as either negative, neutral or positive as follows:

- Positive – An advantageous effect to a receptor;
- Neutral – An effect that on balance, is neither positive nor negative to a receptor; or
- Negative – A detrimental effect to a receptor.

Assumptions and Limitations

7.74 The assessment has relied on 2019 traffic survey data extracted from the approved SD20A/0121 Traffic Impact Assessment; this is also consistent with the approach undertaken in the VA06S.308585 application. It has been assumed that these data sets have been reported correctly.

7.75 It has been assumed that the AM and PM peak from each cumulative scheme would occur at the same peak periods with the 2019 traffic survey data.

7.76 TEMPRO growth rates have been applied to 2019 survey data to forecast future baseline traffic data.

Baseline Conditions

Existing Baseline

7.77 The following paragraphs provide an overview of the current baseline transport and accessibility conditions within the study area considering pedestrian and cycle facilities and access; public transport accessibility; and the operation of the existing highway network. Consideration is also given to the existing baseline flows where available. This analysis provides the baseline context against which the transport movements and accessibility of the proposed development have been assessed.

Local Highway Network

7.78 The site is accessed off Profile Park which is a street-lit dual carriageway providing access to the businesses within Profile Park and forms a junction with the R134 New Nangor Road and Grange Castle Business Park. Profile Park is subject to a 50 km/hr speed limit.

7.79 The site's immediate boundaries are defined by the following:

- Falcon Avenue to the north, beyond which is undeveloped land, proposed to be developed into a Data Centre by Vantage (under planning reference SD21A/0241, subject to an additional information request from SDCC);
- Agricultural fields to the east, beyond which is Grange Castle Golf Club;
- Barnakyle Substation to the southwest and Digital Reality Profile Park to the southeast, beyond which lies Casement Aerodrome; and
- A data center development on agricultural fields to the west and Castlebaggot Substation.

7.80 Traffic data from various sources including traffic surveys commissioned in December 2019 has been used to inform the assessment and to provide baseline traffic flows. The 2021 Baseline traffic flows for the highway network are shown in Table 7.5. Unit 5.5 of the TII Project Appraisal Guidelines (Link-Based Traffic Growth Forecasting) has been used to apply growth factors to 2019 traffic data to generate the future baseline. The future baseline also includes cumulative schemes. The factors applied are:

Table 7.5: Growth Factor

Years	Growth Factor
2019-2021	A
2019-2022	1.015
2019-2023	1.020

7.81 Table 7.6 presents the baseline traffic figures 2021 AADT,% HGV and link speed limits. 2019 baseline AM and PM peak hour traffic flow and distribution diagrams are presented in Technical Appendix 7.1.

Table 7.6: 2021 Baseline Traffic Data

Location	Direction	Speed Limit/kph	2021 Baseline	
			24hr AADT	% HGV
R120 Adamstown Road (N)	SB	80	5,026	5
	NB	80	4,341	11
R134 New Nangor Road (W)	EB	40	6,397	8
	WB	40	5,269	9
R120 Adamstown Road (S)	SB	80	4,069	6
	NB	80	4,511	4
R134 New Nangor Road (E)	EB	40	5,674	8
	WB	40	5,258	9
Baldonnel Road (S)	SB	60	3,387	10
	NB	60	2,917	9
R134 New Nangor Road (W)	EB	40	6,003	8
	WB	40	5,117	10
Kilcarbery Park (N)	SB	40	1,212	19
	NB	40	1,167	26
R134 New Nangor Road (E)	EB	40	6,911	9
	WB	40	6,484	11
Profile Park	SB	50	276	20
	NB	50	248	14
R134 New Nangor Road (W)	EB	40	5,947	8
	WB	40	5,539	9
Grange Caste Business Park (N)	SB	40	2,658	11
	NB	40	2,639	11
R134 New Nangor Road (E)	EB	40	7,766	11
	WB	40	7,547	12

Table 7.6: 2021 Baseline Traffic Data				
Location	**Direction**	**Speed Limit/kph**	**2021 Baseline**	
			24hr AADT	**% HGV**
Grange Caste Business Park (S)	SB	40	125	0
	NB	40	120	0
R134 New Nangor Road (W)	EB	40	6,986	10
	WB	40	6,781	11
R136 Grange Caste Road (N)	SB	80	8,321	4
	NB	80	9,005	4
R134 New Nangor Road (E)	EB	40	7,693	7
	WB	40	6,653	7
R136 Grange Caste Road (S)	SB	80	13,127	7
	NB	80	14,302	6
R134 New Nangor Road (W)	EB	40	7,804	11
	WB	40	7,294	11

Public Transport

Bus Services

7.82 The nearest bus stops are located in both directions on the R134 Nangor Road, within 600m of the site, from which frequent routes operate between the site and Dublin city centre. The bus stops are served by three bus services, which are presented in Table 7.7.

Table 7.7: Bus Services				
Service/ Bus Stop	**Bus Route**	**Frequency (minutes)**		
		Monday	**Saturday**	**Sunday**
13	Grange Castle-Harristown	EB: 15 mins (05:50-23:30) WB: 15 mins (05:30-23:30)	EB: 15 mins (06:10-23:30) WB: 15 mins (06:10-23:30)	EB: 15 mins (07:00-23:30) WB: 15 mins (07:00-23:30)
68	Hawkins Street-Newcastle/Greenogue Business Park	EB: 60 mins (06:00-00:15) WB: approximately 60 mins (06:00-00:15)	EB: 60 mins (06:35-00:15) WB: approximately 60 mins (06:40-23:30)	EB: 75 mins (10:15-00:25) WB: 75 mins (09:00-23:30)
68X	Newcastle/Greenogue Business Park-Hawkins Street	One service at 07:30	N/A	N/A

National Rail

7.83 Clondalkin/Fonthill railway station is located at approximately 3km to the north-east of the site from which frequent commuter services operate to/from Dublin city.

7.84 Citywest Campus Luas Tram Stop is approximately 4km to the south-east of the site from which frequent tram services to Dublin city and beyond can be accessed.

Walking and Cycling Network

Pedestrians and Cyclists

7.85 The pedestrian and cycle environment in the site vicinity is of a high standard, with wide, well-lit lengths of dedicated and segregated off-road cycle and pedestrian routes.

7.86 Pedestrian and cyclist access to the proposed development would be via Profile Park where footpaths of approximately 3m are provided on both sides of the road.

7.87 Profile Park intersects with the R134 New Nangor Road at a four-arm roundabout. Pedestrian crossing facilities with dropped kerbs and tactile paving are provided an all arms of the roundabout, except the northern arm (Kilcabery Park).

7.88 A shared use footway/cycleway of approximately 5m is provided on the northern side of the R134 New Nangor Road, whilst shared foot / cycle paths of approximately 3m are present on both sides of the R136.

7.89 Signal-controlled toucan crossings with dropped kerbs and tactile paving are provided on all arms of the R134 New Nangor Road/R136.

Accident Data

7.90 All reported accidents between 2012-2016, within the locality of the application site are identified in Technical Appendix 7.2.

7.91 A summary of the accidents is presented in Table 7.8.

Table 7.8: 2012-2016 Accident Data				
Year	**Severity**			**Total Accidents**
	Slight	**Serious**	**Fatal**	
2012	1	0	0	1
2013	1	0	0	0
2014	2	0	1	3
2015	6	0	0	6
2016	4	0	0	4

7.92 One fatal accident occurred at the R134 New Nangor Road / R136 junction in 2014, with the remaining accidents within the study area reported as slight.

7.93 Most of the accidents occurred at the R134 New Nangor Road / R136 junction, with 3 slight accidents reported at the Profile Park/R134 New Nangor Road junction.

Future Baseline

7.94 The assessment has considered future years of 2022 (peak construction stage) and 2023 (fully operational year).

7.95 The proposed development would include the Kilcarbery 110kV GIS Substation, 3 no. transformer bays, and associated compound and site infrastructure.

7.96 The site would be accessed via Profile Park and during operation would have weekly inspections only. Parking would be provided within the site boundary.

Local Highway Network

7.97 The 2023 Baseline 'Do Nothing' traffic flows for the highway network are shown in Table 7.9. Future baseline also includes cumulative schemes.

Table 7.9: 2023 Baseline ('Do Nothing') Traffic Data

Location	Direction	2023 Baseline
		24hr AADT
R120 Adamstown Road (N)	SB	5,201
	NB	4,467
R134 New Nangor Road (W)	EB	6,735
	WB	5,471
R120 Adamstown Road (S)	SB	4,176
	NB	4,705
R134 New Nangor Road (E)	EB	6,017
	WB	5,504
Baldonnel Road (S)	SB	3,681
	NB	3,237
R134 New Nangor Road (W)	EB	6,169
	WB	5,212
Kilcarbery Park (N)	SB	1,224
	NB	1,178
R134 New Nangor Road (E)	EB	7,504
	WB	6,979
Profile Park	SB	555
	NB	527
R134 New Nangor Road (W)	EB	6,293
	WB	5,788
Grange Caste Business Park (N)	SB	2,684
	NB	2,665
R134 New Nangor Road (E)	EB	8,406
	WB	8,077
Grange Caste Business Park (S)	SB	127
	NB	122
R134 New Nangor Road (W)	EB	7,618
	WB	7,303
R136 Grange Caste Road (N)	SB	8,427
	NB	9,151
R134 New Nangor Road (E)	EB	7,874
	WB	6,805

Table 7.9: 2023 Baseline ('Do Nothing') Traffic Data

Location	Direction	2023 Baseline
		24hr AADT
R136 Grange Caste Road (S)	SB	13,660
	NB	14,792
R134 New Nangor Road (W)	EB	8,445
	WB	7,821

Public Transport

7.98 No public transport improvements within the study area are proposed to be implemented by 2023. Therefore, it has been assumed that the future public transport baseline in 2023 would be the same as the existing public transport baseline.

7.99 All vehicular traffic would access the site to the south via the four-arm roundabout on Profile Park which leads to a roundabout on the R134 New Nangor Road.

Walking and Cycling

7.100 No improvements to the walking and cycling facilities within the study area are proposed to be implemented by 2023.

7.101 Pedestrians and cyclists would continue to access the site via Profile Park, with pedestrian and cycle routes aligned with existing routes around the site.

Sensitive Receptors

7.102 The receptors identified as sensitive to the proposed development and which have been 'scoped-in' to the assessment are summarised in Table 7.10. These have been based on the criteria identified in Table 7.2.

Table 7.10: Summary of Sensitive Receptors

Receptor	Sensitivity
Pedestrians and Cyclists	High
Local highway network	Low
Road Users	Medium

Assessment of Effects

7.103 The following section describes the potential transport and accessibility impacts and effects which could arise as a result if the proposed development during the construction stage and the operation stage.

Construction Effects

7.104 Based on information provided by the project team it has been assumed that the daily peak construction traffic for the proposed development would comprise the following:

- 30 construction staff (60 construction staff vehicles movements);
- 10 HGVs (20 movements); and
- 30 'other' light construction vehicles (60 movements).

7.105 This results in a total daily increase of 140 vehicle movements.

Local Highway Network

7.106 The peak construction period would be in 2022 when there would be a maximum of 140 construction vehicle movements per day, as identified in Table 7.11.

Table 7.11: Maximum Daily Construction Stage Trip Generation

Period	Arrivals		Departures		Total	
	Car	HGV	Car	HGV	Arrivals	Departures
Daily	60	10	60	10	70	70

7.107 Light and heavy vehicle construction traffic has been distributed across the surrounding network in the same manner as in the previous approved SD20A/0121 application, this is also consistent with the approach undertaken in the VA06S.308585 application. Light construction traffic has been distributed based upon the 2019 traffic surveys, whilst heavy construction traffic would travel to the site from the N7 national road and from the M50 motorway orbital motorway, via the R136 and R134 regional roads, and depart along the same routes.

7.108 There are no highway links identified in Table 7.12 with an increase over 30% in construction vehicle movements.

Table 7.12:%Increase between 2022 Do Nothing and Do Something Construction Phase

Location	Direction	2022 Do Nothing	2022 Do Something	% Increase
		24hr AADT	24hr AADT	
R120 Adamstown Road (N)	SB	5,176	5,178	0
	NB	4,445	4,445	0
R134 New Nangor Road (W)	EB	6,703	6,709	0
	WB	5,444	5,444	0
R120 Adamstown Road (S)	SB	4,155	4,155	0
	NB	4,683	4,686	0
R134 New Nangor Road (E)	EB	5,988	5,994	0
	WB	5,477	5,477	0
Baldonnel Road (S)	SB	3,664	3,664	0
	NB	3,222	3,222	0
R134 New Nangor Road (W)	EB	6,138	6,145	0
	WB	5,186	5,186	0
Kilcarbery Park (N)	SB	1,218	1,218	0
	NB	1,172	1,172	0
R134 New Nangor Road (E)	EB	7,469	7,519	1
	WB	6,947	6,990	1
Profile Park	SB	553	603	9
	NB	525	575	10
R134 New Nangor Road (W)	EB	6,263	6,269	0
	WB	5,760	5,760	0
Grange Caste Business Park (N)	SB	2,671	2,671	0
	NB	2,652	2,652	0
R134 New Nangor Road (E)	EB	8,367	8,417	1
	WB	8,039	8,083	1
Grange Caste Business Park (S)	SB	126	126	0
	NB	121	121	0
R134 New Nangor Road (W)	EB	7,583	7,633	1
	WB	7,269	7,313	1
Grange Caste Road (N)	SB	8,385	8,388	0
	NB	9,106	9,113	0
R134 New Nangor Road (E)	EB	7,835	7,848	0
	WB	6,771	6,784	0
Grange Caste Road (S)	SB	13,594	13,625	0
	NB	14,720	14,748	0
R134 New Nangor Road (W)	EB	8,405	8,455	1
	WB	7,785	7,829	1

7.109 In accordance with the IEMA Guidelines, the assessment would focus on the highway network where a potential increase in traffic of greater than 30% has been identified.

7.110 Construction traffic management procedures for the construction stage are discussed in Volume 1, Chapter 5: Construction Environmental Management.

7.111 In accordance with IEMA Guidelines projected changes in traffic flows of less than 10% create no discernible environmental effect. Therefore, effects to transport and access during construction would be temporary, **imperceptible, negative** and **not significant** in EIA terms for:

- Pedestrian Severance, Delay, Amenity, Fear and Intimidation;
- Driver Delay; and
- Accidents and Safety.

Operation Effects

7.112 The proposed development access hierarchy gives precedence to walking, cycling and public transport over private vehicles. The proposed development would be focussed on people, including considered provision for people to be able to travel actively, sustainably and safety.

7.113 The proposed development would be fully operational in 2023. Any impacts from the operation of the proposed development would be permanent whilst the site remains operational although would be reversible should the site cease operation.

Proposed Development Trip Generation

7.114 There are negligible vehicle trips anticipated with the operational stage of the proposed development, with weekly site visits by two vehicles only.

Local Highway Network

Table 7.13:%Increase between 2023 Do Nothing and Do Something Operational Phase

Location	Direction	2023 Do Nothing	2023 Do Something	%Increase
		24hr AADT	24hr AADT	
R120 Adamstown Road (N)	SB	5,201	5,201	0
	NB	4,467	4,467	0
R134 New Nangor Road (W)	EB	6,735	6,735	0
	WB	5,471	5,471	0
R120 Adamstown Road (S)	SB	4,176	4,176	0
	NB	4,705	4,705	0
R134 New Nangor Road (E)	EB	6,017	6,017	0
	WB	5,504	5,504	0
Baldonnel Road (S)	SB	3,681	3,681	0
	NB	3,237	3,237	0
R134 New Nangor Road (W)	EB	6,169	6,169	0
	WB	5,212	5,212	0
Kilcarbery Park (N)	SB	1,224	1,224	0
	NB	1,178	1,178	0
R134 New Nangor Road (E)	EB	7,504	7,504	0
	WB	6,979	6,979	0
Profile Park	SB	555	555	0
	NB	527	527	0
R134 New Nangor Road (W)	EB	6,293	6,293	0
	WB	5,788	5,788	0
Grange Caste Business Park (N)	SB	2,684	2,684	0
	NB	2,665	2,665	0
R134 New Nangor Road (E)	EB	8,406	8,406	0
	WB	8,077	8,077	0
Grange Caste Business Park (S)	SB	127	127	0
	NB	122	122	0
R134 New Nangor Road (W)	EB	7,618	7,618	0
	WB	7,303	7,303	0
Grange Caste Road (N)	SB	8,427	8,427	0
	NB	9,151	9,151	0
R134 New Nangor Road (E)	EB	7,874	7,874	0
	WB	6,805	6,805	0
Grange Caste Road (S)	SB	13,660	13,660	0
	NB	14,792	14,792	0
R134 New Nangor Road (W)	EB	8,445	8,445	0
	WB	7,821	7,821	0

7.115 In accordance with the IEMA Guidelines, the assessment would focus on the highway network where a potential increase in traffic of greater than 30% has been identified. However, as a result of the two weekly vehicle trips generated by the proposed development during the operational stage, there is no change anticipated between the baseline traffic figures 2023 'Do Nothing' and 'Do Something' AADT as presented in Table 7.13. The future baseline includes background growth (including cumulative schemes).

7.116 In accordance with IEMA Guidelines projected changes in traffic flows of less than 10% create no discernible environmental effect. Therefore, effects on transport and access during operation are **imperceptible, negative** and **not significant** in EIA terms for:

- Pedestrian Severance, Delay, Amenity, Fear and Intimidation;
- Driver Delay; and
- Accidents and Safety.

7.117 All impacts from the operation of the proposed development would be permanent whilst the site remains operational, although would be reversible should the site cease operation.

Assessment of Residual Effects

Additional Mitigation

Construction Stage

7.118 No additional mitigation measures beyond the CMP would be required for the construction stage.

Operation Stage

7.119 No additional mitigation measures would be required for the operation stage.

Enhancement Measures

7.120 No additional enhancement measures would be required for the construction stage.

Construction Residual Effects

7.121 No additional mitigation would be required; therefore, the residual construction effects remain as reported in the assessment of effects section:

- Temporary **imperceptible, negative** effects for Pedestrian Severance, Delay, Amenity, Fear and Intimidation that are **not significant** in EIA terms;

- Temporary **imperceptible, negative** effects for Driver Delay that are **not significant** in EIA terms; and
- Temporary **imperceptible, negative** effects for Accidents and Safety that are **not significant** in EIA terms.

Operation Residual Effects

7.122 No additional mitigation would be required; therefore, the residual operation effects remain as reported in the assessment of effects section:

- **Imperceptible, negative** effects for Pedestrian Severance, Delay, Amenity, Fear and Intimidation that are **not significant** in EIA terms;
- **Imperceptible, negative** effects for Driver Delay that are **not significant** in EIA terms; and
- **Imperceptible, negative** effects for Accidents and Safety that are **not significant** in EIA terms.

7.123 As stated above, all impacts from the operation of the proposed development would be permanent whilst the site remains operational, although would be reversible should the site cease operation.

Summary of Residual Effects

7.124 Table 7.14 provides a tabulated summary of the outcomes of the Transport and Accessibility assessment of the proposed development. Where **significant positive** effects are likely these are highlighted in bold green and where **significant negative** effects are predicted these are highlighted in bold red.

Table 7.14 Summary of Residual Effects

Receptor	Description of Residual Effect	Additional Mitigation	Scale and Significance of Residual Effect **	Nature of Residual Effect*				
				+ -	L U	R IR	D ID	M B T St Mt Lt P**
Construction Stage								
Pedestrians	Change in pedestrian severance, delay, amenity, fear and intimidation	None	Imperceptible	-	L	R	D	T
Road users	Change in Driver delay	None	Imperceptible	-	L	R	D	T
Road users, pedestrians and cyclists	Change in accidents and safety	None	Imperceptible	-	L	R	D	T
Operation Stage								
Pedestrians	Change in pedestrian severance, delay, amenity, fear and intimidation	None	Imperceptible	-	L	R	D	P
Road Users	Change in Driver delay	None	Imperceptible	-	L	R	D	P
Road Users, Pedestrians and Cyclists	Change in accidents and safety	None	Imperceptible	-	L	R	D	P

Notes:
* - = Negative/ + = Positive / +/- = Neutral; R = Reversible, IR = Irreversible; D = Direct, ID = Indirect;

Table 7.14 Summary of Residual Effects

L= Likely, U = Unlikely; M = Momentary, B = Brief, T= Temporary, St = Short-term, Mt = Medium-term, Lt = Long-term, P = Permanent

** Imperceptible, Not Significant, Slight, Moderate, Significant, Very Significant, Profound

Cumulative Effects

Intra-Project Effects

7.125 As explained in Chapter 2: EIA Process and Methodology, intra-project cumulative effects are discussed in Volume 1, Chapter 16: Cumulative Effects.

Inter-Project Effects

7.126 Table 7.15 provides a summary of the likely cumulative effects resulting from the proposed development and the cumulative developments.

Table 7.15: Inter-Project Cumulative Effects

Cumulative Development	Construction (2022)		Operation (2023)	
	Cumulative Effects Likely?	Reason	Cumulative Effects Likely?	Reason
Vantage – Townlands of Ballybane and Killbride within Profile Park, Clondalkin, Dublin 22 (SA21A/0241)	Yes	Would overlap between construction of both developments	Yes	Construction would be ongoing during operational stage of proposed development.
Digital Reality Trust – Profile Park, Baldonnel, Dublin 22, D22 TY06 (SD17A/0377)	No	The cumulative development has already been constructed.	No	It was not possible to locate all supporting transport documents but those available indicate that the proposed amendments under this application SD17A/0377 would not generate additional traffic to the previously permitted SD12A/0002.
Centrica Business Solutions, Profile Park, Baldonnel, Dublin 22 (SD21A/0167)	Yes	Possible overlap between construction of both developments	Yes	Construction Period 2023-2025 – to be considered in operational phase
Equinix (Ireland) Ltd, Plot 100 Profile Park, Nangor Road, Clondalkin, Dublin 22 (SD21A/0186)	Yes	Possible overlap between construction of both developments	Yes	Construction Period 2023-2025 – to be considered in operational phase
UBC Properties – Townlands within	Yes	Construction traffic would overlap with the	Yes	Construction traffic would overlap with the operational

Table 7.15: Inter-Project Cumulative Effects

Cumulative Development	Construction (2022)		Operation (2023)	
	Cumulative Effects Likely?	Reason	Cumulative Effects Likely?	Reason
Grange Castle South Business Park, Baldonnel, Dublin 22 (SD20A/0121)		construction stage of the proposed development.		stage of the proposed development. Opening year of the cumulative scheme is 2028.
UBC Properties – Grange Castle South Business Park, Dublin 22 (VA06S.308585)	No	Opening year of this cumulative development is anticipated to be 2021, therefore construction stage would not overlap with the opening year of the proposed development, therefore no effects considered likely.	No	The Grange Castle South Business Park EIAR describes a very low trip generation which professional judgement indicates would result in negligible associated traffic expected on each link within the study area. The proposed Clutterland substation does not require any full-time staff to operate it on a daily basis.
Cyrus One – Grange Castle Business Park, Clondalkin, Dublin 22 (SD18A/0134)	Yes	Operation stage would overlap with the construction stage of the proposed development.	Yes	Operation stage would overlap with the opening year of the proposed development. Considered to be in close proximity to the application site.
Cyrus One Townlands within Grange Castle South Business Park, Baldonnel, Dublin 22 (SD20A/0295)	No	According to the reports the construction works should be complete. Number of trips anticipated to be generated are very low (approximately 25 HGVs between January 2021 and June 2021).	No	It was not possible to locate all supporting transport documents but those available indicate that the proposed amendments under this cumulative scheme would not generate additional traffic to the previously permitted SD18A/0134.
Cyrus One Townlands within Grange Castle South Business Park, Baldonnel, Dublin 22 (VA06S.309146)	Yes	Construction phase 2021-2022; however, due to delay in planning decision, assumed construction phase would be 2022/2023.	Yes	Construction phase 2021-2022; however, due to delay in planning decision, assumed construction phase would be 2022/2023.

Construction Cumulative Effects

7.127 The assessment undertaken includes all the cumulative schemes that overlap with the construction stage of the proposed development, as identified in Table 7.16.

7.128 The appointed construction contractor(s) and Applicant would consult neighbouring schemes on the programme and local effects of the construction works, such as pedestrian routes, for example. In addition, collaboration around the scheduling of vehicle movements would be undertaken so that if works coincide with other construction activity already taking place within the immediate vicinity of the application site, the cumulative effect of dismantling and construction traffic is considered not significant and can be minimised.

Operation Cumulative Effects

7.129 The assessment undertaken includes all the cumulative schemes that overlap with the operation stage of the proposed development and may generate additional traffic on the local highway network, as identified in Table 7.16.

7.130 Trip generation and distribution for the cumulative developments has been extracted from the supporting Traffic Impact Assessment.

7.131 Daily trip generation and distribution diagrams for the cumulative scheme and the proposed development can be found in Technical Appendix 7.3.

7.132 The traffic flows from these developments have been included within the 'Do Nothing' baseline of the assessment and are therefore considered to be not significant.

Summary of Assessment

Background

7.133 This chapter has detailed the potential Transport and Accessibility effects due to the construction stage and the operation stage of the proposed development. The assessment of the construction stage and the operation stage have been undertaken taking into account the relevant national and local guidance and regulations.

7.134 The pedestrian and cycle environment in the site vicinity is of a high standard, with wide, well-lit lengths of dedicated and segregated off-road cycle and pedestrian routes. This would allow for future employees of the application site to walk, cycle or use public transport and complete their journeys by alternatives to the private vehicle.

Construction Effects

7.135 The peak construction period would be in 2022 with a maximum of 140 construction vehicle movements per day.

7.136 In accordance with IEMA Guidelines projected changes in traffic flows of less than 10% create no discernible environmental effect.

7.137 A CMP would require construction traffic including both construction plant and material deliveries to be programmed to avoid peak traffic periods on the surrounding local and strategic road network and minimise any effect on the local highway network and road, pedestrian and cycle users. No additional mitigation would be required for the construction stage.

7.138 Therefore, it is considered that effects to transport and access during construction would be temporary, **imperceptible, negative** and **not significant** in EIA terms.

Operation Effects

7.139 The proposed development would be fully operational in 2023 and is anticipated to generate two weekly two-way vehicle trips.

7.140 In accordance with IEMA Guidelines projected changes in traffic flows of less than 10% create no discernible environmental effect.

7.141 Overall, it is considered that effects on transport and access during operation are **imperceptible**, **negative** and **not significant** in EIA terms.

7.142 No additional mitigation would be required for the operation stage.

Cumulative Effects

7.143 The cumulative effects of the proposed development, and neighbouring schemes has been considered within the traffic assessment.

7.144 Whilst there would be an increase in traffic resulting from the cumulative schemes during both the construction stage and the operation stage, overall, there are no significant effects anticipated as a result of the cumulative impacts and therefore no mitigation is proposed.

8 AIR QUALITY

Introduction

8.1 This chapter of the Environmental Impact Assessment Report (EIAR) reports on the likely significant air quality effects to arise from the construction and operation stage of the proposed development.

8.2 The chapter describes the air quality policy context; the methods used to assess the potential impacts and likely effects; the baseline conditions at and surrounding the site; the likely air quality effects taking into consideration embedded mitigation; the need for additional mitigation and enhancement; the significance of residual effects; and inter-project cumulative effects.

8.3 The potential exists for dust deposition and increased particulate matter concentrations to occur during the construction stage, as well as increased air emissions resulting from the operational phases of the proposed development. The main air pollutants of concern are dust and particulate matter with an aerodynamic diameter of less than 10 µm (PM_{10}), typically generated during construction activities, and nitrogen oxides (NOx) represented as nitrogen dioxide (NO_2) typically generated by combustion engine emissions and road traffic.

8.4 The chapter is supported by the following technical appendices in EIAR Volume 3:

- Appendix 8.1: Construction Dust Assessment Methodology

Methodology

8.5 The assessment has been informed by the following legislation, policies, and published guidance:

- International Legislation:
  - European Air Quality Framework Directive 2004/107/EC[1] and daughter Directive 2008/50/EC[2] on ambient air quality and cleaner air for Europe (CAFE), which set out a series of limit values for the protection of human health and critical levels for the protection of vegetation;
  - Directive 2010/75/EU industrial emissions (integrated pollution prevention and control)[3] known as Industrial Emissions Directive (IED);
  - Directive (EU) 2015/2193 on the limitation of emissions of certain pollutants into the air from medium combustion plants (MCPD)[4];
- National Legislation and Policy:
  - Air Pollution Act 1987[5];
  - Environmental Protection Agency Act, 1992[6];
  - Protection of The Environment Act 2003[7];
  - Air Quality Standards Regulations 2011[8] amended by the Air Quality Standards (Amendment) and Arsenic, Cadmium, Mercury, Nickel and Polycyclic Aromatic Hydrocarbons in Ambient Air (Amendment) Regulations 2016[9], which transposed the European Directive 2008/50/EC into Irish legislation;
  - European Union (Medium Combustion Plants) Regulations 2017[10] which transposed the European Directive 2015/2193 into Irish legislation;
  - The National Climate Action Plan 2021[11]
- Guidance and industry standards:
  - Institute of Air Quality Management (IAQM) guidance on the Assessment of Dust from Demolition and Construction, 2014[12];
  - Environmental Protection UK/IAQM (EPUK/IAQM) guidance on Land Use and Development Control for Air Quality, 2017[13];
  - Environmental Protection Agency (EPA) Air Dispersion Modelling from Industrial Installations Guidance Note (AG4)[14];
  - U.S. Environmental Protection Agency (USEPA) Additional Clarification Regarding Application of Appendix W Modelling Guidance for the 1-Hour National Ambient Air Quality Standard[15]; and
  - UK Environment Agency Specified generators: dispersion modelling assessment[16,17].

Assessment Scope

8.6 The assessment scope has been based on the proposed development, including embedded mitigation as described in Chapter 4: Proposed Development Description and Chapter 5: Construction Environmental Management of this Volume. The assessment has assumed implementation of the mitigation measures described in these two chapters.

Technical Scope

8.7 The assessment considers the effects of the proposed development using the methodology set out below within the context of the policy framework and baseline conditions. The assessment considers the following potential impacts and associated likely effects:

- Development works - the resulting dust impacts from construction activities and the associated effects on human health receptors and amenity, as per the IAQM Guidance on assessment of dust from construction[12]; and
- Development works - construction and operational stage traffic emission effects on human health receptors, as per the IAQM Guidance on land use and development control for air quality[13].

1 European Air Quality Directive 2004/107/EC. European Air Quality Directive 2004/107/EC of the European Parliament and of the Council of 15 December 2004 relating to arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air.

2 European Commission. Directive 2008/50/EC. Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe.

3 Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control).

4 Directive (EU) 2015/2193 of the European Parliament and of the Council of 25 November 2015 on the limitation of emissions of certain pollutants into the air from medium combustion plants.

5 Air Pollution Act, 1987. Number 6 of 1987

6 Environmental Protection Agency Act, 1992. Number 7 of 1992.

7 Protection of the Environment Act 2003. Number 27 of 2003

8 Statutory Instruments S.I. No. 180/2011 - Air Quality Standards Regulations 2011.

9 Statutory Instruments S.I. No. 659 of 2016 – Air Quality Standards (Amendment) and Arsenic, Cadmium, Mercury, Nickel and Polycyclic Aromatic Hydrocarbons in Ambient Air (Amendment) Regulations 2016.

10 Statutory Instruments S.I. No. 595/2017 - European Union (Medium Combustion Plants) Regulations 2017.

11 Government of Ireland, 2021. Climate Action Plan. Department of the Environment, Climate and Communications

12 Holman et al, 2014. IAQM Guidance on the Assessment of Dust from Demolition and Construction, Institute of Air Quality Management, London.

13 Moorcroft and Barrowcliffe. et al., 2017, Land-use Planning & Development Control: Planning for Air Quality. v1.2. Institute of Air Quality Management, London.

14 Environmental Protection Agency Office of Environment Enforcement (OEE), 2019. Air Dispersion Modelling from Industrial Installations Guidance Note (AG4).

15 USEPA, 2011. Additional Clarification Regarding Application of Appendix W Modelling Guidance for the 1-Hour National Ambient Air Quality Standard.

16 Guidance Specified generators: dispersion modelling assessment. Available at: https://www.gov.uk/guidance/specified-generators-dispersion-modelling-assessment [Accessed on 01/11/2021]

17 UK Environmental Agency. Guidance Specified generators: dispersion modelling assessment. Available at: https://consult.environment-agency.gov.uk/psc/mcp-and-sg-regulations/supporting_documents/Specified%20Generators%20Modelling%20GuidanceINTERIM%20FINAL.pdf [Accessed on 01/11/2021]

8.8 The UK EPUK/IAQM guidance is applicable to assessing the effect of changes in exposure of members of the public resulting from developments where a proposal could affect local air quality and for which no other appropriate guidance exists in Ireland, as such this guidance has been adopted. The guidance considers the proximity to an Air Quality Management Area (AQMA), which is an area likely to approach or exceed the values set by air quality objectives. The guidance provides an indicative criterion to determine the level of an air quality assessment due to road traffic flows emissions:

- A change of Light Duty Vehicles (LDVs) flows of more than 100 Average Annual Daily Traffic (AADT) within or adjacent to an Air Quality Management Area (AQMA) or more than 500 AADT elsewhere; and
- A change of Heavy-Duty Vehicles (HDVs) flows of more than 25 AADT within or adjacent to an AQMA or more than 100 AADT elsewhere.

8.9 The proposed development site and study area are not expected to approach or exceed the air quality objectives (as shown in the Baseline Conditions of this Chapter) and therefore the criteria outside an AQMA would apply to determine the significance of effects arising on local air quality due to the proposed development traffic flows.

8.10 The estimated construction stage vehicle movements for nine hours working day would result in a peak combined LGV and HGV of 140 daily trips, which consists of 60 two-way LGV and 10 two-way HGV trips. Construction works' traffic flows are not expected to exceed the threshold of 500 AADT LGV movements or the 100 AADT HGVs for a detailed modelling assessment to be necessary according to EPUK/IAQM guidance.

8.11 In addition, HGV movements would be controlled through the implementation of a CEMP as described in Volume 1, Chapter 5: Construction Environmental Management, which would be secured by means of an appropriately worded planning condition. The effects of construction related traffic emissions would be temporary, negative in nature, and not significant to slight in relation to human health (i.e. not significant in EIA terms). Accordingly, construction traffic emissions have not been considered further within this chapter.

8.12 During operation the proposed development would be unmanned and is likely to be inspected weekly by up to two personnel entering/exiting via a van. The operation stage generated traffic would be well below the EPUK/IAQM criteria. The effects of the operation stage related traffic emissions would be long-term, neutral, and not significant in EIA terms with relation to human health. Accordingly, operational stage traffic emissions have not been considered further within this chapter.

8.13 There are no protected European sites, designated under the EC Habitats Directive (92/43/EEC)[18], or National Heritage Areas (NHAs), designated under the Wildlife Acts[19], within the proposed development boundary. The nearest European sites to the Proposed Development are the Rye Water Valley/ Carton Special Area of Conservation (SAC), approximately 5.9 km north-west of the site, and Glenasmole Valley SAC, approximately 8.0 km south-east of the site. The Grand Canal proposed NHA is located approximately 2 km north of the site. The nearest protected European sites and NHAs are considered to fall outside the zone of influence of the proposed development and therefore the construction stage and operation stage air quality effects would be expected to be long-term, neutral, and imperceptible (i.e. not significant in EIA terms) and have not been considered further within this chapter.

8.14 There is a theoretical potential to impact to air quality during the operation phase, this is due to emissions released from the proposed development combustion backup generator engine. The main pollutant of concern in relation to emissions from the combustion engines is NO_2.

8.15 It is considered that the proposed development would not give rise to any odour impacts and associated effects and odour is not assessed as part of the EIAR Chapter.

Spatial Scope

8.16 The study area for the construction stage assessment is defined as up to 350 m from the site boundary for the assessment of construction dust emissions, and 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s) as per the IAQM guidance[12].

Temporal Scope

8.17 In line with EPA guidance, as outline in Volume 1, Chapter 2: EIA Process and Methodology, the duration of effects has been classified using the following: Momentary (seconds to minutes), Brief (<1 Day), Temporary (<1 Year), Short-term (1 to 7 years), Medium-term (7 to 15 years), Long-term (15 to 60 years), Permanent (>60 years).

8.18 The assessment has considered impacts arising during the construction stage which would be of expected to be temporary to short term (8 to 10 months) in nature and from the operation stage which would be expected to be long-term to permanent in nature (i.e., more than 10 years).

Baseline Characterisation Method

Desk Study

8.19 To establish baseline air quality conditions in the study area, relevant data was reviewed and assessed. Local air quality monitoring data was obtained from EPA air quality continuous monitoring network[20] and from cumulative schemes EIAR[21].

8.20 Traffic flows were provided by the project transport consultant (Ramboll) as per Volume 1, Chapter 7: Transport and Accessibility.

8.21 The cumulative air quality impacts for the cumulative developments described in Volume 1, Chapter 2: EIA Process and Methodology have been extracted from the EIARs submitted as part of the planning applications.

Field Study

8.22 No site-specific field study was undertaken at the site as the data collected from other sources was deemed to be adequate and representative of the site and local air quality conditions.

[18] https://www.npws.ie/legislation/eu-directives
[19] https://www.npws.ie/legislation/irish-law
[20] EPA, 2021, EPA Website: http://www.epa.ie/whatwedo/monitoring/air/ [Accessed on 30/06/2021]
[21] South Dublin County Council, 2021. Available at: h http://www.sdublincoco.ie/Planning/Details?p=1&r=SD21A%2F0167&regref=SD21A%2F0167 [Accessed on 04/08/2021]

Assessment Method

Methodology

8.23 The assessment has been based on the planning application drawings and plans and the development description presented in Volume 1, Chapter 4: Proposed Development Description, as well as reported in Volume 1, Chapter 5: Construction Environmental Management.

8.24 Full details of the construction stage assessment methodology are provided in Technical Appendix 8.1 in the EIAR Volume 3.

Construction Stage

8.25 During the construction stage, the main potential impacts would be dust annoyance and locally elevated concentrations of PM_{10}. These impacts have the potential to occur when dust generating activities coincide with dry, windy conditions, and where sensitive receptors are located downwind of the dust source. Separation distance is also an important factor as significant dust annoyance is usually limited to within a few hundred metres of its source. This is due to the rapid decrease in concentrations with distance from the source due to dispersion.

8.26 Likely effects associated with construction dust emissions, unlike other air borne pollutants, cannot be accurately predicted and quantified because they are highly dependent on local weather conditions and mitigation measures implemented at source. This assessment has followed the guidance published by the IAQM on the assessment of the effects of construction on air quality[12].

8.27 The guidance recommends that the risk of dust emission magnitude is combined with the sensitivity of the area surrounding the site to determine the risk of dust impacts from construction stage activities. The risk of dust arising in sufficient quantities to cause annoyance and/or health impacts is determined using four risk categories: high, medium, low, or negligible. Depending on the level of risk for each activity, appropriate mitigation is selected. Full details of the dust risk assessment methodology which includes the assessment criteria are provided in Technical Appendix 8.1 in the EIAR Volume 3.

Operation Stage

8.28 The Proposed Development would be unmanned and is likely to be inspected weekly by up to two personnel entering/exiting via a van. The operation stage generated traffic would be well below the EPUK/IAQM criteria. Operational stage traffic emissions have not been considered within this chapter.

8.29 The Proposed Development would have one backup generator located within the GIS substation; its purpose is to temporally supply power to the GIS substation. It is likely that the backup generator would only operate for a short period, with a maximum of 1-hour testing done annually to confirm its functionality. It is unlikely that any emissions associated with the backup generator would cause an impact on air quality and cause an exceedance of the AQS. An assessment of the generator emissions has not been considered further within this EIAR chapter.

Cumulative Stage

8.30 The cumulative impact scenario includes the impact of the proposed development, as outlined above, combined with emissions from nearby cumulative developments with granted permission or due to be decided, subject to availability of cumulative scheme information in the public domain. Cumulative effects have been included in this Chapter following the review the cumulative schemes EIARs submitted as part of the planning applications.

Assessment Criteria

8.31 The criteria used to assess if an effect is significant or not, is set out in subsequent sub-sections. This is determined by consideration of the sensitivity of the receptor, magnitude of impact and scale of the effect. In considering the significance of an effect, consideration has been given to the duration of the effect, the geographical extent of the effect and the application of professional judgement.

Receptor Sensitivity/Value Criteria

8.32 The sensitivity of receptors has been classified as low, medium, or high, in accordance with the criteria set out in Table 8.1.

Table 8.1: Receptor Sensitivity Criteria

Sensitivity	Criteria
Low	• The enjoyment of amenity would not reasonably be expected; or • Property would not reasonably be expected to be diminished in appearance, aesthetics, or value by soiling; or • There is transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land. • Indicative examples include playing fields, farmland (unless commercially sensitive horticultural), footpaths, short-term car parks and roads.
Medium	• Users would expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home; or • First occupants moving into residential dwellings on a large, phased housing development; or • The people or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land. • Indicative examples include parks and places of work.
High	• Users can reasonably expect enjoyment of a high level of amenity; or • The appearance, aesthetics or value of their property would be diminished by soiling; and • The people or property would reasonably be expected to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land. • Indicative examples include dwellings, museums, and other culturally important collections, medium- and long-term car parks and car showrooms.

Impact Magnitude Criteria

Construction Stage

8.33 The criteria provided in the guidance produced by the IAQM[12] was used to assess the potential risk of impacts to air quality from construction stage activity in the absence of mitigation during the construction stage of the proposed development. The methodology combines the magnitude of dust emissions together with the sensitivity of the receptor to identify low, medium, or high risk of dust impacts in the absence of mitigation for the three stages of construction: earthworks, construction and track out.

Scale of Effect Criteria

Construction Stage

8.34 The IAQM guidance recommends that no assessment of the significance of dust effects is made without mitigation in place, as mitigation is assumed to be secured by industry best practice, planning conditions, legal requirements or required by regulations. With appropriate mitigation in place, the effect of the construction stage dust emission impacts on air quality is always assessed as not significant. The purpose of the construction stage dust assessment has therefore been to identify the appropriate level of mitigation to employ.

8.35 Using the IAQM assessment methodology to identify the appropriate level of mitigation, and on the assumption that the identified mitigation measures are applied and are commensurate with the risk of potential dust impacts, the guidance indicates that that the potential for dust effects to arise during the construction stage would be at worst 'slight negative' and would be temporary in nature.

8.36 Impacts have been assessed based on the value/sensitivity of receptors against the magnitude of impact to determine the scale of effect as presented in Table 8.2.

Table 8.2: Scale of Effect Criteria

Magnitude	Sensitivity of Receptors		
	Low	**Medium**	**High**
Low	None	Imperceptible	Not Significant - Slight
Medium	None - Imperceptible	Not Significant - Slight	Moderate - Significant
High	Not Significant - Slight	Moderate - Significant	Very Significant - Profound

8.37 Based on Environmental Protection Agency's (EPA) Draft Guidelines on the information to be contained in Environment Impact Assessment Reports[22] (2017), as described in Volume 1, Chapter 2: EIA Process and Methodology, effects ranging from 'moderate' to 'profound' are considered **significant** in EIA terms.

Nature of Effect Criteria

8.38 The nature of the effect has been described as either negative, neutral, or positive as follows:

- Positive – An advantageous effect to a receptor;
- Neutral – An effect that on balance, is neither positive nor negative to a receptor; or
- Negative – A detrimental effect to a receptor.

Assumptions and Limitations

8.39 The assessment has relied on data provided by H&MV Engineering as well as data extracted from the EPA and Planning application EIAR Air Quality Assessment. It has been assumed that these data sets have been reported correctly.

Baseline Conditions

Existing Baseline

8.40 Under the Ambient Air Quality and Cleaner Air for Europe Directive (2008/50/EC), Ireland has designated four air quality zones for the purpose of air quality management and assessment[23]. In terms of air quality monitoring, the development site is within Dublin Zone A.

NO_2

8.41 Air Quality monitoring is carried out by the EPA and local authorities at Dublin Zone A urban and suburban background locations. A summary of the closest and most representative monitoring locations is presented in Table 8.3, the locations of which are shown in Figure 8.1.

Table 8.3: Measured Annual Average NO_2 Concentrations (µg/m³)

Station	Type	Distance from Site (km)	2015	2016	2017	2018	2019	5 years Average
Ballyfermot	Suburban Background	≈ 6.5	16	17	17	17	20	17
Rathmines	Urban Background	≈ 11.8	18	20	17	20	22	19
Dun Laoghaire	Suburban Background	≈ 21.1	16	19	17	19	15	17
Swords	Suburban Background	≈ 21.8	13	16	14	16	15	15
AQS			**40**					

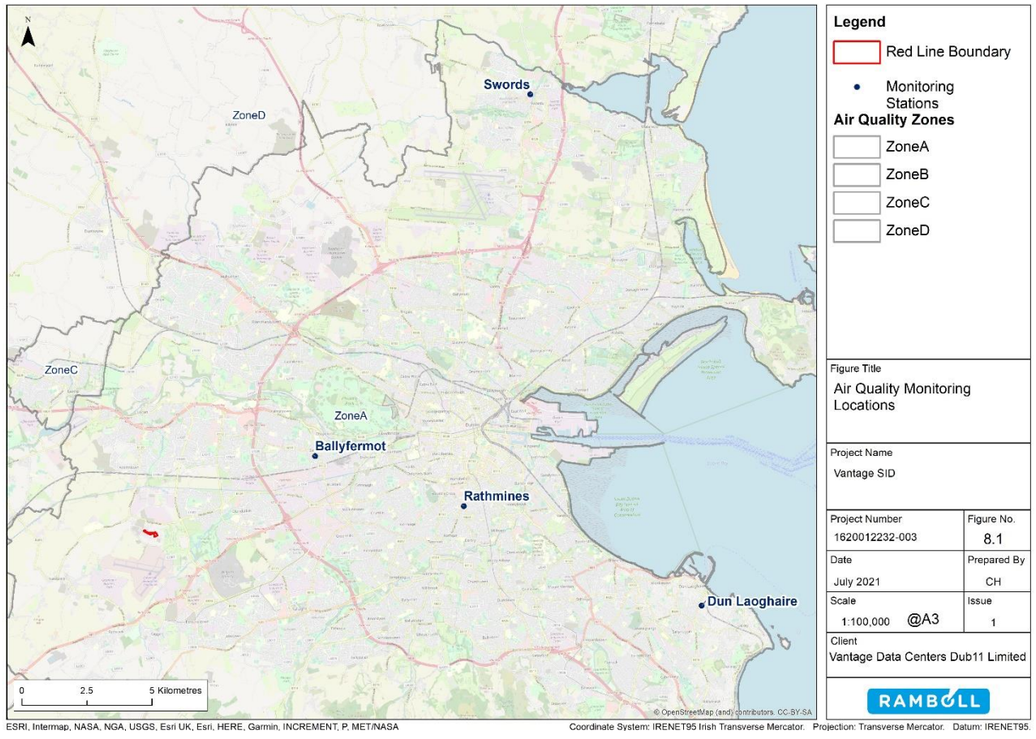


Figure 8.1: Air Quality Monitoring Locations

8.42 Measured NO_2 concentrations at the closest background automatic monitoring station to the site, Ballyfermot, have been well below the ambient AQS with an average annual mean concentration of approximately 17 µg/m³ between 2015-2019.

Particulates (PM_{10} and $PM_{2.5}$)

8.43 Measured continuous PM_{10} monitoring carried out within Dublin Zone A background locations have been well below the ambient AQS with an average annual mean concentration of approximately 15 µg/m³ in 2019.

8.44 Measured continuous $PM_{2.5}$ monitoring carried out within Dublin Zone A locations have been well below the ambient AQS with an average annual mean concentration of approximately 11 µg/m³ in 2019.

[22] Environmental Protection Agency, 2017. Draft Guidelines on the information to be contained in Environmental Impact Assessment Report (EIAR)
[23] Environment Protection Agency (2021) *Air Quality Zones.* Available at: https://airquality.ie/information/air-quality-zones (Accessed: 23/11/2021).

Assessment of Monitoring Data

8.45 Ballyfermot background station is the closest station to the site and would therefore be considered representative of the air quality within study area. Measured NO_2 and PM_{10} at Ballyfermot have been well below the relevant AQS and therefore background concentrations at the site and within the study area would be expected to be below the AQS.

8.46 Measured $PM_{2.5}$ within Dublin Zone A have been well below the relevant AQS and therefore $PM_{2.5}$ background concentrations at the site and within the study area would be expected to be below the AQS.

Sensitive Receptors

Construction

8.47 The IAQM's guidance[12] states that a Detailed Assessment is required if there are human receptors within 350 m of the site boundary and/or within 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s), or if there is an ecological receptor within 50 m of the site boundary.

8.48 The closest human receptors to construction phase works are located within 350 m of the site and are shown in Figure 8.2. A Detailed Assessment was therefore required.

8.49 There are no designated ecological sites within 350 m of the site, therefore the effect of dust on ecological receptors has been screened out. The distance boundaries for the construction phase assessment are detailed in Figure 8.2.

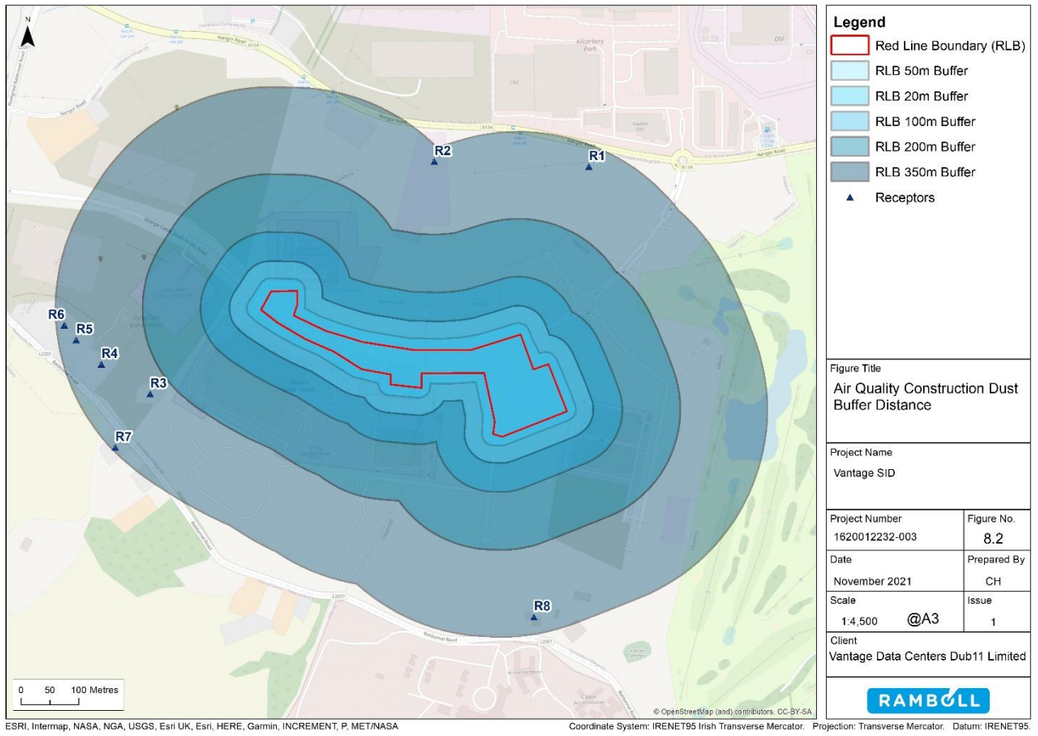


Figure 8.2: Air Quality Construction Dust Buffer Distance

Assessment of Effects

Construction Effects

8.50 The main activities with potential to cause emissions of dust construction would include:

- Earthworks and site preparation;
- Construction of building structures, including foundations;
- Materials Handling such as storage of materials in stockpiles and spillage;
- Construction of on and off-site highway improvements; and
- Hard and soft landscaping.

8.51 Dust impacts would be greatest in dry weather following long periods without rain and with the wind blowing towards sensitive receptors. Depending on wind speed and turbulence it is likely that most of the dust would be deposited within 100 m of the source. Meteorological data for Casement Aerodrome, shown in Technical Appendix 8.1 in EIAR Volume 3, suggests that prevailing winds are typically south-westerly.

8.52 The risk of potential air quality impacts from earthworks, construction and track out (the transport of dust and dirt from the application site onto the public road network) was assessed according to guidance developed by the IAQM to identify the appropriate level of mitigation.

8.53 Using the evaluation criteria within the IAQM's Guidance, the potential dust emission magnitude has been identified for each stage of the proposed development as shown in Table 8.4 based on information presented in Chapter 5: Construction Environmental Management.

Table 8.4: Dust Emission Impact Magnitude for Proposed Development Works

Activity	Dust Emission Magnitude	Justification
Demolition	N/A	There is no demolition anticipated during the construction of the development.
Earthworks	Medium	Total site area between 2,500 m^2- 10,000 m^2. With approximately 10 Heavy moving vehicles active at any one time.
Construction	Medium	The proposed development would have a total estimated construction volume of between 25,000 m^3 - 100,000 m^3.
Trackout	Low	HDV movements over the course of the worst-case phase would be up to 10 HDV movements in one day.

8.54 The closest sensitive receptors to construction activity within 350 m of the site would be residential property approximately 320m south of the site and a car show room north of the site boundary.

8.55 The next stage of the process is to define the sensitivity of the assessment area to dust soiling and human health impacts. This process combines the sensitivity of the receptor with the distance from the source to determine the overall sensitivity. The sensitivity of the area to dust impacts (considering distance to construction activity) is provided in Table 8.5.

Table 8.5: Sensitivity of Study Area to Dust Impacts

Sensitivity to Dust Soiling	Sensitivity to Human Health Impacts
Medium: 1-10 medium sensitive receptors within 20 m of the site.	Low: 1-10 sensitive receptors within 20 m of the site. Average measured PM_{10} concentrations are below 24 µg/m^3 (see Baseline Conditions section).

8.56 The dust emission magnitude determined in Table 8.4 has been combined with the sensitivity assessment in Table 8.5 to define the risk of impacts for each stage of the proposed development works in the absence of mitigation, as shown in Table 8.6.

Table 8.6: Risk of Dust Impacts in Absence of Mitigation at Proposed Development

Sensitivity of Study Area	Dust Emission Magnitude for Each Phase of Works		
	Earthworks (Medium)	Construction (Medium)	Trackout (Low)
Dust Soiling (Medium)	Medium Risk/ Not Significant - Slight	Medium Risk/ Not Significant - Slight	Negligible Risk/ Imperceptible
Human Health (Low)	Low Risk/ None - Imperceptible	Low Risk/ None - Imperceptible	Negligible Risk/ None

8.57 Therefore, using professional judgement, the overall risk of dust impacts in the absence of mitigation has been assessed as the highest resulting risk, i.e., as being **Medium Risk** in the range from None-Slight (Not Significant).

Embedded Mitigation and Standard Good Practice

8.58 The control of dust and construction traffic emissions from a construction site relies upon good site management and mitigation techniques to reduce emissions of dust and limit dispersion. A summary of the mitigation measures recommended in IAQM guidance to reduce impacts from medium risk sites is provided Table 8.6. The mitigation measures for both direct impacts and those from traffic would be detailed within the site's CEMP. It is noted that these measures have already been accounted for in Volume 1, Chapter 5: Construction Environmental Management.

Table 8.6: Dust Mitigation Measures for Medium Risk Sites

Phase	Mitigation Measure
Communications	• Develop and implement a stakeholder communications plan that includes community engagement before work commences on site • Display name and contact details of responsible person for dust issues on the site boundary (e.g., hoarding) in addition to head/regional office contact information. • Display the head or regional office contact information.
Dust Management Plan	• Develop and implement a Dust Management Plan (DMP) which is included as part of the CEMP.
Site Management	• Record all complaints and incidents in a site log. • Take appropriate measures to reduce emissions in a timely manner, and record the measures taken within the log. • Make the complaints log available to the Local Authority if requested. • Record any exceptional dust incidents on- or off-site. • Hold regular liaison meeting with other high-risk construction sites within 500 m.
Monitoring	• Undertake daily on and off-site visual inspections where there are nearby receptors. • Carry out regular inspections to ensure compliance with the DMP and record results in the site logbook. • Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.
Preparing and Maintaining the Site	• Plan site layout to locate dust generating activities as far as possible from receptors. • Use solid screens around dusty activities and around stockpiles. • Avoid site runoff of water and mud. • Fully enclose the site or specific operations where there is a high potential for dust production and the site is active for an extensive period. • Keep site fencing barriers and scaffolding clean using wet methods. • Remove dusty materials from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below • Minimise emissions from stockpiles by covering, seeding, fencing or damping down.
Operating Vehicle/ Machinery and Sustainable Travel	• Enforce an on-site speed limit of 15 mph on surfaced roads and 10 mph on unsurfaced areas. • Ensure vehicles switch off engines when stationary. • Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable. • Produce a Construction Logistics Plan (CLP) to manage the sustainable delivery of goods and materials. • Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).
Operations	• Only undertake cutting, grinding, or sawing equipment with suitable dust suppression equipment or techniques. • Ensure adequate water supply for effective dust and particulate matter suppression. • Use enclosed chutes, conveyors, and covered skips. • Minimise drop heights of materials. • Ensure suitable cleaning material is always available to clean up spills.

Table 8.6: Dust Mitigation Measures for Medium Risk Sites

Phase	Mitigation Measure
Waste Management	• Avoid bonfires. • Avoid explosive blasting using appropriate manual or mechanical techniques. • Bag and remove any biological debris.
Measures Specific to Construction	• Ensure aggregates are stored in bunded areas and are not allowed to dry out. • Avoid concrete scabbling where possible. • Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos. • For smaller supplies of fine powder materials ensure bags are sealed after use and stored appropriately to prevent dust.
Measures Specific to Trackout	• Use water-assisted dust sweepers to clean access and local roads. • Avoid dry sweeping of large areas. • Ensure vehicles entering and leaving the site are appropriately covered. • Record inspections of haul roads in site log, including any remedial action taken. • Implement a wheel washing system. • Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit. • Access gates to be located at least 10 m from the receptors where possible.
Measures Specific to Earthworks	• Re-vegetate earthworks and exposed areas / soil stockpiles to stabilise surfaces as soon as practicable. • Use Hessian, mulches or tackifiers where it is not possible to re-vegetate or cover with topsoil. • Only remove the cover in small areas during work and not all at once.

8.59 The IAQM's guidance recommends that no assessment of the significance of construction stage effects is made without mitigation in place. With the implementation of the CEMP, CLP (i.e., the measures outlined in Volume 1, Chapter 5: Construction Environmental Management), the construction dust and on-site vehicle emissions effects in the study would be **neutral**, short-term and **imperceptible** and **not significant** in EIA terms.

Assessment of Residual Effects

Additional Mitigation

Construction Stage

8.60 No significant negative effects are predicted and consequently no additional mitigation is required.

Enhancement Measures

Construction Residual Effects

8.61 With the IAQM recommended mitigation measures include within the CEMP, the residual construction effects remain as reported in the assessment of effects section i.e. **neutral,** short-term and **imperceptible** and **not significant** in EIA terms.

Summary of Residual Effects

8.62 Table 8.7 provides a tabulated summary of the outcomes of the air quality assessment of the proposed development. Where **significant positive** effects are likely these are highlighted in bold green and where **significant negative** effects are predicted these are highlighted in bold red provides a tabulated summary of the outcomes of the air quality assessment of the proposed development.

Table 8.7: Summary of Residual Air Quality Effects

Receptor	Description of Residual Effect	Additional Mitigation	Scale and Significance of Residual Effect **	Nature of Residual Effect*				
				+ -	L U	D I	R IR	M B T St Mt Lt P**
Construction								
Existing Off-site Human Health and Amenity	Dust Soiling and PM_{10} due to construction works	None required	Imperceptible	-/+	U	D	R	St
Existing Off-site Human Health	Change in NO_2, PM_{10} and $PM_{2.5}$ levels due to vehicle emissions	None required	Imperceptible	-/+	U	D	R	St

Notes:

* - = Negative/ + = Positive / +/- = Neutral; R = Reversible, IR = Irreversible; D = Direct, ID = Indirect;

L= Likely, U = Unlikely; M = Momentary, B = Brief, T= Temporary, St = Short-term, Mt = Medium-term, Lt = Long-term, P = Permanent, R = Reversible.

** Imperceptible, Not Significant, Slight, Moderate, Significant, Very Significant, Profound.

Cumulative Effects

Intra-Project Effects

8.63 As explained in Volume 1, Chapter 2: EIA Process and Methodology, intra-project cumulative effects are discussed in Volume 1, Chapter 16: Cumulative Effects.

Inter-Project Effects

8.64 A review of potential cumulative schemes has been undertaken as listed in Volume 1, Chapter 2: EIA Process and Methodology

8.65 The construction stage cumulative effects exercise has been undertaken for cumulative schemes within 35 m of the proposed development as construction stage effects of cumulative schemes beyond 350m are not expected to combine with the construction effects of the proposed development according to IAQM guidance.

8.66 Table 8.8 provides a summary of the likely cumulative effects resulting from the proposed development and the cumulative developments.

Table 8.8: Inter-Project Cumulative Effects

Cumulative Development	Construction		Operation	
	Cumulative Effects Likely?	Reason	Cumulative Effects Likely?	Reason
Vantage – townlands of Ballybane & Kilbride within Profile Park, Clondalkin, Dublin 22 [SD21A/0241]	Yes	Development is located within 50m of the site. Scheme anticipated to employ dust mitigation techniques as the proposed development.	No	Substation operation air quality effects are not significant.
Centrica Business Solutions – Profile Park, Baldonnel, Dublin 22 [SD21A/0167]	Yes	There would be a potential for overlap with the site's development works. Scheme anticipated to employ dust mitigation techniques as the proposed development.	No	Substation operation air quality effects are not significant.
Digital Reality Trust - Profile Park, Baldonnel, Dublin 22, D22 TY06 [SD17A/0377]	No	Development located beyond the 350m of the site and constructed.	No	Substation operation air quality effects are not significant.
Equinix (Ireland) Ltd – Plot 100, Profile Park, Nangor Road, Clondalkin, Dublin 22	Yes	There would be a potential for overlap with the site's development works. Scheme anticipated to employ dust mitigation techniques as the proposed development.	No	Substation operation air quality effects are not significant.

Table 8.8: Inter-Project Cumulative Effects

Cumulative Development	Construction		Operation	
	Cumulative Effects Likely?	Reason	Cumulative Effects Likely?	Reason
[SD21A/0186]				
UBC Properties - Townlands within Grange Castle South Business Park, Baldonnel, Dublin 22 [SD20A/0121]	Yes	Development is located within 300m of the site. Scheme anticipated to employ dust mitigation techniques as the proposed development.	No	Substation operation air quality effects are not significant.
Cyrus One - Grange Castle Business Park, Clondalkin, Dublin 22 [SD18A/0134]	No	Development located beyond the 350m of the site.	No	Substation operation air quality effects are not significant.
Cyrus One - Grange Castle Business Park, Clondalkin, Dublin 22 [SD20A/0295]	No	Development located beyond the 350m of the site.	No	Substation operation air quality effects are not significant.
Cyrus One - Grange Castle Business Park, Clondalkin, Dublin 22 [An Bord Pleanála VA06S.309146]	No	Development located beyond the 350m of the site.	No	Substation operation air quality effects are not significant.
Digital Reality Trust - Profile Park, Baldonnel, Dublin 22, D22 TY06 [SD17A/0377]	No	Development located beyond the 350m of the site and constructed.	No	Substation operation air quality effects are not significant.

Construction Cumulative Effects

8.67 Construction significant cumulative effects are unlikely to occur, as all cumulative developments within 350m of the site boundary are anticipated to employ similar dust mitigation techniques such that the individual construction stage effects are not significant, alone or in combination.

Operation Cumulative Effects

8.68 Operation cumulative effects are considered to be unlikely as the substation air quality effects are not significant.

Summary of Assessment

Background

8.69 This chapter has detailed the potential air quality effects due to the construction and operation stages of the proposed development. The assessment of construction and operation stages has been undertaken considering the relevant national and local guidance and regulations. Potential sources of emissions have been identified and assessed in the context of existing air quality and the nature and location of receptors.

8.70 The main air pollutants of concern are dust and particulate matter with an aerodynamic diameter of less than 10 microgram (PM_{10}), typically generated during construction activities and nitrogen dioxide (NO_2), typically generated by road traffic and combustion engines.

Construction Effects

8.71 During the construction works, there is the potential for vehicle emissions and dust emissions to arise at existing off-site human health receptors, as well as a loss of amenity at nearby existing residential and commercial properties.

8.72 The predicted annual average construction traffic flows are not expected to exceed the IAQM guidance threshold such as to require formal assessment. In addition, traffic flows would be controlled through the implementation of the CEMP. The effects of construction related traffic emissions would be temporary and not of a scale that would give rise to significant effects.

8.73 Based on criteria set out in the IAQM guidance, the construction works would present a medium risk of negative effects from dust impacts in the absence of appropriate mitigation. With the implementation of suitable mitigation measures, already incorporated within the proposed development's CEMP, it is anticipated that dust effects could be mitigated to at worst result in temporary negative, but not significant, effects at existing off-site receptors.

8.74 Overall, construction activities associated with the proposed development would result in an **imperceptible**, **negative effect** on air quality and identified receptors, and as such would **not give rise to significant** effects on air quality.

Operation Effects

8.75 The predicted annual average operation traffic flows are not expected to exceed the IAQM guidance threshold such as to require formal assessment. The effects of operation stage related traffic emissions would be long-term and **not significant** in EIA terms.

8.76 It is likely that the proposed development backup generator would only operate for a short period, with a maximum of 1-hour testing done annually to confirm its functionality. Given the short period of operation and its slightly elevated exhaust, it is unlikely that any emissions associated with the backup generator would cause an impact on air quality and cause an exceedance of the ambient AQS. No significant air quality effects are predicted with the use of the back-up generator.

Cumulative Effects

8.77 Demolition and construction stages of approved cumulative schemes within 350 m of the proposed development are not expected to combine with the construction stage of the proposed development. Significant cumulative effects are unlikely to occur as each scheme is anticipated to employ similar dust mitigation techniques such that the individual construction stage effects are not significant, alone or in combination.

8.78 Overall, no significant long term cumulative effects on air quality are anticipated as a result of the operation of the proposed development.

9 NOISE AND VIBRATION

Introduction

9.1 This chapter of the EIAR reports on the likely significant noise and vibration effects to arise from the construction stage and the operation stage of the proposed development.

9.2 The chapter describes the noise and vibration policy context; the methods used to assess the potential impacts and likely effects; the baseline conditions at and surrounding the site; the likely noise and vibration effects taking into consideration embedded mitigation; the need for additional mitigation and enhancement; the significance of residual effects; and inter-project cumulative effects.

9.3 The chapter is supported by the following technical appendices in EIAR Volume 3:

- Appendix 9.1: Acoustic Terminology; and
- Appendix 9.2: Construction Noise Calculations.

Methodology

9.4 The assessment has been informed by the following legislation, policies and published guidance:

- International Legislation:
  - EU Directive 2002/49/EC[1];
- National Legislation and Policy:
  - Environmental Noise Regulations, SI number 140 of 2006[2];
  - Environmental Protection Agency Act 1992[3];
- Regional Policy:
  - Dublin Agglomeration Environmental Noise Action Plan December 2018 to July 2023[4];
- Local Policy:
  - As Regional Policy, Volume 1 – Dublin City Council;
- National guidance and industry standards:
  - EPA Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4)[5], which refers to the following British Standards:
    - BS5228:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites[6];
    - BS6472-1:2008 for vibration effects on humans[7]; and
    - BS4142:2014+A1 2019 for industrial and commercial noise[8]

Assessment Scope

Technical Scope

Effects Assessed in Full

9.5 The technical scope of the assessment has considered the following:

- Construction noise from works being undertaken;
- Construction road traffic noise;
- Construction vibration; and
- Operational noise from plant and servicing.

9.6 In the context of this assessment, noise is defined as unwanted or undesirable sound derived from sources such as construction activities, road traffic, and building services plant. Vibration is defined as perceptible oscillations in ground and building structure transmitted from sources such as construction plant.

Effects Scoped Out

9.7 Given that the proposed development is unmanned with weekly maintenance visits by up to two staff there are no predicted significant road traffic noise, or operational vibration effects associated with the operational phase of the proposed development, therefore these elements have been scoped out of the noise and vibration assessment.

Spatial Scope

9.8 The study area incorporates the application site, existing noise-sensitive receptors (NSR) situated along the application site boundaries; as well as NSRs located at further distances from the application site boundary.

9.9 For the purposes of construction and operational noise and construction vibration impact assessments, a number of NSRs have been identified from site investigations, satellite imagery and the proposed development plans. These NSRs are considered to represent a worst case, such that other receptors located at greater distances from the application site should not experience greater noise and vibration impacts.

9.10 The existing NSRs which have been considered in the assessment are provided in Table 9.1 and indicated on Figure 9.1.

Table 9.1: NSR and Approximate Distance from the Proposed Development Phases

Receptor Ref	Receptor	Type of Receptor	Approximate Distance from Nearest Proposed Development Phase (m)
1	Detached house to northeast of application site on New Nangor Road	Residential	320

[1] Directive 2002/49/EC of the European Parliament and of the Council of 25 June 2002 relating to the assessment and management of environmental noise - Declaration by the Commission in the Conciliation Committee on the Directive relating to the assessment and management of environmental noise.
[2] Irish Statutory Instrument (S.I.) No. 140/2006 - Environmental Noise Regulations 2006.
[3] Irish Environmental Protection Agency Act, 1992.
[4] Dublin Agglomeration Noise Action Plan 2018-2023(NAP) Relating to The Assessment and Management of Environmental Noise.
[5] Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4, January 2016). EPA.
[6] British Standards Institute, 2009 + A1 2014. British Standard BS 5228: Code of Practice for Noise and Vibration Control on Construction and Open Sites. BSI.
[7] British Standards Institute, 2008. British Standard BS 6472: Part 1 Guide to evaluation of human exposure to vibration in buildings. Vibration sources other than blasting. BSI.
[8] British Standards Institute, 2014 + A1 2019. British Standard BS 4142: Methods for rating and assessing industrial and commercial sound. BSI.

Table 9.1: NSR and Approximate Distance from the Proposed Development Phases			
2	Detached house off Baldonnel Road to west of application site	Residential	600
3	Detached house off Baldonnel Road to south of application site, outside the department of defence.	Residential	320
4	Houses located south of Baldonnel Road	Residential	480

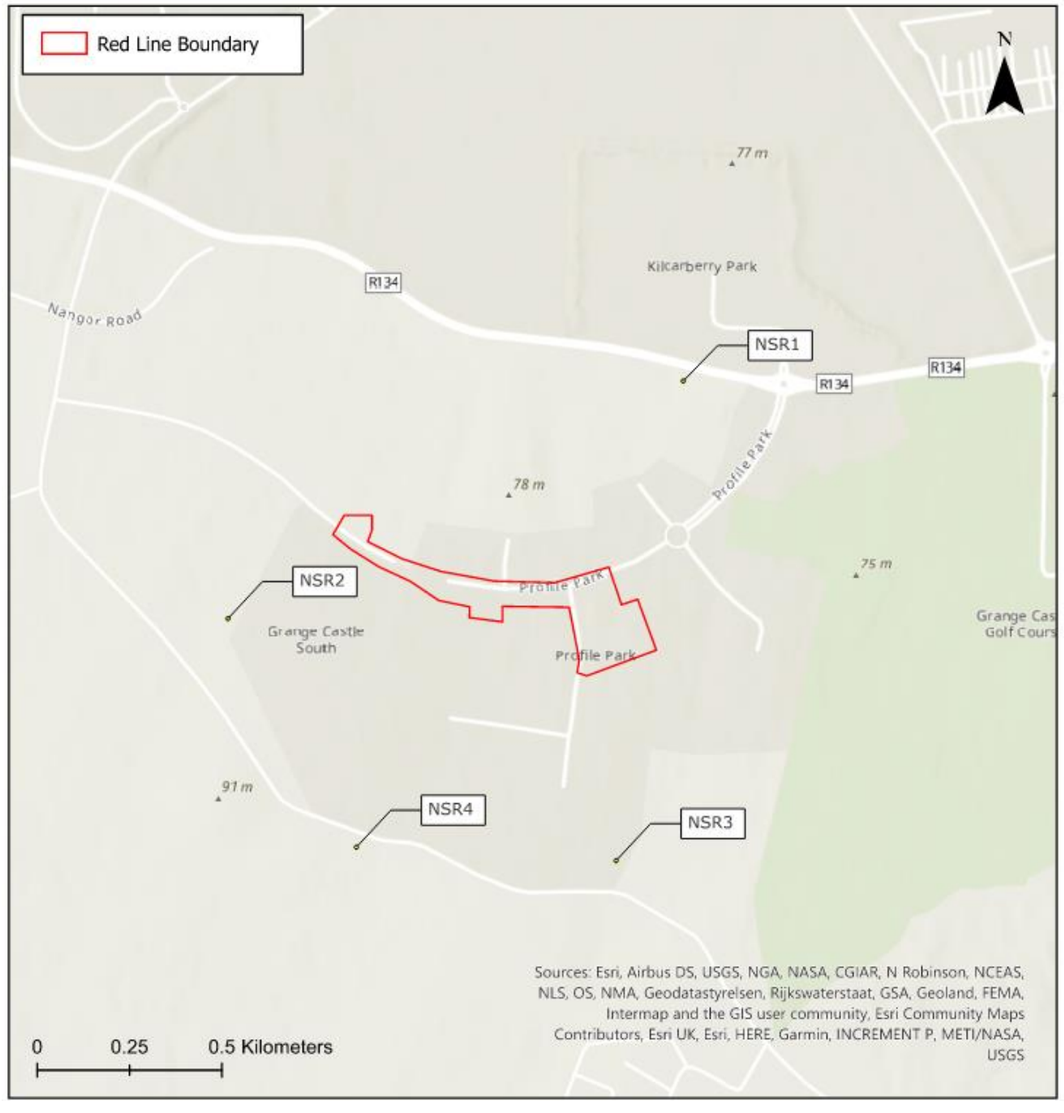


Figure 9.1: Nearest Noise Sensitive Receptors 1-4 (NSR)

Temporal Scope

9.11 In line with EPA guidance, as outline in Volume 1, Chapter 2: EIA Process and Methodology the duration of effects has been classified using the following: Momentary (seconds to minutes), Brief (<one day), Temporary (<one year), Short-term (one to seven years), Medium-term (seven to 15 years), Long-term (15 to 60 years), Permeant (>60 years). The assessment has considered impacts arising during the construction stage (eight to 10 months) which would be expected to be temporary in nature and from the operation stage which would be expected to be long-term to permanent.

Baseline Characterisation Method

Desk Study

9.12 In order to establish baseline noise and vibration conditions in the study area, relevant data was reviewed and assessed. Data was obtained from the following sources:

- Other previous planning applications in the public domain (planning portal);
- Satellite imagery;
- Architectural GAs, Sections, Elevations; and
- Manufacturer supplied noise data for proposed plant installations.

Field Study

9.13 The existing noise environment was characterised by baseline noise surveys. These were taken in and around the application site to quantify the prevailing ambient and background noise levels during the daytime and night-time periods. The ambient and background noise levels have been used to inform the assessment criteria for plant noise emissions, building envelope and ventilation strategies and construction noise effects.

9.14 The surveys were taken outside of Covid-19 lockdown measures. However, the noise levels measured on site may have been lower due to reduced traffic levels. This is not considered to affect the assessments because the use of lower background levels would form a worst-case in terms of settling plant noise emission limits.

9.15 Attended and unattended measurements have identified the major noise sources around the application site. The locations of noise measurements are detailed in Figure 9.2. LT positions were unattended monitoring positions. ST positions were attended monitoring positions.

9.16 At each measurement location, a comprehensive suite of noise level metrics was recorded. The following noise level indices are relevant to this assessment:

- $L_{Aeq,T}$ The A-weighted equivalent continuous noise level over the measurement period; and
- $L_{A90,T}$ The A-weighted noise level exceeded for 90% of the measurement period. This parameter is often used to describe background noise.

9.17 Vibration surveys were not undertaken as there are no active rail links or considerable vibration generating sources within 100m.

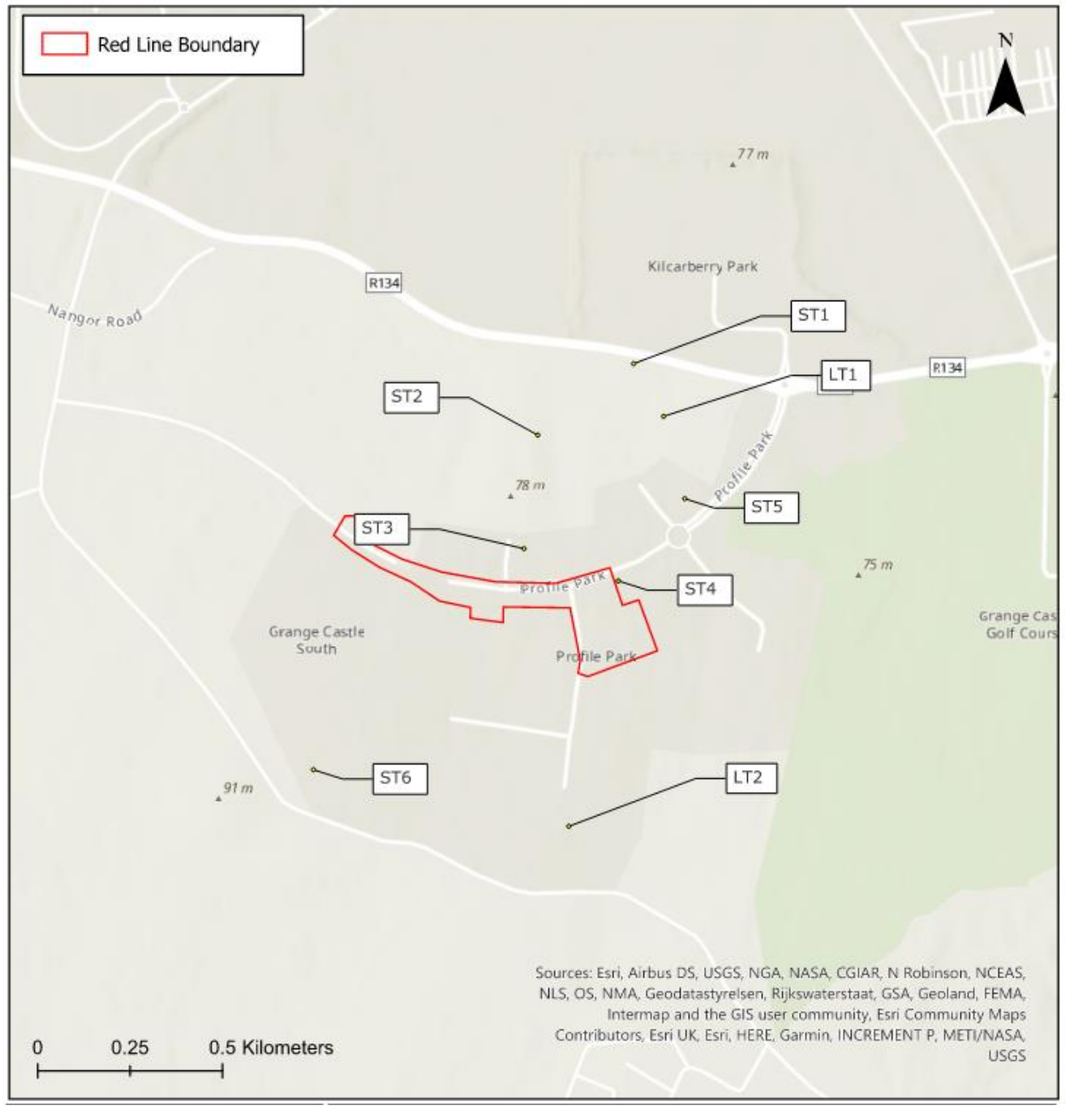


Figure 9.2: Noise Measurement Locations (LT positions were unattended monitoring positions and ST positions were attended monitoring positions)

Assessment Method

Methodology

Construction Stage

9.18 Published Guidance: BS5228:2009+A1 2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites BS5228:2009+A1 2014 gives recommendations for basic methods of noise and vibration control relating to construction work. It also provides guidance concerning methods of predicting and measuring noise and vibration and assessing their impacts on those exposed to it. The prediction method considers the noise emission level of proposed plant, the separation distance between the source and the receiver and the effect of the intervening topography and structures.

9.19 The approach adopted in BS5228:2009+A1 2014, calls for the designation of a noise sensitive location into a specific category (A, B or C) based on existing ambient noise levels in the absence of construction noise. This then sets a threshold noise value that, if exceeded at this location, indicates a significant noise impact is associated with the construction activities.

9.20 BS5228:2009+A1 2014 sets out guidance on permissible noise levels relative to the existing noise environment. Table 9.2 sets out the values which, when exceeded, signify a significant effect at the facades of residential receptors as recommended by BS5228:2009+A1 2014. These are construction noise levels only and not the cumulative noise level due to construction plus existing ambient noise.

Table 9.2: BS5228:2009+A1 2014 Assessment Categories

Assessment Category and Threshold Value Period (L_{Aeq})	**Threshold Value (in decibels (dB))**		
	Category A (A)	**Category B (B)**	**Category C (C)**
Night-time (23:00 to 07:00)	45	50	55
Evenings and weekends[D]	55	60	65
Daytime (07:00 to 19:00) and Saturdays (07:00 to 13:00)	65	70	75

Notes:

A - Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are less than these values

B - Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are the same as category A values

C - Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are higher than category A values

D - 19:00 to 23:00 weekdays, 13:00 to 23:00 Saturdays and 07:00 to 23:00 Sundays

9.21 Noise limits have been set for the purposes of the construction noise effects assuming daytime working (07:00 to 19:00). It should be noted that this assessment method is only valid for residential properties.

9.22 Part 2 of the standard gives recommendations for basic methods of vibration control relating to construction and open sites where work activities/operations generate significant vibration.

9.23 The legislative background to vibration control is described and recommendations are given regarding procedures for the establishment of effective liaison between developers, site operators and local authorities. The standard also provides guidance on measuring vibration and assessing its effects on the environment.

Construction Noise Assessment

9.24 Proposed construction works on the site would involve the use of a variety of working methods, and operations would vary across the site throughout the construction period. Therefore, noise levels from the works are likely to vary over time as the distance from the noise sources and the type of construction activity change. Note BS5228-1:2009+A1:2014 states that calculations to receivers over 300m away should be treated with caution.

9.25 The exact working methodology and plant to employed on site for the construction work have not yet been established. This level of detail would only be available post-planning when specialist contractors are engaged; therefore a realistic worst case has been assessed.

9.26 An estimate of the expected noise levels over a representative period has been prepared using typical types of plant commensurate for works of this nature, and noise emission data for plant obtained from BS5228-1:2009+A1:2014. As a 'worst case', the assessment has assumed that all plant would operate for each phase of work at a given location within the site.

9.27 Construction noise predictions have been based on the methodology contained within BS5228-1:2009+A1:2014. This enables predictions to be made of the noise emissions from the construction activities for given distances from the works.

9.28 The daytime construction noise criteria used for identifying potentially significant impacts has been identified as 65dB $L_{Aeq,10hr}$, based on the measured noise levels at the site (Category A).

9.29 The following construction stages have been considered:

- Enabling and ground works;
- Substructure;
- Superstructure;
- Internal fit-out; and
- External works.

Construction Traffic Noise Assessment

9.30 There is potential for disturbance to occur as a result of heavy goods vehicles (HGVs) travelling on the public highway. Impacts of this nature are typically more likely to occur close to the construction site access, or on sections of road that are subject to low levels of preconstruction traffic.

9.31 The HGV movements on the roads nearest the site have been considered for the purposes of identifying significant impacts. This approach has been taken because they are bounded by noise-sensitive receptors in close proximity; therefore, they provide the worst case for the assessment.

9.32 The number of HGVs attributable to the construction works would be highest during earthworks.

9.33 This assessment has been undertaken using the haul route method outlined in BS5228-1:2009+A1:2014. The maximum number of trips would be included within the CEMP.

Construction Vibration Assessment

9.34 BS5228-2:2009+A1:2014 states that for the majority of people vibration levels between 0.14 and 0.3mm/s PPV are just perceptible. A vibration level of 1.0mm/s is sufficient to cause complaint, but tolerable with prior warning; whereas a level of 10mm/s is intolerable for anything more than a very brief exposure. Vibration levels exceeding 15mm/s PPV are sufficient to result in minor cosmetic damage in light/unreinforced buildings. This magnitude of vibration is not considered likely as a result of the proposed construction activities being undertaken, and therefore an assessment of building damage has not been undertaken. No piling is proposed as part of the development.

9.35 Perceptibility of vibration is considered in the assessment.

Operation Stage

9.36 Published Guidance: BS4142:2014+A1 2019 Method for Rating Industrial Noise Affecting Mixed Residential and Industrial Areas BS4142:2014+A1 2019 provides a method for rating industrial and commercial sound and method for assessing resulting impacts upon people. The method is applicable to fixed plant installations, sound from industrial and manufacturing process and other associated activities.

9.37 The basis of BS4142:2014+A1 2019 is a comparison between the background noise level in the vicinity of residential locations and the rating level of the noise source under consideration. The relevant parameters in this instance are as follows:

- Background Level, $L_{A90,T}$: defined in the Standard as the 'A' weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, and quoted to the nearest whole number of decibels;
- Specific Level, $L_{Aeq,T}$: the equivalent continuous 'A' weighted sound pressure level produced by the specific sound source at the assessment location over a given time interval, T;
- Residual Level, $L_{Aeq,T}$: the equivalent continuous 'A' weighted sound pressure level at the assessment location in the absence of the specific sound source under consideration, over a given time interval, T; and
- Rating Level, $L_{Ar,Tr}$: the specific sound level plus any adjustment made for the characteristic features of the noise.

9.38 The standard specifies that noise measurements of one hour should be used during the day (07:00 to 23:00) and 15 minutes at night (23:00 to 07:00).

9.39 Potential impacts are predicted from the difference between the representative background level at a noise sensitive receptor and the rating level from the noise source considered. The standard suggests that the greater the excess, the greater the magnitude of impact.

9.40 In determining the significance of the impact, BS4142:2014+A1 2019 requires a consideration of the context of the assessment i.e. the nature of the existing acoustic environment and the new noise source, and the sensitivity of the affected receptors.

Operational Noise Modelling Approach

9.41 The predicted noise levels likely to be generated during the operational phase of the proposed development due to new items of fixed plant have been calculated using the proprietary noise modelling software CadnaA®. The operational noise predictions have been undertaken in accordance with the noise prediction framework set out in ISO 9613-2 'Acoustics – Attenuation of sound during propagation outdoors – Part 2 General method of calculation'.

9.42 The ISO 9613 noise prediction model assumes that individual sources act as point sources; the noise level reducing by 6dB for every doubling of distance. Noise from line sources reduce by 3dB per doubling of distance. The model takes into account the distance between the sources and the receptors and the amount of attenuation due to atmospheric absorption and ground cover.

9.43 The topography on and around the site has been modelled using topographical survey information. The acoustic ground absorbency has been modelled according to local conditions.

Cumulative Stage

9.44 For the purposes of assessing the cumulative effects, consideration has been given to all cumulative schemes that have the potential to result in a significant cumulative effect alongside the proposed development. Full details of all the cumulative schemes are given in Volume 1, Chapter 2: EIAR Process and Methodology. The baseline and assessment of significance, and the judgement of the magnitude of change stages are as above for the construction and operation stages. Only receptors for which the proposed development is predicted to result in a significant residual effect alone are included in this part of the assessment

Assessment Criteria

9.45 The criteria used to assess if an effect is significant or not, is set out in subsequent sub-sections. This is determined by consideration of the sensitivity of the receptor, magnitude of impact and scale of the effect. In considering the significance of an effect, consideration has been given to the duration of the effect, the geographical extent of the effect and the application of professional judgement.

Receptor Sensitivity/Value Criteria

9.46 The sensitivity of receptors has been classified as low, medium or high, in accordance with the criteria set out in Table 9.3.

Table 9.3: Receptor Sensitivity Criteria

Sensitivity	Criteria
Low	Industrial, commercial and retail premises

Table 9.3: Receptor Sensitivity Criteria	
Medium	Places of worship, community facilities, offices
High	Specialist vibration sensitive equipment, residential properties, education buildings, medical facilities, care homes, hotels

9.47 Table 9.4 details the distances at which certain construction activities are likely to give rise to a just perceptible level of vibration. These figures are based on historical field measurements to inform BS5228.

Table 9.4: Distances at which Vibration may just be Perceptible	
Construction Activity	**Distance from Activity (m)**
Heavy vehicles (e.g. dump trucks)	5-10
Excavation	10-15
Hydraulic breaker	15-20
Rotary bored piling	20-30
Driven piling	50-100
Continuous flight auger (CFA) piling	10-20

9.48 The distances provided in Table 9.4 have been used to assess potential vibration impacts at surrounding properties.

Impact Magnitude Criteria

Construction Noise

9.49 The magnitude of impact has been classified as low, medium or high, in accordance with the criteria set out in Table 9.5.

Table 9.5: Impact Magnitude Criteria – Construction Noise	
Magnitude of Impact	**Façade Noise Level dB(A)**
Low	<65
Medium	65-70
High	>70

Construction Vibration

9.50 NSRs located at distances equal to or greater than those provided in Table 9.4, may be subject to perceivable vibration – this would result in a low magnitude of impact. NSRs located at distances less than those provided, may experience levels of vibration which could cause complaints, i.e. a medium magnitude of impact. High magnitudes of impact are unlikely to occur.

Operational Phase Building Services Plant

9.51 Plant rating noise limits have been set following the methodology contained within BS4142:2014+A1 2019. Based on guidance from BS4142:2014+A1 2019 and noise limits defined by the EPA, the following magnitudes of impact have been used:

Table 9.6: Impact Magnitude Criteria – Operational Building Services Noise Emissions	
Magnitude of Impact	**Description**
	Noise due to the normal operation of the proposed development, shall not exceed the lesser of the following limits:
Low	• Daytime (07:00-19:00) 55dB LAr,Tr or 10dB above background • Evening (19:00-23:00) 50dB LAr,Tr or 0dB above background • Night time (23:00-07:00) 45dB LAr,Tr or 0dB above background
Medium	• Daytime (07:00-19:00) 60dB LAr,Tr or 10-15dB above background • Evening (19:00-23:00) 55dB LAr,Tr or 0-5dB above background • Night time (23:00-07:00) 50dB LAr,Tr or 0-5dB above background
High	• Daytime (07:00-19:00) 65dB LAr,Tr or > 15dB above background • Evening (19:00-23:00) 60dB LAr,Tr or > 5dB above background • Night time (23:00-07:00) 55dB LAr,Tr or > 5dB above background

Operational Phase Emergency Plant

9.52 A back-up emergency generator would be provided as part of the proposed development. The generator would only operate in a situation where there is a failure in the electricity supply from the national grid and for routine testing. Routine testing would be conducted during regular weekday daytime periods only.

9.53 Section 4.4.1 of the Environmental Protection Agency (EPA) document "Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities" (NG4 - 2016) 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'.

9.54 With reference to other developments in the area, it is noted that an emergency noise emissions limit of 55dB $L_{Aeq,1hr}$ is generally applied at nearby noise sensitive receptors. On this basis, the following magnitudes of impact have been adopted for this assessment:

Table 9.7: Impact Magnitude Criteria – Operational Emergency Services Noise Emissions	
Magnitude of Impact	**Description**
	Noise due to emergency plant operation at the proposed development, shall not exceed the lesser of the following limits
Low	55-60dB $L_{Aeq,1hr}$
Medium	60-65dB $L_{Aeq,1hr}$
High	>65dB $L_{Aeq,1hr}$

Scale of Effect Criteria

9.55 Impacts have been assessed on the basis of the value/sensitivity of receptors against the magnitude of impact to determine the scale of effect as presented in Table 9.8.

9.56

Table 9.8: Scale of Effect Criteria			
Magnitude	**Sensitivity of Receptors**		
	Low	**Medium**	**High**
Low	Imperceptible	Imperceptible – Not Significant	Not Significant - Slight
Medium	Imperceptible – Not Significant	Not Significant - Slight	Moderate - Significant
High	Not Significant - Slight	Moderate - Significant	Very Significant - Profound

9.57 Based on Environmental Protection Agency's (EPA) Draft Guidelines on the information to be contained in Environment Impact Assessment Reports (2017), as described in Volume 1, Chapter 2: EIA Process and Methodology, and based on professional judgement, effects ranging from 'moderate' to 'profound' are considered **significant** in EIA terms.

9.58 In determining the significance of reported effects, consideration has been given to the characteristic, duration, probability, type and nature of the effect, as defined in Volume 1, Chapter 2: EIA Process and Methodology.

Assumptions and Limitations

9.59 The following assumptions and limitations apply to the assessments contained within this Chapter:

- The assessment has relied on data provided by H&MV. It has been assumed that these data sets have been reported correctly;
- The measured baseline climate is a sample of the current noise climate at the application site and is representative of activities occurring during the surveys;
- A number of assumptions have been made to inform the appraisal of construction stage impacts, such as the techniques used to construct the buildings, the type of plant being used, the number of plant items operating, and the running time throughout the day. The assumptions provide a worst-case assessment;
- The construction phasing strategy for the application site has been set out in Volume 1, Chapter 5: Construction Environmental Management and has been used to assess potential impacts; and
- Noise from externally mounted or terminating plant is not expected to be tonal or intermittent at the receptors due to distance attenuation and masking by ambient noise. The spectral sound data does not indicate any strong tonal properties to the noise.

Approach to Assessment

9.60 The assessment of noise and vibration impacts has been undertaken using the detailed masterplan layouts and general arrangement (GA) plans/sections/elevations that have been prepared for the application site.

Baseline Conditions

Existing Baseline

9.61 The existing noise climate across the application site varies with location. The northern portion of the site generally experiences higher levels of noise due to the influence of the surrounding road network and other commercial/industrial uses. Elsewhere, the noise levels in central part and southern portion of the site are influenced more by other industrial uses and aircraft movements from the nearby Casement Aerodrome.

9.62 A summary of the noise measurements at each position is provided below. The typical $L_{A90,T}$ values have been derived from statistical analysis in line with BS4142:2014+A1 2019.

Table 9.9: Summary of Noise Measurements at Monitoring Position LT1			
Measurement Period	**Time Period**	**Log Average $L_{Aeq,T}$**	**Typical $L_{A90,T}$ dB**
25/06/2021 to 02/07/2021	Daytime (07:00-19:00)	53	46
	Evening (19:00-23:00)	50	44
	Night time (23:00-07:00)	47	42

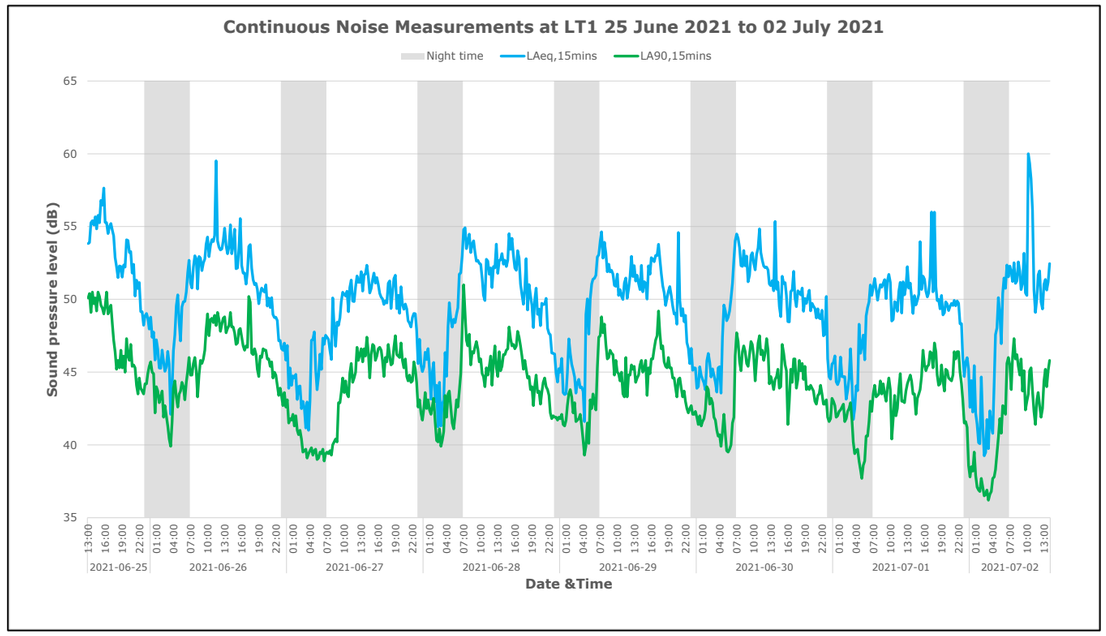


Figure 9.3: Continuous Noise Measurements at LT1

9.63 It is evident from the survey data recorded at LT1 that the noise levels did not vary significantly throughout the duration of the survey. The dominant noise sources were road traffic noise, aeroplanes and helicopters and more distant noise from other industrial land uses.

Table 9.10: Summary of Noise Measurements at Monitoring Position LT2			
Measurement Period	**Time Period**	**Log Average $L_{Aeq,T}$**	**Typical $L_{A90,T}$ dB**
25/06/2021 to 02/07/2021	Daytime (07:00-19:00)	47	42
	Evening (19:00-23:00)	45	40
	Night time (23:00-07:00)	42	38

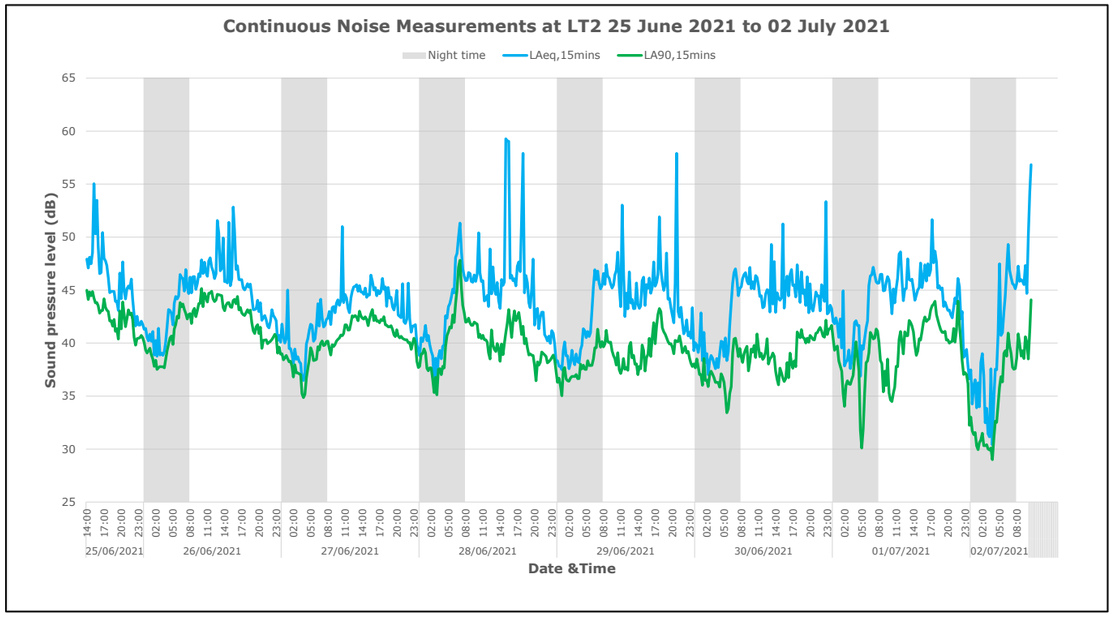


Figure 9.4: Continuous Noise Measurements at LT2

9.64 The noise climate at LT2 during the survey was dominated by road traffic noise and aircraft movements from the department of defence/Casement Aerodrome. Distant plant noise from the Google Data Center Campus was also audible at this position.

Table 9.11: Summary of Noise Measurements at Monitoring Position ST1

Date of Measurement	Time	$L_{Aeq,15mins}$ dB	$L_{A90,15mins}$ dB
23/06/2021	23:17	54	40
24/06/2021	00:28	48	39
	01:33	45	37
02/07/2021	11:14	67	46
	13:31	69	49
	16:58	69	51

9.65 The noise climate at STI was dominated by road traffic noise during the daytime, with occasional planes and helicopters also contributary. Other sources included cyclists in the cycle lane along New Nagor Road and birdsong. During the night time, road traffic noise was reduced with only one car approximately every 30 mins. Humming from nearby industrial units was more clearly audible during the night time measurements.

Table 9.12: Summary of Noise Measurements at Monitoring Position ST2

Date of Measurement	Time	$L_{Aeq,15mins}$ dB	$L_{A90,15mins}$ dB
23/06/2021	23:39	38	33
24/06/2021	00:48	38	34
	01:54	36	34
02/07/2021	11:35	45	39
	13:52	49	43
	17:19	44	40

9.66 During the daytime the noise climate at ST2 was dominated by distant road traffic noise and the nearby car garage workshop (hammering, banging, and cars idling). During the night time, the noise climate was dominated by distant road traffic noise.

Table 9.13: Summary of Noise Measurements at Monitoring Position ST3

Date of Measurement	Time	$L_{Aeq,15mins}$ dB	$L_{A90,15mins}$ dB
24/06/2021	00:05	39	35
	01:13	40	37
	02:11	39	36
02/07/2021	13:11	46	44
	15:41	44	41
	16:38	45	40

9.67 During the daytime the noise climate at ST3 was dominated by distant road traffic noise and the occasional aircraft noise as noted for ST1 above. Some nearby construction noise was also noted. During the night time, humming from other data centers was more audible, along with faunal clicks in nearby trees.

Table 9.14: Summary of Noise Measurements at Monitoring Position ST4

Date of Measurement	Time	$L_{Aeq,15mins}$ dB	$L_{A90,15mins}$ dB
24/06/2021	00:52	41	39
	23:43	41	38
	01:53	41	39
02/07/2021	12:52	46	43
	15:22	44	42
	16:20	50	42

9.68 During the daytime the noise climate at ST4 was dominated by road traffic noise and overheard aircraft movements. Other distant sources included a lorry reversing, a car alarm and fan exhaust noise from the Google Data Center. During the night time, road traffic noise was more distant with the 'hum' from Google's plant more audible.

Table 9.15: Summary of Noise Measurements at Monitoring Position ST5

Date of Measurement	Time	$L_{Aeq,15mins}$ dB	$L_{A90,15mins}$ dB
23/06/2021	23:22	49	39
24/06/2021	00:31	39	37
	01:35	39	36
02/07/2021	12:32	41	39
	15:01	41	37
	16:01	46	41

9.69 The noise climate at ST5 was similar to that at ST4, with the loudest industrial noise contributions coming buildings located to the north of New Nangor Road. During the night time, it was noted that contributions from Digital Realty's Data Center were more audible.

Table 9.16: Summary of Noise Measurements at Monitoring Position ST6

Date of Measurement	Time	$L_{Aeq,15mins}$ dB	$L_{A90,15mins}$ dB
24/06/2021	00:06	34	33
	01:13	50	32
	02:15	36	33
02/07/2021	11:59	64	43
	14:38	64	39
	17:44	65	39

9.70 The noise climate at ST6 in the daytime was dominated by road traffic noise, vehicles accessing the 'Junior Genius' creche, and children playing in the nearby gardens. During the night time, no local vehicle movements were noted except for the measurement at 01:13 when an articulated lorry passed the measurement position. Otherwise, plant noise from the Google Data Center dominated the noise climate during the night time.

9.71 A summary of the weather conditions during the survey period is provided below (as measured at monitoring position LT2):

Table 9.17: Summary of Weather Conditions During Monitoring Period

Average Wind Direction	Average Wind Speed (m/s)	Average Ambient Temperature (°C)	Average Pressure (bar)	Average Precipitation (mm)
Southeast	1.3	14.1	1009.6	0.0

Future Baseline

9.72 The future baseline of the site and study area would be the continued construction of phases of the business parks across the area defined by the South Dublin County Council Development Plan 2016-22 under use zoning Objective EE.

9.73 If any new development of a data center (or other) were proposed, an assessment of the potential noise and vibration effects on the surrounding receptors would need to be considered.

9.74 The existing baseline has been used to form the basis of the noise and vibration assessment as this provides a reasonable worst-case.

Assessment of Effects

9.75 The assessment of effects has taken account of the following embedded mitigation.

Embedded Mitigation

Construction

9.76 Standard best practice controls and measures, as detailed below, would be adopted onsite to ensure that noise management forms an integral part of the contractor's scope of works.

Construction Environmental Management Plan

9.77 A CEMP would be prepared that defines construction mitigation measures to be adopted to minimise noise and vibration emissions at surrounding sensitive receptors. This would be updated as the project progresses to incorporate specific measures for all phases of the construction works where noise and vibration may give rise to disturbance.

9.78 The CEMP would include the following Best Available Techniques (BAT):

- Use of plant conforming with relevant Irish standards, directives or recommendations on noise or vibration;
- Works would only be carried out within agreed working hours. Restricted working hours (including Monday-Friday: 07:00-19:00, Saturday: 08:00-13:00, and no working on Sundays or Bank Holidays). Planning of working hours to take account of the effects of noise and vibration upon persons in areas surrounding site operations and upon persons working onsite;
- Construction plant would be maintained in good condition with regards to minimising noise output and workers exposed to harmful noise and vibration;
- All drivers to site, including deliveries, would drive vehicles in a considerate manner in accordance with the specified speed limits with any failure to comply addressed as per infringements of the contractor's Project Health and Safety Plan;
- Construction plant would be operated and maintained appropriately, having regard to the manufacturer's written recommendations and maintenance programmes;
- Starting-up plant and vehicles sequentially rather than all together. Plant, equipment and site vehicles would be switched off when not in use;
- Construction traffic would only use the designated routes as per the construction traffic management plan as outlined in Chapter 5: Construction Environmental Management;
- The transport of construction materials, spoil and personnel would be programmed and routed to reduce the risk of increased noise and vibration impacts;
- Adoption of quiet working methods, using plant with lower noise emissions where reasonably practicable;
- Use of silenced and well-maintained plant conforming with the relevant Irish directives relating to noise and vibration. Vehicle and mechanical plant used for the purpose of the works would be fitted with effective exhaust silencers and/or mufflers, maintained in good working order and operated in such a manner as to minimise noise emissions;
- Construction plant and activities would be positioned to minimise noise at sensitive locations;
- Equipment that breaks concrete by munching or similar, rather than by percussion, would be used as far as is practicable;
- Mufflers would be used on pneumatic tools;
- Avoiding breaking out hard surfaces using percussive techniques, where reasonably practicable. Where practicable, rotary drills actuated by hydraulic or electrical power would be used for excavating hard materials;
- Adoption of working methods that minimise vibration generation, where reasonably practicable;
- Locating plant away from noise and vibration sensitive receptors, where feasible;
- Use of site hoarding, assumed 2.4m high, and acoustic screening for static items of plant and work areas, where feasible;
- Avoiding unnecessary revving of engines and switch off equipment, when not required;
- Keeping internal haul routes well maintained and avoid steep gradients;
- Use of rubber linings for chutes and dumpers to reduce impact noise;
- Minimisation of drop height of materials;
- Carrying out regular inspections of noise mitigation measures to ensure integrity is maintained at all times;
- Providing briefings for all site-based personnel so that noise and vibration issues are understood, and mitigation measures are adhered to;

- Management of plant movement to take account of surrounding noise sensitive receptors, as far as is reasonably practicable; and
- Carrying out compliance monitoring of onsite noise and vibration levels to ensure that the agreed limits are being adhered to.

9.79 An appropriate community awareness campaign would be undertaken to provide information to people residing in properties in the vicinity of the construction works, to reduce the likelihood of negative impacts on the public which could result in complaints. The level of engagement would vary depending upon the expected effects experienced by individual receptors due to the construction works.

9.80 It is envisaged that the public awareness campaign would provide local residents with the following items of information:

- The nature of the works being undertaken;
- The expected duration of the works;
- The contractor's working hours;
- Mitigation measures that have been adopted to minimise noise and vibration, as detailed in the CEMP; and
- Contact details in the event of a noise disturbance.

9.81 If work is required to extend into periods beyond the agreed hours, separate authorisation would be secured with the relevant authority via the CEMP or other agreement process.

9.82 BAT as defined in Section 7 of the Protection of the Environment Act would be implemented as part of the working methodology as detailed in the CEMP. This would serve to minimise the noise and vibration effects at receptors in the vicinity of the construction works. The reduction in noise levels provided through the implementation of BAT varies depending on the nature of the works; however, values in excess of 5dB can be expected through a combination of appropriate measures and the use of site hoardings for noise screening.

Operational

9.83 For operational phase processes and locations, reference should be made to the phasing plan details and drawings included in Volume 1, Chapter 4: Proposed Development Description.

Transformers

9.84 3no. transformers would be located in the northern compound. A sound power of 106dB L_w has been assumed per transformer, in the model.

Emergency Generators

9.85 One FG Wilson P50-3_50Hz emergency generator, with CAL Modular Acoustic Enclosure 30 – 220KVA, or equivalent, would be included. This would be located inside the GIS substation with louvres in the façade to provide fresh air. This has been included in the model as a point source at the position of the louvre with sound power of 83dB L_w (this is considered conservative, as the noise level at the louvre would be lower due to distance and louvre attenuation losses).

Construction Effects

Construction Noise

9.86 Reference should be made to Appendix 9.2 for details of the construction noise calculation that has been used to inform this summary.

9.87 Table 9.18 presents the mitigated noise levels (dBA) at various distances from the construction activities taking place at the site. A +3dB building façade correction factor has been applied in accordance with BS5528:2009+A1 2014.

Table 9.18: Construction Noise Assessment Results (dB L_{Aeq}) (façade levels)

Activity	NSR1 (New Nangor Road)	NSR2 (Baldonnel Road)	NSR3 (Baldonnel Road)	NSR4 (Baldonnel Road)
Minimum separating distance	340m	600m	380m	480m
Enabling works	47	42	46	44
Substructure	48	44	47	45
Superstructure	41	36	40	38
Internal fit-out	38	33	37	35
External works	45	40	44	42

9.88 The noise levels at the identified noise sensitive receptors are not predicted to exceed the threshold criteria as demonstrated by the above table.

9.89 On the basis of the predicted mitigated noise levels and distances to receptors, the construction works are predicted to give rise to noise levels that would constitute a direct temporary to short-term **slight, negative** effect i.e. **not significant** in EIA terms.

Construction Traffic Noise

9.90 The assessment has calculated a maximum number of trips per hour to not exceed the construction noise limit (65dB L_{Aeq}).

9.91 Based on a (80dBA at 10m) 44t lorry travelling at 34 kph, the peak permissible number of HGV vehicle movements passing a receptor at 5m has been assessed as 8 per hour, or 4 return journeys per hour. On this basis the predicted construction traffic noise level would be calculated as 64.7dB L_{Aeq}. This would constitute a direct temporary to short-term **slight, negative** effect i.e. **not significant** in EIA terms.

9.92 Notwithstanding this, the management of construction vehicle movements would form an integral part of the CEMP.

Construction Vibration

9.93 With reference to Table 9.4 and the distances to surrounding NSRs throughout the various phases of the work, there is potential that construction induced vibration may be perceptible. The activities that are most likely to give rise to just perceptible levels of vibration are some earthworks activities. This would constitute a medium level of impact, prior to application of the embedded mitigation. With application of BAT within the CEMP, it is expected that the magnitude of impact would be low.

9.94 This constitutes a direct temporary to short-term **slight, negative** effect i.e. **not significant** in EIA terms.

Operation Effects

Building Services Plant

Noise Emission Limits

9.95 The specifications for fixed plant installations serving the proposed development have been based on the following noise limits, which have been set in accordance with BS4142:2014+A 2019 and local requirements.

9.96 Limits are set at 1m from the window of the nearest NSRs and include a façade reflection.

Table 9.19: Noise Emissions Limits for New Building Services Plant				
NSR Ref	**Time Period**	**Representative Background Noise Level $L_{A90,15min}$ (dB)**	**Rating Noise Limit $L_{Ar,Tr}$ (dB)**	**Emergency Noise Limit $L_{Aeq,1hr}$ (dB)**
1	Daytime (07:00-19:00)	46	≤56	55
	Evening (19:00-23:00)	44	≤44	55
	Night-time (23:00-07:00)	42	≤42	55
2-4	Daytime (07:00-19:00)	42	≤52	55
	Evening (19:00-23:00)	40	≤40	55
	Night-time (23:00-07:00)	38	≤38	55

9.97 The proposed development is expected to run 24 hours a day, seven days a week, therefore the assessment has taken into account the noise emission limits during night time only (for normal operation).

Modelled Sound Levels – Normal Operations

9.98 In order to quantify the levels of environmental noise affecting the surrounding NSRs, noise levels have been predicted using the computer noise propagation model, the proposed building constructions, proposed screens and barriers and proposed fixed plant installations, inclusive of any embedded mitigation measures as outlined in this assessment.

9.99 An extract of the noise model is shown in Figure 9.5.

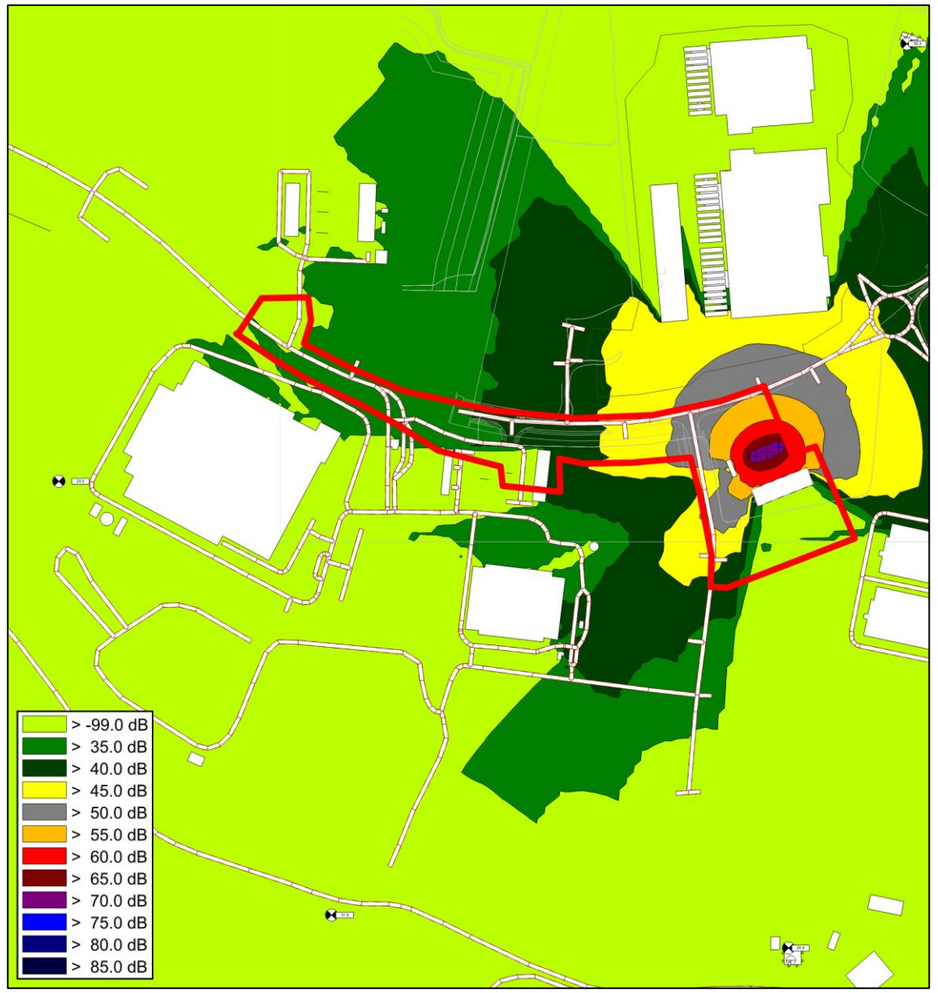


Figure 9.5: Overview of Modelled Noise Emissions (dBA during daytime and night time - grid set at 4.0AGL)

9.100 The worst-case predicted noise levels at each NSR location are presented below in Table 9.20.

Table 9.20: Predicted Normal Operational Building Services Noise at NSR		
NSR Ref	**Rating Noise Limit $L_{Ar,Tr}$ (dB)**	**Predicted Rating Noise Level $L_{Ar,Tr}$ (dB)**
1	42	35
2	38	23
3	38	20
4	38	31

9.101 The above table shows the predicted noise rating levels at NSRs meet the required limits. This constitutes a direct permanent long-term to permanent **slight, negative** effect i.e. **not significant** in EIA terms.

Modelled Sound Levels – Emergency Condition

9.102 An extract of the noise model showing the calculated noise levels during the emergency condition is shown in Figure 9.6.

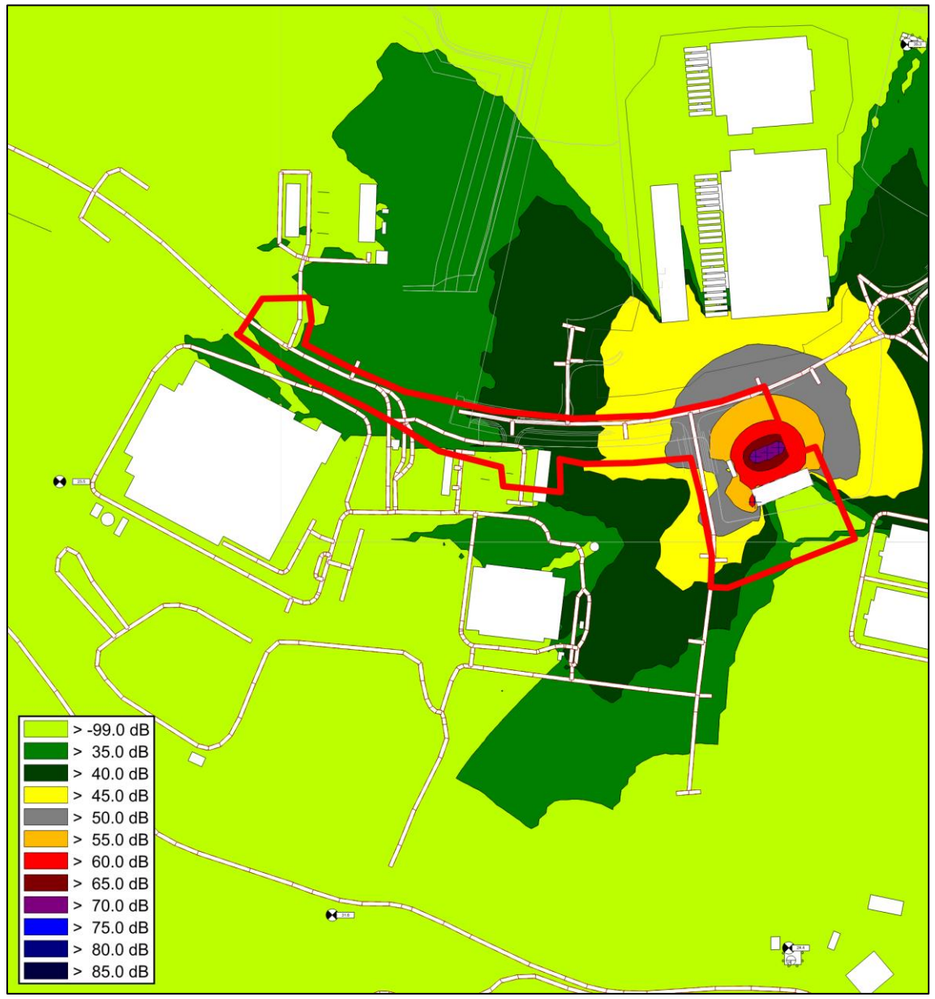


Figure 9.6: Overview of Modelled Emergency Noise Emissions (grid set at 4.0AGL)

9.103 The predicted noise levels at each NSR location for the emergency scenario are presented below in Table 9.21.

Table 9.21: Predicted Emergency Operational Building Services Noise at NSR

NSR Ref	Emergency Noise Guideline Limit $L_{Aeq,1hr}$ (dB)	Predicted Emergency Noise Level $L_{Aeq,1hr}$ (dB)
1	55	35
2	55	24
3	55	24
4	55	32

9.104 The above table shows that for the emergency scenario, the predicted noise rating levels constitute a direct temporary **imperceptible, negative** effect i.e. **not significant** in EIA terms.

Assessment of Residual Effects

Additional Mitigation

Construction Stage

9.105 No significant effects are identified therefore no additional mitigation is proposed.

9.106 The CEMP would include provision for monitoring to see that construction phase noise levels do not exceed thresholds above which significant effects may occur. Any complaints would be recorded and addressed with additional mitigation considered as appropriate.

Operation Stage

9.107 No significant effects are identified therefore no additional mitigation is proposed.

9.108 It is expected that compliance with the adopted criteria for plant noise emissions can be achieved through use of a suitably worded planning condition.

9.109 Noise and vibration monitoring has not been proposed during the operational phase of the proposed development.

Enhancement Measures

9.110 No enhancement measures are proposed in respect of noise and vibration.

Construction Residual Effects

9.111 As no additional mitigation would be required, the residual construction effects remain as reported in the assessment of effects section:

- Direct temporary to short-term **slight, negative** (**not significant** in EIA terms) effect for construction noise;
- Direct temporary to short-term **slight, negative** (**not significant** in EIA terms) effect for construction traffic noise; and
- Direct temporary to short-term **slight, negative** (**not significant** in EIA terms) effect for construction vibration.

Operation Residual Effects

9.112 As not additional mitigation would be required, the residual operation effects remain as reported in the assessment of effects section:

- Direct permanent long-term to permanent **slight, negative** (**not significant** in EIA terms) effect for normal operation; and
- Direct temporary **imperceptible, negative** (**not significant** in EIA terms) effect with emergency kit running.

Summary of Residual Effects

9.113 Table 9.22 provides a tabulated summary of the outcomes of the noise and vibration assessment of the proposed development.

Table 9.22: Summary of Residual Noise and Vibration Effects

Receptor	Description of Residual Effect	Additional Mitigation	Scale and Significance of Residual Effect **	Nature of Residual Effect*				
				+ -	L U	D I	R IR	M B T St Mt Lt P**
Construction								
Local Residents	Construction noise	None required	Slight	-	L	D	IR	T to St
Local Residents	Construction traffic noise	None required	Slight	-	L	D	IR	T to St
Local Residents	Construction vibration	None required	Slight	-	L	D	IR	T to St
Operation								
Local Residents	Plant noise emissions from normal operation	None required	Slight	-	L	D	IR	Lt to P
Local Residents	Plant noise emissions + emergency kit	None required	Imperceptible	-	L	D	IR	T

Notes:
* - = Negative/ + = Positive / +/- = Neutral; R = Reversible, IR = Irreversible; D = Direct, ID = Indirect;
L= Likely, U = Unlikely; M = Momentary, B = Brief, T= Temporary, St = Short-term, Mt = Medium-term, Lt = Long-term, P = Permanent, R = Reversible
** Imperceptible, Not Significant, Slight, Moderate, Significant, Very Significant, Profound

Cumulative Effects

Intra-Project Effects

9.114 As explained in Chapter 2: EIA Process and Methodology, intra-project cumulative effects are discussed in Chapter 16: Cumulative Effects.

Inter-Project Effects

9.115 Table 9.23 provides a summary of the likely cumulative effects resulting from the proposed development and the cumulative developments.

Table 9.23: Inter-Project Cumulative Effects

Cumulative Development	Construction		Operation	
	Cumulative Effects Likely?	Reason	Cumulative Effects Likely?	Reason
Vantage – townlands of Ballybane & Kilbride within	No	As construction periods overlap, there is potential for cumulative effects to occur. However, given the distance of the application site from the identified receptors	No	Both schemes are considered in combination to achieve the same noise emission limit.
Profile Park, Clondalkin, Dublin 22		it is considered that construction noise levels would be sufficiently attenuated below the construction noise levels associated with the Vantage Site, and therefore are not considered significant		
Centrica Business Solutions – Profile Park, Baldonnel, Dublin 22 [SD21A/0167]	No	As construction periods overlap, there is potential for cumulative effects to occur. However, given the distance of the Centrica site from the identified receptors it is considered that construction noise levels would be sufficiently attenuated below the construction noise levels associated with the Application Site, and therefore are not considered significant	No	Application site emissions calculated to be up to 35dBA at nearest receptors and Centrica site has been designed to 45dBA emissions limit. Worst-case 1dB cumulative level expected which is not significant.
Digital Reality Trust - Profile Park, Baldonnel, Dublin 22, D22 TY06 [SD17A/0377]	No	Already constructed	No	Operational noise included within the baseline characterisation for the application site.
Equinix (Ireland) Ltd, Plot 100, Profile Park, Nangor Road, Clondalkin, Dublin 22 [SD21A/0186]	No	As construction periods overlap, there is potential for cumulative effects to occur. However, given the distance of the Application site from the identified receptors it is considered that construction noise levels would be sufficiently attenuated below the construction noise levels associated with the Equinix Site, and therefore are not considered significant	No	Application site emissions calculated to be up to 35dB $L_{Ar,Tr}$ at nearest receptors and Equinix site has been designed to 45dB $L_{Ar,Tr}$ emissions limit. Worst-case 0dB cumulative level expected which is not significant.
UBC Properties - Townlands within Grange Castle South Business Park, Baldonnel, Dublin 22 [SD20A/0121]	No	As construction periods overlap, there is potential for cumulative effects to occur. However, given the distance of the UBC site from the identified receptors it is considered that construction noise levels would be sufficiently attenuated below the construction noise levels associated with the Application	No	Application site emissions calculated to be up to 35dB $L_{Ar,Tr}$ at nearest receptors and UBC Properties site has been designed to 45dB $L_{Ar,Tr}$ emissions limit. Worst-case 0dB cumulative level

Table 9.23: Inter-Project Cumulative Effects

Cumulative Development	Construction		Operation	
	Cumulative Effects Likely?	Reason	Cumulative Effects Likely?	Reason
		Site, and therefore are not considered significant.		expected which is not significant.
UBC Properties - Grange Castle South Business Park, Dublin 22 [An Bord Pleanála Ref 308585]	No		No	Application site emissions calculated to be up to 35dB $L_{Ar,Tr}$ at nearest receptors and UBC Properties site has been designed to 45dB $L_{Ar,Tr}$ emissions limit. Worst-case 0dB cumulative level expected which is not significant.
Cyrus One - Grange Castle Business Park, Clondalkin, Dublin 22 [SD18A/0134]	No	Already constructed	No	Operational noise included within the baseline characterisation for the application site.
Cyrus One Townlands within Grange Castle South Business Park, Baldonnel, Dublin 22 [SD20A/0295]	No	Already constructed	No	Operational noise included within the baseline characterisation for the application site.
Cyrus One - Grange Castle South Business Park, Baldonnel, Dublin 22 [An Bord Pleanála Ref 309146]	No	Construction phases do not overlap and therefore no effects considered likely	No	Application site emissions calculated to be up to 35dB $L_{Ar,Tr}$ at nearest receptors and Cyrus site has been designed to 45dB $L_{Ar,Tr}$ emissions limit. Worst-case 0dB cumulative level expected which is not significant.

9.116 On the basis of the above table, the background noise levels are likely to increase as a result of the committed developments shown. The baseline characterisation undertaken for the application site would have therefore been undertaken when background levels were lower and, as such, the noise emissions limits set out in this assessment are likely to be significantly below future baseline noise levels.

9.117 In the event of a power failure from the national grid, cumulative impacts would be expected from emergency plant from each development. However, these would be expected to be brief in nature and therefore not considered significant in EIA terms.

Summary of Assessment

Background

9.118 This chapter has detailed the potential noise and vibration effects due to the construction and operation stages of the proposed development. The assessment of has taken into account the relevant national and local guidance and regulations.

9.119 Attended and unattended noise monitoring surveys were undertaken to establish the existing noise climate across the application site. The existing baseline noise climate is generally dominated by road traffic noise and noise from fixed plant installations associated with other industrial activity in the nearby vicinity (data centers). The results of the noise surveys have been used to assess construction and operation effects attributable to the application site.

Construction Effects

9.120 The assessment of noise and vibration during the construction phase was undertaken in accordance with BS5228:2009+A1:2014, using representative data for the various phases of the works. The assessment has considered the following phases of construction:

- Enabling and ground works;
- Substructure;
- Superstructure;
- Internal fit-out; and
- External works.

9.121 An assessment of construction traffic noise has also been undertaken to calculate the number of HGV movements permissible per hour, along with consideration of the distance at which perceptible levels of vibration may occur from construction activities.

9.122 With the adoption of a CEMP and BAT implemented as part of the construction stage embedded mitigation, it is considered that the noise and vibration impacts can be controlled sufficiently to achieve acceptable levels at the surrounding sensitive receptors.

9.123 Overall, it is considered that the construction of the proposed development would result in direct temporary to short-term **slight**, **negative** effects for the identified receptors, and as such would **not give rise to significant effects** in EIA terms.

Operation Effects

9.124 The proposed development would be designed to achieve the noise emission limits as stipulated by the relevant authority, which requires that the rating noise level does not exceed the representative background noise level, set in accordance with the principles of BS4142:2014+A1 2019. The effects of noise emissions from proposed fixed items of plant have been considered for normal operation of the proposed development, along with consideration of emergency conditions in the event of the proposed development losing grid power. On the basis of the proposed design, noise emissions are predicted to meet the prescribed limits at the nearest noise sensitive receptors.

9.125 Overall, it is considered that the operation stage would result in a direct long-term to permanent, **slight, negative,** effect, and as such would **not give rise to significant** effects in EIA terms for noise and vibration. During emergency conditions, there would be direct temporary **slight**, **negative** (**not significant**) noise effects.

Cumulative Effects

9.126 The proposed development has the potential to result in cumulative effects when considered in combination with other committed developments. However, the proposed development has been

designed to lower noise emissions levels than other committed developments. As such it is expected that the future baseline noise levels would be higher, irrespective of whether this development went ahead. As such, cumulative effects are not considered significant.

10 WATER RESOURCES AND FLOOD RISK

Introduction

10.1 This chapter of the EIAR reports on the likely significant water resources and flood risk effects to arise from the construction stage and the operation stage of the proposed development.

10.2 The chapter describes the water resources and flood risk policy context; the methods used to assess the potential impacts and likely effects; the baseline conditions at and surrounding the site; the likely water resources and flood risk effects taking into consideration embedded mitigation; the need for additional mitigation and enhancement; the significance of residual effects; and inter-project cumulative effects.

10.3 The chapter is supported by the following technical appendices in EIAR Volume 3:

- Technical Appendix 10.1: Clifton Scannell Emerson Associates Ltd, Engineering Planning Report - Drainage & Water Services, RPT-21_115-002;
- Technical Appendix 10.2: Clifton Scannell Emerson Associates Ltd, Flood Risk Assessment, RPT-21_21_115-001.

Methodology

10.4 The assessment has been informed by the following legislation, policies and published guidance:

- International Legislation:
  - Water Framework Directive (WFD) (2000/60/EC)[1];
  - Environmental Quality Standards (EQS) Directive (2008/105/EC)[2] (as amended)[3];
  - Priority Substances Directive (2008/105/EC)[4];
  - Directive 2014/52/EU. The assessment of the effects of certain public and private projects on the environment[5];
- National Legislation and Policy:
  - Planning and Development Act, 2000, Updated to 16 July 20216;
  - The Planning System and Flood Risk Management, Guidelines for Planning Authorities[7];
  - Department of Housing, Local Government and Heritage's Guidelines for Planning Authorities and An Board Pleanála on carrying out Environmental Impact Assessment (2018)[8];
  - Guidelines on Procedures for the Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (National Roads Authority (NRA), 2009)[9];
- Regional Policy:
  - South Dublin City Council (2005) Greater Dublin Strategic Drainage Study (GDSDS): Technical Documents of Regional Drainage Policies. Dublin: Dublin City Council[10];
  - Greater Dublin Regional Code of Practice for Drainage Works: Version Draft 6.0[11];
- National Guidance and Industry Standards:
  - Requirements for the Protection of Fisheries Habitat During Construction and Development Works at River Sites (Eastern Regional Fisheries Board (ERFB)[12];
  - Inland Fisheries Ireland, 2016, Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters[13];
  - Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors[14]; and
  - Institute of Geologists Ireland (2013): Guidelines for Preparation of Soils, Geology & Hydrogeology Chapters in Environmental Impact Statements[15].

Assessment Scope

10.5 Volume 1, Chapter 2: EIA Process and Methodology explains the assessment methodology used throughout this EIAR. The assessment in this chapter is a qualitative one, and the evaluation of significance and effect is ultimately a matter of professional judgement.

10.6 This assessment has taken account of applicable legislation, guidance, and policy.

Technical Scope

10.7 The assessment of the potential impacts and likely effects of the proposed development on water resources and flood risk has considered the following:

- Contamination of controlled waters (surface water or groundwater) arising from construction works and associated drainage;
- Tidal or fluvial flood risk, both in terms of impacts to the proposed development and changes to flood risk in the study areas or to downstream receptors as a result of the proposed development;
- Changes to the surface water runoff regime and associated downstream flood risks;
- Regular discharge of surface water, during operational use, and the associated effects on the water quality of the downstream receiving waterbodies;
- Changes to local hydrogeology; and
- Demand of the local potable water network and on foul drainage infrastructure.

[1] European Union, 2000. Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy. Document 32000L0060.

[2] European Union, 2008. Directive 2008/105/EC of the European Parliament and of the Council of 16 December 2008 on environmental quality standards in the field of water policy, amending and subsequently repealing Council Directives 82/176/EEC, 83/513/EEC, 84/156/EEC, 84/491/EEC, 86/280/EEC and amending Directive 2000/60/EC of the European Parliament and of the Council. Document 32008L0105.

[3] European Union, 2013. Directive 2013/39/EU of the European Parliament and of the Council of 12 August 2013 amending Directives 2000/60/EC and 2008/105/EC as regards priority substances in the field of water policy Text with EEA relevance. Document 32013L0039.

[4] European Union, 2008. Directive 2008/105/EC of the European Parliament and of the Council of 16 December 2008 on environmental quality standards in the field of water policy, amending and subsequently repealing Council Directives 82/176/EEC, 83/513/EEC, 84/156/EEC, 84/491/EEC, 86/280/EEC and amending Directive 2000/60/EC of the European Parliament and of the Council. Document 32008L0105.

[5] European Union, 2014. Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment.

[6] Government of Ireland, 2000. Planning and Development Act, Updated to 16 July 2021.

[7] Department of the Environment, Heritage and Local Government (DoEHLG) and the Office of Public Works (OPW), 2009. The Planning System and Flood Risk Management, Guidelines for Planning Authorities.

[8] Government of Ireland, 2019. Guidelines for Planning Authorities and An Bord Pleanala om carrying out Environmental Impact Assessment 2018 (last updated 19 December 2019).

[9] National Roads Authority (NRA), 2009. Guidelines on Procedures for the Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes. NRA.

[10] Drainage Dublin, 2005. Greater Dublin Strategic Drainage Study Final Strategy Report.

[11] Wicklow County Council, South Dublin County Council, Meath County Council, Kildare County Council, Fingal County Council, Dún Laoghaire-Rathdown County Council & Dublin City Council. Greater Dublin Regional Code of Practice V6.0.

[12] Eastern Regional Fisheries Board, Fisheries Protection Guidelines. Requirements for the Protection of Fisheries Habitat during Construction and Development Works at River Sites.

[13] Inland Fisheries Ireland, 2016, Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters.

[14] CIRIA, 2001. Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors, CIRIA 532, 2001.

[15] Institute of Geologists of Ireland, Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements.

Spatial Scope

10.8 In the absence of published guidance, the study area has been defined based on professional judgment as that within a 1km radius of the site boundary as it is considered unlikely that effects would extend beyond such a geographic area. However, surface water and groundwater quality are often assessed at a river catchment level. Therefore, the potential for impacts on downstream water quality has been considered at a river catchment level.

Temporal Scope

10.9 In line with EPA guidance, as outline in Volume 1, Chapter 2: EIA Process and Methodology the duration of effects has been classified using the following: Momentary (seconds to minutes), Brief (<one day), Temporary (<one year), Short-term (one to seven years), Medium-term (seven to 15 years), Long-term (15 to 60 years), Permanent (>60 years). The assessment has considered impacts arising during the construction stage (eight to 10 months) which would be expected to be temporary to short-term in nature and from the operation stage which would be expected to be long-term to permanent.

Baseline Characterisation Method

Desk Study

10.10 In order to establish baseline water resources and flood risk conditions in the study area, relevant data was reviewed and assessed. Data was obtained from the following sources:

- Clifton Scannell Emerson Associates Ltd, Flood Risk Assessment, RPT-21_21_115-001 (Technical Appendix 10.1);
- Clifton Scannell Emerson Associates Ltd, Engineering Planning Report - Drainage & Water Services, RPT-21_115-002 (Technical Appendix 10.2);
- Environmental Protection Agency (EPA) Online Environmental Mapping and Spatial Data[16];
- Office of Public Works (OPW) flood mapping data[17] (www.floodinfo.ie);
- Relevant Eastern Catchment Flood Risk Assessment and Management (CFRAM) Flood Reports; and
- Strategic Flood Risk Assessment for South Dublin County Council[18].

Field Study

10.11 Field study/data collection was not required at the site as the data provided by other sources was deemed to be adequate and representative of the site conditions.

Assessment Method

Methodology

Construction Stage

10.12 The identification of likely significant effects during the construction stage was based on a review of the presence of potential receptors, a qualitative assessment of the sensitivity of the receptors, the identification of potential impact pathways, and an assessment of the magnitude of the potential impacts.

10.13 The assessment of potential impacts and likely effects has, therefore, comprised the following approach:

- Identification and establishment of the sensitivity of water resource receptors on the basis of their use, proximity to the site, existing quality or resource value;
- Consideration of potential source-pathway-receptor' linkages;
- Evaluation of the magnitude of potential impacts to water quality and hydrology as a result of the introduction of the proposed development;
- Consideration of embedded mitigation measures integral to the proposed development;
- Classification of the significance of likely effects;
- Identification of additional mitigation measures to eliminate or reduce adverse effects, where considered necessary; and
- Re-assessment to conclude the significance of residual effects.

Operation Stage

10.14 The construction stage methodology has been applied to the identification of potential significant effects during the operation stage. The assessment has also been informed by the Engineering Planning Strategy and the Flood Risk Assessment (see Technical Appendices 10.1 and 10.2), which have been undertaken in order to assess in more detail the flood risk and to inform the design of the proposed development, and associated mitigation strategies, in order to minimise any increase in flood risk to both on-site and off-site receptors and to the proposed development itself.

Cumulative Stage

10.15 The potential for cumulative impacts to arise from the combined effects of a number of existing or proposed developments in combination with the proposed development, on water resources and flood risk have been considered.

Assessment Criteria

10.16 The criteria used to assess if an effect is significant or not, is set out in subsequent sub-sections. This is determined by consideration of the sensitivity of the receptor, magnitude of impact and scale of the effect. In considering the significance of an effect, consideration has been given to the duration of the effect, the geographical extent of the effect and the application of professional judgement.

Receptor Sensitivity/Value Criteria

10.17 The sensitivity of receptors has been classified as low, medium or high, in accordance with the criteria set out in Table 10.1.

Table 10.1: Receptor Sensitivity Criteria

Sensitivity	Criteria
Low	Feature of low quality and rarity, with potential for substitution or tolerant of some change: • Surface water quality classified by EPA as A3 waters or seriously polluted; • Heavily engineered or artificially modified watercourses; • No surface water abstractions for public or private water supplies; and • GSI groundwater vulnerability "Low" to "Medium" classification and "Poor" aquifer importance.
Medium	Feature of medium quality and rarity, with some potential for replacement and reasonably tolerant of some change: • Surface water quality classified by EPA as A2; • Salmonid species may be present in the watercourse which may be locally important for fisheries; • Abstractions for private water supplies; and • GSI groundwater vulnerability "High" classification and "Locally" important aquifer.

[16] The EPA Geoportal Website (available at https://gis.epa.ie).

[17] OPWs national flood information portal, providing location specific access to flood risk and flood management information (available at https://www.floodinfo.ie/).

[18] RPS, 2016. Strategic Flood Risk Assessment for South Dublin County Council Development Plan 2016-2022.

Table 10.1: Receptor Sensitivity Criteria	
High	Feature of high quality and rarity, or with limited potential for replacement and highly sensitive to some change e.g.: • Receptor is of high environmental importance or of national or international value i.e. NHA or SAC; • Surface water quality classified by EPA as A1 and salmonid spawning grounds present; • Abstractions for public drinking water supply; and • GSI groundwater vulnerability "Extreme" classification and "Regionally" important aquifer.

Impact Magnitude Criteria

10.18 The magnitude of impact has been classified as negligible, low, medium, or high, in accordance with the criteria set out in Table 10.2.

Table 10.2: Impact Magnitude Criteria	
Magnitude of Impact	**Criteria**
Negligible	No perceptible alteration/change in the quality or quantity of controlled waters and/or to the physical or biological characteristics of surface waters and associated flood risk.
Low	Small alteration/change in the quality or quantity of controlled waters and/or to the physical or biological characteristics of surface waters and associated flood risk.
Medium	Medium alteration/change in the quality or quantity of controlled waters and/or to the physical or biological characteristics of surface waters and associated flood risk.
High	Large alteration/change in the quality or quantity of controlled waters and/or to the physical or biological characteristics of surface waters and associated flood risk.

Scale of Effect Criteria

10.19 Impacts have been assessed on the basis of the value/sensitivity of receptors against the magnitude of impact to determine the scale of effect as presented in Table 10.3.

Table 10.3: Scale of Effect Criteria			
Magnitude	**Sensitivity of Receptors**		
	Low	**Medium**	**High**
Negligible	Imperceptible	Imperceptible	Not Significant - Slight
Low	Imperceptible	Not Significant - Slight	Moderate
Medium	Not Significant	Moderate	Significant
High	Slight	Significant	Very Significant - Profound

10.20 Based on Environmental Protection Agency's (EPA) Draft Guidelines on the information to be contained in Environment Impact Assessment Reports[19] (2017), as described in Volume 1, Chapter 2: EIA Process and Methodology. The significance of effects is determined by consideration of the sensitivity of the receptor, the magnitude of impact and scale of the effect. In assessing the significance of an effect, consideration has been given to the quality, duration, probability and type of the effect, and its geographical extent, and the application of professional judgement.

10.21 Based on professional judgement, an effect is considered slight if it could alter the character of the environment but in a manner that is consistent with existing and emerging baseline trends. A moderate, significant or very significant/profound effect would, by its character, magnitude, duration, or intensity alter a sensitive aspect of the environment or, in the case of very significant and profound, most of a sensitive aspect of the environment. 'Moderate', 'significant' or 'very significant/profound' effects are considered **significant** in EIA terms.

10.22 In assessing the significance of an effect, consideration has been given to the quality, duration, probability and type of the effect, and its geographical extent, and the application of professional judgement. Further details are set out in Volume 1, Chapter 2: EIA Process and Methodology.

Assumptions and Limitations

10.23 The assessment has relied on data included within the Engineering Planning Strategy and Flood Risk Assessment (Technical Appendices 10.1 and 10.2) as well as publicly available data reported via the EPA online Environmental Mapping and Spatial Data Service and the OPW online Flood Mapping. It has been assumed that these data sets have been reported correctly.

Baseline Conditions

Existing Baseline

Existing Site

10.24 The site is an irregular parcel of land, extending to approximately 3.19 ha in area and is predominately occupied by agricultural fields with areas of hardstanding comprising roads and paths associated with roads within Profile Park. Geographically, the site is located in Profile Park, approximately 10 kilometres (km) to the south-west of Dublin city centre, within South Dublin County.

Existing Surface Water Features

10.25 The Baldonnel Stream flows approximately 150m north of the site. The head waters of the Baldonnel Stream are within the Casement Aerodrome to the south of the site. The airfield is largely greenfield in nature with areas of impermeable limited to landing strips, the main aerodrome buildings, and adjacent hardstanding. The stream flows in a northerly direction from the aerodrome although the route of the stream has been realigned as part of recent development. The stream has been culverted in some sections to allow for crossings. The Baldonnel Stream ultimately discharges to the River Griffeen and then to the River Liffey.

Surface Water Quality

10.26 The site is located within the Liffey and Dublin Bay WFD Catchment, and the Liffey Sub-Catchment. Currently, the EPA classifies the Liffey sub-catchment as having a 'moderate' ecological status or potential and a 'Good' chemical surface water status.

10.27 Four EPA monitoring stations are located in proximity to the site. They are named as Baldonnel Stream – Blakes Farm (RS09B090100), Baldonnel Stream – u/s STW (RS09B090200), Baldonnel Stream – d/s STW (RS09B090300), and Baldonnel Stream – Nangor Road (RS09B090400). They are located approximately 430m south of the site, 290m southeast of the site, 160m southeast of the site, and 290m north of the site respectively. The nearest located River Q value, found at Station RS09G010200 (Griffeen – First Bridge E. of Milltown) located approximately 870m northwest of the site, indicated a score of Q3 (poor) in 1991. The EPA identified the significant pressures for waterbodies that are at risk of not meeting their water quality objectives under the WFD. While there are a multitude of pressures in every waterbody, the significant pressures are those pressures which need to be addressed in order to improve water quality. The main pressures preventing the achievement of 'Good Status' for the River Liffey WMU (Water Management Unit) being urban runoff or urban wastewater. As part of the River Basin Management Plan 2009-2015, the water quality of the Griffeen Lower was assessed. The overall water

[19] Environmental Protection Agency, 2017. Draft Guidelines on the information to be contained in Environmental Impact Assessment Report (EIAR).

quality status obtained for the Griffeen Lower was 'Bad' primarily due to its fish status and overall chemical status which each obtained a 'Bad' classification.

Existing Surface Water Drainage

10.28 There are not considered to be any existing engineered surface water drainage assets which serve the site.

OPW Flood Mapping

10.29 The OPW online Flood Mapping service[17] does not indicate there to be any records of historic flooding at the site; the closest incident of flooding being approximately 1.2km northwest of the site. This was flooding at the Peamount R134 R120 junction which flooded in November 2000.

10.30 There are areas of the site shown in the OPW mapping to be in an area of Low fluvial flooding probability. This shows the "modelled extent of land that might be flooded by rivers in a very extreme flood event". Low Probability flood events are indicated by the OPW to have a 1 in a 1000 Annual Exceedance Probability (AEP); i.e. they have a 0.1% chance of being exceeded in any year. These areas appear to be disconnected from other areas of fluvial flood risk such that there would not be a pathway for water to reach these. An area just within the southwest boundary of the site is shown to be in an area of Medium fluvial flood probability (indicated by the OPW to have a 1 in a 100 AEP, i.e. they have a 1% chance of being exceeded in any year).

10.31 The OPW mapping shows the 'Present Day' scenario (referred to as the Current Scenario in the Maps and Plans) which "were generated using methodologies based on historic flood data, without taking account of potential changes due to climate change". No flood level data is provided by the OPW for the site.

Flood Defences and Structures

10.32 The Baldonnel Stream flows through two parallel 600 mm internal diameter culverts to the north of the site, passing for approximately 60m below the yard of the nearby commercial land use. There are further culverted sections downstream of this between the site and the River Griffeen.

Groundwater

10.33 As set out in Volume 1, Chapter 12: Ground Conditions, there are three main bedrock aquifer classifications in Ireland (regionally important, locally important and poor aquifers) and the bedrock aquifers underlying the site (Dinantian Limestones) are classified as Locally Important; i.e. an aquifer which is moderately productive only in local zones. It is also reported in Volume 1, Chapter 12: Ground Conditions that, during a 2021 ground investigation, groundwater seepages were only encountered in one of the trial pits excavated. The groundwater was reported at a depth of 2.3m below ground level. Groundwater is likely to be in continuity with the Baldonnel stream which runs to the east and north of the site and, given this, the groundwater flow direction is likely to be towards the north.

10.34 With reference to the WFD, the Groundwater Body underlying the site is the Dublin GWB (EU GWB Code: IE_EA_G_008), which under WFD is of 'good status' and has a GWB risk score of 'not at risk' (2010-2015 WFD status). The GSI currently classifies the aquifer vulnerability underlying the site to be high (H) with the subsoils being of low permeability.

10.35 The site is not situated with a Groundwater Drinking Water Protection Area or Groundwater SPA and there are no wells or springs within 1km of the site with the closest being approximately 3km southeast and east of the site. There are no Special Protection Areas, candidate Special Areas of Conservation or proposed Natural Heritage Areas within or immediately adjacent to the site.

Future Baseline

10.36 The only change to the future baseline with regard to water resources and flood risk is associated with climate change. The Surface Water Drainage Strategy (within the Engineering Planning Strategy) and the Flood Risk Assessment provided in Technical Appendices 10.1 and 10.2 take account of potential for increased fluvial flood risk, as well as increased rainfall rates.

Sensitive Receptors

10.37 The receptors identified as sensitive to the proposed development and which have been 'scoped-in' to the assessment are summarised in Table 10.6.

Table 10.6: Summary of Sensitive Receptors

Receptor	Sensitivity
Surface Water Features (Baldonnel Stream)	Medium (the stream is heavily, artificially altered north of the site and downstream and whilst the stream is classified as being of moderate status, it is also given a biological assessment score of 'poor' downstream of the site)
Flood Risk (on-site or downstream terrestrial receptors within the catchment)	High The flood risk status of a site or receptor is considered to be of high sensitivity due to the potential implications of a flood event.
Groundwater	Medium (whilst the Groundwater Body underlying the site is of 'good status' and has a GWB risk score of 'not at risk', the site is not situated with a Groundwater Drinking Water Protection Area or Groundwater SPA)

10.38 Based on the baseline characterisation, the following issues have been scoped out of the subsequent assessment:

- Direct impacts on groundwater quality:
  - The proposed development would involve groundworks which would inevitably have an interaction with the on-site soils and water environment. However, such potential impacts are considered separately within Volume 1, Chapter 12: Ground Conditions and is noted that construction works would be undertaken in compliance with a CEMP which would be established and maintained by the contractors during the construction stage which would cover all potentially polluting activities and emergency response procedures. Volume 1, Chapter 12: Ground Conditions does not specifically consider the potential for the proposed development to result in a reduction of local recharge to the underlying aquifer. However, as the overall area of aquifer is large relative to the site area, the potential reduction in local recharge is considered to have no potential for significant change in the natural hydrogeological regime, so is not considered further. The potential for localised disruption of groundwater is considered.

Assessment of Effects

Construction Effects

10.39 The following potential impacts on water resources could arise during the construction stage of the proposed development:

- Contamination of Surface Water as a result of silt-laden runoff across the construction site and from stockpiles, polluting substances (e.g. fuels and chemicals) from accidental spillages and other wastes during general construction activity;
- Disruption of Groundwater during construction excavations;
- Changes to Flood Risk; and
- Water Supply and Foul Drainage during construction.

Contamination of Surface Water

10.40 There are a range of embedded mitigation measures that are incorporated within the Proposed Development in order to reduce the potential for effects on the surface water environment. A project

specific CEMP would be established and maintained by the contractors during the construction stage which would cover all potentially polluting activities and emergency response procedures. All personnel working on the site would be trained in the implementation of the procedures. The measures identified in this section and in Volume 1, Chapter 12: Ground Conditions, and those provided in Volume 1, Chapter 5: Construction Environmental Management, would be included in the CEMP.

10.41 Subsoil would be excavated to facilitate the proposed development. Such works would be carefully planned to ensure as much material is left in situ as possible. Reuse of on-site excavated soil and capping with hardstand would minimise any increase in aquifer vulnerability. Construction works would require local removal of soil cover where levelling of the site is required and its use for re-instatement elsewhere on the site. It is envisaged that any soil excavated would be retained on-site and reused as fill material or landscaping. Excavation works would be carefully monitored by a suitably qualified person to ensure any potentially contaminated soil is identified and segregated from clean/inert soil.

10.42 Stockpiles have the potential to cause negative impacts on water quality through increased potential for sediment release to watercourses. The effects of soil stripping and stockpiling would be mitigated against through the implementation of an appropriate earthworks handling protocol during construction within the CEMP. It is anticipated that any stockpiles would be formed within the boundary of the site and there would be no direct link or pathway from this area to any surface water body.

10.43 The following procedures would be included in the CEMP in order to prevent any spillages of fuels to groundwater, and to prevent any resulting water quality impacts:

- Designation of a bunded refuelling areas on the site; and
- Provision of spill kit facilities across the site.

10.44 Where mobile fuel bowsers are used the following measures would be taken:

- Any flexible pipe, tap or valve would be fitted with a lock and would be secured when not in use;
- Pumps or valves would be fitted with a lock and would be secured when not in use;
- All bowsers to carry a spill kit;
- Operatives must have spill response training; and
- Drip trays used on any required mobile fuel units.

10.45 In the case of drummed fuel or other potentially polluting substances which may be used during the construction stage the following procedures would be adopted:

- Secure storage of all containers that contain potential polluting substances in a dedicated internally bunded chemical storage cabinet unit or inside a concrete bunded area;
- 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 would be secured and on spill pallets; and
- Drums to be loaded and unloaded by competent and trained personnel using appropriate equipment.

10.46 The aforementioned list of measures is non-exhaustive and would be included in the CEMP.

10.47 Runoff from excavations/earthworks cannot be prevented entirely and is largely a function of prevailing weather conditions. Earthwork operations would be carried out with adequate drainage, falls and profile to control runoff and prevent ponding and flowing. Correct management, as set out in the CEMP, would ensure that there would be minimal inflow of shallow/perched groundwater into any excavation.

10.48 Care would be taken to ensure that exposed soil surfaces are stable to minimise erosion. All exposed soil surfaces would be within the main excavation site which limits the potential for any off-site impacts. All runoff would be prevented from directly entering into any watercourses or drainage ditches.

10.49 Should any discharge of construction related water be required, discharge would be to a foul sewer. Pre-treatment and silt reduction measures on-site would include a combination of silt fencing, settlement measures (e.g. silt traps, 20m buffer zone between machinery and watercourses, off-site refuelling of machinery) and use of hydrocarbon interceptors. Active treatment systems such as Siltbusters or similar may be required depending on turbidity levels and discharge limits.

10.50 Considering the embedded mitigation that would be specified within the CEMP, which in turn would be secured by means of an appropriately worded planning condition the effects would be of a low magnitude. The likely effect of contamination of surface water is likely to be a temporary to short term, **not significant**, **negative** in nature effect which is **not significant** in EIA terms.

Disruption of Groundwater during Construction Excavations

10.51 Groundwater is likely to be in downstream continuity with the Baldonnel stream which runs to the north of the site, given this the groundwater flow direction is likely to be towards the north. The proposed excavation methods could result in short-term changes to groundwater patterns. However, this is unlikely to lead to a significant change to hydrogeological conditions outside of the site boundary. Therefore, the potential impact of the proposed development on groundwater flows (medium sensitivity) would be of negligible magnitude which equates to a temporary to short term, **imperceptible, negative** in nature effect which is **not significant** in EIA terms.

Changes to Flood Risk

10.52 The Flood Risk Assessment states that the site is located in Flood Zone C (low probability of flooding). The development would not therefore be at significant risk of flooding and would not be expected to directly affect areas of fluvial floodplain during construction. Whilst there is a potential that the surface water runoff regime of the site could be affected during construction, surface water would be managed during construction through the CEMP and a surface water drainage network is designed for the proposed development such that runoff would be attenuated to a greenfield rate upon completion of the construction phase. Therefore, the proposed construction could result in a negative impact of negligible magnitude on flood risk (high sensitivity) which equates to a **not significant to slight, negative** in nature effect which is **not significant** in EIA terms.

Water Supply and Foul Drainage Capacity During Construction

10.53 As set out in Volume 1, Chapter 15: Material Assets, welfare facilities would be required for the construction compound and portable toilets would be provided for construction workers. A temporary connection to the foul water drainage network within Profile Park may also be required to accommodate the site welfare facilities during construction. It is understood that the foul water drainage network has sufficient available capacity for the wastewater discharges for the short-term construction stage.

10.54 Accordingly, foul drainage effects on the public sewerage network during the construction stage are considered to be temporary to short term, **imperceptible** and **neutral** i.e. **not significant** in EIA terms.

10.55 A temporary connection to the mains water supply would be established for the construction phase. The water demand during the construction phase would not be significant enough to affect existing pressures and from discussions with the SDCC, it is understood that there is adequate capacity within the existing watermain network to supply the proposed development. Effects associated with water supply during the construction stage are considered to be temporary to short term, **imperceptible** and **neutral** i.e. **not significant** in EIA terms.

Operation Effects

10.56 The following potential impacts on water resources and flood risk could arise during the operation stage of the proposed development:

- Surface Water Flood Risk: Increased surface water runoff volumes leading to flood risks off-site;
- Disruption of Groundwater: Potential to alter local groundwater flow paths and levels;

- Water Demand: Increase in water demand from the site to supply the new occupants of the proposed development; and
- Foul Sewer Capacity: Increase in discharge volumes of effluent to foul sewer.

Surface Water Flood Risk

10.57 As set out in the Engineering Planning Report, the proposed surface water drainage system has been designed in accordance with the Greater Dublin Strategic Drainage Study (GDSDS)[10], and the Greater Dublin Regional Code of Practice for Drainage Works[11]. As a result, it is not expected that the proposed development would negatively impact on flood risk for downstream receptors and neighbouring properties.

10.58 The subject site currently comprises a greenfield site and the proposed surface water measures are aimed at mimicking the natural drainage patterns of the site. They include measures to attenuate and provide extensive treatment of surface water prior to discharge from the site. The measures include silt traps, separators and oil separators to ensure the highest quality of surface water discharge in both the construction and operation phase of the proposed development.

10.59 Discharge from the site compound would be limited to the Greenfield runoff rate using a vortex flow control unit and surface water would be attenuated within an underground tank in the north of the compound. The attenuated volume has been calculated assuming a 100% runoff rate from the roadways and roofs and using rainfall data from Met Eireann for Dublin Airport for the 1 in 100 year storm. The rainfall data has been factored up by 20% to allow for climate change. The required attenuation volume is 285 m^3 and the attenuation volume provided within the underground tank is 320 m^3. The Flood Risk Assessment (Technical Appendix 10.1) states that the proposed substation facility's surface water drainage system would mitigate any risk from surface water flooding.

10.60 Water would be collected off the roofs through downpipes which connect into 225 mm diameter concrete pipes. Water from the roads would be collected through gullies and is connected to the same 225mm diameter pipe network. The water would then pass through the underground concrete attenuation tank, before passing through a hydrodynamic solid separator, a proposed hydrobrake and a NSBE010 (or equivalent) silt and oil separator with a silt capacity of 1000 litres and an oil capacity of 150 litres. The use of an underground concrete tank has been proposed based on the restriction of levels and space on site. The tank would be placed beneath the proposed roadway serving HGVs (including abnormal delivery and replacement of the proposed transformers which can weigh up to 100 Tonnes), and due to the invert levels of the existing surface water network, there would not be enough cover to enable the use of a Stormtech or similar SUDS system. We also note the site would be heavily congested with underground services linking the proposed GIS Substation, Transformers, and Control Building including LV, MV and HV Ducting which limits the location for surface water services.

10.61 Therefore, the proposed surface water management, which would include an allowance for climate change, would result in a positive impact on the flood risk status (High sensitivity). However, as the site is not directly adjacent to a watercourse and the site area is small relative to the contributing catchment of downstream flood risk areas, the magnitude of benefit is unlikely to be perceptible. On this basis, the proposals would equate to a long-term **not significant to slight, positive** effect which would be **not significant** in EIA terms.

Disruption of Groundwater: Potential to Alter Local Groundwater Flow Paths and Levels

10.62 The proposed structures would require foundations to structural engineer specifications. However, the foundations for the precast concrete or structural steel frames would require moderate scale excavations and the method of foundations would take account of the ground conditions and environmental considerations such that any long-term effects on groundwater flows (medium sensitivity) would likely be of negligible magnitude which would equate to a long-term, **imperceptible, negative** effect which would be **not significant** in EIA terms.

Water Demand and Foul Sewer Capacity

10.63 A pre-connection application has been submitted to Irish Water for the proposed development. It is proposed to take a 100mm connection from the external watermain to the north of the site. This main is to feed the GIS building on the site. A connection would not be allowed unless there is adequate capacity within the existing water main network to supply the proposed development. As such, effects on water supply during the operation stage are considered to be a permanent, **imperceptible** and **neutral** effect which would be **not significant** in EIA terms.

10.64 The proposed foul water drainage network would collect domestic foul water from the buildings within the Substation Compound. In addition, rainfall which passes through the transformers is collected in the foul water network, which passes through a treatment unit before connecting to the main foul water network.

10.65 The proposed foul water network would connect to the existing drainage network via the foul manhole (300 mm pipe) in the road to the north of the site. A sump pump would be fitted to the transformer bund, which pumps water into the foul water network on the site.

10.66 The permanent foul connection to the wider network would be undertaken in consultation with Irish Water to ensure there is no impact on the network when the connection is made. Accordingly, foul drainage effects on the public sewerage network during the operation stage are considered to be long term, **imperceptible** and **neutral** which would be **not significant** in EIA terms.

Assessment of Residual Effects

Additional Mitigation

Construction Stage

10.67 No additional mitigation measures are proposed.

Operation Stage

10.68 No additional mitigation measures are necessary.

Enhancement Measures

10.69 No additional enhancement measures are proposed.

Construction Residual Effects

10.70 As no additional mitigation would be required, the residual construction effects remain as reported in the assessment of effects section:

- The likely effect of contamination of surface water is likely to be only temporary to short term and **not significant, negative** effect (i.e. **not significant** in EIA terms) and no further mitigation beyond that to be set out in the CEMP is necessary;
- The potential impact of the proposed development on groundwater flows (medium sensitivity) would be of negligible magnitude which equates to a temporary to short-term, **imperceptible,** and **negative** effect (i.e. **not significant** in EIA terms);
- Surface water would be managed during construction through the CEMP and a surface water drainage network is designed for the proposed development such that runoff would be attenuated to a greenfield rate upon completion of the construction phase. Therefore, the proposed construction could result in a negative impact of negligible magnitude on flood risk (high sensitivity) which equates to a **not significant to slight, negative** effect (i.e. **not significant** in EIA terms); and

- Effects on the public sewerage and potable water supply networks during the construction stage are considered to be temporary to short term, **imperceptible** and **neutral** (i.e. **not significant** in EIA terms).

Operation Residual Effects

10.71 The Site-Specific Flood Risk Mitigation Plan and associated maintenance regime would ensure that the residual operation effects would remain as reported in the assessment of effects section:

- The proposed surface water management, which would include an allowance for climate change, would result in a positive impact of low magnitude on the flood risk status (High sensitivity) which equates to a long-term **not significant to slight, positive** effect (i.e. **not significant** in EIA terms);
- Any long-term effects on groundwater flows (medium sensitivity) would be likely to be of negligible magnitude and the effect long-term, **imperceptible, negative** (i.e. **not significant** in EIA terms); and
- It is understood that there is adequate capacity within the existing foul drainage and water main network to supply the proposed development. As such, effects during the operation stage are considered to be permanent, **imperceptible**, **neutral** (i.e. **not significant** in EIA terms).

Summary of Residual Effects

10.72 Table 10.7 provides a tabulated summary of the outcomes of the water resources and flood risk assessment of the proposed development. Where **significant positive** effects are likely these are highlighted in bold green and where **significant negative** effects are predicted these are highlighted in bold red.

Table 10.7: Summary of Residual Water Resources and Flood Risk Effects

Receptor	Description of Residual Effect	Additional Mitigation	Scale and Significance of Residual Effect **	Nature of Residual Effect*				
				+ -	L U	D I	R IR	M B T St Mt Lt P**
Construction								
Surface Water Receptors	Potential contamination as a result of silt-laden runoff across the construction site and potential for contaminants to be introduced to surface water by construction activities through leakages/spillages	None Required	Not Significant	-	L	D	R	T to St
Groundwater Supply	Disruption of Groundwater during Construction Excavations	None Required	Imperceptible	-	L	D	R	T to St
Flood Risk	Increases in surface water runoff during construction as a result of compaction of soils and construction of hardstanding.	None Required	Not Significant to Slight	-	L	D	R	T to St
Water Supply and Foul Drainage Network	Water Supply and Foul Drainage Capacity During Construction	None Required	Imperceptible	+/-	U	D	R	T to St
Operation								
Flood Risk	Changes to flood risk as a result of changes to the surface water runoff regime of the site	None Required	Not Significant to Slight	+	L	D	IR	Lt
Groundwater	Potential to alter local groundwater flow paths and levels	None Required	Imperceptible	-	L	D	IR	Lt
Water Demand and Foul Drainage Network	Water Supply and Foul Drainage Capacity During Operation	None Required	Imperceptible	+/-	L	D	IR	Lt

Notes:

* - = Negative/ + = Positive / +/- = Neutral; R = Reversible, IR = Irreversible; D = Direct, ID = Indirect;

L= Likely, U = Unlikely; M = Momentary, B = Brief, T= Temporary, St = Short-term, Mt = Medium-term, Lt = Long-term, P = Permanent, R = Reversible

** Imperceptible, Not Significant, Slight, Moderate, Significant, Very Significant, Profound

Cumulative Effects

Intra-Project Effects

10.73 As explained in Volume 1, Chapter 2: EIA Process and Methodology, intra-project cumulative effects are discussed in Volume 1, Chapter 16: Cumulative Effects.

Inter-Project Effects

10.74 Consent would not be granted for any development which would increase off-site flood risks. Consent would also not be granted to any surface water discharge from a proposed development were it to increase downstream flood risk. Any discharge to sewer or to a fluvial watercourse would need to be restricted so as to provide betterment in terms of downstream capacity, taking account of predicted climate change. As the proposed development would discharge at a greenfield rate, there would be no detrimental impact on downstream flood risk. It would be reasonable to assume that any other development would similarly need to decrease flood risk and reduce pressures on downstream sewer or watercourse capacity such that any cumulative impact during the operation stage would be beneficial.

10.75 In accordance with national and local policy, it is reasonable to assume that other schemes would similarly be required to demonstrate suitable surface water runoff management measures during construction and that discharges of surface water would be subject to suitable treatment such that there would be no cumulative significant effect on downstream water quality during construction works, or for the operation. Furthermore, each cumulative would be expected to deliver improvements in respect of contamination, groundwater disruption, water demand and sewer capacity.

10.76 Accordingly, the overall scale of water resources and flood risk cumulative effects would be no greater than that of the proposed development in isolation. Therefore, it is unlikely that there would be any significant negative cumulative effects on flood risk or surface water quality.

Summary of Assessment

Background

10.77 This chapter has detailed the potential water resources and flood risk effects due to the construction and operation stages of the proposed development. The assessment of construction and operation stages has been undertaken taking into account the relevant national and local guidance and regulations.

10.78 The subject site is greenfield and appears to have historically been in agricultural use. There is no evidence of pluvial drainage entering the site and the Flood Risk Assessment states that there is no evidence of groundwater flooding.

10.79 Areas of the site are shown in the OPW mapping to be in areas of Low fluvial flooding probability. This designation shows the "modelled extent of land that might be flooded by rivers in a very extreme flood event". Low Probability flood events are indicated by the OPW to have a 1 in a 1000 Annual Exceedance Probability (AEP) i.e. they have a 0.1% chance of being exceeded in any year. The southwest of the site is shown to be within an area of Medium fluvial flood probability (indicated by the OPW to have a 1 in a 100 AEP, i.e. they have a 1% chance of being exceeded in any year). However, mapping suggests there is no direct topographical route from this area to the main area where the substation would be built.

10.80 The bedrock aquifers underlying the site (Dinantian Limestones) are classified as Locally Important, i.e. an aquifer which is moderately productive only in local zones. The site is not situated with a Groundwater Drinking Water Protection Area or Groundwater SPA and there are no wells or springs within 1km of the site with the closest being approximately 3km southeast and east of the site. There are no Special Protection Areas, candidate Special Areas of Conservation or proposed Natural Heritage Areas within or immediately adjacent to the site.

10.81 The proposed development is not deemed to have any significant risk of flooding and is classified as Zone C. The proposed substation development falls under strategic infrastructure, for which the guidelines state that the development is appropriate within Flood Zone C. The site is therefore suitable for planning.

Construction Effects

10.82 During construction works, there is the potential for the following impacts on water resources and flood risk:

- Contamination of surface water as a result of silt-laden runoff across the construction site and from stockpiles, polluting substances (e.g. fuels and chemicals) from accidental spillages and other wastes during general construction activity;
- Disruption of groundwater during construction excavations;
- Changes to flood risk; and
- Water supply and foul drainage during construction.

10.83 Overall, and considering the embedded mitigation (primarily through the CEMP), it is considered that the construction of the proposed development would **not give rise to significant effects** in EIA terms on water resources and flood risk.

Operation Effects

10.84 The following potential impacts on water resources and flood risk could arise during the operation stage of the proposed development:

- Surface Water Flood Risk: Increased surface water runoff volumes leading to flood risks off-site;
- Disruption of Groundwater: Potential to alter local groundwater flow paths and levels;
- Water Demand: Increase in water demand from the site to supply the new occupants of the proposed development; and
- Foul Sewer Capacity: Increase in discharge volumes of effluent to foul sewer.

10.85 The proposed development includes measures to manage surface water runoff (a reduction to a greenfield rate whilst also taking account of climate change) which would result in improvements in terms of flood risk as the current rates of runoff would be expected to increase with climate change, although the scale of such benefit is likely to be negligible.

10.86 Overall, whilst the operational phase could have a potential for a imperceptible negative effect on local groundwater flow paths and levels, effects on water supply and foul drainage capacity during operation could be imperceptible and neutral and, when considered against the potential benefit in terms of climate change accommodation within drainage designs, the operational phase would **not give rise to significant effects** on water resources and flood risk.

Cumulative Effects

10.87 Consent would not be granted for any development which would increase off-site flood risks. Consent would also not be granted to any surface water discharge from a proposed development were it to increase downstream flood risk. Accordingly, the overall scale of water resources and flood risk cumulative effects would be no greater than that of the proposed development in isolation. Therefore, it is unlikely that there would be any significant negative cumulative effects on flood risk or surface water quality.

11 ECOLOGY

Introduction

11.1 This chapter of the EIAR reports on the likely significant ecological effects to arise from the construction and operation stage of the proposed development.

11.2 The chapter describes the ecological policy context; the methods used to assess the potential impacts and likely effects; the baseline conditions at and surrounding the site; the likely ecological effects taking into consideration embedded mitigation; the need for additional mitigation and enhancement; the significance of residual effects; and inter-project cumulative effects.

11.3 The chapter is supported by the following technical appendices in EIAR Volume 3:

- Appendix 11.1: Ecological Impact Assessment
- Appendix 11.2: Appropriate Assessment Screening

Methodology

11.4 The assessment has been informed by the following legislation, policies and published guidance:

- International Legislation:
  - EU Habitats Directive 92/43/EEC1;
  - The Birds Directive 2009/147/EC2;
  - Environmental Liability Directive 2004/35/EC3; and
  - Bern Convention[4].
- National Legislation and Policy:
  - The Wildlife Act 1976 (as amended)[5];
  - EC (Birds and Natural Habitats) Regulations 2011 (amended 2015)[6];
  - Flora Protection Order 2015[7]; and
  - The EC (Water Policy) Regulations 2003[8].
- Local Policy:
  - South Dublin Development Plan 2016–2022[9].
- National guidance and industry standards:
  - BS 42020:2013 Biodiversity[10]
- CIEEM Guidelines:
  - Ecological Impact Assessment[11]
  - Ecological Report Writing[12].

11.5 Further details are provided in EIAR Volume 3: Technical Appendix 11.1.

Assessment Scope

11.6 The assessment has been conducted by ecologists registered with the Chartered Institute of Ecology and Environmental Management (CIEEM). All work has been carried out in line with the relevant professional guidance; CIEEM's Guidelines for Preliminary Ecological Appraisal[13], Guidelines for the Ecological Impact Assessment in the UK and Ireland[14] and the Environment, Heritage and Local Government's Guidance on Appropriate Assessments[15].

11.7 Dara Dunlop BSc (Hons) is a Qualifying Member of CIEEM with approximately three years of experience in the ecology sector, including working for an ecological consultancy, undertaking a range of protected species surveys and extended Phase 1 habitat surveys for industrial schemes, and land management of designated sites. Dara has co-authored a number of reports including Ecological Impact Assessments and Protected Species Reports for various developments.

11.8 Dylan Donoghue is an Ecologist in the process of receiving membership with CIEEM. Dylan has two years' experience in the Ecology Sector, including working for an ecological consultancy, undertaking bird and bat surveys.

11.9 Daniel Flenley BSc (Hons) MPhil MCIEEM is a full member of CIEEM and has over 14 years of ecology experience including undertaking surveys and writing associated reports. Daniel is experienced at undertaking and managing a range of surveys and assessments, including Ecological Impact Assessment (EcIA), extended Phase 1 habitat surveys, and ornithological and protected species surveys, for over 450 projects. These include a variety of development types such as residential, energy, commercial, industrial and transport infrastructure. Daniel holds a great crested newt class licence and has worked as an accredited agent under bat and amphibian mitigation and reptile survey licences.

Technical Scope

11.10 The technical scope of the assessment has considered the following:

- Disturbance/injury/death of a protected species, both during the Construction stage and the Operation stage (including lighting impacts and effects on bats);
- Disturbance of breeding birds;
- Direct loss of habitats;
- Reduction in local biodiversity;
- Damage to local ecology through pollution;
- Chemical or physical pollution of aquatic habitats and consequent effects on designated sites;
- Accidental trapping of mammals in excavations;
- Habitat fragmentation and loss of ecological connectivity/commuting pathways for wild and protected species;
- Loss or damage of habitats as a result of dust and other air- or water-borne pollution; and

1 Council Directive 92/43/EEC of 21 May 1992 on The Conservation of Natural Habitats and of Wild Fauna and Flora.
2 Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the Conservation of Wild Birds.
3 Directive 2004/35/CE of the European Parliament and of the Council of 21 April 2004 on Environmental Liability with Regard to The Prevention and Remedying of Environmental Damage.
4 The Council of Europe's Convention on the Conservation of European Wildlife and Natural Habitats, 1979. Bern.
5 Government of Ireland. The Wildlife Act 1976 (as amended). Available from: http://www.irishstatutebook.ie/eli/1976/act/39/enacted/en/html#zza39y1976
6 Government of Ireland. S.I. No. 477/2011 - European Communities (Birds and Natural Habitats) Regulations 2011 (as amended).
7 Government of Ireland. S.I. No. 356/2015 - Flora (Protection) Order, 2015.
8 Government of Ireland. S.I. No. 722/2003 - European Communities (Water Policy) Regulations 2003.
9 South Dublin County Council. South Dublin Development Plan 2016–2022. Dublin. South Dublin County Council.
10 British Standards Institution, 2013. BS 42020:2013 Biodiversity. Code of practice for planning and development. London. BSI.
11 Chartered Institute of Ecology and Environmental Management, 2019. Guidelines for the Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Version 1.1. Winchester. CIEEM
12 Chartered Institute of Ecology and Environmental Management, 2017. Guidelines on Ecological Report Writing. Winchester. CIEEM
13 Chartered Institute of Ecology and Environmental Management, 2017. Guidelines for Preliminary Ecological Appraisal. Second Edition. Winchester. CIEEM
14 Chartered Institute of Ecology and Environmental Management, 2019. Guidelines for the Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Version 1.1. Winchester. CIEEM
15 Environment, Heritage and Local Government, 2009. Appropriate Assessment of Plans and Projects in Ireland, Guidance for Planning Authorities. Dublin. Department of the Environment, Heritage and Local Government

- Potentially consequent population-level effects of these impacts on wild species and groups including bats, badger, otter, birds, herptiles, invertebrates and flora.

11.11 The following have been considered in terms of embedded mitigation:

- Standard practice pollution prevention measures (see Volume 1, Chapter 5: Construction Environmental Management);
- Preparation and implementation of a SWMP;
- Environmental monitoring during the construction stage, to be specified in a CEMP as outlined in Volume 1, Chapter 5: Construction Environmental Management;
- Cowling of lighting, plus reduction of light levels to 1lux where possible (see CSEA lighting plan[16] which accompanies the application);
- Setting of noise and vibration limits, with associated monitoring during the Construction stage (see Volume 1, Chapter 5: Construction Environmental Management).

Spatial Scope

11.12 The study area for international/European statutory designations has been determined by means of reference to published guidance (Appropriate Assessment of Plans and Projects in Ireland, Guidance for Planning Authorities[17]), and covers an area of 15km from the site boundary. The study area for national statutory designations follows standard professional practice as accepted in a number of similar planning applications. This covers an area of 5km from the site boundary.

11.13 The study area for protected and priority species has been derived by reference to CIEEM Guidelines for Preliminary Ecological Appraisal[18] and consideration of their ecological characteristics and covers an area of 2km from the site boundary. The study area for the Fossitt habitat survey has been determined with reference to CIEEM Guidelines for Preliminary Ecological Appraisal[19]. All of the above also consider the scale and nature of the proposed development.

11.14 Sensitive receptors in the study area include Rye Water Valley/Carton Special Area of Conservation (SAC; 5.9km northwest of the site), Glenasmole Valley SAC (approximately 8km southeast of the site), Wicklow Mountains SAC (9.6km southeast), Red Bog, Kildare SAC (13.9km southwest), South Dublin Bay SAC (15.45km east), North Dublin Bay (18.15km northeast), Wicklow Mountains Special Protection Area (SPA; 12.7km southeast), South Dublin Bay and River Tolka SPA (15.1km northeast), Poulaphouca Reservoir SPA (14.9km southwest), North Bull Island SPA (18.2km northeast) Grand Canal proposed Natural Heritage Area (pNHA; 2km north) and Liffey Valley pNHA (4.5km north).

Temporal Scope

11.15 The assessment has considered impacts arising during the construction stage, which would be expected to be temporary (8-10 months) in nature, and from the operation stage which would be expected to be long-term to permanent in nature (i.e. more than 20 years).

11.16 The following scenarios have been considered:

- Baseline;
- Baseline + Proposed Development; and
- Baseline + Proposed Development + Cumulative Development.

Baseline Characterisation Method

Desk Study

11.17 In order to establish baseline ecology conditions in the study area, relevant data was reviewed and assessed. Data was obtained from the following sources:

- National Biodiversity Data Centre (NBDC); and
- National Parks and Wildlife Service (NPWS).

11.18 Further details are provided in EIAR Volume 3: Technical Appendix 11.1.

Field Study

11.19 A Fossitt habitat survey was undertaken on 17 August 2021 by Dylan Donoghue BSc (Hons). This encompassed all lands within the red line boundary and up to 50m outside, where access allowed.

11.20 A bat activity survey was completed on the night of 17 August 2021 by Dylan Donoghue. A static (Wildlife Acoustics Song Meter SM4 BAT FS) bat detector was also deployed on site from 17 August 2021 and collected on 17 September 2021. All bat surveys were designed based on Bat Conservation Trust guidance[20].

11.21 Further details are provided in EIAR Volume 3: Technical Appendix 11.1.

Assessment Method

Methodology

Construction Stage

11.22 The evaluation of ecological receptors is based upon CIEEM guidelines[21], which suggests that the value or potential value of an ecological resource or feature (for example a habitat type, species or ecosystems) should be determined within a geographical context (e.g. rare at a local level).

11.23 At the construction stage, the impact assessment process involves:

- Identifying and characterising impacts and their effects;
- Incorporating measures to avoid and mitigate negative impacts and effects;
- Assessing the significance of any residual effects after mitigation;
- Identifying appropriate compensation measures to offset significant residual effects; and
- Identifying opportunities for ecological enhancement.

Operation Stage

11.24 Assessment methods used for the operation stage follow this same process with only slight variation. Impact assessment during the operation stage emphasises the potential for disturbance of wild and protected species, including through lighting impacts on bats, rather than the wider range of potential impacts during the Construction stage.

Cumulative Stage

11.25 The potential for cumulative impacts to arise from the combined effects of a number of existing or proposed developments in combination with the proposed development on ecology has been considered as set out in Volume 1, Chapter 2: EIA Process and Methodology.

16 Burns McDonnel, 2021. DUB11 Campus Development Design Statement ref DUB11-DC-XX-G021-V0-PL-BMD.

17 Environment, Heritage and Local Government, 2009. Appropriate Assessment of Plans and Projects in Ireland, Guidance for Planning Authorities. Dublin. Department of the Environment, Heritage and Local Government.

18 Chartered Institute of Ecology and Environmental Management, 2017. Guidelines for Preliminary Ecological Appraisal. Second Edition. Winchester. CIEEM.

19 Chartered Institute of Ecology and Environmental Management, 2017. Guidelines for Preliminary Ecological Appraisal. Second Edition. Winchester. CIEEM.

20 Collins J (ed.), 2016. Bat Surveys for Professional Ecologists: Good Practice Guidelines. 3rd edition. London. The Bat Conservation Trust

21 Chartered Institute of Ecology and Environmental Management, 2019. Guidelines for the Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Version 1.1. Winchester. CIEEM.

Assessment Criteria

11.26 The criteria used to assess if an effect is significant or not is set out in subsequent sub-sections. This is determined by consideration of the sensitivity of the receptor, magnitude of impact and scale of the effect. In considering the significance of an effect, consideration has been given to the duration of the effect, the geographical extent of the effect and the application of professional judgement.

Receptor Sensitivity/Value Criteria

11.27 The sensitivity of receptors has been classified as international, national, regional, local or negligible, in accordance with the criteria set out in Table 11.1.

Table 11.1: Receptor Sensitivity Criteria

Sensitivity	Criteria
International	An internationally designated site (e.g. SAC, SPA, Ramsar site); Site meeting criteria for international designations or qualifying species of a SAC where there is connectivity Species present in internationally important numbers (>1% of biogeographic populations)
National	A nationally designated site (NHA, pNHA), or sites meeting the criteria for national designation or qualifying species where there is connectivity Species present in nationally important numbers (>1% Irish population)
Regional	Species present in regionally important numbers (>1% of regional population) Areas of valuable habitat falling below criteria for selection as an NHA (e.g. areas of ancient woodland larger than 0.25ha)
Local	Areas of ancient woodland smaller than 0.25ha Areas of habitat or species considered to appreciably enrich the ecological resource within the local context, e.g. species-rich flushes or hedgerows Baldonnel Stream
Negligible	Usually widespread and common habitats and species. Features falling below local value are not normally considered in detail in the assessment process

Impact Magnitude Criteria

11.28 The magnitude of impact has been classified as negligible, low, medium, high or very high, in accordance with the criteria set out in Table 11.2.

Table 11.2: Impact Magnitude Criteria

Magnitude of Impact	Criteria
Negligible	Minimal impact on a very small scale; effects not dissimilar to those expected within a 'do nothing' scenario.
Low	Would lead to a not significant effect upon the feature or its viability. For example, less than 10% habitat loss, damage or gain.
Medium	Would lead to a slight to moderate effect on the feature or its viability. For example, between 10% to 20% habitat loss, damage or gain.
High	Would lead to a significant effect on the feature or its viability. For example, more than 20% habitat loss, damage or gain.
Very High	Would cause the loss of the majority of a feature (>80%) or would be sufficient to damage a feature enough to affect its viability immediately. For positive effects, would e.g. create over 80% habitat gain.

Scale of Effect Criteria

11.29 Impacts have been assessed on the basis of the value/sensitivity of receptors against the magnitude of impact to determine the scale of effect as presented in Table 11.3.

Table 11.3: Scale of Effect Criteria

Magnitude	Sensitivity of Receptors				
	Negligible	Local	Regional	National	International
Negligible	Imperceptible	Imperceptible	Imperceptible/ Not Significant	Imperceptible/ Not Significant	Imperceptible/ Not Significant
Low	Imperceptible	Imperceptible	Not Significant/ Slight	Moderate	Moderate
Medium	Imperceptible	Not Significant	Moderate	Significant	Significant
High	Imperceptible	Slight	Significant	Significant	Very Significant/ Profound
Very High	Imperceptible	Slight	Significant	Very Significant/ Profound	Very Significant/ Profound

11.30 In line with CIEEM guidance[22], the duration of effects should be defined in relation to the lifespan of each organism in question. The criteria used to determine duration of effects under this approach is provided in Table 11.4.

Table 11.4: Effect Duration Criteria

Magnitude	Criteria
Momentary	Effects lasting from seconds to minutes.
Short-term	Up to (but not including) five years; for short-lived species, a single season or part of a season.
Medium-term	From five years up to (but not including) 15 years; for short-lived species, a single generation.
Long-term	From 15 years up to (and including) 30 years; for short-lived species such as invertebrates, multiple generations.
Permanent	Effects continuing indefinitely beyond the span of one human generation (taken here as 30+ years), except where there is likely to be substantial improvement after this period in which case the category Long-term may be more appropriate.
Reversible	Effects that can be undone, for example through remediation or restoration.

11.31 The criteria used to assess whether an effect is significant or not, are given in the EPA Guidelines 2017, and are set out in Table 2.1 in Volume 1, Chapter 2: EIA Process and Methodology. The significance of effects is determined by consideration of the sensitivity of the receptor, the magnitude of impact and scale of the effect. In assessing the significance of an effect, consideration has been given to the quality,

[22] Chartered Institute of Ecology and Environmental Management, 2019. Guidelines for the Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Version 1.1. Winchester. CIEEM.

duration, probability and type of the effect, and its geographical extent, and the application of professional judgement.

11.32 Based on professional judgement, moderate, significant, very significant and profound effects are considered **significant** in EIA terms.

Assumptions and Limitations

11.33 The assessment has relied on data provided by NBDC and NPWS. It has been assumed that these data sets have been reported correctly.

11.34 At the time of the Fossitt survey, access was only permitted within the landownership boundary. The areas of land which formed the Ecological Study Area (ESA) which were not within the landownership boundary were viewed from field boundaries, with the use of binoculars, where needed. It is considered that the limited access to areas of land directly adjacent to the Proposed Development boundary has not unduly impacted upon the findings of the habitat or species scoping surveys.

11.35 Results of the survey undertaken are representative of the time that surveying was undertaken.

11.36 The absence of specific species records returned during the data search does not necessarily indicate absence of a species or habitat from an area, but rather that these have not been recorded or are perhaps under-recorded within the search area.

11.37 A Fossitt habitat survey does not aim to produce a full botanical or faunal species list or provide a full protected species survey, but enables competent ecologists to ascertain an understanding of the ecology of the site in order to:

- Identify broadly the nature conservation value of a site and preliminary assess the significance of any potential impacts on habitat/species recorded, and/or
- Confirm the need and extent of any additional specific ecological surveys that are required to identify the true nature conservation value of a site.

Baseline Conditions

Existing Baseline

Desk Study

11.38 The data search conducted via the NBDC identified the presence of 5 bat species/groups, otter, Irish hare, West European hedgehog, two invasive mammals, one bird species (house martin) and one invasive plant species within 2km of the site. Six SACs, four SPAs and two pNHAs were identified within the relevant national and international search areas. Further details are presented in EIAR Volume 3: Technical Appendix 11.1.

Fossitt Habitat Survey

11.39 A Fossitt habitat survey was undertaken on 17 August 2021 by Dylan Donoghue. This encompassed all lands within the red line boundary and up to 50m outside, where access allowed.

11.40 Survey work was carried out in accordance with Fossitt habitat survey guidance[23]. Habitats were mapped electronically in the field in order to produce a habitat map.

11.41 The following habitat types were identified within the site:

- Improved agricultural grassland (GA1);
- Treelines (WL2);
- Recolonising bare ground (ED3); and
- Buildings and artificial surfaces (BL3).

Species Scoping Survey

11.42 A species scoping survey was carried out to identify the presence of protected species, or the potential of the Application Site to support protected species. The aim of the survey was to provide an overview of the Application Site and to determine whether any further survey work was required.

11.43 No additional protected species surveys were undertaken at this time.

11.44 Table 11.5 outlines the relevant habitat and field signs that indicate the potential presence of protected or notable species within the ESA.

Table 11.5: Indicative Habitats and Field Signs of Protected Species

Taxon	Indicative Habitat(s)	Field Signs (In Addition to Sightings)
Bats	Roosts – trees, buildings, bridges, caves, etc. Foraging areas – e.g. parkland, water bodies, streams, wetlands, woodland edges and hedgerow. Commuting routes – linear features (e.g.) hedgerows, water courses, tree lines). See Appendix C of EIAR Volume 3: Technical Appendix 11.1 for preferred foraging and commuting habitat of individual species.	In or on potential roost sites: droppings stuck to walls, urine spotting in roof spaces, oil from fur staining round roost entrances, feeding remains (e.g. moth wings under a feeding perch).
Badger *Meles meles*	Found in most rural and many urban habitats.	Excavations and tracks: sett entrances, latrines, hairs, well-worn paths, prints, scratch marks on trees.
Otter *Lutra lutra*	Watercourses.	Holts (or dens), prints, spraints (droppings), slide marks into watercourses, feeding signs (e.g. fish bones).
Birds	Trees, scrub, hedgerow, field margins, grassland, buildings.	Nests, droppings below nest sites (especially in buildings of trees), tree holes.
Common lizard *Zootoca vivipara*	Rough grassland, log and rubble piles.	Sloughed skins.

Weather Conditions

11.45 Table 11.6 describes the weather conditions at the time of survey giving air temperature (°C), wind speed (Beaufort force), cloud cover (percentage) and precipitation.

Table 11.6: Indicative Habitats and Field Signs of Protected Species

Survey Date	Temperature (°C)	Wind	Cloud Cover (%)	Precipitation
17/08/2021	17	36	30	None

Additional Surveys

11.46 One walked bat activity transect survey was performed. Three bat passes (from soprano pipistrelle and Leisler's bat) were recorded. Static detector monitoring undertaken between August 2021 and September 2021 recorded 12 bat passes.

11.47 The overall picture suggested is one of low levels of commuting/foraging bat use of the site.

[23] Fossitt J A, 2000. A Guide to Habitats in Ireland.

11.48 Receptors identified are as follows:

- Ten internationally designated sites (SACs and SPAs) – International sensitivity;
- Two pNHAs – National sensitivity;
- Other habitats – Negligible to Local sensitivity;
- Bats – Negligible to Local sensitivity;
- Badger – Negligible sensitivity;
- Otter (population not connected to European sites) – Negligible sensitivity;
- Hedgehog – Negligible sensitivity;
- Other mammals – Negligible sensitivity;
- Birds – Negligible to Local to sensitivity;
- Herptiles (amphibians and reptiles) – Negligible sensitivity;
- Terrestrial and aquatic invertebrates – Negligible sensitivity;
- Flora – Negligible sensitivity.

Sensitive Receptors

11.49 The receptors identified as sensitive to the proposed development and which have been 'scoped-in' to the assessment are summarised in Table 11.7.

Table 11.7: Summary of Sensitive Receptors

Receptor	Sensitivity
South Dublin Bay and River Tolka SPA, North Bull Island SPA, South Dublin Bay SAC and North Dublin Bay SAC	International
Other habitats on site	Negligible to Local
Bats	Negligible to Local
Birds	Negligible to Local

11.50 Based on the baseline characterisation, the following issues have been scoped out of the subsequent assessment:

- Rye Water Valley/Carton SAC: this international site has no connectivity with the site;
- Glenasmole Valley SAC: this international site has no connectivity with the site;
- Wicklow Mountains SAC: this international site has no connectivity with the site;
- Red Bog, Kildare SAC: this international site has no connectivity with the site;
- Wicklow Mountains SPA: this international site has no connectivity with the site;
- Poulaphouca Reservoir SPA: this international site has no connectivity with the site (see EIAR Volume 3: Technical Appendix 11.2);
- Grand Canal pNHA: this national site has no connectivity with the site;
- Liffey Valley pNHA: this national site has no connectivity with the site;
- Otter: negligible sensitivity;
- Hedgehog: negligible sensitivity (common and widespread in Ireland);
- Other mammals: negligible sensitivity;
- Herptiles: negligible sensitivity;
- Terrestrial and aquatic invertebrates: negligible sensitivity; and
- Flora: negligible sensitivity.

11.51 Please note that EIAR Volume 3: Technical Appendix 11.1 considers impacts and effects for the species/groups scoped out above. This highlights that there would be no significant effects for sensitive ecology receptors. It also ensures legal responsibilities towards protected species are met.

Assessment of Effects

Construction Effects

Designated Sites - South Dublin Bay and River Tolka SPA, North Bull Island SPA, South Dublin Bay SAC and North Dublin Bay SAC

11.52 The South Dublin Bay and River Tolka SPA and North Bull Island SPA are designated due to supporting assemblages of wetland and waterbirds. Due to a lack of suitable habitat within the site, it is considered highly unlikely that these species would be present on site.

11.53 There are no watercourses on the Application Site. Given the scale of the development and the large distance between the Application Site and the Dublin Bay, the dilution factor would result in a negligible impact upon the qualifying features of the SPAs and SACs. Therefore, construction effects would be short-term **imperceptible/not significant**, **negative** in nature, and **not significant** in EIA terms.

Terrestrial Habitats

11.54 The proposed development footprint is 5,937m^2, the majority of this would be over grassland habitat. This habitat is abundant in the surrounding area, and it is considered that the small amount of habitat loss would not be significant. Effects would be short-term **imperceptible, negative** in nature and **not significant** in EIA terms.

Bats

11.55 The majority of the site is comprised of improved agricultural grassland and artificial surfaces; these habitats offers sub-optimal foraging habitat for bat species due to the limited number of prey species present. The small amount of habitat loss would not lead to a significant reduction in foraging habitat for local bats, given the abundance of similar habitat in the surrounding landscape, and the poor quality of this habitat on site. This is because the site is currently subjected to high amounts of artificial light from neighbouring similar developments and streetlighting. The increased amount of artificial light has the potential to reduce the suitability of this habitat to commuting and foraging bats. Low levels of bat activity were recorded. Short-term **imperceptible, negative** effects on bats are predicted during the construction stage which are **not significant** in EIA terms.

Birds

11.56 Main impacts on bird species from developments include direct loss or deterioration of habitats, and indirect habitat loss as a result of displacement by disturbance. No evidence of breeding birds was noted in any trees within the survey area. However, in the absence of mitigation there is potential for loss of breeding attempts in and adjacent to the site if construction works are undertaken between the months of March and August inclusive. This would result in an effect of low spatial and medium-term temporal magnitude. The effect may continue beyond a single bird generation but is expected to be sufficiently small for the local population to recover relatively soon. This effect would be not significant for the commoner species but could be significant at the site level for birds of conservation concern. However, due to the Negligible to Local sensitivity of the site's bird assemblage, overall effects during this stage would be short-term **imperceptible, negative** and **not significant** in EIA terms.

Operation Effects

Designated Sites

11.57 It is considered that there is a very limited hydrological connection between the Application Site and the designated sites within the Dublin Bay (South Dublin Bay and River Tolka SPA, North Bull Island SPA,

South Dublin Bay SAC and North Dublin Bay SAC) via surface water drainage. With embedded pollution prevention/mitigation measures included in the proposed development design, it is unlikely that any qualifying habitat or species would be affected by the proposed development. Permanent, **imperceptible, neutral** effects would therefore be expected overall which are **not significant** in EIA terms.

Terrestrial Habitats

11.58 The habitats on site are considered to be of low ecological value. The operation stage would therefore be expected to lead to a permanent **imperceptible, negative** effect on other habitats which are **not significant** in EIA terms.

Bats

11.59 The operation stage of the proposed development would result in overall long-term to permanent imperceptible, negative effects on bats as sub-optimal foraging habitat would be lost.

11.60 It is considered that disturbance would be negligible. To retain dark zones for commuting bats, lighting would be cowled in order to direct artificial light from retained hedgerows which are currently used by bats to commute and forage. As detailed within the lighting Plan by CSEA light would be reduced to 1lux where possible; 1lux is considered to be similar to moonlight levels of light.

11.61 This is considered likely to result in a long term to permanent, **imperceptible, negative** impact on this Local to Negligible sensitivity receptor which is **not significant** in EIA terms.

Birds

11.62 The operation stage of the proposed development would result in overall long-term to permanent imperceptible negative effects on birds as sub-optimal foraging habitat would be lost. This is considered likely to result in a long term to permanent **imperceptible, negative** impact on this Local to Negligible sensitivity receptor which is **not significant** in EIA terms.

11.63 Further details of all impacts and enhancements predicted during the Operation stage can be found in EIAR Volume 3: Technical Appendices 11.1.

Assessment of Residual Effects

Additional Mitigation

Construction Stage

11.64 No significant effects are predicted, and consequently no additional mitigation is required in EIA terms. Please note that EIAR Volume 3: Technical Appendix 11.1 refers to mitigation to meet legal obligations for Negligible-/ Local to Negligible-sensitivity receptors.

Operation Stage

11.65 No significant effects are predicted. Consequently, no additional mitigation is required in EIA terms.

Construction Residual Effects

11.66 As no additional mitigation would be required, the construction effects remain as reported in the assessment of effects section:

- Designated sites - short-term **imperceptible/not significant, negative** and **not significant** in EIA terms;
- Terrestrial habitats on site - short-term **imperceptible, negative** and **not significant** in EIA terms;
- Bats - short-term **imperceptible negative** and **not significant** in EIA terms; and
- Birds - short-term **imperceptible, negative** and **not significant** in EIA terms.

Operation Development Residual Effects

11.67 As no additional mitigation would be required, the residual operation effects remain as reported in the assessment of effects section:

- Designated Sites - permanent **imperceptible, neutral** and **not significant** in EIA terms;
- Terrestrial habitats on site - permanent **imperceptible, negative** and **not significant** in EIA terms;
- Bats – long term to permanent **imperceptible, negative** and **not significant** in EIA terms; and
- Birds – long term to permanent **imperceptible, negative** and **not significant** in EIA terms.

Summary of Residual Effects

11.68 Table 11.8 provides a tabulated summary of the outcomes of the ecology assessment of the proposed development. Where **significant positive** effects are likely these are highlighted in bold green and where **significant negative** effects are predicted these are highlighted in bold red.

Table 11.8: Summary of Residual Ecology Effects

Receptor	Description of Residual Effect	Additional Mitigation	Scale and Significance of Residual Effect **	Nature of Residual Effect*				
				+ -	L U	D I	R IR	M B T St Mt Lt P**
Construction								
Designated Sites: South Dublin Bay and River Tolka SPA, North Bull Island SPA, South Dublin Bay SAC and North Dublin Bay SAC	Pollution	None required	Imperceptible/ Not Significant	-	L	I	IR	St
Terrestrial habitats	Habitat loss	None required	Imperceptible	-	L	D	R/ IR	St
Terrestrial habitats	Pollution	None required	Imperceptible	-	L	I	R	St
Bats	Commuting and foraging habitat loss	None required	Imperceptible	-	L	D	R	St
Birds	Disturbance/ destruction of nest (if works are undertaken between March and August)	None required (pre-commencement checks recommended in Volume 3: Technical Appendix 11.1 to avoid an offence	Imperceptible	-	L	D	IR	St
	Habitat loss as a result of displacement by disturbance	None required	Imperceptible	-	L	I	R	St

Table 11.8: Summary of Residual Ecology Effects

Operation								
Designated Sites – South Dublin Bay and River Tolka SPA, North Bull Island SPA, South Dublin Bay SAC and North Dublin Bay SAC	Pollution Ecological enhancement	None required	Imperceptible	+/-	L	I	IR	P
Terrestrial habitats	Ecological enhancement	None required	Imperceptible	-	L	D	R	P
Bats	Disturbance through lighting	None required	Imperceptible	-	L	D	R	Lt-P
Birds	Foraging habitat enhancement	None required	Imperceptible	-	L	D	R	Lt-P

Notes:

* - = Negative/ + = Positive/+/- = Neutral; R = Reversible, IR = Irreversible; D = Direct, ID = Indirect;

L= Likely, U = Unlikely; M = Momentary, B = Brief, T= Temporary, St = Short-term, Mt = Medium-term, Lt = Long-term, P = Permanent.

** Imperceptible, Not Significant, Slight, Moderate, Significant, Very Significant, Profound.

Cumulative Effects

Intra-Project Effects

11.69 As explained in Volume 1, Chapter 2: EIA Process and Methodology, intra-project cumulative effects are discussed in Volume 1, Chapter 16: Cumulative Effects.

Inter-Project Effects

11.70 Table 11.9 provides a summary of the likely cumulative effects resulting from the proposed development and the cumulative developments.

Table 11.9: Inter-Project Cumulative Effects

Cumulative Development	**Construction**		**Operation**	
	Cumulative Effects Likely?	**Reason**	**Cumulative Effects Likely?**	**Reason**
SD21A/0241 Vantage Data Centers Dub 11 Ltd., Profile Park, Clondalkin, Dublin 22 SD21A/0167 Centrica Business Solutions, Profile Park, Baldonnel, Dublin 22 SD17A/0377	No	All effects during Construction stage of proposed development are imperceptible or not significant	No	All effects during Operation stage of proposed development are imperceptible, not significant and/or neutral – therefore no negative cumulative effects

Table 11.9: Inter-Project Cumulative Effects

Cumulative Development	**Construction**		**Operation**	
	Cumulative Effects Likely?	**Reason**	**Cumulative Effects Likely?**	**Reason**
Digital Realty Trust, Profile Park, Baldonnel, Dublin 22, D22 TY06 SD21A/0186 Equinix (Ireland) Ltd. Plot 100, Profile Park, Nangor Road, Clondalkin, Dublin 22 SD20A/0121 UBC Properties, townlands within Grange Castle, Profile Park, Baldonnel, Dublin 22 VA06S.308585 UBC Properties LLC Grange Castle South Business Park, Dublin 22 SD20A/0295 CyrusOne Irish Datacentres Holdings Ltd. Townlands within Grange Castle South Business Park, Baldonnel, Dublin 22 SD18A/0134 CyrusOne Irish Datacentres Holdings Ltd. Grange Castle Business Park, Clondalkin, Dublin 22 SD20A/0295 CyrusOne Irish Datacentres Holdings Ltd. Townlands within Grange Castle South Business Park, Baldonnel, Dublin 22				

Construction Cumulative Effects

11.71 It has been concluded that, with embedded mitigation measures included in the proposed development, it is likely that there would be no significant cumulative effects on designated sites or any other ecological feature in combination with any other development during these stages.

Operation Cumulative Effects

11.72 It has been concluded that, with embedded mitigation measures included in the proposed development, it is likely that there would be no significant negative cumulative effects on designated sites or any other ecological feature in combination with any other development during the operation stage.

Summary of Assessment

Background

11.73 This chapter has detailed the potential ecology effects due to the construction and operation development stages of the proposed development. The assessment of construction and operation stages has been undertaken taking into account the relevant national and local guidance and regulations.

11.74 The desk-based assessment identified six Special Areas of Conservation (SACs) and four Special Protection Areas (SPA) within 15km, or with a potential hydrological connection. Within 5km of the site boundary there are two proposed Natural Heritage Areas (pNHAs).

11.75 Four habitat types were identified within the site during a Fossitt habitat survey undertaken in June 2021. The main habitat types recorded within the site are Improved Grassland (GA1), and Buildings and Artificial Surfaces (BL3). The lands directly under and adjacent to the proposed development are considered to be of low ecological value.

11.76 Bat surveys revealed low levels of commuting/foraging bat use of the site by common Irish species.

Construction Effects

11.77 During construction works, there may be disturbance of protected species or breeding birds, loss of habitats, habitat damage though air- or water-borne pollutants, accidental trapping of mammals in excavations, and habitat fragmentation and loss of commuting routes for wild mammals. These have the potential to lead to effects on protected species populations and one internationally designated site. However, considering the importance and sensitivity of these designated sites, habitats and species, and embedded mitigation measures designed into the proposed development, these effects are considered to be imperceptible and not significant.

11.78 Overall, it is considered that construction of the proposed development would result in a negative but imperceptible effect on ecology and identified receptors. As such, it would **not give rise to significant effects** on ecology in EIA terms.

Operation Effects

11.79 During the operation stage, no significant impacts to local ecology are expected. The residual effects would be expected to be negative, imperceptible for the local bat and bird populations and terrestrial habitats, and imperceptible and neutral for designated sites.

11.80 Overall, it is considered that the operation stage would result in a negative but imperceptible effect on ecology and identified receptors. It would therefore **not give rise to significant effects** on ecology in EIA terms.

Cumulative Effects

11.81 No significant effects are predicted on ecology as a result of the proposed development alone in either the construction or the operation stage so there is no potential for cumulative effects.

12 GROUND CONDITIONS

Introduction

12.1 This chapter of the EIAR reports on the likely significant ground condition effects to arise from the construction stage and the operation stage of the proposed development.

12.2 The chapter describes the ground condition policy context; the methods used to assess the potential impacts and likely effects; the baseline conditions at and surrounding the site; the likely ground condition effects taking into consideration embedded mitigation; the need for additional mitigation and enhancement; the significance of residual effects; and inter-project cumulative effects.

12.3 The chapter is supported by the following technical appendices in EIAR Volume 3:

- Appendix 12.1: ISGL Ltd, 2021, Project Apollo (Substation): Ground Investigation Report; and
- Appendix 12.2: Ramboll, 2021, Vantage Data Centers Dublin, Contamination Land Interpretative Screening Sheet.

Methodology

12.4 The assessment has been informed by the following published guidance (further to those listed in the Planning Context section in Volume 1, Chapter 1: Introduction and Paragraph 2.7 of Volume 1, Chapter 2: EIA Process and Methodology of this EIAR Volume):

- International Legislation:
  - Water Framework Directive (WFD) (2000/60/EC)[1];
  - Environmental Quality Standards (EQS) Directive (2008/105/EC)[2] (as amended)[3];
  - Priority Substances Directive (2008/105/EC)[4];
- National legislation, guidance and industry standards:
  - European Communities Environmental Objectives (Groundwater) Regulations 2010[5];
  - Guidelines for the preparation of Soils Geology and Hydrogeology Chapters of Environmental Impact Statements' (Institute of Geologists of Ireland (IGI), 2013)[6];
  - Guidelines on Procedures for the Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (National Roads Authority (NRA), 2009)[7];
  - Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites (Environmental Protection Agency (EPA), 2013)[8]; and
  - Code of Practice: Environmental Risk Assessment for Unregulated Waste Disposal Sites (EPA, 2007)[9].

12.5 For human health assessments from impacts to soil, there are no statutory thresholds in Ireland for the assessment of soil contamination. For human health, the EPA recommends the use of Generic Assessment Criteria (GAC), based on the UK Environment Agency Contaminated Land Exposure Assessment (CLEA)[8] model, either produced by the UKEA itself (known as Soil Guideline Values (SGV)) or values generated using the CLEA model by reputable third-party organisations. Where GAC have not been published or if practitioners do not use human health GAC publications, values should be generated by appropriately qualified and experienced professionals using the CLEA model for consistency with the EPA approach.

12.6 The 'Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites' indicates that values for screening of the impact on groundwater may come from several sources, including the European Communities Environmental Objectives (Groundwater) Regulations 2010, the EPA's Groundwater Threshold Values (GTV), the EPA's Interim Guideline Values (IGV) or relevant Environmental Quality Standards (EQS). The latter guidelines are used when considering a surface water receptor.

12.7 There are no provisions to create a contaminated land database in the Republic of Ireland (RoI) and since contaminated land regulations have not yet been enforced. It is unlikely that there is a dedicated contaminated land officer at SDCC, however, most counties have an Environmental Department responsible for waste management; environmental enforcement; litter control; pollution control; environment education and awareness; and water quality.

Assessment Scope

12.8 There is no statutory definition of 'contaminated land' in the RoI, and in contrast to the UK, there is no framework within which the regulatory agencies are required to undertake an assessment of contaminated sites or create a register of contaminated land. Furthermore, there are currently no Irish standards in relation to the clean up or rehabilitation of contaminated land.

12.9 The 'Code of Practice: Environmental Risk Assessment for Unregulated Waste Disposal Sites' (2007) established a risk based approach for soil and groundwater assessment and remediation in line with the UK Environment Agency's document 'Model Procedures for the Management of Land Contamination: Contaminated Land Report No. 11 (CLR 11) – Note CLR 11' (2004)[10], now replaced in the UK by 'Contaminated Land Risk Management' (2020) guidance[11]. In 2013, the EPA published 'Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites' (e.g. large scale industrial activities, large petrol storage facilities, waste sites).

12.10 As there is no published or formalised technical guidance relating to the assessment of ground contamination (including controlled waters) effects, professional judgement, experience and best practice methods have therefore been drawn upon to assess the significance of the potential ground contamination (including controlled waters) effects of the proposed development. The assessment has taken account of all applicable legislation, guidance and policy as previously outlined.

Technical Scope

12.11 The potential pollutant linkages and contamination impacts for both the construction stage and the operational stage of the proposed development have been assessed.

12.12 The technical scope of the assessment includes the potential for existing contamination to be present within the soil and shallow groundwater on the site, and the risks to human health and the water environment waters associated with the potential presence and mobilisation of existing contamination.

12.13 Accordingly, the following potential pollutant linkages, which have the potential to present an unacceptable risk, have been considered:

- Exposure of construction workers to contaminated soil;

[1] European Union, 2000. Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy. Document 32000L0060.
[2] European Union, 2008. Directive 2008/105/EC of the European Parliament and of the Council of 16 December 2008 on environmental quality standards in the field of water policy, amending and subsequently repealing Council Directives 82/176/EEC, 83/513/EEC, 84/156/EEC, 84/491/EEC, 86/280/EEC and amending Directive 2000/60/EC of the European Parliament and of the Council. Document 32008L0105.
[3] European Union, 2013. Directive 2013/39/EU of the European Parliament and of the Council of 12 August 2013 amending Directives 2000/60/EC and 2008/105/EC as regards priority substances in the field of water policy Text with EEA relevance. Document 32013L0039.
[4] European Union, 2008. Directive 2008/105/EC of the European Parliament and of the Council of 16 December 2008 on environmental quality standards in the field of water policy, amending and subsequently repealing Council Directives 82/176/EEC, 83/513/EEC, 84/156/EEC, 84/491/EEC, 86/280/EEC and amending Directive 2000/60/EC of the European Parliament and of the Council. Document 32008L0105.
[5] Government of Ireland, 2010. European Communities Environmental Objectives (Groundwater) Regulations 2010. S.I. No. 9 of 2010.
[6] Institute of Geologists of Ireland (IGI), 2013. Guidelines for the preparation of the Soils, Geology and Hydrogeology chapters of an Environmental Impact Assessment Report (EIARs). Published 30 April 2013. IGI.
[7] National Roads Authority (NRA), 2009. Guidelines on Procedures for the Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes. NRA.
[8] Environmental Protection Agency (EPA), 2013. Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites. EPA.
[9] EPA, 2007. Code of Practice: Environmental Risk Assessment for Unregulated Waste Disposal Sites. EPA.
[10] Environment Agency, 2004. Model Procedures for the Management of Land Contamination: Contaminated Land Report No. 11 (CLR 11) – Note CLR 11. [Now withdrawn].
[11] Environment Agency, 2020. Guidance: Land contamination risk management (LCRM). October 2020. EA.

- Generation of dust and potentially contaminated dusts, including asbestos;
- Exposure of construction workers to ground gases;
- Exposure of construction workers to contaminated groundwater (if present);
- Mobilisation of contamination in groundwater and surface water through earthworks and foundation works;
- Mobilisation of site materials and pollutants during rainfall events;
- Changes in ground level as a result of earthworks and cut and fill activities may increase vulnerability of the underlying bedrock aquifer;
- Contaminants introduced by construction activities through leakages/spillages; and
- Loss of agricultural land.

12.14 During the operational stage there would be no interaction between the proposed development and deep groundwater beneath the site. As such, deep groundwater has not been assessed for the operational stage.

Spatial Scope

12.15 The study area is defined as that within a radius of up to 2 kilometres (km) from the site boundary. The study area has been used to identify potential historical land uses which may have contributed to contamination issues associated within the site; as well as potentially sensitive land uses in the wider surrounding area that could be impacted if existing contaminants were mobilised as a result of the proposed development.

Temporal Scope

12.16 In line with EPA guidance, as outline in Volume 1, Chapter 2: EIA Process and Methodology, the duration of effects has been classified using the following: Momentary (seconds to minutes), Brief (<one day), Temporary (<one year), Short-term (one to seven years), Medium-term (seven to 15 years), Long-term (15 to 60 years), Permeant (>60 years). The assessment has considered impacts arising during the construction stage (10 months excluding commissioning) which would be expected to be temporary in nature and from the operation stage which would be expected to be long-term to permeant.

Baseline Characterisation Method

Desk Study

12.17 In order to establish baseline geology and soil conditions in the study area, relevant data was reviewed and assessed. Data was obtained from the following sources:

- Geological Survey of Ireland (GSI) – online Public Viewer mapping[12], which includes Geohazard Database, Geological Heritage Sites and Sites of Special Scientific Interest, Bedrock Memoirs and 1:100,000 mapping,
- Teagasc soil and subsoil database[13];
- Ordnance Survey Ireland – aerial photographs and historical mapping[14];
- EPA website mapping and database information[15]; and
- National Parks and Wildlife Services (NPWS) – Protected Site Register[16].

12.18 Site-specific data was derived from the following sources:

- ISGL 2021 Ground Investigation – (provided in Appendix 12.1 of EIAR Volume 3); and
- Various design site plans and drawings.

[12] Geological Survey Ireland, 2021. Data and Maps [online]. Available at: https://www.gsi.ie/en-ie/data-and-maps/Pages/default.aspx [Accessed 29/10/2021].
[13] Teagasc, 2017. County Soils Maps [online]. Available at: https://www.teagasc.ie/crops/soil--soil-fertility/county-soil-maps/
[14] Ordnance Survey Ireland, 2018. Historical Mapping [online]. Available at: https://www.osi.ie/products/professional-mapping/historical-mapping/

Field Study

12.19 An intrusive ground investigation was undertaken in June 2021 by IGSL to characterise the ground, groundwater and ground gas conditions of the site and the potential contamination risks. The factual results of this investigation are reported within Appendix 12.1 of EIAR Volume 3.

12.20 Interpretation of the IGSL data is provided in Appendix 12.2 of EIAR Volume 3.

Assessment Method

Methodology

Construction Stage

12.21 The identification of likely significant effects during the construction stage was based on a review of the presence of potential receptors, a qualitative assessment of the sensitivity of the receptors, the identification of potential impact pathways and an assessment of the magnitude of the potential impacts.

12.22 The assessment of potential impacts and likely effects has, therefore, comprised the following approach:

- Identification and establishment of the sensitivity of receptors on the basis of their use, proximity to the site, existing quality or resource value;
- Consideration of potential source-pathway-receptor linkages;
- Evaluation of the magnitude of potential impacts from potential contamination as a result of the introduction of the proposed development;
- Consideration of embedded mitigation measures integral to the proposed development;
- Classification of the significance of likely effects;
- Identification of additional mitigation measures to eliminate or reduce residual effects, where considered necessary; and
- Re-assessment to conclude the likely significance of residual effects.

Operation Stage

12.23 The construction stage methodology has been applied to the identification of likely significant effects during the operational stage.

Cumulative Stage

12.24 With respect to potential inter-cumulative effects, the assessment reviews the potential effects on geology and soils of the cumulative development (through review of project details for potential effects on geology of their sites and locality) and discusses whether and how any likely effects of the proposed development may interact with them, resulting in a cumulative effect.

Assessment Criteria

12.25 The criteria used to assess if an effect is significant or not, is set out in subsequent sub-sections. This is determined by consideration of the sensitivity of the receptor, magnitude of impact and scale of the effect. In considering the significance of an effect, consideration has been given to the duration of the effect, the geographical extent of the effect and the application of professional judgement.

12.26 Although there is no framework or Irish standards in relation to the assessment of risks associated with contamination, often the UK framework is adopted. This framework allows for the categorisation of risks and is undertaken in terms of consequence (i.e. severity of risk) and probability (i.e. likelihood of the risk being realised), which are combined to produce an overall classification of the risk of harm occurring.

[15] Environment Protection Agency, 2021. Maps [online]. Available at: https://gis.epa.ie/EPAMaps/
[16] National Parks and Wildlife Service, 2020. Information [online]. Available at: https://www.gov.ie/en/organisation-information/09575-national-parks-and-wildlife-service/

Whilst this classification is not directly translatable into the EIA process, the principles and land use scenarios from the framework have been used to allocate criteria that can be used in EIA.

12.27 The human health criteria, set out in Tables 12.1 and 12.2, have been based on that principle for the assessment of risks associated with contaminated land. Criteria for surface and groundwater have been based on a variety of sources including Water Framework Directive (WFD) Protected Area designations, GSI and EPA aquifer classifications.

Receptor Sensitivity/Value Criteria

12.28 The sensitivity of receptors has been classified as low, medium, high or very high, in accordance with the criteria set out in Table 12.1.

Table 12.1: Receptor Sensitivity/Importance Criteria

Sensitivity	Criteria (Examples)
Low	Human health: low sensitivity land use such as commercial or industrial.
	Surface water: • Has no or minimal ecosystem present; • Does not form or supply water to a designated site; • Provides low/no amenity value; • Is not used as a commercial or private water supply; • Is substitutable in short-term; and • Does not form part of a designated fishery.
	Groundwater: • Poor aquifers are classed as either generally unproductive except for local zones (Pl) or generally unproductive (Pu). • Is classified as having low aquifer vulnerability; • Does not supply baseflow to local rivers; • Resource is such that there is some potential for substitution; • Is classified by the EPA as not being at risk; • Is not located within a groundwater source protection area (SPA); • Is not used as a commercial or private water supply; • Does not supply a groundwater dependent terrestrial ecosystem (GWTE); • No hazardous substances recorded within the aquifer; and • Is not threatened by, or sensitive to, saline intrusion.
Medium	Human health: medium sensitivity land use such as public open space.
	Surface water: • Has an ecosystem that has low sensitivity to water quality or quantity changes; • Provides amenity value on a local basis; • Is used as a water supply for industrial, commercial or agricultural purposes; • May be substitutable in the long-term; and • Is or forms part of a cyprinid fishery.
	Groundwater: • Is a locally important aquifer. These are sub-divided into those that are generally moderately productive (Lm) and those that are generally moderately productive only in local zones (Ll). • Is classified as having low or intermediate aquifer vulnerability; • Contributes some baseflow to local rivers;

Table 12.1: Receptor Sensitivity/Importance Criteria

Sensitivity	Criteria (Examples)
	• May be substitutable in the long-term; • Is classified by the GSI as probably not being at risk; • Is located within a groundwater SPA (source catchment area); • Provides water for agricultural or industrial use with limited connection to surface water; • Supplies a GWTE that has species that are not protected or listed. They are abundant/common and not critical for GWDTE functions; • Shows a downward trend in hazardous substances; • Is potentially at risk from or sensitive to saline intrusion; and • Is extracted such that extraction could potentially put water balance at risk.
High	• Human health: high sensitivity land use such as schools or residential without private gardens.
	Surface water: • Has an ecosystem that has moderate sensitivity to water quality or quantity changes; • Supports protected aquatic flora and fauna of national importance; • Is or supplies water to nationally designated sites (e.g. National Park or Nature Reserve); • Is regularly used for recreation (where water immersion sports are practiced regularly) and commercial navigation, important on a local or regional basis; • Is used as a local water supply for potable water supply purposes; • Is not substitutable in the short- or long-term; • Is or forms part of a salmonid fishery; and • Is a designated shellfish water.
	Groundwater: • Is a regionally important aquifer. These are 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). • Regionally important aquifer with high vulnerability; • Contributes some baseflow to regionally important rivers; • Is not substitutable in the short- or long-term; • Is classified by the GSI as being probably at risk; • Is located within a groundwater SPA (outer catchment); • Provides water for a private water supply or locally important industrial, commercial or agricultural purposes; • Provides locally important resource or supports aquatic ecosystems; • Shows a stable pattern of hazardous substances; • Quality is sensitive to or likely to be threatened by saline intrusion; and • Is extracted such that extraction is putting water at risk.
Very High	Human health: very high sensitivity land use such as allotments or residential with private gardens.
	Surface water: • Has an ecosystem that has high sensitivity to water quality or quantity changes; • Supports nationally or internationally protected species or supplies a site that has these characteristics; • Is or supplies water to internationally designated sites (e.g. Ramsar sites);

Table 12.1: Receptor Sensitivity/Importance Criteria	
Sensitivity	**Criteria (Examples)**
	• Is a major commercially significant navigational or recreational water body (where water immersion sports are practiced regularly); • Is used as a regional water supply for potable water supply purposes; • Is not substitutable in the short- or long-term; and • Is or forms part of a salmonid fishery.
	Groundwater: • Is a regionally important aquifer. These are 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). • Regionally important aquifer with high vulnerability; • Provides significant baseflow to rivers; • Is not substitutable in the short- or long-term; • Is classified by the GSI as being at risk; • Is located within a groundwater SPA (inner catchment); • Provides water for a public water supply or regionally important industrial, commercial or agricultural purposes; • Supports aquatic ecosystems incorporating protected species; • Shows an upward trend in hazardous substances; • Is subject to saline intrusion causing damage to quality of the groundwater; and • Is extracted such that extraction is putting water balance at severe risk.

Impact Magnitude Criteria

12.29 The magnitude of impact has been classified as low, medium or high, in accordance with the criteria set out in Table 12.2.

Table 12.2: Impact Magnitude Criteria	
Magnitude of Impact	**Criteria**
Low	Human health: • Contaminant concentrations substantially below relevant screening criteria as detailed in Appendix 12.2 of EIAR Volume 3; • Resulting exposure to contamination is unlikely to represent significant harm or significant potential of significant harm (SPOSH) to receptors; and • No requirement for specific control measures to reduce risks to human health and/or make land suitable for intended use.
	Surface water: • Small alteration/change in the quality or quantity of controlled waters and/or to the physical or biological characteristics of surface waters (refer to Chapter 10: Water Resources and Flood Risk).
	Groundwater: • Water quality/quantity within screening levels and unlikely to affect most sensitive receptors; • Localised changes in groundwater levels or quality but no appreciable change in wider groundwater regime; and • Short-term changes that would recover in the short- to medium-term.
	Buildings: • Damage to buildings or property easily repairable as part of normal maintenance routines.
Medium	Human health: • Contaminant concentrations are below relevant screening criteria as detailed in Appendix 12.2 of EIAR Volume 3; • Significant contamination is unlikely with a low risk to human health; and • Best practice measures can be required to minimise risk to human health.
	Surface water: • Medium alteration/change in the quality or quantity of controlled waters and/or to the physical or biological characteristics of surface waters (refer to Chapter 10: Water Resources and Flood Risk).
	Groundwater: • Non-compliance with water quality/quantity standards on a short-term basis; • Localised changes in groundwater levels or quality with small-scale measurable changes in wider groundwater regime but no significant impact on local private water supplies; and • Change in water body but not enough to change its WFD status.
	Buildings: • Damage to buildings or property requiring investment in excess of normal maintenance routines.
High	Human health: • Contamination levels exceed background levels and relevant screening criteria as detailed in Appendix 12.2 of EIAR Volume 3 with potential for significant harm to human health; and • Control/remediation measures are required to reduce risks to human health and/or make land suitable for intended use.
	Surface water: • Large alteration/change in the quality or quantity of controlled waters and/or to the physical or biological characteristics of surface waters (refer to Chapter 10: Water Resources and Flood Risk).
	Groundwater: • Non-compliance with water quality/quantity standards on a long-term basis; • Measurable changes in groundwater levels or quality in wider groundwater regime with significant impact on local private or public water supplies; and • Changes in quantity or quality that result in a reduction in WFD status.
	Buildings: • Significant or material damage to buildings or property.

Scale of Effect Criteria

12.30 Impacts have been assessed on the basis of the value/sensitivity of receptors against the magnitude of impact to determine the scale of effect as presented in Table 12.3.

Table 12.3: Scale of Effect Criteria			
Magnitude	**Sensitivity of Receptors**		
	Low	**Medium**	**High to Very High**
Low	Imperceptible	Imperceptible/Not Significant	Slight/Moderate
Medium	Imperceptible/Not Significant	Moderate	Moderate/Significant
High	Slight/Moderate	Moderate/Significant	Very Significant/Profound

12.31 Based on Environmental Protection Agency's (EPA) Draft Guidelines on the information to be contained in Environment Impact Assessment Reports[17] (2017), as described in Volume 1, Chapter 2: EIA Process and Methodology, effects ranging from 'moderate' to 'profound' are considered **significant** in EIA terms based on professional judgement.

Nature of Effect Criteria

12.32 The nature of the effect has been described as either negative, neutral or positive as follows:

- Positive – An advantageous effect to a receptor;
- Neutral – An effect that on balance, is neither positive nor negative to a receptor; or
- Negative – A detrimental effect to a receptor.

Assumptions and Limitations

12.33 The assessment has relied on data provided within public domain environmental databases. It has been assumed that the data sets within these reports have been reported correctly and are most up to date.

12.34 The field data comprising soil and groundwater quality was collected for the site was collected IGSL. It has been assumed that the data sets within the IGSL report have been reported correctly.

Baseline Conditions

Existing Baseline

Current and Historical Use

12.35 An assessment of site history using historical maps (OSI, 2019) indicates that the site has been in agricultural use since the earliest mapping available (1837 to 1842).

12.36 The site currently consists of mostly flat undeveloped land with the land surrounding the site comprising a mixture of undeveloped land/agricultural and light industrial uses. The cable transmission route runs predominantly down Falcon Avenue. The Google PPK Data Center is located to the west of the site and Digital Realty Profile Park building is located to the east of the site. To the north and south the land is undeveloped. Several data centre developments are under construction or are operational in the vicinity of the site.

Geology

12.37 With reference to published GSI and Teagasc records, the site is anticipated to be underlain (in sequence) by Quaternary Glacial Till Deposits and the Lucan Formation which comprises dark grey to black limestone and shale (also known as Dinantian (Upper Impure) Limestone or Calp Limestone). It is also anticipated that topsoil would be present within the site and Made Ground in previously developed areas e.g. underlying Falcon Avenue/Profile Park.

12.38 The following ground conditions were encountered in the site-specific investigation undertaken by IGSL in June 2021 and comprised 22 dynamic probe holes and six trial pits excavated across the site. Figure 12.1 identifies the probe hole/trial pit locations.

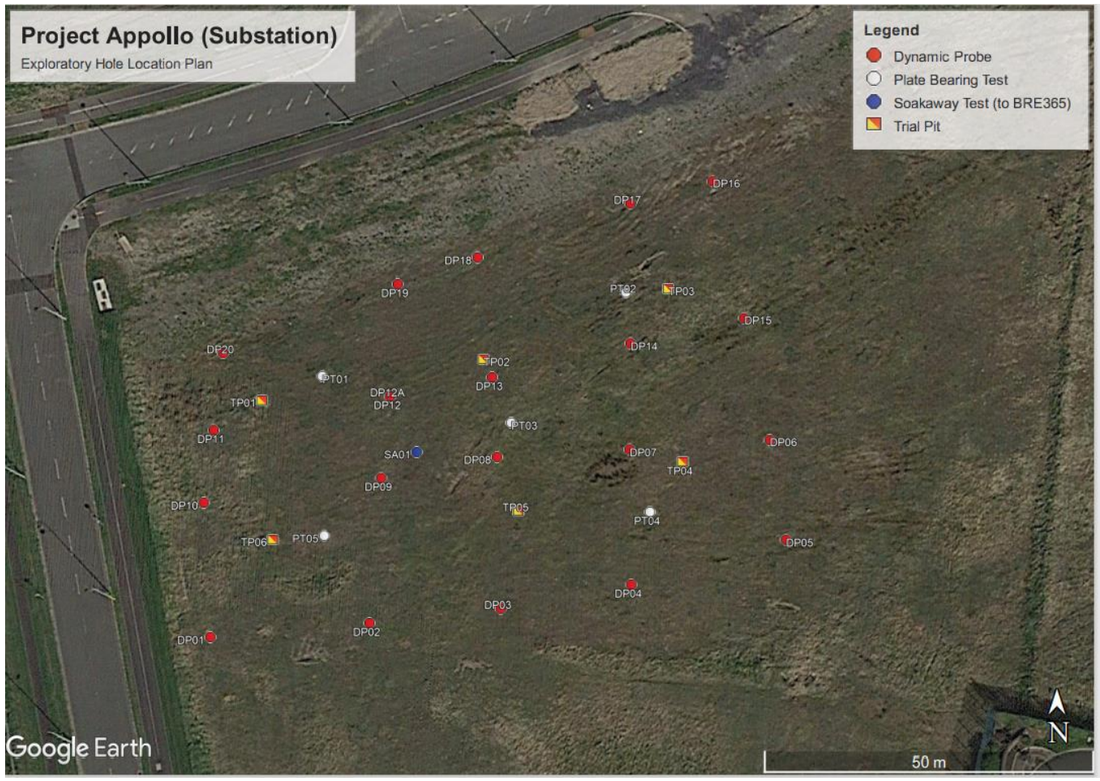


Figure 12.1: Site Investigation Sample Location Plan (extracted from IGSL 2021 report)

12.39 The investigations have revealed the ground conditions at the proposed substation site to comprise:

- Topsoil consisting of brown slightly sandy silty clay/silt with occasional rootlets;
- Glacial Till – firm mottled grey and brown sandy gravelly clay/silt with a medium cobble content;
- Glacial Till – stiff to very stiff dark grey very gravelly silt/clay with a medium cobble content;
- Variably weathered rockhead recovered as dark grey clayey silty gravel shy of trial pit termination. Gravel and cobbles range from medium strong limestone to weak mudstone or shale; and
- Bedrock consisting of dark grey and black limestone with thin horizons of fissile shale or mudstone.

12.40 Made ground is also anticipated in previously developed areas and, in particular, beneath Falcon Avenue/Profile Park on the route of the transmission lines.

12.41 The GSI Public Viewer was reviewed to identify sites of geological heritage for the site and surrounding area. There are no recorded geological heritage sites on the site and there is no evidence of any geological heritage site which could be considered suitable for protection from the proposed development. Likewise, there are no identified geological heritage sites in the SDCC Development Plan 2016-2022[18] associated with the site.

[17] Environmental Protection Agency, 2017. Draft Guidelines on the information to be contained in Environmental Impact Assessment Report (EIAR)

[18] SDDC, 2016. South Dublin County Council Development Plan 2016-2022 [online]. Available at: https://www.sdcc.ie/en/services/planning/development-plan/plan-2016-2022/ [Accessed 28/06/2021].

Hydrogeology

12.42 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; cubic metres per day), specific capacity ($m^3/d/m$; cubic metres per day per m depth) and groundwater throughput (mm^3/d; cubic millimetres per day). 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 comprises 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).

12.43 The bedrock aquifers underlying the site according to the GSI National Draft Bedrock Aquifer Map (see earlier reference to GSI – online Public Viewer mapping) are classified as Dinantian Limestones (Calp). The GSI has classified this aquifer as Locally Important (Ll), i.e. an aquifer which is moderately productive only in local zones.

12.44 During the 2021 ground investigation, groundwater seepages were only encountered in one of the trial pits excavated. The groundwater was reported at depth of 2.3m below ground level.

12.45 There is the potential for groundwater beneath the site to be in continuity with the Baldonnel stream (located approximately 150m north). Given this, the groundwater flow direction is likely to be towards the north.

12.46 There is no evidence of springs or karstification in this area according to the GSI Karst database.

Groundwater Quality Status and Groundwater Bodies

12.47 With reference to the WFD, the Groundwater Body (GWB) underlying the site is the Dublin GWB (EU GWB Code: IE_EA_G_008), which under WFD is of 'good status' and has a GWB risk score of 'not at risk' (2010-2015 WFD status).

12.48 The GSI currently classifies the aquifer vulnerability underlying the site to be high (H) with the subsoils being of low permeability.

12.49 The site is not situated with a Groundwater Drinking Water Protection Area or Groundwater SPA and there are no wells or springs within 1km of the site with the closest being approximately 3km southeast and east of the site.

12.50 There are no Special Protection Areas, candidate Special Areas of Conservation or proposed Natural Heritage Areas within or immediately adjacent to the site.

Hydrology

12.51 The site is situated within the sub catchment of the Griffeen River and Baldonnel Stream which are tributaries of the River Liffey. The Baldonnel Stream runs approximately east to west 150m north of the site. Further surface water features are present within the Grange Castle Golf Club situated approximately 300m east of the site.

Surface Water Quality Status and Surface Water Bodies

12.52 Currently, the EPA classifies the Baldonnel Stream and Griffeen River as being under review. A review of WFD waterbody status (2013-2018) indicates that the Baldonnel Stream is classified as having 'moderate status'. The nearest EPA monitoring stations are at Baldonnel Stream (RS09B090400) located 300m west of the site, downstream of Bolands Garage and at Griffeen (RS09G010200), located approximately 1.1km west of the site. The latest EPA biological assessment of surface water from the latter location indicated a score of Q3 (poor) in 1991.

Ground Gases (including Radon)

12.53 According to the EPA (now incorporating the Radiological Protection Institute of Ireland) the site is in a Low Radon Area where is it estimated that between 5% to 10 % of dwellings would exceed the Reference Level of 200Bq/m^3 (becquerel per cubic meter). This is the third lowest of the five radon categories which are assessed by the EPA.

Mining and Quarrying

12.54 According to the GSI there are no active quarries located in the immediate vicinity of the site with the nearest quarry being located approximately 3km southeast at Belgard Quarry. EPA mapping indicates there are no mines on or near the site.

Geomorphology and Designated Sites

12.55 No designated geological or geomorphological areas or sites are present on-site or adjacent to the site. As such, the proposed development is not considered to negatively impact on such receptors. The closest geological heritage site is the Belgard Quarry, located 3km to the southeast of the site.

Current Regulated Activities and Industrial Uses including Landfills

12.56 According to the EPA, there are a number of licensed Integrated Pollution Prevention and Control (IPPC) and waste facilities; however, these are located approximately 3km from the site.

12.57 Information gained from surrounding planning applications indicates that there no known illegal or historic landfills within 500 m of the site; however it is understood that uncontrolled waste operations are undertaken at the car centre 200m northwest of the site.

Sources of Contamination

12.58 Due to the lack of development at the site (aside from along Falcon Avenue and pedestrian and cycle paths) and the low risk historical agricultural use, the risk of contaminated soils being present on site is low.

12.59 No particular types of potential contaminants were identified from the current and historical use of the site; therefore, the 2021 ground investigation included a typical contaminated land chemical testing suite comprising of heavy metals, petroleum hydrocarbons, asbestos, organic contaminants (such as polycyclic aromatic hydrocarbons (PAHs)) and ground gases.

12.60 The findings of the initial contaminated land assessment (i.e. comparison of soil and water contaminant levels against GAC) as detailed in Appendix 12.2 of EIAR Volume 3 is as follows:

- There are no potentially significant contaminative activities on site;
- No significant visual or olfactory field evidence of contamination within soils or groundwater was found on site;
- Very low levels of soil contamination were recorded on site, typical of a greenfield site at concentrations that do not present a significant risk to potential receptors;
- No asbestos was detected on site; and
- No significant potential off site contamination sources were identified.

12.61 It is expected that similar conditions are present underlying Falcon Avenue.

12.62 Below is a summary of the site sensitivity in relation to geology, hydrogeology, hydrology and contamination:

- The site has been predominantly greenfield and agricultural use historically. There is no evidence of any historical waste disposal or source of contamination;
- The site is underlain by a LI aquifer;

- The site is underlain by the Lucan formation comprising dark grey to black limestone and shale from the Carboniferous Age; and
- Very low levels of soil contamination were recorded typical of a greenfield site at concentrations that do not present a significant risk to potential receptors.

Future Baseline

12.63 The existing baseline conditions have been used for this assessment as the proposed future activities on site (use as a substation) would not introduce any significant sources of contamination which could significantly impact soil or the water environment.

Sensitive Receptors

12.64 The receptors identified as sensitive to the proposed development and which have been 'scoped-in' to the assessment are summarised in Table 12.4.

Table 12.4: Summary of Sensitive Receptors

Receptor	Sensitivity
Construction workers	Low
Adjacent site users	Low
Future site users	Low
Water environment (Baldonnel Stream 150m north)	Low
Groundwater beneath the site (aquifers)	Medium

Assessment of Effects

Construction Effects

Embedded Mitigation

12.65 This section identifies a range of embedded mitigation measures that are incorporated within the Proposed Development.

Construction Environment Management Plan

12.66 A project-specific CEMP would be established and maintained by the contractors during the construction stage which would cover all potentially polluting activities and emergency response procedures. All personnel working on the site would be trained in the implementation of the procedures.

12.67 The measures identified in this section (including those in relation to control of soil excavation, material export, fill materials, fuel and chemical handling, transport and storage and control of water), and those provided in Volume 1, Chapter 5: Construction Environmental Management, would be included in the CEMP.

Control of Soil Excavation

12.68 Subsoil would be excavated to facilitate construction of foundations, access and internal roads, expansion of drainage connections, cable transmission routes and other ancillary works. The proposed development would incorporate the reduction, reuse and recycle approach in terms of on-site soil excavations as much as possible.

12.69 It is predicted that the majority of the cut material generated during site preparation/levelling (2,829 m^3) would be disposed of offsite (mainly topsoil material). Approximately 10, 800m^3 fill would be required to facilitate construction of the proposed roads, carparks, buildings and landscaping berms. It is assumed that the majority of the topsoil/cut material would be taken offsite.

12.70 The proposed works would be carefully planned to ensure only material required to be excavated would be, with as much material left *in situ* as possible.

12.71 Excavation works would be carefully monitored by a suitably qualified person to ensure any potentially contaminated soil is identified and segregated from clean/inert soil. In the unlikely event that any potentially contaminated soils are encountered, the soil should be tested and classified as hazardous or non-hazardous in accordance with the EPA's Waste Classification –List of Waste & Determining if Waste is Hazardous or Non-Hazardous'[19] publication, HazWasteOnline tool[20] or similar approved method. The material would then need to be classified as inert, non-hazardous, stable non-reactive hazardous or hazardous in accordance with EC Decision 2003/33/EC[21]. It should then be removed from site by a suitably permitted waste contractor to an authorised waste facility.

12.72 Stockpiles have the potential to cause negative impacts on air and water quality. The effects of soil stripping and stockpiling would be mitigated against through the implementation of an appropriate earthworks handling protocol during construction within the CEMP. It is anticipated that any stockpiles would be formed within the boundary of the site and there would be no direct link or pathway from this area to any surface water body.

12.73 Dust suppression measures (e.g. damping down during dry periods), vehicle wheel washes, road sweeping, and general housekeeping would ensure that the surrounding environment is free of nuisance dust and dirt on roads.

Export of Material from Site

12.74 It is currently envisioned that the majority of soil/stones arising on the site would be taken off site. In the event that any excavated material requires removal off site, it may be removed as either a waste or, where appropriate, as a by-product. Where the material is to be reused on another site as a by-product (and not as a waste), this would be done in accordance with Article 27 of the *European Communities (Waste Directive) Regulations 2011*[22]. EPA agreement would be obtained before re-using the spoil as a by- product. It is currently anticipated that most of the excavated material would be removed offsite. Where material cannot be reused off site it would be sent for recovery or disposal at an appropriately authorised facility.

12.75 If any waste soil requires removal from site, it would be classified by an experienced and qualified environmental professional to ensure that the waste soil is correctly classified for transportation and recovery/disposal offsite. Refer to Volume 1: Chapter 14: Waste for further information.

Sources of Fill and Aggregates

12.76 All fill and aggregate for the proposed development would be sourced from reputable suppliers. All suppliers would 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.

[19] EPA, 2018. Waste Classification List of Waste & Determining if Waste is Hazardous or Non-hazardous. July 2018 EPA.
[20] HazWasteOnline, 2012. Waste Assessment Tool [online]. Available at: https://www.hazwasteonline.com/ [Accessed 28/07/2021].
[21] European Union, 2003. 2003/33/EC: Council Decision of 19 December 2002 establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 of and Annex II to Directive 1999/31/EC. Document 32003D0033.
[22] Article 27 of the **European Communities (Waste Directive) Regulations 2011**,

Fuel and Chemical Handling

12.77 The following procedures would be included in the CEMP in order to prevent any spillages to ground of fuels and prevent any resulting soil and/or groundwater quality impacts:

- 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 would be taken:
  - Any flexible pipe, tap or valve would be fitted with a lock and would be secured when not in use;
  - The pump or valve would be fitted with a lock and would be secured when not in use;
  - All bowsers to carry a spill kit;
  - Operatives must have spill response training; and
  - Drip trays used on any required mobile fuel units.

12.78 In the case of drummed fuel or other potentially polluting substances which may be used during the construction stage the following procedures would be adopted:

- Secure storage of all containers that contain potential polluting substances in a dedicated internally bunded chemical storage cabinet unit or inside a concrete bunded area;
- Clear labelling of containers so that appropriate remedial measures can be taken in the event of aspillage;
- All drums to be quality approved and manufactured to a recognised standard;
- If drums are to be moved around the site, they would be secured and on spill pallets; and
- Drums to be loaded and unloaded by competent and trained personnel using appropriate equipment.

12.79 The aforementioned list of measures is non-exhaustive and would be included in the CEMP.

Control of Water during Construction

12.80 Run-off from excavations/earthworks cannot be prevented entirely and is largely a function of prevailing weather conditions. Earthworks operations would be carried out with adequate drainage, falls and profile to control run-off and prevent ponding and flowing. Correct management, as set out in the CEMP, would ensure that there would be minimal inflow of shallow/perched groundwater into any excavation.

12.81 Care would be taken to ensure that exposed soil surfaces are stable to minimise erosion. All exposed soil surfaces would be within the main excavation site which limits the potential for any off-site impacts. All run-off would be prevented from directly entering into drainage ditches.

12.82 Should any discharge of construction related water be required, discharge would be to foul sewer. Pre-treatment and silt reduction measures on site would include a combination of silt fencing, settlement measures (e.g. silt traps, 20m buffer zone between machinery and watercourses, off site refuelling of machinery) and use of hydrocarbon interceptors. Active treatment systems, such as Siltbusters or similar, may be required depending on turbidity levels and discharge limits.

Groundworks

12.83 The proposed development would involve groundworks, which would inevitably have an interaction with the on-site soils and water environment. Outlined construction works would be undertaken in compliance with a CEMP.

12.84 Proposed activities that are likely to be occurring at the site during the construction stage which could involve, or which could affect the ground, are as follows:

- Archaeological evaluation works;
- Re-use of excavated material within construction works where possible in order to minimise off-site material movements, including excavated soils and roads;
- Foundations;
- Soil stripping, excavation and/or exposure of underlying materials;
- Topsoil and subsoils would be segregated during the works;
- Excavations for foundations, drainage works or services (standard open trenching techniques would be used for excavations);
- Dewatering of excavations (if required);
- Site-won material would be re-used on site wherever possible, subject to relevant geotechnical testing. Imported materials would also be required to provide engineered fill as part of the construction of structures and embankments;
- Where waste material is to be disposed of off-site this would be to a licensed waste facility in accordance with a Materials Management Plan (MMP) or equivalent;
- Establishment of a temporary construction compound(s), storage and use of fuels or chemicals – the establishment stage sits prior to the installation of appropriate bunds and other pollution control measures and as such represents the highest risk. All storage areas for fuels and oils would be appropriately bunded in line with best practice guidance;
- Movement of plant and machinery within the proposed development and to/from the compound;
- Wheel washing facilities would be provided during the construction stage for plant and vehicles; and
- Vehicles moving across soils within the site.

12.85 As outlined above the activities required for the construction stage of the proposed development represents the greatest risk of potential impact on the geological environment. These activities primarily pertain to the site preparation, excavation, levelling and infilling activities required to facilitate construction of proposed development and ancillary services.

12.86 Taking the above into account, the likely effects associated with contamination during the construction stage are as follows:

- A proportion of the development area would be covered in hardstand. This provides protection to the underlying aquifer but also reduces local recharge in this area of the aquifer. As the area of aquifer is large this reduction in local recharge would have no significant change in the natural hydrogeological regime.
- Excavated and stripped soil can be disturbed and eroded by site vehicles during the works. Rainfall and wind can also impact on non-vegetated/uncovered areas within the excavation or where soil is stockpiled. This can lead to run-off with high suspended solid content which can impact on water bodies. The potential risk from this indirect impact to water bodies and/or habitats from contaminated water would depend on the magnitude and duration of any water quality impact.
- Due to the lack of development at the site and the historical use the risk of contaminated soils being present on site is low. Nonetheless, material which is exported from site, if not correctly managed or handled, could impact negatively on human beings (on-site and off-site) as well as water and soil environments. However, it is currently anticipated that the majority of soil would be disposed off-site.
- As with all construction projects, there is potential for water (e.g. surface water, groundwater) to become contaminated with pollutants associated with the construction works. Contaminated water which arises from construction sites can pose a risk to groundwater quality for the duration of the construction if contaminated water is allowed to percolate to the underlying aquifer. The potential main contaminants include:

- Increase in suspended solids due to muddy water with increase turbidity, arising from excavation and ground disturbance;
- Spills and releases of cement and concrete causing an increase turbidity and pH arising from the use of these construction materials;
- Spills and releases of wastewater (nutrient and microbial rich) arising from poor on-site toilets and washrooms.

12.87 With consideration of the embedded mitigation measures outlined above predicted impacts on human health and the geological and hydrogeological environment would be unlikely to occur during the construction stage. Effects would be temporary, **imperceptible, negative** and **not significant** in EIA terms.

Accidental Spills and Leaks

12.88 During the construction of the proposed development there is a risk of accidental pollution incidences from the following sources:

- spillage or leakage of temporary oils and fuels stored on-site;
- spillage or leakage of oils and fuels from construction machinery or site vehicles;
- spillage of oil or fuel from refuelling machinery on site; and
- run-off from concrete and cement during pad foundation construction.

12.89 Accidental spillages may result in localised contamination of soils and groundwater underlying the site, should contaminants migrate through the subsoils and impact underlying groundwater. Groundwater vulnerability at the site is currently classified as extreme and high. Any soil stripping would also further reduce the thickness of subsoil and the natural protectionthey provide to the underlying aquifer. However, capping of site with impermeable paving and building and associated drainage infrastructure would provide additional protection following construction.

12.90 During the construction stage, with consideration of the embedded mitigation measures, predicted impacts on the hydrogeological environment from accidental spills and leaks would be unlikely to occur during the construction stage. Effects would be temporary, **imperceptible to imperceptible/not significant negative**, i.e. **not significant** in EIA terms.

Loss of Agricultural Land

12.91 There would be local loss of undeveloped land/agricultural soil within the site as a result of the proposed development; however, the area of development is small in the context of the overall agricultural land available in the region. Furthermore, the site has been zoned under Objective EE of the SDCC Development Plan 2016-2022 to provide for enterprise and employment uses.

12.92 There would be no impact to mineral resources (such as sands and gravels/or quarried stone) in the area as a result of the proposed development.

12.93 As such effects would be permanent and **imperceptible, neutral** i.e. **not significant** in EIA terms.

Operation Effects

Embedded Mitigation

Environmental Procedures and Fuel Storage

12.94 As detailed in Volume 1, Chapter 4: Description of Development, the Applicant would implement an Environmental Safety and Health Management System for the proposed development. Prior to operation of the proposed development, a comprehensive set of operational procedures would be established which would include site-specific mitigation measures and emergency response measures.

12.95 The primary potential impact relates to a failure or accidental spill of fuel or chemicals from the generator room, workshops and battery room in the GIS substation.

12.96 In order to minimise any impact on the underlying subsurface strata from material spillages, the storage of these would in designated areas with an impervious base.

Operational Activities

12.97 Reasonably foreseeable activities or factors during the operational stage which could affect or be affected by the ground are as follows:

- Periodic maintenance which could involve small scale excavations;
- Areas of soft landscaping and planting; and
- Drainage and storm water attenuation with infiltration to ground solely in areas underlain by a stone surface in the client control area.

12.98 These potential impacts are not anticipated to occur following the implementation of mitigation measures outlined below.

12.99 With consideration of the embedded mitigation measures outlined above predicted impacts on human health and the geological and hydrogeological environment would be unlikely to occur during the operation stage. Effects would be permanent, **imperceptible, negative**, and **not significant** in EIA terms.

Accidental Spills and Leaks

12.100 During the operational stage there is a potential for leaks and spillages from any fuel or chemical storage on-site. In addition, there is a potential for leaks and spillages from vehicles along access roads and in parking areas. Any accidental spillages and leaks of oil, petrol or diesel could cause soil/groundwater contamination if the spillages and leaks are unmitigated.

12.101 In the event of an on-site fire, firewater would also need to be contained or it may contaminate soils and/or groundwater.

12.102 With consideration of the embedded mitigation measures outlined above predicted impacts on the hydrogeological environment would be unlikely to occur during the operation stage. Effects would be permanent, **imperceptible, negative**, and **not significant** in EIA terms.

Assessment of Residual Effects

Additional Mitigation

12.103 No additional mitigation measures are proposed.

Enhancement Measures

12.104 No enhancement measures are proposed.

Construction Residual Effects

12.105 The residual construction effects remain as reported in the assessment of effects section:

- Temporary **imperceptible, negative** effect from groundworks which would be **not significant** in EIA terms.
- Temporary **imperceptible to imperceptible/not significant, negative** effect from accidental spills/leaks which would be **not significant** in EIA terms.
- Permanent **imperceptible, neutral** effect from loss of agricultural land which would be not **significant** in EIA terms.

Operation Residual Effects

12.106 The residual operation stage effects remain as reported in the assessment of effects section:

- Permanent, **imperceptible, negative** effect associated with general operation activities such as periodic maintenance including within areas of soft landscaping and use of the site's drainage network. These are not considered to be **not significant** in EIA terms.
- Permanent, **imperceptible, negative** effect associated with accidental spills and leaks which would be **not significant** in EIA terms.

Summary of Residual Effects

12.107 Table 12.5 provides a tabulated summary of the outcomes of the ground conditions assessment of the proposed development. Where **significant positive** effects are likely these are highlighted in bold green and where **significant negative** effects are predicted these are highlighted in bold red.

Table 12.5: Summary of Residual Ground Conditions Effects

Receptor	Description of Residual Effect	Additional Mitigation	Scale and Significance of Residual Effect **	Nature of Residual Effect*				
				+ -	L U	D I	R IR	M B T St Mt Lt P
Construction								
Construction workers	Impact to human health from exposure to contaminated soils/dust/ground gases/water during enabling and construction works	None required	Imperceptible	-	U	D	IR	T
Adjacent users		None required	Imperceptible	-	U	I	IR	T
Water environment (Baldonnel Stream 150m N)	Increased potential for leaching of contaminants from soils and mobilisation of contamination in surface water and groundwater during earthworks and foundation works. Also, contaminants introduced to groundwater by construction activities through leakages/ spillages	None required	Imperceptible	-	U	D	IR	T
Groundwater beneath the site (aquifers)		None required	Imperceptible/Not Significant	-	U	D	IR	T
Agricultural Land	Loss of agricultural land	None required	Imperceptible	+/-	U	D	IR	P
Operation								
Adjacent users	Impact to human health from exposure to residual contaminated soils/dust/ground gases/water	None required	Imperceptible	-	U	I	IR	P
Future users		None required	Imperceptible	-	U	D	IR	P
Water environment (Baldonnel Stream 150m N)	Contaminants released by operation activities	None required	Imperceptible	-	U	D	IR	P
Groundwater beneath the site (aquifers)	through leakages/spillages	None required	Imperceptible/Not Significant	-	U	D	IR	P

Notes:

* - = Negative/+ = Positive/+/- = Neutral; R = Reversible, IR = Irreversible; D = Direct, ID = Indirect;

L= Likely, U = Unlikely; M = Momentary, B = Brief, T= Temporary, St = Short-term, Mt = Medium-term, Lt = Long-term, P = Permanent

** Imperceptible, Not Significant, Slight, Moderate, Significant, Very Significant, Profound

Cumulative Effects

Intra-Project Effects

12.108 As explained in Chapter 2: EIA Process and Methodology, intra-project cumulative effects are discussed in Chapter 16: Intra-Cumulative Effects.

Inter-Project Effects

12.109 Table 12.8 provides a summary of the likely cumulative effects resulting from the proposed development and the cumulative developments.

Table 2.4: Inter-Project Cumulative Effects

Cumulative Schemes	Construction and Operation	
	Cumulative Effects Likely?	Reason
SD21A/0241 Vantage – townlands of Ballybane and Kilbride within Profile Park, Clondalkin, Dublin 22 SD21A/0167 Centrica Business Solutions – Profile Park, Baldonnel, Dublin 22	No	Cumulative effects are unlikely as each site would be mitigated through an appropriate staged approach to contaminated land assessment and ground investigation as required under EPA (2013) guidance, *Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites*. Cumulative effects are unlikely from other operational sites nearby as each site would have spill response procedures and would have been subject to contaminated land assessment and ground investigation as required under EPA (2013) guidance. Similarly, each development site would have embedded mitigation through their site specific contaminated land management procedures documented in the site environmental management systems.
SD17A/0377 Digital Reality Trust - Profile Park, Baldonnel, Dublin 22, D22 TY06		
SD21A/0186 Equinix (Ireland) Ltd – Plot 100, Profile Park, Nangor Road, Clondalkin, Dublin 22		
SD20A/0121 and VA06S.308585 UBC Properties - Townlands within Grange Castle South Business Park, Baldonnel, Dublin 22		
SD18A/0134, SD20A/0295 and VA06S.309146 Cyrus One - Grange Castle Business Park, Clondalkin, Dublin 22		

Construction Cumulative Effects

12.110 Cumulative effects from other developments nearby are unlikely as each development site would be mitigated through an appropriate staged approach to contaminated land assessment and ground investigation as required under EPA (2013) guidance, Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites. Similarly, each development site would have embedded mitigation through their site-specific contaminated land management procedures documented in the site CEMP.

Operation Cumulative Effects

12.111 Cumulative effects from other operational sites nearby are unlikely as each site would have spill response procedures to manage storage and use of potential polluting fuels and chemicals and would have been subject to contaminated land assessment and ground investigation as required under EPA (2013) guidance; Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites. Similarly, each development site would have embedded mitigation through their site-specific contaminated land management procedures documented in the site environmental management systems.

Summary of Assessment

Background

12.112 This chapter has detailed the potential ground condition effects due to the construction and operational stages of the Proposed Development. The assessment of effects has been undertaken using the relevant national and local guidance and regulations.

12.113 Baseline assessment has been made using publicly available information supplemented by a ground investigation assessing soil and water quality. The assessment of the baseline information and ground investigation results indicate that:

- The site has been predominantly greenfield and agricultural use historically. There is no evidence of any historical waste disposal or source of contamination within the site itself;
- The site is underlain by the Lucan formation comprising dark grey to black limestone and shale from the Carboniferous Age;
- The site is underlain by a locally important aquifer; and
- Very low levels of soil contamination were recorded typical of a greenfield site at concentrations that do not present a significant risk to potential receptors.

12.114 Overall, the results of the baseline assessment identified no significant sources of ground contamination in either the soil or the water environment.

Construction Effects

12.115 The proposed development would involve groundworks, which would have an interaction with the on-site soils and water environment.

12.116 The activities that could affect the ground, are:

- Re-use of excavated material within construction works and landscaping where possible in order to minimise off-site material movements, including excavated soils and roads;
- Excavations for foundations, drainage works or services and transmission cable routes (standard open trenching techniques would be used for excavations) and any dewatering of excavations (if required);
- Movement of plant and machinery within the proposed development and to/from the compound;
- Wheel washing facilities would be provided during the construction stage for plant and vehicles; and
- Vehicles moving across soils within the site.

12.117 With consideration of the embedded mitigation measures outlined above predicted impacts on human health and the geological and hydrogeological environment would be unlikely to occur during the construction stage. Effects would be temporary, imperceptible to imperceptible/not significant, and not significant in EIA terms.

12.118 Also, during the construction, there is a risk of accidental pollution incidences from the following sources:

- spillage or leakage of temporary oils and fuels stored on-site;
- spillage or leakage of oils and fuels from construction machinery or site vehicles;
- spillage of oil or fuel from refuelling machinery on site; and
- run-off from concrete and cement during pad foundation construction.

12.119 Again, with consideration of the embedded mitigation measures outlined predicted impacts on the hydrogeological environment from accidental spills and leaks would be unlikely to occur during the construction stage. Effects would be imperceptible/not significant and not significant in EIA terms

12.120 Overall, it is considered that the construction of the proposed development would result in a temporary and imperceptible to imperceptible/not significant effect on the ground conditions and identified receptors, and as such **would not give rise to significant effects in EIA terms.**

Operation Effects

12.121 During the operational stage there is a potential for leaks and spillages from small scale fuel and chemical storage to occur on-site. In addition, there is a potential for leaks and spillages from vehicles along access roads in parking areas. Any accidental spillages and leaks of oil, petrol or diesel could cause soil/groundwater contamination if the spillages and leaks are unmitigated.

12.122 With consideration of the embedded mitigation measures predicted impacts on the hydrogeological environment would be unlikely to occur during the operation stage. Effects would be permanent, imperceptible/not significant, and not significant in EIA terms.

12.123 Reasonably foreseeable activities or factors during the operational stage which could affect or be affected by the ground are as follows:

- Periodic maintenance which could involve small scale excavations;
- Areas of soft landscaping; and
- Drainage and storm water attenuation with infiltration to ground solely in areas underlain by a stone surface in the client control area.

12.124 With consideration of the embedded mitigation measures predicted impacts on human health and the geological and hydrogeological environment would be unlikely to occur during the operation stage. Effects would be permanent, imperceptible to imperceptible/not significant, and not significant in EIA terms.

12.125 Overall, it is considered that the operation of the proposed development would result in an imperceptible to imperceptible/not significant effect on the ground conditions and identified receptors, and as such **would not give rise to significant effects in EIA terms.**

Cumulative Effects

No significant effects are predicted on the ground conditions as a result of the proposed development alone in either the construction or the operation stage so there is no potential for cumulative effects.

13 CLIMATE CHANGE

Introduction

13.1 This chapter of the Environmental Impact Assessment (EIA) reports on the likely significant climate change effects to arise from the construction stage and the completed development stage of the proposed development.

13.2 The chapter describes the climate change policy context; the methods used to assess the potential impacts and likely effects; the baseline conditions at and surrounding the site; the likely climate change effects taking into consideration embedded mitigation; the need for additional mitigation and enhancement; the significance of residual effects; and inter-project cumulative effects.

13.3 There are no technical appendices associated with this chapter.

Methodology

13.4 The assessment has been informed by the following legislation, policies, and published guidance:

- International Legislation:
  - The Paris Agreement, which builds upon the United National Framework Convention on Climate Change (UNFCCC)[1];
  - Kyoto Protocol of the UNFCCC[2];
  - European Union (EU) Nationally Determined Contribution (INDCs)[3] under the UNFCCC;
  - European Union Emission Trading Scheme (2015)[4].
- National Legislation and Policy:
  - The Climate Action and Low Carbon Development Act 2015 (Amendment Bill 2021)[5];
  - Government of Ireland National Mitigation Plan (2017)[6];
  - Government of Ireland Climate Action Plan (2021)[7];
  - Climate Action and Low Carbon Development (Amendment) Act 2021[8].
- Regional Policy:
  - South Dublin County Council (SDCC) Climate Change Action Plan 2019-2024[9];
  - SDCC 2020-2024 Corporate Plan, Theme 4 Environment, water and climate change, Objective 1: Create a sustainable low carbon and climate-resilient county[10].
- Local Policy:
  - Dublin City Council Climate Change Action Plan (2019-2024)[11];
  - Dublin City Development Plan (2016-2022)[12].
- National guidance and industry standards:
  - Institute of Environmental Management and Assessment's (IEMA) Environmental Impact Assessment Guide to assessing Greenhouse Gas (GHG) emissions and evaluating their significance (2017)[13];
  - IEMA's Environmental Impact Assessment Guide to Climate Change Resilience and Adaptation (2020)[14];
  - Environmental Protection Agency research, National Risk Assessment of Impacts of Climate Change: Bridging the Gap to Adaptation Action (2016)[15];
  - EPA's Draft Guidelines on the information to be contained in Environment Impact Assessment Reports (2017)[16]; and
  - PAS 2080:2016 Carbon management in infrastructure[17].

Assessment Scope

13.5 There is currently no specific climate change assessment guidance in Ireland and therefore this chapter provides a preliminary assessment of the potential climate impacts and effects from the construction and operation of the proposed development, following the methodology set out in IEMA's aforementioned guidance[13,14]. However, terminology regarding the scale of impacts has been adapted to reflect the terminology as set out in the Environmental Protection Agency's (EPA) Draft Guidelines on the information to be contained in Environment Impact Assessment Reports[16]

13.6 In line with the requirements of IEMA, this chapter describes the likely significant effects of the proposed development on the environment resulting from the:

- Climate Change Resilience (CCR) assessment;
- In-combination climate impacts (ICCI) assessment; and
- GHG assessment.

13.7 The chapter presents the proposed development's construction and operational stages' sources of GHG emissions. GHG emissions have been measured in carbon dioxide equivalent emissions (CO_2e), which is a measure used to compare the emissions from various GHGs based upon their global warming potential.

[1] UNFCCC, 2015, Paris Agreement. Available at: https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement [Accessed 12/04/2021].
[2] UNFCCC, 1998, Kyoto Agreement. Available at https://unfccc.int/kyoto_protocol. [Accessed 13/07/2021].
[3] UNFCCC, 2016. NDC User Guide. Available at: https://unfccc.int/files/focus/indc_portal/application/pdf/ndc_parties_userguide_version_1__may_2016_(2).pdf [Accessed 13/07/2021].
[4] EU Emissions Trading System (EU ETS). Available at: https://ec.europa.eu/clima/policies/ets_en [Accessed 12/04/2021].
[5] Climate Action and Low Carbon Development (Amendment) Bill 2021. Available at: https://www.gov.ie/en/publication/984d2-climate-action-and-low-carbon-development-amendment-bill-2020/ [Accessed 13/07/2021].
[6] Department of Communications, Climate Action & Environment. National Mitigation Plan (2017). Available at: https://www.climatecaseireland.ie/wp-content/uploads/2018/04/National-Mitigation-Plan-2017.pdf [Accessed 13/07/2021.
[7] Government of Ireland. Climate Action Plan (2021). Available at https://www.gov.ie/en/publication/6223e-climate-action-plan-2021/ [Accessed 24/11/2021].
[8] Climate Action and Low Carbon Development (Amendment) Act 2021. Available at: Climate Action and Low Carbon Development (Amendment) Act 2021 (irishstatutebook.ie) [Accessed 24/11/21].
[9] SDCC, 2019. South Dublin Climate Change Action Plan (CCAP) 2019-2024 [online]. Available at: SDCC's Climate Change Action Plan - SDCC [Accessed 13/07/2021].
[10] SDCC, 2020. Corporate Plan (2020) [online]. Available at: https://www.sdcc.ie/en/services/our-council/policies-and-plans/corporate-plan/ [Accessed 13/07/2021].
[11] Dublin City Council Climate Change Action Plan 2019 - 2024. (2019). Available at: https://www.dublincity.ie/sites/default/files/2020-07/2019-dcc-climate-change-action-plan.pdf [Accessed 12/04/2021].
[12] Dublin City Development Plan 2016-2022. (2016). Available at: https://www.dublincity.ie/dublin-city-development-plan-2016-2022 [Accessed 13/07/2021].
[13] IEMA Environmental Impact Assessment (IEMA) Guide to assessing GHG emissions and evaluating their significance, 2015. Available at: assessing-greenhouse-gas-emissions-and-evaluating-their-significance (iema.net) [Accessed 13/07/2021].
[14] IEMA, 2020, Climate Change Resilience and Adaptation. Available at: https://www.iema.net/resources/reading-room/2020/06/26/iema-eia-guide-to-climate-change-resilience-and-adaptation-2020 [Accessed 13/07/2021].
[15] EPA Research. (2016). National Risk Assessment of Impacts of Climate Change: Bridging the Gap to Adaptation Action. Available at: http://www.epa.ie/pubs/reports/research/climate/Research_Report_346.pdf [Accessed 13/07/2021].
[16] Environmental Protection Agency, 2017. Draft Guidelines on the information to be contained in Environmental Impact Assessment Report (EIAR). Available at: EPA_EIAR_Guidelines.pdf [Accessed 29/11/21].
[17] BSi, 2016, PAS2080 Carbon management in infrastructure. Available at: https://shop.bsigroup.com/ProductDetail?pid=000000000030323493 [Accessed 13/07/2021]

13.9 Table 13-1 presents the GHG emissions assessment boundaries.

Table 13-1: GHG Emissions Assessment Boundaries

Item	Description	Input Data	Emissions Factors*
Construction Stage			
Embodied GHG emissions	Embodied GHG emissions which are emitted during the manufacture, transport and construction of materials used in the construction works.	Estimated volumes construction materials	University of Bath Inventory of Carbon and Energy[18]
Waste disposal GHG emissions	GHG emissions associated with the disposal of waste from construction, and excavation works.	Estimated volumes of waste arisings	UK Government GHG Emissions Factors[19]
On-site GHG emissions	GHG emissions associated to onsite energy requirements during construction works.	Estimated energy consumption associated to the construction works	UK Government GHG Emissions Factors[17]
Transport GHG emissions	GHG emissions associated with vehicles travelling to and from the proposed development.	Distances travelled by construction vehicles	UK Emissions Factors Toolkit (EFT) v10.1[20]
Operation Stage			
Operational energy demand	GHG emissions associated with the operation of the proposed development (e.g., lighting)	Kilowatt hours of energy and fuel consumption	UK Government GHG Emissions Factors[17]
Operational GHG emissions	Annual average daily traffic (AADT)	Kilowatt hours of energy and fuel consumption	UK Emissions Factors Toolkit (EFT) v10.1[20]
* UK Government Emissions Factors have been used as there is no Irish Government equivalent available.			

Technical Scope

CCR and ICCI

13.10 The assessment of the potential impacts and likely effects of the proposed development on climate has considered the following:

- Vulnerability of the proposed development to extreme weather and projected climate change; and
- The additive impact that climate and climate change may have on impacts identified by other environmental topics as a result of the proposed development, now and in future years.

GHG Emissions

13.11 The assessment of GHG emissions, associated to construction, and operational activities, has considered the following emissions sources:

- GHG emissions resulting from construction stage activities, such as from the material supply including primary extraction, manufacturing, transportation and construction process and site works associated with the proposed development; and
- GHG emissions resulting from the operation of the proposed development.

13.12 Sources of GHG emissions during the construction stage include:

- GHG emissions associated with the required raw materials, including raw material supply, transport, and manufacture;
- GHG emissions associated with construction processes, including transport to/from works site and construction/installation processes; and
- GHG emissions associated with land use change, e.g. those mobilised from vegetation or soil loss during construction

13.13 Sources of potential GHG emissions during the operation stage include:

- GHG emissions from scope 2 electricity[21] associated with the powering of the data servers;
- GHG emissions associated with ongoing land use change/sequestration; and
- Transport of workers to and from the site.

Spatial Scope

CCR and ICCI

13.14 The study area for the CCR and ICCI assessments comprised the construction footprint of the proposed development, including compounds and temporary land take (i.e. the site).

GHG Emissions

13.15 For the assessment of GHG emissions associated with the construction stage, the study area has taken account of emissions associated with the extraction, processing, and transport of materials from outside of the site (red line) boundary as well as site-based emissions that result from the construction activities within the site (red line) boundary.

13.16 The study area for operation stage GHG emissions was consistent with the area selected for the proposed development's traffic model. This area is described in the Study Area section of Chapter 7: Air Quality of this EIAR Volume.

Temporal Scope

13.17 In line with EPA guidance, as outline in EIAR Chapter 2: EIA Process and Methodology of this EIAR Volume, the duration of effects has been classified using the following: Momentary (seconds to minutes), Brief (<1 Day), Temporary (<1 Year), Short-term (1 to 7 years), Medium-term (7 to 15 years), Long-term (15 to 60 years), Permeant (>60 years). The assessment has considered impacts arising during the construction stage (TBC) which would be expected to be temporary to short-term in nature and from the operation stage which would be expected to be long-term to permanent.

13.18 The CCR, ICCI and GHG emissions assessments have considered impacts arising during the construction stage (8 to 10 months) which would be of expected to be temporary to short-term in nature. In addition, the assessments have also considered impacts arising during the operation stage (design life - estimated 60 years) of the proposed development. This would be expected to be permanent in nature.

[18] University of Bath Inventory of Carbon and Energy (ICE) Version 2.0. Available at: http://www.circularecology.com/embodied-energy-and-carbon-footprint-database.html#.XPaGoFWWyUk [Accessed 13/07/2021].
[19] UK Government conversion factors for company reporting of greenhouse gas emissions. 2021. Available at: https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2021 [Accessed on 24/11/2021].
[20] UK Emissions Factors Toolkit (EFT) v10.1. Available at: https://laqm.defra.gov.uk/review-and-assessment/tools/emissions-factors-toolkit.html [Accessed on 26/04/2021].
[21] World Resources Institute, 2015. Greenhouse Gas Protocol, Scope 2 Guidance [online]. Available at: https://ghgprotocol.org/sites/default/files/standards/Scope%202%20Guidance_Final_Sept26.pdf [Accessed 12/08/2021].

Baseline Characterisation Method

Desk Study

13.19 In order to establish baseline climate change conditions in the study area, relevant data was reviewed and assessed. Data was obtained from the following sources:

- EPA, 2019 GHG Emissions Projections Report for 2018-2040 Field Study (2020)[22]; and
- Met Éireann, Irelands Climate: The Road Ahead (2013)[23].

Field Study

13.20 Field study/data collection was not required at the site as the data provided by other sources was deemed to be adequate and representative of the site conditions.

Assessment Method

Methodology

CCR and ICCI

13.21 The CCR assessment has assessed the potential vulnerabilities which may affect the proposed development during the construction and operation stages against the EPA climate projections[24]. The ICCI assessment has evaluated the potential additive impact that climate change may have on receptors identified by other environmental topics. Professional judgement has been used to assess whether projected climate change could increase the magnitude of the effects as identified by the disciplines, change the sensitivity of the receptors, or reduce the effectiveness of embedded mitigation measures. In line with IEMA guidance, qualitative assessments have been undertaken for the CCR and ICCI assessments by:

- Identifying sensitive receptors;
- Analysing current and future climate in the study area using data from the EPA[24] and Met Éireann[23] and assessing projected changes on climate variables;
- Assessing the likelihood and consequence of the climate impact on the proposed development to determine the significance; and
- Identifying mitigation and adaptation measures for any significant effects, in liaison with the proposed development's design team and relevant environmental discipline specialists.

GHG Emissions

13.22 The IEMA guidance indicates that all GHG emissions should be considered as 'significant' in EIA terms, but that it is appropriate to contextualise emissions. Therefore, the estimated GHG emissions associated with the proposed development would be compared to the proposed carbon budgets for Ireland[25] to provide a national context. The proposed budgets are listed as follows:

- Carbon Budget 1 (2021-2025)- 295 Mt CO_2e;
- Carbon Budget 2 (2026-2030)- 200 Mt CO_2e; and
- Carbon Budget 3 (2031-2035)- 151 Mt CO_2e.

13.23 The goal of the GHG emissions estimation exercise is to estimate the emissions that would be generated or avoided by the proposed development, within the redline boundary. The purpose of this is to:

- Determine the magnitude of the proposed development's emissions for the relevant scenarios: 'Do-Something' (i.e. with the proposed development) and 'Do-Nothing' (i.e. no proposed development);
- Enable comparison of the 'Do-Something' scenario against the 'Do-Nothing scenario and the Ireland carbon budgets; and
- Enable identification of emissions hot spots within the 'Do-Something' scenario to inform identification and prioritisation of mitigation measures.

13.24 The assessment considers two sources of GHG emissions, during the construction and operation (use) lifecycle stages over a 60-year assessment period, including:

- Construction emissions: Carbon is assessed based on information provided by the design team and information from similar projects, including the use of products or materials, construction transport, construction plant and construction waste; and
- Operational use-related emissions: An estimation of carbon emissions associated with the operation and maintenance of the proposed development.

13.25 In line with IEMA guidance, end of life or decommissioning impacts have not been considered due to the long design life of the proposed development and given that emissions associated with end of life are commonly relatively small.

13.26 Emissions from the considered sources are compared to a baseline 'Do-Nothing' scenario to quantify the impact of the proposed development. The scenarios used for the GHG emissions assessment of the proposed development is summarised in Table 13-2.

Table 13-2: GHG emissions assessment scenarios

Scenario	Description
'Do-Nothing'	'Business as usual' – the proposed development is not implemented.
'Do-Something'	The proposed development is implemented, considering embedded GHG mitigation measures.

13.27 GHG emissions in each scenario have been compared to assess the contribution of the proposed development to climate change. Values are reported in $MtCO_2e$. This measure considers the six Kyoto Protocol gases: carbon dioxide (CO_2), methane (CH4), nitrous oxide (N_2O), sulphur hexafluoride (SF_6), hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs). This calculation normalises the global warming potential of the main GHG into one measure, based on the global warming potential of CO_2.

Cumulative Stage

CCR

13.28 The climate resilience effects resulting from the construction and operation stages will be limited in their spatial extent to the site boundary and the proposed development in isolation. Therefore, cumulative climate change resilience effects with other schemes will not be considered.

ICCI

13.29 The in-combination climate impacts resulting from the construction and operation stages will be limited in their spatial extent to the relevant technical assessments in the EIAR for the proposed development. Therefore, cumulative effects will not be considered for each technical discipline as opposed to in-combination with cumulative schemes.

[22] Ireland's Greenhouse Gas Emissions Projections. 2020. Available at: https://www.epa.ie/pubs/reports/air/airemissions/ghgprojections2019-2040/2020-EPA-Greenhouse-Gas-Emissions-Projections_final.pdf [Accessed on 21/04/2021].
[23] Met Éireann, Irelands Climate: The Road Ahead (2013). Available at: (PDF) Ireland's climate: the road ahead (researchgate.net) [Accessed 24/11/21].
[24] Paul Nolan and Jason Flanagan. Environment Protection Agency. 2020. Research 339: High-resolution Climate Projections for Ireland – A Multi-model Ensemble Approach. Available at: https://www.epa.ie/pubs/reports/research/climate/researchreport339/ [Accessed on 12/04/2021]
[25] Climate Change Advisory Council Carbon Budget Technical Report [Online] Available at: Technical report on carbon budgets 25.10.2021.pdf (climatecouncil.ie) [Accessed on 01/12/2021].

GHG Emissions

13.30 GHG emissions contribute cumulatively with all sources of GHG emissions globally to cause climate change. In line with IEMA guidance, the assessment will only consider GHG emissions in the context of GHG emissions in local area and the UK.

Assessment Criteria

13.31 The criteria used to assess if an effect is significant or not, is set out in subsequent sub-sections. This is determined by consideration of the sensitivity of the receptor, magnitude of impact and scale of the effect. In considering the significance of an effect, consideration has been given to the duration of the effect, the geographical extent of the effect and the application of professional judgement.

Impact Magnitude Criteria

CCR and ICCI

13.32 The magnitude of impact has been assessed using professional judgement as a combination of both the probability (likelihood) of the impact and the consequence of the impact.

13.33 The probability of the impact refers to the likelihood of a climate impact occurring and having an impact on the proposed development, over its lifespan. This includes consideration of existing and embedded mitigation measures within the design. The probability of the impact is classified as unlikely, possible (as likely as not) and likely in accordance with the criteria set out in Table 13-3.

Table 13-3: Probability of Impact Criteria

Likelihood level	Criteria
Unlikely	The climate impact is not anticipated to occur during the lifetime of the proposed development (60 years).
Possible (as likely as not)	The climate impact may occur a limited number of times during the lifetime of the proposed development (60 years).
Likely	The climate impact may occur multiple times during the lifetime of the proposed development (60 years).

13.34 The consequence of the impact occurring considers the geographical extent of the effect or the number of receptors affected (e.g., scale), the complexity of the effect, degree of harm to those affected and the duration, frequency, and reversibility of effect. The consequence of the impact is classified as very low, low, medium, high, and very high in accordance with criteria set out in Table 13-4.

Table 13-4: Consequence of the Impact Criteria

Consequence Level	Health and Safety	Disruption to Construction/ Operation	Cost
Very High	Multiple fatalities	Site-wide disruption lasting more than one week	>10 % of the proposed development construction value
High	Single fatality / multiple long-term injuries	Site-wide disruption lasting more than one day but less than one week	8-10 % of the proposed development construction value
Medium	Long-term injury or illness, prolonged hospitalisation, or inability to work	Partial disruption across elements of the site / proposed development lasting more than one day but less than one week	4–8 % of the proposed development construction value
Low	Lost time injury or medical treatment required, short-term impact on persons affected	Partial disruption across elements of the site / proposed development lasting less than a day	1–3 % of the proposed development construction value
Very Low	Minor harm or near miss	Disruption to an isolated section of the site / proposed development lasting less than a day	<1 % of the proposed development construction value

GHG Emissions

13.35 The IEMA guidance indicates all GHG emissions should be considered as 'significant', but it is appropriate to contextualise emissions. Therefore, the total GHG emissions associated with the proposed development have been compared to the carbon budgets for the Ireland to provide a national context. Additional mitigation has been identified to reduce GHG emissions where necessary.

Scale of Effect Criteria

CCR and ICCI

13.36 Impacts have been assessed on the basis of the probability of impact against the consequence of impact to determine the scale of effect as presented in Table 13.5.

Table 13.5: CCR and ICCI Scale of Effect Criteria

Consequence Level	Likelihood of Impact		
	Unlikely	Possible	Likely
Very High	Slight to Moderate	Very Significant to Profound	Profound
High	Slight to Moderate	Very Significant to Profound	Very Significant to Profound
Medium	Imperceptible to Not Significant	Slight to Moderate	Very Significant to Profound
Low	Imperceptible to Not Significant	Imperceptible to Not Significant	Slight to Moderate
Very Low	Imperceptible	Imperceptible to Not Significant	Slight to Moderate

13.37 Based on Environmental Protection Agency's (EPA) Draft Guidelines on the information to be contained in Environment Impact Assessment Reports[16] (2017), as described in Chapter 2: EIA Process and Methodology, effects ranging from 'moderate' to 'profound' are considered 'significant' in EIA terms based on professional judgement.

GHG Emissions

13.38 The IEMA guidance indicates all GHG emissions should be considered as 'significant'.

Nature of Effect Criteria

CCR and ICCI

13.39 The nature of the effect has been described as either negative, neutral or positive as follows:

- Positive – An advantageous effect to a receptor;

- Neutral – An effect that on balance, is neither positive nor negative to a receptor; or
- Negative – A detrimental effect to a receptor.

GHG Emissions

13.40 There is a presumption of significant effects and the effects are considered negative in nature as any GHG emissions contribute to global climate change

Assumptions and Limitations

CCR and ICCI

13.41 The assessment has relied on data provided by Met Éireann[23]; the climate projections data are generated from Phase 5 of the Coupled Model Intercomparison Project (CMIP5) simulations. It has been assumed that these data sets have been reported correctly.

13.42 Climate projections can be used to determine likely future trends in climate conditions in the locality of the proposed development through its lifetime. The climate trends included in this assessment are based on a range of GHG emissions scenarios which are subject to a degree of uncertainty. How the climate will react to different levels of emissions is also uncertain. There are three key sources of uncertainty within climate projections:

- Natural climate variability: either from natural external influences on climate (e.g. change in atmospheric particulates due to volcanic activity), or changes in the energy received from the sun;
- Incomplete understanding of Earth system processes and their imperfect representation in climate models (modelling uncertainty); and
- Uncertainty in future man-made emissions of GHGs and other pollutants.

13.43 The ICCI assessment has also relied on the data and professional judgement of other chapters within this report.

GHG Emissions

13.44 The GHG emissions assessment presented in this chapter considers the construction and operational GHG emissions only and should not be considered a full Whole Life Carbon assessment. For example, emissions associated with end of life of the proposed development have not been included in the GHG assessment as they are considered out of scope.

13.45 Other than that of excavated materials, estimations of waste volume arisings were not available at the time of writing. Therefore, estimation of waste volumes have been based using a calculation of the proposed development's Gross Floor Area (GFA) and project cost, using the BRE / SmartWaste Waste Benchmark Data 2019.

13.46 Estimated quantities of key materials associated to the construction of the proposed development were not available at the time of writing. Therefore, material quantities during construction were calculated for these developments using the waste generated from construction as a proxy. Here, construction waste for materials were assumed to be a certain percentage of the total construction materials used in the development, and as such the materials within the construction stage were aligned to 100 % of the waste values. The percentage of waste material each material was equivalent to the wastage rates as described in the Waste and Resources Action Programme (WRAP) net waste tool[26].

13.47 As complete data on materials and proposed material quantities for embodied carbon calculations are not available at the planning stage and therefore this assessment should be considered indicative. The materials included are those which are considered to represent the majority of embodied carbon emissions. Given the design life of the proposed development (>60 years), technological advancement, application and uptake of circular economy principles, and the recent commitments in Ireland as part of the Climate Action plan and Climate Act 2021 to reach net zero emissions by 2050, it is considered likely that accelerated carbon reduction would have occurred throughout the design life of the proposed development. The emissions from the deconstruction stage cannot be accurately quantified at this stage as a result of future uncertainty in methods of construction, deconstruction and decarbonisation across the industry. The full specification of construction materials is not anticipated to be known until detailed design has been completed.

13.48 Emissions through the operational phase of the proposed development are anticipated to come primarily from the testing of back-up generators for an hour annually. This figure was based on a full load of fuel.

13.49 Vehicle movements associated with access and construction would vary through the construction stage programme, with short periods of peak Heavy Goods Vehicle (HGV) and Light Goods Vehicle (LGV) movements associated with delivery of material resources and waste. Values have been calculated using the Central Statistics Office Transport Omnibus 2019 Transport statistics.

13.50 Information on Republic of Ireland (ROI) traffic emissions is not readily available, therefore, traffic emissions for this GHG assessment were calculated using Defra's Emission Factors Toolkit (EFT) (v11.0). The EFT allows users to calculate road vehicle pollutant emission rates for CO2 for a specified year, road type, vehicle speed and vehicle fleet composition.

13.51 The EFT calculates emission factors in the UK, including Northern Ireland, which is assumed as the representative region for the development area. In EFT v11.0, CO2 emission factors have been factored to consider improved engine efficiency anticipated in the future years, in line with DfT predictions. The EFT is updated periodically, considering the change in vehicle fleet compositions across the UK.

13.52 The proposed development traffic flows are expected to arrive via the main R roads, therefore, an average speed of the 80 kilometres per hour (kph) has been inputted into the EFT, based on the current speed limits. The average vehicle kilometres travelled per year and day were estimated based on information from the Central Statistics Office Transport Omnibus 2019 Transport statistics. Note that this data assumed a decrease in transport emissions overtime in response to committing to the ROI's national net zero targets.

Baseline Conditions

Existing Baseline

CCR and ICCI

13.53 A local climate baseline has been provided by Met Éireann[23] which presents a set of 30-year averages, covering the period 1981-2010 for a range of parameters and locations. The nearest meteorological station to the site is Dublin Airport. Data from this station has been used to provide a baseline for this assessment and is a robust basis.

13.54 Climate data available for Dublin Airport shows a mean annual temperature of 9.8 °C (degrees Celsius), which is within the range for the whole of Ireland of 9-10 °C. The average annual maximum temperature at the vicinity of the proposed development is 13.3 °C; the average annual minimum temperature is 6.4 °C with an annual mean of 29.4 air frost days. Higher temperature values in Ireland are generally found in coastal regions[27]. The average annual rainfall within the proximity of the proposed development is 758.0 mm (millimetres), compared to an average for Ireland of 1,230 mm. The Dublin Airport station experiences a mean annual wind speed of 10.3 knots, with an average of 8.2 days with gales per year.

[26] WRAP, 2021. New Net Waste Tool helps construction projects calculate potential savings in quantities and costs of waste [online]. Available at: https://archive.wrap.org.uk/content/new-net-waste-tool-helps-construction-projects-calculate-potential-savings-quantities-and-co [Accessed 12/08/2021].

[27] Met Éireann. A Summary of Climate Averages for Ireland 1981-2010 [online]. Available at: https://www.met.ie/climate-ireland/SummaryClimAvgs.pdf [Accessed on 09/04/2021].

13.55 The Flood Risk Assessment (FRA) (Technical Appendix 10.2: Site-Specific Flood Risk Assessment, EIAR Volume 3) indicates that 3% of the site has a 0.1% probability of flooding. The site has been classified as Zone C, i.e., a low probability of flooding from rivers and the sea is low (<0.1% AEP, 1:1000-year flood event), and is not at risk from fluvial or pluvial flooding.

13.56 Ireland's Climate: The Road Ahead (2013) details historic climate trends from 1900-2012, which can inform and provide context for future projections. The following trends have been observed across Ireland between 1900-2012:

- Mean annual temperature has increased by approximately 0.8 °C;
- 5% increase in mean annual precipitation; and
- Increase in the number of days with heavy rain (10 mm or more) in the west and north-west of Ireland.

GHG Emissions

13.57 National CO_2 emissions statistics have been published by the EPA and contain historic emissions data covering 1990-2020 for Republic of Ireland[28]. Total emissions in 2020 were 57.70 $MtCO_2e$, which is 3.6% lower than emissions in 2019. Emissions reductions have been recorded in 6 of the last 10 years of inventory data (2010-2020). It is estimated that between 1990-2017 there was an overall 17.7% increase in GHG emissions due primarily to fuel combustion in transport, followed by energy industries.

13.58 Ireland's CO_2 emissions in 2020 consisted of 37.1% from agriculture, 17.9% from transport, 15.0% from energy industries and 12.3% from residential.

13.59 The total CO_2 emissions in Dublin City in 2016 were 2,810,800 tCO_2e, which is the equivalent to 5.1 tCO_2e per capita. The sectors that produced the greatest emissions were 35% from residential, 33% from commercial and 25% from transport[29].

13.60 In the most recent review by the EPA, which details emissions up to 2018, the data published in 2020 states that Ireland has exceeded its 2018 annual limit set under the EU's Effort Sharing Decision (ESD), 406/2009/EC1 by 5.59 $MtCO_2e$. In 2020, Ireland's GHG emissions are estimated to be 57.70 $MtCO_2e$, which is 3.6% lower (2.14 $MtCO_2e$) than emissions in 2019.

Carbon Budgets

13.61 The National Policy Position provides a high-level policy direction for the adoption and implementation by Government of plans to enable Ireland to move to a low carbon economy by 2050. The Government of Ireland have committed to reducing its greenhouse gas emissions by 51% by 2030 and reaching net zero by 2050 at the latest, across the electricity generation, built environment and transport sectors.

13.62 Note that this means operational emissions as operational emissions from electricity will begin to decline to the gradual greening of the national grid, in which the proposed development is connected to via a substation.

13.63 The Minister for Communications, Climate Action and Environment has brought forward a new Climate Action (Amendment) Act that adopted the three five-year period carbon budgets presented below. Details of these carbon budgets were released in October 2021 within the Climate Change Advisory Council Carbon Budget Technical Report[25], although they have not yet been legislated by the government and Oireachtas.

- Carbon Budget 1 (2021-2025)- 295 Mt CO_2e;
- Carbon Budget 2 (2026-2030)- 200 Mt CO_2e; and
- Carbon Budget 3 (2031-2035)- 151 Mt CO_2e.

Future Baseline

CCR and ICCI

13.64 Future climate projections have been published by EPA through the Regional Climate Model (RCM) simulations which take the outputs from global climate models to produce more refined projections of the potential local and regional impacts of climate change. Climate projections can be used to determine the likely future climate conditions in the locality of the proposed development through its operational life. RCM simulations include projections of a range of climate variables, such as temperature and precipitation.

13.65 Climate projections are subject to uncertainty due to both natural variability and an incomplete understanding of the climate system. These uncertainties can create large outliers in the model ensemble which skew the mean projections. To allow for this, different percentiles are considered which allows a quantification of the likelihood of projections. There are also a number of Representative Concentrations Pathways (RCP) available for RCM simulations with each pathway resulting in a different range of global mean temperature increases over the 21st century. Simulating climatic changes under different RCP scenarios accounts for the uncertainty surrounding future GHG emissions. IEMA guidance recommends the use of RCP 8.5 at the 50 % percentile, for the 2071-2100 timeline to ensure a suitably conservative approach.

13.66 The projections informing this assessment were generated from a regional scale-down of eight datasets from phase 5 of the Coupled Model Intercomparison Project, using three RCMs for Ireland. The high spatial resolution (3.8 and 4 km) of these projections provides a good evaluation of regional climate variation. The RCM simulations were found to be robust when compared to observational datasets.

13.67 The general climate trends for Ireland have been described below, summarised from the RCM projections. The projections are for the future period of 2041-2060 compared to the baseline period of 1981-2000, simulated for RCP8.5:

- an increase of 1.3-1.6 °C in mean annual temperatures, with the largest increases seen in the east of the country;
- warming would be enhanced at the extremes with an increase in summer daytime and winter night-time temperatures of 1-2.4 °C;
- summer heatwave events are expected to occur more frequently, with the largest increases in the south of the country;
- precipitation is expected to become more variable, with substantial projected increases in the occurrence of both dry periods and heavy precipitation events;
- a mean reduction in wind speed of 2.6%, with a decrease in all seasons; and
- a decrease in the number of frost days of 58% and ice days of 78%.

13.68 The climate projections for Dublin indicate increased likelihood of milder wetter winters for the future assessment period in comparison to the 1981-2000 baseline, as shown in Figure 13-1 and Figure 13-2. However, due to natural variability, some cold and dry winters will still occur. Mean wind speeds are projected to decrease in all seasons, with the largest decreases for summer months as shown in Figure 13-3.

[28] Environment Protection Agency. Greenhouse Gas Emissions. Current Situation [online]. Available at: http://www.epa.ie/ghg/currentsituation/ [Accessed on 24/11/2021].

[29] Dublin City Baseline Emissions Report 2016. Codema. Available at: https://www.seai.ie/publications/Dublin-City-Baseline-Report.pdf [Accessed on 09/04/2021].

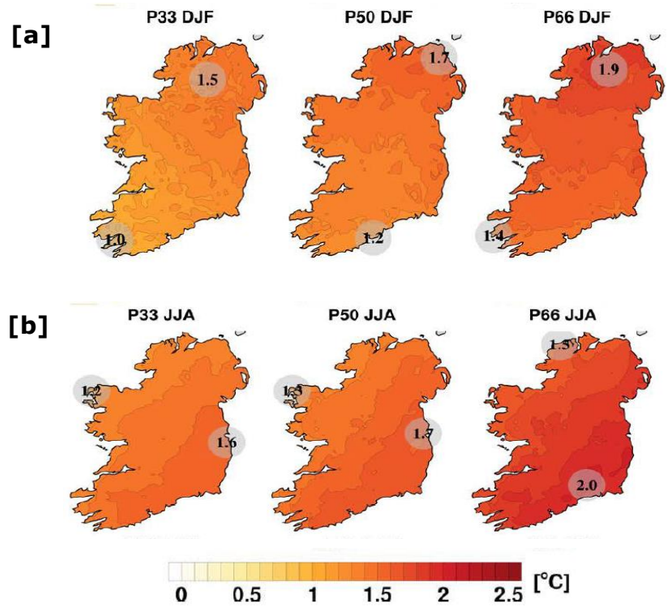


Figure 13-1 The 33rd, 50th and 66th percentiles of [a] winter and [b] summer wind speed projections for the RCP 8.5 scenario. *The future period (2041-2060) is compared with the reference period (1981-2000). The numbers on each plot are the minimum and maximum projected changes at their locations*

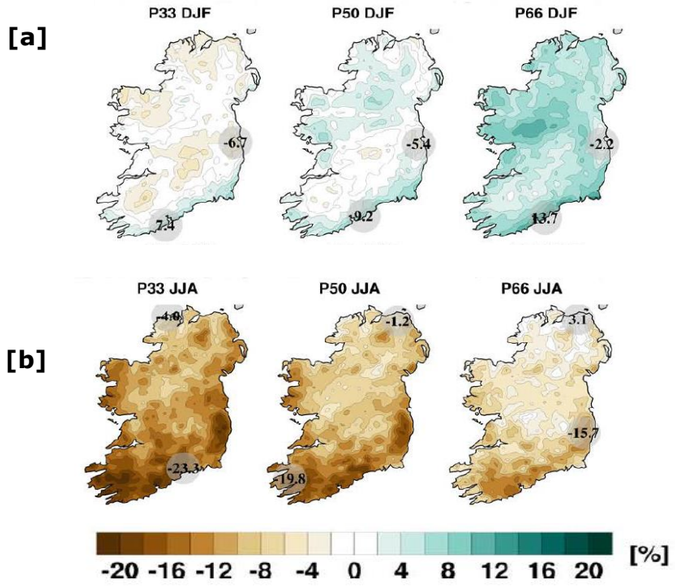


Figure 13-2 The 33rd, 50th and 66th percentiles of [a] winter and [b] summer mean precipitation projections for the RCP 8.5 scenario. *The future period (2041-2060) is compared with the reference period (1981-2000). The numbers on each plot are the minimum and maximum projected changes at their locations*[Error! Bookmark not defined.]

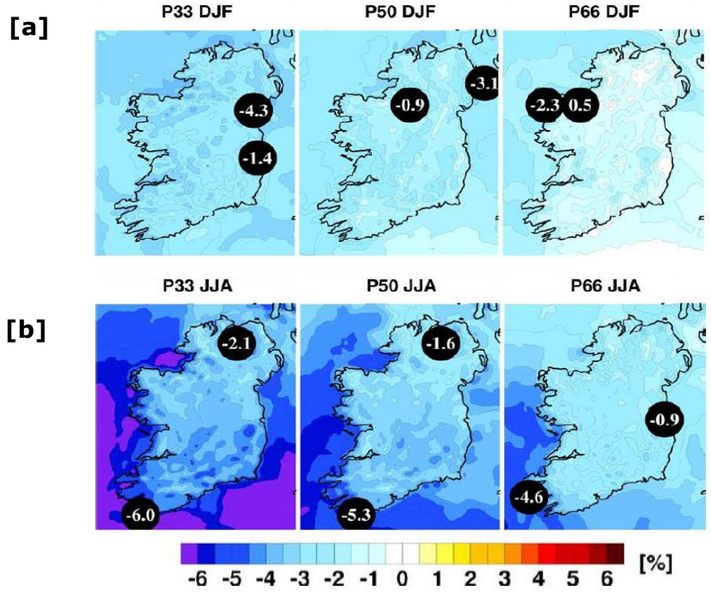


Figure 13-3 The 33rd, 50th and 66th percentiles of [a] winter and [b] summer wind speed projections for the RCP 8.5 scenario. *The future period (2041-2060) is compared with the reference period (1981-2000). The numbers on each plot are the minimum and maximum projected changes at their locations.*

GHG Emissions

13.69 In the absence of the proposed development (do-nothing), the GHG emissions from the site are not anticipated to change compared to the existing baseline.

13.70 The EPA has produced GHG emission projections for two scenarios; 'With Existing Measures' and a 'With Additional Measures' which include implementation of Ireland's 2019 Climate Action Plan. Under the 'With Existing Measures' scenario, the projections indicate that Ireland will have total emissions of 57.96 $MtCO_2e$ by 2030. For the energy sector, emissions are project to increase by 1.4% to 8.6 $MtCO_2e$ over the period 2020 to 2030.

13.71 Under the "With Additional Measures" scenario, which includes changing the source of electricity generation from coal and peat to wind power and diesel, and increasing use of electric vehicle engines, the projections indicate that Ireland will have a total emissions of 47.87 $MtCO_2e$ by 2030[22]. The energy sector emissions are projected to decrease by 24.8% to 6.3 $MtCO_2e$ over the period 2020 to 2030.

13.72 In addition, Ireland's GHG emissions in 2030 are projected to consist of 38.7% agriculture, 16.2% transport and 15% energy industries.

Sensitive Receptors

CCR

13.73 Following identification of the future climate projections, the proposed development receptors which are vulnerable to climate change during the construction have been identified as the human health, buildings and infrastructure, including pavements and road surfaces, drainage, geotechnical conditions, signs, traffic signals and lighting, landscape, workforce, plant and equipment and user facilities.

ICCI

13.74 The ICCI assessment includes sensitive receptors in the surrounding environment, as defined by each environmental discipline in their technical assessments.

GHG Emissions

13.75 Construction and operational GHG emissions associated with the proposed development would be released to the global atmosphere. Therefore, the global atmosphere is considered to be the receptor and is of high sensitivity. In line with standard practice, the sensitivity of human and natural receptors is not considered within this assessment.

Assessment of Effects

CCR

Construction Effects

13.76 A summary of potential CCR impacts during the construction stage and embedded and additional mitigation measures have been provided in Table 13-6. The CCR assessment for the proposed development has not identified any significant effects for the construction stage taking into consideration the embedded mitigation measures of the proposed development. All impacts have been considered to be of low consequence of impact with possible probability of impact; therefore, the effects are considered to range from **imperceptible to not significant**, **negative** in nature and **not significant** in EIA terms.

Operation Effects

13.77 A summary of potential climate resilience impacts during the operation stage and embedded and additional mitigation measures have been provided in Table 13-7. Most weather and climate-related resilience effects during the operation stage are expected to be mitigated through measures embedded in the design of the proposed development, providing a level of resilience throughout operation. Mitigation measures considered in this preliminary assessment include:

- Drainage infrastructure has been designed with sufficient allowance to account for climate change and to withstand extreme rainfall events; and
- Soft landscape features to be maintained following establishment through watering in periods of dry weather and carrying out periodic inspections to monitor the establishment of new planting.

13.78 Overall, the effects during the operational stage have been considered to range from **imperceptible to moderate, negative** in nature and **not significant** in EIA terms.

Table 13-6: Construction Stage CCR Effects

Climate Change Trend	Stage	Climate (Change) Impact on Receptor	Existing Design and Mitigation Measures	Significance of Effect	Additional Mitigation Required
Increased frequency and intensity of extreme weather events: Intense rainfall events	Construction	**Receptor:** Buildings and infrastructure. Extreme rainfall events could result in the erosion of stockpiles and resultant silting of drainage assets. This could result in secondary impacts such as localised flooding.	• As committed to in EIAR Chapter 5: Construction Environmental Management (in this Volume), a detailed Construction Environmental Management Plan (CEMP) would be secured by means of an appropriately worded planning condition and would be prepared in advance of the construction works following the appointment of the key contractors. The detailed CEMP would include a Site Waste Management Plan (SWMP) and would consider specific measures to minimise stockpiling on-site by avoiding and minimising the potential for contamination, for example by: • Ensuring Deliveries would be 'just-in-time' to avoid storing large volumes of materials that could be affected; • Material stockpiles and structures will be inspected before and after extreme weather events to ensure stability and incorporating measures into materials management plans. • Appropriate storage, handling, and management of construction materials with due regard to the potential for mobilisation into surface drainage. Furthermore, re-vegetating earthworks of exposed soil stockpiles would occur as soon as practicable; • Water pollution will be minimised by implementing adequate bunding for dust suppression on site roads, and regular plant maintenance. The Construction Industry Research and Information Association (CRIA) provides guidance on the control and management of water pollution from construction sites[30]; and • As stated in the outline CEMP, material will be stored in sheltered parts of the site to minimise interaction with rainfall and damage by the weather, while stockpiling will be limited when possible. Covering, seeding, fencing/ screening, or damping down of stockpiles would also occur.	**Likelihood level**: Unlikely **Consequence level:** Low as a result of partial disruption across elements of the site lasting less than a day. **Scale of Effect:** Imperceptible to Not Significant **EIA Significance:** Not significant	Additional mitigation not required. Existing design and mitigation measures are appropriate to account for climate change/ extreme weather.
	Construction	**Receptor:** Buildings and Infrastructure / Programme. Extreme rainfall events and their secondary impacts could affect the ability to undertake certain construction activities leading to programme delays (e.g. pouring of concrete and asphalt) increasing project costs.	In line with best practice, vulnerable activities such as the construction of earthworks would take place in appropriate weather conditions (taking into account construction programme timescale constraints). This would reduce the likelihood of weather-related delays to these activities and would be undertaken in accordance with measures detailed in the CEMP. The contractor would be required to ensure that site activities, such as site preparation works, are postponed during rainfall events. As stated in the outline CEMP, materials would be stored in sheltered parts of the site to minimise interaction with rainfall and damage by the weather, while stockpiling will be limited when possible. Covering, seeding, fencing/ screening, or damping down of stockpiles would also occur.	**Likelihood level**: Unlikely **Consequence level:** Low as a result of partial disruption across elements of the site lasting less than a day. **Scale of Effect:** Imperceptible to Not Significant **EIA Significance:** Not significant	Additional mitigation not required. Existing design and mitigation measures are appropriate to account for climate change/ extreme weather.
	Construction	**Receptor:** Environment**.** Extreme rainfall events could result in increased runoff of concrete or cement products when equipment and vehicles are being washed which, as well as flooding of the ground excavations, which could lead to contaminants entering nearby watercourses.	As committed to in EIAR Chapter 5: Construction and Environmental Management (in this Volume), which anticipates the environmental issues and necessary management controls that would need be covered within the CEMP, good practice measures would be employed on site to prevent uncontrolled runoff. This includes provision of on-site pollution control kits and use of settlement system prior to discharge. To ensure no contaminant-pathway-receptors pathways are created and to reduce the potential for contamination to occur during construction, all site activities would be undertaken in accordance with relevant water regulations. The Applicant would also be responsible for obtaining all necessary consents and ensuring compliance with the conditions of the consents. Within the CEMP, the following provisions would be covered:	**Likelihood level**: Unlikely **Consequence level:** Low as a result of partial disruption lasting less than a day. **Scale of Effect:** Imperceptible to Not Significant **EIA Significance:** Not significant	Additional Mitigation not required. Existing design and mitigation measures are appropriate to account for climate change/ extreme weather.

[30] Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors – C532 CIRIA Report (Masters-Williams et al, 2001)

Table 13-6: Construction Stage CCR Effects

Climate Change Trend	Stage	Climate (Change) Impact on Receptor	Existing Design and Mitigation Measures	Significance of Effect	Additional Mitigation Required
			• Handling of construction materials is undertaken with due care and consideration to minimise the risk of accidental spills; and • Material stockpiles should be adequately protected to avoid being washed or blown away from the immediate area. Potential pathways for contamination would be minimised as follows: • Groundwater would be prevented from entering excavations by dewatering, if required; • Surface water would be prevented from entering excavations by using cut-off ditches, covering the excavation, or captured within the groundwater pumping system; • Concrete preparation would be constrained to dedicated protected areas where contaminated water can be collected; • Contaminated water from excavations would be collected within a settlement tank or lagoon to enable treatment prior to release; • Implementing good construction practices including adequate bunding for oil containers, wheel washers and dust suppression on site roads, and regular plant maintenance; and • Adhering to guidance provided by the Construction Industry Research and Information Association (CIRIA), that provide information on the control and management of water pollution from construction sites in their publication[30]. The proximity of the site to potential sources, pathways, and impacts of pollution; and the historical uses of the site will be examined early in project planning and design, to ensure that suitable redesign and mitigation measures are undertaken as necessary. A contingency plan for pollution emergencies should also be developed and regularly updated, which would identify the actions to be taken in the event of a pollution incident. In addition, the construction drainage system for the proposed development would be designed and managed to comply with appropriate industry standards British Standard (BS) 6031:2009[31] (or equivalent), which details methods that should be considered for the general control of drainage on construction sites. Further advice is also contained within BS 8004:2015[32] (or equivalent). Water pollution will be minimised by adequate bunding for oil containers, wheel washers and dust suppression on site roads, and regular plant maintenance. Practises will adhere to guidance specified by CIRIA[30]. As specified within the outline CEMP, Earthwork operations shall be designed with adequate drainage, falls and profile to control run-off and prevent flowing and the contamination of local water courses. Correct management will ensure that there will be minimal inflow of shallow/perched groundwater into any excavation. Care will be taken to ensure that exposed soil surfaces are stable to minimise erosion. All exposed soil surfaces will be within the main excavation site which limits the potential for any offsite impacts.		
Increased frequency and intensity of high temperatures: Drought conditions	Construction	**Receptor:** Human health. Heatwaves, higher temperatures and drought conditions (<0.2mm/day) could impact dust generated during construction activities.	Best practice measures would be employed to reduce dust generating activities such as: storing cement products to prevent dust generation and pollution; dampening down areas of the site that have the potential to give rise to dust (i.e. stockpiles and earthworks); covering or enclosing vehicles that deliver materials with tarpaulins with dust potential covering stored material and on-site skips, and using long reach excavators fitted with crushing attachments, use of. The CEMP would focus on dust management, temporary dust	**Likelihood level**: Unlikely **Consequence level:** Low as a result of health and safety impacts.	Additional Mitigation not required. Existing design and mitigation measures are appropriate to account for climate change/ extreme weather.

[31] British Standard Institution, 2009. BS6031:2009 British Standard Code of Practice for Earthworks. London. BSi.
[32] British Standard Institution, 2015. BS8004:2015 Code of Practise for Foundations. London. BSi.

Table 13-6: Construction Stage CCR Effects

Climate Change Trend	Stage	Climate (Change) Impact on Receptor	Existing Design and Mitigation Measures	Significance of Effect	Additional Mitigation Required
			screens as high as any stockpiles, preparing and implementation of a SWMP, and appropriately sourcing materials. Construction practices will adhere to requirements as set out in the Safety, Health and Welfare at Work (Construction) Regulations 2013[33]. Dust generated from construction works would also be managed by means of 2.4 m high site hoarding and dust suppression measures, such as the use of water sprays, dampening down of roads and covering of storage areas, such that the potential for negative dust generation is reduced. Others measures design to mitigate the emissions and impact of dust include: • Carrying out regular dust soiling checks of buildings within 100 m and provide cleaning if necessary; • Removing dusty materials from the application site; • Cutting, grinding or sawing equipment only to be used with suitable dust suppression equipment or techniques; • Re-using and recycling waste to reduce dust from waste materials; and • Using tackifier, a sticky substance that temporally binds the surface of stockpiled material, reducing dust emissions. The outline CEMP stipulates the following dust mitigation measures that will be reviewed at regular monthly intervals during the works to ensure effectiveness of the mitigation: • Monitoring of the contractors' performance to ensure proposed mitigation measures are implemented, as it is the responsibility of the contractor at all times to comply with dust management measures; • The contact details of a person to contact regarding dust issues shall be displayed, while a Complaints Register relate to dust nuisance will be kept on site together with details of any remedial actions carried out; • Overburden material will be protected from exposure to wind by storing the material in sheltered parts of the site, where possible stockpiles should be located downwind of sensitive receptors; • There will be no storage of soil along the cable route; • Where feasible, hoarding will be erected around site boundaries which would prevent larger particles from impacting nearby sensitive receptors; • 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; and • At the main site traffic exits, a wheel wash facility shall be installed if feasible. All trucks leaving the site must pass through the wheel wash.	**Scale of Effect:** Imperceptible to Not Significant **EIA Significance:** Not significant	
Increased frequency of extreme weather events: Windstorms and wind gusts	Construction	**Receptor:** Human health and nearby Sensitive receptors. Winds gusts (wind speeds >10 m/s) could result in the damage of stockpiles. Secondary impacts could include site personnel welfare impacts and impacts on sensitive receptors.	The following measures would be implemented during the construction of the proposed development: • Best practice measures for stockpile management would be utilised; • Prefabrication off-site would be considered to minimise stockpilingon-site; • Deliveries would generally be 'just-in-time' to avoid storing large volumes of materials. Any construction materials that are stored on-site would be protected to minimise damage by weather; and • Construction practices will adhere to requirements as set out in the Safety, Health and Welfare at Work (Construction) Regulations 2013.	**Likelihood level**: Unlikely **Consequence level:** Low as a result of health and safety impacts. **Scale of Effect:** Imperceptible to Not Significant **EIA Significance:** Not significant	Additional Mitigation not required. Existing design and mitigation measures are appropriate to account for climate change/ extreme weather.

[33] Government of Ireland, 2013. Safety, Health and Welfare at Work (Construction) Regulations 2013 (S.I. No. 291 of 2013).

Table 13-6: Construction Stage CCR Effects

Climate Change Trend	Stage	Climate (Change) Impact on Receptor	Existing Design and Mitigation Measures	Significance of Effect	Additional Mitigation Required
			The outline CEMP stipulates the following dust mitigation measures that will be reviewed at regular intervals during the works to ensure effectiveness of the mitigation: • 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 always the responsibility of the contractor 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 monthly as a minimum; • Overburden material will be protected from exposure to wind by storing the material in sheltered parts of the site, where possible stockpiles should be located downwind of sensitive receptors; • Regular watering will take place during dry/windy periods to ensure the moisture content is high enough to increase the stability of the soil and suppress dust; • there will be no storage of soil along the cable route; and • Where feasible, hoarding will be erected around site boundaries which would prevent larger particles from impacting nearby sensitive receptors.		
Increased frequency and intensity of high temperatures: Heatwaves	Construction and operation	**Receptor**: Human health. Heatwaves, higher temperatures could impact on site construction personnel welfare, for example, causing heat stress and unsafe working conditions.	All works on-site would be undertaken in accordance with the provisions of the Safety Health and Welfare at Work (Construction) Regulations 2013. The risk of heat stress to site personnel working outdoors would be managed through health and safety procedures. This would include provision of necessary Personal Protective Equipment (PPE) and Toolbox Talks to highlight risks of heatstroke.	**Likelihood level:** Possible **Consequence level:** Low as a result of health and safety impacts relating to heat stress. **Scale of Effect:** Imperceptible to Not Significant **EIA Significance:** Not significant	Additional mitigation not required. Existing design and mitigation measures are appropriate to account for climate change/ extreme weather.

Table 13-7: Operation Stage CCR Effects

Climate Change Trend	Stage	Climate (Change) Impact on Receptor	Existing Design and Mitigation Measures	Significance of Effect	Additional Mitigation Required
Increased frequency and intensity of extreme weather events: Intense rainfall events	Operation	**Receptor:** Buildings and Infrastructure The increased intensity and frequency of extreme rainfall events could overwhelm drainage assets. This could result in secondary impacts such as localised flooding of the proposed development. This is especially critical as moisture contamination inside the compartment can cause a flash over, a high-voltage electric short circuit.	The FRA and Engineering Planning Report (containing information on Surface water and Drainage), that have been prepared to accompany the planning application, set out the principles of the drainage design. They also consider recent national climate change guidance and the design life of the proposed development. As stated in the FRA, approximately 3% of the site has a 0.1% probability of flooding. The site can therefore be classified as Zone C, i.e., a low probability of flooding from rivers and the sea is low (<0.1% AEP, 1:1000-year flood event). Compensatory storage is provided by reducing the ground level in the landscape area adjoining the northern boundary. As stated in the Engineering Planning Report, the required total attenuation volume has been calculated as 165m^3, with the attenuation volume provided by the underground tank exceeding this figure at 200m^3. This attenuated volume has been calculated using rainfall data supplied by Met Eireann for Dublin Airport for a 1 in 100-year storm, with rainfall data also being factored up by 20% to allow for climate change. The existing foul water network at the North of the site will be extended to collect domestic foul water from the buildings within the Substation Compound, and rainfall that passes through the transformers. As such, collected water will be transferred to the main foul water network. The surface water proposals include measures to attenuate and provide extensive treatment of surface water prior to discharge from the site, include silt traps to prevent the blockage of drainage assets and subsequent localised flooding. To mitigate surface water flooding, surface water proposals for the development have been developed to mimic the natural drainage patterns of the side and in accordance with the Best Management Practices (BMPs) of Sustainable Drainage Systems (SuDS). Additionally, consideration of levels and topography across the site has been undertaken and it is proposed to provide a graduated fall in levels away from the proposed buildings to avoid pooling of water. Site investigations have been carried out and the results have shown that the existing sub-soil would provide inadequate soil infiltration rates and thus it is not practical to install a soakaway system. Furthermore, the FRA, Section 2.6 Pluvial Flooding states that the site is not at risk from pluvial flooding and further assessment is not required.	**Likelihood level:** Unlikely **Consequence level:** Medium as a result of partial disruption lasting more than one day but less than one week. **Scale of Effect:** Imperceptible to Not Significant **EIA Significance:** Not significant	Additional Mitigation not required. Existing design and mitigation measures are appropriate to account for climate change/ extreme weather.
	Operation	**Receptor:** Buildings and Infrastructure Extreme rainfall events could lead to flooding of the underground foundations or services (electrical cables) This is especially critical as moisture contamination inside the compartment can cause a flash over, a high-voltage electric short circuit.	The FRA indicates the site is in Flood Zone C (<0.1 AEP, 1:1000-year flood event), with only 3% of the site having a 0.1% probability of flooding. Section 2.6 of the FRA notes no recorded historical flood events at the site. Furthermore, the proposed substation facility's surface water drainage system will be designed, constructed and tested in accordance with the Greater Dublin Drainage Strategic Study, Greater Dublin Regional Code of Practice for Drainage Works v6 and the CIRIA SuDS Manual V6, thereby mitigating risks. The materials used in the manufacture of electrical cables and ducts would be in accordance with BS 3506:1996[34] (or equivalent) to protect against weathering (Section 4.3 of Tender Document Volume 5: Scope 5.2 Contract Specifications). As stated in the Engineering Planning report, the required total attenuation volume has been calculated as 165m^3, with the attenuation volume provided by the underground tank being 200m$^{3.}$ This attenuated volume has been calculated using rainfall data supplied by Met	**Likelihood level:** Unlikely **Consequence level:** Medium as a result of partial disruption lasting more than one day but less than one week. **Scale of Effect:** Imperceptible to Not Significant **EIA Significance:** Not significant	Additional Mitigation not required. Existing design and mitigation measures are appropriate to account for climate change/ extreme weather.

[34] BSi, 1998. BS EN ISO 3506-3:1998 - Mechanical properties of corrosion-resistant stainless-steel fasteners. Set screws and similar fasteners not under tensile stress.

			Eireann for Dublin Airport for the 1 in 100-year storm, with rainfall data also being factored up by 20% to allow for climate change.		
	Operation	**Receptor:** Buildings and Environment and infrastructure. Extreme rainfall events could lead to flooding of the drainage assets which could result in overflow of contaminated water from the foul and surface water infrastructure impacting the water quality and ecology of nearby watercourses.	The Flood Risk Assessment indicates the site is in Flood Zone C (<0.1 AEP, 1:1000-year flood event), with only 3% of the site having a 0.1% probability of flooding. The proposed substation facility's surface water drainage system will be designed, constructed and tested in accordance with the Greater Dublin Drainage Strategic Study, Greater Dublin Regional Code of Practice for Drainage Works v6 and the CIRIA SuDS Manual V6, thereby mitigating any risk from pluvial flooding. As stated in the Engineering Planning report, the required total attenuation volume has been calculated as 165m^3, with the attenuation volume provided by the underground tank being greater at 200m$^{3.}$ This attenuated volume has been calculated using rainfall data supplied by Met Eireann for Dublin Airport for the 1 in 100-year storm that has been factored up by 20% to allow for climate change. As discussed above, the existing foul water network at the North of the site will be extended to collect domestic foul water from the site. Here, an additional foul sewer is to be provided from the transformers to capture possible contaminated rainwater. The drainage from transformers will pass through a Full Retention Interceptor located downstream of a Manhole. The transformers'' bunds associated with this interceptor will provide surface water storage during the 1 in 30-year storm event prior to discharging into the foul main. In addition, the highest quality of surface water discharge will be attained during operation. This will occur by implementing measures to attenuate and provide extensive treatment of surface water prior to discharge from the site. The measures include silt traps, land drains and oil separators. Here, water will be collected by pipes and gullies, and will be treated by a hydrodynamic solid separator, hydrobrake, and silt and oil separator (silt capacity = 1000 litres, oil capacity = 150 litres). The construction management of the building project will incorporate protection measures to minimise as far as possible the risk of spillage that could lead to surface and groundwater contamination.	**Likelihood level**: Unlikely **Consequence level**: Low **Scale of Effect:** Imperceptible to Not Significant **EIA Significance:** Not significant	Additional Mitigation not required. Existing design and mitigation measures are appropriate to account for climate change/ extreme weather.
	Operation	**Receptor:** Buildings and Environment and infrastructure. Wetter winters and increased frequency of intense rainfall events could result in increased groundwater levels.	As stated in the Engineering Planning Report, the required total attenuation volume has been calculated as 165m^3, with the attenuation volume provided by the underground tank being greater at 200m$^{3.}$ This attenuated volume has been calculated using rainfall data supplied by Met Eireann for Dublin Airport for the 1 in 100-year storm that has been factored up by 20% to allow for climate change. As the underground tanks has a storage capacity greater than the total attenuation volume accounted for a mid-climate change scenario, the mitigation to flooding in the operation phase is deemed to be sufficient.	**Likelihood level**: Unlikely **Consequence level**: Low as a result of disruption across elements of the site lasting less than a day. **Scale of Effect**: Imperceptible to Not Significant **EIA Significance**: Not significant	Additional mitigation not required. Existing design and mitigation measures are appropriate to account for climate change/ extreme weather
	Operation	**Receptor:** Human health. Increased frequency of intense rainfall events could result in wet pavement surface leading to reduced skid resistance leading to unsafe conditions for site personnel.	As committed to in the Engineering Planning Report, a network of collector pipes will convey and direct surface water to storage facilities, which would help to maintain runoff rates and eliminate the collection of surface water on pavements. The pavement markings will be skid resistant through application of a glass bead and grain mix improving the safety of site personnel.	**Likelihood level**: Unlikely **Consequence level**: Medium as a result of health and safety impacts requiring medical treatment. **Scale of Effect:** Imperceptible to Not Significant **EIA Significance:** Not significant	Existing design and mitigation measures are appropriate to account for climate change/ extreme weather. Additional mitigation not required.

Increased frequency and intensity of high temperatures: Heatwave	Operation	**Receptor**: Buildings and Infrastructure. Increased frequency and severity of extreme heat events could result in overheating of the electrical equipment (e.g. Transformers and Switchers, resulting in a reduced rating; Underground cable systems affected by increase in ground temperature, reducing rating).	Electrical specification for electrical equipment including cabinets, would account for appropriate temperature thresholds to reduce risks of overheating during operation.	**Likelihood level**: Unlikely **Consequence level**: Medium **Scale of Effect**: Imperceptible to Not Significant **EIA Significance**: Not significant	Additional Mitigation not required. Existing design and mitigation measures are appropriate to account for climate change/ extreme weather.
	Operation	**Receptor**: Buildings and Infrastructure. High temperatures and heatwaves could result in overheating and unsuitable conditions e.g., discomfort for occupants in the welfare spaces.	The site will be unmanned for most of the time and would only be inspected weekly by up to two personnel entering/exiting via a van. Therefore, personnel would not be present at the site for a long duration and would be unlikely to be affected by heatwaves.	**Likelihood level**: Unlikely **Consequence level**: Low **Scale of Effect**: Imperceptible to Not Significant **EIA Significance**: Not significant	Additional Mitigation not required. Existing design and mitigation measures are appropriate to account for climate change/ extreme weather.
	Operation	**Receptor**: Buildings and Infrastructure. Heatwaves, higher temperatures could damage the building structure.	The proposed development would be inspected weekly by up to two personal entering/exiting via a van. Materials required to construct the proposed development should be selected that provide increased tolerance to high temperatures in accordance with BS EN 1367-4:2008[35] - Test for thermal and weathering properties of aggregates – Part 4: Determination of dry shrinkage (or equivalent).	**Likelihood level**: Unlikely **Consequence level**: Medium **Scale of Effect**: Imperceptible to Not Significant **EIA Significance:** Not significant	Additional Mitigation not required. Existing design and mitigation measures are appropriate to account for climate change/ extreme weather.
	Operation	**Receptor**: Buildings and Infrastructure. Heatwaves, high temperatures and increased humidity could lead to lightning striking the Substation resulting in damage to infrastructure or loss of power.	Emergency response and contingency plans would be put in place to manage the risk of lightning strikes. As committed to in the Engineering Planning Report, in the event of electrical failure or a power outage, an underground tank (200m^3) has been provided enabling the collection of run-off.	**Likelihood level:** Unlikely **Consequence level:** High as a result of health and safety impacts and disruption to operations **Scale of Effect:** Slight to Moderate **EIA Significance:** Not significant	Additional Mitigation not required. Existing design and mitigation measures are appropriate to account for climate change/ extreme weather.
Increased frequency and intensity of high temperatures: Drought	Operation	**Receptor**: Infrastructure and human health. Prolonged periods of drought could lead to vegetation drying, increasing risk of grassland fires near the Substation. Secondary	Emergency response and contingency plans would be put in place to manage the risk of fires.	**Likelihood level**: Unlikely **Consequence level:** High as a result of health and safety impacts.	Additional Mitigation not required. Existing design and mitigation measures are appropriate to account for climate change/ extreme weather.

[35] BSi, 2009. BS EN 1367-4:2008 – Tests for thermal and weathering properties of aggregates. Determination of drying shrinkage. June 2009.

		impacts include infrastructure damage and vegetation		**Scale of Effect**: Slight to Moderate **EIA Significance:** Not significant	
Increased frequency and intensity of high temperatures: Drought	Operation	**Receptor:** Human health receptors. Prolonged periods of drought could affect water and potable water availability.	A leak detection system capable of detecting a major water leak on the mains waster would be installed to maximise the volume of water retained within the system.	**Likelihood level**: Unlikely **Consequence level:** Low **Scale of Effect:** Imperceptible to Not Significant **EIA Significance:** Not significant	Additional mitigation not required. Existing design and mitigation measures are appropriate to account for climate change/ extreme weather.
Extreme weather events: Cold weather events	Operation	**Receptor:** Buildings and Infrastructure and human health. Freeze-thaw could damage the proposed development, e.g. cracking, deformation, that reduces the proposed development's service life.	Materials required to construct the proposed development should be selected that offer increased tolerance to temperatures in accordance with BS EN 1367-4:2008 - Test for thermal and weathering properties of aggregates – Part 4: Determination of dry shrinkage.	**Likelihood level**: Unlikely **Consequence level**: Low **Scale of Effect:** Imperceptible to Not Significant **EIA Significance:** Not significant	Additional Mitigation not required. Existing design and mitigation measures are appropriate to account for climate change/ extreme weather.

ICCI

Construction Effects

13.79 A summary of potential ICCI effects during the construction stage is provided in Table 13-8. The assessment has been based on professional judgment informed by a review of individual technical assessments within the EIAR.

13.80 The ICCI assessment for the proposed development has not identified any significant effects for the construction stage, taking into account embedded mitigation measures of the proposed development. All effects have therefore been considered to range from **imperceptible to not significant**, **negative** in nature and **not significant** in EIA terms.

Operation Effects

13.81 A summary of potential ICCI effects during the operational stage has been provided in Table 13-9. The assessment has been based on professional judgment informed by a review of individual technical assessments within the EIAR.

13.82 The ICCI assessment for the proposed development has not identified any significant effects for the operation stage once existing design mitigation measures are taken into account. All effects have therefore been considered to be **imperceptible to not significant**, **negative** in nature and **not significant** in EIA terms.

Table 13-8: Construction Stage ICCI Effects

Effect of Proposed Development on Receptors	Existing Design and Mitigation Measures	Climate Change Trend	Potential ICCI on Individual Technical Effects or Embedded Mitigation	Is there a Significant ICCI?	Additional Mitigation Required?
Transport Potential interactions of climate change with the identified effects are considered to be imperceptible negative (not significant in EIA terms) based on professional judgement and review of the topic EIAR chapter.					
Population and Human Health Potential interactions of climate change with the identified effects are considered to be imperceptible negative (not significant in EIA terms) based on professional judgement and review of the topic EIAR chapter.					
Air Quality					
Exposure of sensitive receptors to dust from construction activities.	A Dust Management Plan would be prepared for the site and included as part of the CEMP. This would be secured by means of an appropriately worded planning condition. The Dust Management Plan would include measures such as the implementation of dust suppression techniques. The CEMP would also include mitigation measures to minimise impacts from construction HGV traffic.	Increased frequency and intensity of high temperatures: Drought conditions.	Extended periods of drought could arise as a result of warmer summer months and limited precipitation. This may increase dust production and reduce deposition which has the potential to affect human health.	Not significant due to the design and mitigation measures committed to in the CEMP (e.g. increase the frequency of inspections during activities with a high potential to create dust or in prolonged dry weather; development and implementation of a Dust Management Plan.	No additional measures required.
Exposure of sensitive receptors to dust from construction activities.	Control of dust would rely upon good site management and mitigation techniques including some that rely on water, such as ensuring effective water suppression.	Increased frequency and intensity of high temperatures: Drought conditions.	Drought conditions may reduce the availability of water for dust suppression mitigation measures, which would reduce the effectiveness of embedded mitigation measures.	Not significant due to mitigation measures which do not rely on water as committed to in the CEMP (e.g. covering stockpiles and minimising stockpile size).	No additional measures required. Temporary storage of water could be considered during the construction stage to be used for dust suppression in drought conditions.
Noise and Vibration Potential interactions of climate change with the identified effects are considered to be imperceptible to not significant, negative (not significant in EIA terms) based on professional judgement and review of the topic EIAR chapter.					
Ecology Potential interactions of climate change with the identified effects are considered to be imperceptible to not significant, negative (not significant in EIA terms) based on professional judgement and review of the topic EIAR chapter.					
Ground Conditions Potential interactions of climate change with the identified effects are considered to be imperceptible to not significant, negative (not significant in EIA terms) based on professional judgement and review of the topic EIAR chapter.					
Waste Potential interactions of climate change with the identified effects are considered to be imperceptible to not significant, negative (not significant in EIA terms) based on professional judgement and review of the topic EIAR chapter.					
Material Assets Potential interactions of climate change with the identified effects are considered to be imperceptible to not significant, negative (not significant in EIA terms) based on professional judgement and review of the topic EIAR chapter.					
Landscape and Visual Potential interactions of climate change with the identified effects are considered to be imperceptible to not significant, negative (not significant in EIA terms) based on professional judgement and review of the topic EIAR chapter.					
Cultural Heritage Potential interactions of climate change with the identified effects are considered to be imperceptible to not significant, negative (not significant in EIA terms) based on professional judgement and review of the topic EIAR chapter.					

Table 13-9: Operational Stage ICCI

Effect of Proposed Development on Receptors	Existing Design and Mitigation Measures	Climate Change Trend	Potential ICCI on Individual Technical Effects or Embedded Mitigation	Is there a Significant ICCI?	Additional Mitigation Required?
Population and Human Health Potential interactions of climate change with the identified effects are considered to be imperceptible to not significant, negative (not significant in EIA terms) based on professional judgement and review of the topic EIAR chapter.					
Transport Potential interactions of climate change with the identified effects are considered to be imperceptible to not significant, negative (not significant in EIA terms) based on professional judgement and review of the topic EIAR chapter.					
Air Quality Potential interactions of climate change with the identified effects are considered to be imperceptible to not significant, negative (not significant in EIA terms) based on professional judgement and review of the topic EIAR chapter.					
Noise and Vibration Potential interactions of climate change with the identified effects are considered to be imperceptible to not significant, negative (not significant in EIA terms) based on professional judgement and review of the topic EIAR chapter.					
Water Resources and Flood Risk Potential interactions of climate change with the identified effects are considered to be imperceptible to not significant, negative (not significant in EIA terms) based on professional judgement and review of the topic EIAR chapter.					
Ecology Potential interactions of climate change with the identified effects are considered to be imperceptible to not significant, negative (not significant in EIA terms) based on professional judgement and review of the topic EIAR chapter.					
Ground Conditions Potential interactions of climate change with the identified effects are considered to be imperceptible to not significant, negative (not significant in EIA terms) based on professional judgement and review of the topic EIAR chapter.					
Waste Potential interactions of climate change with the identified effects are considered to be imperceptible to not significant, negative (not significant in EIA terms) based on professional judgement and review of the topic EIAR chapter.					
Material Assets Potential interactions of climate change with the identified effects are considered to be imperceptible to not significant, negative (not significant in EIA terms) based on professional judgement and review of the topic EIAR chapter.					
Landscape and Visual Potential interactions of climate change with the identified effects are considered to be imperceptible to not significant, negative (not significant in EIA terms) based on professional judgement and review of the topic EIAR chapter.					
Cultural Heritage Potential interactions of climate change with the identified effects are considered to be imperceptible to not significant, negative (not significant in EIA terms) based on professional judgement and review of the topic EIAR chapter.					

GHG Emissions

13.83 The proposed development would result in GHG emissions during the construction and operation stages. Embedded mitigation measures and potential impacts have been identified in this section and a preliminary assessment of effects has also been provided below.

Embedded Mitigation

13.84 Consideration has been given to the proposed development's opportunities to reduce, minimise or avoid GHG emissions. In line with the Government of Ireland National Mitigation Plan (2017)[36], the Government of Ireland Climate Action Plan (2019)[37], and more specifically the SDCC Climate Change Action Plan 2019-2024[38], which set out the Irish Government's carbon reduction plan targets, as part of the design process potential impacts on GHG emissions have been considered.

13.85 The following mitigation hierarchy has been and would continue to be considered to reduce GHG emissions from the proposed development:

- **avoid/prevent** – maximise potential for re-using and/or refurbishing existing assets to reduce the extent of new construction required, and/or explore alternative lower carbon options to deliver the development objectives;
- **reduce** – low carbon and/or reduced resource consumption solutions (including technologies, materials and products) to minimise resource consumption during construction, operation, and at end of life; and
- **remediate** – measures to further reduce carbon through on- or off-site offsetting or sequestration.

Construction Stage

13.86 The proposed development would seek to minimise GHG emissions, wherever possible, to contribute to the achievement of Ireland's GHG reduction targets and carbon budgets. The embedded mitigation measures relevant to the construction stage of the proposed development have been presented in Table 13-10.

Table 13-10: GHG Mitigation Measures during Construction Stage

Mitigation Measure	Mitigation Detail	Method of Reduction
Excavation of materials	Material excavated during construction would be processed for use in the works wherever possible to reduce the amount of material disposed of off-site as well as imported from other sources, and associated GHG emissions. Possible uses of excavated materials include general fill and other graded materials. Processing of material would take place on-site.	Reduce
Sustainable materials	Sustainability sourced, recycled or secondary materials with lower embedded GHG emissions and water consumption would be specified for the proposed development. For example, products with a high recycled content and replacement for up to 30 % of the cementitious material such as portland cement could be specified. In addition, recycled crushed concrete, from existing pavements to be demolished as part of the works, could be utilised as granular sub-base materials for pavements.	Reduce
Reporting	Energy consumption and materials use would be recorded and reported on an ongoing basis during the construction phase of the development.	Reduce
Equipment	Using low-emissions or electric construction plant, including the potential for portable PV for use in powering temporary compound and equipment.	Reduce
Procurement	Procuring materials with Environmental Product Declarations (EPD) to allow for the most informed procurement choices; and procuring materials from suppliers that offer take back schemes, where possible.	Reduce
Reuse	Reusing the materials from the construction process wherever possible.	Avoid/ prevent
Minimising waste during construction	Following measures would be proposed in the SWMP to minimise waste generation on-site; ordering the quantity of materials required for the job, thus reducing over-ordering.	Reduce

13.87 In addition, and to reduce GHG emissions associated with vehicles from workers, the following mitigation measures would be implemented:

- The contractor would encourage workers to car share where possible and would set up a car sharing database to identify where matches could be made;
- Incentives such as a free breakfast once a week for those walking, cycling, car sharing or using public transport would be provided;
- Selecting electrically driven equipment where possible in preference to internal combustion powered; hydraulic power in preference to pneumatic; and wheeled in lieu of tracked plant;
- Operating plant at low speeds where possible and incorporating automatic low speed idling; and
- Switching off vehicle engines where vehicles are standing for extended periods and avoid unnecessary revving of vehicle engines.
- Cycle parking would be provided, and this would be covered and secure;
- Facilities for changing and storing cycling clothes would be provided; and
- The developer would investigate the provision of public transport vouchers to encourage workers to travel to the application site by bus or rail.

Operation Stage

13.88 Embedded mitigation measures relevant to the operation stage have been described in Table 13-11.

Table 13-11: GHG Mitigation Measures during Operation Stage

Mitigation Measure	Mitigation Detail	Method of Reduction
Internal lighting	Internal lighting shall be provided by high efficiency, low energy LED luminaires combined with presence detection controls or local switching where appropriate.	Reduce
External lighting	External lighting will make use of high efficiency, low energy LED luminaires.	Reduce
Transformers	To reduce electrical losses between HV/MV/LV conversions, the applicant will install low loss transformers which comply with the Ecodesign directive 2009/125/EC as a minimum.	Reduce

[36] Department of Communications, Climate Action & Environment. National Mitigation Plan (2017). Available at: https://www.climatecaseireland.ie/wp-content/uploads/2018/04/National-Mitigation-Plan-2017.pdf [Accessed 12/04/2021]

[37] Government of Ireland. Climate Action Plan (2019). Available at: https://assets.gov.ie/25419/c97cdecddf8c49ab976e773d4e11e515.pdf [Accessed 12/04/2021]

Table 13-11: GHG Mitigation Measures during Operation Stage		
Wellbeing facilities	Minimisation of water usage would be undertaken where possible.	Remediate
Materials	Specifying materials/assets for longer lifespans to avoid future need for replacement.	Avoid/prevent

GHG Emissions Effects

13.89 This assessment presents an estimation of the GHG emissions for the 'Do Something' scenario, a comparison against the 'Do Nothing' baseline, and assessment against Ireland's carbon budgets. The GHG emissions in this section are a high-level indication only and will be updated and refined as the proposed development's design develops and updated traffic and air quality modelling becomes available.

13.90 Due to the embedded nature of the mitigation measures proposed, some of which have already been incorporated into the design and some of which are yet to be incorporated, it is not practicable to complete a quantitative assessment of 'before' and 'after' mitigation. Rather, the assessment shows a snapshot of the current design.

Construction Stage

13.91 A high-level breakdown of construction activities GHG emissions is presented in Table 13-12. Construction activities have been broken down into a product's life cycle stages as specified in PAS208017

Table 13-12: Estimated GHG Emissions from Construction Activities				
Main Stage of Project Lifecycle	**Sub-stage of Lifecycle**		**Emissions (tCO2e)**	**% of Total Construction Emissions**
Construction stage	Product stage; including raw material supply, transport, and manufacture		3,264	21.62%
	Construction process stage	Transport to/from works site	565	3.74%
		Construction/installation processes	11,267	74.61%
		Waste treatment / disposal	5	0.03%
	Total		**15,101**	**100%**

13.92 Emissions from the construction phase are predicted to total in the region of 15,101 tCO_2e. The largest GHG emissions during the construction activities (74.61%) is likely to arise from on-site construction processes required for the construction of the proposed development. GHG emissions associated to materials, equate to 21.62% of the total construction GHG emissions, transport of materials accounts for 3.74 % of the GHG emissions, and waste treatment/disposal accounts for 0.03% of the total GHG emissions.

Operation Stage

13.93 For the estimation of GHG emissions associated with the operation of the proposed development, including maintenance and refurbishment, it has been assumed that certain assets would be replaced periodically during the assumed 60-year design life of the proposed development. Note that the carbon emissions presented below are from the data center. This has been considered a 'worst-case' scenario as operational emissions associated to electricity consumption would begin to decline in line with the gradual greening of the national grid.

Table 13-13: Estimated Operation ('use stage') GHG Emissions for Modelled Opening Year (2023) and Total Over the Assumed 60-year Operational Period (2023-2082)			
Main Stage of Project Lifecycle	**Sub-stage of Lifecycle**	**Emissions (tCO2e)**	
		2023 (modelled opening year)	**Total (cumulative) Over Modelled 60-year Operation (2026-2085)**
Operation ('use-stage')	Use of the proposed development	17.75	2,130.55
	Traffic associated to the proposed development	0.44	6.82

Assessment against Ireland's carbon budgets

13.94 The construction GHG emissions have been reported in tonnes of CO_2e for the duration of the construction activities (Q3 2022 to Q3 2023). The operational GHG emissions have been reported in tonnes of CO_2e for the anticipated opening year of the proposed development (Q3 2023) and for the period covering Ireland's carbon budgets (2021 to 2025, 2026 to 2030 and 2031 to 2035). It is expected that GHG emissions would continue to decrease year on year, primarily due to increasing generation of electricity from sources that produce less GHG emissions and the development of cleaner fuels. This approach is therefore considered to be conservative.

13.95 The construction and operation of the proposed development is expected to contribute 0.005% of Ireland's proposed 295 $MtCO_2e$ carbon budget for 2021-2025, 0.00009% of the 2026-2030, and 0.0001% of the 2031-2035. In the absence of any significance criteria or a defined threshold, IEMA guidance[13] states all GHG emissions contribute towards climate change and might be considered 'significant'. However, IEMA guidance also states that it is down to the practitioner's professional judgement on how best to contextualise a project's GHG emissions impact. Therefore, as the emissions from the proposed development are very low in comparison to the carbon budgets, it has been considered that there would not be predicted impacts to climate during the construction and operation stages of the proposed development. As such, if mitigation measures outlined in Table 13-10 and Table 13-11 are implemented, the construction and operational stages are considered **not significant** in EIA terms.

Assessment of Residual Effects

Additional Mitigation

Construction Stage

13.96 The proposed development has been designed to improve its resilience to climate change through a range of design and construction standards, good engineering practice. No additional mitigation measures for the CCR, ICCI and GHG assessments beyond the mitigation already described would be required for the construction stage.

Operation Stage

CCR

13.97 The following CCR mitigation is proposed in addition to the embedded mitigation already described in Table 13-7:

- Regular inspection of drainage infrastructure and structures has been specified to assess the condition after extreme weather events.
- Drainage Mitigation Plan to be prepared for the operation stage. This must include a maintenance regime for all drainage features.

13.98 Accordingly, the risk of flooding would be unlikely, and the associated climate resilient effect would be reduced to not significant

ICCI

13.99 No additional mitigation is proposed for ICCI.

GHG Emissions

13.100 IEMA best practice guidance states all GHG emissions contribute towards climate change. However, IEMA guidance also states that it is down to the practitioner's professional judgement on how best to contextualise a project's GHG emissions impact. Therefore, as the emissions from the proposed development are very low in comparison to the carbon budgets, it has been considered that there would not be significant residual effects and no mitigation required.

Enhancement Measures

13.101 None identified.

Construction Residual Effects

13.102 As no additional mitigation would be required, the residual construction effects remain as reported in the assessment of effects section:

- CCR and ICCI**: Not significant**; and
- GHG Emissions: **Not Significant**.

Operation Residual Effects

13.103 As no additional mitigation would be required, the residual operation effects remain as reported in the assessment of effects section:

- CCR and ICCI: **Not significant**; and
- GHG Emissions: **Not Significant**.

Summary of Residual Effects

13.104 Table 13-14 provides a tabulated summary of the outcomes of the CCR, ICCI and GHG assessment of the proposed development.

Table 13-14: Summary of Residual Climate Change Effects

Receptor	Description of Residual Effect	Additional Mitigation	Scale and Significance of Residual Effect**	Nature of Residual Effect*				
				+ -	R IR	D I	L U	M B T St Mt Lt P
Construction								
CCR								
Buildings and Infrastructure	Heavy rainfall leading to stockpile erosion and siltation of drainage assets	None required	Imperceptible to Not Significant	-	R	D	U	T/St
Buildings and infrastructure	Heavy rainfall leading to an inability to delays in the construction programme.	None required	Imperceptible to Not Significant	-	R	D	U	T/St
Environment	Heavy rainfall leading to contamination of water courses.	None required	Imperceptible to Not Significant	-	R	I	U	T/St
Human Health	Heatwaves and high temperatures leading to increased dust generation.	None required	Imperceptible to Not Significant	-	R	D	U	T/St
Human Health	Strong winds leading to damage of stockpiles and secondary impacts on site personnel welfare.	None required	Imperceptible to Not Significant	-	R	ID	U	T/St
Human Health	Heatwaves and high temperatures affecting site personnel welfare.	None required	Imperceptible to Not Significant	-	R	D	U	T/St
ICCI								
Air Quality – Sensitive Receptors	Extended period of drought could increase exposure of sensitive receptors to dust generated from demolition and construction activities.	None required	Not Significant	-	R	D	U	T/St
Air Quality – Sensitive Receptors	Extended period of drought could reduce availability of water for dust suppression which would reduce the effectiveness of embedded mitigation measures.	None required	Not Significant	-	R	D	U	T/St
Population and Human Health Sensitive Receptors	Potential interactions of climate change with the identified Population and Human Health effects.	None required	Imperceptible	-	R	D	U	T/St

Table 13-14: Summary of Residual Climate Change Effects

Transport Sensitive Receptors	Potential interactions of climate change with the identified Transport effects.	None required	Imperceptible	-	R	D	U	T/St
Noise and Vibration Sensitive Receptors	Potential interactions of climate change with the identified Noise and Vibration effects.	None required	Imperceptible to Not Significant	-	R	D	U	T/St
Ecology Sensitive Receptors	Potential interactions of climate change with the identified Ecological effects.	None required	Imperceptible to Not Significant	-	R	D	U	T/St
Ground Conditions Sensitive Receptors	Potential interactions of climate change with the identified Ground Conditions effects.	None required	Imperceptible to Not Significant	-	R	D	U	T/St
Waste Sensitive Receptors	Potential interactions of climate change with the identified Waste effects.	None required	Imperceptible to Not Significant	-	R	D	U	T/St
Material Assets Sensitive Receptors	Potential interactions of climate change with the identified Material effects.	None required	Imperceptible to Not Significant	-	R	D	U	T/St
Landscape and Visual Sensitive Receptors	Potential interactions of climate change with the identified Landscape and Visual effects.	None required	Imperceptible to Not Significant	-	R	D	U	T/St
Cultural Heritage Sensitive Receptors	Potential interactions of climate change with the identified Cultural Heritage effects.	None required	Imperceptible to Not Significant	-	R	D	U	T/St
GHG Emissions								
Global atmosphere	GHG Emissions	None required	Not Significant	-	IR	D	L	LT

Table 13-14: Summary of Residual Climate Change Effects

Operation								
CCR								
Buildings and Infrastructure	Increased frequency of intense rainfall leading to overwhelming of drainage assets and flooding.	Drainage management plan. Regular monitoring and maintenance of drainage facilities and culverts	Imperceptible to Not Significant	-	R	D	U	Lt
Infrastructure	Flooding of the underground foundations or services (electrical cables	None required	Imperceptible to Not Significant	-	R	D	U	Lt
Environment	Overflow of contaminated water, impacting nearby watercourses.	None required	Imperceptible to Not Significant	-	R	I	U	Lt
Buildings and infrastructure	Increased frequency of intense rainfall leading to increased groundwater levels.	None required	Imperceptible to Not Significant	-	R	D	U	Lt
Human Health	Rainfall events resulting in wet pavement surface leading to reduced skid resistance leading to unsafe conditions.	None required	Imperceptible to Not Significant	-	R	D	U	Lt
Buildings and infrastructure	Extreme heat events could result in overheating of the electrical equipment (e.g., data servers).	None required	Imperceptible to Not Significant	-	IR	D	U	Lt
Human health	Increased mean temperatures and heatwaves leading to overheating in ancillary buildings and office spaces.	None required	Imperceptible to Not Significant	-	R	D	U	Lt
Buildings	Higher temperatures could	None required	Imperceptible to Not Significant	-	IR	D	U	Lt

Table 13-14: Summary of Residual Climate Change Effects

	damage the building structure.							
Buildings and infrastructure	Higher temperatures leading to increased lightning strikes, resulting in damage to infrastructure or power loss.	None required	Slight to Moderate	-	IR	D	U	Lt
Buildings and infrastructure, Human Health	Drought could lead to vegetation drying, increasing risk of vegetation fires.	None required	Slight to Moderate	-	R	I	U	Lt
Human health	Drought conditions affecting water and potable water availability.	None required	Imperceptible to Not Significant	-	R	D	U	Lt
Buildings and infrastructure	Freeze-thaw could damage of the proposed development, e.g., cracking.	None required	Imperceptible to Not Significant	-	IR	D	U	Lt
ICCI								
Population and Human Health Sensitive Receptors	Potential interactions of climate change with the identified Population and Human Health Effects.	None required	Imperceptible to Not Significant	-	R	D	L	P
Transport Sensitive Receptors	Potential interactions of climate change with the identified Transport effects.	None required	Imperceptible to Not Significant	-	R	D	L	P
Air Quality Sensitive Receptors	Potential interactions of climate change with the identified Air Quality effects.	None required	Imperceptible to Not Significant	-	R	D	L	P
Noise and Vibration Sensitive Receptors	Potential interactions of climate change with the identified Noise and Vibration effects.	None required	Imperceptible to Not Significant	-	R	D	L	P
Water Resources and Flood Risk Sensitive Receptors	Potential interactions of climate change with the identified Water Resources and Flood Risk effects.	None required	Imperceptible to Not Significant	-	R	D	L	P
Ecology Sensitive Receptors	Potential interactions of climate change with the identified Ecological effects.	None required	Imperceptible to Not Significant	-	R	D	L	P
Ground Conditions Sensitive Receptors	Potential interactions of climate change with the identified Ground Conditions effects.	None required	Imperceptible to Not Significant	-	R	D	L	P
Waste Sensitive Receptors	Potential interactions of climate change with the identified Waste effects.	None required	Imperceptible to Not Significant	-	R	D	L	P
Material Assets Sensitive Receptors	Potential interactions of climate change with the identified Material effects.	None required	Imperceptible to Not Significant	-	R	D	L	P
Landscape and Visual Sensitive Receptors	Potential interactions of climate change with the identified Landscape and Visual effects.	None required	Imperceptible to Not Significant	-	R	D	L	P
Cultural Heritage Sensitive Receptors	Potential interactions of climate change with the identified Cultural Heritage effects.	None required	Imperceptible to Not Significant	-	R	D	L	P
GHG Emissions								
Global Climate	GHG Emissions	None required	Not Significant	-	IR	D	L	LT

Notes: * - = Negative/ + = Positive / +/- = Neutral; R = Reversible, IR = Irreversible; D = Direct, ID = Indirect; L= Likely, U = Unlikely; M = Momentary, B = Brief, T= Temporary, St = Short-term, Mt = medium-term, Lt = Long-term, P = Permanent, R = Reversible. ** Imperceptible, Not Significant, Slight, Moderate, Significant, Very Significant, Profound.

Cumulative Effects

Intra-Project Effects

13.105 As explained in Chapter 2: EIA Process and Methodology, intra-project cumulative effects are discussed in Chapter 16: Cumulative Effects. However, in the instance of this climate assessment, in line with IEMA guidance, intra-cumulative effects have been considered in the ICCI assessment.

Inter-Project Effects

CCR

13.106 The climate resilience effects identified as a result of the construction and completed development stages are limited in their spatial extent to the site boundary and the proposed development in isolation. Therefore, cumulative climate change resilience effects with other schemes have not been considered.

ICCI

13.107 The in-combination climate impacts identified as a result of the construction and completed development stages are limited in their spatial extent to the relevant technical assessments in the EIAR for the proposed development. Therefore, cumulative effects have been considered for each technical discipline as opposed to in-combination with cumulative schemes.

GHG Emissions

13.108 GHG emissions contribute cumulatively with all sources of GHG emissions globally to cause climate change. In line with IEMA guidance, this assessment has considered GHG emissions in the context of GHG emissions of Dublin and Ireland and no further consideration of the proposed developments GHG emissions with other sources of GHGs is necessary

Summary of Assessment

Background

13.109 This chapter has detailed the potential climate change effects due to the construction and operation stages of the proposed development. The assessment of construction and completed development stages has been undertaken taking into account the relevant national and local guidance and regulations.

Construction Effects

13.110 During construction works, it is expected that general climate trends for Ireland, including extreme weather events (e.g., increased wind speeds, drought, intensity of precipitation events) would continue to occur irrespective of whether the proposed development is built or not.

CCR

13.111 The CCR assessment has reviewed the potential vulnerability of the proposed development to extreme weather and projected climate change. Considering embedded mitigation measures, all effects have been of low or medium magnitude and therefore the effects are considered to range from **imperceptible to not significant, negative** in nature are **not significant** in EIA terms.

ICCI

13.112 The basis of this assessment was to review the identified effects, the receptors and embedded mitigation measures for each technical assessment contained within the EIAR. Professional judgement has been used to assess whether projected climate change could increase the magnitude of the effects as identified by the disciplines, change the sensitivity of the receptors, or reduce the effectiveness of embedded mitigation measures.

13.113 Overall, the effects are considered to be from **imperceptible to not significant, negative** in nature and **not significant** in EIA terms.

GHG Emissions

13.114 The high-level GHG emissions assessment has estimated the construction of the proposed development would result in approximately 15,101 tCO_2e over the course of the construction stage based on information available at the time of the assessment.

13.115 IEMA best practice guidance states all GHG emissions contribute towards climate change and might be significant. However, IEMA guidance also states that it is down to the practitioner's professional judgement on how best to contextualise a project's GHG emissions impact. Therefore, as the emissions from the proposed development are very low in comparison to the carbon budgets, it has been considered that the overall effects are **not significant** in EIA terms. However, it is recommended the implementation a CEMP with best practice measures would contribute to reducing GHG emissions associated with the construction stage of the proposed development.

Operation Effects

13.116 During the completed development stage, it is expected that general climate trends for Ireland, including extreme weather events, would continue to occur irrespective of whether the proposed development is built or not. This includes:

- an increase in mean annual temperatures;
- warming will be enhanced at the extremes with an increase in summer daytime and winter night-time temperatures;
- summer heatwave events are expected to occur more frequently;
- precipitation is expected to become more variable, with substantial projected increases in the occurrence of both dry periods and heavy precipitation events;
- a mean reduction in wind speeds; and
- a decrease in the number of frost days and ice days.

CCR

13.117 The CCR assessment has reviewed the potential vulnerability of the proposed development to extreme weather and projected climate change. Considering embedded mitigation measures, all effects have been of low or medium magnitude and therefore the effects are considered to range from **imperceptible to slight/moderate, negati**ve in nature are **not significant** in EIA terms.

ICCI

13.118 The basis of this assessment was to review the identified effects, the receptors and embedded mitigation measures for each technical assessment contained within the EIAR. Professional judgement has been used to assess whether projected climate change could increase the magnitude of the effects as identified by the disciplines, change the sensitivity of the receptors, or reduce the effectiveness of embedded mitigation measures.

13.119 Overall, the effects are considered to be from **imperceptible to not significant**, **negative** in nature and **not significant** in EIA terms.

GHG Emissions

13.120 The GHG assessment has estimated the operational proposed development would result in approximately 2,137 tCO_2e during the operation stage of the proposed development.

13.121 In addition, the GHG assessment has estimated the proposed development would result in approximately 17,239 t CO_2e during the construction and operation stage of the proposed development.

13.122 The completed development is expected to contribute 0.005% to the Ireland's carbon budget (295 Mt CO_2e) to the 2021 to 2025 carbon budget, 0.00009% to the 2026 to 2030 carbon budget, and 0.0001% to the 2031-2035 carbon budget. Therefore, the proposed development's GHG emissions would be minor in comparison to the Ireland Carbon Budgets and consequently, it has been considered that the overall effects are **not significant** in EIA terms.

Cumulative Effects

CCR

13.123 The CCR identified are limited in their spatial extent to the site boundary and therefore no cumulative effect with other committed developments has been considered.

ICCI

13.124 The ICCI assessment identified are limited in their spatial extent to the relevant technical assessments in the EIAR for the proposed development. Therefore, cumulative effects have been considered for each technical discipline as opposed to in-combination with cumulative schemes.

GHG Emissions

13.125 GHG emissions contribute cumulatively with all sources of GHG emissions globally to cause climate change. This assessment has considered GHG emissions in the context of GHG emissions in Ireland and no further consideration of the proposed developments GHG emissions with other sources of GHGs is considered necessary.

14 WASTE

Introduction

14.1 This chapter of the EIAR reports on the likely significant waste effects to arise from the construction and operation stages of the proposed development.

14.2 The chapter describes the waste policy context; the methods used to assess the potential impacts and likely effects; the baseline conditions at and surrounding the site; the likely waste effects taking into consideration embedded mitigation; the need for additional mitigation and enhancement; the significance of residual effects; and inter-project cumulative effects.

14.3 There are no technical appendices supporting this chapter.

Methodology

14.4 The assessment has been informed by the following legislation, policies, and published guidance:

- International Legislation:
  - Waste Framework Directive (2008/98/EC)[1];
- National Legislation and Policy:
  - Waste Management Act 1996 (as amended)[2];
  - Waste Management (Licencing) Regulations 2004[3];
  - European Communities (Waste Directive) Regulations 2011[4];
  - Draft Best Practice Guidelines for the Preparation of Waste Management Plans for Construction Demolition Projects (2021)[5] – which revised previous Guidelines set in 2006[6]; and
  - Environmental Protection Agency (EPA) National Waste Statistics Summary Report for 2018[7].
- Regional Policy:
  - Eastern Midlands Regional Waste Management Plans 2015-2021 (2017)[8]; and
  - Construction and Demolition (C&D) Waste: Soil and Stone Recovery/Disposal Capacity, Update Report (2020)[9];
- National guidance and industry standards:
  - Waste Action Plan for a Circular Economy 2020-2025 (2021)[10];
  - Guidance on Soil and Stone By-Products (2019)[11];
  - Materials and Waste in Environmental Impact Assessment (2020)[12]; and
  - A Resource Opportunity – Waste Management Policy in Ireland (2012)[13].

Assessment Scope

14.5 In considering the generation and management of waste, it is important to define when, under current legislation and understanding, a material is considered to be waste. The Waste Framework Directive (2008/98/EC) defines waste as *"…any substance or object which the holder discards, intends to discard or is required to discard"*.

14.6 More specifically, the Waste Action Plan for a Circular Economy (2021) describes C&D waste as waste from any building works, demolition, and development (including transport infrastructure).

14.7 The IEMA guidance relating to Materials and Waste in Environmental Impact Assessment[12]/EPA Best Practice Guidelines for the Preparation of Waste Management Plans for Construction Demolition Projects was used in the assessment. Furthermore, professional judgement, experience and best practice methods have been drawn upon to assess the significance of the potential effects of the proposed development. The assessment has taken account of all applicable legislation, policy, and industry guidance.

14.8 The site is located within the jurisdiction of South Dublin County Council (SDCC) and the SDCC Development Plan 2016-2022[14] sets out a number of objectives and actions for the South Dublin area in line with the objectives of the Eastern Midlands Region (EMR) Waste Management Plan (WMP) 2015-2021. The waste objectives with a particular relevance to the proposed development are as follows:

- IE5 Objective 1: To support the implementation of the EMR WMP 2015-2021 by adhering to overarching performance targets, policies, and policy actions.
- IE5 Objective 2: To support waste prevention through behavioural change activities to de-couple economic growth and resource use.
- IE5 Objective 3: To encourage the transition from a waste management economy to a green circular economy to enhance employment and increase the value recovery and recirculation of resources.
- IE5 Objective 8: To secure appropriate provision for the sustainable management of waste within developments, including the provision of facilities for the storage, separation, and collection of such waste.

14.9 The waste types and estimated quantities used in this assessment have been based on published data by the Environmental Protection Agency (EPA) in National Waste Statistics[15], data recorded from similar previous developments, and other available research sources.

[1] European Union, 2008. Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives (Text with EEA relevance). Document 32008L0098.
[2] Government of Ireland, 1996. Waste Management Act 1996 (as amended). Updated to 27 August 2020.
[3] Government of Ireland, 2004. Waste Management (Licencing) Regulations, 2004.
[4] Government of Ireland, 2011. European Communities (Waste Directive) Regulations 2011.
[5] Government of Ireland, 2021. C&D Waste. Available at: https://www.gov.ie/en/publication/c305a-construction-and-demolition-cd-waste/ [Last accessed 30/06/2021].
[6] Department of the Environment, Heritage and Local Government, 2006. Best Practice Guidelines of the Preparation of Waste Management Plans for C&S projects. Available at: https://www.leanbusinessireland.ie/includes/documents/BPGConstructionand%20demolition.pdf [Last accessed 30/06/2021].
[7] Environmental Protection Agency (EPA), 2018. National Waste Statistics Summary Report for 2018. Available at: EPA_Nat_Waste_Stats_Report_Web.pdf [Last Accessed 4/8/2021]
[8] Eastern Midlands Region, 2017. Eastern Midlands Region Waste Management Plan 2015-2021. Available at: http://emwr.ie/emwr-plan/ [Last accessed 04/08/2021].
[9] Government of Ireland, 2020. C&D Waste Soil and Stone Recovery/ Disposal Capacity Update Report. Available at: http://southernwasteregion.ie/sites/default/files/National%20C%20%20D%20Report%20Dec%202020%20for%20Publication.pdf [Last accessed 30/06/2021].
[10] Government of Ireland, 2020. Waste Action Plan for a Circular Economy. Available at: https://www.gov.ie/en/publication/4221c-waste-action-plan-for-a-circular-economy/ [Last accessed 30/06/2021].
[11] EPA, 2010. Guidance on Soil and Stone By-products. Available at: https://www.epa.ie/publications/licensing--permitting/waste/Guidance_on_Soil_and_Stone_By_Product.pdf [Last accessed 30/06/2021].
[12] Institute of Environmental Management and Assessment (IEMA), 2020. Materials and Waste in Environmental Impact Assessment 2020. Available at: https://www.iema.net/resources/reading-room/2020/03/30/materials-and-waste-in-environmental-impact-assessment [Last accessed 4/8/2021].
[13] Government of Ireland, 2012. A Resource Opportunity – Waste management policy in Ireland. Available at: https://www.gov.ie/en/publication/a9d98-a-resource-opportunity-waste-management-policy-in-ireland/ [Last accessed 04/08/2021].

Technical Scope

14.10 The assessment of the likely effects of the proposed development due to the generation and management of waste has considered the remaining landfill void capacity that would be depleted by waste produced during the construction operation stages of the proposed development.

Spatial Scope

14.11 There are two main study areas for the waste assessment:

- A wider study area of the Eastern Midlands Region of Ireland. This area has been used for baseline data investigation, and to locate potential sensitive receptors off-site, including surrounding landfill sites and other waste management infrastructure.
- A study area of 500m from the site boundary. This area has been determined by means of a number of cumulative developments, listed in Chapter 2: EIA Process and Methodology of this EIAR Volume. An extensive review of these schemes is imperative for the cumulative stage assessment and for generating waste estimates for the proposed development.

Temporal Scope

14.12 In line with EPA guidance, as outline in EIAR Chapter 2: EIA Process and Methodology of this EIAR Volume, the duration of effects has been classified using the following: Momentary (seconds to minutes), Brief (<1 Day), Temporary (<1 Year), Short-term (one to seven years), Medium-term (seven to 15 years), Long-term (15 to 60 years), Permeant (>60 years). The assessment has considered impacts arising during the construction stage (eight to 10 months) which would be expected to be temporary to short-term in nature and from the operation stage which would be expected to be long-term to permeant.

Baseline Characterisation Method

Desk Study

14.13 In order to establish baseline waste conditions in the study area, relevant data was reviewed and assessed. Data was obtained from the following sources:

- South Dublin County Council Plan 2016-2022[16];
- EMR WMP 2015-2021[8];
- Draft Best Practice Guidelines for the Preparation of Waste Management Plans for Construction Demolition Projects[5];
- Waste Action Plan for a Circular Economy[10];
- C&D Waste Soil and Stone Recovery/Disposal Capacity Update Report 2020[9];
- Project Ireland 2040[17]; and
- National Development Plan 2018-2027[18].

Field Study

14.14 Field study/data collection was not required at the site as the data provided by other sources was deemed to be adequate and representative of the site conditions.

Assessment Method

Methodology

Construction Stage

14.15 The impacts of the proposed development, arising from the generation and management of waste, has been assessed. Due to the absence of EPA/Irish guidelines for waste assessments in EIA, the assessment has considered the methodology specified in Institute of Environmental Management and Assessment (IEMA) Materials and Waste in Environmental Impact Assessment guidance documents[12]. An extensive document review to assist in identifying current and future requirements of waste management including national and regional waste policy, waste strategies, management plans, legislative requirements and relevant reports has also been undertaken.

14.16 To assess the potential effects arising from the generation of waste during the construction, and operation stages, a desk study was carried out which included:

- A review of applicable policy and legislation to create the legal framework for waste management in Ireland.
- Description of the typical waste materials that would be generated during the construction and operation stages; and
- Identification of mitigation measures to prevent waste generation and promote management of waste in accordance with the waste hierarchy.

14.17 The waste estimates calculated for the construction stage of the proposed development have been derived from a calculation of the proposed development's Gross Floor Area (GFA) used to estimate potential waste volumes for the proposed development using the BRE/SmartWaste Waste Benchmark Data 2019. Additionally, the assessment has taken into consideration published data by the EPA in National Waste Reports.

14.18 Mitigation measures were also proposed to minimise the proposed development's environmental effects during the construction stage.

Operation Stage

14.19 The methodology for assessing likely operation stage effects is the same as that presented for the construction stage above.

Cumulative Stage

14.20 The combined effects of the proposed development and the cumulative developments on a given receptor have been assessed for both stages of the proposed development.

14.21 As part of the cumulative assessment, consideration has also been given to the proposed data centre that would be located <50m to the north of the site. This cumulative assessment has been considered qualitatively.

Assessment Criteria

14.22 The criteria used to assess if an effect is significant or not, is set out in subsequent sub-sections. This is determined by consideration of the sensitivity of the receptor, magnitude of impact and scale of the effect. In considering the significance of an effect, consideration has been given to the duration of the effect, the geographical extent of the effect and the application of professional judgement.

[16] South Dublin County Council, 2016. Plan 2016-2022. Available at: https://www.sdcc.ie/en/services/planning/development-plan/plan-2016-2022/ [Last accessed 30/06/2021].
[17] Government of Ireland, 2019. Project Ireland 2040 Documents and Information. Available at: https://www.gov.ie/en/collection/580a9d-project-2040-documents/ [Last accessed 30/06/2021].
[18] Government of Ireland, 2018. National Development Plan 2018-2027. Available at: https://www.gov.ie/en/policy-information/07e507-national-development-plan-2018-2027/?referrer=/en/national-development-plan-2018-2027/ [Last accessed 30/06/2021].

Receptor Sensitivity/Value Criteria

14.23 The sensitivity of waste relates to availability of regional (and where appropriate, national) landfill void capacity in the absence of the proposed development. Landfill capacity is recognised as an unsustainable and increasingly scarce option for managing waste.

14.24 Information presented in Table 14.1 has been used to determine the sensitivity of landfill void capacity. For the purposes of EIA, 'negligible' and 'low' are classed as Low; 'medium' is classed as Medium and 'high' and 'very high' are classed as High.

Table 14.1: Receptor Sensitivity Criteria

Sensitivity	Criteria
Negligible	Across construction and/or operation phases, the baseline/future baseline (i.e. without development) of regional (or where justified, national) inert and non-hazardous landfill void capacity is expected to remain unchanged or is expected to increase through a committed change in capacity.
Low	Across construction and/or operation phases, the baseline/future baseline (i.e. without development) of regional (or where justified, national) inert and non-hazardous landfill void capacity is expected to reduce minimally by <1% as a result of wastes forecast.
Medium	Across construction and/or operation phases, the baseline/future baseline (i.e. without development) of regional (or where justified, national) inert and non-hazardous landfill void capacity is expected to reduce noticeably by 1%-5% because of wastes forecast.
High	Across construction and/or operation phases, the baseline/future baseline (i.e. without development) of regional (or where justified, national) inert and non-hazardous landfill void capacity is expected to reduce considerably by 6%-10% because of wastes forecast.
Very High	Across construction and/or operation phases, the baseline/future baseline (i.e. without development) of regional (or where justified, national) inert and non-hazardous landfill void capacity is expected to reduce very considerably (by >10%); end during construction or operation; is already known to be unavailable; or would require new capacity or infrastructure to be put in place to meet forecast demand.

Impact Magnitude Criteria

14.25 The magnitude of impact has been classified as 'no change', 'negligible', 'minor', 'moderate' and 'major' in accordance with the criteria set out in Table 14.2. For the purposes of EIA, 'no change' and 'negligible' are classed as Low; 'minor' is classed as Medium and 'moderate' and 'major' are classed as High.

Table 14.2: Impact Magnitude Criteria

Magnitude	Criteria
No Change	In construction and/or operation, a development is expected to achieve 100% landfill diversion.
Negligible	In construction and/or operation, a development is expected to achieve 90%-99% landfill diversion.
Minor	In construction and/or operation, a development is expected to achieve 60%-89% landfill diversion.
Moderate	In construction and/or operation, a development is expected to achieve 30%-59% landfill diversion.
Major	In construction and/or operation, a development is expected to achieve <30% landfill diversion.

Scale of Effect Criteria

14.26 Impacts have been assessed based on the value and sensitivity of receptors against the magnitude of impact to determine the scale of effect as presented in Table 14.3.

Table 14.3: Scale of Effect Criteria

Magnitude	Sensitivity of Receptors		
	Low	Medium	High
Low	Imperceptible/Not Significant	Not Significant to Slight	Slight to Moderate
Medium	Not Significant to Slight	Slight to Moderate	Moderate to Significant
High	Slight to Moderate	Moderate to Significant	Very Significant to Profound

14.27 Based on Environmental Protection Agency's (EPA) Draft Guidelines on the information to be contained in Environment Impact Assessment Reports[19] (2017), as described in Chapter 2: EIA Process and Methodology, effects ranging from 'moderate' to 'profound' are considered significant in EIA terms. Nature of Effect Criteria

14.28 The nature of the effect has been described as either negative, neutral or positive as follows:

- Positive – An advantageous effect to a receptor;
- Neutral – An effect that on balance, is neither positive nor negative to a receptor; or
- Negative – A detrimental effect to a receptor.

Assumptions and Limitations

14.29 The assessment for waste receptors has been based on a review of the baseline information available at the time of assessment. Whilst the baseline data sources used in this assessment have been obtained from the most recently available information, it is still possible that conditions could have changed since their publication.

14.30 The quantities of materials to be used for the construction stage of the proposed development design, sources of materials and their mode of transport are yet to be finalised. Values have been estimated based on data obtained from a review of other similar substation applications in the surrounding area. It has been assumed that these data sets have been reported correctly.

14.31 It has been assumed that a Site Waste Management Plan (SWMP) would be developed by the contractor. The SWMP would ensure suitable management of construction and excavation waste, prevent (where practicable) and minimisation of waste arising and maximisation of waste re-use and recycling.

Baseline Conditions

Existing Baseline

14.32 For waste planning purposes, Ireland is divided into three regions: Connacht-Ulster; Southern; and Eastern Midlands[10]. SDCC lies within the Eastern Midlands Region (EMR)[8]. Therefore, reference to Waste management, generation, and capacity of landfills would refer to both the wider EMR in addition to the local authority SDCC. In terms of waste management, the local authority responsible for setting and administering waste management activities in the site area is SDCC. Waste management activities within the area is governed by the requirements set out in the EMR WMP 2015-2021.

[19] Environmental Protection Agency, 2017. Draft Guidelines on the information to be contained in Environmental Impact Assessment Report (EIAR).

14.33 The EU Waste Framework Directive 2008/98/EC requires that a target of 70% recovery by weight of construction and demolition) C&D waste generated be met by the year 2020. The latest figures published by the Environment Protection Agency (EPA) state that Ireland is on track to meet this target.

14.34 In general, the largest element of C&D waste consisted of excavated soil (making up approximately 77% of total C&D waste)[5]. The remainder included concrete, brick, tiles, metal, glass, wood, plastic, and metal[10]. Currently, the majority of C&D waste generated in Ireland is recovered or reused. Where recovery or reuse is not feasible, it is disposed of at suitably licensed facilities.

14.35 Within Ireland, the total mass of waste produced in the year 2018 was 14.1 million tonnes across all sectors[7]. For C&D waste, approximately 6.2 million tonnes were collected by authorised waste collectors for treatment in 2018. This was significantly greater than the 4.7 million tonnes reported in 2017, which corresponded with increases in construction activity nationally[7]. In 2015, 5.1 million C&D waste was processed[7]. All C&D waste arise predominantly from demolition of existing structures, and from materials brought to site that were not used for their intended purposes, such as damaged items, cut offs and surplus materials.

14.36 According to the latest figures, most of the C&D waste collected in 2018 consisted of soil and stones (77%). The remainder was made up of concrete, bricks, tiles, and gypsum waste (12%) and mixed C&D waste (7%). Only three per cent of C&D waste was collected separately as single material streams (wood, glass, plastic, or metal). Soil and stone waste are typically managed at Local Authority–permitted infill sites. Backfilling activities account for a significant portion of the recovery rate being achieved. The most recent figures available for C&D waste arising in Ireland, and that waste's disposal and recovery routes, are shown in Table 14.4. It should be noted that these figures are likely to have increased since then and would continue to do so in the coming years, due to the renewed growth in the economy.

Table 14.4: Collection and Management of C&D Waste Excluding Soil and Stone

Management	Recycling (tonnes)	Energy Recovery (tonnes)	Backfilling (tonnes)	Disposal (tonnes)	Total (tonnes)
Metal waste	185,000	0	0	0	185,000
Segregated wood, glass, and plastic waste	43,023	0	7,596	181	50,800
Concrete, brick, tile, and gypsum waste	181,192	11	592,479	20	773,702
Waste bituminous mixtures	19,943	0	40,603	0	60,546
Mixed construction waste	66,158	1,049	23,859	7,022	98,089
Waste soils, stones, and dredging spoil	7,804	14	4,664,819	26,242	4,698,879
Waste treatment residues	20,413	17,959	168,912	112,184	319,469
Total	**523,534**	**19,033**	**5,498,268**	**145,649**	**6,186,485**

14.37 According to the C&D Waste Update Report (2020)[9] there are 106 authorised facilities in the EMR for soil and stone acceptance, including:

- Four active licenced soil recovery facilities;
- Six licenced soil recovery facilities due to start providing capacity;
- Four active inert landfills;
- 49 permitted facilities; and
- 43 registered facilities with a Certificate of Registration (CoR).

14.38 Overall, licensed Soil Recovery Facility (SRF) capacities in the EMR are concentrated in the local authority areas of Fingal, Meath, Kildare, and Wicklow. There are no licensed SRFs outside the Greater Dublin Area (GDA).

14.39 Waste licence facilities in the EMR are of the scale required by the markets[5]. EMR's current active and available annual licenced market capacity for SRF (Soil Recovery facilities) is 2.4 million tonnes (Mt). Waste licence facilities in the EMR Region are of the scale required by the market. Six of the ten licenced sites have annual capacity of 300,000 tonnes or more and one facility is licenced to accept 1,500,000 tonnes of soil wastes each year. This capacity is concentrated in the Greater Dublin Area. Licensed capacity is authorised on an annual basis. The capacity for uncontaminated soil comprises of 2.4 million tonnes annual licenced capacity

14.40 The permitted and registered facilities offer a much smaller capacity to the Region. The EMR remaining permitted lifetime capacity is 1.3 million tonnes (at end-2018). The registered remaining lifetime capacity in the region is much smaller by comparison with just over 188,000 tonnes available (at end-2018). while permitted and registered capacity is authorised on a lifetime capacity, meaning that these cannot be aggregated and are reported separately, and 1.52 million tonnes lifetime capacity provided by permitted and registered sites.

14.41 The geographical spread of these sites is reasonably good. The local authorities within Dublin County have low counts of permitted or registered facilities with no area having more than one of each. A number of local authorities (Laois, Louth, Offaly, and Westmeath) have low registered capacities and are reliant on permitted facilities.

14.42 There are three inert landfills in Ireland, plus the Tara Mines facility, which are all located in the EMR, providing predominantly disposal capacity. The four active inert landfill facilities have approximately 6.1 million tonnes of remaining lifetime capacity to accept lightly contaminated soils.

14.43 The Integrated Materials Solutions Limited Partnership (IMS) facility had 3.9 million tonnes remaining, with 2.1 million tonnes remaining at Walshestown, at the end of 2018.

14.44 In addition, there are a number of non-hazardous municipal landfill sites in the region which have an ongoing requirement for soil and stone material for daily cover, capping and other remediation activities at the sites. These facilities relevant to the proposed development are presented in Table 14.5.

14.45 The acceptance of non-hazardous waste and inert soils has reduced since 2016 as available void capacity has diminished. At the end of 2018, the remaining capacity at Drehid was 636,085 m^3 compared to 5,006,968 m^3 of available capacity when the site commenced activity. Conversely, Ballynagran increased the intake of non-hazardous soil waste for recovery from 163 tonnes in 2017, to 22,002 tonnes in 2018 in response to market demand.

Table 14.5: Licensed Capacity at Active Landfills

Landfill Facility Name	Waste for Disposal (maximum tonnes per annum)	Waste Types for Disposal (maximum tonnes per annum)	Waste Types for Recovery (maximum tonnes per annum)
Knockharley Landfill - County Meath	175,000	100,000 household 45,000 commercial 30,000 industrial	25,000 (C&D) 70,000 (inert waste)
Ballynagran Residual Landfill - County Wicklow	175,000	62,500 household 67,500 commercial 45,000 industrial	28,000 (C&D)
Drehid Waste Management Facility - County Kildare	120,000	120,000 non-hazardous municipal, commercial, and industrial wastes	No limit for inert waste were used in landfill engineering
Total	**470,000**	**-**	**-**

14.46 There are also a number of materials recover facilities/waste transfer stations in operation in the region which are suitable for the acceptance of C&D wastes should they be required. Details of the facilities relevant to the proposed development are presented in Table 14.6.

Table 14.6: Licensed Waste Transfer Stations that Could Potentially Accept C&D Waste

Waste Transfer Station Name	Licensed Limitation from Acceptance of C&D Waste at Active Sites (tonnes per annum) at start of 2016
Starrus Eco Holdings Limited (now Greenstar) – Bray Depot	54,040
Nurendale Ltd, trading as Panda Waste – Rathdrinagh	120,000
Greyhound Recycling and Recovery – Clondalkin	3,000
Thorntons Recycling Centre – Dunboyne	28,020
Nurendale Ltd, trading as Panda Waste – Finglas	40,000
Dean Waste Company Ltd – Upper Sherriff Street	105,000
Labre Park Civic Amenity Site – Ballyfermot	6,000
Total	**356,060**

14.47 There is no dedicated 'hazardous waste to energy' or landfill treatment capacity in Ireland. Hazardous soil materials, depending on the nature of the contamination, are treated, and stabilised at specialised indigenous facilities. Treatment activities at some of these facilities can change the characterisation of soil wastes from hazardous to non-hazardous, whereby the soil can then be directed back to non-hazardous facilities. The lack of final treatment capacity for hazardous soils nationally creates a reliance on overseas facilities for final treatment.

14.48 There has been a significant increase in the treatment of contaminated soils in Ireland. This rise in treatment of hazardous soil waste domestically, is associated with a drop in the volumes exported; in 2018 Ireland exported almost 75,000 tonnes of hazardous soil, a drop of over 26,000 tonnes from 2017, as presented in Table 14.7.

Table 14.7: Hazardous Soil Treatment and Exportation in Ireland

Type	Waste (tonnes)				
	2014	2015	2016	2017	2018
Irish hazardous waste treatment facilities	1,630	5,938	682	608	18,733
Exported	5,701	14,329	79,591	101,440	74,912

Future Baseline

14.49 Prediction of C&D waste was projected to increase to 8.2 million tonnes by 2025, and then increase again to 10 million tonnes by 2029. This figure is almost double that of the 2020 figure[9].

14.50 The generation of C&D waste, and the need for adequate management, is expected to grow over the medium- to long-term in line with the planned delivery of housing and infrastructure projects set out in Project Ireland 2040[17], which sets out Ireland's ambition and vision in terms of development over the next 20 years. The plan includes a number of major construction projects which presents huge potential in terms of preventing and recycling construction waste, as well as a challenge in terms of ensuring the generated waste is managed correctly.

14.51 If Ireland is to meet the targets as set out in the National Development Plan 2018-2027[18], it is vital that there is sufficient capacity for the recovery and/or disposal of the envisaged increased C&D waste. However, short-term growth is being negatively impacted by the COVID-19 pandemic, which has led to significant contraction in the economy, and this is expected to reduce C&D waste generation in 2021.

14.52 In July 2020, there were three license applications for new waste facilities in the EMR. The combined capacity of un-commenced facilities is 1.5 million tonnes per annum. This capacity contains 73% of the future capacity expected nationally (including new applications and un-commenced operations), which is expected to exceed 2.1 million tonnes.

Sensitive Receptors

14.53 The receptors identified as sensitive to the proposed development and which have been 'scoped-in' to the assessment are summarised in Table 14.8.

Table 14.8: Summary of Sensitive Receptors

Receptor	Sensitivity
Waste management infrastructure	High
Landfills (i.e. reduction in capacity from disposal of waste)	High

Assessment of Effects

Construction Stage

Embedded Mitigation

14.54 Following the successful discharge of relevant pre-commencement planning conditions, and receipt of other required statutory permissions, on-site works would commence with enabling works (described in Chapter 5: Construction Description of this EIAR Volume and would be outlined in the CEMP).

14.55 Prior to commencement of construction works, a SWMP would be prepared and agreed with the planning authority. This would be in accordance with the most up to date WMP for the EMR. The following mitigation measures would also be implemented at the construction stage:

- All excavations would be carefully monitored by a suitably qualified person to ensure that potentially contaminated soil is identified and segregated, if encountered. If any potentially contaminated material is encountered, it would be segregated from clean/inert material, tested, and classified as either non-hazardous or hazardous and further classified as clean, inert, non-hazardous, or hazardous in accordance with the EC Council Decision 2003/33/EC[20], which establishes the criteria for the acceptance of waste at landfills. All excavated material would be used;
- Waste materials generated at the site compound would be stored in suitable receptacles in designated areas of the site compound;
- Where possible, on-site segregation of waste materials would be carried out to increase opportunities for off-site reuse, recycling, and recovery, to ensure that the majority of construction materials are either recyclable or recoverable – it is anticipated that the following waste types, at a minimum, would be segregated: made ground, soils and stones and trees/shrubbery. In addition, the following wastes would be segregated at the site compound: organic (food) waste, packaging (paper/card/plastic), mixed dry recyclables and mixed non-recyclable waste;
- All waste contractors collecting waste from the site would hold a valid collection permit to transport waste, which is issued by the National Waste Collection Permit Office (NWCPO);
- Construction wastes would be taken to suitably registered/permitted/licenced waste facilities for processing and segregation, recycling, recover and/or disposal. As stated in the baseline section, there are numerous licensed waste facilities in the local region that have sufficient capacity to

[20] European Union, 2003. 2003/33/EC: Council Decision of 19 December 2002 establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 of and Annex II to Directive 1999/31/EC. Document 32003D0033.

accept both hazardous and non-hazardous waste materials and could manage C&D waste from the proposed development;

- All waste leaving site would be reused, recycled, or recovered where possible to avoid material designated for disposal;
- All waste leaving the site would be transported by suitable permitted contractors and taken to suitably registered, permitted, or licenced facilities;
- All waste leaving the site would be recorded and copies of relevant documentation maintained;
- Any hazardous wastes generated (such as chemicals, solvents, glues, fuels, oils) would also be segregated and would be stored in appropriate receptacles (in suitably bunded areas, where required);
- A waste manager would be appointed by the main contractor to ensure effective management of waste during the excavation and construction works;
- All construction staff would be provided with training regarding the waste management procedures; and
- The waste from delivers into the two-bay truck loading bay would be compacted on-site.

14.56 These mitigation measures would ensure that the waste arising from the C&D phases of the development are dealt with in compliance with the provisions of the Waste Management Act 1996, as amended, and associated regulations including the Litter Pollution Act 1997 (as amended to 2009)[21] and the EMR WMP (2015-2021). It would also ensure optimum levels of waste reduction, reuse, recycling, and recovery are achieved and would encourage sustainable consumption of resources.

Waste Generation

14.57 Waste arising from the primary infrastructure and earthworks is expected to comprise of topsoil, clay/silt material, gravel and mudstone.

14.58 Site preparation, excavations and levelling works required to facilitate construction of foundations, access roads and the installation of services and transmission cables would generate approximately 4,225m^3 of material.

14.59 It is predicted that the majority of the cut material generated during site preparation/levelling (2,829m^3) would be disposed of offsite. Circa 10,800 m^3 of fill would be required to facilitate construction of the proposed roads, carparks, buildings and landscaping berms. It is assumed that the majority of the topsoil/cut material would be taken offsite.

14.60 If any soils/stones are imported onto the site from another construction site as a by-product, this would need to be carried out in accordance with Article 27 of the European Communities (Waste Directive) Regulations 2011.

14.61 As stated in the methodology, the estimated construction waste arisings from the proposed development, presented in Table 14.9, have been calculated using the proposed development's Gross Floor Area and an estimate of potential waste volumes using the BRE/SmartWaste Waste Benchmark Data 2019.

Table 14.9: Estimated Construction and Excavation Waste and End Destination

Waste Type	Estimated Quantities*	Waste Arisings		Recycle/ Recovery		Disposal	
	Tonnes	%	Tonnes	%	Tonnes	%	Tonnes
Mixed C&D Waste	-	-	71.53	90	64.38	10	7.15
Timber	273	8	21.8	90	19.62	10	2.18
Plasterboard	6.6	22.5	1.5	90	20.25	10	0.15
Metals	550	3	16.52	100	16.52	0	0
Concrete	492	4	19.67	0	0	0	0
Other (including cabling, ducting, conduits, packaging, and plastic	-	-	14.91	80	11.95	20	2.96
Topsoil	1,056	100	1,056	100	1,056	0	0
Excavated materials	3,169	100	3,169	100	3,169	0	0
Total	**5,547**	**-**	**4,370**	**-**	**133**	**-**	**12.5**

Notes:
Values have been rounded to the nearest 1 tonne
* Materials not arising as waste would be used as part of development

14.62 It is expected that wastes generated from other construction activities, such as from construction workers, would be imperceptible and not significant. These wastes would generally be organic/food waste, dry mixed recyclables (wastepaper, newspaper, plastic bottles, packaging, aluminium cans, tins, and Tetra Pak cartons), mixed non-recyclables and potentially sewage sludge from temporary welfare facilities provided at the site compound during the construction stage.

Waste Infrastructure and Landfill Sites

14.63 Recycling all inert and non-hazardous waste on-site and implementing the SWMP would ensure that impacts of construction waste are minimised. In this assessment, it has been estimated that approximately 4,370 tonnes of C&D waste would be generated and of this volume only 12.5 tonnes would be disposed to landfill. This would have negligible impact on the capacity in the waste management facilities and landfill sites.

14.64 The reduction in capacity of waste management facilities would be around less than 0.01% and the reduction in landfill capacity would be even less. In addition, it is expected that 99.7% of the C&D waste and over 90% of operational waste would be diverted from landfill. This represents a minimal reduction in capacity of waste infrastructure in the region (less than 1%) and therefore, the sensitivity is low. As the diversion from landfill is over 90%, the magnitude of impact is negligible (low) and the effect from waste generation on the waste management infrastructure and landfill sites is likely to be **temporary to short-term**, **imperceptible/not significant, negative** in nature and **not significant** in EIA terms.

14.65 The residual effect on void space in landfill sites is anticipated to be **permanent**, **imperceptible/not significant, negative** in nature, and **not significant** in EIA terms.

Operation Stage

Embedded Mitigation

14.66 The following mitigation measures would be implemented during the operation stage of the proposed development:

- All waste from the development would be reused, recycled, or recovered where possible, with the exception of those waste streams where appropriate facilities are currently not available;
- A network of waste facilities would be used to ensure waste is managed efficiently. The waste hierarchy would be implemented, and waste recovery techniques would be employed if recycling is not possible; and

[21] Government of Ireland, 1997/2009. Litter Pollution Act 1997; Electoral (Amendment) (No. 2) Act 2009 – An Act To Regulate Expenditure By Political Parties And Candidates; To Amend The Local Elections (Disclosure Of Donations And Expenditure) Act 1999; To Amend The Litter Pollution Act 1997; and to Provide for Related Matters.

- All waste leaving the site would be transported by suitable permitted contractors and taken to suitably registered, permitted, or licensed facilities.

14.67 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.

14.68 These mitigation measures would ensure the waste arising from the development is dealt with in compliance with the provisions of the Waste Management Act 1996, as amended, and associated regulations including the Litter Pollution Act 1997 and the EMR WMP (2015-2021). It would also ensure optimum levels of waste reduction, reuse, recycling, and recovery are achieved.

Waste Generation

14.69 The proposed development is an un-manned facility that would be subject to maintenance inspections on a weekly basis by two staff. As such the primary waste stream would come from use of toilets within the GIS substation. Other operational waste generation would be associated with maintenance activities.

14.70 These wastes may include organic/food waste, dry mixed recyclables (waste paper, newspaper, plastic bottles, packaging, aluminium cans, tins and Tetra Pak cartons) and non-recyclable waste. Waste fuels/oils, waste printer/toner cartridges, waste electrical and electronic equipment (WEEE) and waste batteries may also be generated infrequently.

14.71 Waste would be managed to according to relevant national and regional legislation such as the waste framework directive.

14.72 If the waste materials are not managed and stored correctly on-site, it would likely to lead to litter, health issues or pollution events at the site and/or on adjacent developments. As stated previously, the secondary effect of litter issues is the potential presence of vermin.

14.73 The waste materials generated on site would be removed by operatives.

Waste Infrastructure and Landfill Sites

14.74 The nature of the proposed development means that the generation of waste materials during the operation stage is unavoidable. Small quantities of waste would be generated from the proposed substation site with no waste generated from the operation of the transmission and cable lines.

14.75 The nature of the development means the generation of waste materials during the operational phase is an unavoidable impact. Networks of waste collection, treatment, recovery, and disposal infrastructure are in place in the region to manage waste efficiently from this type of development. Waste which is not suitable for recycling is typically sent for energy recovery. There are also facilities in the region for segregation of municipal recyclables which is typically exported for conversion into recycled products (e.g. paper mills and glass recycling). As outlined above due to the minimal reduction in capacity of waste infrastructure in the region the sensitivity is low and the magnitude of impact is negligible (low).

14.76 Overall, the effect from waste generation on the waste management infrastructure and landfill sites is likely to be **long term**, **imperceptible/not significant**, **negative** in nature and **not significant** in EIA terms.

14.77 Similarly, the residual effect on void space in landfill sites is anticipated to be **permanent**, **imperceptible/not significant, negative** in nature, and **not significant** in EIA terms.

Assessment of Residual Effects

Additional Mitigation

14.78 No additional mitigation measures are proposed in respect of waste for the construction and operation stages.

Enhancement Measures

14.79 No enhancement measures are proposed in respect of waste.

Construction Residual Effects

14.80 The residual effects are as previously report in the Assessment of Effects section, which are:

- Temporary to short-term **imperceptible**, **negative** effects for waste infrastructure capacity that are **not significant** in EIA terms; and
- Permanent **imperceptible/ not significant**, **negative** effects for void space in landfill sites that are **not significant** in EIA terms.

Operation Residual Effects

14.81 The residual effects are as previously report in the Assessment of Effects section, which are:

- Long term **imperceptible/ not significant, negative** effects for waste infrastructure capacity that are **not significant** in EIA terms; and
- Permanent **imperceptible/ not significant, negative** effects for void space in landfill sites that are **not significant** in EIA terms.

Summary of Residual Effects

14.82 Table 14.10 provides a tabulated summary of the outcomes of the waste assessment of the proposed development. Where **significant positive** effects are likely these are highlighted in bold green and where **significant negative** effects are predicted these are highlighted in bold red.

Table 14.10: Summary of Residual Ground Conditions Effects

Receptor	Description of Residual Effect	Additional Mitigation	Scale and Significance of Residual Effect**	Nature of Residual Effect*				
				+ -	L U	D I	R IR	M B T St Mt Lt P
Construction								
Waste Management Infrastructure	Effect on capacity	None required	Imperceptible/Not Significant	-	L	D	IR	T to St
Landfill Sites	Effect on void space	None required	Imperceptible/Not Significant	-	L	D	IR	P
Operation								
Waste Management Infrastructure	Effect on capacity	None required	Imperceptible/Not Significant	-	L	D	IR	Lt
Landfill Sites	Effect on void space	None required	Imperceptible/Not Significant	-	L	D	IR	P

Notes:
* - = Negative/ + = Positive/+/- = Neutral; R = Reversible, IR = Irreversible; D = Direct, IR = Indirect; L= Likely, U = Unlikely; M = Momentary, B = Brief, T= Temporary, St = Short-term, Mt = medium-term, Lt = Long-term, P = Permanent, R = Reversible. ** Imperceptible, Not Significant, Slight, Moderate, Significant, Very Significant, Profound

Cumulative Effects

Intra-Project Effects

14.83 As explained in Chapter 2: EIA Process and Methodology, intra-project cumulative effects are discussed in Chapter 16: Intra Cumulative Effects.

Inter-Project Effects

14.84 There are numerous cumulative developments planned for in the surrounding area (as presented in Chapter 2: EIA Process and Methodology) that would have a cumulative impact by in-combination effects throughout the construction stage, and operation stage of the proposed development. However, it is not considered possible to reasonably undertake a quantitative cumulative assessment of the likely significant effects regarding waste for the reasons explained in the Assumptions and Limitations section of this chapter. Therefore, a qualitative assessment has been carried out.

14.85 It is reasonably considered that all the cumulative developments would be developed in line with the similar policy requirements as the proposed development; in particular with the requirements for maximising reuse and recycling of CDE waste through a SWMP (or equivalent) and the meeting of targets for recycling and composting waste during operation. Therefore, results would be similar to that presented for residual effects; resulting in the following effects:

- Construction Stage:
  - Effect on waste infrastructure capacity: temporary to short-term, **imperceptible/not significant**, and **negative** (**not significant** in EIA terms); and
  - Effect on void space in landfill sites: **permanent**, **imperceptible/not significant,** and **negative** (**not significant** in EIA terms);
- Operation Stage:
  - Effect on waste infrastructure capacity: **long-term**, **imperceptible/not significant,** and **negative** (**not significant** in EIA terms); and
  - Effect on void space in landfill sites: **permanent**, **imperceptible/not significant,** and **negative** (**not significant** in EIA terms).

Summary of Assessment

Background

14.86 This chapter has detailed the potential waste effects for the construction stage, and operation stage of the proposed development. The assessment has been undertaken considering the relevant national and local guidance and regulations.

14.87 The baseline assessment was undertaken using publicly available information and indicates that:

- The local authority responsible for setting and administrating waste management activities in the site area is SDCC.
- There are 106 authorised facilities in the EMR for soil and stone acceptance.
- Licensed SRF capacities in the EMR are concentrated in the local authority areas of Fingal, Meath, Kildare, and Wicklow.
- Waste licence facilities in the EMR are of the scale required by the current markets.
- The four active inert landfill facilities located in the EMR have approximately 6.1 million tonnes of remaining lifetime capacity to accept lightly contaminated soils.
- There are a number of non-hazardous municipal landfill sites in the region which have an ongoing requirement for soil and stone material for daily cover, capping and other remediation activities at the sites.
- There are a number of materials recover facilities/waste transfer stations in operation in the region which are suitable for the acceptance of C&D wastes (should they be required).
- There is no dedicated 'hazardous waste to energy' or landfill treatment capacity in Ireland.

14.88 Overall, the results of the baseline assessment identified numerous waste management infrastructure facilities and landfill sites within the surrounding area. Many of the facilities/sites were indicated to have sufficient capacity to support future influxes of C&D and operational waste.

Construction Effects

14.89 Networks of waste collection, treatment, recovery, and disposal infrastructure are in place in the region to manage waste efficiently from this type of development. Waste which is not suitable for recycling is typically sent for energy recovery. There are also facilities in the region for segregation of municipal recyclables which is typically exported for conversion into recycled products (e.g. paper mills and glass recycling). According to the C&D Waste Update Report (2020)[9] there are 106 authorised facilities in the EMR for soil and stone acceptance, three landfill sites for C&D waste and a number of materials recover facilities/waste transfer stations in operation in the region which are suitable for the acceptance of C&D wastes should they be required.

14.90 Recycling all inert and non-hazardous waste on-site and implementing the SWMP would ensure that impacts of construction waste are minimised. It is anticipated that the proposed development would generate approximately 4,370 tonnes of C&D waste and of this volume only 12.5 tonnes would be disposed to landfill. This would have a negligible impact on the capacity in the waste management facilities and landfill sites.

14.91 Overall, it is considered, with embedded mitigation in place, that waste generation from construction stage activities would result in an **imperceptible/not significant, negative** effect on waste management facilities and landfill sites, which is not **significant** in EIA terms.

Operational Effects

14.92 During the operation stage, the nature of the proposed development means that the generation of waste materials is unavoidable. Small quantities of waste would be generated from the proposed substation site with no waste generated from the operation of the transmission and cable lines

14.93 Waste would be managed in accordance with relevant national and regional legislation such as the Waste Framework Directive. Waste collection vehicles would service the development regularly to ensure the resources are dedicated to ensuring efficient waste management practices.

14.94 Networks of waste collection, treatment, recovery, and disposal infrastructure are in place in the region to manage waste efficiently from this type of development. Waste which is not suitable for recycling is typically sent for energy recovery. There are also facilities in the region for segregation of municipal recyclables which is typically exported for conversion into recycled products (e.g. paper mills and glass recycling).

14.95 Overall, the effect from operation waste generation on the waste management infrastructure and landfill sites is considered to be **imperceptible/ not significant, negative**, and **not significant** in EIA terms.

Cumulative Effects

14.96 It is reasonably assumed that all the cumulative developments would be developed in line with the similar policy requirements as the proposed development, including the requirements for maximising reuse and recycling of CDE waste through a SWMP (or equivalent) and the meeting of targets for recycling and composting waste during operation. Therefore, results would be similar to that of the proposed development, resulting in a cumulative effect that is **imperceptible/ not significant, negative,** and **not significant** in EIA terms.

15 MATERIAL ASSETS

Introduction

15.1 This chapter of the Environmental Impact Assessment Report (EIAR) reports on the likely significant material assets effects to arise from the construction stage and the operation stage of the proposed development.

15.2 The chapter describes the material assets policy context; the methods used to assess the potential impacts and likely effects; the baseline conditions at and surrounding the site; the likely material assets effects taking into consideration embedded mitigation; the need for additional mitigation and enhancement; the significance of residual effects; and inter-project cumulative effects.

15.3 There are no technical appendices supporting this chapter.

Methodology

15.4 The assessment has been informed by the legislation, policies and published guidance identified within Chapter 2: EIA Process and Methodology.

Assessment Scope

15.5 The 2011 EIA Directive (2011/92/EU) state that material assets include architectural and archaeological heritage. In accordance with the 2014 EIA Directive, those heritage aspects are dealt with as components of cultural heritage which is assessed in EIAR Volume 2 Chapter 2: Cultural Heritage.

15.6 Additionally, the EPA Draft EIA Report Guidelines 2017 state that material assets are now taken to mean built services and infrastructure, roads, and traffic, as well as waste management.

15.7 In this EIAR, the impacts on the material assets listed above have been considered in the following Chapters and are not considered further in this Chapter:

- Chapter 6: Population and Human Health;
- Chapter 7: Transport;
- Chapter 8: Air Quality; and
- Chapter 14: Waste.

15.8 The European Commission refers to a number of examples of material assets including buildings, other structures, mineral resources, and water resources. The impacts on mineral resources and water resources have been considered in the following Chapters and are not considered further in this Chapter:

- Chapter 10: Water Resources and Flood Risk; and
- Chapter 12: Ground Conditions.

15.9 As there is no published or formalised technical guidance relating to the assessment of material assets effects, professional judgement, experience, and best practice methods have been drawn upon to assess the significance of the potential effects of the proposed development. The assessment has also taken account of applicable legislation, guidance, and policy.

Technical Scope

15.10 The technical scope of the assessment has considered the following:

- Direct disturbance and damage to existing or proposed infrastructure; and
- Indirect disturbance of assets in the surrounding area.

15.11 It has been assumed that the Proposed Development would not impact on any other structures.

15.12 The potential impacts on built services and infrastructure, if any, have been assessed in terms of the following:

- Power and Electricity Supply;
- Gas Supply
- Water Services (including surface water and foul drainage infrastructure and water supply); and
- Telecommunications.

15.13 As several of the assets mentioned above have been addressed in other chapters within this EIAR, they are not discussed in detail in this chapter, but references are provided to other EIAR chapters where appropriate.

15.14 Mitigation measures are proposed (where required) to minimise the effect of the proposed development on the environment during the construction and operation stages.

Spatial Scope

15.15 The site lies within the South Dublin County Council (SDCC) area in the north of the Profile Park. The study area is considered to comprise the surrounding utility network within Profile Park and the wider area.

Temporal Scope

15.16 The assessment has considered impacts arising during the construction stage, which would be expected to be temporary and short term (1-7 years) in nature, and from the operation stage which would be expected to be permanent and long-term in nature (i.e. more than 20 years).

Baseline Characterisation Method

Desk Study

15.17 In order to establish baseline material assets conditions in the study area, relevant data was reviewed and assessed. Data was obtained from the following sources:

- Proposed Overall Route Layout Plan[1]; and
- Engineering Planning Report – Drainage & Water Services[2].

Field Study

15.18 Field study/data collection was not required at the site as the data provided by other sources was deemed to be adequate and representative of the site conditions.

[1] Clifton Scannell Emerson, 2021. Proposed Overall Route Layout Plan, Sheet No 21_115-CSE-00-XX-DR-C-1200

[2] Clifton Scannell Emerson, 2021. Engineering Planning Report – Drainage & Water Services ref RPT-21_115-002

Assessment Method

Methodology

15.19 The EPA 2017 draft guidelines include information on the assessment of the effects of a development on material assets and advises on the nature of the material assets which should be examined as part of the preparation of an EIAR. These include the following:

- Economic assets of natural origin; and
- Economic assets of human origin.

15.20 Economic assets of natural origin, which include biodiversity, land and soil, cultural heritage, and the natural water environment, have already been addressed within other chapters of this EIAR. However, economic assets of human origin are considered in this chapter.

15.21 To assess economic assets of human origin, a desktop study was carried out on existing material assets found at the site and within the immediate surrounding area.

Construction and Operation Stage

15.22 Projections of resource use on economic assets of human origin have been undertaken for the construction and operation stages of the proposed development, and the impacts have been assessed.

15.23 The baseline has been defined through a desktop review of existing and planned licences, studies, applications, and datasets. This established the current status of known and planned infrastructure within the study area.

Cumulative Stage

15.24 For the purposes of assessing the cumulative effects, consideration has been given to all cumulative schemes that have the potential to result in a significant cumulative effect alongside the proposed development. Full details of all the cumulative schemes are given in Chapter 2: EIA Process and Methodology. The baseline and assessment of significance, and the judgement of the magnitude of change stages are as above for the construction and operation stages. Only receptors for which the proposed development is predicted to result in a significant residual effect alone are included in this part of the assessment.

Assessment Criteria

15.25 The criteria used to assess whether an effect is significant or not, are given in the EPA Guidelines 2017, and are set out in Table 2.1 in Chapter 2: EIA Process and Methodology. The significance of effects is determined by consideration of the sensitivity of the receptor, the magnitude of impact and scale of the effect. In assessing the significance of an effect, consideration has been given to the quality, duration, probability and type of the effect, and its geographical extent, and the application of professional judgement. There is some flexibility based on professional judgement to take account of any particular value a heritage asset or receptor may have because of its use or presentation for public amenity and tourism or education.

15.26 Based on professional judgement, effects of moderate significance and above are considered significant in EIA terms.

Assumptions and Limitations

15.27 The assessment has relied on data pertaining to existing licences or as-built infrastructure supplied by others. It has been assumed that these datasets have been reported correctly.

Baseline Conditions

Existing Baseline

Land Ownership

15.28 The subject site is as described in Chapter 4: Description of Development.

15.29 The application site is a material asset, as the land has been zoned for employment development. The nature of the proposed development means that the land's material asset should not be affected by the development and is not considered further.

15.30 The proposed development is situated in land owned by the Applicant with the construction compound located in land to the south that is not owned by the Applicant. The 110kV transmission lines run through land that is owned by the Applicant, Google, Profile Park and ESB Networks.

15.31 Letters of consent, to apply for development on the lands not owned by the Applicant have been obtained from other parties and are accompany the planning application.

Power and Electrical Supply

15.32 The main power supply to the Business Park is from the ESB EirGrid. This power network is known to be constrained in terms of providing electrical grid power to the area.

15.33 The proposed 110 kV GIS substation, 110 kV cable circuits and 49 kVA cable installation are designed to support power demand for the proposed data center to the north of the application site by the Applicant under application reference SD21A/0241.

15.34 Further to this, the 49 kVA cable installation is intended to provide a house power supply to the proposed GIS substation.

Gas Supply

15.35 The Business Park is served by the Gas Networks Ireland network, which is a natural gas network. Supply is understood to not be constrained in the area. A gas connection is not required as part of the proposed development and is not discussed further.

Telecommunications

15.36 Multiple connection service lines currently exist along Falcon Avenue and Concorde Drive, including

- Virgin Media Fibre Cable;
- BT Fibre Cable;
- Colt Fibre Cable; and
- Eu Network Fibre Cable.

15.37 In addition, there are numerous Chambers situated along both Falcon Avenue and Concorde Drive, owned by Magnet and Virgin Media (UPC/NTL), that provide access to the underground utility services listed above.

15.38 A telecommunications network would be installed at the main data center site to the north of the application site. The telecommunications network used at the main data site would be extended to the GIS substation. The connection to the regional network would be implemented by the statutory network operator.

Surface Water Infrastructure

15.39 A new surface water drainage network is to be designed and installed to serve the proposed development. The proposed surface water works would include measures to attenuate surface water prior to discharge from the site. The catchment area of the transformers is excluded from discharge to the surface water network and would be connected to the proposed foul network via a petrol interceptor.

Foul Drainage Infrastructure

15.40 Irish Water record drawings identify a foul sewer pipe, located in Falcon Avenue. within Profile Park. Foul drainage is ultimately treated at the Dublin City Wastewater Treatment plant at Ringsend. The existing foul sewer network is understood to have adequate capacity to cater for the proposed discharge from the site and there are no known issues noted with the sewer network and Ringsend Wastewater Treatment plant.

Water Supply

15.41 Irish Water record drawings identify an existing 250mm Ø main located within Falcon Avenue.

15.42 It is understood that there is adequate capacity within the existing watermain network to supply the proposed development.

Receptor Sensitivity

15.43 The receptors identified as sensitive to the proposed development and which have been 'scoped-in' to the assessment are summarised in Table 15.2.

Table 15.2: Summary of Sensitive Receptors

Receptor	Sensitivity
Electrical grid capacity	High
Surface water infrastructure	Medium
Foul water infrastructure network	Low
Gas network	Low
Water supply network	Low
Telecommunications network	Low

Assessment of Effects

Construction Effects

Embedded Mitigation

Construction Environment Management Plan

15.44 As described in Chapter 5: Construction Environmental Management Plan a project-specific CEMP would be established and maintained by the contractors during the construction stage which would cover all potentially polluting activities and emergency response procedures. All personnel working on the site would be trained in the implementation of the procedures. The CEMP would be secured by means of an appropriately worded planning condition.

Power and Electrical Supply

15.45 During construction, contractors would require power for heating and lighting of the site and their onsite facilities. Some on site equipment/plant would also require power. A construction compound and temporary power supply would be installed for the construction stage.

15.46 Power and electrical supply receptors are of high sensitivity as the development is located in what is noted as a constrained area in terms of electrical grid capacity.

15.47 Connections to EirGrid's substations (Barnakyle and Castlebaggot) would involve excavations in the vicinity of and connections to exiting services and these would be carried out in consultation with ESB Networks to ensure there is no impact on existing supplies.

15.48 Overall, the power demand from the construction stage would be relatively minor and accordingly the power and electrical effects are considered to be temporary to short term, **imperceptible** and **neutral** in nature i.e. **not significant** in EIA terms.

Gas Supply

15.49 Gas supply is not anticipated to be required during the construction stage. Connections to the gas supply network would be carried out in consultation with GNI to ensure there is no impact on existing supplies.

15.50 Overall, effects during the construction stage are considered to be temporary to short term, **imperceptible** and **neutral** in nature i.e. **not-significant** in terms of EIA.

Surface Water Infrastructure

15.51 The proposed surface water is designed in accordance with the requirements of the Greater Dublin Strategic Drainage Study (GDSDS), as outlined in Chapter 5: Construction Description of this EIAR. All surface water works including connections would be carried out in accordance with the Code of Practice for Development Works – Drainage.

15.52 As with all construction projects, there is potential for surface water runoff to become contaminated with pollutants associated with the construction works. Contaminated water which arises from construction sites can pose a risk to surface water quality in the surface water network. The potential main contaminants include:

- Increase in suspended solids due to muddy water with increase turbidity, arising from excavation and ground disturbance;
- Spills and releases of cement and concrete causing an increase turbidity and pH arising from the use of these construction materials;
- Spills and releases of wastewater (nutrient and microbial rich) arising from poor on-site toilets and washrooms.
- There also is a risk of accidental pollution incidences from the following sources:
- spillage or leakage of temporary oils and fuels stored on-site;
- spillage or leakage of oils and fuels from construction machinery or site vehicles;
- spillage of oil or fuel from refuelling machinery on site; and
- run-off from concrete and cement during pad foundation construction.

15.53 With consideration of the embedded mitigation measures outlined above within the CEMP predicted impacts from surface water runoff would be unlikely to occur. Effects are considered to be temporary to short-term, **imperceptible,** and **neutral** in nature i.e. **not significant** in EIA terms.

Foul Drainage Infrastructure

15.54 Welfare facilities would be required for the construction compound and workers and portable toilets would be provided for construction workers. A temporary connection to the foul water drainage network within Profile Park may also be required to accommodate the site welfare facilities during construction. It is understood that the foul water drainage network has sufficient available capacity for the wastewater discharges for the short-term construction stage.

15.55 The permanent foul connection to the wider network in Profile Park would be undertaken in consultation with Irish Water to ensure there is no impact on the network when the connection is made.

15.56 Accordingly, foul drainage effects on the public sewerage network during the construction stage are considered to be temporary to short term, **imperceptible** and **neutral** in nature i.e. **not significant** in EIA terms.

Water Supply

15.57 Welfare facilities would be required for the construction staff. A temporary connection to the mains water supply would be established for the construction phase. The water demand during the construction phase

would not be significant enough to affect existing pressures and from discussions with the South Dublin County Council, it is understood that there is adequate capacity within the existing watermain network to supply the proposed development.

15.58 Effects associated with water supply are considered to be temporary to short term, **imperceptible** and **neutral** in nature i.e. **not significant** in EIA terms.

Telecommunications

15.59 During the construction stage a mobile connection would be provided. A telecommunications network would be installed at the site with connection to the regional network would be implemented by the statutory network operator.

15.60 Effects associated with telecommunications during the construction stage are considered to be temporary to short term, **imperceptible** and **neutral** in nature i.e., **not significant** in EIA terms.

Operation Effects

Embedded Mitigation

Environmental Procedures & Fuel Storage

15.61 Prior to operation of the proposed development, a comprehensive set of operational procedures would be established which would include site-specific mitigation measures and emergency response measures, as outlined in Chapter 4: Proposed Development Description.

15.62 The primary potential impact on surface water infrastructure relates to surface water flooding. The Flood Risk Assessment states that the proposed substation facility's surface water drainage system would mitigate risks from surface water flooding.

15.63 The primary potential impact on ground conditions at the site relates to a failure or accidental spill of fuel or chemicals from the transformer area and the generator room, workshops and battery room in the GIS substation. In order to minimise any impact on the underlying subsurface strata from material spillages, the storage of these would in designated areas with an impervious base. In addition, the catchment area of the transformers is excluded from discharge to the surface water network and would be connected to the proposed foul network.

Power & Electrical Supply

15.64 The proposed 110 kV GIS substation, 110 kV cable circuits and 49 kVA cable installation are designed to support power demand for the proposed data center to the north of the application site. Further to this, the 49 kVA cable installation is intended to provide a house power supply to the proposed GIS substation.

15.65 Please refer to Chapter 4: Development Description for a more in-depth description of the substation plan and connection points to the external grid.

15.66 Given the main use of the site (i.e. a substation to support power demand) the effects on power, electrical and gas supply are considered to be permanent, **imperceptible** and **neutral** in nature i.e. **not significant** in EIA terms.

Surface Water Infrastructure

15.67 Surface water from the proposed development has been designed in accordance with the Greater Dublin Strategic Drainage Strategy.

15.68 The proposed connection point for positive drainage serving the 110kV GIS substation would be to the permitted manholes which are located in Falcon Avenue, via an underground attenuation tank.

15.69 Asphalt/tarmacadam strips for earthing purposes under the proposed lightning masts and along fence lines would discharge to ground via the adjacent stone fill and gravel areas.

15.70 Surface water is discussed further in Chapter 10: Water Resource and Flood Risk and the Engineering Planning Report accompanying the application.

15.71 Effects associated with surface water during operation are considered to be permanent, **imperceptible,** and **neutral** i.e. **not significant** in EIA terms.

Foul Drainage Infrastructure

15.72 Domestic effluent arising from the welfare facilities at the GIS substation would be collected in a newly constructed foul drainage network within the site. The proposed foul water drainage network would collect domestic foul water from the buildings within the Substation Compound. The proposed foul water network would connect to the existing drainage network via the foul manhole (Ø300mm pipe) in the road to the north of the site.

15.73 Rainfall which passes through the transformers would also be collected in the foul water network, which passes through a treatment unit and sump pump before connecting to the main foul water network.

15.74 As such, foul drainage effects on the public sewerage network during the operation stage are considered to be permanent, **imperceptible** and **neutral** in nature i.e. **not significant** in EIA terms.

Water Supply

15.75 Water would be required for the welfare facilities at the GIS substation. From consultation with Irish Water, it is proposed to take a 100mm connection from the external watermain to the north of the site to provide adequate water services for the proposed development. It is understood that there is adequate capacity within the existing water main network to supply the proposed development.

15.76 As such, effects on water supply during the operation stage are considered to be permanent, **imperceptible** and **neutral** in nature i.e. **not significant** in EIA terms.

Telecommunications

15.77 Multiple connection service lines currently exist along Falcon Avenue and Concorde Drive and there is understood to be sufficient capacity available in the network to supply the proposed development with telecommunications.

15.78 As outlined a telecommunications network would be installed at the main data center site to the north of the application site and would be extended to the GIS substation. The connection to the regional network would be implemented by the statutory network operator.

15.79 As such, effects associated with telecommunications during the operation stage are considered to be permanent, **imperceptible** and **neutral** in nature i.e. **not significant** in EIA terms.

Assessment of Residual Effects

Additional Mitigation

15.80 No additional mitigation measures are proposed.

Enhancement Measures

15.81 No enhancement measures are proposed.

Construction Residual Effects

15.82 The residual construction effects remain as reported in the assessment of effects section:

- Temporary to short term, **imperceptible** and **neutral** effects on power and electrical supply.
- Temporary to short-term, **imperceptible,** and **neutral** effects on surface water infrastructure.
- Temporary to short term, **imperceptible** and **neutral** effects on foul drainage infrastructure and water supply.

- Temporary to short term, **imperceptible** and **neutral** effects on telecommunications.

15.83 These are **not significant** in terms of EIA.

Operation Residual Effects

15.84 The residual operation stage effects remain as reported in the assessment of effects section:

- Permanent, **imperceptible,** and **neutral** effects on power and electrical supply.
- Permanent, **imperceptible,** and **neutral** effects on surface water infrastructure, foul infrastructure, and water supply.
- Permanent, **imperceptible,** and **neutral** effects on telecommunications.

15.85 These are **not significant** in terms of EIA.

Summary of Residual Effects

15.86 Table 15.3 provides a tabulated summary of the outcomes of the material assets assessment of the proposed development. Where **significant positive** effects are likely these are highlighted in bold green and where **significant negative** effects are predicted these are highlighted in bold red.

Table 15.3: Summary of Residual Material Asset Effects

Receptor	Description of Residual Effect	Additional Mitigation	Scale and Significance of Residual Effect **	Nature of Residual Effect*				
				+ -	L U	D I	R IR	M B T St Mt Lt P
Construction								
Power and Electrical Supply	Increased demand on the surrounding network	None required	Imperceptible	+/-	L	D	R	T to St
Foul Water Infrastructure				+/-	L	D	R	T to St
Water Supply				+/-	L	D	R	T to St
Telecommunications				+/-	L	D	R	T to St
Surface Water Infrastructure	Risks of contamination from increased run-off, machinery on site, concrete activities, and/or accidental spillages.			+/-	L	D	R	T to St
Operation								
Power and Electrical Supply	Increased demand on the surrounding network	None required	Imperceptible	+/-	L	D	IR	P
Foul Water Infrastructure				+/-	L	D	IR	P
Water Supply				+/-	L	D	IR	P
Telecommunications				+/-	L	D	IR	P
Surface Water Infrastructure	Risk of contamination to surrounding water environment.			+/-	L	D	IR	P

Notes:

* - = Negative/ + = Positive / +/- = Neutral; R = Reversible, IR = Irreversible; D = Direct, ID = Indirect;

L= Likely, U = Unlikely; M = Momentary, B = Brief, T= Temporary, St = Short-term, Mt = Medium-term, Lt = Long-term, P = Permanent.

** Imperceptible, Not Significant, Slight, Moderate, Significant, Very Significant, Profound.

Cumulative Effects

Intra-Project Effects

15.87 As explained in Chapter 2: EIA Process and Methodology, intra-project cumulative effects are discussed in Chapter 16: Intra Cumulative Effects.

Inter-Project Effects

15.88 Table 15.4 provides a summary of the likely cumulative effects resulting from the proposed development and the cumulative developments.

Table 6.8: Inter-Project Cumulative Effects

Cumulative Development	Construction		Operation	
	Cumulative Effects Likely?	Reason	Cumulative Effects Likely?	Reason
Vantage – townlands of Ballybane & Kilbride within Profile Park, Clondalkin, Dublin 22 [SD21A/0241]	Yes	There would be overlap between construction of both developments	No	Construction would be ongoing during operational stage of proposed development, however due to the purpose of development (to provide power to the network, rather than using the significant power from the network itself) there are no cumulative effects predicted.
Centrica Business Solutions – Profile Park, Baldonnel, Dublin 22 [SD21A/0167]	Yes	There would be a potential for overlap with the site's development works.	No	Construction Period 2023-2025, however due to the purpose of development there are no cumulative effects predicted.

Table 6.8: Inter-Project Cumulative Effects

Cumulative Development	Construction		Operation	
	Cumulative Effects Likely?	Reason	Cumulative Effects Likely?	Reason
Digital Reality Trust - Profile Park, Baldonnel, Dublin 22, D22 TY06 [SD17A/0377]	No	The cumulative scheme has already been constructed.	No	The proposed amendments to the cumulative scheme would not generate additional effects.
Equinix (Ireland) Ltd – Plot 100, Profile Park, Nangor Road, Clondalkin, Dublin 22 [SD21A/0186]	Yes	There would be a potential for overlap with the site's development works.	No	Construction Period 2023-2025, however due to the purpose of development there are no cumulative effects predicted.
UBC Properties - Townlands within Grange Castle South Business Park, Baldonnel, Dublin 22 [SD20A/0121]	Yes	Construction would overlap with the construction stage of the proposed development.	Yes	Construction period would overlap with the operational stage of the proposed development. The opening year of the cumulative scheme is 2028. Due to the purpose of development there are no cumulative effects predicted.
UBC Properties - Grange Castle South Business Park, Dublin 22 [ABP ref – 308585]	No	The opening year of this cumulative scheme is anticipated to be 2021; therefore, the construction stage would not overlap with the construction stage of the proposed development.	No	The cumulative scheme would be operational at the same time as the proposed development; however due to the purpose of development there are no cumulative effects predicted.
Cyrus One - Grange Castle Business Park, Clondalkin, Dublin 22 [SD18A/0134]	Yes	Operation stage would overlap with the construction stage of the proposed development.	Yes	Operation stage would overlap with the opening year of the proposed development, however due to the purpose of development there are no cumulative effects predicted.
Cyrus One Townlands within Grange Castle South Business Park,	No	The cumulative scheme construction works should be complete.	No	The proposed amendments to the cumulative scheme would not generate additional effects.

Table 6.8: Inter-Project Cumulative Effects

Cumulative Development	Construction		Operation	
	Cumulative Effects Likely?	Reason	Cumulative Effects Likely?	Reason
Baldonnel, Dublin 22 [SD20A/0295]				
Cyrus One - Grange Castle South Business Park, Baldonnel, Dublin 22 [ABP Ref - 309146]	Yes	There would be a potential for overlap with the site's development works.	Yes	Construction phase 2021-2022. however, due to delay in planning decision assumed construction phase would be 2022/2023. The proposed development would facilitate the demand for material assets (mainly in regard to electricity network) in the local area.

Construction Cumulative Effects

15.89 Cumulative effects during the construction stage of the proposed development are unlikely for material assets and effects are considered to be temporary to short term, **imperceptible** and **neutral** in nature i.e. **not significant** in EIA terms.

Operation Cumulative Effects

15.90 Cumulative effects during the operation stage of the proposed development are unlikely for material assets and effects are considered to be permanent, **imperceptible** and **neutral** in nature i.e. **not significant** in EIA terms.

Summary of Assessment

Background

15.91 This chapter has detailed the potential material assets effects due to the construction and operation stages of the proposed development. The assessment of construction and operational stages has been undertaken considering relevant national and local guidance and regulations.

15.92 The site lies in the north of the Profile Park and the study area is considered to comprise the surrounding utility network with Profile Park and the wider area.

15.93 The main power supply to the Business Park is from the ESB EirGrid. This power network is known to be constrained in terms of providing electrical grid power to the area. The proposed 110 kV GIS substation, 110 kV cable circuits and 49 kVA cable installation are designed to support power demand for the data center to the north of the application site proposed by the Applicant under application reference SD21A/0241. Further to this, the 49 kVA cable installation is intended to provide a house power supply to the proposed GIS substation.

15.94 The Business Park is served by the Gas Networks Ireland network, which is a natural gas network. It is understood the network is not constrained. A gas connection is not required for the proposed development.

15.95 A new surface water drainage network is to be designed and installed to serve the proposed development which has been designed in accordance with the Greater Dublin Strategic Drainage Strategy. The drainage system serving the site would be connected to the permitted manholes which are located in Falcon Avenue, via an underground attenuation tank. Asphalt/tarmacadam strips for earthing purposes under the proposed lightning masts and along fence lines would discharge to ground via the adjacent stone fill and gravel areas.

15.96 Domestic effluent arising from the welfare facilities at the GIS substation would be collected in a newly constructed foul drainage network within the site and discharged to the foul drainage network within Profile Park. Rainfall which passes through the transformers would also be collected in the foul water network, which passes through a treatment unit and sump pump before connecting to the main foul water network. Foul drainage is ultimately treated at the Dublin City Wastewater Treatment plant at Ringsend.

15.97 Potable water would be required for the welfare facilities at the GIS substation. It is understood that there is suitable capacity in the network to supply to proposed development.

15.98 The telecommunications network used at the main data center to the north of the application site would be extended to the site. The connection to the regional network would be implemented by the statutory network operator.

Construction Effects

15.99 During the construction stage demand on the networks outlined above would be predominantly for minor temporary connections for welfare facilities.

15.100 Overall, effects during construction are considered to be temporary to short-term, **imperceptible** and **neutral** i.e. **not significant** in EIA terms.

Operation Effects

15.101 The baseline assessment identified that there are adequate facilities in regard to surface water, foul water, potable water supply and telecommunications for the operation stage of the proposed development.

15.102 During operation, the proposed development is intended to provide power to the network, rather than using the significant power from the network itself.

15.103 Overall, effects during operation are considered to be permanent, **imperceptible** and **neutral** i.e. **not significant** in EIA terms.

Cumulative Effects

15.104 Cumulative effects during the construction and operation stages of the proposed development are considered to be unlikely for material assets.

16 CUMULATIVE EFFECTS

Introduction

16.1 The Planning and Development Regulations require that the likely significant environmental effects of a development are taken into account, including cumulative effects which are defined in the EPA Draft EIA Report Guidelines 2017 as *"the addition of minor or significant effects, including effects of other projects, to create larger, more significant effects"*.

16.2 The relevant Institute of Environmental Management and Assessment (IEMA) Guidance[1] identifies two types of cumulative effects:

- Inter-project effects - incremental changes caused by other development schemes occurring together with the proposed development and the cumulative effects combining to worsen the effect of a particular impact; and
- Intra-project effects - those effects that occur as a result of impact interaction between different environmental topics within the same project. For example, a project might affect bird species as a result of direct loss of habitat and by noise and light disturbance. Each of these when considered in isolation may have a limited effect but taken together the sum is greater than the parts.

Inter-Project Cumulative Effects

16.3 A list of cumulative schemes for consideration in the inter-project cumulative effect assessment of the proposed development was presented to ABP as part of the pre-application meeting. Details of the full list of cumulative developments (EIAR Volume 1, Chapter 2: EIA Process and Methodology).

16.4 Inter-project effects have been addressed in each technical chapter of the EIAR (Chapters 6-15 of EIAR Volume 1 and EIAR Volume 2), as appropriate. To avoid significant repetition, information on the potential combined effects of the proposed development together with cumulative schemes is not presented within this chapter of the EIAR.

Intra-Project Cumulative Effects

16.5 The potential for intra-project cumulative effects is considered within this chapter.

Intra-Project Cumulative Effects

Assessment Approach

16.6 As indicated earlier, there is no established EIA methodology for assessing and quantifying the combined effects of individual effects on sensitive receptors. Accordingly, Ramboll has developed an approach which uses the defined residual effects of the proposed development to determine the potential for interactions between effects and consequently the potential for significant intra-project cumulative effects to arise. This is a tried, tested and robust approach that has been implemented and accepted on a wide range of planning applications over many years.

16.7 The approach comprised the following steps:

- First, a review of the likely residual effects (and in particular the likely significant environmental effects) presented within the EIAR was undertaken;
- Second, the likely receptors or receptor groups were identified;
- Third, the individual effects which may impact a singular receptor or receptor group were listed in a matrix format;
- Fourth, the potential for individual effects to interact for a given receptor was identified; and
- Fifth, the scale of the combined intra-project cumulative effects was assessed.

16.8 To ensure a proportionate approach, no/non-standalone imperceptible and not significant effects have been disregarded. Where a range of effects has been predicted, the full range has been considered e.g. imperceptible/not-significant to slight, negative, except for cases where the range of effects has been considered to be imperceptible to not significant.

16.9 It is noted that intra-project cumulative effects are more likely to arise when the receptor or receptor group is of higher sensitivity to change, such as human receptors.

16.10 Within this EIAR topics such as air quality, transport, noise and vibration and climate change are considered in their own right and also in the context of their associated human health effects; of which, these are then assessed against relevant receptor groups (which includes human health receptors and local residents etc.) as part of the population and human health assessment. Due to the nature of the population and human health assessment these are not considered within this intra-cumulative assessment, due to the need to ensure these effects are reported within their own right and are not double counted. As such, in the instance that human health effects result in an in-combination effect within the matrices presented in this section they are disregarded (as they are already considered from an intra- cumulative perspective in Chapter 6: Population and Human Health).

16.11 Where there is more than one effect likely to arise on a particular receptor or receptor group, the potential for effect interactions and the scale of the combined effect have been determined based on professional judgement and experience. The results of the assessment are presented within a matrix format in the Assessment Results section of this chapter.

Assessment Results

16.12 Based on the methodology detailed above, Figure 16.1 and Figure 16.2 present the results of the potential for interactions of individual effects on receptors during the construction stage and once the proposed development is in operation, respectively.

[1] Institute of Environmental Management and Assessment. The State of Environmental Impact Assessment Practice in the UK. 2011

Likely Residual Effects		Receptors and Receptor Groups																		
		Existing Off-Site Human Health	Existing Off-Site Local Residents	Existing and Future Pedestrians	Existing and Future Cyclists	Existing Road Users	Surface Water Receptors	Groundwater Supply	Flood Risk	Water Supply and Foul Drainage Network	Onsite Soils and Water Environment	Designated Sites	Habitats and Protected Species	Waste Management Infrastrcuture	Landfill Sites	Global Climate	Existing Character Areas and Landscape Features	Landscape Features	Existing Views	Archaeology onsite
Human Health	Air quality effects																			
	Noise effects																			
	Transport effects																			
Noise and Vibration	Construction noise																			
	Construction traffic noise																			
	Construction vibration																			
Water Resource and Flood Risk	Changes to the surface water runoff regime of the site																			
LVHIA	Increased development within urban fringe transition area																			
	Disturbance of linked green infrastructure																			
	Distrubance and change																			
Cultural Heritage	Knowledge gained through archaeological investigations																			
Potential for Effect Interaction and so Combined Cumulative Effect?		**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**

Significant/Very Significant Positive
Moderate to Significant / Very Significant Positive
Moderate Positive
Slight to Moderate Positive
Slight Positive

Significant/Very Significant Neutral
Moderate to Significant / Very Significant Neutral
Moderate Neutral
Slight to Moderate Neutral
Slight Neutral

Significant/Very Significant Negative
Moderate to Significant / Very Significant Negative
Moderate Negative
Slight to Moderate Negative
Slight Negative

Imperceptible/Not-significant to Slight Negative

Imperceptible/Not-significant to Moderate Negative

Imperceptible/Not-significant to Significant/Very Significant Negative

Figure 16.1: Construction Intra-Project Cumulative Effects

Likely Residual Effects		**Receptors and Receptor Groups**														
		Local Economy and New Workers	Existing Off-Site Human Health	Existing Off-Site Residents	Existing Pedestrians and Cyclists	Future Pedestrians and Cyclists	Road Users	Surface Water Receptors	Flood Risk	Designated Sites	Ecology and Habitats onsite	Buildings and Infrastructure	Global Climate	Exisiting Character Areas and Landscape Features	Landcape Features	Existing Views	Heritage Assets
Noise and Vibration	Plant noise emissions from normal operation																
Water Resource and Flood Risk	Changes to surface water runoff regime at the site																
Climate	Higher temperatures leading to increased lightning strikes, resulting in damage to infrastructure or power loss.																
	Drought could lead to vegetation drying, increasing risk of vegetation fires																
LVIA	Improvde green infrastructure																
	Change in visual amenity																
Cultural Heritage	Change to visual qualities of setting																
Potential for Effect Interaction and so Combined Cumulative Effect?		**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**

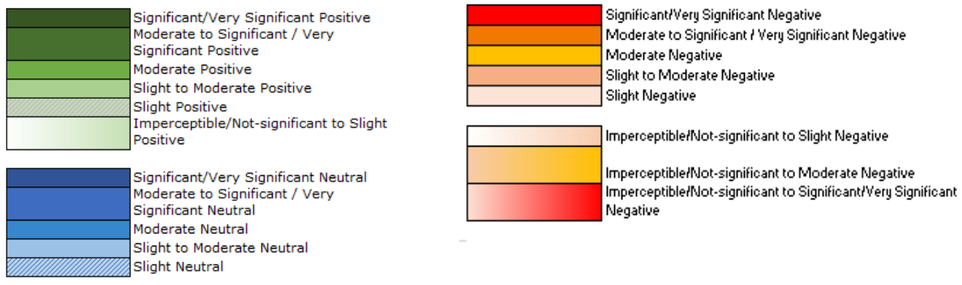


Figure 16.2: Operation Intra-Project Cumulative Effects

Construction

16.13 As shown in Table 16.1, no effect interactions are likely to arise during the construction period.

Operation

16.14 As shown in Tables 16.2, no effect interactions are likely to arise during the construction period.

Conclusions

16.15 From the assessment of intra-project cumulative effects, no effects have been identified during construction or operation period of the proposed development.

17 RESIDUAL EFFECTS AND MITIGATION

Introduction

17.1 This chapter summarises the additional mitigation measures, the enhancement measures and the residual effects identified in the technical assessments of EIAR Volume 1 (Chapters 6-15) and EIAR Volume 2.

Additional Mitigation and Enhancement

17.2 As set out in Chapter 2: EIA Process and Methodology, the aim of an EIA is to develop measures to avoid, offset or reduce the significant negative environmental effects of a project and to enhance any beneficial effects.

17.3 Within each of the technical assessments, the need for additional mitigation measures has been considered in respect of likely significant negative effects as far as reasonably possible. In addition, opportunities for environmental enhancement have been explored where practicable. The proposed additional mitigation and enhancement measures are in addition to the embedded design and operational mitigation measures (as described in EIAR Chapter 4: Proposed Development Description) and standard embedded construction mitigation measures (as described in EIAR Chapter 5: Construction Description), which have been considered within the technical assessments.

17.4 Table 17.1 presents a summary of the additional mitigation measures that have been identified over the course of the EIA of the proposed development categorised under the following stages:

- Construction; and
- Operation.

17.5 It is noted that no enhancement measures have been identified within the individual technical assessments.

17.6 Reference should be made to individual technical assessment chapters for more detail.

Table 17.1: Summary of Proposed Additional Mitigation

Topic	Proposed Additional Mitigation
Construction	
Population and Human Health	None
Transport and Accessibility	• Construction Environmental Management Plan (CEMP)
Air Quality	None
Noise and Vibration	None
Water Resource and Flood Risk	None
Ecology	• Pre-commencement checks recommended in Volume 3: Technical Appendix 11.3 to avoid an offence.
Ground Conditions	None
Climate Change	None
Waste	None
Material Assets	None
Landscape and Visual	None
Cultural Heritage	• Undertake an archaeological excavation of an area measuring 50m by 50m in order to preserve by record the identified oval/circular enclosure in advance of construction works commencing.
Operation	
Population and Human Health	None
Transport and Accessibility	None
Air Quality	None
Noise and Vibration	None
Water Resource and Flood Risk	None
Ecology	None
Ground Conditions	None
Climate Change	• Regular inspection of drainage infrastructure and structures to assess conditions after extreme events. • Drainage Management Plan to be prepared and implemented throughout the operational life of the proposed development with an associated maintenance regime.
Waste	None
Material Assets	None
Landscape and Visual	None
Cultural Heritage	None

Residual Effects

17.7 This section summarises the likely residual environmental effects of the proposed development following the adoption and inclusion of the additional mitigation measures that are set out in Table 17.1.

17.8 Reference should be made to EIAR Chapters 6-15 in EIAR Volume 1 and Volume 2 for a detailed description of likely significant residual environmental effects.

Construction Residual Effects

17.9 Table 17.2 summarises the residual effects which have been identified by the individual technical assessments as likely to arise from the construction of the proposed development.

17.10 The following significant positive environmental effects for the construction stage have been identified and are highlighted in green text in Table 17.2.

Cultural Heritage:

- Knowledge gained from excavation of oval/circular enclosure.

17.11 No significant negative environmental effects have been identified.

Table 17.2: Construction Residual Effects

Topic	Receptor	Description of Residual Effect	Additional Mitigation	Scale and Significance of Residual Effect **	Nature of Residual Effect*				
					+ -	L U	D I	R IR	M B T St Mt Lt P**
Population and Human Health	Local Residents and Economy	Creation of employment	None	Imperceptible	+	L	D/I	R	T
	Local Residents	Air quality effects	None	Not Significant – Slight	-	U	D	R	T
	Local Residents	Noise effects	None	Not Significant – Slight	-	L	D	IR	T
	Local Residents	Transport effects	None	Not Significant – Slight	-	L	D	IR	T
	Local Residents	Amenity	None	Imperceptible	-	L	D	R	T
Transport and Accessibility	Pedestrians	Change in Pedestrian Severance, Delay, Amenity, Fear and Intimidation	CEMP	Imperceptible	-	L	D	R	T
	Road Users	Change in Driver Delay	CEMP	Imperceptible	-	L	D	R	T
	Road Users, Pedestrians and cyclists	Change in Accidents and Safety	CEMP	Imperceptible	-	L	D	R	T
Air Quality	Existing Off-site Human Health and Amenity	Dust Soiling and PM_{10} due to construction works	None	Imperceptible	+/-	U	D	R	St
	Existing Off-site Human Health	Change in NO_2, PM_{10} and $PM_{2.5}$ levels due to vehicle emissions	None	Imperceptible	+/-	U	D	R	St
Noise and Vibration	Local Residents	Construction Noise	None	Slight	-	L	D	IR	T to St
	Local Residents	Construction Traffic Noise	None	Slight	-	L	D	IR	T to St
	Local Residents	Construction Vibration	None	Slight	-	L	D	IR	T to St
Water Resource and Flood Risk	Surface Water Receptors	Potential contamination as a result of silt-laden runoff across the demolition and construction site and potential for contaminants to be introduced to surface water by construction activities through leakages/spillages	None	Not Significant	-	L	D	R	T to St
	Groundwater Supply	Disruption of Groundwater during Construction Excavations	None	Imperceptible	-	L	D	R	T to St
	Flood Risk	Increases in surface water runoff during construction as a result of compaction of soils and construction of hardstanding	None	Not Significant to Slight	-	L	D	R	T to St

Table 17.2: Construction Residual Effects

Topic	Receptor	Description of Residual Effect	Additional Mitigation	Scale and Significance of Residual Effect **	Nature of Residual Effect*				
					+ -	L U	D I	R IR	M B T St Mt Lt P**
	Water Supply and Foul Drainage Network	Water Supply and Foul Drainage Capacity During Construction	None	Imperceptible	+/-	U	D	R	T to St
Ecology	Designated Sites: South Dublin Bay and River Tolka SPA, North Bull Island SPA, South Dublin Bay SAC and North Dublin Bay SAC	Pollution	None	Imperceptible/Not Significant	-	L	I	IR	St
	Terrestrial habitats	Habitat loss	None	Imperceptible	-	L	D	R/IR	St
	Terrestrial habitats	Pollution	None	Imperceptible	-	L	I	R	St
	Bats	Commuting and foraging habitat loss	None	Imperceptible	-	L	D	R	St
	Birds	Disturbance / destruction of nest (if works are undertaken between March and August)	Pre-commencement checks recommended in Volume 3: Technical Appendix 11.3 to avoid an offence.	Imperceptible	-	L	D	IR	St
		Habitat loss as a result of displacement by disturbance	None	Imperceptible	-	L	I	R	St
Ground Conditions	Construction Workers	Impact to human health from exposure to contaminated soils / dust / ground gases / water during enabling and construction works.	None	Imperceptible	-	U	D	IR	T
	Adjacent site users	Impact to human health from exposure to contaminated dust during enabling and construction works.	None	Imperceptible	-	U	I	IR	T
	Water environment (Baldonnel Stream 150m N)	Increased potential for leaching of contaminants from soils and mobilisation of contamination in surface water and groundwater during earthworks and foundation works. Also, contaminants introduced to groundwater by construction activities through leakages/ spillages	None	Imperceptible	-	U	D	IR	T
	Groundwater beneath the site (aquifers)		None	Imperceptible/Not Significant	-	U	D	IR	T
	Agricultural Land	Loss of agricultural land	None	Imperceptible	+/-	U	D	IR	P
Climate Change	CCR – Buildings and Infrastructure	Heavy rainfall leading to stockpile erosion and siltation of drainage assets	None	Imperceptible to Not Significant	-	U	D	R	T/St
	CCR – Buildings and Infrastructure	Heavy rainfall leading to an inability to undertake demolition/ construction activity and programme delays.	None	Imperceptible to Not Significant	-	U	D	R	T/St
	CCR – Environment	Heavy rainfall leading to contamination of water courses.	None	Imperceptible to Not Significant	-	U	I	R	T/St
	CCR – Human Health	Heatwaves and high temperatures leading to increased dust generation.	None	Imperceptible to Not Significant	-	U	D	R	T/St

Table 17.2: Construction Residual Effects

Topic	Receptor	Description of Residual Effect	Additional Mitigation	Scale and Significance of Residual Effect **	Nature of Residual Effect*				
					+ -	L U	D I	R IR	M B T St Mt Lt P**
	CCR- Human Health	Strong winds leading to damage of stockpiles and secondary impacts on site personnel welfare.	None	Imperceptible to Not Significant	-	U	ID	R	T to St
	CCR – Human Health	Heatwaves and high temperatures affecting site personnel welfare.	None	Imperceptible to Not Significant	-	U	D	R	T to St
	ICCI – Air Quality	Extended period of drought could increase exposure of sensitive receptors to dust generated from demolition and construction activities	None	Not Significant	-	U	D	R	T to St
	ICCI – Air Quality	Extended period of drought could reduce availability of water for dust suppression which would reduce the effectiveness of embedded mitigation measures.	None	Not Significant	-	U	D	R	T to St
	ICCI - Population and Human Health	Potential interactions of climate change with the identified Population and Human Health effects	None	Imperceptible	-	U	D	R	T to St
	ICCI – Transport	Potential interactions of climate change with the identified transport effects.	None	Imperceptible	-	U	D	R	T to St
	ICCI – Noise and Vibration	Potential interactions of climate change with the identified Noise and Vibration effects.	None	Imperceptible to Not Significant	-	U	D	R	T to St
	ICCI – Water Resource and Flood Risk	Potential interactions of climate change with the identified Water Resource and Flood Risk effects.	None	Imperceptible to Not Significant	-	U	D	R	T to St
	ICCI – Ecology	Potential interactions of climate change with the identified ecological effects.	None	Imperceptible to Not Significant	-	U	ID	R	T to St
	ICCI – Ground Conditions	Potential interactions of climate change with the identified Ground Conditions effects.	None	Imperceptible to Not Significant	-	U	D	R	T to St
	ICCI – Waste	Potential interactions of climate change with the identified Waste effects.	None	Imperceptible to Not Significant	-	U	D	R	T to St
	ICCI – Material Assets	Potential interactions of climate change with the identified material effects.	None	Imperceptible to Not Significant	-	L	D	R	T to St
	ICCI – Landscape and Visual	Potential interactions of climate change with the identified Landscape and Visual effects.	None	Imperceptible to Not Significant	-	L	D	R	T to St
	ICCI – Cultural Heritage	Potential interactions of climate change with the identified Cultural Heritage effects.	None	Imperceptible to Not Significant	-	L	D	R	T to St
	GHG – Global Climate	GHG Emissions	None	Not Significant	-	L	D	IR	Lt
Waste	Waste Management Infrastructure	Effect on capacity	None	Imperceptible/Not Significant	-	L	D	IR	T to St
	Landfill Sites	Effect on void space	None	Imperceptible/Not Significant	-	L	D	IR	P
Material Assets	Power and Electrical Supply	Increased demand on the surrounding network	None	Imperceptible	+/-	L	D	IR	T to St
	Foul Water Infrastructure		None	Imperceptible	+/-	L	D	IR	T to St

Table 17.2: Construction Residual Effects

Topic	Receptor	Description of Residual Effect	Additional Mitigation	Scale and Significance of Residual Effect **	Nature of Residual Effect*				
					+ -	L U	D I	R IR	M B T St Mt Lt P**
	Water Supply		None	Imperceptible	+/-	L	D	IR	T to St
	Telecommunications		None	Imperceptible	+/-	L	D	IR	T to St
	Surface Water Infrastructure	Risks of contamination from increased run-off, machinery on site, concrete activities, and/or accidental spillages.	None	Imperceptible	+/-	L	D	IR	T to St
Landscape and Visual	Newcastle Lowlands Character Area	Increased construction activity within allocated business park area. Similar in size and scale to existing activity	None	Not Significant/Slight	-	D	P	R	St
	The Grand Canal	Disturbance of linked green infrastructure	None	Not Significant/Slight	-	I	T	R	St
	Baldonnel Stream	Disturbance and change	None	Not Significant/Slight	-	I	P	R	St
	The Site	Disturbance and change	None	Not Significant/Slight	-	D	T	R	St
	VP1-9	Contribution to ongoing construction within area	None	Imperceptible	+/-	I	T	R	St
Cultural Heritage	On site archaeology	Knowledge gained from excavation of oval/circular enclosure	Preservation by record	**Moderate**	**+**	**L**	**D**	**IR**	**Lt**
	Built heritage	None identified	None	Imperceptible	+/-	U	D	IR	T to St

Notes:

* - = Negative/ + = Positive / +/- = Neutral; R = Reversible, IR = Irreversible; D = Direct, ID = Indirect; L= Likely, U = Unlikely; M = Momentary, B = Brief, T= Temporary, St = Short-term, Mt = Medium-term, Lt = Long-term, P = Permanent.

** Imperceptible, Not Significant, Slight, Moderate, Significant, Very Significant, Profound.

Operation Residual Effects

17.12 Table 17.3 summarises the residual effects which have been identified by the individual technical assessments as likely to arise upon completion and operation of the proposed development.

17.13 No significant positive or negative environmental effects have been identified for the completed development stage.

Table 17.3: Operation Residual Effects

Topic	Receptor	Description of Residual Effect	Additional Mitigation	Scale and Significance of Residual Effect **	Nature of Residual Effect*				
					+ -	L U	D I	R IR	M B T St Mt Lt P**
Population and Human Health	Local Residents	Amenity	None	Imperceptible	-	L	D	IR	Lt
Transport and Accessibility	Pedestrians	Change in Pedestrian Severance, Delay, Amenity, Fear and Intimidation	None	Imperceptible	-	L	D	R	P
	Road Users	Change in Driver Delay	None	Imperceptible	-	L	D	R	P
	Road Users, Pedestrians and Cyclists	Change in Accidents and Safety	None	Imperceptible	-	L	D	R	P
Noise and Vibration	Local Residents	Plant noise emissions from normal operation	None	Slight	-	L	D	IR	Lt to P
	Local Residents	Plant noise emissions + emergency kit	None	Imperceptible	-	L	D	IR	T
Water Resource and Flood Risk	Flood Risk	Changes to flood risk as a result of changes to the surface water runoff regime of the site	None	Not Significant to Slight	+	L	D	IR	Lt
	Groundwater	Potential to alter local groundwater flow paths and levels	None	Imperceptible	-	L	D	IR	Lt
	Water Supply and Foul Drainage Network	Water Supply and Foul Drainage Capacity During Operation	None	Imperceptible	+/-	L	D	IR	Lt
Ecology	Designated Sites – South Dublin Bay and River Tolka SPA, North Bull Island SPA, South Dublin Bay SAC and North Dublin Bay SAC	Pollution Ecological enhancement	None	Imperceptible	+/-	L	I	IR	P
	Terrestrial habitats	Ecological enhancement	None	Imperceptible	-	L	D	R	P
	Bats	Disturbance through lighting	None	Imperceptible	-	L	D	R	Lt to P
	Birds	Foraging habitat enhancement	None	Imperceptible	-	L	D	R	Lt to P
Ground Conditions	Adjacent site users	Impact to human health from exposure to residual contaminated soils / dust / ground gases / water.	None	Imperceptible	+/-	U	I	IR	P
	Future site users		None	Imperceptible	+/-	U	D	IR	P

Table 17.3: Operation Residual Effects

Topic	Receptor	Description of Residual Effect	Additional Mitigation	Scale and Significance of Residual Effect **	Nature of Residual Effect*				
					+ -	L U	D I	R IR	M B T St Mt Lt P**
	Water environment (Baldonnel Stream 150m N)	Contaminants released by operation activities through leakages/spillages.	None	Imperceptible	+/-	U	D	IR	P
	Groundwater beneath the site (aquifers)		None	Imperceptible/ Not Significant	-	U	D	IR	P
Climate Change	CCR – Building and Infrastructure	Increased frequency of intense rainfall leading to overwhelming of drainage assets and flooding	Drainage Management Plan to be implemented. Regular monitoring and maintenance of drainage facilities and culverts	Imperceptible to Not Significant	-	U	D	R	Lt
	CCR – Infrastructure	Flooding of the underground foundations or services (electrical cables)	None	Imperceptible to Not Significant	-	U	D	R	Lt
	CCR – Environment	Overflow of contaminated water, impacting nearby watercourses.	Drainage Management Plan to be implemented. Regular monitoring and maintenance of drainage facilities and culverts	Imperceptible to Not Significant	-	U	I	R	Lt
	CCR – Buildings and Infrastructure	Increased frequency of intense rainfall leading to increased groundwater levels.	None	Imperceptible to Not Significant	-	U	D	IR	Lt
	CCR – Human Health	Rainfall events resulting in wet pavement surface leading to reduced skid resistance leading to unsafe conditions	None	Imperceptible to Not Significant	-	U	D	R	Lt
	CCR – Environment	Drought conditions affecting landscape mitigation planting	None	Imperceptible to Not Significant	-	U	D	R	Lt
	CCR – Buildings and Infrastructure	Extreme heat events could result in overheating of the electrical equipment (e.g., data servers)	None	Imperceptible to Not Significant	-	U	D	IR	Lt
	CCR – Human Health	Increased mean temperatures and heatwaves leading to overheating in ancillary buildings and office spaces	None	Imperceptible to Not Significant	-	U	D	R	Lt
	CCR – Buildings	Higher temperatures could damage the building structure	None	Imperceptible to Not Significant	-	U	D	IR	Lt
	CCR – Buildings and Infrastructure	Higher temperatures leading to increased lightning strikes, resulting in damage to infrastructure or power loss.	None	Slight to Moderate	-	U	D	IR	Lt
	CCR – Buildings and Infrastructure, Human Health	Drought could lead to vegetation drying, increasing risk of vegetation fires	None	Slight to Moderate	-	U	I	R	Lt
	CCR – Human Health	Drought conditions affecting water and potable water availability	None	Imperceptible to Not Significant	-	U	D	R	Lt
	CCR – Buildings and Infrastructure	Freeze-thaw could damage of the proposed development, e.g., cracking	None	Imperceptible to Not Significant	-	L	D	IR	Lt

Table 17.3: Operation Residual Effects

Topic	Receptor	Description of Residual Effect	Additional Mitigation	Scale and Significance of Residual Effect **	Nature of Residual Effect*				
					+ -	L U	D I	R IR	M B T St Mt Lt P**
	ICCI – Population and Human Health	Potential interactions of climate change with the identified Population and Human Health effects	None	Imperceptible to Not Significant	-	L	D	R	P
	ICCI – Transport	Potential interactions of climate change with the identified transport effects.	None	Imperceptible to Not Significant	-	L	D	R	P
	ICCI – Air Quality	Potential interactions of climate change with the identified Air Quality effects	None	Imperceptible to Not Significant	-	L	D	R	P
	ICCI – Noise and Vibration	Potential interactions of climate change with the identified Noise and Vibration effects	None	Imperceptible to Not Significant	-	L	D	R	P
	ICCI – Water Resources and Flood Risk	Potential interactions of climate change with the identified Water Resources and Flood Risk effects	None	Imperceptible to Not Significant	-	L	D	R	P
	ICCI - Ecology	Potential interactions of climate change with the identified Ecological effects	None	Imperceptible to Not Significant	-	L	D	R	P
	ICCI – Ground Conditions	Potential interactions of climate change with the identified Ground Conditions effects	None	Imperceptible to Not Significant	-	L	D	R	P
	ICCI – Waste	Potential interactions of climate change with the identified Waste effects	None	Imperceptible to Not Significant	-	L	D	R	P
	ICCI – Material Assets	Potential interactions of climate change with the identified Material effects	None	Imperceptible to Not Significant	-	L	D	R	P
	ICCI – Landscape and Visual	Potential interactions of climate change with the identified Landscape and Visual effects	None	Imperceptible to Not Significant	-	L	D	R	P
	ICCI – Cultural Heritage	Potential interactions of climate change with the identified Cultural Heritage effects	None	Imperceptible to Not Significant	-	L	D	R	P
	ICCI – Global Climate	GHG Emissions	None	Not Significant	-	L	D	IR	Lt
Waste	Waste Management Infrastructure	Effect on capacity	None	Imperceptible/ Not Significant	-	L	D	IR	Lt
	Landfill Sites	Effect on void space	None	Imperceptible/ Not Significant	-	L	D	IR	P
Material Assets	Power and Electrical Supply	Increased demand on the surrounding network	None	Imperceptible	+/-	L	D	IR	P
	Foul Water Infrastructure		None	Imperceptible	+/-	L	D	IR	P
	Water Supply		None	Imperceptible	+/-	L	D	IR	P
	Telecommunications		None	Imperceptible	+/-	L	D	IR	P
	Surface Water Infrastructure	Risk of contamination to surrounding water environment	None	Imperceptible	+/-	L	D	IR	P
Landscape and Visual	Newcastle Lowlands Charac-ter Area	Additional data centre development within a business park on the urban fringe	None	Imperceptible	-	D	P	R	Lt
	The Grand Canal	Improved green infrastructure linked to sight	None	Not Significant/Slight	-	I	P	IR	Lt

Table 17.3: Operation Residual Effects

Topic	Receptor	Description of Residual Effect	Additional Mitigation	Scale and Significance of Residual Effect **	Nature of Residual Effect*				
					+ -	L U	D I	R IR	M B T St Mt Lt P**
	Baldonnel Stream	Additional commercial development within proximity	None	Imperceptible	-	I	P	R	Lt
	The Site	Change from agricultural field to industrial site	None	Imperceptible	-	D	P	R	Lt
	VP 1, 2, 3	Not visible	None	Imperceptible	+/	D	P	R	Lt
	VP 4, 5, 7	Slight increase in data centre development within business park area	None	Imperceptible	-	D	P	R	Lt
	VP 6, 8, 9	Slight increase in data centre development within business park area	None	Not Significant/Slight	-	D	P	R	Lt
Cultural Heritage	On site archaeology	None identified	None	Imperceptible	+/-	U	D	IR	Lt
	Built heritage (TOR6-8)	Change to visual qualities of setting	None	Slight	-	L	D	IR	Lt
	Built heritage (TOR1-4, 14, 15, 16-22)	None identified	None	Imperceptible	+/-	U	D	IR	Lt

Notes:

* - = Negative/ + = Positive / +/- = Neutral; R = Reversible, IR = Irreversible; D = Direct, ID = Indirect; L= Likely, U = Unlikely; M = Momentary, B = Brief, T= Temporary, St = Short-term, Mt = Medium-term, Lt = Long-term, P = Permanent.

** Imperceptible, Not Significant, Slight, Moderate, Significant, Very Significant, Profound.

GLOSSARY OF TERMS

Accurate Visual Representations	A static or moving image which shows the location of a proposed development as accurately as possible; it may also illustrate the degree to which the development will be visible, its detailed form or the proposed use of materials. AVRs are produced by accurately combining images of the proposed building with a representation of its context.
AIS Substation	Air Insultation Switchgear Substation
Ambient Noise Level	The totally encompassing sound in a given situation at a given time, usually composed of a sound from many sources both distant and near (LAFeq,T).
Amenity	A pleasant or advantageous aspect of the environment.
An Bord Pleanála	Ireland's national independent planning body.
Annual Probable Sunlight Hours	The Annual Probable Sunlight Hours (APSH) is a measure of sunlight that a given window may expect over the period of a year, and where there is no obstruction, equates to a maximum of 1,486 hours. Sunlight is measured using a sun indicator which contains 100 spots, each representing 1 % of APSH (i.e. 14.86 hours of the total APSH).
Applicant	Vantage Data Centers DUB11 Limited
Application	Means the full planning application, for the proposed development on the site.
A-weighting Sound Pressure Level	The sound pressure level with the A-weighting applied. The A-weighting is used for most environmental noise measurements and is used to weight a spectrum of sound to match the sensitivity of the human ear.
Background Sound/Noise Level	These are amongst the lowest noise levels measured over a given period of time and exclude short term, intermittent noise sources. The background noise level is quantified by the LA90 descriptor and is therefore the level which is exceeded for 90% of a given period of time.
Baseline Studies	Studies of existing environmental conditions which are designed to establish the baseline conditions against which any future changes can be measured or predicted.
Biodiversity	The diversity, or variety of plants and animals and other living things in a particular area of region. It encompasses landscape diversity, ecosystem diversity, species diversity and genetic diversity.
Brief Effects	Effects lasting less than a day
Completed Development	A development scheme which has been build out and is operational.
Construction Environmental Management Plan	A documented management system with environmental procedures to monitor residual effects of the demolition and construction stage of a development.
Construction Logistics Plan	A documented travel plan specific for a construction site.
Construction Method Statement	A document which addresses the health and safety risks to workers and other personnel on-site during the demolition and construction stage of the development.
Cumulative Effects	Effects that result from incremental changes caused by other past, present or reasonably foreseeable actions.
Cumulative Developments	Developments that have received a resolution to grant planning permission or have a signed legal agreement in place. They are likely to be delivered concurrently with the Proposed Development assessed in the EIA.
Decibel	A scale for comparing the ratios of two quantities, including sound pressure and sound power. The difference in level between two sounds s1 and s2 is given by 20 log10 (s1 / s2). The decibel can also be used to measure absolute quantities by specifying a reference value that fixes one point on the scale. For sound pressure, the reference value is 20μPa.
Desk Study	A non-intrusive study and review of all available information pertaining to a site, including historical records, collated and monitored data, and consultation with relevant stakeholders.
Diffusion Tube	A passive sampler used for collecting NO_2 in the air.
Directive	European Union (EU) Directives impose legal obligations on European Member States. They are binding as to the results to be achieved but allow individual states the right to decide the form and methods used to achieve the results.
EIA Scoping	An initial stage in determining the nature and potential scale of the environmental impacts arising from a proposed development and assessing what further studies are required to establish their significance.
EIA Scoping Opinion	A written statement of the opinion of the relevant planning authority as to the information to be provided in the Environmental Statement.
EIA Screening	An initial stage in which the need for EIA is considered in respect of a development. Some developments are automatically subject to EIA by means of their inevitable size, nature and effects (Annex I developments). Other projects are made subject to EIA because it is anticipated that they are likely to have significant environmental effects (Annex II Developments).
Emission	A material that is expelled or released to the environment. Usually applied to gaseous or odorous discharges to the atmosphere.
Environmental Impact Assessment	A process by which information about the environmental effects of a development is collected and taken into account by the relevant decision-making body before a decision is given on whether the development should go ahead.
Environmental Impact Assessment Report	A statement that includes such information that is reasonably required to assess the environmental effects of a development.
Environmental Protection Agency	An independent public body established under the Environmental Protection Agency Act , 1992, responsible for protecting and improving the environment.
Equivalent Continuous A-Weighted Sound Pressure Level	The L_{Aeq} is an energy average and defined as the level of sound which, over a given period of time, would equate to the same A-weighted sound energy as the actual fluctuating sound.

Façade	The front or face of a building.
Fit-out	Installation of all non-substructure and non-superstructure items such as electrical water services, as well as final internal finishings.
Frequency	In sound, the number of cycles per second of a pressure fluctuation and frequency in sound is proportional to its pitch. Different frequencies are divided into octave and one third octave bands.
Frequency of Effects	Describe how often the effect will occur. (once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annually).
Frequency Weightings	Weightings can be applied to a spectrum of sound and act as a filter to account for different sensitivities and conditions.
GIS	Geographic Information Systems
GIS Substation	Gas Insulated Switchgear Substation
Gross External Area	A measure of area of a building measured externally at each floor level.
Heavy Goods Vehicle	A vehicle with a gross vehicle weight greater than 3.5 tonnes.
Imperceptible Effect	An effect capable of measurement but without significant consequences
Likely Effects	The effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented.
Long-term Effects	Effects lasting fifteen to sixty years.
Maximum Noise Level	The maximum instantaneous noise level measured during a given period of time. The time weighting to which the meter is set for this measurement parameter is always indicated by either an F or S.
Medium-term Effects	Effects lasting seven to fifteen years.
Minimum Noise Level	The minimum instantaneous noise level measured during a given period of time. The time weighting to which the meter is set for this measurement parameter is always indicated by either an F or S.
Mitigation	Any process, activity of thing designed to avoid, reduce or remedy adverse environmental effects likely to be caused by a development project.
Mitigation Measure	Measure aiming at reducing an adverse environmental effect.
Moderate Effects	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends
Momentary Effects	Effects lasting from seconds to minutes
National Planning Framework (2018)	At the national level, planning policy is contained within the National Planning Framework (NPF) 2018. The Department of Housing Planning and Local Government, on behalf of the Government of Ireland, published the NPF in February 2018 and is the Government's high-level strategic plan for shaping the future growth and development of our country out to the year 2040.
National Development Plan 2018-2027	The National Development Plan 2018-2027 (NDP) sets out the investment priorities that will underpin the implementation of the NPF, through a total investment of approximately €116 billion. Finalisation of the NPF alongside the ten-year NDP will culminate one plan to guide strategic development and the infrastructure investment at the national level.
National Spatial Strategy	The National Spatial Strategy (NSS) (2002) is a 20-year coherent national planning framework for Ireland. It aims to guide the achievement of a better balance of social, economic and physical development across the country, supported by more effective and integrated planning.
Negative 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.
Nitrogen dioxide	Road transport and the burning of fossil fuels for power are the main sources of Nitrogen dioxide. In addition to being a greenhouse gas it also contributes to photochemical smog formation. It is an irritant to the respiratory system.
Noise Rating Level	This is a single figure value derived by plotting a noise spectrum against a set of curves. The curve under which the spectrum fits is the resulting Noise Rating Level.
Non-Technical Summary	A summary of the Environmental Statement in 'non-technical language'.
Normalised Element Level Difference	The normalised difference in sound level between a pair of rooms via a small element such as a trickle ventilator. The level difference in octave bands is normalised to a reference amount of absorption.
Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences
Objective EE	A classification under the South Dublin County Development Plan 2016-2022: to provide for enterprise and employment uses.
Ordnance Datum	Land levels are measured relative to the average sea level at Newlyn, Cornwall. This average level is referred to as 'Ordnance Datum'.
Particulate Matter	Discrete particles in ambient air, sizes ranging between nanometres (nm, billionths of a metre) to tens of micrometres (µm, millionths of a metre).
Pathways	The routes by which impacts are transmitted through air, water, soils or plants and organisms to their receptors.
Percentile Level	A-weighted sound pressure level obtained using time-weighting F, which is exceeded for N% of a specified time interval. An example of this is background noise which is quantified with the LA90 descriptor, which is the A-weighted level which is exceeded for 90% of the measurement period.
Permeant Effects	Effects lasting over sixty years.
Plant	A building's generator, heating, ventilation, and/or electricity-production system.
Positive Effects	A change which improves the quality of the environment (for example, by increasing species diversity; or the improving reproductive capacity of an ecosystem, or by removing nuisances or improving amenities).
Profound Effects	An effect which obliterates sensitive characteristics.
Quality of Effects	An effect that is positive, neutral, or negative.
Receptor (Sensitive)	A component of the natural, created, or built environment such as human being, water, air, a building, or a plant that is affected by an impact.
Residual Effects	Those effects of a development that cannot be mitigated following implementation of mitigation proposals.
Reverberation Time	The time that would be required for the sound pressure level to de-crease by 60 dB after the sound source has stopped. The descriptor T, often includes other nomenclature to describe the type of reverberation time

	measurement or if the reverberation time is an average taken for specific frequencies.
Reversible Effects	Effects that can be undone, for example through remediation or restoration.
Regional Spatial and Economic Strategy (2019)	The Draft Regional Spatial and Economic Strategy for the Eastern and Midlands Regional Assembly includes Regional Policy Objectives.
Regional Policy Objective 8.25	A policy objective under the RSES which outline the responsibility of local authorities to support the implementation of ICT infrastructures such as data storage facilities at appropriate locations.
Risk Assessment	An assessment of the likelihood and severity of an occurrence.
Short-term Effects	Effects lasting one to seven years.
Significance of Effect	The impact of an effect on a receptor defined at one of the following significance levels: imperceptible, not-significant, slight, moderate, significant, very significant and profound.
Significant Effects	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
Site	Located at Irish grid reference O 03647 30493, within Profile Park, Dublin.
Slight Effects	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Sound Exposure Level	A level of a sound, of 1 s duration, that has the same sound energy as the actual noise event considered.
Sound Power Level	This is the total sound energy radiated from a given source. The sound power Level is 10 times the logarithm to base 10 of the ratio of the reference sound power level (1x10-12) and the measured power.
Sound Pressure Level	This is the unweighted or linear level which is measured prior to any weightings being applied. The sound pressure level is 20 times the logarithm to base 10 of the ratio of the reference sound pressure (2x10-5) and the measured sound pressure.
Sound Reduction Index	The laboratory measured sound insulation properties of a material or building element in octave or third octave bands.
South Dublin County Council	The South Dublin County Council (SDCC) which is the local planning authority for South Dublin County.
South Dublin County Council Development Plan 2016-2022	The relevant statutory development plan for the Site, adopted in May 2016.
Specific Noise Level	The equivalent continuous A-weighted sound pressure level at the assessment position produced by the specific noise source (the noise source under investigation) over a given time interval (LAeq,T).
Standardised Weighted Level Difference	The standardised, weighted difference in sound level between a pair of rooms, stated as a single figure. The level difference in octave bands is first normalised to a reference reverberation time and then plotted against a set of reference curves to establish a single figure value.
Statutory Consultees	Groups or bodies that, by law, must be consulted as part of the planning application process for EIA development.
Structure Borne Noise	Audible noise caused by the vibration of elements of a structure, the source of which is within a building or structure with common elements.
Study Area	Defined impact assessment area surrounding the site relative to the technical topic in question and determined based professional judgement.
Substructure	Elements of a development below ground level, typically basements and foundations.
Superstructure	Elements of a development above ground principally the mega frame, supporting core and outer shell cladding.
Sustainable Development	Development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs.
Temporary Effects	Effects lasting less than a year.
Time Weightings	A time weighting to denote the response of the sound level meter. For most measurements the Fast time weighting is selected (F) how-ever, a slow time weighting (S) is often used to for the measurement train noise and vibration.
Topography	The natural and man-made features of an area collectively.
Unlikely Effects	The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented
Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.
Vibration	The periodic movements of structures transferred by ground and parts of the building, due to events such as train pass-by, piling, blasting or use of heavy machinery.
Vibration Dose Value	The Vibration Dose Value is the vibration dose a person is expected to be exposed to over the course of the day or night. It is given by the fourth root of the time integral of the fourth power of the acceleration after it has been frequency-weighted.
Weighted Sound Reduction Index	A single number which represents the sound reduction of a material. It is derived by plotting the sound reduction index against a set of reference curves. The curves are shifted until a best-fit is established and the curve which best fits the sound reduction spectrum is used to represent the single figure value.

ABBREVIATIONS

AA	Appropriate Assessment
AADT	Annual Average Daytime Traffic Flows
ABP	An Bord Pleanála
ADMS	Atmospheric Dispersion Modelling System
AEP	Annual Exceedance Probability
AOD	Above Ordnance Datum
AQMA	Air Quality Management Area
AQO	Air Quality Objective
AQS	Air Quality Standards
BAT	Best Available Technique
BH	Borehole
BMP	Biodiversity Management Plan
BT	British Telecommunications
CAFE	Directive 2008/50/EC on ambient air quality and cleaner air for Europe
CCTV	Closed Circuit Television
CDE	Construction, Demolition and Excavation
CDM	Construction Design and Management
CEMP	Construction Environmental Management Plan
CFA	Continuous Flight Auger
CFRAM	Catchment Flood Risk Assessment and Management
CGI	Computer Generated Image
CIEEM	Chartered Institute of Ecology and Environmental Management
CLEA	Contaminated Land Exposure Assessment
CLOCS	Construction Logistics and Community Safety
CLP	Construction Logistics Plan
CLR	Contaminated Land Report
CMP	Construction Management Plan
CO	Carbon Monoxide
COMAH	Control of Major Accident and Hazard
COSHH	Control of Substances Hazardous to Health
COVID 19	Coronavirus Disease
CSO	Central Statistics Office
CTMP	Construction Traffic Management Plan
DAS	Design and Access Statement
DC	Data Center
DMP	Dust Management Plan
DOAS	Dedicated Outside Air-handling Units
DS	Data Center
DSMP	Delivery and Servicing Management Plan
EB	East Bound
EC	Environmental Commissions
ED	Electoral Division
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EIA	Environmental Impact Assessment
EMR	East Midlands Region
EMRA	Eastern and Midlands Regional Assembly
EPA	Environment Protection Agency
EPUK	Environmental Protection UK
EQS	Environmental Quality Standards
ERFB	Eastern Regional Fisheries Board
ESA	Ecological Survey Area
ESB	Electricity Switch Board
EU	European Union
EV	Electric Vehicle
EVCP	Electric Charging Point
FFL	Finished Floor Level
FM	Facilities Management
FRA	Flood Risk Assessment
FTE	Full Time Equivalent
GA	General Arrangement
GAC	Generic Assessment Criteria
GDA	Greater Dublin Area
GDSDS	Greater Dublin Strategic Drainage Strategy
GEA	Gross External Area
GFA	Gross Floor Area
GHG	Greenhouse Gases
GIS	Geographical Information System
GLVIA	Guidance for Landscape and Visual Impact Assessment
GSI	Geological Survey of Ireland
GTV	Groundwater Threshold Values
GWB	Groundwater Body

GWDTE	Groundwater Dependent Terrestrial Ecosystem
ha	Hectare
HDV	Heavy Duty Vehicles
HGV	Heavy Goods Vehicle
HRU	Heat Recovery Units
HSA	Health and Safety Authority
HV	High Voltage
IAQM	Institute of Air Quality Management
ICT	Information and Communications Technology
ID	Indirect
IDF	Intermediate Distribution Frame
IE	Industrial Emissions
IED	Industrial Emissions Directive
IEMA	Institute of Environmental Management and Assessment
IGI	Geologist of Ireland
IGR	Irish Grid Reference
IGV	Interim Guideline Values
IMS	Industrial Marine Silencers
IPPC	Integrated Pollution Prevention Control
IR	Irreversible
ISO	International Organisation of Standards
ITS	Irish Traffic Surveys
LCA	Landscape Character Area
LDV	Light Duty Vehicle
LGV	Light Goods Vehicles
LT	Long Term
LV	Low Voltage
LVHIA	Landscape, Visual and Heritage Impact Assessment
m	Metre
m AOD	Metres Above Ordnance Datum
MCPD	Medium Combustion Plan Directive
MMP	Materials Management Plan
MPOE	Main Point of Entry
Mt	Medium Term
MV	Medium Voltage
MW	Megawatts
N/A	Not applicable
NB	North Bound
NBDC	National Biodiversity Data Centre
NDP	National Development Plan
NHA	National Heritage Area
NIAH	National Inventory of Architectural Heritage
NO_2	Nitrogen Dioxide
NOx	Nitrogen Oxide
NPF	National Planning Framework
NPWS	National Parks and Wildlife Services
NRA	National Roads Authority
NSS	National Spatial Strategy
nZEB	Nearly Zero Energy Building
NRA	National Roads Authority
NSR	Noise Sensitive Receptor
NTS	Non-Technical Summary
NWCPO	National Waste Collection Permit Office
OCEMP	Operational CEMP
OPW	Office of Public Works
PAH	Polycyclic Aromatic Hydrocarbons
PC	Process Contribution
PCE	Pre-Connection Enquiry
PEC	Process Environmental Contribution
PEM	Project Environmental Manager
PI	Performance Indicator
PIA	Personal Injury Accident
$PM_{2.5}/PM_{10}$	Particulate Material of a particular size fraction
PPE	Personal Protective Equipment
PPG	Planning Practice Guidance
PPV	Peak Particle Velocity
PV	Photovoltaic
RPO	Regional Policy Objective
RSES	Regional Spatial and Economic Strategy
SA	Small Area
SAC	Special Area of Conservation
SB	South Bound
SCR	Special Catalytic Reduction
SDCC	South Dublin County Council
SFRA	Strategic Flood Risk Assessment
SID	Strategic Infrastructure Development

SRF	Soil Recovery Facility
SGV	Soil Guideline Values
SPA	Special Protection Area
SPOSH	Significant Potential of Significant Harm
ST	Short Term
SuDS	Sustainable Drainage Systems
SWMP	Site Waste Management Plan
TA	Transport Assessment
TRL	Transport Research Laboratory
USEPA	U.S. Environmental Protection Agency
VP	View Point
WB	West Bound
WMP	Waste Management Plan
WMU	Water Management Unit
ZOI	Zone of Influence
ZTV	Zone of Theoretical Visibility