Planning & Development Act, 2000 - 2020,
European Communities (Environmental Impact Assessment) Regulations 1989 (as amended), Planning & Development Regulations, 2001 (as amended)

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

Clutterland Substation and transmission lines
Grange Castle South Business Park

November 2020

MARSTON
PLANNING CONSULTANCY

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1. INTRODUCTION

Proposed Development

1.1 This Environmental Impact Assessment (EIA) Report has been prepared on behalf of UBC Properties LLC (herein referred to as the 'applicant') to accompany a Strategic Infrastructure Development planning application to An Bord Pleanála (ABP). Planning permission is being sought for the provision of a 110kV Gas Insulated Switchgear (GIS) Substation (known as Clutterland Substation), 4 no. transformer bays, Client Control Building, a 49kVa electrical supply to the 110kV GIS Substation, and all associated and ancillary development to be located on lands at Grange Castle South Business Park, Baldonnel, Dublin 22. Planning permission is also being sought for an underground single circuit 110kV transmission line from the proposed 110kV GIS Substation compound to the existing 220kV / 110kV Castlebaggot Substation to the immediate south; and an underground single circuit 110kV transmission line from the proposed 110kV GIS Substation compound connecting to the existing 110kV underground Kilmahud-Corkagh circuit c. 1.1km to the north-west. These works are described in detail within Chapter 2 (Description of the Proposed Development) of this EIAR.

1.2 This development will hereafter be referred to as the 'Proposed Development'. EirGrid will be the transmission system operator (TSO). ESB Networks will be the transmission asset owner (TAO). (The company background and roles of the TSO and TAO are summarised in paragraph 1.20-1.22).

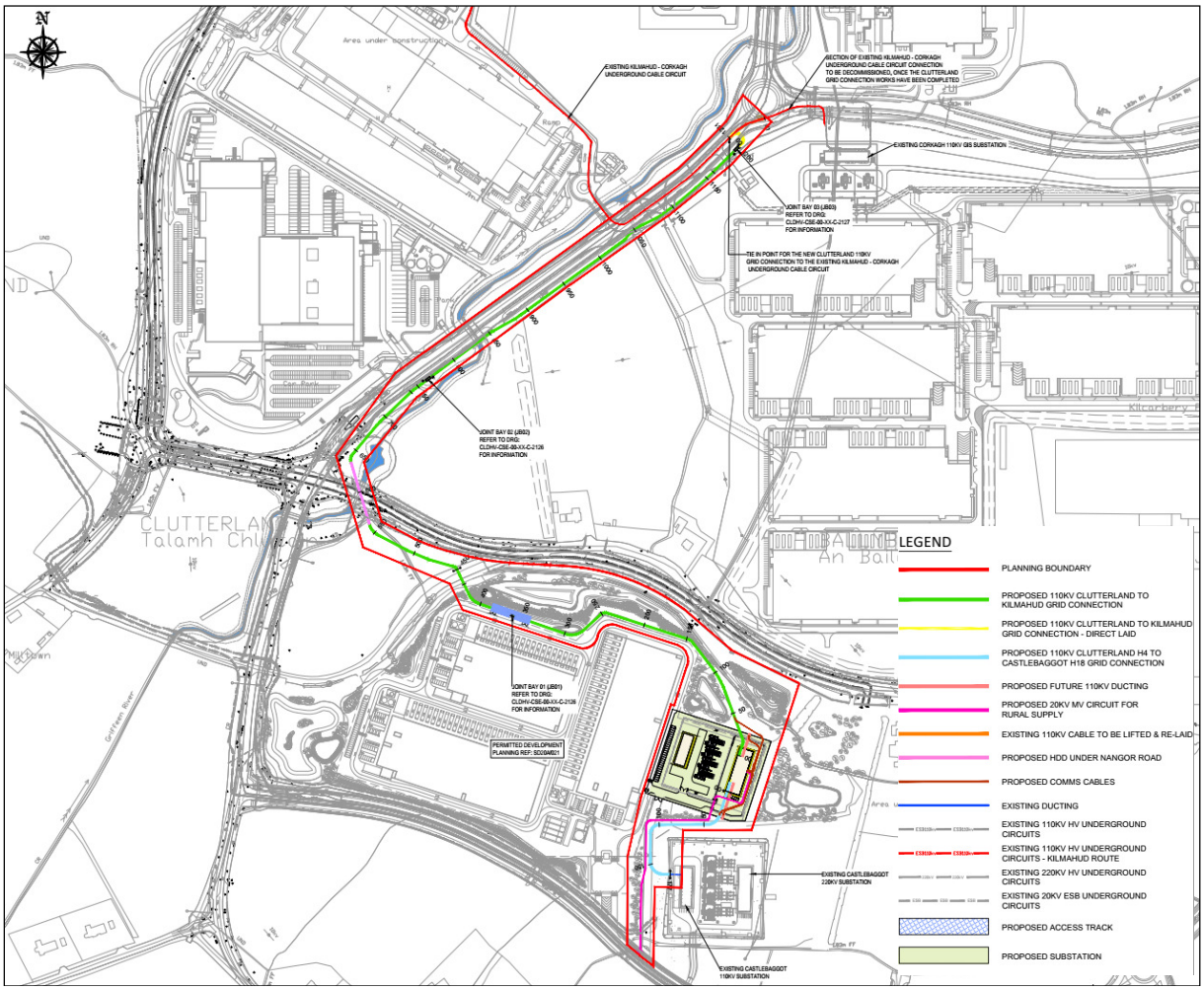

Figure 1.1 Site Boundaries - Proposed Development site boundary (red line), Permitted Development boundary, the proposed 110kV transmission lines (green, light pink and cyan lines) and 49kVa (pink line) (Source: Clifton Scannell Emerson Associates, July 2020)

1.3 Figure 1.1 presents the route of the proposed underground 110kV transmission lines and the proposed GIS substation compound. A detailed description of the Proposed Development, and further drawings of the Proposed Development are provided in Chapter 2 (Description of the Proposed Development).

1.4 The Proposed Development was assessed cumulatively (as a potential future development that would be subject to a separate planning application and separate Environmental Impact Assessment) as part of the Environmental Impact Assessment (EIA) undertaken in respect of the application under South Dublin County Council Reg. Ref.: SD20A/0121. The Proposed Development will be located primarily within the overall site of this permitted data storage facility development.

1.5 The Grange Castle South Business Park is owned by SDCC, and promoted in association with IDA Ireland, to attract overseas investment to the area. Located to the west of Clondalkin, Grange Castle has been the focus of significant international investment over the last several years.

1.6 The Proposed Development site of 7.7ha. is approximately 5km west of the M50 Orbital Motorway, and is close to the strategic road and mainline rail connections to the west and south of Ireland. The site is within 15 kilometres of the city centre and enjoys easy access to Dublin Airport and Dublin Port.

Context

Legislative Requirements

1.7 The requirement for EIA for certain types and scales of development is set out in the EIA Directives (2011/92/EU and 2014/52/EU), European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (the bulk of which came into operation in September 2018), the European Communities (Environmental Impact Assessment) Regulations 1989-2006, Planning and Development Act 2000 (as amended) and the Planning and Development Regulations 2001-2017. It should be noted that this EIA Report is prepared in accordance with the 2011 EIA Directive (2011/92/EU), as amended by the 2014 EIA Directive.

1.8 The EIA Directives list those projects for which an EIA is mandatory (Annex I) and those projects for which an EIA may be required (Annex II). With regard to Annex II projects, Member States can choose to apply thresholds or use case by case examination or a combination of both to assess where EIA is required. In Ireland, a combination of both has been applied.

1.9 The project proposed is not listed under Annex I EIA Directives. However, it exceeds the relevant threshold as set out in the Planning and Development Regulations 2001-2019 for Annex II projects. The threshold for "*industrial estate development projects, where the area would exceed 15 hectares"* as set out in Part 2 of Schedule 5 of the Regulations was considered to be most relevant threshold in the context of the Proposed Development in the subject location. An EIA Report has been provided as the Proposed Development is required to provide the permanent power supply for the Permitted Development.

1.10 The main objective of an EIA, as set out in Article 3(1) of the 2014 EIA Directive, is to identify, describe and assess the direct and indirect significant impacts of a project on population and human health, biodiversity, land, soils, water, air & climate (including noise), material assets, cultural heritage and the landscape and the interaction between the aforementioned factors. The EIA Report reports on the findings of the EIA process to date and informs the Planning Authority, statutory consultees, other interested parties and the public in general about the likely effects of the project on the environment.

Format of the EIA Report

1.11 This EIA Report has been prepared in accordance with the requirements of EIA Directives (2011/92/EU and 2014/52/EU). It is prepared in the Grouped Format Structure following the guideline structure set down in the Environmental Protection Agency (EPA) Draft "*Guidelines on the Information to be Contained in Environmental Impact Assessment Reports" (*2017).

1.12 The "Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment" (August 2018) and the European Commission Guidance on the preparation of the Environmental Impact Assessment Report have been considered in the preparation of the EIA report.

1.13 This Environmental Impact Assessment Report (EIA Report) has been prepared in accordance with the requirements of the following:

- EU Directive /337/EEC; 2011/92/EU and 2014/52/EU;
- Planning and Development Act 2000 (as amended);

- Planning and Development Regulations 2001 (as amended);
- *Guidelines on the Information to be Contained in Environmental Impact Statements* 2002 (Environmental Protection Agency);
- *Advice Notes on Current Practice in the Preparation of Environmental Impact Statements* 2003 (Environmental Protection Agency);
- *Revised Guidelines on the Information to be Contained in Environmental Impact Statements* Draft September 2017 (Environmental Protection Agency); and
- *Advice Notes on Current Practice in the Preparation of Environmental Impact Statements* Draft September 2015 (Environmental Protection Agency).

1.14 Using the Grouped Format Structure, the EIA Report examines each environmental aspect in a separate chapter. Each chapter generally covers the following:

- Receiving Environment;
- Characteristics of the Proposed Development;
- Potential Impacts of the Proposed Development;
- Do-Nothing Scenario;
- Remedial and Mitigation Measures;
- Predicted Impacts of the Development; and
- Residual Impacts.

1.15 A Non-Technical Summary of the findings of the EIA Report is provided as a separate document.

1.16 A Schedule of Mitigation measures to be implemented as part of the Proposed Development is included in Appendix 2.2.

1.17 Cumulative impacts for each environmental topic are assessed in Chapter 16 of this EIA Report.

1.18 Interactions i.e. the interrelationship between each environmental aspect, are assessed as they occur in each chapter. The final chapter of the EIA Report, Chapter 17 shows where interactions have been identified and how they have been addressed.

Need for the Proposed Development

1.19 The Proposed Development is designed to provide a permanent power supply for the Permitted Development granted under South Dublin County Council (SDCC) Planning Reg. Ref. SD20A/0121. The Permitted Development was accompanied by a separate EIA Report. The Permitted Development is for 3 no. Data Centres with a gross floor area of 80,269sqm on an overall landholding of c. 16.5 hectares at Grange Castle South Business Park, Baldonnel, Dublin 22.

Company background

1.20 The Applicant provides data storage, management and dissemination. To date, the Applicant has developed a number of data facilities in Ireland and are a significant Irish employer.

1.21 Eirgrid is the transmission system operator (TSO). Since 2006, Eirgrid has operated and developed the national high voltage electricity grid in Ireland. EirGrid is a state-owned company. EirGrid is independent from ESB. They operate the flow of power on the grid and plan for its future, while ESB Networks (the TAO) is responsible for carrying out maintenance, repairs and construction on the grid. The grid moves wholesale power around the country. Eirgrid brings energy from generation stations to heavy industry and high-tech users. They also supply the distribution network operated by ESB Networks that powers every electricity customer in the country.

1.22 ESB Networks are the transmission asset owner (TAO). ESB Networks is a subsidiary within ESB Group. ESB Networks finances, builds, and maintains the transmission system through which electricity flows from generation stations to bulk supply points near Ireland's cities and towns. It does this under a TAO licence granted by the Commission for Regulation of Utilities (CRU). ESB Networks performs its transmission related functions under the direction of Eirgrid. In summary EirGrid operates the transmission system (TSO) while ESB Networks carries out construction, maintenance, and repairs (TAO) under the direction of EirGrid. For this development, EirGrid will operate and the proposed new GIS substation, remotely from their control centres. However, ESB Networks will carry out all local

operations on Eirgrid's behalf. Eirgird and ESB Networks are committed to running their businesses in the most environmentally friendly way possible.

Consultation

1.23 The Applicant and the project team have liaised with An Bord Pleanala (ABP) in advance of lodgement of the application for the Proposed Development on 3rd September 2020. Previously consultation meetings were held with South Dublin County Council as part of the application for the Permitted Development in which the Proposed Development was presented as part of future infrastructure development, on the 15th of January 2020 and 28th of January 2020.

1.24 The EIA contributors/authors have incorporated advice and comments received from South Dublin County Council and ABP into the relevant chapters of this EIA Report

Regulatory control

1.25 The proposed transmission of electricity is not an EPA regulated activity in terms of the Industrial Emissions Directive (Directive 2010/75/EU) (which replaced the IPPC directive). The TSO and TAO will ensure the relevant regulatory requirements relating to power activities are met.

Description of effects

1.26 The quality, magnitude and duration of potential effects are defined in accordance with the criteria provided in the EPA Draft *'Guidelines on the information to be contained in Environmental Impact Assessment Reports'* (2017) as outlined in Table 1.1.

Table 1.1 Description of Effects as per EPA Guidelines (Draft, 2017)

Effect Characteristic	Term	Description
Quality	Positive	A change which improves the quality of the environment
	Neutral	A change which does not affect the quality of the environment
	Negative	A change which reduces the quality of the environment
Significance	Imperceptible	An impact capable of measurement but without noticeable consequences
	Not significant	An effect which causes noticeable changes in the character of the environment but without noticeable consequences
	Slight	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 consistent with existing and emerging 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 the majority of a sensitive aspect of the env..
	Profound	An impact which obliterates sensitive characteristics
Duration of Effects	Momentary Effects	Effects lasting from seconds to minutes
	Brief Effects	Effects lasting less than a day
	Temporary Effects	Effects lasting less than a year
	Short-term Effects	Effects lasting one to seven years.
	Medium-term Effects	Effects lasting seven to fifteen years
	Long-term Effects	Effects lasting fifteen to sixty years
	Permanent Effects	Effects lasting over sixty years
	Reversible Effects	Effects that can be undone, for example through remediation or restoration
Probability of Effects	Likely Effects	The effects that can reasonably be expected to occur as a result of the planned project if all mitigation measures are properly implemented.
	Unlikely Effects	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	The addition of many minor or significant effects, including effects of other projects, to create larger, more significant effects.
	'Do Nothing'	The environment as it would be in the future should no development of any kind be carried out
	`Worst case' Effects	The effects arising from a project in the case where mitigation measures substantially fail
	Indeterminable	When the full consequences of a change in the environment cannot be described
	Irreversible	When the character, distinctiveness, diversity, or reproductive capacity of an environment is permanently lost
	Residual	Degree of environmental change that will occur after the proposed mitigation measures have taken effect
	Synergistic	Where the resultant impact is of greater significance than the sum of its constituents

Additional assessments required

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

Appropriate Assessment Screening Report

1.28 A screening report has been completed by Scott Cawley, Consulting Ecologists for the Proposed Development, as required under the Habitats and Birds Directive (92/43/EEC and 79/409/EEC) and is included as a stand-alone report. The AA (Appropriate Assessment) screening report document forms part of the SID application. The AA screening process has identified that four European sites lie within 15km of the Proposed Development; with another four hydrologically connected to the Proposed Development site via the River Liffey.

1.29 Following an examination, analysis and evaluation of the relevant information, including in particular, the nature of the project and its potential relationship with European sites and their conservation objectives, as well as considering other plans and projects, and applying the precautionary principle, it is the professional opinion of the authors of the AA Screening Report that there is no potential for likely significant effects on any European sites.

Flood Risk Assessment

1.30 A Stage 1 Flood Risk Assessment has been undertaken for the site and forms a stand-alone report that forms part of this application.

Forecasting methods and difficulties in compiling the specified information

1.31 Forecasting methods and evidence used to identify and assess the significant effects on the environment for each environmental aspect are set out in each chapter. There were no significant difficulties in compiling the specified information for this EIA Report. Any issues encountered during the assessment of individual factors are noted within the relevant chapters.

Contributors to the EIA Report

1.32 The preparation and co-ordination of this EIA Report has been completed by Marston Planning Consultancy in conjunction with specialist subcontractors. Specialist inputs were provided by the following (Table 1.2):

Table 1.2 Roles and responsibilities in the EIA Report

Role		**Company**
EIA Project Management		Marston Planning Consultancy (MPC) – Anthony Marston
Engineering Design		Clifton Scannell Emerson Associates (CSEA)
EIA Chapter no.	**Chapter title**	**Company and consultant**
	Non-technical summary	MPC – input from each specialist
Chapter 1	Introduction	MPC – Anthony Marston
Chapter 2	Description of the Proposed Development	MPC – Anthony Marston
Chapter 3	Planning and Development context	MPC – Anthony Marston
Chapter 4	Consideration of Alternatives	MPC – Anthony Marston
Chapter 5	Population and Human Health	MPC – Anthony Marston
Chapter 6	Biodiversity	Scott Cawley – Lorna Gill & Ashling Cronin
Chapter 7	Land, Soil, Geology and Hydrogeology	AWN Consulting – Paul Conaghan & Teri Hayes
Chapter 8	Hydrology	AWN Consulting - Paul Conaghan & Teri Hayes
Chapter 9	Noise and Vibration	AWN Consulting – Damian Kelly
Chapter 10	Air Quality and Climate	AWN Consulting – Ciara Nolan
Chapter 11	Landscape and Visual Impact	Kevin Fitzpatrick, Landscape Architecture – Kevin Fitzpatrick
Chapter 12	Traffic and transportation	CSEA, Consulting Engineers - Carol Diaz Rosario
Chapter 13	Cultural heritage	IAC Archaeology – Faith Bailey
Chapter 14	Waste Management	AWN – Jonathan Gauntlett
Chapter 15	Material Assets	MPC – Anthony Marston
Chapter 16	Cumulative effects	MPC – input from each specialist
Chapter 17	Interactions	MPC – input from each specialist

Project Director / Selected Chapters - Anthony Marston, MSc (Environmental Planning). Anthony is a corporate member of both the Royal Town Planning Institute and the Irish Planning Institute. Anthony is the Principal of Marston Planning Consultancy with over 25 years' experience in EIA Management; and planning and development consultancy. He has project managed, co-ordinated, provided specialist input and contributed to numerous EIA Reports.

Biodiversity - Lorna Gill. Lorna is a Consultant Ecologist with Scott Cawley. Lorna holds an MSc in Conservation and Biodiversity from the University of Exeter and an honours degree in Natural Sciences with a specialisation in Zoology from Trinity College Dublin. Lorna is experienced in carrying out field surveys in Ireland including wintering birds, breeding birds, bats and other protected mammals. Other experience includes monitoring badger sett closures, radiotracking bats, manual bat call analysis and the use of GIS software. At Scott Cawley, Lorna's work also includes data analysis and the preparation of Appropriate Assessment reports and Ecological Impact Assessments for residential and other commercial projects across the country.

Biodiversity - Ashling Cronin. Ashling is a Technical Director with Scott Cawley. She holds a Masters in Ecological Assessment, an honours degree in Applied Ecology from University College Cork and an Advanced Diploma in Planning and Environmental Law from Kings Inns. She has over ten years' experience in environmental management and environmental / ecological assessment across both the

private and public sector. Ashling has provided environmental and ecological support on a variety of planning applications including Strategic Infrastructure Developments (ports and roads), wind farm developments, utilities infrastructure, small to large scale industrial, commercial, residential and mixed use developments. Ashling has a keen interest in both national and international environmental legislation and has extensive experience in the Appropriate Assessment (AA) process. She has been the lead ecologist for the preparation of a number of Natura Impact Statements for a range of development types and national plans, and Natura Impact Reports for a range of land use plans. Ashling also provides technical review and due diligence of Appropriate Assessment documentation for public and local authorities to aid their decision making process as well as peer review of AA documentation prior to lodgement of planning applications.

Land, Soils, Geology, Hydrogeology & Hydrology - Paul Conaghan. Paul is an Environmental Consultant at AWN with over 9 years' experience working in the environmental science and environmental engineering fields. Paul holds a degree in Environmental Science from the University of Limerick and a masters in environmental engineering from Queens University Belfast. Paul has worked on a wide range of projects including hydrogeology, contaminated land, project management, site geotechnical evaluations, site assessments specialising in environmental impact assessment. Paul is a member of the International Association of Hydrogeologists.

Land, Soils, Geology, Hydrogeology & Hydrology - Teri Hayes, BSc (Geology), MSc (Hydrogeology) 1990. Teri is a member of the International Association of Hydrogeologists (Irish Group) – former president and the Institute of Geologists of Ireland – Professional Member. Teri is a Director with AWN with 25 years of experience in EIA Management, water resource management and contaminated land assessment. She has project managed and contributed to numerous environmental impact assessments and design of appropriate mitigation measures, acted as an expert witness at public hearings, lectured in EIA and providing expert advice on EIA sections for planning authorities.

Noise & Vibration - Damian Kelly, Director and Principal Acoustic Consultant in AWN. He holds a BSc from DCU and an MSc from Queens University Belfast. He has over 18 years' experience as an acoustic consultant. He is a member of the Institute of Acoustics. He has extensive knowledge in the field of noise modelling and prediction, having prepared the largest and most complex examples of road and industrial noise models currently in existence in Ireland. He was also co-author of the EPA document "Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities" (2012) and advised in relation to the noise limits applied to commercial developments by the various local authorities in the Dublin region.

Air Quality & Climate - Ciara Nolan. Ciara is an Environmental Consultant in the Air Quality section of AWN. She holds a BSc in Energy Systems Engineering from University College Dublin and has also completed an MSc in Applied Environmental Science at University College Dublin. She is an Associate Member of the Institute of Air Quality Management. She specialises in the fields of ambient air monitoring, indoor air monitoring and EIA.

Landscape and Visual Impact - Kevin Fitzpatrick, BA(Hons) Land Arch, MLA, MILI. Kevin is a corporate member of the Irish Landscape Institute. Kevin is the Principal of Kevin Fitzpatrick Landscape Architecture with over 15 years' experience in landscape and visual Impact assessment for inclusion in EIAR. He has provided visual assessment and specialist landscape analysis and design input to numerous EIA Reports.

Traffic and Transportation - Carol Diaz Rosario, MsC Transport Planning and Modelling. Carol is a Transportation Engineer with CSEA with 2 years of experience in the traffic and transportation field. She has been involved in a variety of projects involving transport planning, Modelling, Traffic and Transport assessments, sustainable mobility planning, and engineering design. In addition to that, Carol has undertaken junction analysis using modelling software such as LinSing3, ARCADY, Vissim, and Vissum.

Cultural heritage - Faith Bailey. Faith is an Associate Director, Project Manager and Senior Archaeologist and Cultural Heritage Consultant with IAC Archaeology. She holds a BA in Archaeology and an MA in Cultural Landscape Management. She is a licence eligible archaeologist, a member of the Chartered Institute of for Archaeologists, a member of the Institute of Archaeologists of Ireland and has over 18 years' experience working in the commercial archaeological and cultural heritage sector.

Cultural heritage - Jacqueline Anderson. Jacqueline joined IAC in 2017 as an archaeological and cultural heritage consultant. She holds a BA and MA in Archaeology and has over 6 years' experience

within the commercial archaeological sector. She has carried out a large amount of fieldwork and has also been responsible for the production and delivery of a large number of archaeological impact assessments and EIAR associated with all sectors of development in Ireland.

Waste Chapter - Jonathan Gauntlett Jonathan is an Environmental Consultant in AWN Consulting with ongoing roles in impact assessment, licensing, environmental compliance and project management. Jonathan has over 9 years' experience in environmental compliance, environmental licensing, and urban planning. Recent projects include; SID and planning applications, IE Licence applications for biopharma and ICT facilities. Jonathan has a BSocSc (Environmental Planning) and BBA (Economics) from the Waikato University in New Zealand and has experience working in environmental consultancy, planning, and regulatory fields in Ireland, the UK and New Zealand.

2. DESCRIPTION OF THE PROPOSED DEVELOPMENT

Introduction

2.1 As described in Chapter 1 (Introduction), the Applicant is applying to ABP for planning permission for the provision of a new 110kV Gas Insulated Switchgear (GIS) Substation (known as Clutterland), 4 no. transformer bays, Client Control Building, 49kVa cable installation, associated compounds and site infrastructure to be located on lands at Grange Castle South Business Park, Baldonnel, Dublin 22. The application also includes an underground single circuit 110kV transmission line from the proposed Clutterland Substation to the existing 220kV / 110kV Castlebaggot Substation to the immediate south; and an underground single circuit 110kV transmission line from the proposed Clutterland Substation connecting to the existing 110kV underground Kilmahud-Corkagh circuit c. 1.1km to the north-west and all associated and ancillary works (hereafter referred to as the 'Proposed Development').

2.2 This chapter presents a description of the Proposed Development as required by the relevant planning legislation, 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, as amended by the 2014 EIA Directive (2014/52/EU) (herein referred to as the EIA Directive), European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018, the Draft EPA "*Guidelines on the Information to be Contained in Environmental Impact Assessment Reports*" (2017) and the Draft EPA "Advice Notes for Preparing Environmental Impact Statements" (2015) (herein referred to as the Draft EPA Advice Notes for EIS 2015). Guidance outlined in the 'Environmental Impact Assessment of Projects - Guidance on the preparation of the Environmental Impact Assessment Report'' published by the European Commission in 2017 was also considered in the preparation of this EIA Report.

Characteristics of the Application

Description of the Proposed Development site

2.3 The Proposed Development is to be located on a site of c. 7.7 hectares that consists of a primarily greenfield site within the Grange Castle South Business Park. The proposed 110kV GIS Substation Compound; the transmission line to the existing 110kV underground Kilmahud Corkagh circuit and the 49kVa (MV) cable installation are located on lands that at the time of making this application are in the control or ownership of SDCC. The transmission line to the existing 220kV / 110kV Castlebaggot Substation to the immediate south is located on lands that are in the control or ownership of SDCC and ESBN. Letters of consent are included within the planning application documentation for the Proposed Development.

Proposed 110kV GIS Substation

2.4 The proposed 110kV GIS substation is located on lands that are bounded by the realigned Baldonnel Road to the west; by the old and new Nangor Road to the north; by agricultural fields and the Grange Castle Motor Company to the east; and by the Grange Castle South Access Road that provides access off the Baldonnel Road into Grange Castle South Business Park and the Castlebaggot Substation to the south.

110kV transmission line to the Castlebaggot Substation

2.5 The route of the underground 110kV transmission line to the Castlebaggot Substation passes around the northern and part of the western boundary of the Castlebaggot Substation before passing into the Substation approximately half way along its western boundary with the Proposed Development site. The length of the 110kV cable route is c. 180m.

110kV transmission line to the Kilmahud-Corkagh circuit

2.6 The route of the underground 110kV transmission line to the Kilmahud-Corkagh circuit passes to the north of two of the permitted two storey data centre buildings (Buildings A and C) as permitted under Reg. Ref. SD20A/0121. It then passes under the former Nangor Road (now cut off at either end) before passing across SDCC owned land before passing under the culverted Griffeen River and under the realigned Nangor Road (R134) and passing along the wayleave on the east side of the Grange Castle Business Park internal access road before looping around to connect to the Kilmahud-Corkagh circuit. The length of the 110kV cable route is c. 1.1kms. A proposed joint bay is to be installed at the connection to the Kilmahud-Corkagh circuit as well as along this route.

Proposed 49kVa cable installation

2.7 The route of the proposed 49kVa cable installation will link from the proposed Clutterland Substation and pass within the SDCC wayleave to the west of the Castlebaggot Substation before connecting into existing MV cabling infrastructure within the SDCC wayleave along the Grange Castle South Business Park access road. The estimated length of the 49kVa cable route is c. 300m.

2.8 The Proposed Development is not located directly adjacent to any areas of national or local environmental sensitivity/designation (Refer to Chapter 6 - Biodiversity for further details). The need for the Proposed Development is described on page 4 of Chapter 1 of the EIA Report.

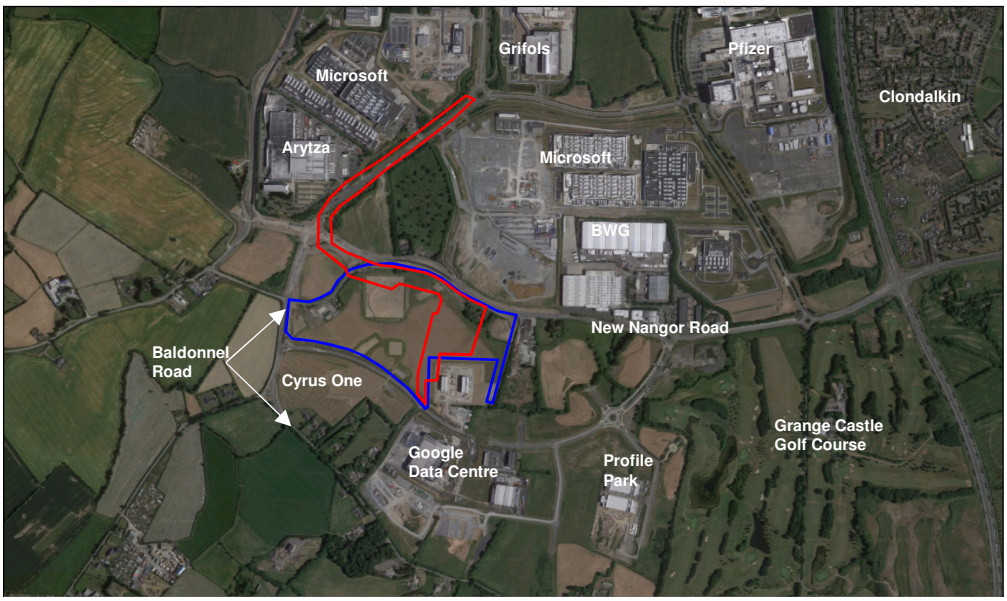

Figure 2.1 Proposed Development site outlined in red with the Permitted Development outlined in blue in context of surrounding development and land uses (Source: Google Earth)

Permitted development

2.9 The lands to the west of the Proposed Development are currently undeveloped and are subject to the recent decision of SDCC to issue a Final Grant Permission, dated 3rd September 2020 for 3 no. two storey data centres and ancillary elements with a total gross floor area of 80,269sqm under Reg. Ref. SD20A/0121 as indicated by the blue line in Figure 2.1 (hereafter referred to as the 'Permitted Development'). A portion of the lands that are subject to the Proposed Development under the current application (indicated by the red line in Figure 2.1) are within the property boundary of the Permitted Development.

Proposed Development description

2.10 The Proposed Development will consist of:

- The proposed development primarily comprises the provision of two no. 110kV 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 east of the 3 no. data centres permitted under South Dublin County Council Reg. Ref. SD20A/0121, and within an overall landholding bound to the north by the R134 / New Nangor Road; to the west by the realigned Baldonnel Road; to the south by the Grange Castle South Business Park access road; and to the east by the Grange Castle Motor Company within Baldonnel, Dublin 22. The site of the proposed development has an area of c. 7.7 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 1,447sqm) (known as the Clutterland Substation), four transformers, a Client Control Building (with a gross floor area of 380sqm), lighting masts, car parking, associated underground services and roads within a 2.6m high fenced compound and all associated construction and ancillary works;
- A proposed underground single circuit 110kV transmission line will connect the proposed Clutterland 110kV GIS Substation to the existing 220kV / 110kV Castlebaggot Substation to the immediate south. The proposed transmission line covers a distance of approximately 180m within the townlands of Ballybane, and Aungierstown and Ballybane;

- A proposed underground single circuit 110kV transmission line will connect the proposed Clutterland 110kV GIS Substation to the existing 110kV underground Kilmahud-Corkagh circuit to the north-west. The proposed transmission line covers a distance of approximately 1.1km within the townlands of Ballybane and Grange and will include 3 joint bays along its length;
- The development includes provision of a unit substation and 49kVa electricity connection (approximately 300m in length to the Grange Castle South Business Park access road to the south of the proposed substation) for the proposed GIS substation building. The development includes the connections to the two substations (existing and proposed) as well as to the Kilmahud-Corkagh circuit, changes to landscaping permitted under SDCC Reg. Ref. SD20A/0121 and changes to planting within Grange Castle Business Park and all associated construction works, and all ancillary works.

2.11 Figure 2.2 presents a site layout plan showing the route of the proposed 2 no. underground 110kV transmission lines, the proposed 110kV GIS substation, and the 49kVa underground cable installation.

110kV GIS Substation Compound

2.12 The proposed 110kV Gas Insulated Switchgear (GIS) Substation Compound is to be located on lands which are currently greenfield in nature, to the east of Permitted Development granted under SDCC Planning Reg. Ref. SD20A/0121, and within an overall landholding bound to the north by the R134 / New Nangor Road; to the west by the realigned Baldonnel Road; to the south by the Grange Castle South Business Park access road; and to the east by the Grange Castle Motor Company within Baldonnel, Dublin 22.

2.13 The proposed 110kV GIS Substation Compound includes the provision of a two storey GIS Substation building (with a gross floor area of 1,447sqm) (to be known as the Clutterland Substation), four transformers, a Client Control Building (with a gross floor area of 380sqm), Lighting Masts, Car Parking and Roads within a 2.6m high fenced compound and all associated construction and ancillary works.

2.14 The two storey GIS substation building (with a gross floor area of 1,447sqm) will accommodate a cable room, control room, mess room, generator room, battery room and workshop at ground floor level, with a storeroom and substation room at first floor level. The single storey Client Control Building (with a gross floor area of 380sqm) will accommodate 4 number electrical switch rooms and a control room. Both buildings are rectilinear in form, and finished in metal cladding to compliment the Permitted Development (SD20A/0121).

2.15 The proposed transformers will be located centrally within the substation compound, set out in a row running north-south within the compound area. The Substation compound will be accessed from the permitted internal circulation roads and infrastructure permitted under SDCC Planning Reg. Ref. SD20A/0121. A main access gateway to the compound will be provided on the southern side of the substation compound, providing for vehicular and pedestrian access to the substation area.

110kV transmission lines

2.16 The design of each underground 110kV transmission line will comprise a single 110kV circuit installed underground in high-density polyethylene (HDPE) ducting. The 110kV cables will be a standard XLPE (cross-linked polyethylene) copper cable. XLPE does not contain oil, therefore there is no risk of migration of oil into the ground in the event of a failure (such as a short circuit, a joint fail, a termination failure etc.). These types of failures would not have the potential to result in a perceptible environmental impact.

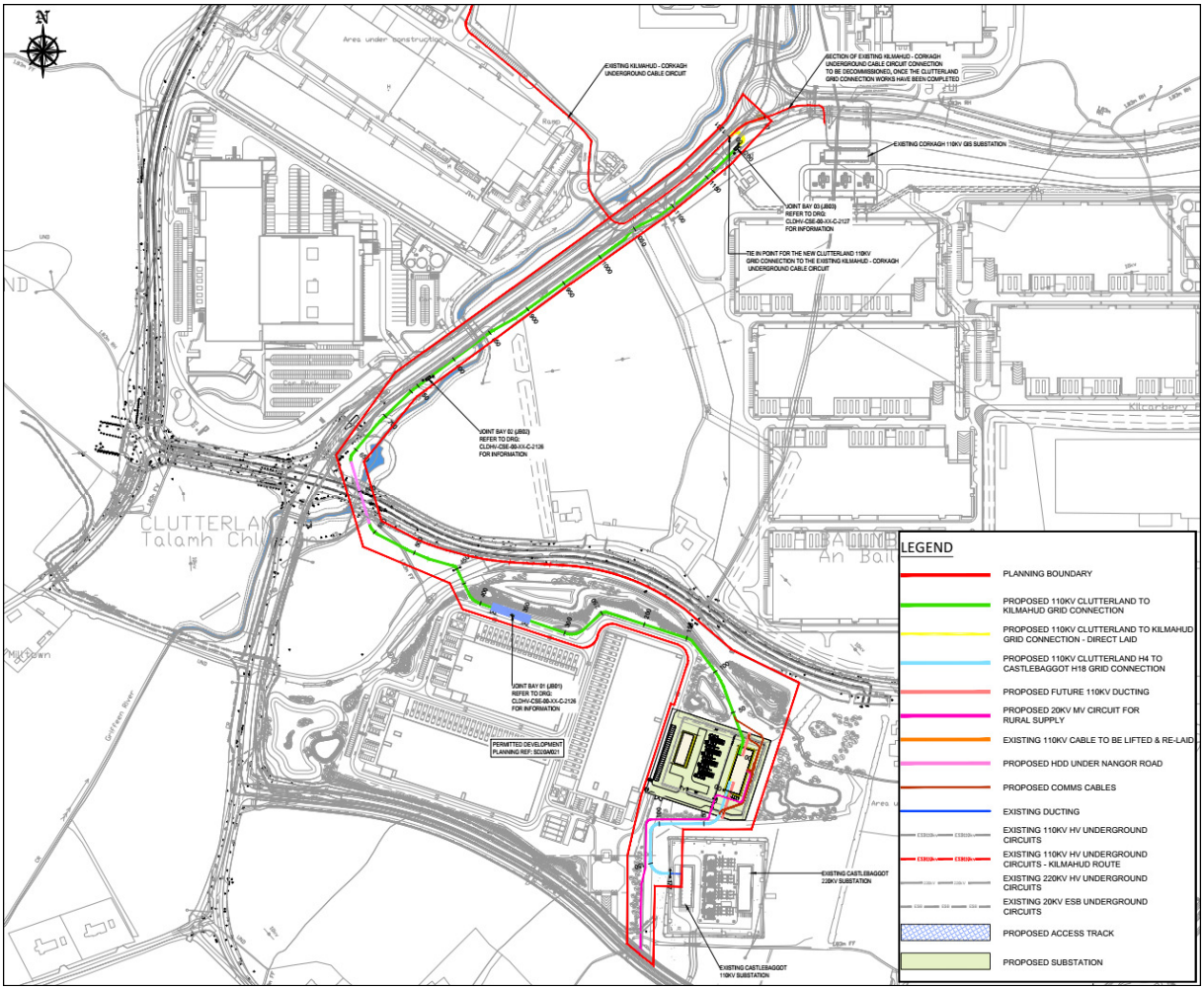

Figure 2.2 Proposed site layout plan of the Proposed Development site (red line) indicating proposed 110kV transmission lines (green and cyan line) , proposed 49kVa (pink) as well as the permitted development site (blue line) (Source: Drawing no. CLDHV-CSE-00-XX-DR-C-2102, CSEA Consulting Engineers)

2.17 The installation of the HDPE ducting will require the excavation of one trench along each of the routes; each containing one 110kV circuit. The optimum depth of excavation of the trenches will typically be 1.3m below ground level but may increase up to c. 3.5m at utility crossings. The typical width of each trench is 0.85m, however this may vary depending on ground conditions and the location of existing services. Between five and separate ducts will be installed in each trench. For the purposes of this assessment, reference to the 'transmission lines' refers to both the transmission line to the Castlebaggot substation and the transmission line to the Kilmahud-Corkagh circuit. A typical cross section of the trench is illustrated in Figure 2.3.

2.18 Horizontal directional drilling is proposed for a c. 100m length of the 110kV transmission line from the Kilmahud-Corkagh circuit. The location of the directional drilling is under the culverted Griffeen River where the 110kV transmission line from the Kilmahud-Corkagh circuit crosses under the New Nangor Road. The depth of the drilling is expected to be c. 6m in depth and will require four separate directional drillings that will be c. 1m apart.

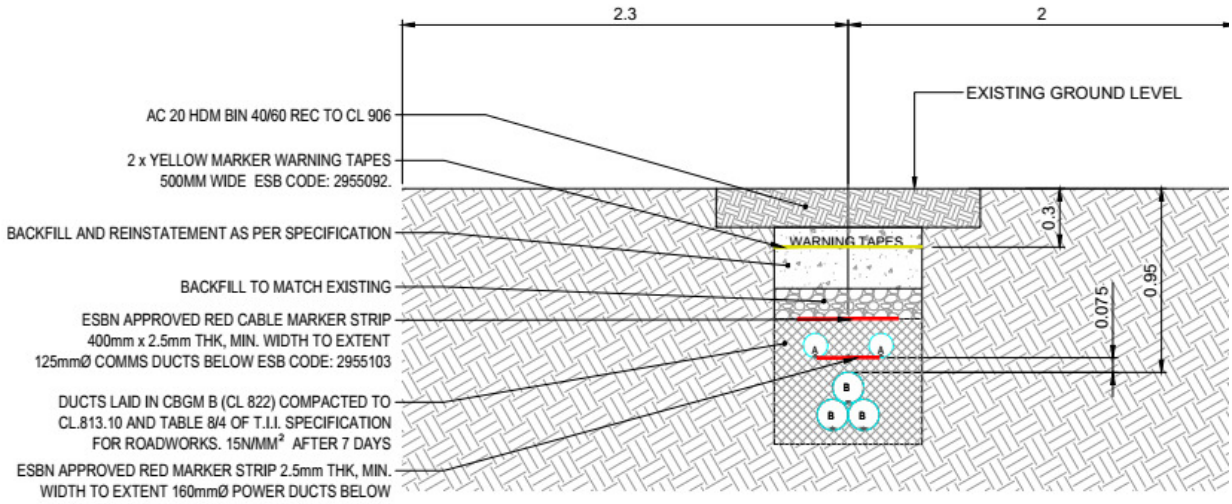

Figure 2.3 Typical cross-section of HV transmission line trench from the Kilmahud-Corkagh Circuit to the proposed Clutterland substation (Source: Drawing no. CLDHV-CSE-00-XX-DR-C-2131, CSEA Consulting Engineers)

2.19 The design of the 49kVa underground cable will comprise a looped 10kV circuit installed underground in PVC ducting. The 10kV cables will be a standard XLPE (cross- linked polyethylene) Aluminium cable. XLPE does not contain insulating fluid, therefore there is no risk of migration of insulating fluid into the ground in the event of a failure (such as a short circuit, a joint fail, a termination failure etc.). The route of the 49kVa cable and detailed proposed Clutterland substation layout is indicated in Figure 2.4 below.

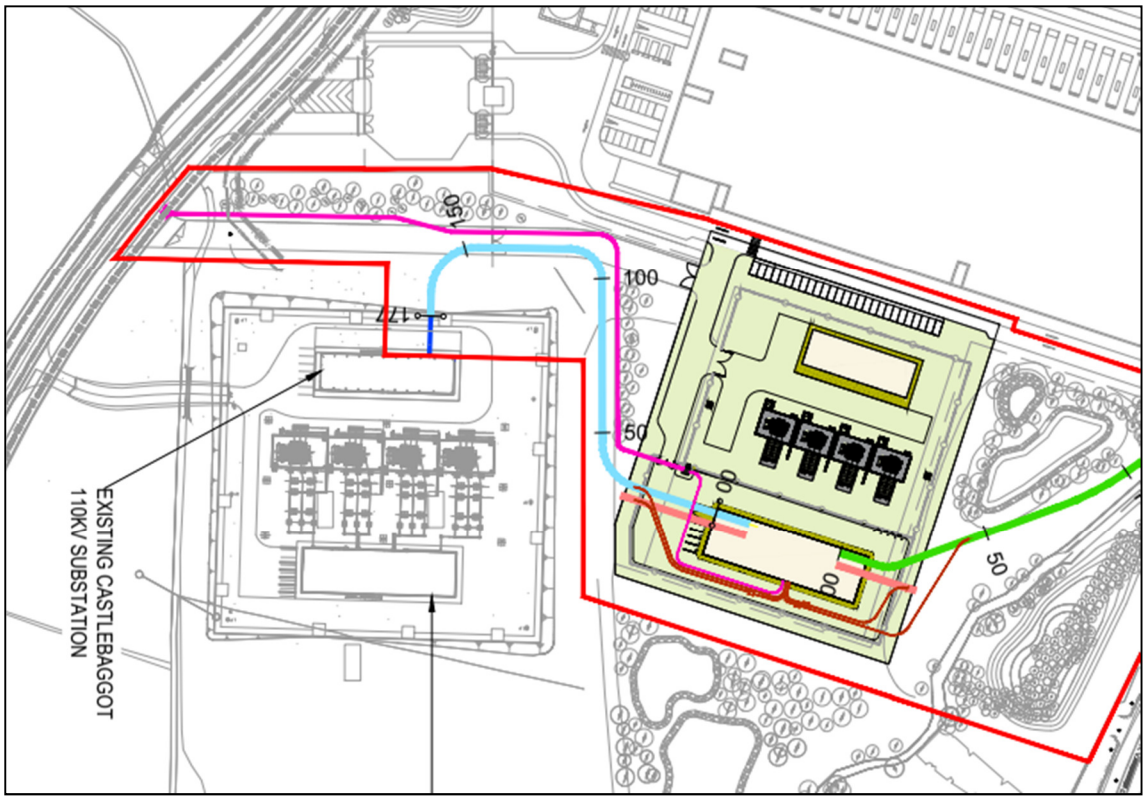

Figure 2.4 Proposed Clutterland substation layout indicating proposed 49kVa transmission line (pink), 110kV transmission line to the Castlebaggot substation (cyan), and start of 110kV transmission line to the Kilmahud-Corkagh circuit (green) (Source: Drawing no. CLDHV-CSE-00-XX-DR-C-2121, CSEA Consulting Engineers)

2.20 The installation of the PVC ducting will require the excavation of one trench along the route; the trench will contain one 10kV circuit. Two separate 160mm outside diameter ducts will be installed in the trench. The optimum depth of excavation required to facilitate installation of the ducting is 0.95-1m

below ground level (bgl). The optimum width of the trench is c. 0.525m, however this may vary depending on ground conditions and existing services to up to c. 1-2m. A typical cross section of the trench is illustrated in Figure 2.5.

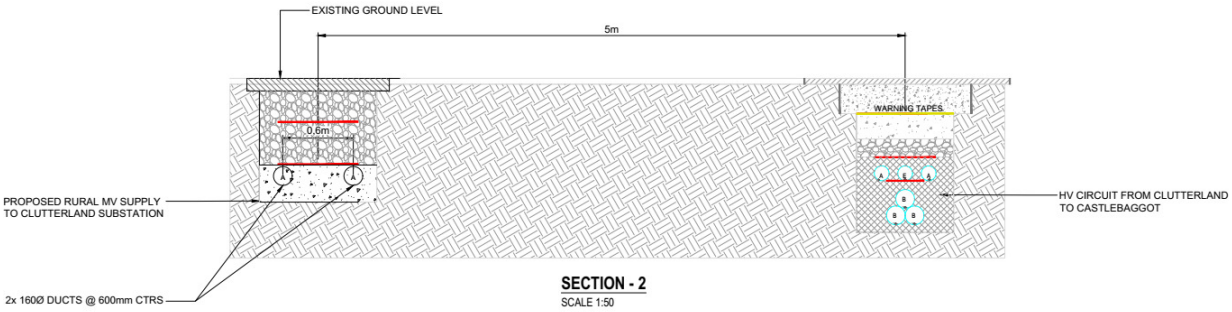

Figure 2.5 Typical cross-section of 49kVa underground cable trench and ducts; and 110kV transmission line trench to the Clutterland Substation from Castlebaggot Substation (Source: Drawing no. CLDHV-CSE-00-XX-DR-C-2130, CSEA Consulting Engineers)

Proposed Site Infrastructure and Secondary Facilities

Surface Water Drainage (Refer to Chapter 8 – Hydrology for further details)

2.21 In accordance with the requirements of South Dublin County Council and the Design Guidelines of the Regional Code of Practice for Drainage Works and the Greater Dublin Strategic Drainage Study any new development must adhere to the overall design requirements of these documents. The proposed drainage network granted under Reg. Ref. SD20A/0121 has been designed to convey all the captured storm water on site, including the Proposed Development site, and to direct it to 4 no. attenuation areas (with a capacity of 10,385m^3) located along the western, northern and eastern boundaries of the Permitted Development site.

2.22 The drainage design requirements of SDCC state that any development must restrict post development run-off rates to the pre-development, greenfield rates of 2.0 l/s/ha. to the Baldonnel Stream. In practice, to accommodate this requirement, on-site storage must be provided to temporarily store rainwater generated on site. 4 no. attenuation ponds have been sized to accommodate storm water runoff from building roofs, yards and the internal road network, including the proposed GIS (Clutterland) substation. Three of the permitted attenuation ponds will drain to the north and outfall into the Baldonnel stream. One of the attenuation ponds will drain to the west and into an existing storm sewer and will discharge via the local sewer network to the Local Authority wastewater treatment plant (WWTP) at Ringsend.

2.23 The surface water drainage of the substation element of the Proposed Development will drain to the attenuation pond permitted under Reg. Ref. SD20A/0121 to its immediate east. The storm water system has been modelled to ensure no physical clashes with other utilities, notably the proposed foul system.

2.24 The attenuation design for the Permitted Development granted under SD20A/0121 was designed to accommodate runoff from the Proposed Development. The Permitted Development design includes oil separator interceptor systems to ensure the quality of storm water discharge is controlled prior to attenuation and discharge offsite.

2.25 A second design requirement for the storm water system is to comply with the general principles of sustainable urban drainage design. The permitted attenuation ponds will receive storm water which has passed through gullies (to aid in the removal of debris) and a suitably sized oil separator to ensure any hydrocarbon pollution is removed prior to storm water entering the attenuation pond. A further stage to improve overall storm water quality is the construction of 'forebays' that allow small intensity rainfall events to be stored separated from the main water body. This allows for any detritus material to be removed from the water and aids in particulate removal, increasing overall storm water quality prior to disposal. All four attenuation ponds, including the one into which the Substation will drain, have suitably sized forebays to achieve this requirement.

2.26 Full details on surface water drainage design are provided within the *Engineering Services Report*, prepared by CSEA Consulting Engineers which accompanies the planning submission for the

Proposed Development. Chapter 8 Hydrology and Chapter 15 Material Assets address the potential impacts of the Proposed Development on storm water drainage.

2.27 The proposed 110kV substation will result in a small increase in hard standing area of 3,600sqm as a result of its construction. This increase in hard standing area was taken into account in terms of attenuation under the Permitted Development.

2.28 The underground 110kV transmission lines from the proposed substation to the existing Castlebaggot 220kV / 110kV substation and to the Kilmahud-Corkagh Circuit, new joint bays, and the underground 49kVa cable installation do not require any surface water drainage infrastructure.

Foul Drainage

2.29 Domestic effluent arising from the welfare facilities at the Proposed Development's GIS substation will be collected in a foul drain within the site and discharge to the existing foul drainage network serving the Business Park which ultimately discharges to the municipal Waste Water Treatment Plant (WWTP) at Ringsend. The wastewater contribution from the Proposed Development will be minimal.

2.30 The proposed layout of the Permitted Development under Reg. Ref. SD20A/0121 requires that a number of connections to the existing foul infrastructure are undertaken (refer to CSEA Consulting Drawings for details of same). The Permitted Development's foul network has been designed in accordance with the requirements of the Building Regulations, Part H and the Irish Waters Code of Practice for Wastewater Infrastructure.

2.31 The underground 110kV transmission lines from the proposed substation to the existing Castlebaggot 220kV / 110kV substation and to the Kilmahud-Corkagh Circuit, new joint bays, and the underground 49kVa cable installation do not require any foul drainage infrastructure.

2.32 Irish Water (IW) provided a confirmation of feasibility (CoF) for the overall development (including the requirements of the proposed development) on the 20th May 2020 (IW Reference Number: Reference No CDS20000724).

2.33 Further detail in relation to wastewater emissions is presented in the CSEA Engineering Services Report – Drainage and Water Services, which accompanies this planning permission and in Chapter 8 Hydrology and Chapter 15 Material Assets of this EIA Report. There are no process wastewater emissions to the foul drainage system.

Water Supply

2.34 Water will be required for the welfare facilities at the GIS substation. It is proposed that this will be provided via a connection to the watermain for Building A of the Permitted Development under Reg. Ref. SD20A/0121. The water demand for the Proposed Development will be minimal. Chapter 8 Hydrology and Chapter 15 Material Assets address the impacts on water supply.

2.35 The underground 110kV transmission lines from the proposed substation to the existing Castlebaggot 220kV / 110kV substation and to the Kilmahud-Corkagh Circuit, new joint bays, and the underground 49kVa cable installation do not require any water supply.

2.36 A pre-connection enquiry (PCE) form was submitted to Irish Water (IW) as part of the Permitted Development application (Reg. Ref. SD20A/0121) which as well as addressing the water demand for the Permitted Development also addressed water demand for the Proposed Development. IW provided a confirmation of feasibility (CoF) for the development on the 20th May 2020 (IW Reference Number: Reference No CDS20000724).

Electricity

2.37 The proposed 110kV GIS substation, 110kV transmission lines and 49kVa cable installation are designed to support power demand for the Permitted Development of three data centres under Reg. Ref. SD20A/0121. The Permitted Development was subject to a separate planning application and EIA Report and is located to the west of the proposed 110kV GIS (Clutterland) substation. A full description of the Permitted Development is set out under Chapter 3 of this EIA Report. The 49kVa cable installation is intended to provide a house power supply to the proposed GIS substation.

Telecommunications

2.38 A fibre optic cable distribution network will be installed to serve the Permitted Development Reg. Ref. SD20A/0121. The fibre network for the permitted development will be extended to the GIS substation.

Fire water system

2.39 A fire water ring main will be installed for the Permitted Development and will extended to the Proposed Development to provide firefighting water to hydrants in the event of a fire.

Security and lighting

2.40 Other than during construction, the traffic accessing the GIS substation will approach and access the site through the permitted new entrance to be constructed off the Grange Castle South access road along the southern boundary of the Permitted Development site (Reg. Ref. SD20A/0121). A maximum speed limit of 20km/hour will be in place on the access road.

2.41 A pair of access gates will be manned and maintained by security personnel 24/7 and will form the main entrance into the Permitted and Proposed Development sites. (The access gates have been designed to act as a vehicle trap as and when required). An additional entrance, to the immediate east of the main entrance, will be created into the site to be used initially during the construction phases of the Proposed and Permitted Development; and then will form an emergency entrance on completion of both the Proposed and Permitted Developments.

2.42 Security will ensure that the procedure for accessing the facility is followed at all times. A record will be maintained of all personnel visiting the site (including deliveries etc.). All visitors to site will be monitored and supervised at all times, and if required suitable and appropriate procedures to deal with Covid-19 will be implemented.

2.43 A 2.4m high security fence will be constructed around the perimeter of the Permitted Development site as granted under Reg. Ref. SD20A/0121 and will be located 2m inside the base of the proposed berms that will bound the Permitted Development site. The Proposed Development will be partly screened from the R134 and Baldonnel Road by berms and planting. The intention is that boundary berms and planting will be significant as set out under the Permitted Development landscape plan (refer to Chapter 11 Landscape and Visual Impact). CCTV cameras will be installed at strategic locations around the site to ensure all boundaries and approaches to the site are adequately monitored.

2.44 An Intruder Detection System (IDS) combined with CCTV and security lighting will be utilised. 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 residential receptors or business users.

2.45 Bat Conservation Ireland (www.batconservationireland.org) has produced a set of guidance notes for consideration in the design of bat sensitive lighting schemes. Further and more recent guidance has been provided by Bat Conservation Trust in the UK in relation to bats and artificial lighting. The main items to consider for both types of bat habitat are listed below.

Table 2.1 Lighting mitigation design for bats

Bat Roosts	Foraging & Commuting
No direct illumination at exist points	Avoid lighting along river, lakes and canals
Position lights to avoid sensitive areas	Avoid lighting along important commuting routes
Use low pressure or high pressure sodium lights	Avoid the use of mercury or metal halide lamps
Avoid the use of mercury or metal halide lamps	Minimise light spills using shields masking and louvres
Restrict lights and the timing of such to avoid bat activity	Keep lighting columns as low as possible
Restrict lighting to ensure there are dark areas	Restrict lighting to ensure there are dark areas

2.46 The Permitted Development has been modelled, to ensure that it achieves the twin aims of having safe circulation routes whilst not having a long term impact on foraging, commuting and bat roosts. The lighting design will ensure the illumination levels fall off to 0.5 lux within 2m of the roadways etc.

(1 lux is accepted as being equivalent to a moon lit night). This is further detailed and assessed within Chapter 6 – Biodiversity.

Site roads and parking

2.47 The main construction and operational access to the Proposed and Permitted Developments will be via the Grange Castle South Business Park access road that extends from the Baldonnel Road to the west. Other than during construction, the traffic accessing the Proposed Development's GIS substation will approach and access the site through the permitted new entrance to be constructed off the Grange Castle South access road along the southern boundary of the Permitted Development site that was granted under Reg. Ref. SD20A/0121. This new entrance will be constructed as part of the Permitted Development. A maximum speed limit of 20km/hour will be in place on the internal access roads. Access arrangements and potential traffic safety impacts are considered in Chapter 12 Traffic and Transportation. Car parking for 5 cars will be provided adjacent to the proposed 110kV GIS substation. This is to allow for parking for full time staff as well as external staff, maintenance contractors and visitors attending the Proposed Development.

Existence of the Project

2.48 Under the current Draft EPA Guidelines on the information to be contained in EIA Reports, the description of the existence of the project is required to define all aspects of the proposed lifecycle of the Proposed Development under the following headings:

- Construction;
- Commissioning;
- Operation;
- Decommissioning; and
- Description of other related projects.

2.49 The following sections present a description of each of these aspects.

Description of Construction

2.50 The construction of the proposed 110kV GIS substation will comprise four main stages, namely:

- Site preparation works;
- Building Structure Construction;
- Building Envelop Construction; and
- Fit Out including mechanical and electrical fit-outs and commissioning.

2.51 The construction of the 110kV transmission lines and 49kVa cable installation will comprise three main stages, namely:

- Site preparation works and excavations;
- Cable installation, jointing and testing; and
- Reinstatement.

2.52 The construction of the new joint bays will be undertaken as part of the 110kV transmission line works to the Kilmahud-Corkagh circuit will comprise three main stages, namely:

- Site preparation works and excavations;
- Construction of concrete bases for the electrical apparatus; and
- Fit Out Including M&E and commissioning.

Working Hours

2.53 It is anticipated that the construction of the GIS substation, the 110kV transmission lines with their joint bays will be completed during normal construction hours i.e. 7am to 7pm Monday to Friday with a half day working on Saturday (9am-1pm). Covid-19 restrictions may result in a prolonged construction schedule.

2.54 A portion of the 110kV transmission line to the Kilmahud-Corkagh circuit is in the public domain. Construction of this portion of the route will be carried out between the hours of 10am and 4pm. During construction, staff will arrive on site at approximately 8am and take c. 1.5 to 2 hours to mobilise before

commencing works. Any works requiring the closure of one or more traffic lanes will be carried out at night, between the hours of 7pm and 6am.

2.55 The remainder of the routes will be completed during normal construction hours i.e. 7am to 7pm Monday to Friday with a half day working on Saturday (9am-1pm). However, it is possible that the appointed contractors may wish to carry out certain operations outside these hours i.e. evening hours during long summer days etc. Such occurrences will be notified to the local authority, where required and generally kept to a minimum. Where they do occur, contractors will ensure they take place over as short a timeframe as possible and as such are unlikely to cause excessive disturbance.

Staffing

2.56 The following construction data has been used to estimate peak daily construction traffic (assumed to occur during civil works period for substation building):

- Average construction staff: 15-20; and
- Peak construction staff (peak staff levels during civil works): 30.

Construction schedule

- Application for Planning Permission – October 2020;
- Commence Site Construction works (subject to grant of planning permission) – Q2 2021; and
- Completion of Construction and Commissioning – Q4 2022.

Site preparation

2.57 The construction of the first data centre on site (SDCC Planning Ref. SD20A/0121) commenced in Q3 2020. The first data hall is estimated to be in operation by Q3 2021, with the completion of construction and commissioning of the remaining data centres targeted for completion by Q3 2028.

2.58 It is proposed that the accesses and haul roads for vehicles, the contractors' compound and fencing that have been established for the construction of the Permitted Development under Reg. Ref. SD20A/0121 will be utilised for the Proposed Development.

2.59 The construction compound, which will be the same that is being established for the Permitted Development, will facilitate office, portable sanitary facilities, equipment storage, parking etc. for contractors. It will be used for the duration of the works.

2.60 The site preparation phase for the GIS substation will involve site clearance, excavations and levelling of the site to the necessary base level for construction, surveying and setting out for structures and any rerouting of services/connections to services. A combination of bulldozer, excavators, trucks and other soil shifting plant will commence the main site clearance and levelling aspects.

2.61 The site preparation required for the 110kV transmission lines, the 49kVa cable installation and the new joint bays will require minimal site clearance. A combination of excavators, trucks and other soil shifting plant will commence the transmission line clearance and levelling aspects.

Building Construction Works

Foundations and Structure

2.62 Following the completion of site clearance and levelling, all structures will require foundations to structural engineer specifications. Building structures will comprise standard structural steel frames. It is anticipated that foundations will require moderate scale excavations. Minor dewatering may be required during excavation works and groundworks (depending on the time of year development works are carried out; refer to Chapter 8 - Hydrology of this EIA Report).

Levelling/Cut and Fill

2.63 It is proposed that some of the spoil generated will be reused under landscaped areas and/or in the formation level for roads and/or the construction compound. Any temporary storage of spoil required will be managed in accordance with a Construction and Environmental Management Plan (CEMP) to prevent accidental release of dust and uncontrolled surface water run-off which may contain sediment etc. (refer to Chapter 7 – Land, Soil and Hydrogeology and Chapter 14 – Waste Management of this EIA Report for further details).

2.64 Any excess spoil not suitable and/or required for reuse on site will be removed offsite for appropriate reuse, recovery and/or disposal as required (see Chapter 14 – Waste Management). The Permitted Development granted under Reg. Ref. SD20A/0121 will require the importation of 41,500m^3 of fill material. The Proposed Development will require the importation of c. 6,000m^3 of fill material and will generate c. 24,300m^3 of construction waste. The fill material will be sourced from various locations within the Greater Dublin Area to facilitate construction of the Permitted Development.

2.65 Contractors for the Proposed Development will be required to submit to the Planning Authority and adhere to a method statement (including the necessary risk assessments) indicating the extent of the areas likely to be affected and demonstrating that they will achieve the minimum disturbance necessary to achieve the required works. Any temporary storage of spoil will be managed, as set out under the finalised Construction Environmental Management Plan (CEMP) to be updated by the contractor from the draft CEMP submitted as part of this planning application pack. This will prevent accidental release of dust and uncontrolled surface water run-off which may contain sediment etc. Please refer to Chapter 10 – Air quality and Climate of this EIA Report for further details).

Building Envelopes and Finishes

2.66 The outer finishing of the building envelopes are intended to be of a similar quality and appearance to the Permitted Development for the data centres granted under Reg. Ref. SD20A/0121. Reinstatement along the 110kV transmission lines and 49kVa cable installation route will be as current, i.e. grassed in greenfield areas and hardstand along paved areas and roads.

Roads, services and landscaping

2.67 The internal road system will be completed as part of the Permitted Development under SD20A/0121. Landscaping will be undertaken in accordance with the Permitted Development's landscape plan. Minor localised amendment to the Permitted Development landscape scheme is required to enable the 110kV transmission line connection to the Kilmahud-Corkagh circuit. The height and form of the bunds, and planting which they support, will remain the same as permitted under the Permitted Development (Reg. Ref. SD20A/0121). The permitted landscaping scheme to the north, east and south of the Substation will be in place within the first planting season following the completion of this Substation in summer 2023 (refer to Chapter 11 Landscape and Visual Impact of this EIA Report for further details).

Material sourcing, transportation and storage

Materials

2.68 Key materials will include steel, concrete, composite cladding, piping, electrical cabling, process equipment and architectural finishes. A 'Just in Time' delivery system will operate to minimise storage of materials and waste management on site.

Sourcing

2.69 Where possible it is proposed to source general construction materials from the Dublin area to minimize transportation distances.

Storage

2.70 Aggregate materials such as sands and gravels will be stored in clearly marked stockpiles within a secure area in the construction compound to prevent contamination. Liquid materials will be stored within temporary bunded areas, doubled skinned tanks or bunded containers (all bunds will conform to standard bunding specifications – BS EN 1992-3:2006) to prevent spillage.

Transportation

2.71 Construction materials will be brought to site by road along the R134 and R120. Construction materials will be transported in clean vehicles. Lorries/trucks will be properly enclosed or covered during transportation of friable construction materials and spoil to prevent the escape material along the public roadway.

Waste Management

2.72 Chapter 14 contains a detailed description of waste management (including quantities and types of waste) relating to construction and operation of the Proposed Development. A site-specific Construction and Demolition Waste Management Plan prepared by AWN Consulting Ltd. is included

as Appendix 14.1 of this EIA Report. This C&D Waste Management Plan will be refined and updated by the appointed contractor in advance of the works to ensure best practice is followed in the management of waste from the Proposed Development.

Noise, Vibration and Dust Nuisance Prevention

2.73 With regard to construction activities, reference will be made to BS 5228 (i.e. BS 5228-1:2009+A1:2014 and BS 5228-2:2009+A1:2014) *Code of practice for noise and vibration control on construction and open sites*, which offers detailed guidance on the control of noise and vibration from demolition and construction activities. Mitigation measures will be implemented during the construction of the Proposed Development, that will include:

- Limiting the hours during which site activities which are likely to create high levels of noise are permitted, e.g. soil levelling/excavations;
- Establishing channels of communication between the contractor/developer, local authority and residents;
- Appointing a site representative responsible for matters relating to noise and vibration, and;
- Monitoring typical levels of noise during critical periods and at sensitive locations.

2.74 Furthermore, practicable noise control measures will be employed. These will include:

- Selection of plant with low inherent potential for generation of noise;
- Erection of acoustic barriers as necessary around items such as generators or high duty compressors; and
- Siting of noisy plant as far away from sensitive receptors as permitted by site constraints.

2.75 Noise and vibration control measures are discussed in detail in Chapter 9 - Noise and Vibration of this EIA Report.

2.76 The potential for dust to be emitted depends on the type of construction activity being carried out in conjunction with environmental factors including levels of rainfall, wind speeds and wind direction. The potential for impact from dust depends on the distance to potentially sensitive locations and whether the wind can carry the dust to these locations. The majority of dust produced will be deposited close to the generated source.

2.77 In order to ensure that no dust nuisance occurs, a series of measures will be implemented during construction including:

- Hard surface roads will be swept to remove mud and aggregate materials from their surface while any unsurfaced roads will be restricted to essential site traffic only;
- If required, any area/road that has the potential to give rise to fugitive dust will be regularly watered, as appropriate, during dry and/or windy conditions;
- Vehicles using site roads will have their speed restricted, and this speed restriction will be enforced rigidly. On any un-surfaced site road, this will be 10km/hour, and on hard surfaced roads as site management dictates;
- In all conditions vehicles delivering material with dust potential (soil, aggregates) will be enclosed or covered with tarpaulin at all times to restrict the escape of dust;
- Wheel washing facilities will be provided for vehicles exiting the site to ensure that mud and other wastes are not tracked onto public roads;
- Public roads outside the site will be regularly inspected for cleanliness and cleaned as necessary; and
- At all times, these procedures will be strictly monitored and assessed. In the event of dust emissions occurring outside the site boundary, movements of materials likely to raise dust would be curtailed and satisfactory procedures implemented to rectify the problem before the resumption of construction operations.

2.78 Dust nuisance control measures are discussed in further detail in Chapter 10 (Air Quality and Climate).

Water discharges

2.79 The Proposed Development will require site preparation, excavations and levelling for foundations, the installation of services and landscaping. Some removal of perched rainwater from the excavation may

be required. Volumes will be quite low, and all pumped water will be subject to onsite settlement before release.

2.80 During the construction phase, there is a risk of accidental pollution incidences from the following sources:

- Spillage or leakage of fuels (and oils) stored on site;
- Spillage or leakage of fuels (and oils) from construction machinery or site vehicles;
- Spillage of oil or fuel from refuelling machinery on site;
- The use of concrete and cement; and
- Storage of chemical on site.

2.81 See Chapter 8 - Hydrology for a full description of mitigation measures proposed to address all of the above.

Construction impacts

2.82 Each of the following EIA Report chapters (Chapters 3 -17) includes an assessment of the potential impact of construction works on their individual environmental aspect and set out the relevant mitigation measures relating to that aspect. A Construction Environmental Management Plan (CEMP) will be put in place by contractors to minimise the impact of all aspects of the construction works on the local environment. The CEMP will include emergency response procedures in the event of a spill, leak, fire or other environmental incident related to construction. A Draft CEMP is submitted with the Proposed Development planning application documentation submitted by CSEA Consulting Engineers with the application package. The contractor will ensure that all workers and sub-contractors abide by the CEMP, which will be a live document to be updated throughout the construction process.

2.83 The primary potential effects from construction are short to medium term and will include:

- Potential effects in terms of nuisances relating to the air quality of the environs due to dust and other particulate matter generated from excavation works and effects on the noise environment due to plant and equipment involved in construction;
- Potential effects on the land, soils, geology & hydrogeology of the site during construction i.e. some loss of protection of the underlying aquifer to contaminants during site clearance, levelling and excavations etc.; and
- Potential effects on the local road network and its environs due to construction workers and other staff attending site during preparation, construction and commissioning phases.

2.84 Mitigation measures to address each of these potential short to medium term effects are presented in each individual chapter of this EIA Report and contained in the CEMP.

Description of commissioning

2.85 Once the construction of the Proposed Development is completed, ESB Networks will be mobilised to complete the commissioning. Commissioning will be carried out over a period of months. Commissioning works primarily involve a suitably qualified individual connecting the relevant cables to a switchgear within the substations. Following this, energisation can take place. As there is no requirement for chemicals usage and minimal access to the route by personnel there is no likely environmental effect as a result of commissioning.

Operation of the Proposed Development

2.86 As stated in Section 1.2 of Chapter 1, EirGrid will be the transmission system operator (TSO) and ESB Networks will be the transmission asset owner (TAO). EirGrid will operate transmission stations, including the existing Castlebaggot substation and the proposed new GIS substation, remotely from their control centres. However, ESB Networks will carry out all local operations on Eirgrid's behalf. ESB Networks will undertake local operational activities from the substations with only interim inspections along the underground 220kV transmission line and 49kVa cable installation.

2.87 The estimated staff required are outlined in the following paragraphs.

110kV GIS substation

2.88 The 110kV GIS substation does not require any full-time staff to operate it. However, maintenance of the substation will be required by ESB Networks, including a routine weekly inspection, and a more comprehensive inspection once per year. The weekly inspection of the GIS substation will take a maximum of 8 hours on a single day and will be conducted by up to 2 staff.

2.89 In addition to the weekly inspections, more comprehensive maintenance works will take place annually on each cubicle. This will require up to 4 staff to conduct testing at the substation over a maximum period of 15 days (120 hours). It is expected that the proposed 4 new transformers (to be located west of and adjacent to the 110kV GIS substation) will also be inspected during this time.

Underground 110kV Transmission Lines

2.90 Once constructed, the underground transmission line will not require any staff to operate it. Instead, two ESB Networks maintenance staff will carry out a routine inspection of the asset one year after completion and once every three years thereafter.

Underground 49kVa Cable Installation

2.91 Once constructed, the underground cable installation will not require any staff to operate it. Instead, two ESB Networks maintenance staff will carry out a routine inspection of the asset one year after completion and once every three years thereafter. These inspections are likely to be conducted at the same time the underground 110kV transmission line is inspected.

Joint Bays

2.92 Once constructed, these joint bays will not require any staff to operate them. Instead, ESB Networks maintenance staff will inspect these bays as part of their existing overall maintenance operations at the Castlebaggot substation (similar maintenance schedule to that described above for the proposed Clutterland 110KV GIS substation) and the Kilmahud-Corkagh circuit. Therefore, no additional staff (above existing requirements) will be required to maintain the joint bays and thus, there will be no additional trips generated by this element of the Proposed Development.

2.93 Traffic relating to staff movements have been assessed as part of the traffic and transportation chapter of this EIA Report (Chapter 12).

Decommissioning of the Proposed Development

2.94 The lifespan of the Proposed Development is not defined but it is anticipated that it will be maintained, and periodic upgrading undertaken over a long lifetime to meet future demand and upgrade in technology. If the GIS substation is no longer required over the long term, then full decommissioning in accordance with prevailing best practice will be undertaken. Retirement of any cables will involve decoupling the cable from the switchgear. An excavation pit of approximately 10sqm will then be established. The cable to be retired will be identified within this excavation pit and spiked (to ensure that decoupling from the switchgear has been successful and the cable is not live). The cable will then be cut and capped to protect the exposed cable. The excavated pit can be reinstated using the excavated material with no import of fill required for this part of the Proposed Development. The retired cable can remain in situ in the ground, with the potential for it to be returned to operation should it be required in the future.

2.95 As result of the Proposed Development, the existing Corkagh-Kilmahud Circuit will be decommissioned. This will result in the cables being disconnected from the transmission network and being taken out of operation by the TSO. Typically, the ducts and cables are left in situ. In certain circumstances the cables may be pulled from their ducts using a steel wire and a cable winch and taken to an appropriately licensed waste facility using standard construction vehicles. The decommissioning and/or removal of the cable is ultimately a matter for the ESB/EirGrid in their function as TSO/TAO and does not form part of the Proposed Development.

Description of other developments

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

Sustainability energy efficiency and resource use

2.97 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. 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 (2017 – 2020) (NEEAP), include an energy efficiency target of 33% for the public sector.

Health & safety

Design and Construction Health and Safety

2.98 The Proposed Development has been designed in accordance with the Safety, Health and Welfare at Work Act 2005 (No. 10 of 2005) as amended and the Safety, Health and Welfare at Work (General Application) Regulations 2007-2016 (S.I. 299 of 2007, S.I. 445 of 2012, S.I. 36 of 2016) as amended and associated regulations.

2.99 The Proposed Development has been designed by skilled personnel in accordance with internationally recognised standards, design codes, legislation, good practice and experience based on a number of similar developments.

General operational health and safety

2.100 ESB Networks has an Environmental Safety and Health Management System that will be established at the Proposed Development.

Potential impacts of the Proposed Development

2.101 The Proposed Development is to be located on EE (Enterprise and Employment) zoned lands with the objective "*To provide for enterprise and employment related uses" under the South Dublin County Development Plan 2016-2022 and located* adjacent to extensive industrial development that includes the 110kV / 220kV Castlebaggot Substation. The development, when operational, will generate limited additional traffic, air, noise and water emissions and waste generation from activities.

2.102 During construction, there is the potential for temporary nuisance impacts from traffic, dust, noise and construction waste, if not carefully managed. All contractors will be required to adhere to the CEMP to ensure each of these potential impacts are minimised.

2.103 Each chapter of this EIA Report assesses the potential impact of the construction and operation of the Proposed Development on the receiving environment. Please refer to each specialist chapter respectively.

Major accidents / disasters

2.104 The 2014 EIA Directive and associated EPA Draft EIA Report Guidelines 2017 requires that the vulnerability of the project to major accidents, and/or natural disasters (such as earthquakes, landslides, flooding, sea level rise etc.) is considered in the EIA Report. The site has been assessed in relation to the following external natural disasters; landslides, seismic activity and volcanic activity and sea level rise/flooding as outlined below. The potential for major accidents to occur at the Proposed Development has also been considered with reference to Seveso/COMAH.

Landslides, Seismic Activity and Volcanic Activity

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

Flooding/Sea Level Rise

2.106 The potential risk of flooding on the site was also assessed. A Stage 1 Flood Risk Assessment was carried out and it was concluded that the development is not at risk of flooding. The assessment indicates that the Proposed Development would not adversely impact on the flood risk for other neighbouring properties. Further detail is provided in Chapter 8 - Hydrology and the accompanying

Stage 2 Flood Risk Assessment that forms a stand-alone document as part of the planning application. Given the inland location of the site, it is not at risk from sea level rise.

Seveso/COMAH

2.107 The Proposed Development will not be a Seveso/COMAH facility. The only substance stored on site controlled under Seveso/COMAH will be diesel for a single back up generator (tank capacity 1m3) and the transformers (tank capacity 36m3) and the amounts proposed do not exceed the relevant thresholds of the Seveso directive.

Minor accidents/leaks

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

Related development and cumulative effects

2.109 The Proposed Development is designed to support power demand for the Permitted Development (Reg. Ref. SD20A/0121) that received its Final Grant of permission on the 3rd September 2020. A detailed description of this Permitted Development is provided in paragraph 2.9 of this Chapter and in paragraphs 3.23 and 3.24 of Chapter 3 – Planning and Development Context. This separate planning application was also subject to an EIA Report. The Proposed Development will be constructed at the same time as the first data centre (Building A) of the Permitted Development.

2.110 The cumulative impact of the Proposed Development with Building A of the Permitted Development during the construction phase; and the entire Permitted Development as granted under Reg. Ref. SD20A/0121 during the operational phase have been considered in Chapter 16 Cumulative Effects.

2.111 Works that do not form part of the Proposed Development that will be undertaken by the statutory undertaker include an MV connection through existing ducts and cables comprising an additional 10m length of ducting to connect two existing sets of ducting infrastructure along a c. 1.35km route to the east through Profile Park to the roundabout on the R134 New Nangor Road. These works have also been cumulatively assessed under Chapter 16 of this EIA Report.

2.112 It is unlikely that more than two data centre buildings would ever be under construction concurrently. If such a scenario did occur, due to the phased nature of the works, it is likely that one of the buildings would be at the superstructure stage of construction whilst the other would be in the earlier stages of construction.

2.113 As part of the assessment of the impact of the Proposed Development, the cumulative effects of the Proposed Development with the proposed 3 no. data centres proposed under Reg. Ref. SD20A/0121 and other developments that are currently permitted or under construction within the vicinity of the site, neighbouring industrial parks and surrounding areas has been assessed. A list of the other developments considered to be relevant is provided in Chapter 3 (Planning and Development Context). The cumulative impact assessment is provided in Chapter 16 of this EIA Report. The implementation of all mitigation measures set out under this EIA Report and under the EIA Report for the Permitted Development for each environmental aspect, will ensure that there will be no cumulative impacts arising.

3. PLANNING AND DEVELOPMENT CONTEXT

3.1 The Proposed Development is within the functional area of South Dublin County Council (SDCC). The following section details compliance of the Proposed Development, as described in Chapter 2, with regard to national policies and objectives as well as local planning policy under the South Dublin County Development Plan 2016-2022.

3.2 The Applicant is applying to ABP for planning permission for the Proposed Development. The project is designed to support the power demand for the Permitted Development that received its Final Grant of Permission on the 3rd September 2020 under SDCC Planning Reg. Ref. SD20A/0121 (as detailed in Chapter 2 and within this chapter and was subject to a separate planning application and EIA as detailed in Chapter 2). The proposed 110kV GIS substation compound of the Proposed Development is located to the east of the Permitted Development, within the overall landholding.

Strategic Infrastructure Development

3.3 Section 182A of the Planning & Development Act 2000 (as amended), provides that applications for approval of "*development comprising or for the purposes of electricity transmission*" shall be made directly to ABP. Section 182A, sub-section 9, also provides that "*transmission*" is to be construed in accordance with section 2(1) of the Electricity Regulation Act 1999 but shall also be construed as meaning the transport of electricity by means of:

(a) a high voltage line where the voltage would be 110 kilovolts or more, or
(b) an interconnector, whether ownership of the interconnector will be vested in the undertaker or not.

3.4 Section 2(1) of the Electricity Regulation Act 1999 defines "*transmission*", in relation to electricity, as:

*"the transport of electricity by means of a transmission system, that is to say, a system which consists, wholly or mainly, of high voltage lines and electric plant and which is used for conveying electricity from a generating station to a substation, from one generating station to another, from one substation to another or to or from any interconnector or to final customers but shall not include any such lines which the [*Electricity Supply*] Board may, from time to time, with the approval of the Commission* [for Energy Regulation]*, specify as being part of the distribution system but shall include any interconnector owned by the [*Electricity Supply*] Board."*

3.5 It should be noted that the Commission for Energy Regulation is now known as the Commission for the Regulation of Utilities (CRU). The Board's *Strategic Infrastructure Development Electricity Transmission Guidelines* provide that "*certain private sector Proposed Developments may constitute electricity transmission under section 182A where such proposals will ultimately form a node on or part of the transmission network. This might include for example substations and related connection infrastructure to the national grid associated with large commercial or industrial development*."

3.6 The Pre-application Consultation with ABP that included a meeting on the 3rd September 2020 led to the Board ruling that the Proposed Development meets the relevant criteria and constitutes Strategic Infrastructure Development (SID) under Section 182A of the Planning and Development Act 2000 (as amended) (ABP Reg. Ref.: ABP-307360-20).

National Planning Framework

3.7 The National Planning Framework (NPF) was published in February 2018 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.

3.8 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 (including datacentres) 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."

3.9 The Proposed Development comprises a substation and associated ancillary development designed to support ICT and surrounding future development. A full description of the Proposed Development is available in Chapter 2 Description of the Proposed Development.

3.10 The Proposed Development comprises the provision of a permanent power supply for the Permitted Development, in a location which is well suited and serviced to accommodate such a use. The NPF also states under National Strategic Outcome 5, A Strong Economy Supported by Enterprise, Innovation and Skills :

"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 facilitys. 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."

3.11 The NPF is favourably disposed to the location of ICT infrastructure in Ireland, and the Proposed Development, which comprises of such ICT infrastructure, is therefore considered to be wholly in accordance with this key body of national planning policy.

Regional Spatial and Economic Strategy for the Eastern and Midlands Regional Assembly

3.12 The Regional Spatial and Economic Strategy (RSES) for the Eastern and Midlands Regional Assembly (EMRA) includes Regional Policy Objective (RPO) 8.25 which states the following:

"Local Authorities shall:
- *Support and facilitate delivery of the National Broadband Plan.*
- *Facilitate enhanced international fibre communications links, including full interconnection between the fibre networks in Northern Ireland and the Republic of Ireland.*
- *Promote and facilitate the sustainable development of a high-quality ICT network throughout the Region in order to achieve balanced social and economic development, whilst protecting the amenities of urban and rural areas.*
- *Support the national objective to promote Ireland as a sustainable international destination for ICT infrastructures such as data storage facilities and associated economic activities at appropriate locations.*
- *Promote Dublin as a demonstrator of 5G information and communication technology."*

3.13 The site is therefore considered to be an appropriate location for the development of data centres under this Strategy.

Regional Planning Guidelines – Greater Dublin Area, 2010-2022

3.14 The Regional Planning Guidelines (RPGs) for the Greater Dublin Area 2010 – 2022 set out a strategic planned direction for growth in the Greater Dublin Area up to 2022 encompassing Dublin City, Dún Laoghaire-Rathdown, South Dublin, Fingal, Meath, Kildare and Wicklow by giving effect to the National Spatial Strategy (NSS). The RPGs provide an overall strategic context for the Development Plans of each local authority in the Greater Dublin Area (GDA) including enterprise and employment creation. A number of policies and recommendations support the economic development of this region by developments similar to the Proposed Development on sites such as this. These include Strategic Policies EP2, ER9 and ER10.

3.15 The RPGs supports economic development within the GDA and clustering of development within identified strategic employment areas. The RPGs identify the prevalence of converging sectors in particular the connection between Information and Communications Technology (ICT) and Green Technology. This convergence of sectors has led to new emerging sectors such as the prevalence of data centres in Ireland and on strategic sites such as this. The Proposed Development is considered to be in compliance with regional planning policies as they are strategically zoned employment land in South Dublin County Council.

South Dublin County Development Plan 2016-2022

3.16 The South Dublin County Development Plan (The Plan) is the statutory planning document that covers the entire South Dublin administrative area. The Plan was adopted in June 2016.

3.17 The Proposed Development is to be located within an area zoned EE (Enterprise and Employment) under the County Development Plan with the stated aim:
"*To provide for enterprise and employment related uses."*

3.18 The Proposed Development is required to provide permanent power to the Permitted Development that received its Final Grant of permission on the 3rd September 2020 under SDCC Planning Reg. Ref. SD20A/0121. The County Development Plan (s. 10.2.9 supports the provision of transmission and energy infrastructure with the appropriate service providers such as ESB Networks and Eirgrid that facilitates the economic development and expansion of the County. Energy (E) Policy 11 of the County Development Plan specifically states that "*It is the policy of the Council to ensure that the provision of energy facilities is undertaken in association with the appropriate service providers and operators, including ESB Networks, Eirgrid and Gas Networks Ireland. The Council will facilitate the sustainable expansion of existing and future network requirements, in order to ensure satisfactory levels of supply and to minimise constraints for development*". The service providers and operators have been fully consulted in formulising this SID application.

3.19 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 northwards from City West to Grange and Grange Castle.

3.20 It is the policy of the Council to support sustainable enterprise and employment growth in South Dublin and in the Greater Dublin Area, whilst maintaining environmental quality. A number of objectives relate to EE zoned lands that include ET3 Objective 2 that states:

"To prioritise high tech manufacturing, research and development and associated uses in the established Business and Technology Cluster to the west of the County (Grange Castle and Citywest areas) to maximise the value of higher order infrastructure and services that are required to support large scale strategic investment."

3.21 Policy ET3 Objective 5 requires that "*all business parks and industrial areas are designed to the highest architectural and landscaping standards and that natural site features, such as watercourses, trees and hedgerows are retained and enhanced as an integral part of the scheme*". The Proposed Development retains and enhances natural site features by the use of the highest architectural and landscaping design standards.

3.22 Policy ET3 Specific Local Objective 1 supports the conducting of a review of the zoning of lands south of the Grand Canal and west and north of the R120, with a view to preparing a long term plan for the expansion of the Grange Castle Economic and Enterprise Zone, to accommodate strategic investment in the future, while also seeking to provide public open space along the Canal, including a natural heritage area in the vicinity of the historic canal quarries at Gollierstown. This rezoning has formed Variation no. 1 of the County Development Plan and does not relate to these lands.

3.23 The nature of the Permitted Development was informed by a site analysis of environmental issues and an EIA Report was prepared and submitted with the application for development under SDCC Planning Reg. Ref. SD20A/0121. This has included noise and air quality objectives. The enhancement and creation of new bio-diversity corridors to fully integrate the Permitted and Proposed Development into the surrounding environment to ensure that direct and cumulative effects on biodiversity are addressed in the overall design. Suitable attenuation and sustainable drainage systems have also informed the design of both the Permitted and Proposed Development. This mitigation of design of the Permitted Development also increases native tree planting within the site from its current position. The Permitted Development incorporates SUDS fully in accordance with policies of the Plan.

3.24 In conclusion it is considered that the Proposed Development is in accordance with the policies and objectives of local, regional and national land use planning policy.

Sustainable Development

3.25 Irelands Framework for Sustainable Development 'Our Sustainable Future' (launched 2012 with subsequent progress report in 2015), by the Department of the Environment, Community and Local Government. It provides a framework to ensure that development is undertaken in a sustainable manner.

3.26 'Our Sustainable Future' aims to ensure that development is carried out sustainably and in an environmentally sound manner which includes optimisation of natural resources, minimisation of waste, safe and sparing use of chemicals and the application of clean technology.

3.27 All of these aspects will be integral considerations in the construction and operation of the Proposed Development on a day to day basis and are addressed within this EIA Report where appropriate.

Consultation

3.28 The Applicant and the project team have liaised with An Bord Pleanala (ABP) in advance of lodgement of the Proposed Development on **3rd September** 2020. Previously consultation meetings were held with South Dublin County Council as part of the application for the Permitted Development in which the future GIS substation development was shown as part of future infrastructure on the 15th of January 2020 and 28th of January 2020.

3.29 EIA contributors/authors have incorporated advice and comments received into the relevant chapters of this EIA Report.

Relevant Planning history

Reg. Ref. SD20A/0121

3.30 The Permitted Development received a Final Grant Permission from SDCC on the 3rd September 2020. This permission was subject to 23 standard conditions and work commenced on the 23rd September 2020 following a compliance submission that addressed all prior to commencement conditions.

3.31 The Permitted Development is for three no. two storey data centres with a gross floor area of 80,269sqm to be undertaken over a ten year period. The development consists of various works that can be summarised as follows:

- Demolition of abandoned dwelling and associated buildings known as Ballybane, Old Nangor Road, Clondalkin, Dublin 22;
- Construction of three no. two storey data centre buildings (Buildings A, B and C) with mezzanine floors at each level and ancillary elements with a gross floor area of 80,269sqm;
- 1 no. two storey data centre (Building A) that will be located to the south-west of the site and will have a gross floor area of 28,573sqm. It will include 26 no. emergency generators located at ground floor level within a compound to the northern side of the data centre with associated flues that will be 25m in height. The facility will also include 26 no. ventilation shafts that will be located above the northern end of each emergency generator that will measure 20m in height;
- 1 no. two storey data centre (Building B) that will be located to the north-west of the site, and to the immediate north of Building A and will have a gross floor area of 21,725sqm. It will include 18 no. emergency generators located at ground floor level within a compound to the northern side of the data centre with associated flues that will be 25m in height. The facility will also include 18 no. ventilation shafts that will be located above the southern end of each emergency generator that will measure 20m in height;
- 1 no. two storey data centre (Building C) that will be constructed last and will be located to the eastern part of the site on a north-south axis and will have a gross floor area of 28,573sqm. It will include 26 no. emergency generators located at ground floor level within a compound to the western side of the data centre with associated flues that will be 25m in height. The facility will also include 26 no. ventilation shafts that will be located above the western end of each emergency generator that will measure 20m in height;
- Each of the three data centres will includes data storage rooms, associated electrical and mechanical plant rooms, loading bays, maintenance and storage spaces, office administration areas, and plant including PV panels at roof level as well as a separate house generator for each facility that will provide emergency power to the admin and ancillary spaces. Each data centre will also include a diesel tank and a refuelling area to serve the proposed emergency generators;

- The overall height of each data centre apart from the flues and plant at roof level is c. 19.85m above the finished floor level;
- Construction of internal road network and circulation areas, security hut (30sqm) at entrance; footpaths, provision of 150 no. car parking spaces, and 78 no. cycle parking spaces, with 50 no car parking spaces and 26 no. cycle parking spaces being provided for each building;
- single storey and temporary substation (29sqm);
- 3 no. single storey MV buildings (each 249sqm - 747sqm in total) that manage the supply of electricity from the Substations to each data centre and are located to the immediate west of the generator compound within Buildings A and B, and to the south of the generator compound within Building C;
- 8 no. prefabricated containerised electrical rooms (65sqm each and 520sqm overall) that are stacked in pairs to the immediate south of the temporary substation; and
- Ancillary site development works, that will include attenuation ponds and the installation and connection to the underground foul and storm water drainage network, and installation of utility ducts and cables, that will include the drilling and laying of ducts and cables under the Baldonnel Stream. Other ancillary site development works will include hard and soft landscaping, lighting, fencing, signage, services road, entrance gate, sprinkler tank house (72sqm), security hut (30sqm) and 150 no. car parking spaces, and 78 no. sheltered bicycle parking spaces. The development will be enclosed with landscaping to all frontages including a wetland to the west.

Other decisions on the Permitted Development site

3.32 The wider site was also subject to a Part 8 application for various road works under Reg. Ref. SD088/0010 and a refused application for the change of use of lands and property, since demolished, within the north-east quadrant of the wider site, to the immediate north of the Proposed Development site, to an Irish Cultural and Language Institute in 2002 under Reg. Ref. S02A/0097. The reasons for refusal were based on traffic concerns and a reduction in the housing stock. The land was zoned for residential purposes at the time. This application was located to the north-east of the Baldonnel Stream that is not proposed to be subject to any development under this application. Neither of these applications impact upon the ability to develop the Proposed Development site for a 110kV GIS substation compound and transmission lines. The wayleaves required by SDCC, Irish Water and ESB as part of the sale around the boundaries and infrastructure crossing the site have been respected when designing the current scheme.

3.33 Several planning permissions have been granted in the Grange Castle area for substations serving data centres in recent years. The following is just a synopsis of these.

Nearby sites

Castlebaggot substation

An Bord Pleanála Reg. Ref. 06S.VA0019

3.34 An order to grant permission dated the 27th June 2016 was issued by An Bord Pleanála for the development of a 220kV /110 kV Substation & Associated Works on land within the Grange Castle South Business Park, Baldonnel, Dublin 22.

3.35 The development description for the application as outlined in the Board's own Inspector's Report was a 220/110 kV Gas Insulated Switchgear (GIS) substation compound, on an approximately three hectare site (including associated landscaped space). The main elements of the substation comprise:

- a 220 kV substation building of approximately 720sqm, rising to approximately 16.6m over ground level;
- a 110 kV substation building of approximately 528sqm, rising to approximately 14.5m over ground level;
- four no. associated 220 kV to 110 kV transformers sited within transformer bunds;
- associated external over ground electrical equipment and apparatus including cable sealing ends, surge arrestors, conductor support structures, post insulators, lightning monopoles (approximately 15m over ground), lighting and associated underground cabling;
- associated ancillary drainage works;
- associated site development and landscaping works;

- associated substation car parking (12 spaces), vehicular circulation route, and other hard surfacing; and
- associated 2.6m (approximately) high metal palisade substation perimeter fence, including substation entrance gates approximately 5.1m wide.

3.36 The application also included two interface compound sites (approximately 0.1ha each) to connect the existing Inchicore-Maynooth 220 kV double-circuit overhead line to the proposed substation by means of underground cable. These interfaces were located to the west of the Lucan Sarsfields GAA Club sports grounds and to the north-western side of Lynches Lane (L-5218- 1).

3.37 The development also included various infrastructural changes to the alignment of the Inchicore-Maynooth 220 kV double-circuit overhead line; and the implementation of 4 no. 220 kV underground cables connecting the two interface compound sites with the new substation; and one 110 kV underground cable connecting the proposed substation with the existing 110 kV Corkagh substation located within the existing Grange Castle Business Park. The decision to grant permission was made on the 27th June 2016 and was subject to 14 conditions.

CyrusOne

Reg. Ref. SD18A/0134 / ABP Ref. ABP-302813-18

3.38 Permission was granted by South Dublin County Council, which was upheld following a third party appeal, by An Bord Pleanála, for a two storey data centre with associated three storey office block and services that had a gross floor area of 35,426sqm on an overall site of 9.2 hectares on the lands to the immediate south of the application site. The data centre and office has a general dimension of being 292.2m in length by some 65.2m in width. The development had an overall height of 15.9m to the top of the parapet level and contained 64 exhaust flues (two per generator), grouped into 16 towers of four flues that are each 20m in height from the proposed ground floor level. This site is currently under construction for the first building and offices of this permitted development.

Google

Reg. Ref. SD14A/0023

3.39 A decision to grant planning permission for a two storey data centre (30,361sqm) and associated facilities including 83 car parking spaces was made on the 14th April 2014. Google were the applicant and operate the data centre that has now been constructed to the immediate south-east of the Proposed Development site. The highest point of any of the buildings is within 20m of the original ground level with the 25 no. stacks at 25m.

Microsoft campus

Reg. Ref. SD07A/0632

3.40 Permission was granted on the 26th October 2007 for a two storey data centre with plant at roof level with a gross floor area of 51,155sqm to the north-west of the application site. Permission was granted for a ten year period to be developed over two phases with an overall height of 24.275m to parapet and flues that are 27.25m in height.

Reg. Ref. SD11A/0211

3.41 Permission was granted in November 2011 for a single storey data centre of 11,090sqm adjoining the permitted two storey data centre granted under the 2007 application to the north-west of the application site.

Reg. Ref. SD13A/0015

3.42 Permission granted for a single storey data centre (15,609sqm) with plant at roof level to the west of permissions granted under the 2007 and 2011 applications and with flues that were 25m in height.

Reg. Ref. SD13A/0143

3.43 Permission granted for DUB06 on the 23rd October 2013 for a single storey data centre with plant at roof level with a total gross floorspace of 35,000sqm with flues that were 24.85m in height. This data centre is located to the north-east of the Kilcarbury Business Park.

Reg. Ref. SD13A/0265

3.44 Permission granted for DUB06 and modified by Reg. Ref. SD14A/0194 (below) that established permission for alternative DUB06 of 35,000sqm.

Reg. Ref. SD14A/0194

3.45 Planning permission was granted to Microsoft Ireland in November 2014 for revisions to and extension of the data centre complex DUB06 granted under SD13A/0265 including external plant and transformers. Revisions included the overall reduction in floor area of permitted DUB06 from 35,000sqm to 21,350sqm and provision of an additional 6 buildings providing data centres totalling 31,828sqm in total and located to the immediate north of the Kilcarbury Business Park.

Reg. Ref. SD15A/0133

3.46 Planning permission was granted to Microsoft Ireland in November 2015 for the construction of a single storey data centre (DUB011) with a total gross floor area of 7,609sqm to be located to the south of DUB06, 07 and 08.

Reg. Ref. SD15A/0343

3.47 Planning permission was granted to Microsoft Ireland on the 23rd February 2016 for the development of two data centres (DUB07 and DUB 08) to the immediate west of the existing data centre (DUB06). Each data centre contained five no. flues each 25m high, with each data centre having an overall height of up to 13m high and with an overall gross floor area of 33,800sqm.

Reg. Ref. SD16A/0088

3.48 Planning permission was granted to Microsoft Ireland on the 6th May 2016 for a development of four single storey data centres (DUB09, DUB10, DUB12 and DUB13) located west of DUB06, 07 and 08, and located to the north of the Proposed Development site and the New Nangor Road. The gross floor area of each data centre and accompanying offices etc. was 17,598sqm with an overall gross floor area of 70,392sqm in total. The height of each data centre will range from 6.1m to 13.3m with five flues per data centre and being 25m in height.

Wider local area

Reg. Ref. SD16A/0214

3.49 A decision to grant planning permission for phase 1 of the development of an Edgeconnex data centre was made on the 11th August 2016. The proposed data centre and associated elements had a gross floor area of 5,839sqm. The overall height of the development is dictated by the parapet screen to the roof plant of the data hall which will be circa 10.5m above finished ground level. The generator flues extend circa. 15m above ground level over each generator.

Reg. Ref. SD16A/0345

3.50 Permission was granted on the 10th January 2017 to extend the Edgeconnex data centre by the construction of a new data hall of 4,176sqm to the immediate south of the data hall of 4,435sqm and single storey office of 1,341sqm permitted under Reg. Ref. SD16A/0214. The permission also included the construction of a temporary gas generation plant within walled yard measuring 2,811sqm and containing 12 no. 1.875 MVA sized container units to be located within the Takeda lands to the east of the site.

Reg. Ref. SD17A/0141

3.51 Permission was granted on the 14th August 2017 for a new stand-alone single storey data hall of 1,515sqm to the immediate north of the data hall, and its extension, permitted under Reg. Ref. SD16A/0214 and SD16A/0345. The attenuation pond was permitted to be enlarged under this permission.

Conclusions

3.52 The Proposed Development, described in Chapter 2 of this EIA Report is fully in accordance with local, regional and national land use planning policy. The Proposed Development will be situated on suitably zoned lands within the Grange Castle South Business Park.

3.53 The content of this EIA Report identifies potential environmental risks and how they will be addressed and mitigated in the design, during construction and during the operational phases of development.

Details of the various environmental topics are identified and discussed in the following chapters of the EIA Report.

3.54 In conclusion, it can be stated that the Proposed Development complies fully with the stated requirements of SDCC and will deliver a key piece of supporting infrastructure, which is of significant importance to the Applicant, a major employer in the Information and Communications Technology (ICT) sector in Ireland.

4. ALTERNATIVES

Introduction

4.1 EIA legislation and the prevailing Guidelines as set out in Chapter 1 of this EIA Report and best practice require that Environmental Impact Assessment Reports (EIA Reports) consider 'reasonable alternatives', for example in terms of project design, technology, location, size and scale; that have been studied, which are relevant to the Proposed Development and its specific characteristics; and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects'. An assessment of alternative landscaping was not undertaken as part of this chapter as all berms and tree planting was granted under the Permitted Development. This section will address:

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

4.2 This chapter describes the alternatives that were considered for the Proposed Development, where applicable, under each of the headings presented in Section 4.1 and the reasons for the selection of the chosen options, including a comparison of environmental effects of the alternative options where relevant.

Do nothing alternative

4.3 In the event that the Proposed Development does not proceed, the permitted data centre development (SDCC Reg. Ref. SD20A/0121), once constructed, would be left without a permanent power supply.

4.4 The permanent power supply is designed to provide the full power requirement of the Permitted Development. Without the permanent power supply that the Proposed Development will provide, Building A would only operate at a fraction of its capability, and Buildings B and C could not operate at all, until such a time as another application is made. The land on which the Proposed Development would be located, would remain undeveloped within the Permitted Development site in a do-nothing scenario. The land would be utilised for the construction phases of the Permitted Development and would then recolonise as scrub following the completion of the development.

4.5 There are no environmental effects associated with the do-nothing scenario. The Do-Nothing scenario has been considered in each chapter of the EIA Report.

Alternative project locations

GIS Substation

4.6 The location of the proposed GIS substation compound was identified as part of the Permitted Development as granted under SDCC Planning Reg. Ref. SD20A/0121 (see Figure 4.1 below of the Proposed Site Layout drawing submitted under the Permitted Development application).

4.7 The location of the proposed substation under the Permitted Development and the Proposed Development has remained unchanged. Its location was assessed having regard to the environmental effects, particularly in terms of visual impact, as well as the length of the 110kV transmission line and therefore construction phase impacts as well as constraints along the route as a result of other infrastructure; to connect to the Castlebaggot 220kv / 110kV substation. The location of the proposed substation enables a strong architectural expression to the public front of the Permitted Development. It also enables the proposed substation to be well screened from the public domain.

4.8 Alternative site were considered for the Permitted Development that included locating the permanent 110kV GIS Substation to the west at the entrance into the Grange Castle South Business Park as well as other positions to the east of the site; and orientating the three permitted data centres in different arrangements. The visual impact of the proposed substation being located at the western end of the Permitted Development site was considered as having a negative visual impact at the entrance to the Grange Castle South Business Park.

4.9 Currently, three data centre facilities detailed in the Permitted Development have been granted planning permission (i.e. Buildings A, B and C) under SDCC Planning Ref. SD20A/0121 with construction on Building A having commenced in Q3, 2020. It was not deemed practicable therefore, to consider an alternative location for the Proposed Development's 110kV GIS Substation compound during the assessment of this Proposed Development.

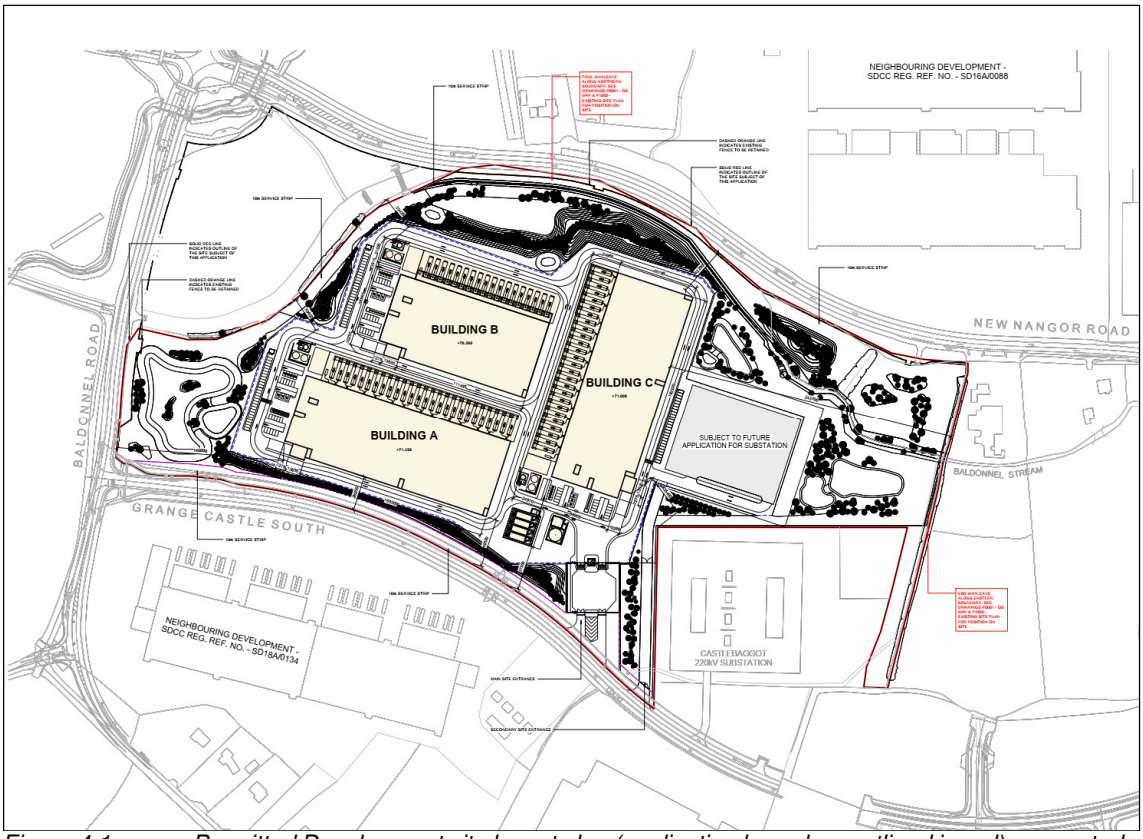

Figure 4.1 Permitted Development site layout plan (application boundary outlined in red) as granted under SDCC Planning Ref. SD20A/0121 indicating future substation compound site (Source: Henry J Lyons Architects April 2020)

110kV Transmission Line Routes

4.10 The assessment of the alternative routes for the 110kV transmission lines considered four route options for the 110kV transmission line to the Kilmahud Corkagh circuit outlined in Figure's 4.2 – 4.5 below.

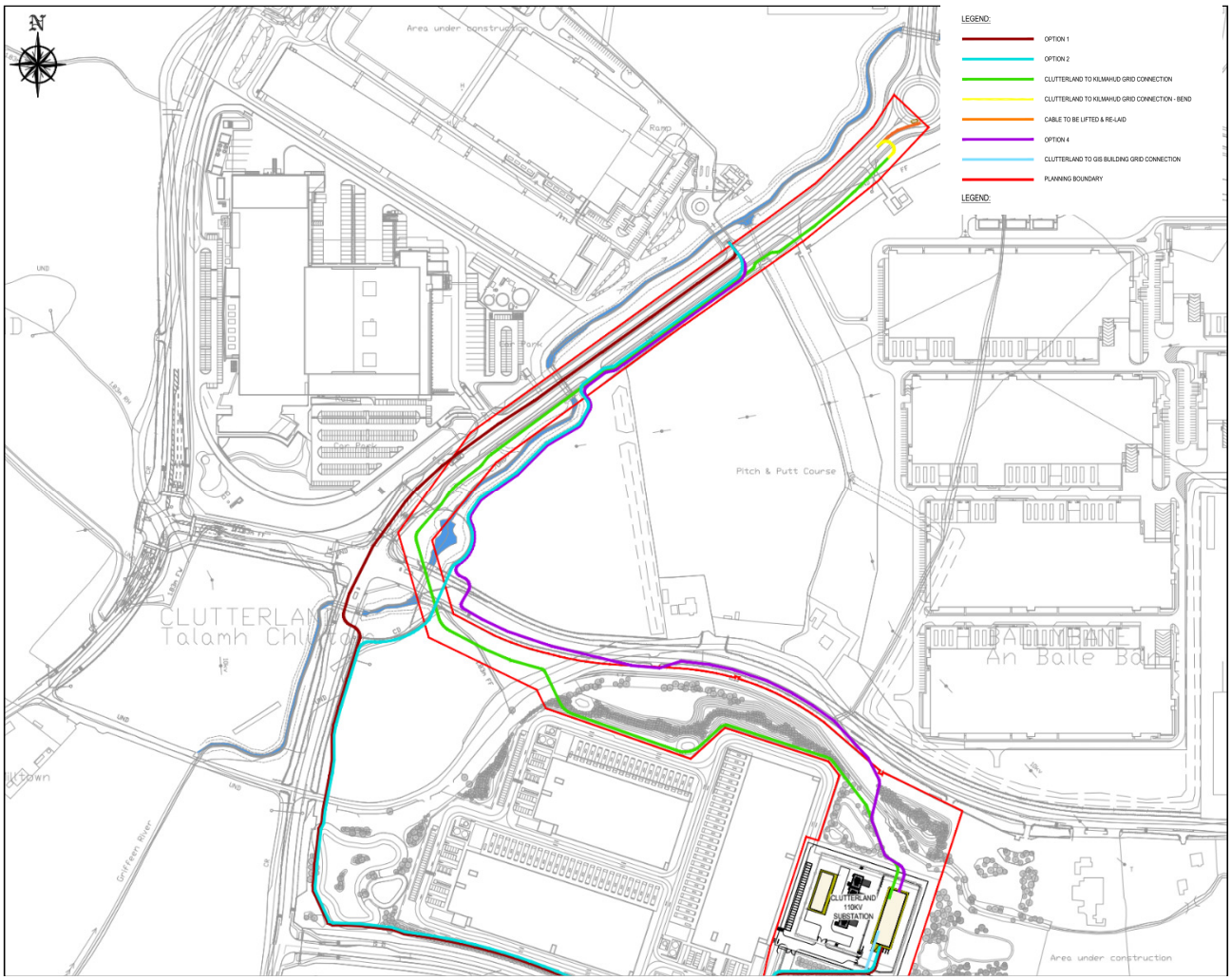

Figure 4.2 Grid Connection Route Options, permitted Data Centre and location of existing Kilmacud-Corkagh Circuit and Castlebaggot 220 / 110kV Substation (Source: Clifton Scannell Emerson Associates September 2020)

- Options 1 and 2 - Both these route options run from the proposed Clutterland 110kV GIS Substation southwards to the Grange Castle South Business Park Access Road, and then westwards within wayleaves along the southern boundary of the wider development site before heading north, parallel to, and within wayleaves to the east of the Baldonnel Road. The alignment of these options splits just to the south of the junction between the R134 and the Baldonnel Road. Option 1 (wine line) is proposed to cross west onto the Baldonnel Road, and will then run within the roadspace, and the to the Kilmahud-Corkagh circuit (see Figure 4.3). The estimated length of this route is 1.5kms. Option 2 (cyan) is proposed to swing east where the alignment of these routes splits and then passes along the wayleave along the eastern side of the internal access road within the Grange Castle Business Park to the Kilmahud-Corkagh circuit (see Figure 4.4). The estimated length of both these routes is 1.5kms.

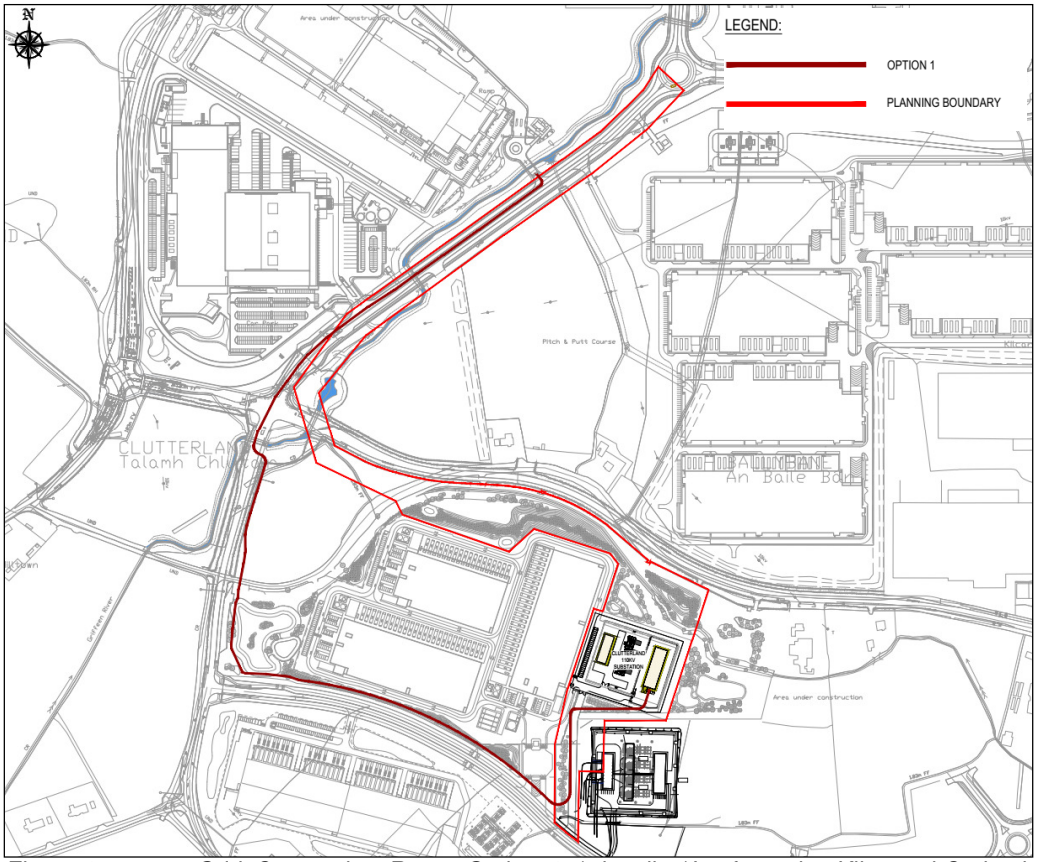

Figure 4.3 Grid Connection Route Option 1 (wine line)I , from the Kilmacud-Corkagh Circuit to the proposed Clutterland Substation in context of application boundary (red line) and the permitted Data Centre (Source: Clifton Scannell Emerson Associates September 2020)

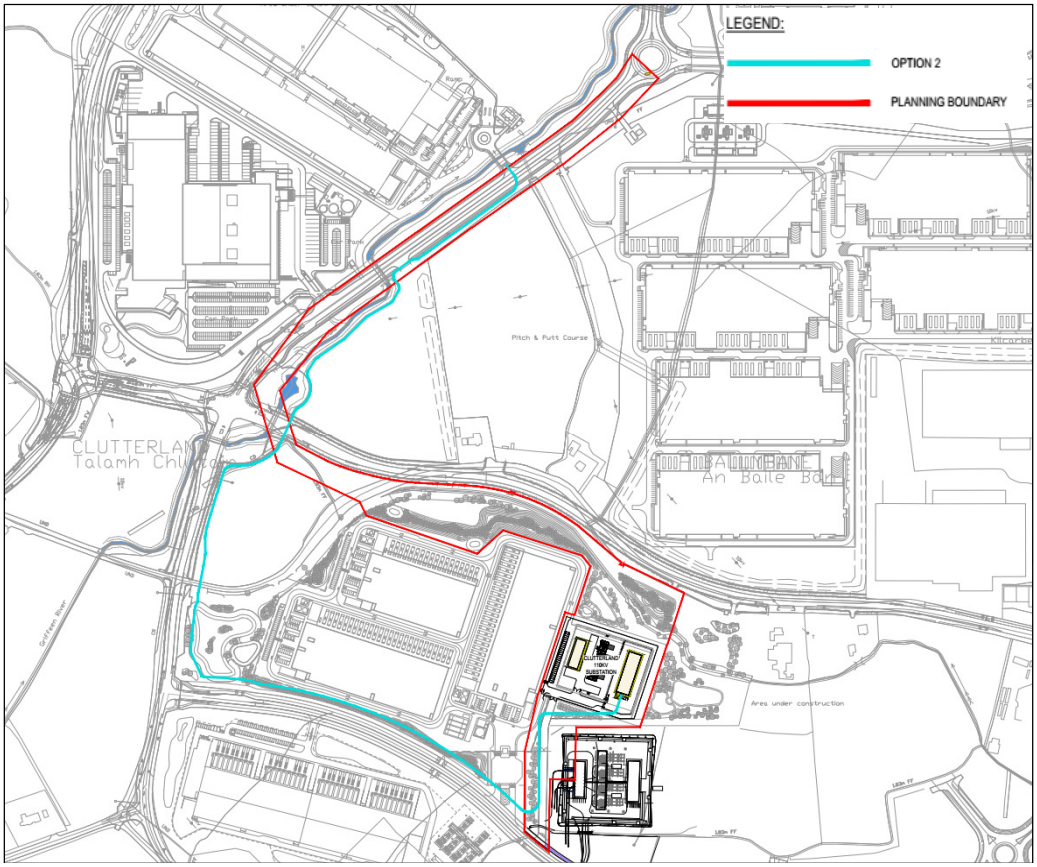

Figure 4.4 Grid Connection Route Option 2 (cyan line), from the Kilmacud-Corkagh Circuit to the proposed Clutterland Substation in context of application boundary (red line) and the permitted Data Centre (Source: Clifton Scannell Emerson Associates September 2020)

- Option 3 – This route option (green line) runs from the proposed Clutterland 110kV GIS Substation to the north before passing to the immediate north of Building C and B and to the south of the permitted landscaping and attenuation under Reg. Ref. SD20A/0121. The route then passes across the former Nangor Road before crossing the northern part of the SDCC lands to the south-east of the junction of the New Nangor Road (R134) and Baldonnel Road. The route then passes under the New Nangor Road (R134) and under the culverted watercourse prior to running within the wayleave on the eastern side of the internal access road within Grange Castle Business Park prior to looping around just south of the internal business park prior to connecting into the Kilmahud-Corkagh circuit. The estimated length of this route is 1.1km (see next page for preferred route map – Figure 4.6).

- Option 4 (see Figure 4.5) – This route option (purple line) runs from the proposed Clutterland 110kV GIS Substation to the north before passing under the culverted Baldonnel Stream and then passed along the southern side within wayleaves along the New Nangor Road (R134) to the west, before passing under the road some 50m east of the junction of the New Nangor Road (R134) and Baldonnel Road. It then passes along the same alignment as Option 2 within the wayleave along the eastern side of the internal access road within the Grange Castle Business Park to the Kilmahud-Corkagh circuit. The estimated length of this route is 1.1km.

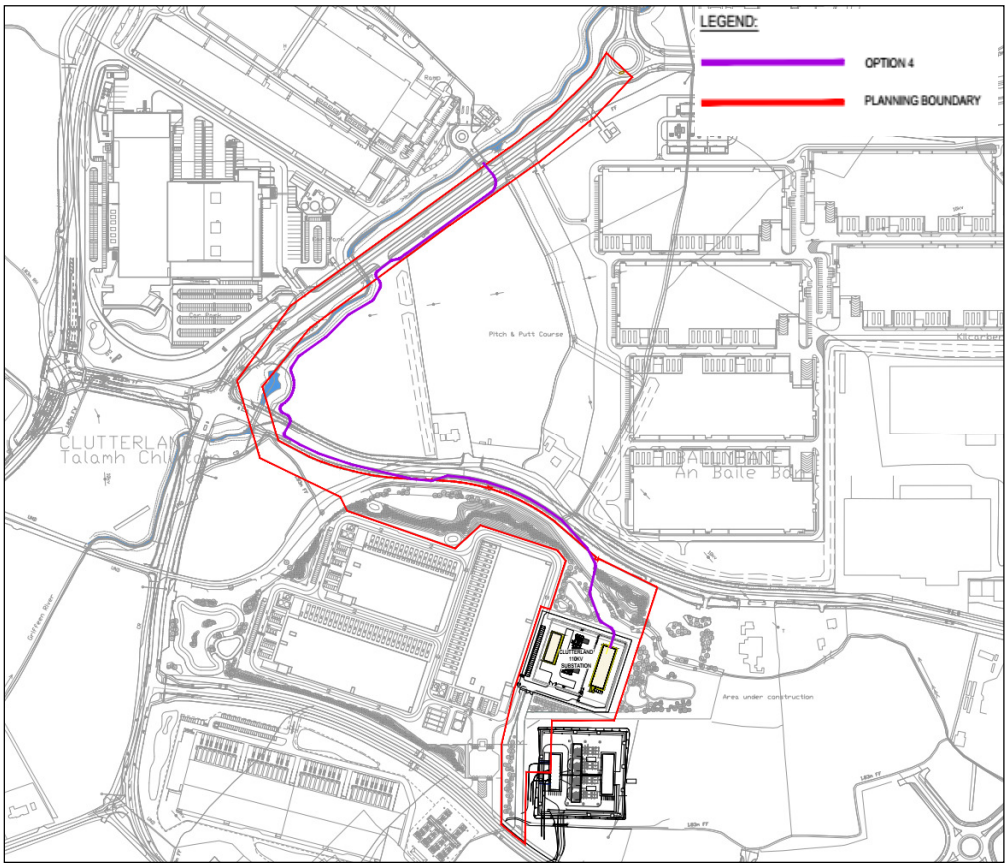

Figure 4.5 Grid Connection Route Option 4 (purple line), from the Kilmacud-Corkagh Circuit to the proposed Clutterland Substation in context of application boundary(red line) and the permitted Data Centre (Source: Clifton Scannell Emerson Associates September 2020)

4.11 A preliminary appraisal of the environmental impact, road closures, water crossings, road impacts, impact on residential properties and businesses; impacts on wayleaves and easements; of Options 1, 2, 3 and 4 was undertaken as part of the route selection process and is presented in Chapter 4-Appendix 4.1 of this EIA Report. Options 1 and 4 were deemed to be not viable due to the level of road works required, as well as restriction of the need to run parallel and cross the two no. 110kV lines running along the New Nangor Road. Only Route Options 2 and 3 were therefore considered further.

4.12 Construction dust related impacts to nearby sensitive receptors are the primary impacts associated with all of the route options. Once constructed there will be no emissions to atmosphere from the cable routes and therefore there will be no impact to air quality or climate. As the area of the cable routes is

primarily industrial in nature there are few nearby sensitive receptors that have the potential to be impacted by any of the cable route options.

4.13 A further appraisal of the environmental impacts of Options 2 and 3 was undertaken as part of the route selection process by CSEA Consulting Engineers. Both routes were determined to be feasible with minimal potential impacts on the environment. In terms of the operational phase for route options, environmental impact, road closures, water crossings, road impacts, impact on residential properties and businesses; impacts on wayleaves and easements; were considered to have a ***long-term***, ***neutral*** and ***imperceptible*** impact on the environment. For the construction phase, the duration of impacts for both route options would be ***short term*** as the works for the transmission line will have a duration of just over a year.

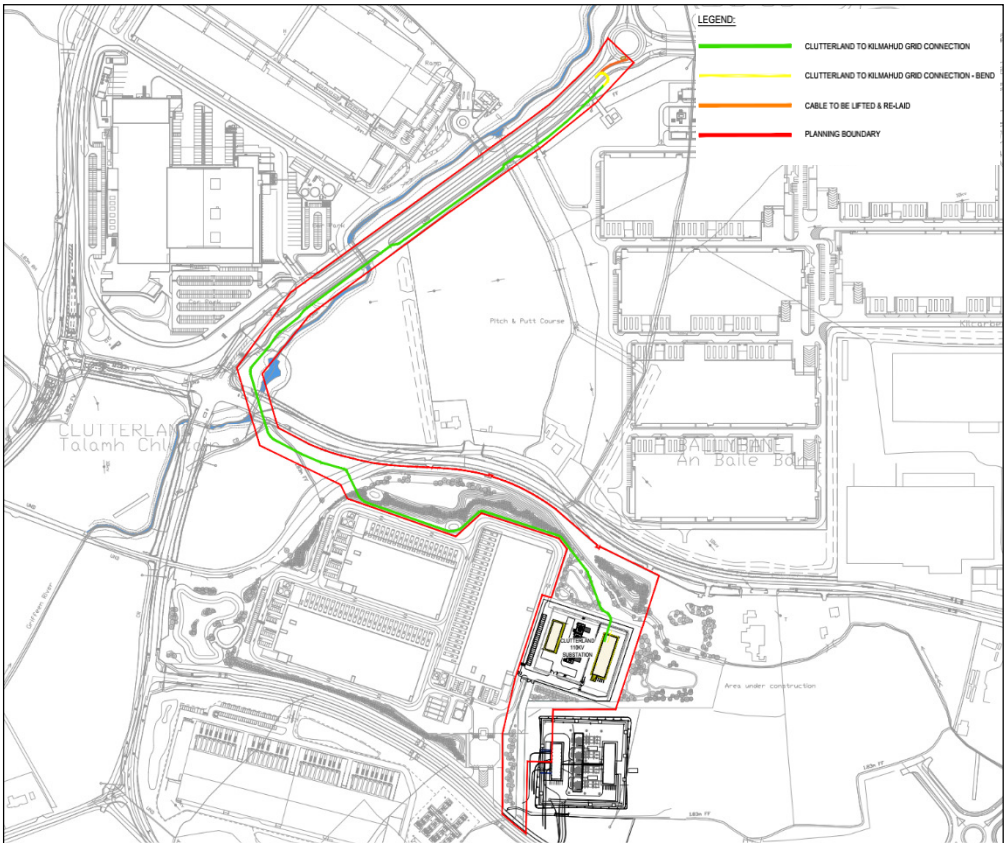

Figure 4.6 Preferred Grid Connection Route Option 3 (green line), from the Kilmacud-Corkagh Circuit to the proposed Clutterland Substation in context of application boundary (red line) and the permitted Data Centre (Source: Clifton Scannell Emerson Associates September 2020)

4.14 Each of the environmental factors were assessed for the construction phase to determine the more preferred and less preferred route option, and in some cases there was no discernible difference between the two options. The conclusions in terms of each of the two preferred route's environmental impact relative to each environmental factor assessed is listed in Table 4.1 below. The methodology used in this assessment was based on the potential impact of each route, without mitigation, on each of the below listed environmental factors. A key factor in Option 3 being the preferred route was the length of the two routes, and the need therefore for a significantly longer construction phase under Option 2, and the less impact on the permitted landscaping of the Permitted Development.

4.15 There were no environmental constraints which would preclude development of either route options 2 or 3. A review of relevant environmental criteria by each specialist show a preference for Option 3 based on short-term impacts during construction. This is primarily due to the greater length of the Option 2 route and closer nature of this route to residential properties.

4.16 Option 3 is c. 400m from the nearest sensitive residential receptors and passes through land within the wider site and is some 400m shorter in length than Option 2. Option 2 is only 240m from several sensitive residential properties and it passes along the southern extent of the wider site boundary. It is noted that standard mitigation measures are available to minimise impacts on these receptors (as

detailed in Chapters 8 and 9), with the exception of higher waste removal required for Option 2. It is also noted that the above preferences were based on construction impacts only and for the operational phase, it was determined that there would be a neutral preference for either route as the impacts are the same for each environmental factor (i.e. *long-term, neutral* and *imperceptible*).

Table 4.1 Summary of route preference for each environmental factor

	Option 2	Option 3
Socio-economic – human beings		
Soil, Geology and Hydrogeology		
Water and hydrology		
Biodiversity		
Air quality and climate		
Noise and vibration		
Landscape and visual impact		
Archaeology, Architecture & Cultural heritage		
Traffic and transportation		
Material Assets and Waste management		

Less preferred	Neutral	More preferred

4.17 There are no significant environmental impacts predicted for the construction phase for the chosen route as set out in the subsequent Chapters 5-17 of this EIA Report. Based on the high-level assessment of the alternative routes as set out in Appendix 4.1, it is considered that the construction phase would not result in any significant environmental impacts.

4.18 The assessment of the alternative routes for the 110kV transmission line to the 220kV / 110kV Castlebaggot substation (see Figure 4.7 below) was defined by the layout of the proposed Clutterland 110kV substation compound, and the position of the connection into the Castlebaggot substation on its western periphery, as well as other infrastructure. There were therefore no reasonable alternative routes available for this line. The route passes along the wayleave outside of the Castlebaggot substation from the proposed Clutterland 110kV substation. The length of this route is c. 180m.

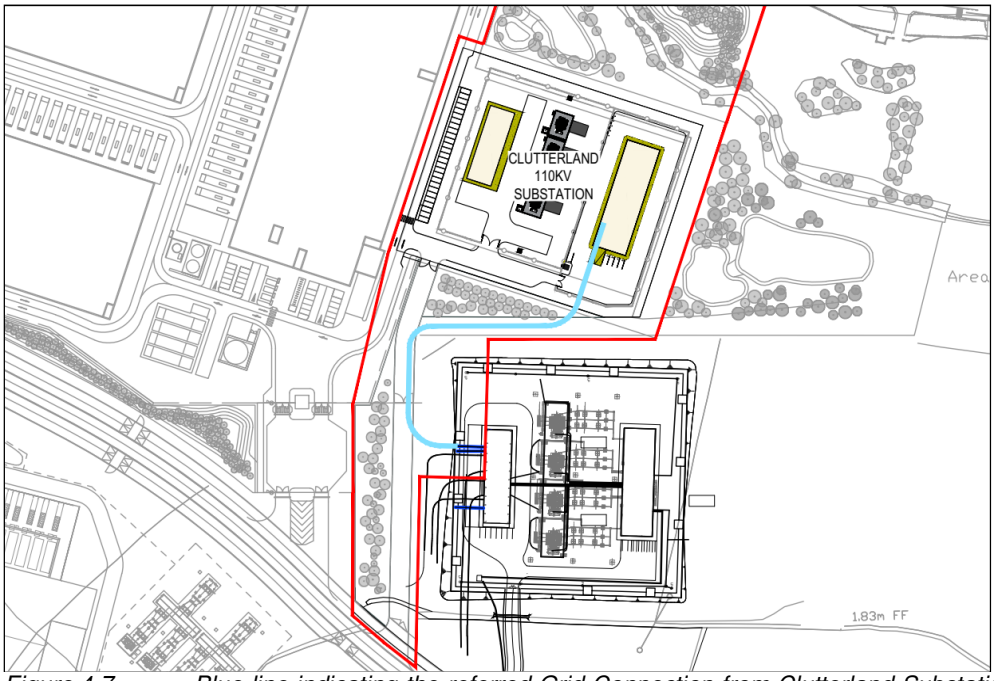

Figure 4.7 Blue line indicating the referred Grid Connection from Clutterland Substation to Castlebaggot 220kV / 110kV Substation in context of application boundary (red line) and the permitted Data Centre (Source: Clifton Scannell Emerson Associates September 2020)

49kVa Route

4.19 Two alternative routes were considered for the 49kVa cable installation which connects the proposed Clutterland 110kV GIS substation compound to a suitable 49kVa tie in. The first of these route options extended a distance of c. 1.1km and ran to the north of the proposed substation compound and required drilling under the Baldonnel Stream. Option 1 then ran to the New Nangor Road and then along and within wayleaves on the southern side of the New Nangor Road. In addition to the potential impact on hydrology in terms of drilling under the open steam there were also constraints relating to traversing multiple land ownerships. Option 2, the preferred route extends through SDCC wayleaves around the Castlebaggot substation to the south and then east along the Grange Castle South Business Park access road to a point within Profile Park; extending to a connection point near the vehicular entrance into the site off the Grange Castle South access road.

4.20 The proposed route is more direct and as such it is shorter in length (300m), as well as being located within the Permitted Development site. The route is also located mostly within the SDCC wayleave around the Castlebaggot substation. Its shorter length also means a shorter construction phase for this element of the Proposed Development and therefore its impact as a result of dust generation, noise, traffic, biodiversity and human health is significantly less than Option 1. The proposed route would have a neutral, imperceptible and temporary impact on the environment.

Alternative designs / layout

4.21 The proposed 110kV GIS substation compound is designed based on requirements stipulated by the TAO i.e. ESB Networks. The design of the Substation Compound is centred around the equipment requirements of ESB Networks that are required to provide an efficient and safe service. From a "design and layout" point of view, therefore, the flexibility to select alternative designs and layouts was not available to the Applicant and there are, therefore no reasonable alternatives to the layout of the proposed 110kV GIS substation compound.

4.22 Alternative design options for the 110kV transmission cables and the 49kVa cable installation also considered the provision of overhead lines. By their very nature, overhead lines require corridors to run along and alignments that must be clear of all other development. In the case of both a significantly wide corridor would be required. This would effectively sterilise the land in this corridor.

4.23 Two no. single circuit 110kV underground transmission lines were chosen above the overhead alternative as it enables more power to be transferred over a particular distance and requires less land to do so – minimising ecological and visual impacts of the Proposed Development and reducing installation costs.

Alternative processes and technologies

4.24 This section typically examines the project processes in relation to likely emissions to air and water, likely generation of waste and likely effect on traffic to determine the process that is least likely to impact on these parameters. The underground 110kV transmission lines and the 49kVa supply cable installation will become an integral part of the national high voltage electricity grid which is currently operated by ESB Networks.

4.25 The underground cable installations must meet EirGrid's strict specifications to ensure it will be seamlessly absorbed into the national grid infrastructure and can provide a reliable power supply. From a "process design" point of view, therefore, the flexibility to select alternative processes for integrating into the current national grid is not available to the Applicant.

4.26 The EirGrid specifications for auxiliary power supplies (i.e. the 49kVa supply cable installation) are set out in Document Reference: XDS GFS 08 001 R2 *Functional Specification Station Auxiliary Power Supplies.* As such there are no reasonable alternatives for the 49kVA line.

4.27 In terms of the proposed processes, the proposed GIS substation and new cable bays will employ the same electricity generation and transmission processes that are used by EirGrid at their other facilities in Ireland and represents the most up-to-date and state of the art processes currently available. As appropriate, alternative processes are considered on an ongoing basis by both EirGrid and ESB Networks as a part of each of their operations based on many factors including technical feasibility, environmental impact, efficiency, security, reliability and cost. Therefore, from a "process design" point

of view, the flexibility to select alternative processes for integrating into the current national grid is not available to the Applicant. There are no reasonable alternatives available.

4.28 The proposed GIS substation is designed based on requirements stipulated by EirGrid. The design of the substation is centred around the equipment requirements of EirGrid that are required to provide an efficient and safe service. Therefore, the flexibility to select alternative technologies was not available to the Applicant.

Alternative mitigation

4.29 For each aspect of the environment, each specialist has considered the existing environment, likely impacts of the Proposed Development and reviewed feasible mitigation measures to identify the most suitable measures appropriate to the environmental setting of the Proposed Development. In making a decision on the most suitable mitigation measure the specialist has considered relevant guidance and legislation (these are identified in the table of mitigation measures in Chapter 2 - Appendix 2.2). In each case, a comparison of environmental effects was made, and the specialist has reviewed the possible mitigation measures available and considered the use of the mitigation in terms of the likely residual impact on the environment. The four established strategies for mitigation of effects have been considered: avoidance, prevention, reduction and offsetting (not required in this development).

4.30 Mitigation measures have also been considered based on the effect on quality, duration of impact, probability and significance of effects. The selected mitigation measures are set out in each of the EIA Report Chapters 4-14 and are summarised in Chapter 2 - Appendix 2.2.

Conclusions on Alternatives

4.31 The selected routes for the 110kV transmission lines are deemed to be the most suitable for the Proposed Development from an engineering and environmental perspective as they offer the shortest construction phase and thus a shorter duration of any potential environmental impacts that might arise. The issues considered in reaching this conclusion is set out in Appendix 4.1. During construction the proposed 110kV routes (similar to the alternative route assessed i.e. Option 2) will have a ***short-term***, ***neutral*** and ***imperceptible*** *to* ***not significant*** environmental effect. It is noted that the proposed route and the alternative route considered (i.e. Option 2) were considered to have a ***neutral, imperceptible, long-term*** environmental effect during the operational phase.

4.32 The selected route for the 49kVa cable installation was deemed to be the most suitable route for the Proposed Development from an engineering perspective taking into account that the route is within the Permitted Development site and the shorter duration of any environmental effects that would arisee. During construction the proposed 49kVA route (similar to the alternative route assessed) will have a ***short term***, ***neutral*** and ***imperceptible*** environmental effect. It is noted that the proposed route and the alternative route considered (i.e. Option 1) were considered to have a ***neutral, imperceptible, long-term*** environmental effect during the operational phase.

4.33 The design of the proposed GIS substation and new cable bays have been selected with due regard to minimising the environmental and visual impact once in situ. The selection of the design has been constrained to the standard specifications required by ESB Networks for connection to the national grid. In conclusion, it is considered that the Proposed Development and design is the most suitable choice to provide the support required to meet the power requirements of the Permitted Development.

5. POPULATION AND HUMAN HEALTH

5.1 This chapter of the EIA Report considers and assesses the *"existence, activities and health of people"* with respect to *"topics which are manifested in the environment such as employment and housing areas, amenities, extended infrastructure or resource utilisation and associated emissions"* as set out under the EPA Draft EIA Report Guidelines 2017.

5.2 In addition, this chapter assesses more broadly the impact of the Proposed Development on the land use of the area, recent trends in population, employment and economic performance, and the community. The assessment also considers the mitigation measures necessary to reduce, and if possible remedy, significant adverse effects on these elements of the environment.

5.3 Population and human health comprise one of the most important elements of the *"environment"*. Any potential impact on the status of the population or human health by the Proposed Development must therefore be assessed. The principal concern is to ensure that human beings experience no significant unacceptable diminution in aspects of *"quality of life"* as a consequence of the construction and operation of the Proposed Development. Relevant components in this section of the EIA Report, include land use, population, employment, and amenity aspects.

5.4 Natural hazards are considered in Chapter 2 (paragraphs 2.96 – 2.98) and Chapter 6 - Biodiversity. Issues examined in this chapter include:

- Demography;
- Population;
- Employment;
- Social Infrastructure;
- Landscape, Amenity and Tourism;
- Natural Resources;
- Air Quality;
- Noise & Vibration;
- Material Assets;
- Traffic; and
- Health and Safety.

5.5 In addition to the impacts on population and human health dealt with under this chapter, the impacts on human beings are also considered in Chapter 9 – Noise and Vibration; Chapter 10 – Air Quality and Climate; and Chapter 11 – Landscape and Visual. The impacts on property are considered in Chapter 15 - Material Assets. Where these topics are dealt with in further detail elsewhere in this EIA Report, the relevant chapters have been cross referenced in this Chapter. The cumulative effect is addressed in Chapter 16 of this EIA Report. Interactions are addressed in Chapter 17 of this EIA Report.

Methodology

5.6 As per Article 3 of Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment, as amended by Directive 2014/52/EU:

"1. The environmental impact assessment shall identify, describe, and assess in an appropriate manner, in the light of each individual case, the direct and indirect significant effects of a project on the following factors:

(a) population and human health;

(b) biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC;

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

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

(e) the interaction between the factors referred to in points (a) to (d).

2. The effects referred to in paragraph 1 on the factors set out therein shall include the expected effects deriving from the vulnerability of the project to risks of major accidents and/or disasters that are relevant to the project concerned."

5.7 A 2017 publication by the European Commission, Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report, considered 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."

5.8 This chapter will follow these EC guidelines, and will examine the health effects relevant to the Proposed Development as they relate to a relevant, defined study area. The effects of the Proposed Development on the population and human health are analysed in compliance with the requirements of the EPA Draft EIA Report Guidelines 2017.

5.9 A desktop survey of the SDCC area as well as an analysis of the local area and its facilities was undertaken. The desktop analysis included a review of background studies and reports; maps and aerial photography of the area; and review of demographic characteristics of the area as ascertained from Census of Population data and other statistics released by the Central Statistics Office (CSO). The quality, magnitude and duration of potential effects are defined in accordance with the criteria provided in the EPA Draft *EIA Report Guidelines* 2017) as outlined in Table 1.1 of Chapter 1 of this EIA Report.

Assessment of Significance and Sensitivity

5.10 The assessment of significance of is a professional appraisal based on the sensitivity of the receptor and the magnitude of effect.

5.11 Within any area, the sensitivity of individuals in a population will vary. As such, it would be neither representative of the population, nor a fair representation of the range of sensitivities in a population, were an overall sensitivity classification assigned to the population in question. As such, the precautionary principle has been adopted for this assessment, which assumes that the population within the study area is of a uniformly high sensitivity.

Magnitude of Impact

5.13 The magnitude of predicted impacts has been quantified in this assessment using the terms outlined in Table 5.1 below.

Table 5.1 Description of magnitude of predicted impacts

Magnitude	Description of Magnitude
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 (adverse or beneficial)
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 (adverse or beneficial)
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 (adverse or beneficial)
Negligible	Change in an environmental and/or socio-economic factor(s) as a result of the Proposed Development which would not result in change to existing baseline conditions at a population level, but may still result in an individual impact (adverse or beneficial)
No change	No change would occur as a result of the Proposed Development which would alter the exiting baseline conditions (adverse or beneficial)

Significance of Effects

5.14 The assessment of significance of effects in this assessment is a professional appraisal and has been based on the relationship between the magnitude of effects (Section 5.2.2) and the sensitivity of the receptor. Table 5.2 below provides a matrix on the measure of the significance of effects based on these parameters.

Table 5.2 Matrix illustrating the significance of effects as determined by the relationship between the magnitude of impact and the sensitivity of receptors

		Magnitude of Impact			
		Negligible	Low	Medium	High
Sensitivity of Receptor	Negligible	Negligible	Negligible or minor	Negligible or minor	Minor
	Low	Negligible or minor	Negligible or minor	Minor	Minor or moderate
	Medium	Negligible or minor	Minor	Moderate	Moderate or major
	High	Minor	Minor or moderate	Moderate or major	Major

Receiving environment

5.15 The Proposed Development is to be located on a site of c. 7.7 hectares that consists of a primarily greenfield site within the Grange Castle South Business Park. The Proposed Development and surrounding area are described in further detail in paragraphs 2.3 – 2.8 of Chapter 2 (Description of the Proposed Development). The nearest occupied residential properties are located c. 300m to the south-west of the Proposed Development site; and c.450m from the proposed 110kV GIS substation.

5.16 The Proposed Development is not located directly adjacent to any areas of national or local environmental sensitivity/designation (Refer to Chapter 6 - Biodiversity for further details). The need for the Proposed Development is described in Chapter 1 of the EIA Report.

Study Area

5.17 The study area selected for the assessment of the impact on human health as a result of the Proposed Development was defined as the Electoral Divisions (ED) of Clondalkin-Village which extends from the centre of Clondalkin and is bounded at its western end by the New Nangor Road to the north, and the Baldonnel Road to the west and south.

Existing Baseline conditions

Population and Demographics

5.18 The Clondalkin-Village Electoral Division had a population of 9,152 at the time of the 2016 Census (Central Statistics Office (CSO). This represents a 7.8% increase in population between 2011 and 2016. This followed a small decrease but primarily static population level change between 2006 and 2011 and therefore the population increased by 5.6% over the 2006 to 2016 period. It is notable that there was a lack of substantial new housing development in this area during this period and that the change in population relates more to changes to household composition during this period.

5.19 Electoral Divisions are broken down into smaller areas in 2011 and 2016 to provide a more detailed understanding of local population trends for this immediate area. The Proposed Development site is located within Small Area 2677053001 that had a population of only 257 at the time of the 2016 Census a decline in population of 13 from the 2011 Census. This Small Area 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 extending from the Fonthill Road South down to the N7 and up to the New Nangor Road and bounded by the Baldonnel Road to the immediate west of the site. The small level of population within this immediate local area makes any conclusions in relation to local population trends to be uncertain.

5.20 The total housing stock in this Small Area was 132, of which vacant households (excluding holiday homes) numbered 17. Apart from part of the St. Johns estate the population in this area is primarily one-off housing. The declining population of this Small Area is indicative of the focus in this area over the last 20 years on employment and enterprise and the increasing policy focus on housing being located on serviced and zoned land within urban areas. A less detailed assessment of population has been undertaken in accordance with the Draft Guidelines (2017).

Table 5.3 Population levels in the study area in 2006, 2011 and 2016

	2006	2011	2016	% change 2006 - 2016
Small Area 2677053001	n/a	270	257	n/a
Clondalkin-Village ED	8,718	8,492	9,152	+5.0%
South Dublin CC	246,935	265,205	278,767	+12.9%
Leinster	2,295,123	2,504,814	2,634,403	+14.8%
State	4,239,848	4,588,252	4,761,865	+12.3%

5.21 The population of the administrative area of South Dublin increased by 12.9% between 2006 and 2016, which is a significantly higher rate in comparison to the population of the Small Area and Clondalkin Village ED. This broadly reflects population growth that was experienced in Leinster and the State.

5.22 The West Dublin area underwent very high levels of population growth during the early 2000s, although this happened primarily outside of the immediate environs of the application site. This growth, which is more similar to County and Regional levels, is evident in new suburban areas to the north and south that were constructed around the western fringes of Dublin during this period. The very small population increase within the ED is indicative of the fact that there is very little undeveloped residentially zoned land within the ED and that the western part of the ED is covered by the Grange Castle Business Park and similarly zoned land for employment based development.

Employment

5.23 The economic conditions in Ireland that stemmed from 2008 resulted in higher unemployment levels over the following six years although this has decreased subsequently, up until the recent Coronavirus outbreak. The number of persons on the Live Register of unemployment fell in the State from 428,876 in February 2013 to 182,500 in February 2020. The Coronavirus pandemic has resulted in a significant and sudden increase in unemployment to 213,700 at the end of August 2020. In addition a further 224,956 were on Pandemic Unemployment benefit; and a further 359,095 on the Temporary Covid-19 Wage Subsidy Scheme.

Table 5.4 At work by industry type 2006, 2011 and 2016 (source: CSO, 2006, 2011 and 2016)

	Year	Clondalkin-Village ED	Clondalkin Local Electoral Area
Agriculture	2006	18	58
	2011	8	78
	2016	4	65
Construction	2006	408	1,677
	2011	177	1,034
	2016	235	1,283
Manufacturing	2006	659	2,513
	2011	418	2,343
	2016	434	2,280
Commerce	2006	1,488	6,234
	2011	1,099	6,144
	2016	1,133	6,065
Transport	2006	396	1,295
	2011	450	2,383
	2016	481	2,434
Public administration	2006	263	1,050
	2011	251	1,316
	2016	257	1,184
Professional services	2006	500	2,334
	2011	751	4,552
	2016	831	4,778
Other	2006	790	3,508
	2011	588	3,949
	2016	909	5,064
Total at work	**2006**	**4,523**	**18,669**
	2011	**3,742**	**21,799**
	2016	**4,289**	**23,153**

Note: The Clondalkin Local Electoral Area extends across a far wider area that includes Saggart, Rathcoole to the south; and all of Clondalkin, Ronanstown and part of Lucan to the north and east.

5.24 The number of persons on the Live Register of unemployment fell in Dublin from 102,591 in February 2013, and has continued to decrease since then, with some seasonal fluctuations, and had dropped to 44,218 in February 2020. The Coronavirus pandemic has resulted in a significant and sudden increase in unemployment in Dublin to 51,541 at the end of August 2020. Significant levels of people were also on the Pandemic Unemployment benefit; and Temporary Covid-19 Wage Subsidy Scheme within the region. The long term implications on employment across the State and in Dublin at the time of making the application are unclear.

5.25 The 2016 Census figures demonstrate that a similar decrease in unemployment has occurred within the Clondalkin-Village ED and Clondalkin Local Electoral Area.

5.26 The changes in persons in work, labour force and unemployed within the wider study area as outlined in Table 5.2 is indicative of the change in the economic circumstance that has been experienced across the State since 2008, and the significant improvements over the last seven years, up until the last 6 months and the Covid-19 pandemic. It is notable that the increase in unemployment between 2008 and 20016 was significantly more marked within the wider local area, although this may have been rectified in the three and a half years since the most recent Census although the Coronavirus pandemic will have significantly altered this.

5.27 In relation to employment type the CSO Clondalkin-Village ED figures for 2006, 2011 and 2016 indicate that employment particularly in construction, manufacturing, and commerce (which includes retailing) have significantly reduced during the Census period 2006 to 2011 but had begun to increase or stabilise since prior to the Coronavirus pandemic. It is also notable that employment in transport related activities have increased during each Censal period; and that professional services increased during the same period to 2011 and have continues to rise. It is notable that the numbers in work within the wider local area decreased between 2006 and 2011 and have subsequently increased again to 2016. This trend continued since the last Census of 2016, based on the continuing decrease in the number of people on the Live Register up until March 2020, but has significantly increased subsequently as a result of the Covid-19 pandemic.

Social infrastructure

Residential dwellings

5.28 The majority of the residential properties bounding the site are no longer in residential use due to the extension of the Grange Castle Business Park and road improvements in recent years. The nearest occupied residential properties are located c. 300m to the south-west of the Proposed Development site, c.450m from the proposed GIS substation. These properties form a ribbon development of three dormer type houses along the northern side of the Baldonnel Road. The three further residential properties to their east are currently and will remain vacant until demolished as part of the development of the Cyrus One site. Further residential properties are located along the Aylmer Road and Peamount Road to the south-west and west of the Proposed Development site. Residential properties and other sensitive receptors within c.1km area of the Proposed Development are shown in Figure 5.1 below.

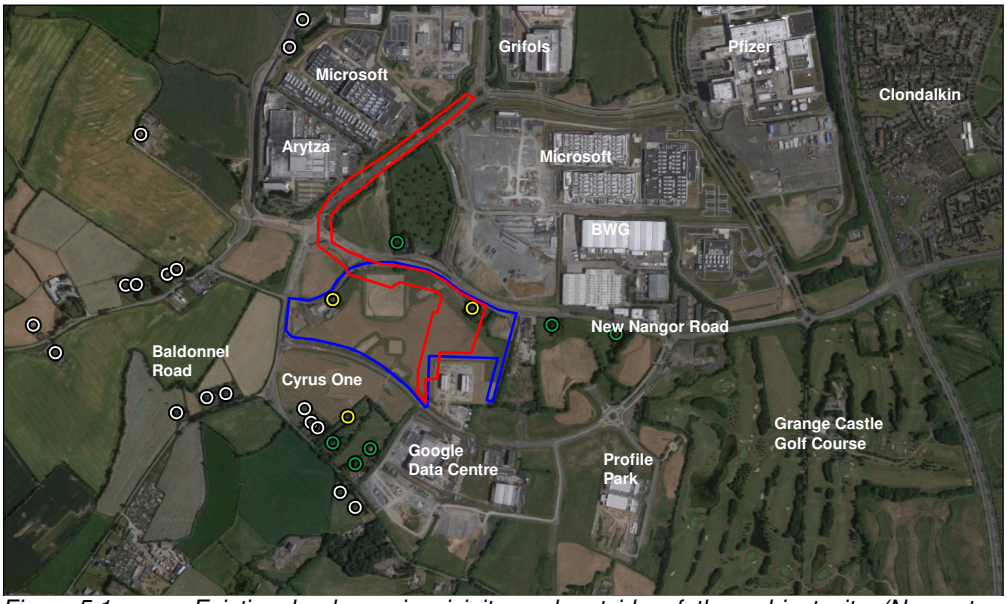

Figure 5.1 Existing land use in vicinity and outside of the subject site (Nearest existing residential properties outlined by white ring; those permitted to be demolished or already demolished outlined in yellow; and existing properties that have been abandoned outlined in green)

5.29 Residential development is primarily located to the west and south of the site (see Figure 5.1). There is one existing but now unoccupied / vacant dwelling within the wider development site but outside of the application site, a farmhouse that is granted to be demolished as part of the permitted development under Reg. Ref. SD20A/0121. A further dwelling was located in the north-eastern part of the site but has already been demolished as part of the road improvements to the R134. Former residential properties that are vacant and abandoned lie to the immediate north, south and east of the wider site. An abandoned property is located some 40m to the north of the New Nangor Road. Two further abandoned properties lie 126m and 315m to the east of the wider site on the southern side of the New Nangor Road. These properties have become abandoned as a result of the expansion of the Grange Castle Business Park and the sale of the properties and their surrounding lands to facilitate future development.

5.30 There is further residential development in the form of ribbon development along the Baldonnel Road to the south with the nearest property being 370m from the southern boundary of the site.

5.31 A group of three occupied residential properties are located on Aylmer Road to the south-west of the main data centre development. The nearest of these properties is located some 570m from the southern extent of the Proposed Development site.

5.32 A further 4 no. occupied residential properties are located to the north-west on the R120 with the nearest being 440m away from the underground transmission line to the Kilmahud-Corkagh circuit where it passes under the New Nangor Road (R134).

5.33 Further residential properties in the form of ribbon development is located to the west of these. A Halting site is located to the north of these some 600m away from the underground transmission line

to the Kilmahud-Corkagh circuit where it passes under the New Nangor Road (R134), and set well back to the west of the R120.

5.34 Further residential properties lie to the east of the R120 as it heads towards the Grand Canal. The nearest occupied property to the east lies beyond the R136 some 1.3km away from the Proposed Development site. The nearest occupied property to the north of the Proposed Development site lies adjacent to the Grand Canal some 670m away from the northern extent of the red line of the Proposed Development site.

Schools

5.35 The population in the surrounding areas of Clondalkin, Newcastle, Lucan, Tallaght and Rathcoole is serviced by junior and secondary schools. The nearest schools are located in Newcastle some 4kms to the south-west; in Adamstown some 2kms to the north; and to the east of the R136 in Clondalkin some 1.6kms to the east. Childcare facilities are similarly distributed with the exception of a crèche at Castlebaggot House that is set-back to the south of the Baldonnel Road some 600m to the south-west of the southern extent of the application site boundary.

Health and security

5.36 The nearest hospital to the facility is located some 5.9kms away at the Adelaide and Meath Hospital incorporating the National Children's Hospital, Tallaght, Dublin 24. The Peamount Healthcare facility sits some 1.2km to the west. The nearest Garda station is 3.8kms away in Rathcoole and nearest fire station is 4.3kms at Belgard Road, Tallaght, Dublin 24.

Landscape, amenity and tourism

5.37 The Proposed Development will be located on the periphery of a largely built up urban area where industrial activities are the main land use. Tourism is not a major industry in the immediate environs of the site. The wider area does contain a small number of hotels and other tourist accommodation (B&B's etc.) that generally increase towards the east in the direction of Dublin city and its many tourist sites. The Grange Castle Golf Club lies to the east of the Google data centre off the New Nangor Road (R134) and some 530m from the eastern boundary of the application site. The Newcastle Golf Centre lies some 930m to the south-west from the underground transmission line to the Kilmahud-Corkagh circuit where it passes under the New Nangor Road (R134).

5.38 In terms of landscape amenity, SDCC recognise that the landscape, natural heritage and amenities of South Dublin have an important role to play in contributing to a high quality of life for residents and a positive experience for visitors. The primary area of landscape amenity is the Grand Canal that is located some 1.4km to the north of the proposed substation. This is both recognised by SDCC and Waterways Ireland and other organisations in that it provides a key amenity link between the city centre and the suburbs and beyond. The impact on this tourism and amenity resource has been considered as part of the assessment under this chapter. Further discussion of impact on landscape amenity is presented in Chapter 11 - Landscape and Visual.

Natural resources

5.39 Natural resources and land uses in the hinterland of the Proposed Development have also been considered as they may have implications for the development of the lands. Historical Ordnance Survey (OS) maps indicate that much of the surrounding land has been in industrial/commercial use for 20-30 years. As such, much of the agricultural resource in the surrounding area has already been lost over recent decades or is zoned to facilitate employment and related development in the future. There are no quarries within a 2km radius of any part of the Proposed Development site. The closest geological heritage site is the Belgard Quarry, which is located 3 km to the south-east of the site.

Land use

5.40 Land use outside of the developing employment zones to the wider north, and immediate east and south is primarily in agricultural use despite its EE zoning. Land zoned RU that provides for the protection of rural amenity is located further to the south and south-west. The Casement Air base and its associated buildings bound the Baldonnel Road some 1.1km to the south-east of the application site.

5.41 The area in which the Proposed Development site is located lies within the functional area of South Dublin County Council. Under the Councils Development Plan, a variety of land use objectives are established for the area including specific location objectives for Grange Castle Business Park.

Policy ET3 Objective supports the development of high tech development within the Grange Castle Business Park.

5.42 Economic clusters and corridors are geographic concentrations of competing, complementary or interdependent firms and industries that may do business with each other and/or have common needs for talent, technology and infrastructure and rely on the services of other cluster firms in the operation of their business. The areas of Grange Castle and City West (existing established industrial areas) and surrounding areas are cited under section 4.3.3 of the County Development Plan as two particularly important areas for the creation of a cluster of high end economic development based around Foreign Direct Investment manufacturing and support industries. The positive characteristics of these areas is the availability of large plot sizes, infrastructure and heavily landscape corporate park models.

5.43 Grange Castle Business Park and its extension to Grange Castle South Business Park and surrounding lands is already home to several industrial facilities and comprises a number of different land uses (See Figure 5.1). These include the Google data centre and its adjacent predecessor further to the east that are located to the immediate south-east of the wider Data Centre site; the under construction CyrusOne data centre that lies on the opposite side of the Grange Castle South access road to the south; and the Microsoft data centre campus within the Grange Castle business Park to the immediate north of the Proposed Development site and to the north of the New Nangor Road. Other data centres are located within Grange Castle Business Park (Edgeconnex and Interxion) further to the north and within Profile Park to the east.

5.44 In addition the business park includes two large biotechnology facility campuses – Pfizer Ireland and Takeda Pharma Ireland Ltd.; as well as the Aryzta AG (Cuisine de France) purpose built food facility located some distance to the north-west of the substation site and immediately to the west of the transmission line to the Kilmahud-Corkagh circuit.

5.45 The new Castlebaggot Substation lies on lands to the immediate south of the substation site. There is an existing and historical light industrial use abounding the eastern boundary of the site.

5.46 To the north of the application site is the recently realigned New Nangor Road (R134) that connects from the R136 to the east with the R120 to the west and subdivides the Grange Castle Business Park and Grange Castle Business Park South. A small length of the old Nangor Road bounds the wider Data Centre site to the north-west and it provided vehicular access to the former farm complex but has now been closed off at both ends.

5.57 The Proposed Development is situated on suitably EE zoned lands in an industrial area in south-west Dublin. Furthermore, the location will minimise the potential environmental impacts through careful design, master planning and mitigation measures as described in various chapters of this EIA Report. Various other objectives of the County Development Plan as outlined throughout this EIA Report (see Chapter 11 – Landscape and Visual Impact) relate to the protection of amenity and townland boundaries.

5.58 Specific details of potential impacts in relation to these resources are dealt with in the relevant chapters within this EIA Report. In conclusion it can be stated that the Proposed Development complies fully with the stated requirements of SDCC and will be a strategic asset in the continued economic development and growth of the Dublin area.

Potential Impact of the Proposed Development

5.59 The impact of construction, commissioning, operation and decommissioning of the Proposed Development are considered below.

Potential Impacts on Human Beings

5.60 There will be a short-term, imperceptible, positive effect on local business with the limited presence of a very small number of construction workers of 15-30 using local facilities during the construction phase of each cable installation. However, the main potential impacts on human beings associated with the Proposed Development will be in relation to air quality, noise and visual effects during the construction stage. The potential impacts are assessed within the corresponding chapters of this EIA Report and are summarised below.

Potential Impacts on Human Health from Air Quality

5.61 As outlined in Chapter 10 Air Quality and Climate, National and European statutory bodies have set limit values in ambient air for a range of air pollutants. These limit values or "Air Quality Standards" are the protection of human health or environmental-based levels for which additional factors may be considered. For example, natural background levels, environmental conditions and socio-economic factors may all play a part in the limit value which is set (see Chapter 10, Table 10.1). The standards for human health have designed to avoid harmful effects to health.

Construction phase

5.62 As detailed in Chapter 10 Air Quality & Climate, there is a potential impact on human beings due to dust generation as a result of construction activities. There is an overall negligible risk of temporary human health impact as a result of the proposed construction activities. When the dust mitigation measures and best practice measures are implemented will ensure that the impact of the development complies with all EU ambient air quality legislative limit values which are based on the protection of human health. Therefore, the impact of construction of the Proposed Development is likely to be ***short-term*** and ***not significant*** with respect to human health.

Operational phase

5.63 During operation, the cables will be buried underground and therefore there will be no emissions to atmosphere. There is the potential for maintenance vehicles accessing the substation site to result in emissions of NO_2, PM_{10}/$PM_{2.5}$ and CO_2. However, due to the infrequent nature of such maintenance the potential impact on human health due to air quality during the Operational Phase is considered to be ***long-term, imperceptible*** and ***neutra****l.*

Potential Impacts on Human Health from Noise & Vibration

5.64 Noise and Vibration impacts associated with the development have been fully considered within Chapter 9 of this EIA Report. Commentary on the impact assessment and related noise levels are summarised below with respect to potential environmental health impacts.

Construction phase

5.65 As detailed in Chapter 9 Noise and Vibration, potential noise emissions associated with the construction phase of the development can be generated by construction plant and activities. These are expected to be less than the prevailing ambient noise level at the nearest sensitive locations. As a result, the existing noise environment is not expected to change significantly because of the short-term construction phase. In addition, due to the distance between the site and the nearest sensitive locations, vibration impacts generated during construction are expected to be negligible. Therefore, the noise and vibration impact of the construction phase of the Proposed Development is likely to be ***short-term*** and ***not significant*** with respect to human health because of the short-term construction phase.

Operational phase

5.66 The potential cumulative impact from noise and vibration with the Permitted Development is considered within Chapter 9 – Noise and Vibration Chapter of the EIA Report.

Potential Impacts on Local Amenities and Tourism

5.67 There will be no potential impact on the local parks or the larger amenity areas such as along the Grand Canal, Dublin Bay and Phoenix Park. It is not anticipated that the Proposed Development will have any potential impact on local tourism or shopping amenities. The Proposed Development will not create any wastewater discharge which could have a potential impact on local amenities or the local population. Should any discharge of construction water (collected stormwater) be required during the construction phase, discharge will be to the storm water/foul sewer drainage system or collected and removed, following appropriate treatment for sediment removal. Further information regarding surface water management can be found in Chapter 8 - Hydrology.

5.68 The underground nature of transmission lines element of the Proposed Development, together with the low sensitivity receiving environment and the existing land use and land use zoning, is such that residual landscape and visual impacts are considered to be *imperceptible* and *neutral*. Further discussion is presented in Chapter 11 - Landscape and Visual Impact.

Potential Impacts from Additional Traffic

5.69 The potential impact as a result of additional traffic on human health during construction and operation relates to added congestion, noise and pollution. An assessment of the additional traffic

movements and short-term diversions associated with the Proposed Development during the construction phase is presented in Chapter 12 - Traffic and Transportation.

5.70 The potential impact of the development on human beings and in particular road users will be ***short-term, negative*** and ***not significant*** for the construction phase and ***long-term, neutral*** and ***imperceptible*** for the operational phase. Any significant construction works will take place outside of main commuter hours and at worst case a single lane carriageway will remain operational where road works are required. There is no potential impact during operation.

Unplanned Events / Potential Impacts on Health and Safety

5.71 The Proposed Development has been designed in accordance with the Safety, Health and Welfare at Work Act 2005 (S.I. 10 of 2005) as amended and the Safety, Health and Welfare at Work (General Application) Regulations 2007 (S.I. 299 of 2007) as amended and associated regulations. The plant has been designed by skilled personnel in accordance with internationally recognised standards, design codes, legislation, good practice and experience based on a number of similar existing facilities operated by the ESB Networks.

5.72 The Proposed Development has the potential for an impact on the health and safety of workers employed on the site, particularly during the construction phase. The activities of contractors during the construction phase will be carried out in accordance with the Safety, Health and Welfare at Work (Construction) Regulations 2013 (S.I. No. 291 of 2013) as amended to minimise the likelihood of any impacts on worker's health and safety.

5.73 During the operational phase of the development, ESB Networks will implement an Environmental Safety and Health (EH&S) Management System and associated procedures. Full training in the EH&S Management System and relevant procedures will be provided to all employees.

5.74 The 2014 EIA Directive, 2018 EIA Regulations and associated EPA Draft EIA Report Guidelines 2017 require that the vulnerability of the project to major accidents and/or natural disasters (such as earthquakes, landslides, flooding, sea level rise etc.), as well as unplanned events, is considered in the EIA Report. The site has been assessed in relation to the following external natural disasters; landslides, seismic activity, volcanic activity and sea level rise/flooding as outlined below. The potential for major accidents to occur at the facility has also been considered with reference to Seveso/Control of Major Accident Hazards (COMAH) Regulations. There is a negligible risk of landslides occurring at the site and in the immediate vicinity due to the topography and soil profile of the site and surrounding areas. There is no history of seismic activity in the vicinity of the site. There are no active volcanoes in Ireland so there is no risk of volcanic activity.

5.75 The potential risk of flooding on the site was also assessed. A Stage 2 Flood Risk Assessment was carried out and it was concluded that the Proposed Development is not at risk of flooding (Refer to Chapter 8 - Appendix 8.2). Furthermore, the permitted development design has adequate attenuation etc. to ensure there is no potential impact on flood risk for other neighbouring properties, nor is the site at risk from sea level rise.

5.76 The Proposed Development will not be a Seveso/COMAH facility. The only substance stored on site controlled under Seveso/COMAH will be diesel for the generators and the amounts proposed do not exceed the relevant thresholds of the Seveso Directive. There is a potential impact on the receiving environment as a result of minor accidents/leaks of fuel/oils during the construction and operational phases. However, the implementation of the mitigation measures set out in Chapter 7 - Land, Soils, Geology and Hydrogeology; and Chapter 8 - Hydrology of the EIA Report will ensure the risk of a minor/accident is low and that the residual effect on the environment is imperceptible.

Remedial and mitigation measures

5.77 Mitigation measures proposed to minimise the potential effects on human health in terms of air quality and climate and noise and vibration during construction are discussed in the relevant sections of Chapters 9 and 10, respectively. Chapter 13 Traffic and Transportation addresses mitigation measures proposed to reduce the effect of additional traffic.

Residual impacts

5.78 The residual impacts on the local population during the construction phase are considered to be *short-term*, *positive* and *imperceptible* due to the expected short-term employment of a small number of construction workers directly employed to work on the construction of the transmission line and in turn creating a small amount of indirect additional business from using local businesses during the construction phase. The operation of the Proposed Development will provide a permanent power supply to the permitted Buildings A, B and C developments and support potential future growth outside of the site which will support employment in the area. It is expected that the Proposed Development will have a *slight, positive* and *long-term* effect on the immediate hinterland through facilitating the provision of adequate electricity supply that could potentially facilitate future employment opportunities.

5.79 A health and safety management plan will be in place to ensure the health and safety of all site personnel during construction. The experience of ESB Networks and the implementation of an EH&S Management System and relevant procedures will minimise any health and safety risks during operation of the development. The cumulative impact is addressed Chapter 16 of this EIA Report. Interactions are addressed in Chapter 17 of this EIA Report.

6. BIODIVERSITY

Introduction

6.1 Scott Cawley Ltd. was commissioned to undertake an assessment of impacts on biodiversity (flora and fauna) of the Proposed Development. The assessment was carried out in compliance with the 2014 EIA Directive, the Planning and Development Act 2000 as amended and the European Commission's guidance on the preparation of the EIA Report. The full description of the Proposed Development is outlined in Chapter 2 – Description of the Proposed Development of this EIA Report. Following these ecological impact assessment guidance documents the aims of this assessment were to:

- establish baseline ecological data for the Proposed Development site;
- determine the ecological value of the identified ecological features;
- assess the impact of the Proposed Development on ecological features of value (flora and fauna);
- apply mitigation measures to avoid, reduce, remedy or compensate impacts; and
- identify any residual impacts after mitigation.

Figure 6.1 Proposed Development site at Grange Castle South Business Park, Dublin 22

Methodology

Relevant legislation, policy and guidelines

6.2 The assessment of the likely impacts of the Proposed Development on ecological resources has considered legislation, policy documents, and guidelines outlined in Chapter 6 – Appendix 6.1 of the Appendix document of this EIA Report, where relevant.

Desk study

6.3 In addition to those listed in the reference section, the following resources assisted in the production of this report:

- Ordnance Survey Ireland (OSI) mapping and aerial photography available from OSI online GeoHive mapping resource. Available from http://map.geohive.ie/mapviewer.html;

- Data on protected species and European sites, available for download and interrogation from the National Parks and Wildlife Service (NPWS) maps and data page. Available from https://www.npws.ie/protected-sites;
- Spatial information relevant to the planning process including land zoning and planning applications from Department of Housing Planning, Community and Local Government web map portal. Available from https://myplan.ie/;
- Data on waterbodies, available for download and interrogation from the Environmental Protection Agency (EPA) web map service. Available from https://gis.epa.ie/EPAMaps/;
- Information on soils, geology and hydrogeology in the area available for download and interrogation from the Geological Survey Ireland (GSI) online Spatial Resources service. Available from https://www.gsi.ie/en-ie/data-and-maps/Pages/Groundwater.aspx;
- Information on the location, nature and design of the Proposed Development supplied by the applicant's design team; and
- Information on the conservation status of birds in Ireland[1].
- The Appropriate Assessment Screening Report and the Environmental Impact Assessment Report submitted for the permitted data centre development, under SDCC Planning Reg. Ref. SD20A/0121, herein referred to as the Permitted Development. See Figure 6.2 for location in relation to the Proposed Development site.
    - Scott Cawley Ltd. (2020). Appropriate Assessment Screening Report for a Proposed Data Centre, Grange Castle South Business Park, Clondalkin, Dublin 22.
    - Marston Planning Consultancy (2020). Environmental Impact Assessment Report – Data Centre Development, Grange Castle South Business Park.

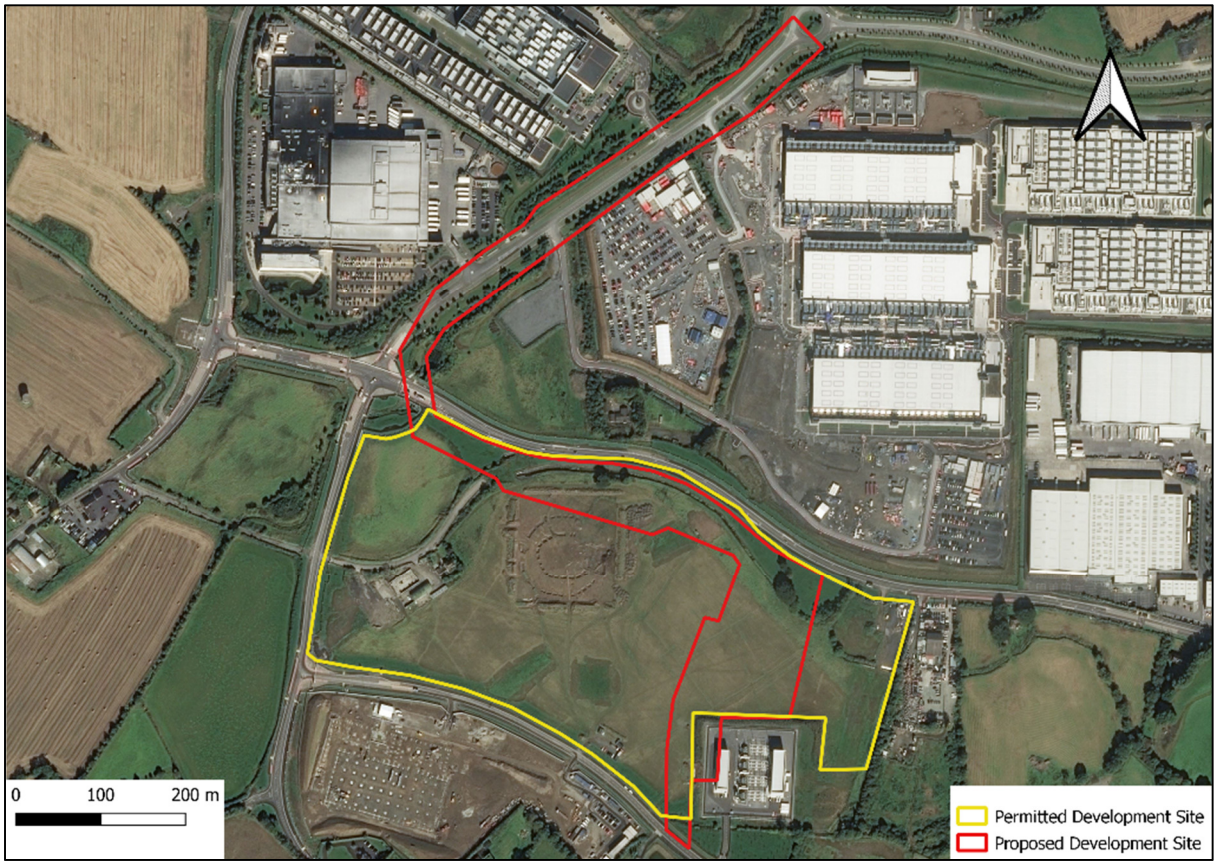

Figure 6.2 The Permitted Development site in yellow and the Proposed Development site in red at Grange Castle South Business Park, Dublin 22

Field survey methodology

Habitats and flora survey

6.4 The Proposed Development site was surveyed for habitats on 2nd September 2020. Surveys were undertaken by Lorna Gill of Scott Cawley Ltd. All habitats were classified using the Guide to Habitats

[1] Colhoun, K. and Cummins, S. (2013). *Birds of Conservation Concern in Ireland*. Irish Birds 9: 523-544.

in Ireland[2], recording dominant species, indicator species and/or species of conservation interest; with the Fossitt category codes given in parentheses. Plant nomenclature follows the BSBI's List of Accepted Plant Names[3].

Fauna survey

6.5 A general fauna survey was carried out concurrently with the habitat survey on 2nd September 2020. Terrestrial mammals were surveyed through the detection of field signs such as tracks, markings, feeding signs, and droppings, as well as by direct observation. The habitats on site were assessed for signs of usage by protected/red-listed fauna species, and potential to support these species.

Bat surveys

6.6 Two activity surveys were carried out by Scott Cawley Ltd. on 27th August 2020 and 3rd September 2020. These activity surveys involved the surveyor walking transects around the site, particularly focused along the site perimeter and along either side of the northern treelines. See Table 6.1 for details of the surveys.

Table 6.1 Time and weather data from the bat survey in 2020.

Data	27th August 2020	3rd September 2020
Sunrise/ Sunset time	06:25	20:09
Start time	03:35	21:39
Finish time	04:30	22:50
Weather conditions	13℃ -18℃ Cloudy, light short showers, calm	17℃ - 12℃ Clear, slight breeze, dry, full moon

Bird surveys

6.7 Breeding bird surveys were undertaken on 11th June and 28th June 2019 to inform the application for the Permitted Development under SDCC Planning Reg. Ref. SD20A/0121. The Permitted Development site and Proposed Development site overlap significantly (see Figure 6.2). In these areas, methodology followed an adapted version of the Breeding Bird Survey (BBS) methodology as detailed in Gilbert et al. (1998)[4]. A walkover route was undertaken which covered the Permitted Development site and a representation of each habitat type within the proposed development site. All bird species seen or heard within the site (including those flying overhead) were recorded and their location and activity noted onto suitably scaled maps. Where there was no overlap between the Permitted Development site and Proposed Development site, an assessment of the habitat for breeding bird suitability was undertaken.

6.8 Wintering bird surveys were carried out on the following dates 26th September; 9th and 23rd October; 8th and 19th November; and 3rd December 2019, to inform the application for the Permitted Development under SDCC Planning Reg. Ref. SD20A/0121. The Permitted Development site and Proposed Development site overlap significantly (see Figure 6.2). In these areas, methodology followed best practice and prevailing guidance as set out in RSPB Bird Monitoring Methods (Gilbert et al. 1998). A similar walkover route used for the BBS surveys was walked and all bird species seen or heard within the site were recorded, location and activity was noted onto suitably scaled maps. Where there was no overlap between the Permitted Development site and Proposed Development site, an assessment of the habitat for wintering bird suitability was undertaken.

6.9 Target species for bird surveys included species listed on Annex 1 of the EU Birds Directive, species listed as Amber and Red in the Birds of Conservation Concern in Ireland 2014-2019, and species protected under the fourth schedule of the Wildlife Acts 1976-2018.

Ecological evaluation and impact assessment methodology

Site evaluation criteria

6.10 The criteria used to assess the ecological value (Chapter 6 - Appendix 6.2 of the Appendix document) and significance of habitats follows *Guidelines for assessment of Ecological Impacts of National Road Schemes* (NRA, 2009) and is consistent with *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal* (CIEEM, 2019).

[2] Fossitt, A. (2000). *A Guide to Habitats in Ireland.* The Heritage Council, October 2000.
[3] BSBI (2007). *BSBI's List of Accepted Plant Names.* Available online at www.bsbi.org.
[4] Gilbert et al. (1998). Bird Monitoring Methods. Bedfordshire: The Royal Society for the Protection of Birds.

Impact assessment criteria

6.11 In accordance with the NRA (2009)[5] guidelines for assessment of ecological impacts, impact assessment is only undertaken of '*Key Ecological Receptors*' (KERs). KERs are within the zone of influence[6] of the development and are '*both of sufficient value to be material in decision making and likely to be affected significantly*'. To qualify as KERs, features must be of local importance (higher value) or higher as per the criteria in Chapter 6 - Appendix 6.2. For example, local importance (higher value) would include locally important populations of priority species or habitats or natural heritage features identified in the Local Biodiversity Action Plan, or, sites containing semi-natural habitat types with high biodiversity in a local context, or populations of species that are uncommon in the locality. Features of lower ecological value are not assessed, and would include, for example, sites containing small areas of semi-natural habitat that are of some local importance for wildlife. The highest levels of impact significance for each Sensitive Ecological Receptor 'value' rating is shown in Table 6.2 below.

Table 6.2 Maximum level of impact significance for Sensitive Ecological Receptors

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

Limitations / data deficiencies

6.12 CIEEM survey validity guidelines[7] state that surveys are likely to be valid for 12-18 months following the survey. Surveys undertaken to inform this ecological impact assessment report have been carried out within 16 months and fall within this 12-18 month validity range.

6.13 As such there no limitations have been noted, and sufficient survey data was gathered to fully inform the assessment of impacts.

Receiving environment

Land use zoning

6.14 The Proposed Development site is currently zoned as 'EE- Enterprise and Employment' with the objective '*To provide for enterprise and employment related uses*' under the South Dublin County Development Plan 2016-2022. The immediately surrounding lands are located within both the Grange Castle; Grange Castle South Business Park and Profile Park are also zoned as 'EE- Enterprise and Employment'. Lands in the vicinity of the Proposed Development site to the south and west are zoned as 'RU- Rural and Agriculture'. Grange Castle Golf Club is located to the east and south-east of the Proposed Development site and is zoned as 'OS- Open Space' with the objective '*To preserve and provide for open space and recreational amenities*'. . For full details on the site zoning, including zoning maps, under the South Dublin County Development Plan 2016-2022 see the Planning Report which accompanies this planning application.

Designated sites

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

[5] National Roads Authority (NRA) (2009) Guidelines for Assessment of Ecological Impacts of National Roads Schemes. Revision 2, 1st June 2009.
[6] In accordance with NRA (2009) Guidelines, the Zone of Influence is an important term to define the receiving environment for the activities associated with the project and the biophysical changes that are likely to occur. The Zone of Influence is the 'effect area' over which change is likely to occur. This differs for different species and habitats due to varying sensitivities to potential impacts.
[7] CIEEM (2019) Advice Note on the Lifespan of Ecological Reports and Surveys.

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

6.17 There are no European sites within the Proposed Development boundary. The nearest European site to the Proposed Development is the Rye Water Valley / Carton SAC; c. 5.2km north-west. The Baldonnell stream flows east-west through the Proposed Development site and acts as a pathway to European sites downstream in Dublin Bay c. 24km hydrological distance downstream to the east of the Proposed Development. The following European sites are located in Dublin Bay: North Dublin Bay SAC, South Dublin Bay SAC, North Bull Island SPA and South Dublin Bay and River Tolka Estuary SPA. See Figure 6.2 for a map of European Sites located within the vicinity of the Proposed Development site.

6.18 There are no NHAs within or directly adjacent to the boundaries of the Proposed Development site. The nearest nationally designated site to the Proposed Development is the Grand Canal pNHA (002104), approximately 1.8km north of the Proposed Development. There is no hydrological connection between the Proposed Development site and the Grand Canal pNHA. The nearest NHA/pNHA sites to the Proposed Development with a potential impact pathway are Liffey Valley pNHA (000128); c. 4.4km north and *c.* 5.5km downstream and the pNHAs in Dublin Bay, South Dublin Bay pNHA (000210); *c.* 16km east and c. 27km downstream of the Proposed Development., North Dublin Bay pNHA(000206); c. 15.7km and c. 27km downstream northeast of the Proposed Development and Dolphins, Dublin Docks pNHA(000201); c. 17.2km east and c. 25.2km downstream of the Proposed Development. See Figure 6.3 for a map of Natural Heritage Areas located in the vicinity of the Proposed Development site.

6.19 The Proposed Development site is not designated as a SAC, SPA, NHA, or pNHA, however, it is located upstream of European designated sites in Dublin Bay and upstream of nationally designated sites in the River Liffey and Dublin Bay. For this reason, European and nationally designated sites have been considered as KERs for the Proposed Development.

6.20 A list of European and nationally designated sites within the vicinity of the Proposed Development, along with their qualifying interests or reasons for designation, are included in Table 6.3 of this Chapter. The locations of these designated sites in relation to the Proposed Development are illustrated in Figure 6.3 and 6.4. Sites shown on Figures 6.3 and 6.4 and not listed in Table 6.3 of this Chapter are considered to fall well outside the zone of influence of the Proposed Development due to the lack of source-pathway-receptor links.

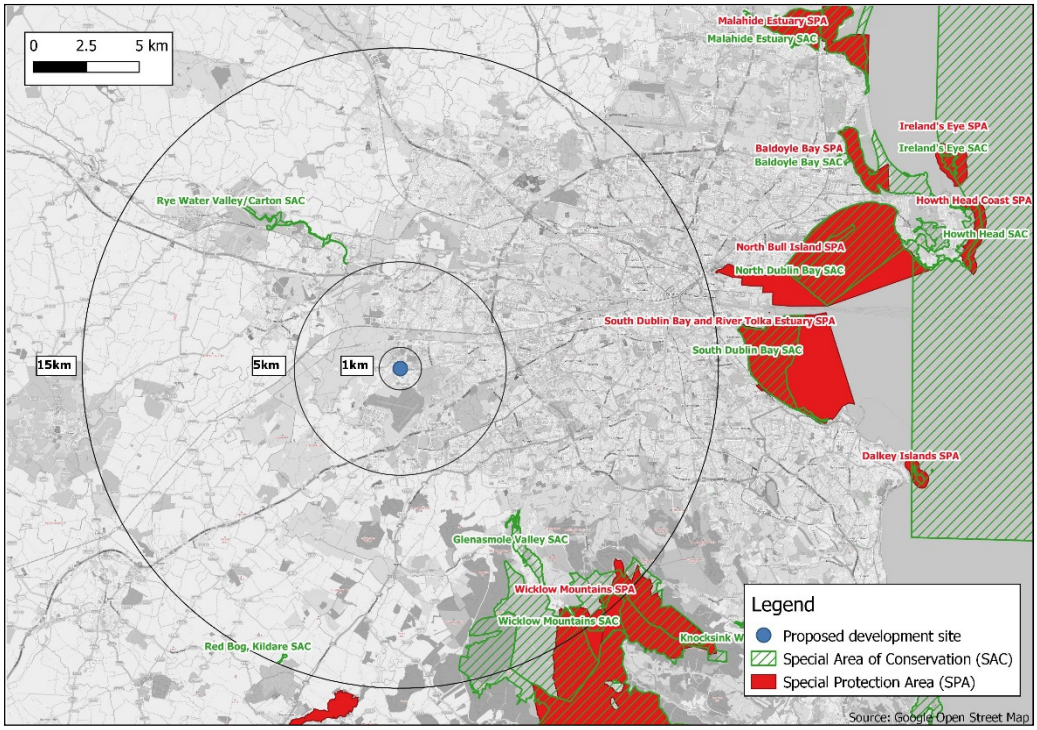

Figure 6.3 European sites in the vicinity of the Proposed Development site

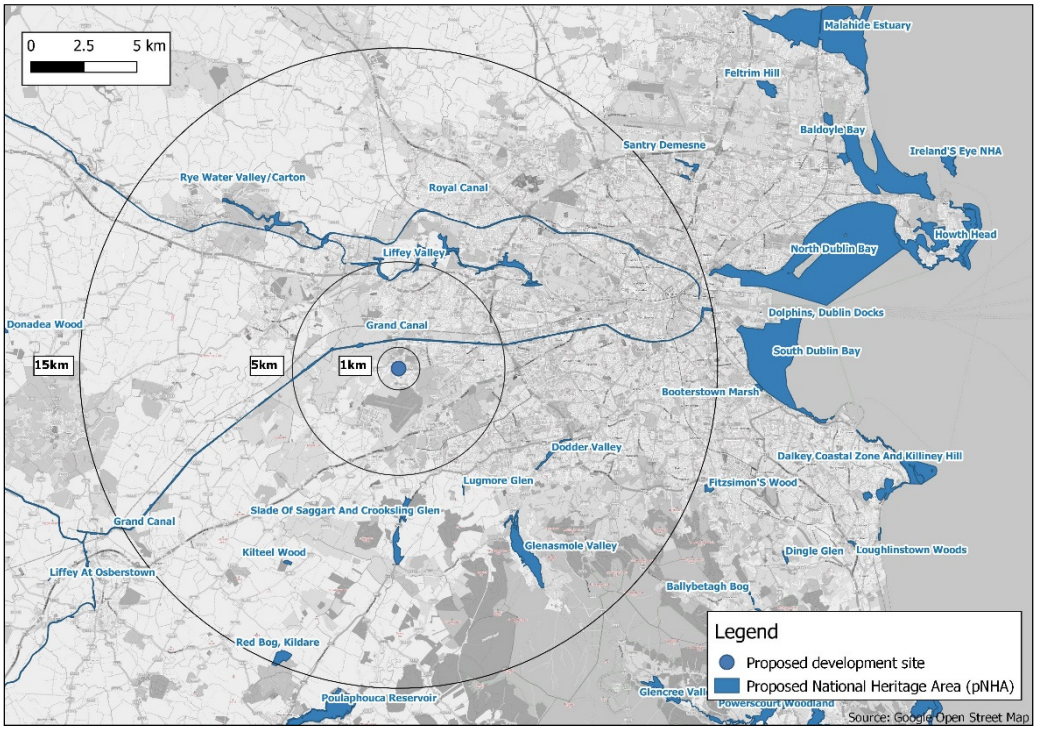

Figure 6.4 Nationally designated sites in the vicinity of the Proposed Development site

Table 6.3 Designated sites located within the vicinity of the proposed development site and proposed Natural Heritage Areas within the vicinity of proposed development site.

Designated Site Name [Code] and its nature conservation features	Location Relative to the Proposed Development Site
Special Area of Conservation (SAC)	
Rye Water Valley/Carton SAC [001398] 7220 Petrifying springs with tufa formation (*Cratoneurion*)* 1014 Narrow-mouthed Whorl Snail *Vertigo angustior* 1016 Desmoulin's Whorl Snail *Vertigo moulinsiana* NPWS (2020) *Conservation objectives for Rye Water Valley/Carton SAC [001398]*. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.[8]	Located *c.* 5.2km north-west of the proposed development site.
Glenasmole Valley SAC [001209] 6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) 6410 *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) 7220 Petrifying springs with tufa formation (*Cratoneurion*)* NPWS (2020) *Conservation objectives for Glenasmole Valley SAC [001209]*. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.	Located *c.* 8.3km south-east of the proposed development site.
Wicklow Mountains SAC [002122] 3110 Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) 3160 Natural dystrophic lakes and ponds 4010 Northern Atlantic wet heaths with *Erica tetralix* 4030 European dry heaths 4060 Alpine and Boreal heaths 6130 *Calaminarian* grasslands of the *Violetalia calaminariae* 6230 Species-rich *Nardus* grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe) 7130 Blanket bogs (* if active bog) 8110 Siliceous scree of the montane to snow levels (*Androsacetalia alpinae* and *Galeopsietalia ladani*) 8210 Calcareous rocky slopes with chasmophytic vegetation 8220 Siliceous rocky slopes with chasmophytic vegetation 91A0 Old sessile oak woods with *Ilex* and Blechnum in the British Isles 1355 *Lutra lutra* (Otter) NPWS (2017) *Conservation Objectives: Wicklow Mountains SAC 002122*. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.	Located *c.* 10k south-east of the proposed development site.
Red Bog Kildare SAC [000397] 7140 Transition mires and quaking bog NPWS (2019) *Conservation Objectives: Red Bog, Kildare SAC 000397*. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.	Located *c.* 14.2km south of the proposed development site.

8 The versions of the conservation objectives documents referenced in this table are the most recent published versions at the time of writing.

Designated Site Name [Code] and its nature conservation features	Location Relative to the Proposed Development Site
South Dublin Bay SAC [000210] [1140] Mudflats and sandflats not covered by seawater at low tide [1210] Annual vegetation of drift lines [1310] *Salicornia* and other annuals colonising mud and sand [2110] Embryonic shifting dunes NPWS (2013) *Conservation Objectives: South Dublin Bay SAC 000210.* Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.	Located *c.* 15.6km east of the proposed development site.
North Dublin Bay SAC [000206] [1140] Mudflats and sandflats not covered by seawater at low tide [1210] Annual vegetation of drift lines [1310] *Salicornia* and other annuals colonising mud and sand [1330] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1395] Petalwort *Petalophyllum ralfsii* [1410] Mediterranean salt meadows (*Juncetalia maritimi*) [2110] Embryonic shifting dunes [2120] Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2130] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2190] Humid dune slacks NPWS (2013) *Conservation Objectives: North Dublin Bay SAC 000206.* Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.	Located *c.* 18.2km east of the proposed development site.
Malahide Estuary SAC [000205] [1140] Mudflats and sandflats not covered by seawater at low tide [1310] Salicornia and other annuals colonising mud and sand [1320] Spartina swards (*Spartinion maritimae*) [1330] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1410] Mediterranean salt meadows (*Juncetalia maritimi*) [2120] Shifting dunes along the shoreline with Ammophila arenaria (white dunes) [2130] Fixed coastal dunes with herbaceous vegetation (grey dunes)* NPWS (2013) *Conservation Objectives: Malahide Estuary SAC 000205*. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.	Located c. 22.9km south-east of the proposed development
Baldoyle Bay SAC [000199] [1140] Mudflats and sandflats not covered by seawater at low tide [1310] Salicornia and other annuals colonizing mud and sand [1330] Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1410] Mediterranean salt meadows (*Juncetalia maritimi*) NPWS (2012) *Conservation Objectives: Baldoyle Bay SAC 000199.* Version 1.0. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.	Located *c.* 22.5km north-east of the proposed development
Howth Head SAC [000202] [1230] Vegetated sea cliffs of the Atlantic and Baltic coasts [4030] European dry heaths NPWS (2016) *Conservation Objectives: Howth Head SAC 000202*. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.	Located *c.* 24km north-east of the proposed development

Designated Site Name [Code] and its nature conservation features	Location Relative to the Proposed Development Site
Rockabill to Dalkey Island SAC [003000] [1170] Reefs [1351] Harbour porpoise *Phocoena phocoena* NPWS (2013) *Conservation Objectives: Rockabill to Dalkey Island SAC 003000*. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht	Located *c.* 23.8km east of the proposed development
Ireland's Eye SAC [002193] [1220] Perennial vegetation of stony banks [1230] Vegetated sea cliffs of the Atlantic and Baltic coasts NPWS (2017) *Conservation Objectives: Ireland's Eye SAC 002193*. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.	Located *c.* 27km north-east of the proposed development
Ballyman Glen SAC [000713] [7220] Petrifying springs with tufa formation (*Cratoneurion*) [7230] Alkaline fens NPWS (2019) *Conservation Objectives: Ballyman Glen SAC 000713*. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.	Located *c.* 22.3km south-east of the proposed development
Special Protection Area (SPA)	
Wicklow Mountains SPA [004040] A098 Merlin *Falco columbarius* A103 Peregrine *Falco peregrinus* NPWS (2020) *Conservation objectives for Wicklow Mountains SPA [004040]*. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.	Located *c.* 13.1km south-east of the proposed development site.
South Dublin Bay and River Tolka Estuary SPA [004024] [A046] Light-bellied Brent Goose *Branta bernicla hrota* [A130] Oystercatcher *Haematopus ostralegus* [A137] Ringed Plover *Charadrius hiaticula* [A141] Grey Plover *Pluvialis squatarola* [A143] Knot *Calidris canutus* [A144] Sanderling *Calidris alba* [A149] Dunlin *Calidris alpina* [A157] Bar-tailed Godwit *Limosa lapponica* [A162] Redshank *Tringa totanus* [A179] Black-headed Gull *Croicocephalus ridibundus* [A192] Roseate Tern *Sterna dougallii* [A193] Common Tern *Sterna hirundo* [A194] Arctic Tern *Sterna paradisaea* [A999] Wetland and Waterbirds NPWS (2015) *Conservation Objectives: South Dublin Bay and River Tolka Estuary SPA 004024*. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.	Located *c.* 15.2km east of the proposed development site.
North Bull Island SPA [004006] [A046] Light-bellied Brent Goose *Branta bernicla hrota* [A048] Shelduck *Tadorna tadorna* [A052] Teal *Anas crecca* [A054] Pintail *Anas acuta* [A056] Shoveler *Anas clypeata*	Located *c.* 18.2km east of the proposed development

Designated Site Name [Code] and its nature conservation features	Location Relative to the Proposed Development Site
[A130] Oystercatcher *Haematopus ostralegus* [A140] Golden Plover *Pluvialis apricaria* [A141] Grey Plover *Pluvialis squatarola* [A143] Knot *Calidris canutus* [A144] Sanderling *Calidris alba* [A149] Dunlin *Calidris alpina* [A156] Black-tailed Godwit *Limosa limosa* [A157] Bar-tailed Godwit *Limosa lapponica* [A160] Curlew *Numenius arquata* [A162] Redshank *Tringa totanus* [A169] Turnstone *Arenaria interpres* [A179] Black-headed Gull *Croicocephalus ridibundus* [A999] Wetlands & Waterbirds NPWS (2015) *Conservation Objectives: North Bull Island SPA 004006.* Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.	
Malahide Estuary SPA [004025] [A005] Great Crested Grebe *Podiceps cristatus* [A046] Brent Goose *Branta bernicla hrota* [A048] Shelduck *Tadorna tadorna* [A054] Pintail *Anas acuta* [A067] Goldeneye *Bucephala clangula* [A069] Red-breasted Merganser *Mergus serrator* [A130] Oystercatcher *Haematopus ostralegus* [A140] Golden Plover *Pluvialis apricaria* [A141] Grey Plover *Pluvialis squatarola* [A143] Knot *Calidris canutus* [A149] Dunlin *Calidris alpina alpina* [A156] Black-tailed Godwit *Limosa limosa* [A157] Bar-tailed Godwit *Limosa lapponica* [A162] Redshank *Tringa totanus* [A999] Wetlands NPWS (2013) *Conservation Objectives: Malahide Estuary SPA 004025*. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.	Located *c.* 22.9km north-east of the proposed development
Baldoyle Bay SPA [004016] [A046] Brent Goose *Branta bernicla hrota* [A048] Shelduck *Tadorna tadorna* [A137] Ringed Plover *Charadrius hiaticula* [A140] Golden Plover *Pluvialis apricaria* [A141] Grey Plover *Pluvialis squatarola* [A157] Bar-tailed Godwit *Limosa lapponica* [A999] Wetlands NPWS (2013) *Conservation Objectives: Baldoyle Bay SPA 004016*. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.	Located *c.* 23km north-east of the proposed development

Designated Site Name [Code] and its nature conservation features	Location Relative to the Proposed Development Site
Ireland's Eye SPA [004117] [A017] Cormorant *Phalacrocorax carbo* [A184] Herring Gull *Larus argentatus* [A188] Kittiwake *Rissa tridactyla* [A199] Guillemot *Uria aalge* [A200] Razorbill *Alca torda* NPWS (2020) *Conservation objectives for Ireland's Eye SPA [004117]*. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht	Located *c.* 26.7km north-east of the proposed development
Howth Head Coast SPA [004113] [A188] Kittiwake *Rissa tridactyla* NPWS (2020) *Conservation objectives for Howth Head Coast SPA [004113]*. Generic Version 6.0. Department of Culture, Heritage and the Gaeltacht.	Located *c.* 26.6km north-east of the proposed development
proposed Natural Heritage Area (pNHA)	
Grand Canal pNHA [002104] The Grand Canal is a man-made waterway linking the River Liffey at Dublin with the Shannon at Shannon Harbour and the Barrow at Athy. The Grand Canal proposed Natural Heritage Area (pNHA) comprises the canal channel and the banks on either side of it. The canal system is made up of a number of branches - the Main Line from Dublin to the Shannon, the Barrow Line from Lowtown to Athy, the Edenderry Branch, the Naas and Corbally Branch and the Milltown Feeder. The ecological value of the canal lies more in the diversity of species it supports along its linear habitats than in the presence of rare species. It crosses through agricultural land and therefore provides a refuge for species threatened by modern farming methods.	*c.* 1.8km north of the proposed development
Liffey Valley pNHA [000128] Diversity of flora and fauna species the river ecosystem supports, including rare and/or legally protected plant species (hairy St. John's wort *Hypericum hirsutum*, green figwort *Scrophularia umbrosa* and yellow archangel *Lamiastrum* *galeobdolon*)	*c.* 4.4km north of the proposed development
Rye Water Valley/Carton pNHA [001398] Diversity of flora and fauna species the river ecosystem supports – *see also Rye Water Valley/Carton SAC in Table 1 above*	*c.* 5.5km north-west of the proposed development
Slade of Saggart and Crooksling Glen pNHA [000211] The northern half of the site comprises a river valley with steep tree-covered sides, while the southern side is flatter and contains two small lakes, the Brittas Pond. The rare Red Data Book species Yellow Archangle (*Lamiastrum galeobdolon*) has been recorded from this site.	*c.* 5.8km south of the proposed development
Lugmore Glen pNHA [001212] This site is a small wooded glen that supports a diversity of flora. The site is notable for the presence of the rare Red Data Book species Yellow Archangle (*Lamiastrum galeobdolon*).	*c.* 5.8km south-east of the proposed development
Royal Canal pNHA [002103] Diversity of flora and fauna species the canal ecosystem supports and the presence of legally protected plant species, opposite-leaved pondweed *Groenlandia densa*.	*c.* 5.8km north of the proposed development
Dodder valley pNHA [00991] Diversity of flora and fauna species the river ecosystem supports, including plant species such as Early-purple Orchid (*Orchis mascula*) and Bugle (Ajugareptans) and protected bird species such as Kingfisher and Grey Wagtail	*c.* 7.8km south-east of the proposed development
Glenasmole Valley pNHA [001209] Listed under similar conservation objectives as it's SAC/SPA designations.	*c.* 8.4km south-east of the proposed development
Kilteel Wood pNHA [001394] The site is a small healthy wood of mostly oak (*Quercus* spp.) and Downy Birch (*Betula pubescens*) with a diversity of flora.	*c.* 10.2km south-west of the proposed development

Designated Site Name [Code] and its nature conservation features	Location Relative to the Proposed Development Site
Red bog Kildare pNHA [000397] Listed under similar conservation objectives as it's SAC/SPA designations.	*c.*14.1km south-west of the proposed development
Poulaphouca Reservoir pNHA [000731] Poulaphouca Reservoir is located in the western foothills of the Wicklow Mountains. The reservoir covers an area of approximately 20 square kilometres and is the largest inland water body in the mideast and south-east regions. Poulaphouca Reservoir supports protected bird species such as Greylag Goose and Lesser Black-backed Gull	*c.* 14.9km south of the proposed development
North Dublin Bay pNHA [000206] Listed under similar conservation objectives as it's SAC/SPA designations.	*c.* 15.7km north-east of the proposed development
South Dublin Bay pNHA [000210] Listed under similar conservation objectives as it's SAC/SPA designations.	*c.* 16.2km east of the proposed development
Dolphins, Dublin Docks pNHA [000201] Listed under similar conservation objectives as South Dublin Bay and river Tolka Estuary SPA [004024].	*c.* 17.2km north-east of the proposed development

Habitats and flora

Desk study results

6.20 The National Biodiversity Data Centre (NBDC) database search returned no records of protected flora species under the Flora (Protection) Order 2015 within 2km of the survey area.

6.21 The NBDC database search returned records of two non-native invasive species listed on the Third Schedule of the *European Communities (Birds and Natural Habitats) Regulations 2011* (as amended) within 2km of the Proposed Development site[9]:

- Nuttall's waterweed *Elodea nuttallii*
- Three-cornered garlic *Allium triquetrum*

6.22 Records of non-native invasive species that are not listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations and were returned from the desk study include, black currant *Ribes nigrum* and butterfly-bush *Buddleja davidii*[8].

Field survey results

6.23 No non-native invasive species listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011, were recorded within the Proposed Development site, or along the proposed grid connection route, during the site visit in September 2020.

6.24 Butterfly-bush *Buddleja davidii*, which is not listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations, but which is considered to be invasive in some habitats and locations was identified within the Proposed Development site. See Chapter 6 – Appendix 6.3 of the Appendix document of this EIA Report for a full list of flora species recorded within the Proposed Development site.

6.25 The following habitat types, assigned using the Heritage Council classification system (Fossitt, 2000), were identified within the survey area and are mapped in Figure 6.4:

- Recolonising bare ground (ED3);
- Improved agricultural grassland (GA1);
- Depositing lowland rivers (FW2);
- Amenity grassland (improved) (GA2);
- Buildings and artificial surfaces (BL3);
- Treelines (WL2); and,
- Scrub (WS1).

[9] These species are listed on Invasive Species Ireland's Amber list. In the right ecological conditions, they may impact on native species or habitats, but these species are not considered to have a high-risk rating overall. The list is available from http://invasive speciesireland.com.

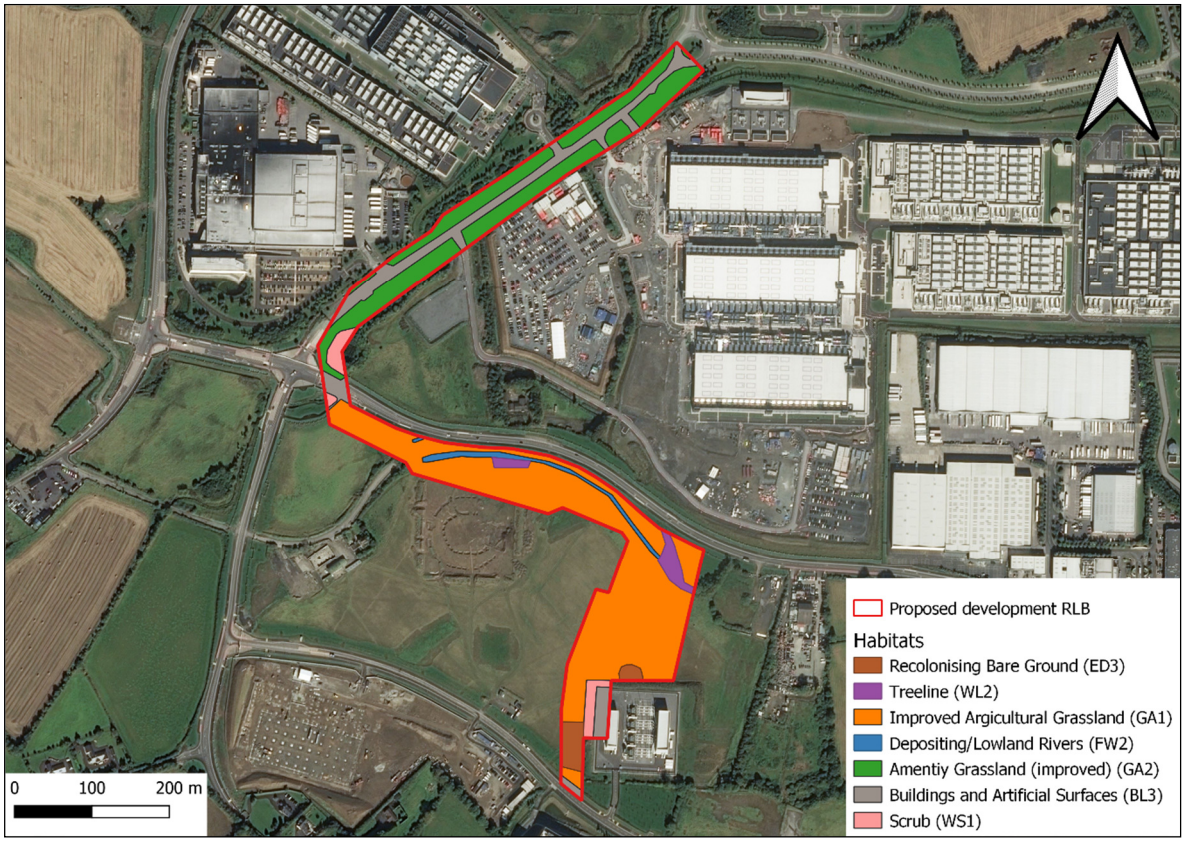

Figure 6.5 Habitats recorded within the Proposed Development site during field surveys

6.26 The majority of the Proposed Development site (that forms part of the Permitted Development site and site to its immediate north-west) is comprised of improved agricultural grassland (GA1) which is no longer managed for agricultural use, under regular mowing or livestock grazing. From examination of aerial orthophotography, the field had been cut for livestock fodder in the past. This habitat is dominated by grass species such as perennial ryegrass *Lolium perenne*, Yorkshire fog *Holcus lanatus* and red fescue *Festuca rubra*. The invasion of weedy species such as curled dock *Rumex crispus*, ragwort *Senecio jacobaea,* meadow buttercup *Ranunculus acris,* red clover *Trifolium pratense,* white clover *Trifolium repens* and creeping thistle *Cirsium arvense* indicates that the Proposed Development site has not been intensively managed for some time.

6.27 Due to the common occurrence of this habitat type in the surrounding area, the lack of species diversity and the common species that occur within the habitat type, the ecological value of this habitat type within the Proposed Development site has been classified as being of local importance (lower value). However, this habitat provides food and shelter to a range of fauna including birds and rabbits. Bird species recorded in this habitat include snipe *Gallinago gallinago* and meadow pipit *Anthus pratensis*.

Figure 6.6 Improved agricultural grassland (GA1) occurring within the Proposed Development site

6.28 There are some areas of buildings and artificial surfaces (BL3) habitat within the proposed route of the 110kV transmission line to the Kilmahud-Corkagh circuit. Given this habitat is artificial, it holds no ecological value.

Figure 6.7 Buildings and artificial surfaces (BL3) occurring within the Proposed Development site

6.30 Recolonising bare ground (ED3) habitat within the Proposed Development site represents areas which have been disturbed by recent works and invaded by a range of weedy species. These species include perennial rye grass Lolium perenne, broad-leaved dock Rumex obtusifolius, ragwort Senecio jacobaea, red clover Trifolium pratense, white clover Trifolium repens, black medic Medicago lupulina, scarlet pimpernel Anagallis arvensis, meadow buttercup Ranunculus acris and nettles Urtica dioica. Given the lack of species diversity and the common species found within the habitat type, the ecological value of this habitat type is considered to be of local importance (lower value). Although this habitat type is low in botanical value, during breeding bird surveys in 2019 a range of bird species were recorded within recolonising bare ground habitat that occurs within the site.

Figure 6.8 Recolonising bare ground (ED3) occurring within the Proposed Development site

6.31 There are fragmented treelines (WL2) within the Proposed Development site and along the 110kV transmission line to the Kilmahud – Corkagh circuit. They are comprised of cedar species *Cedrus sp.,* sycamore *Acer pseudoplatanus*, ash *Fraxinus excelsior*, hawthorn *Crataegus monogyna*, blackthorn *Prunus spinosa,* bramble *Rubus fruticosus agg.*, beech *Fagus sylvatica* and ivy *Hedera helix*. The understorey is comprised of a range of common native herbaceous species including cleavers *Galium aparine*, nettles *Urtica dioica*, herb-Robert *Geranium robertanium* and common hogweed *Heracleum sphondylium*. This treeline, although fragmented, has been classified as being of local importance (higher value) as it contributes towards the existing ecological corridors in the landscape. Although this habitat is unconnected to similar habitats in the surrounding landscape and is relatively sparse, it provides nesting and feeding habitat to breeding bird species.


Figure 6.9 Treeline (WL2) occurring within the Proposed Development site

6.32 The Baldonnel stream present within the Proposed Development site is a tributary of the Griffeen River and has been highly modified in recent years to allow for the construction of the new Nangor Road (R134). The Stream is classified as a depositing lowland river (FW2). A small portion of the natural stream remains along the north-eastern portion of the Proposed Development site (see Figure 6.9). In this area, there is bankside vegetation including Hart's tongue *Asplenium scolopendrium*, meadowsweet *Filipendula ulmaria*, ivy *Hedera helix* and celery-leaved buttercup *Ranunculus scleratus*. Overhanging tree and shrub species include hawthorn *Crataegus monogyna*, elder *Sambucus nigra*, sycamore *Acer pseudoplatanus* and butterfly-bush *Buddleja davidii*. In-stream vegetation includes species such as yellow iris *Iris pseudacorus*, water cress *Nasturtium officinale* and rush species *Juncus sp*. Where the stream has been realigned (see Figure 6.9), steep slopes (up to 4m) have been created and no vegetation was planted as part of these works. The stream has become colonised by large mats of watercress *Nasturtium officinale* and the slopes have become colonised by a range of common weedy species including creeping thistle *Cirsium arvense*, sowthistle species *Sonchus sp.* and nettles *Urtica dioica.* The Baldonnel Stream is culverted for large sections, therefore unculverted sections of the stream providing a wetland habitat are uncommon in the locality, and is therefore considered to be of local importance (higher).

6.33 Despite recent modification to this habitat, it has the potential to support a wide range of fauna. Of particular note, otter *Lutra lutra*, kingfisher *Alcedo atthis* and grey wagtail *Motacilla cinerea* were all recorded along the stream.


Figure 6.10 Depositing lowland river (FW2) occurring within the Proposed Development site

6.34 Within the proposed 110kV transmission line to the Kilmahud-Corkagh circuit, along either side of the internal access road within the Grange Castle Business Park, there is a small area of amenity grassland (GA2) on either side of the road (see Figure 6.10). This area contains the species perennial rye grass *Lolium perenne*, ribwort plantain *Plantago lanceolata,* creeping buttercup *Ranunculus repens* and white clover *Trifolium repens,* with scattered trees such as lime *Tilia sp.* and oak sp. *Quercus sp.*

6.35 As this habitat is heavily managed and is species poor, this habitat is valued as being of a local importance (low value).

Figure 6.11 Improved amenity grassland (GA2) occurring within the proposed 110kV transmission line to the Kilmahud-Corkagh circuit

6.36 Within the proposed 110kV transmission line to the Kilmahud-Corkagh circuit, there are small areas of scrub (WS1) (see Figure 6.11). This area contains the species blackthorn *Prunus spinosa,* bramble *Rubus fruticosus agg.*, common sorrel *Rumex acetose,* ragwort *Senecio jacobaea,* creeping thistle *Cirsium arvense*, common hogweed *Heracleum sphondylium,* rose bay willowherb *Epilobium angustifolium,* herb-Robert *Geranium robertanium,* ivy *Hedera helix*, nettles *Urtica dioica*, and butterfly-bush *Buddleia davidii*.

6.37 This habitat is unconnected to similar habitats in the surrounding landscape and is relatively sparse, the ecological value has been classified as being of local importance (low value). It also provides nesting and feeding habitat to breeding bird species.

Figure 6.12 Scrub (WS1) occurring within the proposed grid connection route

Bats

Desk study results

6.38 A search of the NBDC database returned records of five bat species within 2km of the survey area- brown long-eared bat *Plecotus auritus*, Daubenton's bat *Myotis daubentonii*, Leisler's bat *Nyctalus leisleri*, common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *Pipistrellus pygmaeus*. These bat species are all protected under the Wildlife Acts and the European Habitats Directive, where they are listed on Annex IV.

Field survey results

6.39 The treelines within the Proposed Development site as well as woodland, hedgerows and treelines in the surrounding area are considered to be suitable foraging and commuting habitat for bats.

6.40 Three species of bat were recorded during the activity, Leisler's bat *Nyctalus leisleri,* soprano pipistrelle *Pipistrellus pygmaeus* and common pipistrelle *Pipistrellus pipistrellus*. The majority of the activity recorded on site was along the north-eastern treeline and the hedgerow located within the Castlebaggot substation to the south of the proposed substation, see figure 6.13 below.

6.41 The Proposed Development site has been valued as being of local importance (higher value) for bats as the site was found to be used by small numbers of common bat species for foraging and commuting.

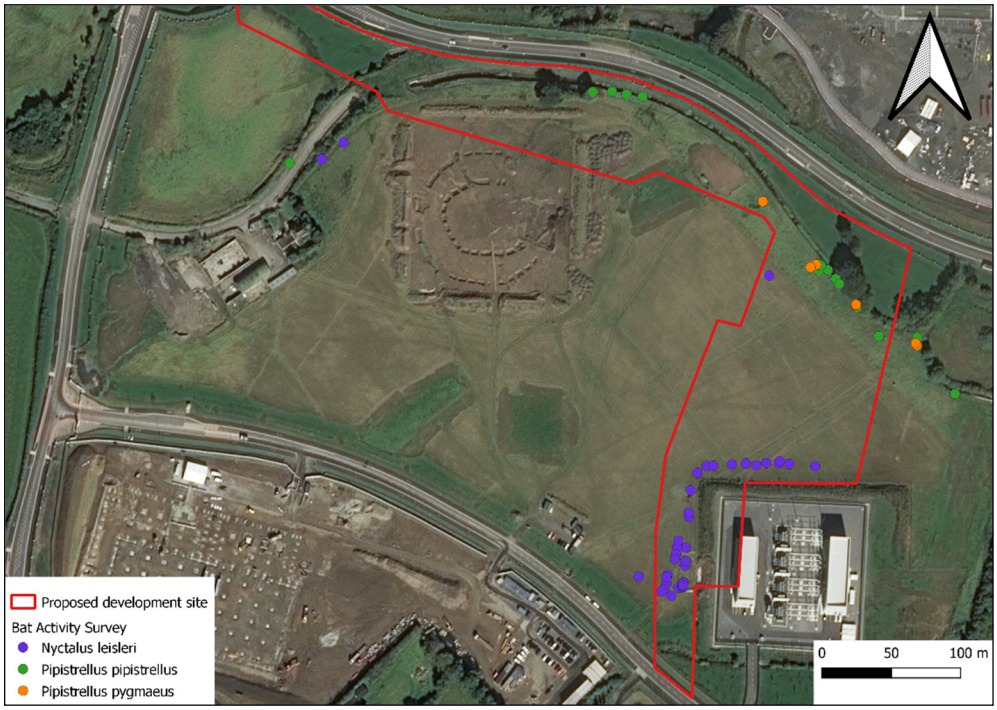

Figure 6.13 Results of bat activity surveys within the Proposed Development site

Otter

Desk study results

6.42 Records of otter *Lutra lutra* were returned within the 2km search area. This mammal species is protected under the Wildlife Acts and under Annex II of the Birds and Habitats Regulations.

Field survey results

6.43 No signs of otter were recorded during the site surveys. However, otter was previously recorded in the Baldonnel stream by Scott Cawley Ltd. as part of the surveys for the Permitted Development application under SDCC Planning Reg. Ref. SD20A/0121. An otter was recorded in the stream on site on the 8th November 2019 after a period of heavy rain. It was observed swimming west through the stream before entering the culvert in the northern portion of the Proposed Development site. No other signs of otter were recorded within the Proposed Development site such as a holt or spraint. There are anecdotal records of otter utilising the Griffeen River within Grange Castle Business Park. During realignment works to the river, undertaken as part of the industrial development of Grange Castle Business Park, artificial holts were installed along the Griffeen River.

6.44 The Proposed Development site has been valued as being of local importance (higher value) for Otter.

Other mammals

Desk study results

6.45 Records of three other mammal species protected under the Wildlife Acts were returned within the 2km search area: European hedgehog *Erinaceus europaeus,* Eurasian pygmy shrew *Sorex minutus,* and Eurasian badger *Meles meles.*

Field survey results

6.46 The Proposed Development site is considered to be suitable to support a range of mammal species due to the presence of a stream and unmanaged grassland. No evidence of badger activity, i.e. setts, tracks, latrines or feeding signs, were made during site surveys of the subject lands in September 2020. No signs of small mammals were noted in the Proposed Development site. As such, the mammal populations are assessed as being of a local importance (low value).

Birds

Desk study results

6.47 All nesting wild birds are protected from disturbance and destruction under the Wildlife Acts. Records of four Red-listed species and nine Amber-listed species of Birds of Conservation Concern in Ireland (BoCCI) (Colhoun and Cummins, 2013) were returned within 2km from the survey area. Red-listed, amber-listed and Annex I species recorded within 2km of the Proposed Development site :

- Barn owl *Tyto alba* in 2011
- Black-headed gull *Larus ridibundus* in 2011
- Coot *Fulica atra* in 2011
- Cormorant *Phalacrocorax carbo* in 2011
- Corn crake *Crex crex* in 1991
- Curlew *Numenius arquata* in 1984
- Eurasian teal *Anas crecca* in 2011
- Gadwall *Anas strepera* in 2011
- Golden plover *Pluvialis apricaria* in 2011
- Goldeneye *Bucephala clangula* in 2011
- Goosander *Mergus merganser* in 2011
- Grasshopper warbler *Locustella naevia* in 2011
- Great crested grebe *Podiceps cristatus* in 2011
- Great-black backed gull *Larus marinus* in 2011
- Grey partridge *Perdix perdix* in 1991
- Greylag goose *Anser answer* in 2011
- Hen harrier *Circus cyaneus* in 1972
- Herring gull *Larus argentatus* in 2011
- House martin *Delichon urbicum* in 2017
- House sparrow *Passer domesticus* in 2011
- Kestrel *Falco tinnunculus* in 2011
- Kingfisher *Alcedo atthis* in 2011
- Lapwing *Vanellus vanellus* in 2011
- Lesser black-backed gull *Larus fuscus* in 2011
- Linnet *Carduelis cannabina* in 2011
- Little egret *Egretta garztta* in 2011
- Little grebe *Tachybaptus ruficollis* in 2011
- Merlin *Falco columbarius* in 2011
- Mew gull *Larus canus* in 2011
- Mute swan *Cygnus olor* in 2011
- Northern pintail *Anas acuta* in 2011
- Northern wheatear *Oenanthe Oenanthe* in 2011
- Oystercatcher *Haematopus ostralegus* in 1984
- Peregrine falcon *Falco peregrinus* in 2017
- Pochard *Aythya ferina* in 2011
- Red grouse *Lagopus lagopus* in 2011
- Redshank *Tringa tetanus* in 2011
- Ringed plover *Charadrius hiaticula* in 1991
- Sand martin *Riparia riparia* in 2011
- Sandpiper *Actitis hypoleucos* in 2011
- Sky lark *Alauda arvensis* in 2011
- Snipe *Gallinago gallinago* in 2011
- Spotted flycatcher *Muscicapa striata* in 2011
- Starling *Sturnus vulgaris* in 2017
- Stock pigeon *Columba oenas* in 1991
- Swallow *Hirundo rustica* in 2017
- Swift *Apus apus* in 2011
- Tree Sparrow *Passer montanus* in 2011

- Tufted duck *Aythya fuligula* in 2011
- Water rail *Rallus aquaticus* in 1972
- Whinchat *Saxicola rubetra* in 1972
- Whooper swan *Cygnus Cygnus* in 2011
- Wigeon *Anas Penelope* in 2011
- Woodcock *Scolopax rusticola* in 2011
- Yellowhammer *Emberiza citronella* in 2011

Field survey results

Breeding birds

6.48 A wide range of bird species were recorded within the Proposed Development site during breeding bird surveys carried out in June 2019. Species recorded included nine Amber-listed species- swallow *Hirundo rustica*, starling *Sturnus vulgaris*, house sparrow *Passer domesticus*, skylark *Alauda arvensis*, goldcrest *Regulus regulus*, house martin *Delichon urbicum*, swift *Apus apus*, greenfinch *Carduelis chloris* and robin *Erithacus rubecula*. Nesting swallows were confirmed using a barn in the farmyard. One Red-listed species was recorded; meadow pipit *Anthus pratensis*. Other species recorded included a range of common urban and farmland species such as wren *Troglodytes troglodytes*, chaffinch *Fringilla coelebs* and blackbird *Turdus merula*. All of the above species were breeding either in hedgerows, treelines or buildings within the vicinity of the Proposed Development site. Of note was the presence of buzzards *Buteo buteo* flying and calling overhead throughout ecological surveys, although no buzzard nest was recorded within the Proposed Development site or in the vicinity of the site. Due to activity recorded, buzzards are likely to be breeding within the locality. Ringed plover *Anthus pratensis* was also recorded feeding on an area of spoil and bare ground that had been cleared for archaeological surveys. It is not anticipated that this species was breeding here as they would have been subject to high levels of human disturbance.

Wintering birds

6.49 The winter bird surveys were carried out from September to December 2019 and recorded an additional four Amber-listed and one Red-listed species. Additional Amber-listed birds included stonechat *Saxicola rubicola*, snipe *Gallinago gallinago*, wheatear *Oenanthe oenanthe* and kingfisher *Alcedo atthis.* Flocks of up to fifty meadow pipit *Anthus pratensis* were recorded wintering on the lands and up to six snipe were flushed from the unmanaged grassland during transects. The presence of kingfisher is notable as it is a species listed on Annex I of the Birds Directive and is subject to special conservation measures. Up to two kingfisher were recorded along the stream on the Proposed Development site, most regularly encountered being flushed from the southern bank of the realigned section. This indicates that a kingfisher territory occurs here, and they may breed during the summer. Grey wagtail *Motacilla cinerea,* a Red-listed species was regularly recorded along the riverbank during the winter surveys. Juvenile grey wagtails were noted, which suggests that this species may be breeding in close proximity to the Proposed Development site. During a site visit on 14th January 2020, a flock of 150 lapwing *Vanellus vanellus*, a Red-listed species were recorded feeding on the Proposed Development site. Yellowhammer *Emberiza citrinella*, a Red-listed species was also recorded on the site during winter bird surveys

6.50 Bird species were recorded on an ad-hoc basis during the site visit on the 2nd September 2020, which lies outside of the breeding bird season. Species recorded within the Proposed Development site included amber-listed species- swallow *Hirundo rustica*, starling *Sturnus vulgaris*, house sparrow *Passer domesticus*, and robin *Erithacus rubecula* and one red-listed species - meadow pipit *Anthus pratensis.* Additionally, during the bat survey on the 27th August 2020, a curlew *Numenius arquata* was observed flying over the Proposed Development site. These species are considered to breed within hedgerows, treelines, grassland or buildings within the vicinity of the Proposed Development. The curlew recorded was likely to be on passage and are not considered to breed within the locality of the Proposed Development site.

6.51 Given that red and amber listed bird species were recorded on site, or in the vicinity of, the Proposed Development site during the breeding and winter season, the site has been valued as being of local importance (higher value) for birds.

Amphibians

Desk study results

6.52 The NBDC record search showed of two records of amphibian species protected under the Wildlife Acts or listed on Annex V of the EU's Habitats Directive were returned within the 2km search area - common frog *Rana temporaria* and smooth newt *Lissotriton vulgaris*.

Field survey results

6.53 No signs of amphibians were noted during the field survey. However, there is potential for frogs to breed in the stream and in any wet areas of the Proposed Development site e.g. wet areas in the recolonising bare ground habitat. The Proposed Development site has been valued as being of local importance (higher value) for amphibians.

Summary of ecological evaluation

6.54 Based on results of surveys undertaken at the Proposed Development site, this section summarises the ecological evaluation of all receptors taking into consideration legal protection, conservation status and local abundance, and identifies the Key Ecological Receptors (KERs). KERs are within the zone of influence[10] of the development and are '*both of sufficient value to be material in decision making and likely to be affected significantly*'. To qualify as KERs, features must be of local importance (higher value) or higher as per the criteria in Chapter 6 – Appendix 6.1 of the Appendix document. Features of lower ecological value are not assessed. The highest levels of impact significance for each key ecological receptor 'value' rating are shown in **Error! Reference source not found.**6.4.

Table 6.4 Maximum level of impact significance for Key Ecological Receptors

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

6.55 Table 6.5 summarises all ecological features identified as KERs based on the completion of the desk study and field survey of the Proposed Development site.

Table 6.5 Ecological evaluation of Key Ecological Receptors (KERs)

Habitat / Species	Highest Ecological Valuation Level	Key Ecological Receptor?
Designated Sites		
European Sites	International Importance	Yes
Proposed Natural Heritage Areas	National Importance	Yes
Fauna		
Bats	Local Importance (Higher Value)	Yes
Otter	Local Importance (Higher Value)	Yes
Other mammals	Local Importance (Higher Value)	Yes
Breeding birds	Local Importance (Higher Value)	Yes
Wintering birds	Local Importance (Higher Value)	Yes
Amphibians	Local Importance (Higher Value)	Yes
Other mammals	Local Importance (Low Value)	No
Habitats & Flora		
(Unmanaged) Improved agricultural grassland (GA1)	Local Importance (Low Value)	No
Buildings and artificial surfaces (BL3)	Artificial habitats - holds no ecological value	No
Recolonising bare ground (ED3)	Local Importance (Low Value)	No
Amenity grassland (improved) (GA2)	Local Importance (Low Value)	No
Treelines (WL2)	Local Importance (Higher Value)	Yes

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

Depositing lowland rivers (FW2)	Local Importance (Higher Value)	Yes
Scrub (WS1)	Local Importance (Low Value)	No

Characteristics of the Proposed Development

6.56 The full description of the Proposed Development is detailed in Chapter 2 of this EIA Report. The The Proposed Development includes minor changes to the landscaping from that approved under the Permitted Development but no changes to the surface water attenuation, which remains as granted under the Permitted Development under SDCC Planning Reg. Ref. SD20A/0121. Domestic effluent arising from the welfare facilities at the GIS substation building will be collected in a foul drain within the site and discharged to the existing foul drainage network. The wastewater contribution from the Proposed Development will be minimal. Chapter 8 Hydrology and Chapter 15 Material Assets address the impacts on foul water drainage.

Potential impacts of the Proposed Development

6.57 As per relevant guidelines, potential significant impacts have only been assessed for key ecological receptors (KERs), as listed in Table 6.5. An impact is considered to be ecologically significant if it is predicted to affect the integrity or conservation status of a KER at a specified geographical scale. All impacts are described in the absence of mitigation. In addition to the above guidance, the definitions of duration have been employed as follows:

- temporary: up to 1 year;
- short-term: from 1-7 years;
- medium-term: 7-15 years;
- long-term: 15-60 years; and
- permanent: over 60 years.

Do-nothing scenario

6.58 Under the do-nothing scenario, it is likely that the Proposed Development site would continue to offer suitable habitat for commuting and foraging bats, nesting birds, wintering birds and feeding/ commuting otter. The habitats on the Proposed Development site are not currently under any management regime. Grassland habitat on the Proposed Development site may become encroached by scrub over time. Storm damage may create new PRFs for bats in trees located within the treeline on the Proposed Development site.

Impacts on designated sites

6.59 This section describes and assesses the potential for the Proposed Development to result in likely significant effects on European sites that lie within the Zone of Influence of the Proposed Development. In the context of European sites this is focussed on the habitats and species for which the sites are selected (QIs for SACs and SCIs for SPAs) and the conservation objectives supporting their conservation status in each site. This assessment is directly related to the assessment methodology for European sites required under the Habitats Directive, which is presented in the Appropriate Assessment Screening Report for the Proposed Development that accompanies this application.

6.60 The Appropriate Assessment Screening Report (Scott Cawley Ltd., 2020) concluded there will be no likely significant effects on any European Sites either alone or in-combination with any other plans or projects for the following reasons:

- There is no possibility of direct habitat loss or loss of habitats that support populations of QI/ SCI populations of European sites as a result of the Proposed Development.
- The Proposed Development will not have any measurable effects on water quality in Dublin Bay or the Irish Sea due to the relatively low volume of any surface water run-off or discharge events and due to the level of mixing, dilution and dispersion of any surface water run-off or discharge in the receiving watercourses.
- There is no potential for hydrogeological impacts on European sites as the nearest SAC for which groundwater dependent habitats have been designated. This is as the Proposed Development will not interact directly with the underlying groundwater body, and lies down gradient of the Rye Water Valley/Carton SAC, it cannot influence groundwater conditions in the European site.
- There is no risk of invasive species spreading to European sites as a result of the Proposed Development.

- There are no European sites within the disturbance Zone of Influence of the Proposed Development and therefore there are no disturbance/ displacement impacts predicted to QI/ SCI species associated with European sites.

6.61 There will be no significant impact on any nationally designated sites for the same reasons outlined above in section 6.56. No impacts on the Grand Canal pNHA are predicted as a result of the Proposed Development as it is located 1km from the Proposed Development site and there are no source-pathway-receptor links, hydrological or otherwise.

6.62 There are no significant potential impacts on the Liffey Valley pNHA [000128] c. 4.4km north, North Dublin Bay pNHA [000206] c. 18.6km northeast, South Dublin Bay pNHA [000210] c. 16km northeast and Dolphins, Dublin Docks pNHA [000201] c. 17.2km northeast given the distance between the nationally designated sites and the Proposed Development site, the level of mixing, dilution and dispersion of any surface water run-off/discharges from the Proposed Development site in the receiving watercourses. The possibility of significant impacts can be excluded and the Proposed Development will not have any measurable effects on water quality in the downstream pNHAs listed above.

Construction phase

6.63 The proposed 110kV GIS Substation compound and its 110kV connections will be constructed during the second year of construction on the Permitted Development site with landscaping and two further attenuation ponds that form part of the Permitted Development under Reg. Ref. SD20A/0121 to be completed following completion of the 110kV GIS Substation and its HV connections. This will ensure that the entire permitted landscape and attenuation plan for the site is in place within the first two years following the commencement of construction on the Permitted development site.

6.64 Vegetation clearance as part of the Permitted Development will occur to allow for the implementation of the permitted landscaping plan. The early establishment of the permitted landscape plan, which will occur within the same timeframe as the Proposed Development as outlined in Chapter 2 of this EIA Report, will result in reduced impacts during the construction of the proposed 110kV Substation as site clearance will be minimal and surrounding habitats established. As such, the potential construction impacts section has considered the worst-case scenario for the Proposed Development that will be constructed during the construction of the initial phase of the Permitted Development.

6.65 Potential impacts could arise from:

- Habitat loss resulting from site clearance, soil-stripping, and earthworks;
- Water quality impacts resulting from surface water carrying silt, hydrocarbons or other chemicals into the existing Baldonnel Stream which discharges into the River Liffey via the River Griffeen; and
- Disturbance impacts resulting from noise, dust, lighting and physical disturbance from vehicles, plant, and construction staff.

Impacts on habitats and flora during construction

6.66 The Proposed Development will require the removal of the majority of habitats which have been classified as being of local importance (lower value) i.e. buildings and artificial surfaces, improved agricultural grassland, recolonising bare ground and amenity grassland (improved). These habitats are very common and their removal is not regarded to be a significant ecological impact.

6.67 The proposed 110kV transmission line to the Kilmahud-Corkagh circuit part of the Proposed Development will require the removal of some treeline habitat within the Grange Castle Business Park, which is considered to be of local importance (higher value). Approximately 90m of treeline habitat will be removed to facilitate this element of the Proposed Development. This habitat is fragmented and is relatively minor in area. In the absence of mitigation, the loss of this habitat is regarded to be significant at the local scale only.

6.68 During the construction phase, surface waters carrying silt, hydrocarbons or other chemicals into the Baldonnel Stream, could result in impacts on habitat quality of the stream onsite and in downstream waterbodies in the immediate vicinity locally i.e. the Griffeen River and River Liffey. Taking into account the nature of the Proposed Development, in the absence of mitigation, there is potential for temporary significant impacts on the receiving surface water system at the local scale only.

Impacts on bats during construction

6.69 Temporary lighting required during construction could illuminate previously unlit feeding areas or commuting flight paths making them unsuitable to bats. All bats can be adversely affected by lighting and only Leisler's bats have shown any positive relationship or neutral response to artificial lighting, presumably because they fly well above the lit areas. Therefore, the potential impact on bat activity is regarded to be significant at the local level.

Impacts on otter during construction

6.70 Noise, vibration and increased human presence during the construction phase of the development could result in the temporary disturbance of otter and reduced usage of this section of the Baldonnel Stream for foraging and commuting otter during this time. However, given the industrial nature of the surrounding lands and the level of construction ongoing within other areas of Grange Castle Business Park, the local otter population are likely to be habituated to a degree to human and vehicle related disturbance. Nevertheless, a temporary significant impact at a local scale is predicted on the otter population using the Baldonnel Stream during the construction phase of the Proposed Development.

6.71 Otters are vulnerable to a water pollution incident in the Baldonnel Stream from surface water carrying silt, hydrocarbons or other chemicals entering the watercourse, and which may directly impact otter through direct contact with pollutants or indirectly by affecting their food source and prey items. Such direct or indirect impacts would result in significant impacts on otter at the local scale.

Impacts on birds during construction

6.72 All birds are protected under the Wildlife Acts. If site clearance (vegetation removal) is carried out during the breeding bird season (i.e. from the 1st March to the 31st August), there is potential for significant impacts to breeding bird populations at a local scale only.

6.73 Noise, vibration and increased human presence associated with the construction of the Proposed Development is likely to result in a disturbance impact to local bird populations during the bird breeding season and has the potential to result in reduced breeding success of birds occurring within the site and in green spaces adjacent to the construction zone. Given the industrial nature of the surrounding lands and the level of construction going on within other areas of Grange Castle Business Park, birds in the locality are expected to be somewhat habituated to a degree to human and vehicle related disturbance. However, during the construction phase disturbance impacts on breeding birds are expected to result in a temporary significant impact at a local scale.

6.74 The Proposed Development will result in the loss of former agricultural grassland which provides suitable feeding and roosting habitat for a range of wintering birds such as yellowhammer, snipe and lapwing. Similar agricultural fields are present in the surrounding area for use by bird species however, the Proposed Development is predicted to have a permanent significant impact at a local scale.

6.75 In addition, birds that use aquatic habitats to feed, roost or breed are vulnerable to a pollution incident in the Baldonnel Stream from surface water carrying silt, hydrocarbons or other chemicals entering the watercourse. Such an event may directly impact kingfisher and grey wagtail through direct contact with pollutants or indirectly by affecting their food source and prey items. Pollution of water as a result of construction works on the Proposed Development site may result in temporary significant impacts on these bird species at the local scale.

Impacts on Common Frog during construction

6.76 No amphibians were recorded during the site surveys. However, there is a risk of direct mortality/injury to common frogs, which may arise from the site clearance of suitable habitats within the Proposed Development site. Due to common frog being a mobile species, and the presence of suitable habitat in the wider environs, the risk of disturbance/mortality is not considered significant at any geographic level.

6.77 Common frog is protected under the Wildlife Acts and it is an offence to hunt, take or kill them, or willfully to interfere with or destroy their breeding places. Mitigation measures have been provided to ensure adherence to the Wildlife Acts., see paragraphs 6.98-6.100.

Operational phase

6.78 Potential impacts could arise from:

- Artificial lighting impacts;
- Disturbance impacts results from increased human presence; and
- Water quality impacts resulting from surface water carrying silt, hydrocarbons or other chemicals into the existing Baldonnel Stream which discharges into the River Liffey via the River Griffeen.

Impacts on habitats and flora during operation

6.79 Surface waters carrying silt, hydrocarbons or other chemicals into the Baldonnel Stream, could result in impacts on habitat quality of the stream onsite and downstream waterbodies in the immediate vicinity i.e. the Griffeen River.

Impacts on bats during operation

6.80 The presence of artificial lighting across the Proposed Development during the operational phase is likely to result in some impact to bats commuting through or feeding within the Proposed Development site. All bats can be adversely affected by lighting and only Leisler's bats have shown any positive relationship or neutral response to artificial lighting, presumably because they fly well above the lit areas. Therefore, the potential impact on bat activity is regarded to be significant at the local level.

Impacts on otter during operation

6.81 Otter are vulnerable to a water pollution incident in the Baldonnel Stream from surface water carrying silt, hydrocarbons or other chemicals entering the watercourse, and which may directly impact otter through direct contact with pollutants or indirectly by affecting their food source and prey items. Such direct or indirect impacts would result in significant impacts on otter at the local scale. It is likely that during the operational phase of the Proposed Development any pollution event would be short-term and therefore resulting in a temporary impact.

6.82 Noise and increased human presence during the operational phase of the Proposed Development may result in the disturbance of otter and reduced usage of this section of the Baldonnel Stream for foraging. However, given the industrial nature of the surrounding lands and the level of construction going on within other areas of Grange Castle Business Park, the local otter population are likely to be habituated to a degree of human and vehicle related disturbance. As such disturbance impacts on otter during the operation of the Proposed Development, are not expected to result in a significant impact at any geographical scale.

Impacts on birds during operation

6.83 Noise, vibration and increased human presence associated with the operational phase of the Proposed Development may result in a disturbance impact to local breeding bird populations during the bird breeding season. However, given the industrial nature of the surrounding lands and the level of construction going on within other areas of Grange Castle Business Park, birds on the Proposed Development site are likely to be habituated to a degree to human and vehicle related disturbance. As such disturbance impacts on birds during the operation of the Proposed Development, are not expected to result in a significant impact at any geographical scale.

6.84 Surface water carrying silt, hydrocarbons or other chemicals into the Baldonnel Stream, may reduce the availability and visibility of prey to bird species associated with aquatic habitats such as kingfisher and grey wagtail. Pollution of water on the Proposed Development site as a result of pollution arising from the Proposed Development could result in significant impacts on birds associated with aquatic habitats at the local scale.

Remedial and mitigation measures

Construction phase

Pollution prevention

6.85 A draft CEMP is included as part of the Proposed Development planning application documents. The CEMP will be refined by the works contractor prior to commencement of construction and will be implemented by all contractors on site. This document will ensure that storm water and wastewater runoff are managed and will not cause an off-site environmental impact. This document will be developed to include the following:

- Silt control on roads;
- Discharge water from dewatering systems;
- Diversion of clean water;
- Treatment and disposal of wastewater from general clean-up of tools and equipment;
- Spills control;
- A buffer zone of at least 20m separating working machinery from watercourses;
- A prohibition on machinery entering watercourses;
- Refueling of machinery off-site or at a designated bunded refueling area; and
- Silt trapping and oil interception (to be considered where surface water runoff may enter watercourses).

6.86 The Outline Construction Management Plan (CSEA Consulting Engineers, 2020) specifies that the following general pollution prevention measures will be implemented:

- It will not be permitted to discharge into any newly constructed storm water systems or watercourse without adhering to the conditions of the discharge licence;
- Only approved storage system for oil/ diesel within the site will be permitted. The bunded area will accommodate the relevant oil/ diesel storage capacity in case of accidental spillage. Any accidental spillages will be dealt with immediately on site however minor by containment/ removal from site;
- The washing out of concrete trucks on site will not be permitted as they are a potential source of high alkalinity in watercourses. Consequently, it is a requirement that all concrete truck washout takes place in the ready-mix depot;
- The Site Management Team will maintain a record of all receipts for the removal of toilet or interceptor waste off site to ensure its disposal in a traceable manner; and
- The cleaning of public roads in and around the subject site will be undertaken to reduce environmental impacts and care will be taken to prevent any pollution of watercourses

6.87 The mitigation measures outlined in the Hydrology chapter (Chapter 8) of this EIAR will prevent pollution of the Baldonnel Stream and the receiving surface water network. These include measures which prevent contaminated surface water run-off entering the stream, measures to prevent spillage of fuels and chemicals, measures to deal with accidental releases and measures to prevent impacts arising from the management of soil removal and compaction.

Habitats and flora

6.88 Invasive species on the site, butterfly-bush *Buddleia davidii,* will be appropriately controlled and eradicated using either physical or chemical control methods, such as:

- Physical removal of the plants using techniques such as cutting and grubbing and/or hand picking for smaller infestations. Mechanical removal can also be used if plants are large. Removed plant material will be chipped and mulched to prevent regrowth of plants;
- Chemical control can be undertaken using a herbicide treatment during active growth in late summer or spring. This can be brushed onto cut back stumps and should only be used by those experienced in this method. Glyphosate can be applied as a foliar spray during dry weather in summer upon limited infestations of young plants. This will require follow-up at 6 monthly intervals where re-growth can occur, especially for Butterfly-bush; and,
- Non-native invasive species will not be included in landscape planting scheme as part of the Proposed Development.

6.89 The landscape strategy[11] associated with the Permitted Development consented under SDCC Planning Reg. Ref. SD20A/0121 will enhance the biodiversity value of the Proposed Development site and provide green infrastructure links to the surrounding area. The landscape strategy forms part of Chapter 11 of the EIA Report with the Permitted and Proposed Landscape Plan forming Chapter 11 - Appendix 11.1 and 11.2 of this EIA Report.

6.90 The north-eastern treeline habitat along the Baldonnel Stream to be lost as part of construction works as part of the Permitted Development will be re-worked around the wayleaves and strengthened with native tree planting. This will create commuting and foraging corridors within the Proposed

[11] Kevin Fitzpatrick Landscape Architecture (2020)

Development site for a range of fauna species. A woodland belt is permitted along the northern boundary of the site, along the route of the proposed 110kV transmission line to the Kilmahud-Corkagh circuit. Large, semi-mature tree planting has been permitted for this area and will provide an immediate ecological corridor within the site. Large areas of native wildflower meadow are also permitted along the Baldonnel Stream and to the east of the proposed substation and will provide foraging and resting habitat for a range of fauna, particularly pollinators and birds. Planting lists for woodlands have included pollinator friendly species as recommended by the All Ireland Pollinator Plan 2015-2020.

6.91 Two of the three attenuation ponds permitted as part of the Permitted Development consented under SDCC Planning Reg. Ref. SD20A/0121 lie within the footprint of the Proposed Development site. These areas will enhance the biodiversity value of the Proposed Development site. The range of proposed habitats in this area will provide a refuge for flora and fauna species.

6.92 The installation of bat and bird boxes in appropriate locations within the Proposed Development site were proposed as part of the Permitted Development consented under SDCC Planning Reg. Ref. SD20A/0121. Bird boxes have been selected to provide nesting habitat for birds of conservation concern that have been recorded on the site i.e. kingfisher, swallow and grey wagtail. Woodcrete bat boxes will be installed in areas with low light levels, in close proximity to suitable commuting and foraging features.

Bats

6.93 Construction phase lighting will be designed to be sensitive to the presence of bats commuting and foraging bats along the northern tree-line and southern boundary to the Castlebaggot substation and should adhere to the following guidance:

- *Bats & Lighting: Guidance Notes for Planners, engineers, architects and developers* (Bat Conservation Trust, 2010);
- *Guidance Notes for the Reduction of Obtrusive Light GN01 (Institute of Lighting Professionals, 2020); and*
- *Bats and Lighting in the UK – Bats and the Built Environment Series (Bat Conservation Trust UK, January 2008).*

6.94 The landscape strategy[12] under the Permitted Development consented under SDCC Planning Reg. Ref. SD20A/0121 allows for the planting of native treelines along the western and northern boundary of the Castlebaggot substation and native woodlands to be planted to the east and north of the proposed substation. This proposed tree planting will further mitigate the effects of light spill.

6.95 No further mitigation measures are required.

Birds

6.96 In order to avoid disturbance of breeding birds, their nests, eggs and/or their unfledged young, all works involving the demolition of buildings and/or removal of trees will be undertaken outside of the nesting season (1st March to 31st August inclusive). If vegetation removal must take place in the nesting season, then checks for breeding birds will be undertaken immediately prior to site clearance. Where active nests are found, works must cease until such a time that the nests are deemed inactive.

6.97 As part of the Permitted Development consented under SDCC Planning Reg. Ref. SD20A/0121, alternative nesting habitat for birds of conservation concern are to be erected that were recorded on the Proposed Development site. Dipper/ wagtail boxes will be installed along the stream to provide suitable nesting habitat for grey wagtails. Kingfisher tunnels will be installed into the banks of the stream[13]. These will be installed during the first phase of the Permitted Development which commenced in Q3 2020. These mitigation measures have been permitted under the Permitted Development (SDCC Planning Reg. Ref. SD20A/0121).

Common frog

[12] Kevin Fitzpatrick Landscape Architcture (2020)

[13] Guidelines on the installation of nest boxes: Chris Du Feu (2005). *Nestboxes. Extracts from British Trust for Ornithology Field Guide Number 23 with some additions and amendments.* British Trust for Ornithology, The Nunnery, Thetford, Norfolk. Available from: https://www.bto.org/sites/default/files/u15/downloads/publications/guides/nestbox.pdf

6.98 If works to clear any of the habitat features suitable to support common frog are to begin during the season where frogspawn or tadpoles may be present (February – mid-summer), a pre-construction survey will be undertaken to determine whether breeding common frogs are present.

6.99 Any frog spawn, tadpoles, juvenile or adult frogs present will be captured and removed from the affected habitat by hand net and translocated to the nearest area of available suitable habitat, beyond the Zone of influence of the Proposed Development.

6.100 Any capture and translocation works will be undertaken immediately in advance of site clearance/construction works commencing.

Operational phase

Pollution prevention

6.101 Pollution of the Baldonnel Stream as a result of surface water run-off during the operation phase of the development will be prevented as outlined in the *'Engineering Services Report'* (CS Consulting, 2020). In summary, all surface waters from hardstanding areas within the Proposed Development site will pass through an oil interceptor and 'forebays' to remove detritus from the water. These waters will be retained onsite in one of the three attenuation areas prior to controlled release into the Baldonnel Stream.

Operational lighting

6.102 Operational phase lighting will be designed to be sensitive to the presence of bats commuting and foraging bats along the northern treeline and southern boundary to the Castlebaggot substation and should adhere to the following guidance:

- *Bats & Lighting: Guidance Notes for Planners, engineers, architects and developers* (Bat Conservation Trust, 2010);
- *Guidance Notes for the Reduction of Obtrusive Light GN01 (Institute of Lighting Professionals, 2020);*
- *Bats and Lighting in the UK – Bats and the Built Environment Series (Bat Conservation Trust UK, January 2008).*

6.103 No further mitigation measures are required.

Residual impacts

Designated sites

6.104 As concluded above and in the Appropriate Assessment Screening Report, there will be no likely significant effects on designated sites as a result of the Proposed Development. Therefore, there is no potential for residual impacts.

Habitats and flora

6.105 With the full and successful implementation of the mitigation measures, no residual impacts are predicted on these habitats at any geographical scale.

Bats

6.106 With the full and successful implementation of the mitigation measures, no residual impacts are predicted on foraging/ commuting bats at any geographical scale.

Otter

6.107 With the full and successful implementation of the mitigation measures, no residual impacts are predicted on foraging/ commuting otter at any geographical scale.

Breeding birds

6.108 Residual impacts on breeding birds include temporary displacement from the Proposed Development site during the construction phase and vegetation clearance. However, assuming the full and successful implementation of the mitigation measures, no long-term significant impacts are predicted on breeding birds at any geographical scale.

Wintering birds

6.109 Residual impacts on wintering birds include permanent loss of agricultural grassland habitat. This is considered to be a permanent significant impact at the local scale

Common frog

6.110 With the full and successful implementation of the mitigation measures, no residual impacts are predicted on common frog at any geographical scale.

Conclusion

6.111 The Proposed Development is located in an area of low ecological value and as such predicted to have a ***neutral imperceptible*** effect on biodiversity.

6.112 The cumulative impact assessment is addressed in Chapter 16 of this EIA Report. Interactions are addressed within Chapter 17 of this EIA Report.

Monitoring

6.113 In order to ensure successful implementation of the mitigation measures relating to potential light spill and bats, monitoring of activity will be undertaken pre-construction and following completion of the Proposed Development. A comparison of bat activity will be undertaken and if necessary additional adjustments to the lighting will be made to address any unforeseen impacts.

7. LAND, SOIL, GEOLOGY AND HYDROGEOLOGY

Introduction

7.1 This chapter assesses and evaluates the potential impacts of the Proposed Development described in Chapter 2 (Description of the Proposed Development) on the land, soils, geological and hydrogeological environment. The impact on hydrology is addressed in Chapter 8.

Methodology

7.2 The quality, magnitude and duration of potential effects are defined in accordance with the criteria provided in the EPA Draft *'Guidelines on the information to be contained in Environmental Impact Assessment Reports'* (2017) as outlined in Table 1.1 of Chapter 1. The duration of each effect is considered to be either momentary, brief, temporary, short-term, medium term, long-term, or permanent. Momentary effects are considered to be those that last from seconds to minutes. Brief effects are those that last less than a day. Temporary effects are considered to be those which are construction related and last less than one year. Short term effects are seen as effects lasting one to seven years; medium-term effects lasting seven to fifteen years; long-term effects lasting fifteen to sixty years; and permanent effects lasting over sixty years.

Guidelines

7.3 This assessment has been carried out generally in accordance with the following guidelines:

- EPA Draft *'Guidelines on the information to be contained in Environmental Impact Assessment Reports'* (2017);
- Environmental Impact Assessment of Projects - Guidance on the preparation of the Environmental Impact Assessment Report, European Union 2017;
- Institute of Geologists of Ireland (IGI) '*Guidelines for the preparation of Soils Geology and Hydrogeology Chapters of Environmental Impact Statements*' (2013); and
- National Roads Authority (NRA) '*Guidelines on Procedures for the Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes'* (2009).

7.4 The principal attributes (and impacts) to be assessed include the following:

- Geological heritage sites in the vicinity of the perimeter of the Proposed Development;
- Landfills, industrial sites in the vicinity of the Proposed Development and the potential risk of encountering contaminated ground;
- The quality, drainage characteristics and range of agricultural uses of soil around the Proposed Development;
- Quarries or mines in the vicinity, the potential implications (if any) for existing activities and extractable reserves;
- The extent of topsoil and subsoil cover and the potential use of this material on site as well as requirement to remove it off-site as waste for recovery or disposal;
- High-yielding water supply springs/wells in the vicinity to within a 2 km radius and the potential for increased risk presented by the Proposed Development;
- Classification (regionally important, locally important etc.) and extent of aquifers underlying the perimeter area and increased risks presented to them by the Proposed Development associated with aspects such as for example removal of subsoil cover, removal of aquifer (in whole or part), drawdown in water levels, alteration in established flow regimes, change in groundwater quality;
- Natural hydrogeological/ karst features in the area and potential for increased risk presented by the activities at the site;
- Groundwater-fed ecosystems and the increased risk presented by operations both spatially and temporally; and
- Vulnerability of the Proposed Development to major disasters from a geological and hydrogeological standpoint such as landslides and seismic activity.

Sources of Information

7.5 Desk-based geological and hydrogeological information on the substrata underlying the extent of the Proposed Development and surrounding areas was obtained through accessing databases and other archives where available. Data was sourced from the following:

- Geological Survey of Ireland (GSI) - online mapping, Geo-hazard Database, Geological Heritage Sites & Sites of Special Scientific Interest, Bedrock Memoirs and 1:100,000 mapping;
- Teagasc soil and subsoil database;
- Ordnance Survey Ireland - aerial photographs and historical mapping;
- Environmental Protection Agency (EPA) – website mapping and database information;
- National Parks and Wildlife Services (NPWS) – Protected Site Register;
- South Dublin County Council- illegal landfill information; and
- Research papers referred to in this chapter.

7.6 Site specific data was derived from the following sources:

- Information from the Dub002 Technical Due Diligence undertaken by O'Connor Sutton Cronin & Associates, Multidisciplinary Consulting Engineers (OCSC) August 2019;
- Various design site plans and drawings; and
- Consultation with civil engineers, Clifton Scannell Emerson Associates (CSEA)

Receiving environment

7.7 The receiving environment is discussed in terms of land geology, soils, hydrogeology and site history including potential for existing and historical contamination. The Proposed Development is to be located in the Grange Castle South Business Park, Clondalkin, Dublin 22 on EE zoned lands with the objective "*To provide for enterprise and employment related uses"*. Much of the surrounding lands are already developed.

Topography and setting

7.8 The site falls generally from south to north, with topographical levels ranging from c. 75mAOD in the south east to c. 65mAOD in the north-west of the Proposed Development site. This area surrounding the proposed substation location is currently greenfield and was previously used for agriculture purposes. An assessment of site history using historical maps (OSI, 2019) indicates that the site has been in agricultural use up until recent years since the earliest mapping available (1837-1842).

7.9 The Proposed Development site is in the catchment of the Griffeen River and the existing drainage is discussed in Chapter 8 - Hydrology of this EIA Report.

Areas of Geological Interest & Historic Land-Use

7.10 The Geological Survey of Ireland (GSI) Public Viewer www.gsi.ie/mapping was reviewed to identify sites of geological heritage for the study area. There are no recorded sites on the development site or in the vicinity. A full audit has not yet been completed for Dublin; however, there is no evidence of any site which could be considered suitable for protection under this program nor is there any recorded in the South Dublin County Development Plan 2016-2022. The closest geological heritage site is the Belgard Quarry, which is located 3 km to the south-east of the site.

7.11 The majority of the Proposed Development site (110kV GIS substation and parts of the transmission lines) is within the Permitted Development site granted under SDCC Planning Reg. Ref. SD20A/0121. The Permitted Development site is located on lands that are bounded by the realigned Baldonnel Road to the west; by the old and new Nangor Road to the north; by agricultural fields and the Grange Castle Motor Company to the east; and by the Grange Castle South Access Road to the south. The Permitted Development has recently commenced development.

7.12 The route of the underground 110kV transmission line to the Castlebaggot Substation passes around its northern and part of the western boundary before passing into the Substation approximately halfway along its western boundary with the Proposed Development site.

7.13 The route of the underground 110 kV transmission line to the Kilmahud-Corkagh circuit passes to the north of Building C and Building A as permitted under Reg. Ref. SD20A/0121. It then passes over the former Nangor Road (now cut off at either end) before passing across SDCC owned land before crossing the realigned Nangor Road and passing along the wayleave on the east / south of the Grange Castle internal Business Park Road before looping around to connect to the Kilmahud-Corkagh circuit. The route of both these transmission lines are shown in Figure 2.2 within Chapter 2 of this EIA Report.

7.14 The route of the proposed 49 kVA cable installation is shown in Figure 2.4 within Chapter 2 of this EIA Report. It will link from existing infrastructure within the wayleave along the Grange Castle South Business Park Road from where it will extend up within the wayleave to the west of the Castlebaggot Substation before connecting into the proposed Clutterland 110 kV GIS Substation.

7.15 According to the EPA (2019), there are a number of licensed Integrated Pollution Prevention and Control (IPPC) and waste facilities in the vicinity, but these are located c. 3 km away from the site. Consultation with South Dublin County Council confirmed that there are no known illegal/historic landfills within 500 meters of the site.

Regional Soils

7.16 Figure 7.1 shows the regional soil coverage in the area of the Proposed Development site. The GSI/ Tegasc mapping shows the soil type beneath the local area is composed of BminPD, mainly basic poorly drained soils and BMinDW mainly basic deep well drained soils.

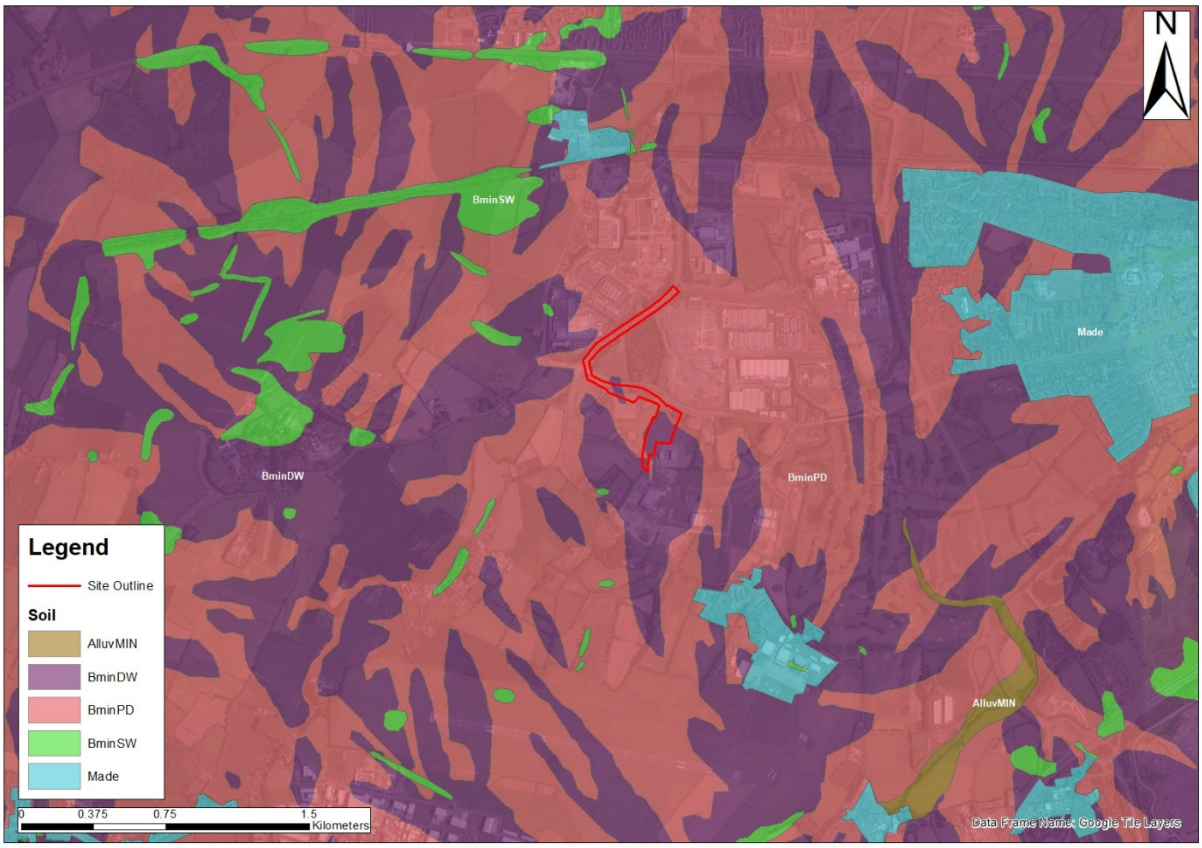

Figure 7.1 Soils map for the Proposed Development site (boundary indicated in red) (GSI, 2019)

7.17 The Quaternary geological period extends from about 1.5 million years ago to the present day and can be sub-divided into the Pleistocene Epoch, which covers the Ice Age period and which extended up to 10,000 years ago, and the Holocene Epoch, which extends from that time to the present day. The GSI subsoil mapping database of the quaternary sediments in the area of the subject site indicates two principal soil types, as shown in Figure 7.2 below. These comprise Quaternary Glacial Till (TLs). The Glacial Till is derived from limestone and is a common soil cover in this region.

Figure 7.2 Subsoils map for the Proposed Development site (boundary indicated in red) (GSI, 2020)

7.18 The following ground conditions were encountered in the site-specific due diligence investigations undertaken in April and May 2019 by IGSI Ltd and O'Connor Sutton Cronin Engineers on lands within and in the vicinity of the Proposed Development site. (OCSC, 2019). There were 16 no. cable percussive boreholes (with rotary coring carried out at 8 of the locations) drilled and 6 no. trial pits excavated across the site (Figure 7.3 shows the borehole/trial pit locations).

- The site is overlain by topsoil in most locations. However, a thin covering of Made Ground was encountered in boreholes BH01 and BH02 comprising granular fill and gravelly clay.
- The underlying deposits comprise sandy gravelly clay. Stiff and very stiff deposits were generally encountered within 1.0 to 1.5m below ground level (BGL). Limestone bedrock was confirmed to be present at depths of typically 2.0 to 2.6m BGL, deepening to 3.6 m BGL towards the north of the site (RC07).
- Based on the results of the standard penetration (SPT) tests, bearing pressures of the order of 150 kPa could be assumed for the stiff gravelly clay soils, increasing to c. 250 to 300 kPa for the very stiff deposits.
- During the site investigations, water strikes were encountered in most boreholes at depths between 2.0m and 2.5m BGL. Moderate groundwater ingress was also observed in several trial pits. However, when the rotary core holes were drilled, there was no groundwater inflows in the bedrock. This would suggest that the water strikes found in the boreholes and trial pits were from perched water at the weathered interface of the overburden and bedrock.

Figure 7.3 Site Investigation Sample Locations (Proposed Development boundary indicated in red and Permitted Development boundary in blue) (Source: OCSC, 2019)

7.19 The site investigation works carried out included the collection of a number of soil and groundwater samples the results of these and. included in the Environmental Site Assessment and Generic Quantitative Risk Assessment (GQRA) undertaken by OCSC Engineers and included in Chapter 7 - Appendix 7.2 of the Appendix document of this EIA Report.

7.20 A GQRA was undertaken using commercial GACs to assess the risk to future commercial users. None of the soil samples contained concentrations in excess of the GAC Commercial land use values. Two parameters, barium and zinc, showed mildly elevated concentrations in groundwater samples however it is not considered that these present a risk to future users nor that they represent a significant plume of contamination. No LNAPL (floating hydrocarbon) or DNAPL (settled/sinking hydrocarbon) layer was observed and/or sampled. A waste soil assessment was undertaken on five (5 No.) samples collected and submitted for a suite of analysis appropriate for completing a Waste Soil Classification (TP1, TP2, TP3, TP4, TP6). All of the samples were classified as Inert, as expected given the greenfield nature of the site.

Regional Geology

7.21 Inspection of available GSI records (2020) show that the bedrock geology underlying the site and surrounding area is dominated by rocks of Carboniferous Age. The site and local area is underlain by the Lucan formation, also called the Dinantian (Upper Impure) Limestones or 'Calp' limestone that is dark grey to black limestone and shale, (Figure 7.4 on next page).

7.22 No bedrock outcrops were encountered during the site investigations or are recorded by the GSI within the red line of the Proposed Development. However, bedrock outcrops occur at several locations within this region as illustrated in Figure 7.2. The GSI database presently lists no karst features in the immediate vicinity of the subject site and significant karstification would not be expected in this type of limestone.

7.23 In terms of the structural relationship of the area, the GSI (2020) bedrock geology map (100K structural database) shows some fault lines to the south and east of the subject site.

Figure 7.4 Bedrock geology map (Proposed Development site indicated in red) (GSI, 2020)

Regional Hydrogeology

Description of the Groundwater Body

7.24 The GSI has devised a system for classifying the bedrock aquifers in Ireland. The aquifer classification for bedrock depends on a number of parameters including, the area extent of the aquifer (km^2), well yield (m^3/d), specific capacity ($m^3/d/m$) and groundwater throughput (mm^3/d). There are three main classifications: regionally important, locally important and poor aquifers. Where an aquifer has been classified as regionally important, it is further subdivided according to the main groundwater flow regime within it. This sub-division includes regionally important fissured aquifers (Rf) and regionally important karstified aquifers (Rk). Locally important aquifers are sub-divided into those that are generally moderately productive (Lm) and those that are generally moderately productive only in local zones (Ll). Similarly, poor aquifers are classed as either generally unproductive except for local zones (Pl) or generally unproductive (Pu).

7.25 The bedrock aquifers underlying the Proposed Development site according to the GSI National Draft Bedrock Aquifer Map 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. Figure 7.5 presents the bedrock aquifer map for the Proposed Development area.

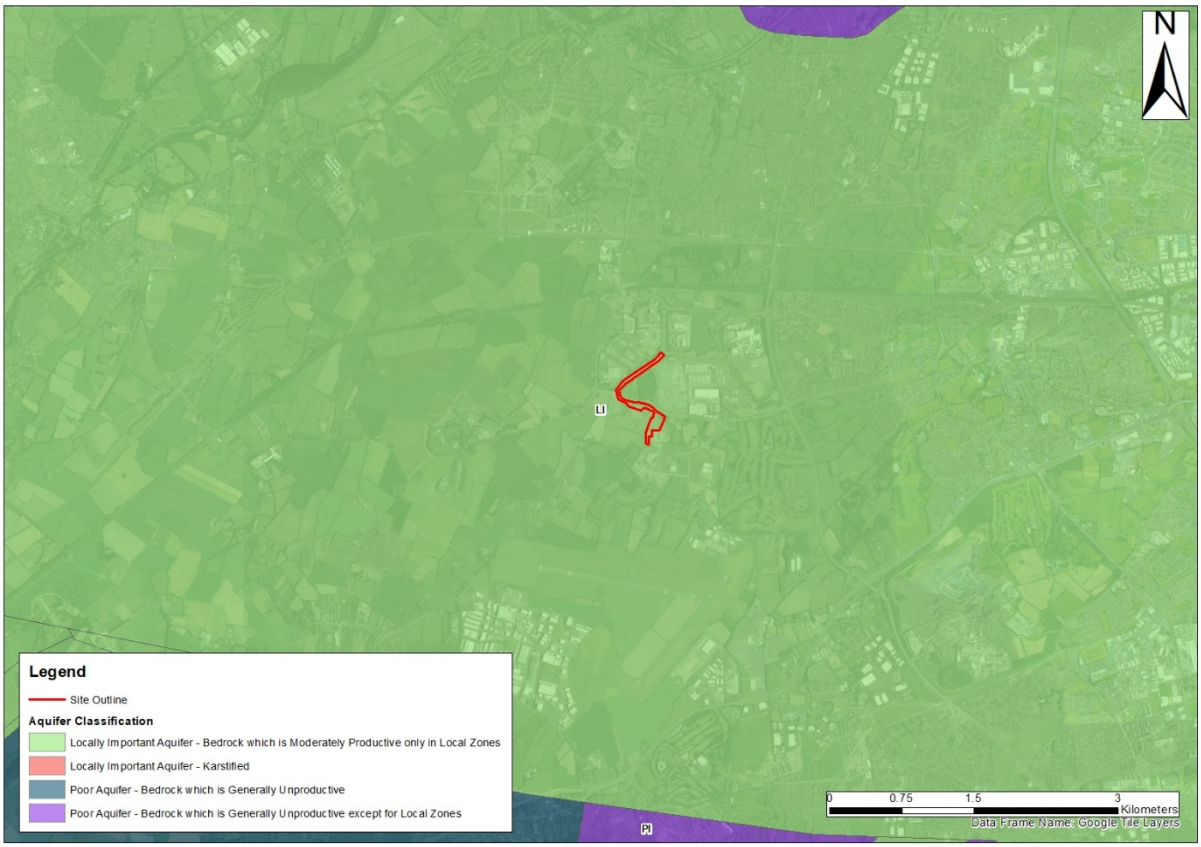

Figure 7.5 Aquifer Classification map (GSI, 2020) (Proposed Development site boundary shown in red)

7.26 Aquifer vulnerability is a term used to represent the intrinsic geological and hydrogeological characteristics that determine the ease with which groundwater may be contaminated generally by human activities. Due to the nature of the flow of groundwater through bedrock in Ireland, which is almost completely through fissures/ fractures, the main feature that protects groundwater from contamination, and therefore the most important feature in the protection of groundwater, is the subsoil (which can consist solely of or of mixtures of peat, sand, gravel, glacial till, clays or silts).

7.27 The GSI currently classifies the aquifer vulnerability in the region of the Proposed Development as 'Extreme' (E) on the west of the site and 'High' (H) on the east of the site. Extreme vulnerability indicates an overburden depth of 0-3m is present, while High vulnerability indicates an overburden depth of 3-5m is present. Site investigation confirmed that presence of limestone bedrock was found at depths that were typically in the range 2.0 to 2.6 m BGL. This can be seen in Figure 7.6 found above.

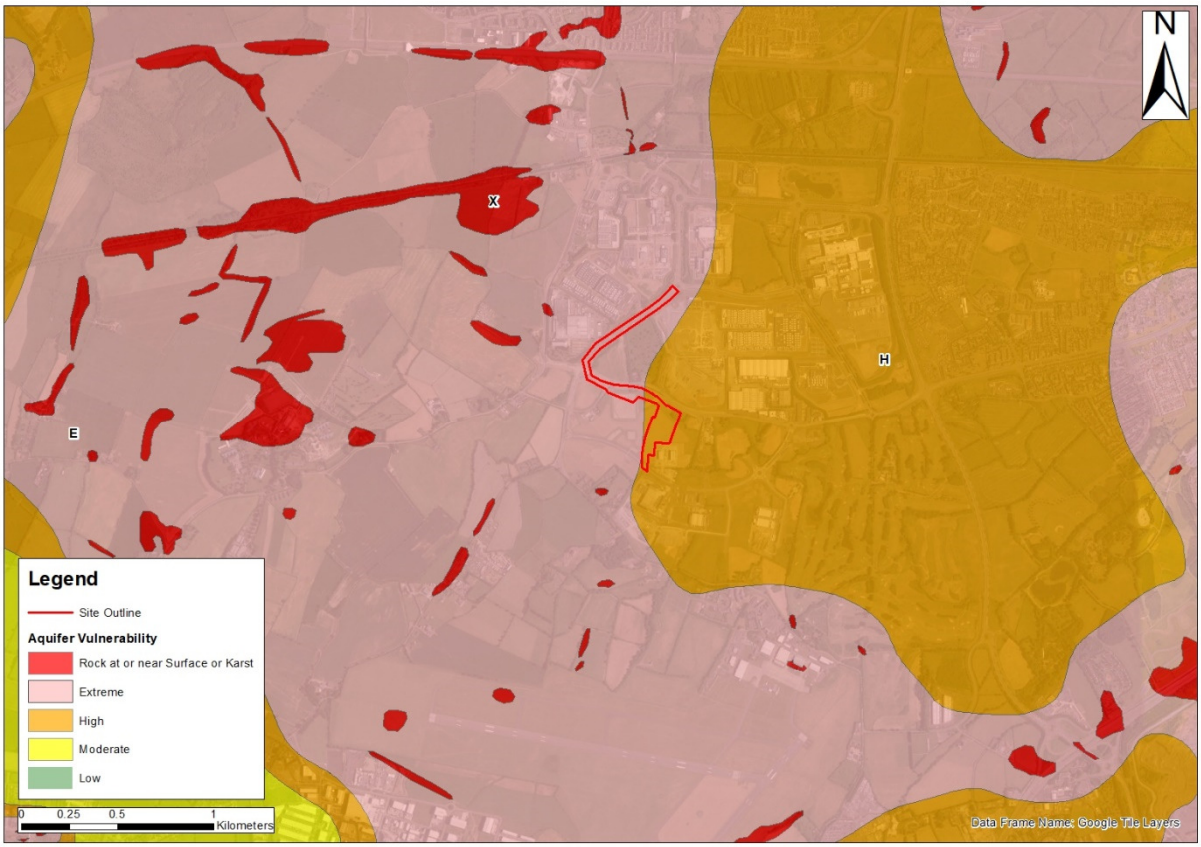

Figure 7.6 Aquifer Vulnerability map (GSI, 2020) (Proposed Development site shown in red)

Groundwater Wells and Flow Direction

7.28 The GSI Well Card Index is a record of wells drilled in Ireland, water supply and site investigation boreholes. It is noted that this record is not comprehensive as licensing of wells is not currently a requirement in the Republic of Ireland. This current index does not show any wells drilled or springs at the site or surrounding area with the nearest recorded wells located over 3 km to the west and east of the site. The area is serviced by public mains therefore it is unlikely that any wells are used for potable supply. The site is not located near any public groundwater supplies or group schemes. There are no groundwater source protection zones in the immediate vicinity of the site

7.29 Figure 7.7 below presents the GSI well search for the area surrounding the site (Note this source does not include all wells) and Table 7.1 on the following page summarises the details of wells recorded within this search area.

Figure 7.7 GSI Well Search (GSI, 2020) (Proposed Development site boundary shown in red)

Table 7.1 GSI Well Index Table from well search (GSI, 2019)

GSI Name	Type	Depth to Bedrock	Townland	County	Use	Yield Class	Yield m3/d
2923SEW006	Borehole	3	Clondalkin	Dublin	Industrial	Good	157.1
2923SEW005	Borehole	1.2	Clondalkin	Dublin	Industrial	Good	185
2923SEW018	Borehole	6.3	Wilkinstown	Dublin	Industrial	Excellent	480
2923EW041	Spring		Bridswell Common	Dublin			
2923SEW025	Borehole	7	Fox and Geese	Dublin	Industrial	Good	384
2923WW207	Borehole	1.5	Lucan	Dublin	Unknown	Poor	35
2921NEW002	Borehole	2.1	Cheeverstown	Dublin	Unknown	Good	109.1
2921NEW003	Borehole		Belgard	Dublin	Industrial	Excellent	654
2921NWW007	Spring		Rathcole	Dublin			
2921NWW004	Borehole	0.9	Highdownhill	Dublin	Domestic		
2921NWW130	Borehole	6	Lyons Demesne	Dublin	Unknown	Good	390
2921NWW128	Borehole	30	Lyons Demesne	Dublin	Unknown	Poor	10
2921NWW129	Borehole		Lyons Demesne	Dublin	Unknown	Moderate	75
2923SWW205	Spring		Loughtown Lower	Dublin			
2923SW196	Borehole	1.2	Loughlinstown	Dublin	Other		
2923SWW129	Borehole	3.1	Stacumny	Dublin	Unknown	Good	218.2
2923SWW202	Borehole	2	Backstown	Dublin	Other	Poor	17.5
2923SWW203	Borehole	3	Backstown	Dublin	Other		
2923SWW204	Borehole	3	Backstown	Dublin	Other	Poor	39.9
2923SWW133	Borehole	2.5	Castletown	Dublin	Other		
2923SWW134	Borehole	3.5	Castletown	Dublin	Other		
2923SWW135	Borehole	2.2	Castletown	Dublin	Other		
2923SWW136	Borehole	3.9	Castletown	Dublin	Other		

7.30 Based on a review of available information, local groundwater flow is expected to be to the north. Information taken from the due diligence states that groundwater ingress occurred in most boreholes at depths of between 2.0 and 2.5m BGL i.e. the weathered surface. Final levels were in the range 0.5 to 1.4m BGL. Moderate groundwater ingress was also observed in several trial pits. However, when the rotary core holes were drilled, there was no groundwater inflows in the bedrock. This would suggest that the water strikes found in the boreholes and trial pits were from perched water at the weathered interface of the overburden and bedrock.

Groundwater quality

7.31 The European Communities Directive 2000/60/EC established a framework for community action in the field of water policy (commonly known as the Water Framework Directive [WFD]). The WFD required '*Good Water Status'* for all European water by 2015, to be achieved through a system of river basin management planning and extensive monitoring. 'Good status' means both *'Good Ecological Status'* and *'Good Chemical Status'*.

7.32 The Groundwater Body (GWB) underlying the site is the Dublin GWB (EU Groundwater Body Code: IE_EA_G_008). Assessments carried out under the 1st Cycle Water Framework Directive 2013-2018 concluded an overall groundwater status as "*Good*" through the assessment programme. Currently the Dublin GWB has a WFD risk score of "*not at risk*" meaning the Dublin GWB is likely to meet its WFD targets. Figure 7.8 shows the current Dublin GWB WFD mapping for the Proposed Development area.

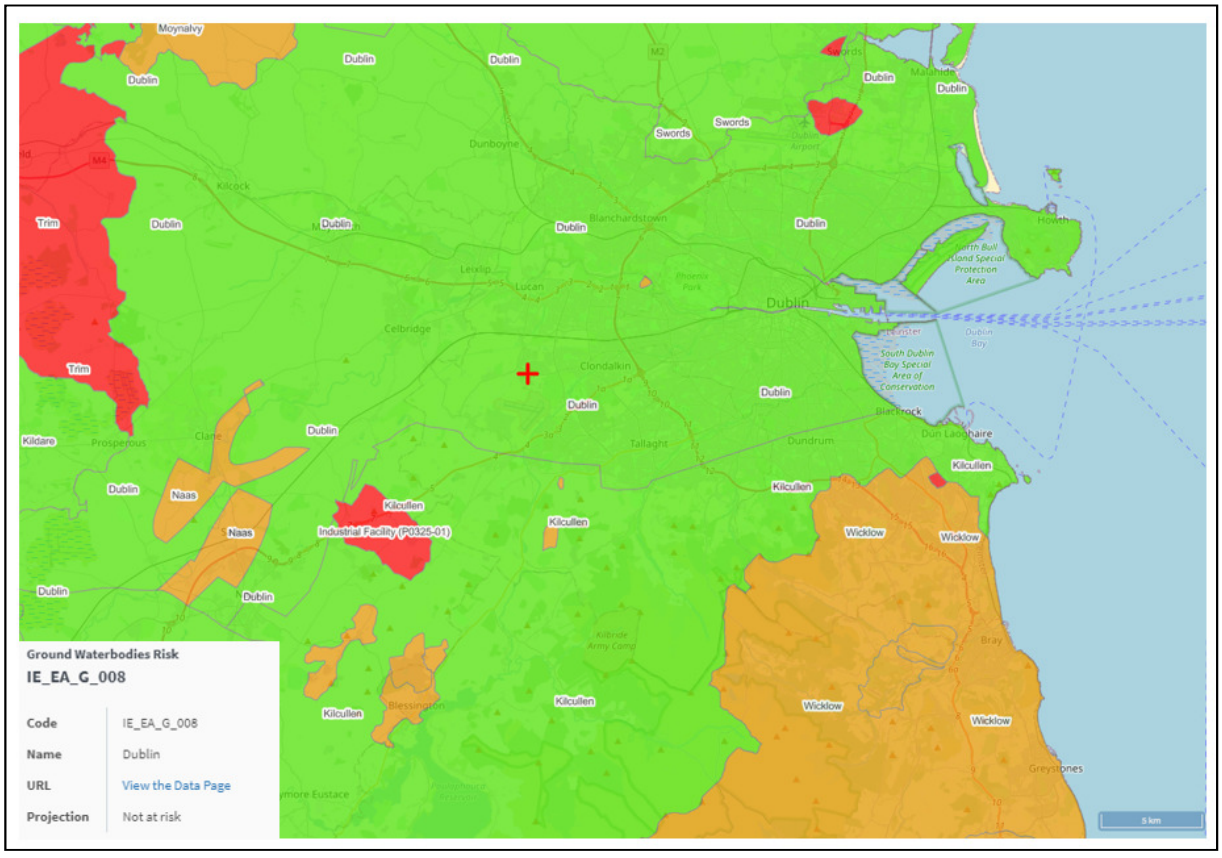

Figure 7.8 Dublin Groundwater Body Current WFD Status "Not at Risk" (EPA, 2020). Proposed Development area shown with red cross.

Hydrogeological features

7.34 There is no evidence of springs or karstification in this area according to the GSI Karst database (2015).

Areas of Conservation

7.35 There are no Special Protection Areas, candidate Special Areas of Conservation or proposed Natural Heritage Areas within or immediately adjacent to the Proposed Development. The nearest designated site at Grange Castle Business Park is the Grand Canal pNHA (Site Code: 002104) at c. 720 m to the

north of the northern boundary of the Proposed Development. There is no direct hydrogeological link with the canal. Refer to Chapter 6 - Biodiversity of this EIA Report, for further details.

Cross sections

7.36 Figure 7.9 and 7.10 present the location of representative cross sections through the site to show the local hydrogeology conceptual site model (CSM) which is as follows:

- The Proposed Development site falls generally from south to north, with topographical levels ranging from c. 75mAOD in the south east to c. 65mAOD in the north west of the site.
- The due diligence report indicated shallow bedrock (<1m) to the south-eastern area of the Proposed Development site lying beyond the proposed site limits. Further north-west, bedrock depths are generally between c. 2 and 3 m BGL, with the overlying soil primarily comprised firm to stiff, brown or grey sandy gravelly clays. The 110kV line route to the north will be located in the current realigned Nangor Road Wayleave which will have been constructed to NRA specifications.
- The underlying aquifer is a Locally Important (LI) aquifer with no evidence of karstification.
- From investigations in the area there is no evidence of a continuous water table within the clayey soil and shallow water was encountered within the weathered surface of the limestone bedrock.
- Review of the hydrogeology and geology in the surrounding region indicates that there are no sensitive receptors such as groundwater-fed wetlands, Council Water Supplies/ Group Water Schemes or geological heritage sites which could be impacted by this development.
- Regional groundwater flows are in a northerly direction, towards the Griffeen River, 195m from the site; however, the potential for any impact on the baseflow in the Griffeen River as a result of the Proposed Development is low based on the absence of any abstraction /dewatering from the aquifer.

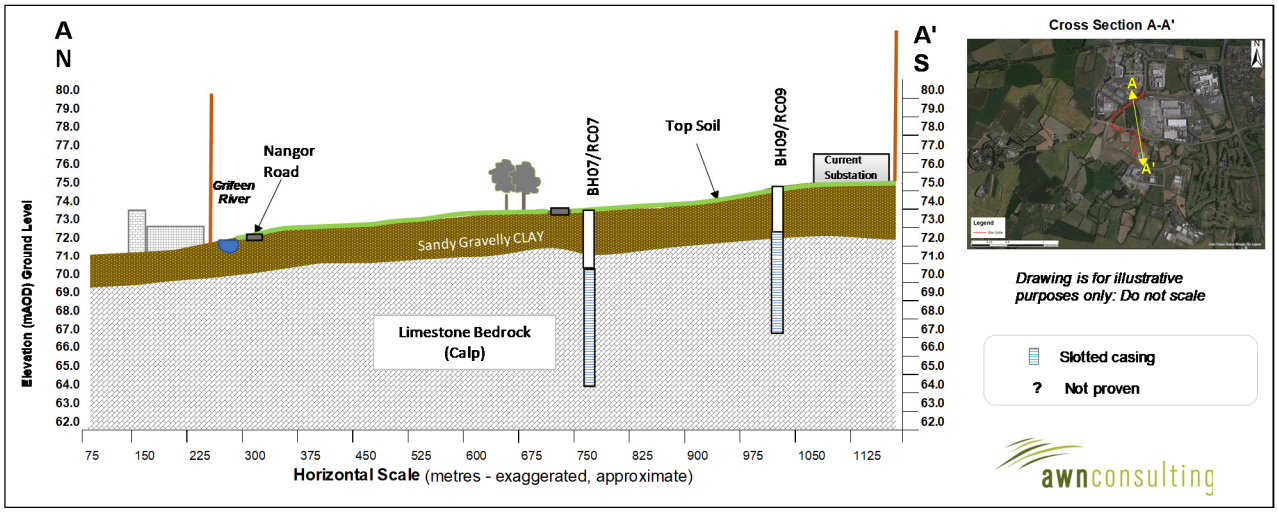

Figure 7.9 A - A' cross section of Proposed Development site.

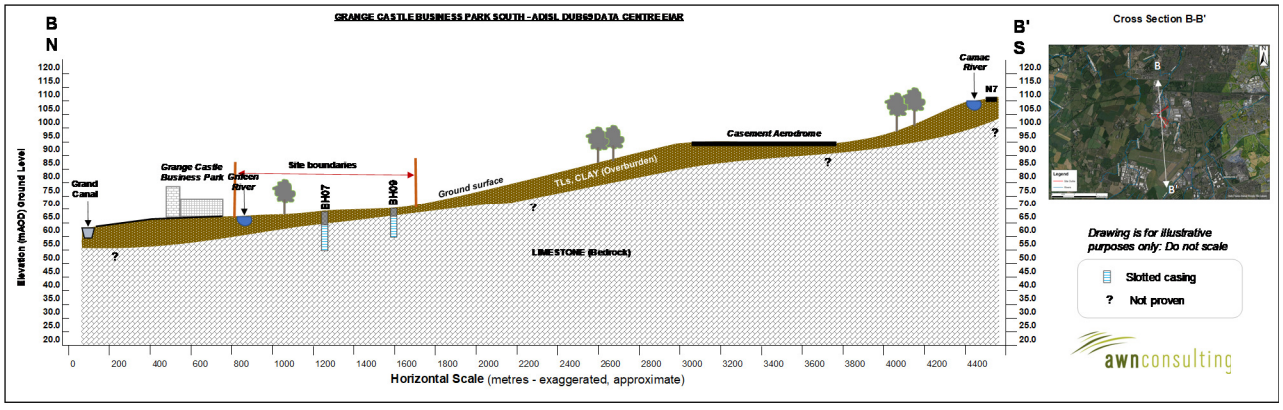

Figure 7.10 B – B' cross section of region located around the proposed site.

Rating of site importance of the geological and hydrogeological features

7.37 Based on the NRA methodology (refer Appendix 7.1), the criteria for rating site importance of hydrogeological features, the importance of the hydrogeological features at this site is rated as ***medium importance***. This is based on the assessment that the attribute has a medium-quality significance or value on a local scale. The aquifer is a Locally Important Aquifer but is not widely used for public water supply or generally for potable use.

Economic Geology

7.38 The EPA Extractive Industry Register (www.epa.ie) and the GSI mineral database was consulted to determine whether there were any mineral sites close to the Proposed Development. There are no active quarries located in the immediate with the nearest quarry is located c. 3km to the southeast which is classified as the Belgard Quarry. The EPA ENVision website also confirmed that there are no mines on or near the site.

Radon

7.39 According to the EPA (now incorporating the Radiological Protection Institute of Ireland) the site location in Cruiserath is a Low Radon Area where is it estimated that between 5% - 10% of dwellings will exceed the Reference Level of 200Bq/m^3. This is the third lowest of the five radon categories which are assessed by the EPA.

Geohazards

7.40 Much of the Earth's surface is covered by unconsolidated sediments which can be especially prone to instability. Water often plays a key role in lubricating slope failure. Instability is often significantly increased by man's activities in building houses, roads, drainage and agricultural changes. Landslides, mud flows, bog bursts (in Ireland) and debris flows are a result. In general, Ireland suffers few landslides. Landslides are more common in unconsolidated material than in bedrock, and where the sea constantly erodes the material at the base of a cliff and leads to recession of the cliffs. Landslides have also occurred in Ireland in recent years in upland peat areas due to disturbance of peat associated with construction activities. The GSI landslide database was consulted and the nearest landslide to the Proposed Development was 7.5km to the north, referred to as the Diswellstown event which occurred on 24th December 1999. There have been no recorded landslide events at the site. Due to the local topography and the underlying strata there is a negligible risk of a landslide event occurring at the site.

7.41 In Ireland, seismic activity is recorded by the Irish National Seismic Network. The Geophysics Section of the School of Cosmic Physics at the Dublin Institute for Advanced Studies (DIAS) has been recording seismic events in Ireland since 1978. The station configuration has varied over the years. However, currently there are five permanent broadband seismic recording stations in Ireland and operated by DIAS. The seismic data from the stations comes into DIAS in real-time and are studied for local and regional events. Records since 1980 show that the nearest seismic activity to the proposed location was in the Irish Sea (1.0 – 2.0 Ml magnitude) and ~55 km to the south in the Wicklow Mountains. There is a very low risk of seismic activity to the Proposed Development site.

7.42 There are no active volcanoes in Ireland so there is no risk from volcanic activity.

Land take

7.43 There will be a loss of agricultural land due to the Proposed Development however the land is within a holding currently owned and operated by the Industrial Development Authority (IDA) of Ireland as a business and industrial park. The site is also zoned to provide for high technology uses subject to the provision of necessary physical infrastructure. Zoning forms part of the County development planning process. This zoning is based on the considered needs for the County and local area. As such, the site was due for development resulting in no long term overall loss of agricultural land.

Summary & Type of Geological/Hydrogeological Environment

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

Type B – Naturally Dynamic Hydrogeological Environment.

7.45 A summary of the site geology and hydrogeology is outlined thus:

- The Proposed Development site has been greenfield/agricultural use historically. There is no evidence of any historical waste disposal or source of contamination;
- The study area is underlain by a locally important aquifer; and
- The study area is underlain by the Lucan formation comprising dark grey to black limestone and shale from the Carboniferous Age.

Characteristics of the Proposed Development

7.46 A detailed description of the Proposed Development is provided in Chapter 2 of this EIA Report. The activities associated with the Proposed Development which are relevant to the land, soils, geology and hydrogeological environment are detailed in Table 7.2.

Table 7.2 Site Activities Summary

Phase	Activity	Description
Construction	Discharge to Ground	Run-off percolating to ground at the construction site.
	Earthworks: Excavation of Superficial Deposits	Cut and fill will be required to facilitate construction of the substation and the installation of the 110 kV transmission lines to the north and south of the Clutterland substation. The installation of the transmission line will require the excavation of one trench along each of the routes; each containing one 110 kV circuit. The optimum depth of excavation of the trenches required to facilitate installation of the ducting will typically have an optimum depth of excavation of 0.95-1m below ground level but may increase to up to c. 3.5 m at utility crossings. The typical width of each trench is 0.525m; however, this may vary depending on ground conditions and existing services. Subsoil stripping and localised stockpiling of soil will be required during construction. It is estimated that approximately 24,300 m^3 of soils will be excavated to facilitate construction of the Proposed Development. Suitable soils and stones will be reused on site as backfill in the grassed areas, where possible. However, it is currently envisaged that majority of the excavated material will require removal offsite.
	Storage of hazardous Material	Bunded fuel storage and wet concrete during construction phase.
	Import/Export of Materials	Suitable soils and stones will be reused on site as backfill in the grassed areas, where possible. However, it is currently envisaged that majority of the excavated material will require removal offsite. Material removed from site may be re-used offsite for beneficial use on other sites with appropriate planning/waste permissions/derogations (e.g. in accordance with Article 27 of the European Communities (Waste Directive) Regulations 2011) as amended or will be reused, recovered and/or disposed off-site at appropriately authorised waste facilities. The removal of waste from the site will be carried out in accordance with Waste Regulations, Regional Waste Plan (Eastern Midland Region) and Waste Hierarchy/Circular Economy Principals. Refer to Chapter 14 Waste Management for further detail. It is estimated that 6,000 m^3 of clean engineered fill material will be required to facilitate construction of the Proposed Development.
Operation	Increase in hard standing area	Altering of local recharge due to increase in hard standing area.
	Storage of hazardous Material	Fuel oil storage (diesel) is required for operational phase. Fuel oil will be stored within a tank for supply of the backup generator for the substation, within an adequately sized bund. The risk to the aquifer is considered low due to the mitigation in place for containment of bulk oil storage, the relatively small amount of fuel stored, delivery and distribution and use of oil interceptors on the stormwater system downgradient of the offloading area and prior to discharge from the site permitted under SDCC Reg. Ref. SD20A/0121.

7.47 As outlined in Table 7.2 the activities required for the construction phase 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 the Proposed Development.

Potential impact of the Proposed Development

7.48 An analysis of the potential impacts of the Proposed Development on the soils, geology and hydrogeological environment during the construction and operation is outlined below. Due to the inter-relationship between soils, geology and hydrogeology and surface water (hydrology) the following impacts discussed will be considered applicable to both this Chapter, and Chapter 8 - Hydrology of the EIAR. Remediation and mitigation measures included in the design of this project to address these potential impacts are presented in section 7.55.

Construction phase

7.49 The following potential effects to land soil and groundwater have been considered:

- Excavation of soil will be required for levelling of the site to render it suitable for building the substation platform. Local removal and reinstatement (including infilling) of the 'protective' topsoil and subsoil cover across the development area at the site will not change the overall vulnerability category for the site which is already 'high to extreme'. Capping of the substation footprint of the site by hardstand/ building following construction and installation of drainage which has been permitted via SDCC Planning Ref. SD20A/0121 will minimise the potential for contamination of the aquifers beneath the site: The Locally Important Bedrock Aquifer (Ll) which is moderately productive in local zones only. Site investigation and laboratory analysis has not identified any existing contamination with hazardous substances. No treatment of any water will be required during construction works.
- Excavation of soil during trenching for the cable works. Local removal and reinstatement (including infilling) will not change the overall vulnerability category for the Proposed Development as the excavations are localised and shallow in depth. Reinstatement of the ducting routes will be as current.
- As with all construction projects there is potential for water (rainfall and/or groundwater) to become contaminated with pollutants associated with construction activity. Contaminated water which arises from construction sites can pose a significant short-term risk to groundwater quality for the duration of the construction if contaminated water is allowed percolate to the aquifer. The potential main contaminants include:
  - Suspended solids (muddy water with increased turbidity (measure of the degree to which the water loses its transparency due to the presence of suspended particulates)) – arising from excavation and ground disturbance;
  - Cement/concrete (increase turbidity and pH) – arising from construction materials;
  - Hydrocarbons (ecotoxic) – accidental spillages from construction plant or onsite storage;
  - Wastewater (nutrient and microbial rich) – arising from poor on-site toilets and washrooms.

Loss of agricultural land

7.50 There will be a local loss of agricultural soil however, the area of development is small in the context of the overall land available in the region and has not been in use for agriculture for a number of years. The lands have been zoned for industrial development. There will be no impact to mineral resources in the area as a result of the Proposed Development

Operational phase

7.51 The following risks have been considered in relation to the operational phase of the development:

- During the operational phase there is a potential for leaks and spillages from the fuel storage to occur on site. In addition to this there is a potential for leaks and spillages from vehicles along access roads, loading bays and in parking areas. Any accidental emissions of oil, petrol or diesel could cause soil/groundwater contamination if the emissions are unmitigated.
- As above, in the event of a fire at the substation facility, firewater could become contaminated and in the absence of mitigation may contaminate soil and groundwater.

7.52 These potential impacts are not anticipated to occur following the implementation of mitigation measures outlined in paragraphs 7.55 onwards.

Do Nothing Scenario

7.53 Permission has been granted for the development of a data storage facilities and associated ancillary development adjacent to the Proposed Development (SDCC Reg. Ref. SD20A/0121). Permission has also been granted for a number of other similar facilities in the area (see Chapter 3 for more details). Should the Proposed Development not take place, sections of the overall landholding will be subject to clearance and landscaping as part of the permitted development. Once construction of the Permitted Development is complete, the land, soils, geological and hydrogeological environment would not be subject to further changes with no additional hardstand cover or soil removal.

Remedial and mitigation measures

7.54 This section describes a range of mitigation measures designed to avoid or reduce any potential adverse geological and hydrogeological impacts identified.

Construction phase

7.55 In order to reduce impacts on the soils and geology environment a number of mitigation measures will be adopted as part of the construction works on site. The measures will address the main activities of potential impact which include:

- Control of soil excavation and export from site;
- Sources of fill and aggregates for the Proposed Development;
- Fuel and chemical handling, transport and storage; and
- Control of water during construction.

Construction Environment Management Plan

7.56 An outline Construction Environmental Management Plan (CEMP) has been prepared by CSEA for the Proposed Development and is included with the planning documentation. In advance of work starting on site, the works Contractor will prepare a detailed Construction Environmental Management Plan (CEMP). The detailed CEMP will set out the overarching vision of how the construction of the Proposed Development will be managed in a safe and organised manner by the Contractor. The CEMP will be a live document and it will go through a number of iterations before works commence and during the works. It will set out requirements and standards which must be met during the construction stage and will include the relevant mitigation measures outlined in this EIA Report and any subsequent planning conditions relevant to the Proposed Development.

Control of soil excavation

7.57 Subsoil will be excavated to facilitate the construction of foundations and the installation of the ducting for the cable routes. The Proposed Development will incorporate the reduction, reuse and recycle approach in terms of soil excavations on site. The construction will be carefully planned to ensure only material required to be excavated will be excavated resulting in as much material left in situ as possible.

7.58 It is unlikely given the findings of the site investigations - where no contamination was encountered, as outlined previously in this chapter - that any contaminated material will be encountered during construction of the Proposed Development. Nonetheless, any excavation works will 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, they should be tested and classified as hazardous or non-hazardous in accordance with the EPA *Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous* publication, HazWasteOnline tool or similar approved method. The material will then need to be classified as inert, non-hazardous, stable non-reactive hazardous or hazardous in accordance with *EC Decision 2003/33/EC*. It should then be removed from site by a suitably permitted waste contractor to an authorised waste facility.

7.59 Stockpiles have the potential to cause negative impacts on air and water quality. The effects of soil stripping and stockpiling will be mitigated against through the implementation of an appropriate earthworks handling protocol (as detailed within the CEMP) during construction. It is anticipated that any stockpiles will be formed within the boundary of the site and there will be no direct link or pathway from this area to any surface water body.

Export of material from site

7.60 It is envisioned that 24,300m^3 of soil/stones will be excavated to facilitate the Proposed Development. Suitable soils and stones will be reused on site as backfill in the grassed areas, where possible.

However, it is currently envisaged that majority of the excavated material will require removal offsite for reuse, recovery and/or disposal. Refer to Chapter 14 Waste Management for further detail.

7.61 If any waste soil requires removal from site, it should 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 Chapter 14 Waste Management for further relevant information.

Sources of fill and aggregates

7.62 All fill and aggregate for the Proposed Development will be sourced from reputable suppliers. All suppliers will be vetted for:

- Aggregate compliance certificates/declarations of conformity for the classes of material specified for the Proposed Development;
- Environmental Management status; and
- Regulatory and Legal Compliance status of the Company.

Fuel and chemical handling

7.63 The following mitigation measures will be taken at the construction stage 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; and
- Where mobile fuel bowsers are used the following measures will be taken:
  - Any flexible pipe, tap or valve will be fitted with a lock and will be secured when not in use;
  - The pump or valve will be fitted with a lock and will be secured when not in use;
  - All bowsers to carry a spill kit
  - Operatives must have spill response training; and
  - Drip trays used on any required mobile fuel units.

7.64 In the case of drummed fuel or other potentially polluting substances which may be used during construction the following measures will be adopted:

- Secure storage of all containers that contain potential polluting substances in a dedicated internally bunded chemical storage cabinet unit or inside 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 will be secured and on spill pallets; and
- Drums to be loaded and unloaded by competent and trained personnel using appropriate equipment.

7.65 The aforementioned list of measures is non-exhaustive and will be included in the CEMP.

Control of water during construction

7.66 No significant dewatering is required for the site development. However, run-off from excavations/earthworks cannot be prevented entirely and is largely a function of prevailing weather conditions. Earthwork operations will 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. These measures will ensure that there will be minimal inflow of shallow/perched groundwater into any excavation

7.67 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. All run-off will be prevented from directly entering into any water courses/ drainage ditches.

7.68 Should any discharge of construction water be required during the construction phase, discharge will be to foul sewer. Pre-treatment and silt reduction measures on site will include a combination of silt fencing, settlement measures (silt traps, 20m buffer zone between machinery and watercourses, refuelling of machinery off site) and hydrocarbon interceptors.

7.69 During the operational phase of the Proposed Development site there is limited potential for site activities to impact on the geological and hydrogeological environment of the area. There will be no emissions to ground or the underlying aquifer from operational activities. There will be no impact on local or regional groundwater resources (abstraction) as a result of the Proposed Development.

Crossing Beneath Culverted Griffeen River

7.70 Horizontal direct drilling will be undertake beneath the culverted section of the Griffeen River. This will ensure no impact on the existing river hydraulics.

Operational phase

Environmental procedures

7.71 During the operational phase of the Proposed Development site there is limited potential for site activities to impact on the geological and hydrogeological environment of the area. There will be no emissions to ground or the underlying aquifer from operational activities. There will be no impact on local or regional groundwater resources (abstraction) as a result of the Proposed Development.

7.72 As detailed in Section 2.92 in Chapter 2, the Operator implements an Environmental Safety and Health Management System at each of its facilities. Prior to operation of the Proposed Development, a comprehensive set of operational procedures will be established (based on those used at other similar facilities) which will include site-specific mitigation measures and emergency response measures.

Fuel storage

7.73 The primary potential impact relates to a failure or accidental spill of fuel which is stored and used on site for the transformers and back-up generator.

7.74 A small (less than 1 MW) generator will be located within the GIS substation to provide power in the event of a power failure to the GIS building. Diesel fuel will be supplied to this generator via a 1,000 litre diesel tank. The tank will be bunded. The primary potential impact of the operational phase relates to a failure or accidental spill of diesel fuel.

7.75 The following mitigation measures will be undertaken at the operational stage in order to manage any leaks from vehicles resulting in soil and/or groundwater quality impacts:

- Provision of spill kit facilities and training of operatives in use of same.

Increase in hard stand

7.76 A proportion of the Proposed Development area will be covered in hardstand (3,600sqm). 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 will have no significant impact on the natural hydrogeological regime.

Predicted impact of the Proposed Development

7.77 This section describes the predicted impact of the Proposed Development following the implementation of the remedial and mitigation measures.

Construction phase

7.78 The implementation of mitigation measures outlined in paragraphs 7.55 onwards will ensure that the predicted impacts on the geological and hydrogeological environment do not occur during the construction phase and that the residual impact will be ***short-term-imperceptible-neutral***. Following the NRA criteria for rating the magnitude and significance of impacts on the geological and hydrogeological related attributes, the magnitude of impact is considered ***negligible***.

Operational phase

7.79 The implementation of mitigation measures highlighted in paragraphs 7.55 onwards will ensure that the predicted impacts on the geological and hydrogeological environment do not occur during the operational phase and that the residual impact will be ***long-term-imperceptible-neutral.*** Following the NRA criteria for rating the magnitude and significance of impacts on the geological and hydrogeological related attributes, the magnitude of impact is considered ***negligible***.

Residual impacts

7.80 Based on the natural conditions present and with appropriate mitigation measures (see Section 7.54) to reduce the potential for any impact of accidental discharges to ground during the construction phase, the potential impact on land soils, geology and hydrogeology during construction (following EPA, 2017) are considered to have a ***short-term, imperceptible*** significance, with a ***neutral*** impact on quality.

7.81 There are no likely significant impacts on the land, geological or hydrogeological environment associated with the proposed operational development of the site with mitigation in place. As such the impact is considered to have a ***long-term, imperceptible*** significance with a ***neutral*** impact on quality i.e. no effects of effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.

7.82 Following the NRA criteria for rating the magnitude and significance of impacts on the geological and hydrogeological related attributes, the magnitude of impact is considered ***negligible*** for the construction and operational phases.

8. HYDROLOGY

Introduction

8.1 This chapter assesses and evaluates the potential impacts of the Proposed Development described in Chapter 2 (Description of the Proposed Development) on the surrounding water and hydrological environment. The impact on land, soils, geology and hydrogeology is addressed in Chapter 7. Chapter 15, Material Assets addresses the impacts on water supply, wastewater and storm water drainage.

Methodology

General

8.2 The methodology used in this assessment follows current European and Irish guidance as outlined in:

- EPA Draft EIA Report Guidelines 2017;
- European Commission *'Environmental Impact Assessment of Projects – Guidance on the Preparation of the Environmental Impact Assessment Report'* 2017; and
- National Roads Authority (NRA) '*Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes',* by the National Roads Authority (2009).

Criteria for Rating Impacts

8.3 In assessing likely potential and predicted impacts, account is taken of both the importance of the attributes and the predicted scale and duration of the likely impacts.

8.4 The quality, significance and duration of potential impacts defined in accordance with the criteria provided in the EPA Draft EIA Report Guidelines (2017) for describing effects are summarised in Table 1.1 in Chapter 1. In addition, due significance is also given to the document entitled '*Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes'* by the National Roads Authority (2009) where appropriate. The National Roads Authority (NRA) criteria is summarised in Chapter 8 - Appendix 8.1 of the EIA Report.

Sources of Information

8.5 This assessment was considered in the context of the available baseline information, potential impacts, consultations with statutory bodies and other parties, and other available relevant information. In collating this information, the following sources of information and references were consulted:

- Latest EPA Maps & Envision water quality monitoring data for watercourses in the area (these data can be accessed at https://gis.epa.ie/EPAMaps/ & catchments.ie);
- National River Basin Management Plan 2018-2021;
- Eastern River Basin District (ERBD) Management Plan;
- The Planning System and Flood Risk Management, Guidelines for Planning Authorities (Department of the Environment, Heritage and Local Government (DoEHLG) and the Office of Public Works (OPW);
- Office of Public Works (OPW) flood mapping data (www.floodmaps.ie);
- Flood points & Historical Floods – Office of Public Works (OPW) floods website www.floodmaps.ie;
- Relevant Eastern Catchment Flood Risk Assessment and Management (CFRAM) Flood Reports;
- Requirements for the Protection of Fisheries Habitat During Construction and Development Works at River Sites (Eastern Regional Fisheries Board (ERFB);
- Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters' (Inland Fisheries Ireland, 2016);
- South Dublin City Council (2005) Greater Dublin Strategic Drainage Study (GDSDS): Technical Documents of Regional Drainage Policies. Dublin: Dublin City Council;
- Greater Dublin Regional Code of Practice for Drainage Works: Version Draft 6.0 (Wicklow County Council, South Dublin County Council, Meath County Council, Kildare County Council, Fingal County Council, Dún Laoghaire- Rathdown County Council & Dublin City Council); and
- Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors" (CIRIA 532, 2001).

8.6 Other relevant documentation consulted as part of this assessment included the following:

- Information from the Due Diligence Report, prepared by O'Connor Sutton Cronin & Associates, Multidisciplinary Consulting Engineers (OCSC);
- Various design site plans and drawings; and
- Consultation with project engineers, Clifton Scannell Emerson Associates (CSEA)

Receiving Environment

Existing Environment

8.7 The Proposed Development is to be located on a portion on lands formerly used for agriculture located in the Grange Castle South Business Park, Clondalkin, Dublin 22. This land is zoned for development. Much of the surrounding lands have been recently developed for data centres and other industrial developments.

Hydrology (Surface Water)

8.8 The site falls generally from south to north, with topographical levels ranging from c. 75 mAOD in the south east to c. 65 mAOD in the north west of proposed development boundary. The Proposed Development is within the River Liffey catchment, which encompasses an area of approximately 1,369 km^2. The river extends from the mountains of Kippure and Tonduff in County Wicklow to the sea at Dublin Bay. The main channel covers approximately 120 km and numerous tributaries enter along its course. The Proposed Development site is within the sub catchment of the Griffeen River and Baldonnel Stream which are tributaries of the River Liffey.

8.9 The Griffeen River (stream) is located to the north-west of the substation site. The Griffeen River rises in the townland of Greenoge, approximately 3.5 km south of the Proposed Development. It flows in a northerly direction where it is culverted beneath the Grand Canal and from there it flows north through Lucan. The Griffeen River enters the River Liffey just north of Lucan town. A section of the Griffeen was realigned during the construction of the Business Park and associated access roads and it now runs alongside the Grange Castle Business Park internal access road in a northerly direction.

8.10 The Baldonnel Stream runs roughly east to west along the boundary of the Proposed Development north of the proposed location of the substation. The river is in three distinct forms. The eastern section, which runs over the north-east corner, is in its natural condition and runs at surface for approximately 200m from the boundary with Boland's Grangecastle in an open ditch. The central 280m reach has been realigned and borders the site (north-west of the proposed substation location). This section of the river runs on the surface in a newly formed channel parallel to the Nangor Road. The final, western reach is in a 200m culvert and borders the north-west boundary of the site. This section of the stream continues northwards to outfall to the Griffeen River at a point southeast of the junction of the New Nangor and Baldonnel roads.

8.11 Other notable hydrological features near the Proposed Development are the Camac river and the stream called 'Miltown 09' by the EPA. The River Camac runs from the south to the north-east, approximately 2.5km south-west of the Proposed Development site. The River Camac catchment from immediately downstream of Baldonnel Business Park has an estimated catchment area of 13.6km^2 and is steeply to moderately sloping (1% to 10%). The catchment area consists largely of greenfield, a section of the residential areas on the outskirts of Saggart, Baldonnel Business Park and one-off residential/ commercial developments. The Miltown 09 is a small stream running off the Griffeen River and runs through the site from north-west to south-east. The local hydrological environment is shown in Figure 8.1 below.

Figure 8.1 Local hydrological environment with Proposed Development site outlined in red

Surface Water Quality

8.12 The Proposed Development is located within the former ERBD (now the Irish River Basin District), as defined under the European Communities Directive 2000/60/EC, establishing a framework for community action in the field of water policy – this is commonly known as the Water Framework Directive (WFD). The Proposed Development site is situated in Hydrometric Area No. 09 of the Irish River Network and is located within the River Liffey Catchment.

8.13 The WFD requires *'Good Water Status'* for all European waters to be achieved through a system of river basin management planning and extensive monitoring by 2015 or, at the least, by 2027. 'Good status' means both *'Good Ecological Status'* and *'Good Chemical Status'.* In 2009 the ERBD River Basin Management Plan (RBMP) 2009-2015 was published. In the ERBD RBMP, the impacts of a range of pressures were assessed including diffuse and point pollution, water abstraction and morphological pressures (e.g. water regulation structures). The purpose of this exercise was to identify water bodies at risk of failing to meet the objectives of the WFD by 2015 and include a programme of measures to address and alleviate these pressures by 2015. This was the first River Basin Management planning cycle (2010-2015). The second cycle river basin management plan for Ireland is currently in place and will run between 2018-2021 with the previous management districts now merged into one Ireland River Basin District (Ireland RBD).

8.14 This second-cycle RBMP aims to build on the progress made during the first cycle. Key measures during the first cycle included the licensing of urban waste-water discharges (with an associated investment in urban waste-water treatment) and the implementation of the Nitrates Action Programme (Good Agricultural Practice Regulations). In more general terms, three key lessons have emerged from the first cycle and the public consultation processes. These lessons have been firmly integrated into the development of the second cycle RBMP. Firstly, the structure of multiple RBDs did not prove effective, either in terms of developing the plans efficiently or in terms of implementing those plans. Secondly, the governance and delivery structures in place for the first cycle were not as effective as expected. Thirdly, the targets set were too ambitious and were not grounded on a sufficiently developed evidence base. The second cycle RBMP has been developed to address these points.

8.15 The strategies and objectives of the WFD in Ireland have influenced a range of national legislation and regulations. These include the following:

- European Communities (Water Policy) Regulations, 2003 (S.I. No. 722 of 2003);
- European Communities (Drinking Water) Regulations 2014 (S.I. 122 of 2014);
- European Communities Environmental Objectives (Surface Waters); Regulations, 2009 (S.I. No. 272 of 2009 as amended by SI No. 77 of 2019);
- European Communities Environmental Objectives (Groundwater) Regulations, 2010 (S.I. No. 9 of 2010 S.I. No. 366 of 2016);
- European Communities (Good Agricultural Practice for Protection of Waters) Regulations, 2010 (S.I. No. 610 of 2010);
- European Communities (Technical Specifications for the Chemical Analysis and Monitoring of Water Status) Regulations, 2011 (S.I. No. 489 of 2011);
- Statutory Instrument (SI) No. 293 of 1988 European Communities (Quality of Salmonid Waters) Regulations 1988;
- Local Government (Water Pollution) Acts 1977-1990; and
- SI No. 258 of 1988 Water Quality Standards for Phosphorus Regulations 1998.

8.16 Figure 8.2 below presents the EPA surface water quality monitoring points in the context of the site and other regional drainage settings.

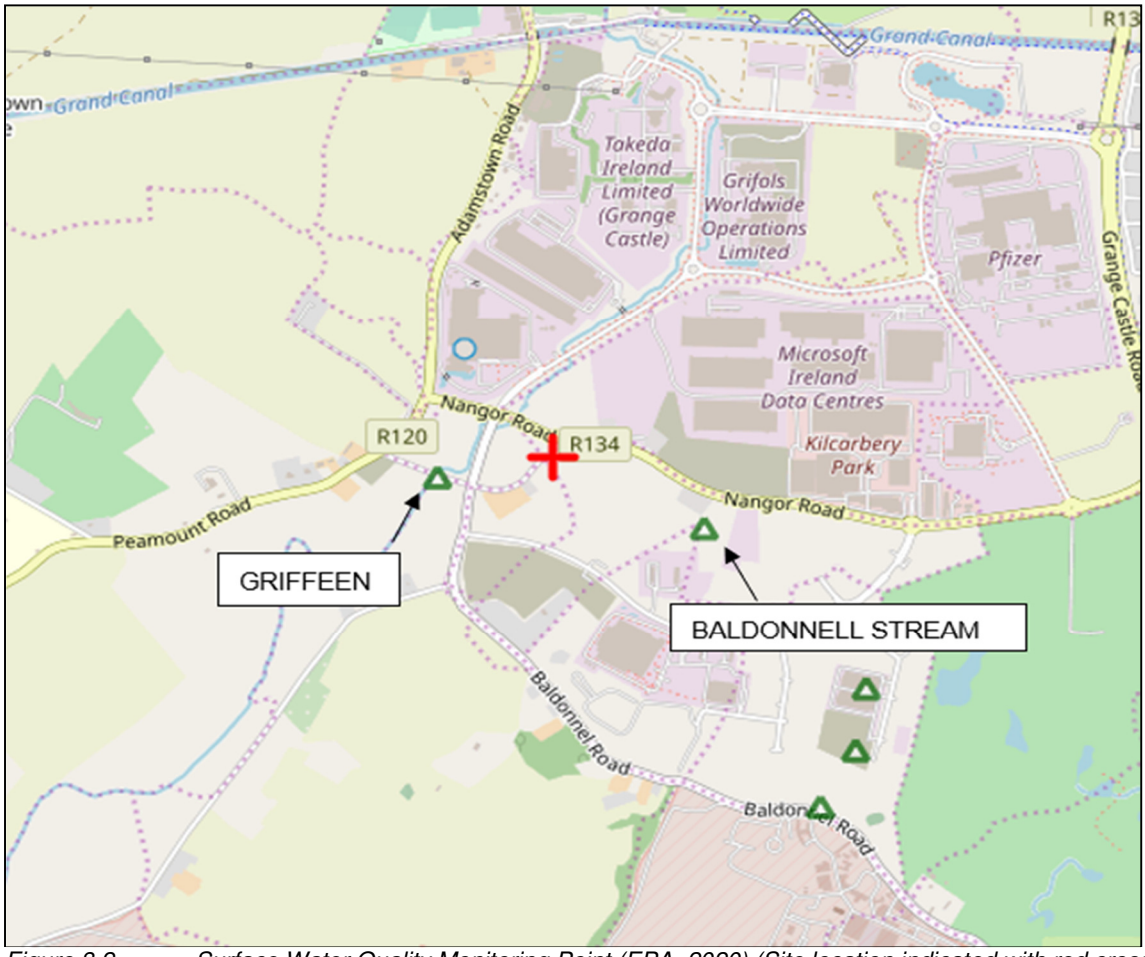

Figure 8.2 Surface Water Quality Monitoring Point (EPA, 2020) (Site location indicated with red cross).

8.17 Surface water quality is monitored periodically by the EPA at various regional locations along principal and other smaller watercourses. The EPA assess the water quality of rivers and streams across Ireland using a biological assessment method, which is regarded as a representative indicator of the status of such waters and reflects the overall trend in conditions of the watercourse. The biological indicators range from Q5 - Q1. Level Q5 denotes a watercourse with good water quality and high community diversity, whereas Level Q1 denotes very low community diversity and bad water quality.

8.18 With reference to the site setting, the nearest EPA monitoring stations are Griffeen (RS09G010200), located at the first bridge East of Milltown, and Baldonnell Stream (RS09B090400), located at Nangor Road. The status given from the Griffeen station given by the EPA is from 1991 and classified as Q3-

Poor. A more recent status, a station at the Lucan Bridge, which monitors the Liffey River, is classified at 'Good'. This monitoring was undertaken between 2004 and 2016 and is taken at a point approximately 400m downstream from where the Griffeen River enters the River Liffey.

8.19 In accordance with the WFD, each river catchment within the former ERBD was assessed by the EPA and a water management plan detailing the programme of measures was put in place for each. Currently, the EPA classifies the Griffeen River, which leads into the Liffey River, waterbody as being 'at risk'. For the River Liffey WMU (Water Management Unit) the main pressure preventing achievement of 'Good Status' is diffuse agricultural pollution. As part of the River Basin Management Plan 2009-2015 the water quality of the Griffeen Lower was assessed. The overall water 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. The overall objective is to achieve 'Good' water quality status by 2027 however the Griffeen Lower has an overall risk rating of 'at risk of not achieving 'Good' status. Figure 8.3 presents the river waterbody risk EPA map.

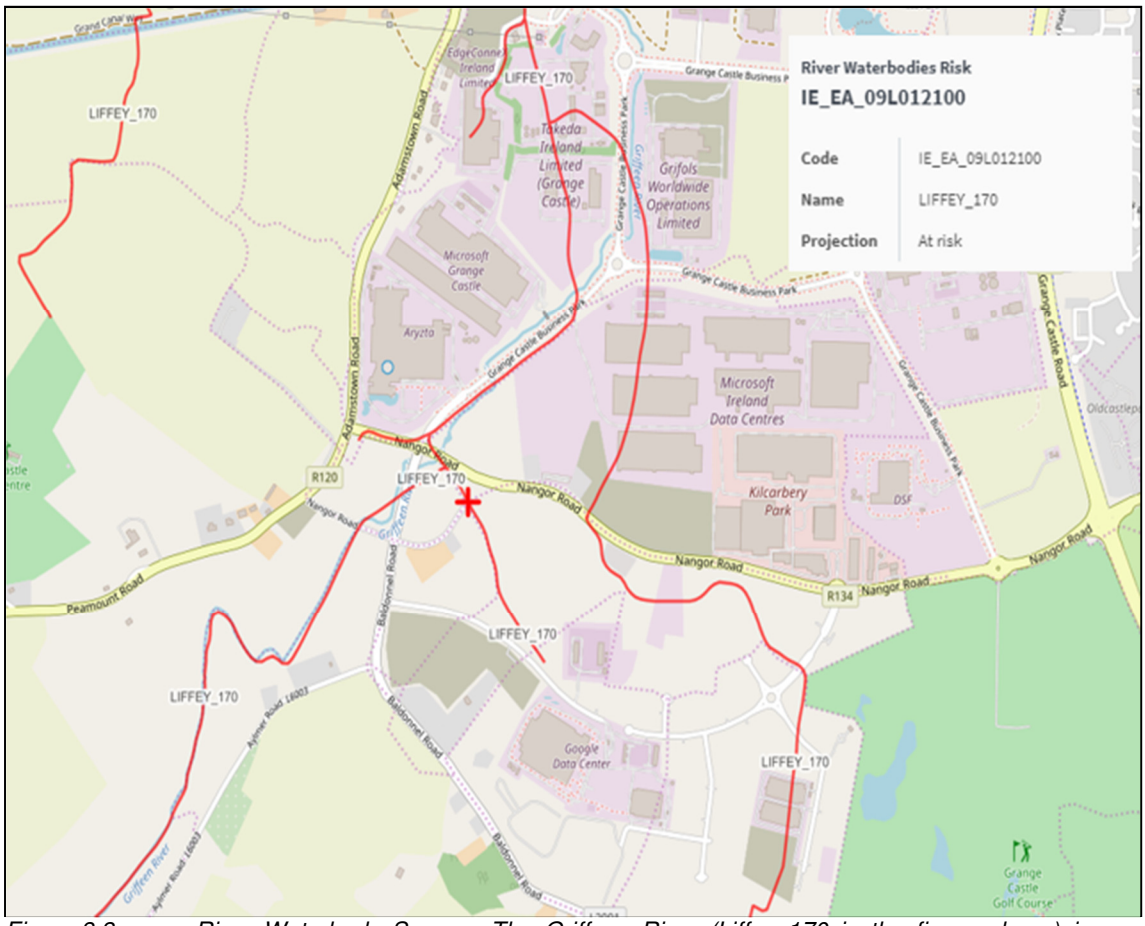

Figure 8.3 River Waterbody Score – The Griffeen River (Liffey_170 in the figure above) is currently considered 'at risk' (Site location indicated with red cross).

Flood Risk

8.20 RPS Group undertook a Flood Study for the OPW in 2017 - HA09 Hydraulic Report (Baldonnel Model). This identified that the southern section of the Proposed Development site is not at risk of flooding. The Study also identified that the west part of the site is shown to be an area that is affected by the 0.1% AEP Flood Event (1 in 1000 year)). This study forms Appendix A of the Stage 2 Flood Risk Assessment by AWN Consulting that accompanies this application and forms Chapter 8 - Appendix 8.2 of this EIA Report. This study is based on local modelling. As part of the application for the Permitted Development under SDCC Planning Reg. Ref. SD20A/0121; RPS undertook a further flood study for the area that indicated that the Proposed Development site is within the 1% AEP Flood Event (1 in 100 year). This study forms Chapter 8 - Appendix 8.3 of this EIA Report.

8.21 As a mitigation measure, it is recommended to incorporate a compensatory flood storage within the proposed development site with a safe discharge route to the Baldonnel stream located along the northern boundary. The proposed compensatory storage volume of 750 m^3 plus freeboard is required

to be designed to accommodate the 1% AEP event taking into account climate change as per the OPW guidelines for new developments. The results of the hydraulic analysis indicated that proposed compensatory storage with a limited peak discharge rate of 75 l/s to the stream will not increase the flood risk to the stream and at other locations.

8.22 Drainage design for the Proposed Development will adhere to the Local Authority requirements, the Greater Dublin Strategic Drainage Study and has incorporated SuDS measures. It is not expected that the proposed development would adversely impact on flood risk for other neighbouring properties.

Rating of site importance of the hydrological features

8.23 In accordance with the 'Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes' by the NRA (2009) the environmental significance of the nearest receiving environment (i.e. Griffeen River and Baldonnel Stream) has been considered as having low-quality significance or value on a local scale.

Characteristics of the Proposed Development

8.24 The Proposed Development is described in detail within Chapter 2 of the EIA Report.

8.25 The Baldonnel Stream runs east to west through the northern section of the proposed development. The stream originally (and indeed currently) runs under the Boland's site on the eastern boundary of the subject site westwards through the holding. The original course of the stream took it northwards under the Nangor Road where it joined the Griffeen River on the western side of the Grifols facility in Grange Castle Business Park, to the north of the subject site.

8.26 As part of the realignment of the Nangor Road, and as part of flood alleviation works, South Dublin County Council (SDCC) has realigned the watercourse to continue along the southern edge of the Nangor Road, at surface, before continuing, via a culvert, to outfall to the Griffeen upstream of its original confluence at a new confluence immediately southeast of the new Nangor Road – Baldonnel Road junction. Storm water runoff from the site will outfall to the Baldonnel Stream and then into the Griffeen River. The outfall to the Baldonnel Stream will be controlled through the permitted attenuation ponds granted under SDCC Planning Reg. Ref. SD20A/0121 that will receive storm water which has passed through gully's (to aid in the removal of debris) and a suitably sized oil separator to ensure any hydrocarbon pollution is removed prior to storm water entering the attenuation pond. A further stage to improve overall storm water quality is the construction of 'forebays' that allow small intensity rainfall events to be stored separated from the main water body. This allows for any detritus material to be removed from the water and aids in particulate removal, increasing overall storm water quality prior to disposal.

8.27 All four attenuation ponds, including the one into which the substation will drain, have suitably sized 'forebays' to achieve this requirement. There is capacity under the attenuation design under the Permitted Development granted under SD20A/0121 to accommodate runoff from the Proposed Development. The Permitted Development design includes oil separator interceptor systems to ensure the quality of storm water discharge is controlled prior to attenuation and discharge offsite.

8.28 The characteristics of the Proposed Development with regard to the hydrological environment, related to both construction and operation activities are described below.

Construction Phase

8.29 The key civil engineering works which will have potential impact on the water and hydrological environment during construction of the Proposed Development are summarised below.

(i) Excavations are required for substation slab and installation of services including the ducting for the 110kV transmission lines.
(ii) Possible discharge of collected rainwater during excavation works and groundworks (the extent of which is dependent on the time of year development works are carried out); and
(iii) Construction activities will necessitate storage of cement and concrete materials, temporary oils and fuels on site. Small localised accidental releases of contaminating substances including hydrocarbons have the potential to occur from construction traffic and vehicles operating on site.
(iv) Horizontal directional drilling is proposed for a c. 100m length of the 110kV transmission line from the Kilmahud-Corkagh circuit. The location of the directional drilling is under the culverted Griffeen River where the 110kV transmission line from the Kilmahud-Corkagh circuit crosses under the New Nangor Road. The depth of the drilling is expected to be c. 6m in depth and require four separate directional drillings that will be c. 1m apart. The depth of the drilling ensures no impact on the existing culvert or river hydrology.

Operational Phase

8.30 The key activities which will have a potential impact on the hydrological environment during operation of the Proposed Development are summarised below:

(i) Fuel will be stored onsite in a 1,000 litre tank which will supply fuel to a back-up generator for the GIS substation building. This backup generator will only be operated in the event of a power failure. The tank will bunded to 110% of its capacity. However, accidental releases may occur during refilling etc. if adequate mitigation measures are not implemented.
(ii) There is a requirement to store a small quantity of oil for the transformers. The maximum storage volume will be c. 36 m^3 . The oil will be stored within a bunded area which is greater than 110% of the storage volume. A float switch will operate to ensure that any collected water is pumped to sewer.
(iii) Localised accidental discharge of hydrocarbons (likely small quantities) could occur in car parking areas and along roads;
(iv) Increase in local overall hardstand (including buildings) by c. 3,600sqm. The Proposed Development will discharge to the surface water drainage system for the Permitted Development
(v) Surface water will be discharged to the business park surface water system utilising services installed during the works permitted under permission (SDCC Reg 20A/0121). Potential contamination of surface water with hydrocarbons from vehicle movements and other areas could cause downstream contamination if no controls in place;
(vi) Wastewater generation from the single WC within the substation building will be minimal and will be discharged to the foul water drainage system installed during the works permitted under permission (SDCC Reg.20A/0121); and
(vii) Water supply (minimal requirement) will be required for the welfare facilities in the substation. This supply of water will be sourced from the public watermain (via a connection to the private distribution watermain within the site boundary and connected to the 150 mm∅ Irish Water supply to the West of the site).

Potential impacts of the Proposed Development

8.31 The potential impacts in relation to the hydrological environment during the construction and operational phases are outlined below. The assessment of effects is based on the description of effects as set out in the EPA Draft EIA Report Guidelines (2017) (refer to Table 1.1 Chapter 1) and the NRA criteria detailed in Chapter 8 - Appendix 8.1.

Construction Phase

8.32 Surface water run-off from site preparation, levelling and excavations during the construction phase may contain increased silt levels or become polluted from construction activities. Run-off containing large amounts of silt can cause damage to surface water systems and receiving watercourses. Silt water can arise from excavations, exposed ground, stockpiles, and access roads.

8.33 During the construction phase, there is potential for a slight increase in run-off due to the introduction of impermeable surfaces and the compaction of soils. This will reduce the infiltration capacity and

increase the rate and volume of direct surface run-off. The potential impact of this is a possible increase in surface water run-off and sediment loading which could potentially impact local drainage, if not adequately mitigated.

8.34 The Baldonnel Stream flows in a westerly direction on the northern edge of the southern part of the Proposed Development site (to the north of the proposed substation location). This stream is a tributary of the Griffeen River which outfalls to the River Liffey c. 4.3km north of the site and ultimately flows into Dublin Bay. This site therefore has a hydrological connection with European designated sites in Dublin Bay i.e. North Dublin Bay SAC, South Dublin Bay SAC, South Dublin Bay, River Tolka Estuary SPA and North Bull Island SPA. However, as the site and receptors are separated by a distance of approximately 17km and based on the nature of the Proposed Development for the subject lands, impacts on water quality at the European Sites in Dublin Bay would be imperceptible.

8.35 The Proposed Development will require site preparation, excavations and levelling for foundations, the installation of services and landscaping. Some removal of perched rainwater from the excavation may be required. Volumes will be quite low, and all pumped water will be subject to onsite settlement before release.

8.36 During the construction phase, there is a risk of accidental pollution incidences from the following sources:

- Spillage or leakage of fuels (and oils) stored on site;
- Spillage or leakage of fuels (and oils) from construction machinery or site vehicles;
- Spillage of oil or fuel from refuelling machinery on site;
- The use of concrete and cement; and
- Storage of chemicals on site.

8.37 Machinery activities on site during the construction phase may result in contamination of runoff/surface water. Potential impacts could arise from accidental spillage of fuels, oils, paints etc. which could impact surface water if allowed to infiltrate to runoff to surface water systems and/or receiving watercourses. However, implementation of the mitigation measures detailed in paragraphs 8.51 onwards will ensure that this does not occur.

8.38 Concreting operations carried out near surface water drainage points during construction activities could lead to discharges to a watercourse. Concrete (specifically, the cement component) is highly alkaline and any spillage to a local watercourse would be detrimental to water quality and local fauna and flora. However, employment of the mitigation measures highlighted in paragraphs 8.51 onwards will ensure that any impact will be mitigated.

Operational Phase

Surface Water

8.39 There will be an increase in hardstanding from the substation roof, yard and associated other hard surfaces of 3,600sqm under the Proposed Development. Rainwater runoff from the substation roof and yard will be collected in storm water drainage channels and diverted to a storm water attenuation basin (sized for a 1 in 100-year rainfall event) which will be installed as part of the Permitted Development (SDCC Reg. Ref. SD20A/0121) to its east. This attenuation basin, as was all of the attenuation design under the Permitted Development, was designed to accommodate surface water drainage from the proposed substation compound.

8.40 The drainage design for the Permitted Development (SDCC Reg. Ref. SD20A/0121) includes an oil separator interceptor system also designed to accommodate the Proposed Development, to ensure the quality of storm water discharge is controlled prior to attenuation.

8.41 The attenuated storm water will be discharged at the allowable greenfield run-off rate set by South Dublin County Council as their requirements under the Greater Dublin Strategic Drainage Study of 2.0 l/s/ha. to the Baldonnel Stream as outlined and granted under the Permitted Development. It is proposed to use 'Hydrobrake' flow control systems to achieve the required discharge rates. Further detail on the storm water drainage system and the basis of its design is provided for in the permitted data centre development (SDCC Reg. Ref. SD20A/0121) Engineering Services Report, prepared by

CS Consulting. There will be no additional hardstanding from the installation of the ducting for the 110kV transmission lines.

Wastewater

8.42 As stated above, a connection to the wastewater network can be facilitated subject to a connection agreement from Irish Water. If the application is accepted, it is proposed to use 225mm uPVC pipes and precast manholes for the external drainage network. It is proposed to outfall into the existing foul network at two location, one to the west and a second to the east. The proposed western outfall will cater for foul flows from Blocks A, B & 50% of Block C. The second outfall to the east will cater for 50% of Block C and the welfare facilities associated with the Substation.

8.43 The average daily foul water demand associated with the Proposed Development is 1 litre per day.

8.44 The foul drainage infrastructure for the permitted development (SDCC Reg. Ref. SD20A/0121) was designed to accommodate foul drainage from the Proposed Development. As such, there is capacity for the permitted development to accommodate wastewater from the Proposed Development. The gravity pipe network to be installed as part of the permitted development will outfall to the 375 mm⌀ Irish Water foul sewer to the south-east of the site The average daily foul water demand associated with the Proposed Development represents a negligible volume in terms of the volume permitted by Irish Water for the already Permitted Development.

Water Supply

8.45 The water demand for the Proposed Development will be minimal due their being a single WC within the GIS building and the low level of maintenance of the building once in operation. The water supply for the Permitted Development (SDCC Planning Reg. Ref. SD20A/0121) was designed to accommodate water demand from the Proposed Development. The proposed development will be served by fire hydrants connected to the permitted water main network which are connected to a permitted 400m^3 fire sprinkler tank.

Fuel and Other Accidental Spills

8.46 There is a small potential for leaks and spillages from the transformer fuel tank. There is a potential for leaks and spillages from the fuel tank that will provide fuel for the onsite generator that provides back-up power to the GIS Substation. In addition to this there is a potential for leaks and spillages from vehicles along access roads and in parking areas. Any accidental emissions of oil, petrol or diesel could cause contamination if the emissions enter the water environment unmitigated.

8.47 There is a direct pathway to surface water from this site, however based on design and mitigation measures discussed in paragraphs 8.50 onwards there will be no impact on the receiving surface water bodies i.e. the Baldonnel Stream and Griffeen River.

Do Nothing Scenario

8.48 Adjacent to the proposed site, permission has been granted for the development of three no. data centres and associated ancillary development (SDCC Planning Reg. Ref. SD20A/0121) and a number of similar developments in the immediate area (see Chapter 3). Should the Proposed Development not take place, sections of the overall landholding will be subject to clearance and landscaping as part of the permitted development(s). Once construction of the permitted developments is complete, the hydrological environment would not be subject to further changes.

Remedial and Mitigation Measures

General

8.49 The design of the Proposed Development has taken account of the potential impacts of the development and the risks to the water environment specific to the areas where construction is taking place. There is a watercourse (Baldonnel Stream) in the southern section of the Proposed Development boundary, which is a tributary of the Liffey River, therefore caution is required to mitigate the potential effects on the local water environment.

8.50 These measures seek to avoid or minimise potential effects in the main through the implementation of best practice construction methods and adherence to all relevant legislation.

Construction Phase

Construction Environmental Management Plan (CEMP)

8.51 An outline Construction Environmental Management Plan (CEMP) has been prepared by CSEA for the Proposed Development and is included with the planning documentation. A detailed CEMP will be prepared and maintained by the appointed contractors during the construction phase of the proposed project. The CEMP will cover all potentially polluting activities and include an emergency response procedure. All personnel working on the site will be trained in the implementation of the CEMP. At a minimum, the CEMP will be formulated in consideration of the standard best international practice including, but not limited, to:

- CIRIA, (2001), *Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors, (C532)* Construction Industry Research and Information Association;
- CIRIA (2002) *Control of water pollution from construction sites: guidance for consultants and contractors (SPI56)* Construction Industry Research and Information Association;
- CIRIA (2005), *Environmental Good Practice on Site* (C650); Construction Industry Research and Information Association;
- BPGCS005, *Oil Storage Guidelines*;
- CIRIA 697 (2007), *The SuDS Manual*; and
- *UK Pollution Prevention Guidelines,* (PPG) UK Environment Agency, 2004.

8.52 All contractors will be required to implement the CEMP.

Surface Water Run-off

8.53 As there is potential for direct run-off to a watercourse present bounding the site, mitigation measures will be put in place to manage run-off during the construction phase. Run-off water containing silt will be contained on site via settlement tanks and treated to ensure adequate silt removal. Silt reduction measures on site will include a combination of silt fencing and settlement measures (silt traps, silt sacks and settlement tanks/ponds).

8.54 The temporary storage of soil will be carefully managed. Stockpiles will be tightly compacted to reduce runoff and graded to aid in runoff collection. This will prevent any potential negative impact on the storm water drainage and the material will be stored away from any surface water drains. Movement of material will be minimised to reduce the degradation of soil structure and generation of dust. Excavations will remain open for as little time as possible before the placement of fill. This will help to minimise the potential for water ingress into excavations. Soil from works will be stored away from existing drainage features to remove any potential impact.

8.55 Weather conditions will be considered when planning construction activities to minimise the risk of run-off from the site and the suitable distance of topsoil piles from surface water drains will be maintained.

Fuel and Chemical Handling

8.56 The following mitigation measures will be taken at the construction stage in order to prevent any spillages of fuels and prevent any resulting impacts to surface water systems.

- Designation of a bunded refuelling areas on the site;
- Provision of spill kit facilities across the site;
- Where mobile fuel bowsers are used the following measures will be taken:
  - Any flexible pipe, tap or valve will be fitted with a lock and will be secured when not in use;
  - The pump or valve will be fitted with a lock and will be secured when not in use;
  - All bowsers will carry a spill kit and operatives must have spill response training; and
  - Portable generators or similar fuel containing equipment will be placed on suitable drip trays.

8.57 In the case of drummed fuel or other potentially polluting substances which may be used during construction the following measures will be adopted:

- Secure storage of all containers that contain potential polluting substances in a dedicated internally bunded chemical storage cabinet unit or inside a concrete bunded areas;
- Clear labelling of containers so that appropriate remedial measures can be taken in the event of a spillage;
- All drums to be quality approved and manufactured to a recognised standard;
- If drums are to be moved around the site, they should be done so secured and on spill pallets; and

- Drums to be loaded and unloaded by competent and trained personnel using appropriate equipment.

8.58 All ready-mixed concrete will be brought to site by truck. A suitable risk assessment for wet concreting will be completed prior to works being carried out which will include measures to prevent discharge of alkaline waste waters or contaminated storm water to the underlying subsoil. Wash-down and washout of concrete transporting vehicles will take place at an appropriate facility offsite.

Accidental Releases

8.59 Emergency response procedures will be outlined in the detailed CEMP. All personnel working on the site will be suitably trained in the implementation of the procedures.

Soil Removal and Compaction

8.60 Temporary storage of soil will be carefully managed in such a way as to prevent any potential negative impact on the receiving environment. The material will be stored away from any surface water drains (see Surface Water Run-off section above). Movement of material will be minimised to reduce degradation of soil structure and generation of dust.

8.61 All excavated materials will be visually assessed for signs of possible contamination such as staining or strong odours. Should any unusual staining or odour be noticed, samples of this soil will be analysed for the presence of potential contaminants to ensure that historical pollution of the soil has not occurred. Should it be determined that any of the soil excavated is contaminated, this will be segregated and appropriately disposed of by a suitably permitted/licensed waste disposal contractor.

8.62 Site investigations carried out at the site in 2019 found no residual contamination on site. Nonetheless, all excavated materials will be visually assessed for signs of possible contamination such as staining or strong odours. Should any unusual staining or odour be noticed, samples of this soil will be analysed for the presence of potential contaminants to ensure that historical pollution of the soil has not occurred. Should it be determined that any of the soil excavated is contaminated, this will be segregated and appropriately disposed of by a suitably permitted/licensed waste disposal contractor.

Operational Phase

Environmental Procedures

8.63 The Operator implements an Environmental Safety and Health Management System at each of its facilities. Prior to operation of the Proposed Development, a set of operational procedures will be established (based on those used at other similar facilities) which will include site-specific mitigation measures and emergency response measures.

Fuel and Chemical Handling

8.64 The containment measures planned will minimise the risk of release of solid/ liquid material spillages to the water environment. Containment measures will include storage of fuels on site in bunded containers or compartments. The design of all bunds will conform to standard bunding specifications - BS EN 1992-3:2006, *Design of Concrete Structures – Part 3: Liquid retaining and containment measures.*

Storm Water & Foul Sewer Drainage

8.65 As stated previously the permitted drainage system formed part of the planning application for the permitted data storage facility on site and is intended to service that development (SDCC Reg. Ref. SD20A/0121) and the Proposed Development. As such, there will be capacity for the SuDs for the permitted development to accommodate runoff from the Proposed Development. Further information regarding the surface and foul water drainage for the Proposed Development is included in the Engineering Planning Report *(Engineering Planning Report – Drainage & Water Services Clutterland – 110 kv GIS Substation DUB 69*) which is included within the Proposed Development Planning Application documentation. The allowable runoff rate (QBAR) applicable to the Proposed Development is 2.0 l/s/ha.

8.66 To mitigate the impact of a spill resulting from the storage of oils/diesel on the Proposed Development site entering the surface water system, fuel tanks are contained within bunded areas and any spill will be contained and taken off site for disposal to a suitable licensed waste facility.

8.67 The proposed surface water attenuation system will be discharged via a hydrobrake control device to the Baldonnell Stream at greenfield runoff rates.

8.68 Foul drainage for the Proposed Development will be installed in accordance with the relevant standards for design and construction as detailed in the *Engineering Planning Report,* prepared by CSEA Engineers and included with the planning pack for the Proposed Development.

Water Supply

8.69 No mitigation measures are required in relation to water supply as Irish Water have advised that there is sufficient water supply for the Proposed Development. The proposed development will connect to a watermain permitted under SDCC Reg. Ref. SD20A/0121.

8.70 The water system will be metered to facilitate detection of leakage and the prevention of water loss. Dual and low flush toilets, water economy outlets and water saving measures will also be proposed.

Crossing Beneath Culverted Griffeen River

8.71 Horizontal drilling beneath the culverted section of the Griffeen River will ensure no impact on the existing river hydraulics.

Predicted Impact of the Proposed Development

8.72 This section describes the predicted impact of the Proposed Development following the implementation of the remedial and mitigation measures.

Construction Phase

8.73 The implementation of mitigation measures highlighted in paragraphs 8.50 onwards will ensure that the potential impacts on the surface water environment do not occur during the construction phase and that the predicted impact will be ***short-term, imperceptible*** and ***neutral****.*

Operational Phase

8.74 The implementation of mitigation measures highlighted in paragraphs 8.50 onwards will ensure that the potential impacts on the surface water environment do not occur during the operational phase and that the predicted impact will be ***long-term, imperceptible*** and ***neutral.***

Residual impacts

8.75 In the case of the Proposed Development, there will be no significant residual impacts; the potential impact on surface water during operation and closure (following the EPA Draft EIA Report Guidelines (2017) will be l***ong term, imperceptible*** and ***neutral*** i.e. an impact capable of measurement but without noticeable consequences.

9. NOISE AND VIBRATION

Introduction

9.1 This chapter of the EIAR has assessed the potential noise and vibration impacts that the Proposed Development may have on the surrounding environment, The Proposed Development is defined in detail within Chapter 2 of the EIA Report. The chapter considers the cumulative impacts of the Proposed Development with the Permitted Development. The Proposed Development includes a small back-up generator for the GIS building.

Methodology

9.2 The following methodology has been adopted for this assessment:

- review appropriate guidance, typical local authority planning conditions, etc. in order to identify appropriate noise criteria for the site operations;
- carry out noise monitoring at a number of locations (e.g. in the vicinity of nearest sensitive properties/boundaries) to identify existing levels of noise in the vicinity of the development;
- construction noise calculations associated with the key construction activities to consider the potential noise impact of the Proposed Development; and
- comment on predicted noise levels against the appropriate criteria and existing noise levels and outline required mitigation measures (if any).

9.3 Chapter 9 - Appendix 9.1 of the EIA Report presents a glossary of the acoustic terminology used throughout this document. In the first instance it is considered appropriate to review some basic fundamentals of acoustics.

Fundamentals of acoustics

9.4 In order to provide a broader understanding of some of the technical discussion in this report, this section provides a brief overview of the fundamentals of acoustics and the basis for the preparation of this noise assessment.

9.5 A sound wave travelling through the air is a regular disturbance of the atmospheric pressure. These pressure fluctuations are detected by the human ear, producing the sensation of hearing. In order to take account of the vast range of pressure levels that can be detected by the ear, it is convenient to measure sound in terms of a logarithmic ratio of sound pressures. These values are expressed as Sound Pressure Levels (SPL) in decibels (dB).

9.6 The audible range of sounds expressed in terms of Sound Pressure Levels is 0dB (for the threshold of hearing) to 120dB (for the threshold of pain). In general, a subjective impression of doubling of loudness corresponds to a tenfold increase in sound energy which conveniently equates to a 10dB increase in SPL. It should be noted that a doubling in sound energy (such as may be caused by a doubling of traffic flows) increases the SPL by 3dB.

9.7 The frequency of sound is the rate at which a sound wave oscillates and is expressed in Hertz (Hz). The sensitivity of the human ear to different frequencies in the audible range is not uniform. For example, hearing sensitivity decreases markedly as frequency falls below 250Hz. In order to rank the SPL of various noise sources, the measured level has to be adjusted to give comparatively more weight to the frequencies that are readily detected by the human ear. Several weighting mechanisms have been proposed but the 'A-weighting' system has been found to provide one of the best correlations with perceived loudness. SPL's measured using 'A-weighting' are expressed in terms of dB(A). An indication of the level of some common sounds on the dB(A) scale is presented in Figure 9.1.

9.8 The 'A' subscript denotes that the sound levels have been A-weighted. The established prediction and measurement techniques for this parameter are well developed and widely applied. For a more detailed introduction to the basic principles of acoustics, reference should be made to an appropriate standard text.

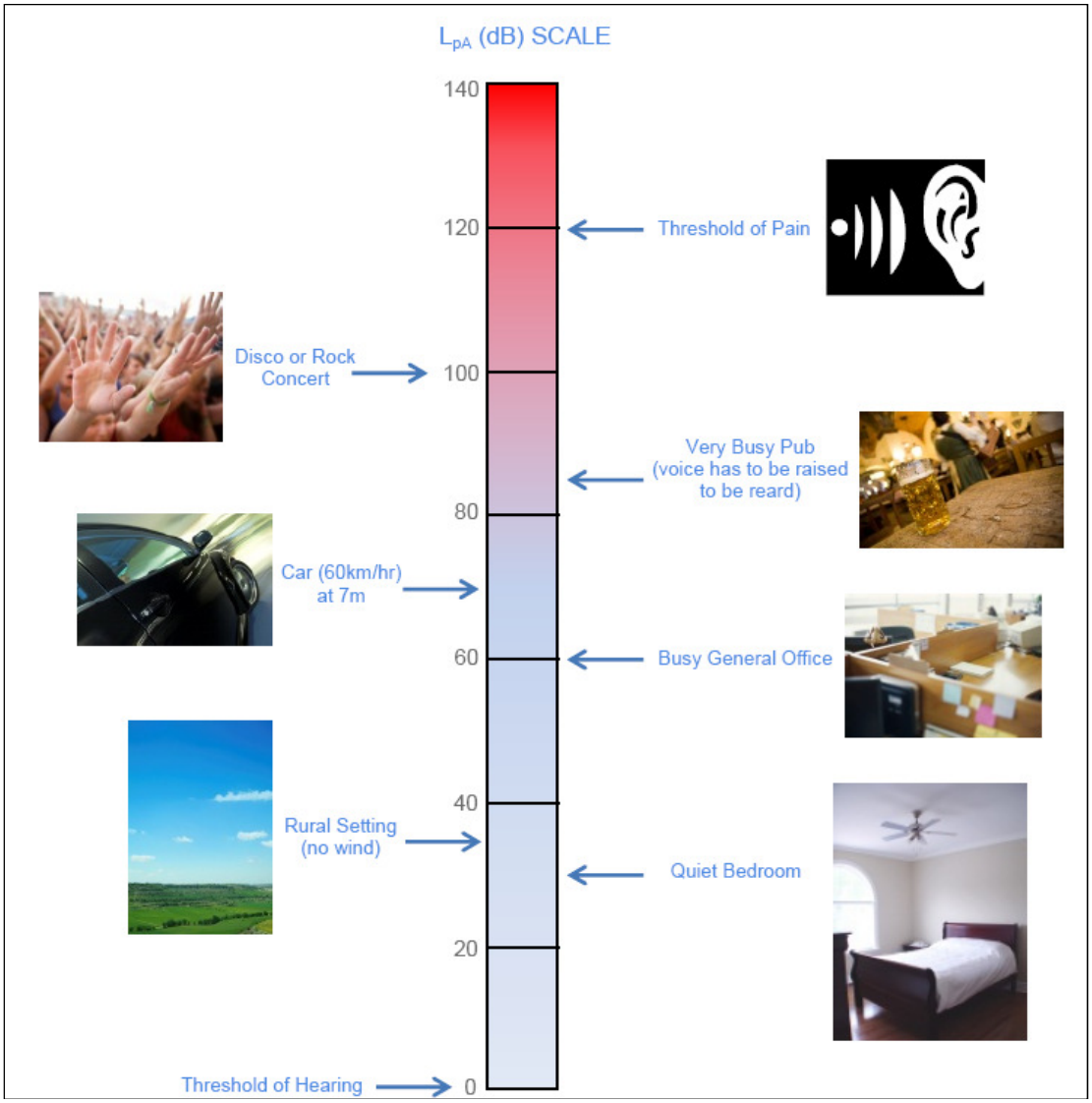

Figure 9.1 dB(A) Scale & Indicative Noise Levels – (EPA: Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4 – 2016))

Significance of impacts

9.9 The significance of noise and vibration impacts has been assessed in accordance with the EPA's *Draft Guidelines on the Information to be contained in Environmental Impact Assessment Reports* 2017 and the EPA's Draft *Advice Notes for Preparing Environmental Impact Statements* 2015, see Tables 9.1 to 9.3 below. As these guidelines do not quantify the impacts in decibel terms, further reference has been made to the '*Guidelines for Environmental Noise Impact Assessment*' produced by the Institute of Environmental Management and Assessment (IEMA) (2014). With regard to the quality of the impact, ratings may have positive, neutral or negative applications where:

Table 9.1 Quality of Potential Effects

Quality of Effects	Definition
Negative	A change which reduces the quality of the environment (e.g. by causing a nuisance).
Neutral	No effects or effects that are imperceptible, within the normal bounds of variation or within the margin of forecasting error.
Positive	A change that improves the quality of the environment (e.g. by removing a nuisance).

9.10 The significance of an effect on the receiving environment are described as follows:

Table 9.2 Significance of Effects

Significance of Effects on the Receiving Environment	Description of Potential Effects
Imperceptible	An effect capable of measurement but without significant consequences.
Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
Slight	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 a sensitive aspect of the environment.
Profound	An effect which obliterates sensitive characteristics.

9.11 The duration of effects as described in the EPA Guidelines are:

Table 9.3 Duration of Effects

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

Construction Phase Guidance

Criteria for Rating Noise Impacts

9.12 There is no published statutory Irish guidance relating to the maximum permissible noise level that may be generated during the construction phase of a project. Local authorities normally control construction activities by imposing limits on the hours of operation and consider noise limits at their discretion.

9.13 In the absence of specific noise limits, appropriate criteria relating to permissible construction noise levels for a development of this scale may be found in the British Standard BS 5228 – 1: 2009+A1:2014*: Code of practice for noise and vibration control on construction and open sites – Noise*.

9.14 The approach adopted in BS 5228 – one 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.

9.15 BS5228 – 1 sets out guidance on permissible noise levels relative to the existing noise environment. Table 9.4 sets out the values which, when exceeded, signify a significant effect at the facades of residential receptors as recommended by BS 5228 – 1. These are construction noise levels only and not the cumulative noise level due to construction plus existing ambient noise.

Table 9.4 Example Threshold of Significant Effect at Dwellings

Assessment category and threshold value period (L_{Aeq})	Threshold value, in decibels (dB)		
	Category A Note A	Category B Note B	Category C Note C
Night-time (23:00 to 07:00hrs)	45	50	55
Evenings and weekends Note D	55	60	65
Daytime (07:00 – 19:00) and Saturdays (07:00 – 13:00)	65	70	75

Note A) Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are less than these values.
Note B) Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are the same as category A values.
Note C) Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are higher than category A values.
Note D) 19:00 – 23:00 weekdays, 13:00 – 23:00 Saturdays and 07:00 – 23:00 Sundays.

9.16 It should be noted that this assessment method is only valid for residential properties.

9.17 For the appropriate periods (i.e. daytime, evening and night-time) the ambient noise level is determined and rounded to the nearest 5dB. Baseline monitoring carried out as part of this assessment, indicate that the baseline categories summarised in Table 9.5 are appropriate in terms of the nearest noise sensitive locations being considered in this instance.

Table 9.5 Rounded Baseline Noise Levels and Associated Categories

Period	Baseline Noise Category	Construction Noise Threshold Value $L_{Aeq,T}$ (dB)
Daytime (07:00 – 19:00) and Saturdays (07:00 – 13:00)	B	70
Evening (19:00 to 23:00hrs)	B	60
Night time (23:00 to 07:00hrs)	B	50

9.18 If the construction noise level exceeds the appropriate category value, then a significant effect is deemed to occur. See paragraphs 9.63 onwards for the construction noise assessment in relation to this site.

9.19 The assessment process outlined above determines if a significant construction noise impact is likely. Notwithstanding the outcome of this assessment, the overall acceptable levels of construction noise are set out in the Transport Infrastructure Ireland (TII) publication *Guidelines for the Treatment of Noise and Vibration in National Road Schemes*[14], which should not be exceeded at noise sensitive locations during the construction phase of the development. Table 9.6 sets out these levels.

Table 9.6 Maximum Permissible Noise Levels at the Facade of Dwellings during Construction

Days and Times	Noise Levels (dB re. $2x10^{-5}$ Pa)	
	$L_{Aeq(1hr)}$	L_{Amax}
Monday to Friday 07:00 to 19:00hrs	70	80
Monday to Friday 19:00 to 22:00hrs	60*	65*
Saturdays 08:00 to 16:30hrs	65	75
Sundays & Bank Holidays 08:00 to 16:30hrs	60*	65*

Note * Construction activity at these times, other than that required for emergency works, will normally require the explicit permission of the relevant local authority.

9.20 Therefore, based on the above the following construction noise criteria are proposed for the site in relation to day to day works during the stated construction hours:

70dB $L_{Aeq,1hr}$ at noise sensitive location

14 *Guidelines for the Treatment of Noise and Vibration in National Road Schemes, Revision 1, 25 October 2004*, Transport Infrastructure Ireland

75dB $L_{Aeq,1hr}$ at commercial property

9.21 In exceptional circumstances there may be a requirement that certain construction works are carried out during evening and night-time periods. In these instances, the relevant evening (60dB L_{Aeq1hr}) and night time (50dB $L_{Aeq,1hr}$) criterion will apply.

Criteria for Rating Vibration Impacts

9.22 Vibration standards come in two varieties: those dealing with human comfort and those dealing with cosmetic or structural damage to buildings. In both instances, it is appropriate to consider the magnitude of vibration in terms of Peak Particle Velocity (PPV).

9.23 It is acknowledged that humans are particularly sensitive to vibration stimuli and that any perception of vibration may lead to concern. In the case of road traffic, vibration is perceptible at around 0.5mm/s and may become disturbing or annoying at higher magnitudes. However, higher levels of vibration are typically tolerated for single events or events of short duration. For example, rock breaking and piling, two of the primary sources of vibration during construction, are typically tolerated at vibration levels up 2.5mm/s. This guidance is applicable to the daytime only; it is unreasonable to expect people to be tolerant of such activities during the night.

9.24 Guidance relevant to acceptable vibration within buildings is contained in the following documents:

- British Standard BS 7385: 1993: *Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration*; and
- British Standard BS 5228-2: 2009+A1:2014: *Code of practice for noise and vibration control on construction and open sites – Vibration*.

9.25 BS 7385 states that there should typically be no cosmetic damage if transient vibration does not exceed 15mm/s at low frequencies rising to 20mm/s at 15Hz and 50mm/s at 40Hz and above. These guidelines relate to relatively modern buildings and should be reduced to 50% or less for more critical buildings.

9.26 BS 5228 recommends that, for soundly constructed residential property and similar structures that are generally in good repair, a threshold for minor or cosmetic (i.e. non-structural) damage should be taken as a peak component particle velocity (in frequency range of predominant pulse) of 15mm/s at 4Hz increasing to 20mm/s at 15Hz and 50mm/s at 40Hz and above. Below these values minor cosmetic damage is unlikely. Where continuous vibration is such as to give rise to dynamic magnification due to resonance, the guide values may need to be reduced by up to 50%. BS 5288-2 also comments that important buildings which are difficult to repair might require special consideration on a case by case basis.

9.27 The Transport Infrastructure Ireland (TII) document *Guidelines for the Treatment of Noise and Vibration in National Road Schemes* also contains information on the permissible construction vibration levels as follows:

Table 9.7 Allowable vibration during construction phase

Allowable vibration (in terms of peak particle velocity) at the closest part of sensitive property to the source of vibration, at a frequency of		
Less than 10Hz	**10 to 50Hz**	**50 to 100Hz (and above)**
8 mm/s	12.5 mm/s	20 mm/s

Operational Phase – Noise Guidance

9.28 The following extract from *the "EirGrid Evidence Based Environmental Studies Study 8: Noise – Literature review and evidence based field study on the noise effects of high voltage transmission development (May 2016)* states the following in relation to noise impacts associated with 110KvA transformer installations:

"The survey on the 110kV substation at Dunfirth indicated that measured noise levels (L_{Aeq}) were less than 40dB(A) at 5m from each of the boundaries of the substation. This is below the WHO night-time free-field threshold limit of 42dB for preventing effects on sleep and well below the WHO daytime threshold limits for serious and moderate annoyance in outdoor living areas (i.e. 55dB and 50dB

respectively). Spectral analysis of the data recorded at this site demonstrated that there were no distinct tonal elements to the recorded noise level. To avoid any noise impacts from 110kV substations at sensitive receptors, it is recommended that a minimum distance of 5m is maintained between 110kV substations and the land boundary of any noise sensitive property."

9.29 Assuming the proposed substation installation has comparable noise emissions to the 110kV unit discussed above and considering the distance between the 110kV substation and the nearest off site locations (i.e. >250m) noise from this installation is not predicted to be an issue off site.

9.30 Considering the above, it is concluded that there will be no significant noise emissions from the operation of the cable installations or substation. Consequently, there is no requirement to assess any operational noise emissions.

BS 4142:2014+A1:2019

9.31 BS 4142:2014+A1:2019: *Methods for rating and assessing industrial and commercial sound* is the industry standard method for analysing building services plant sound emissions to residential receptors. BS 4142 describes methods for rating and assessing sound of an industrial and/or commercial nature. The methods described in this British Standard use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident. It should also be noted that the Environmental Protection Agency (EPA) document "*Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities*" (NG4 - 2016) indicates that this assessment methodology should be used in the assessment of complaints associated with a site's operations.

9.32 For an appropriate BS 4142 assessment it is necessary to compare the measured external background sound level (i.e. the $L_{A90,T}$ level measured in the absence of plant items) to the rating level ($L_{Ar,T}$) of the various plant items, when operational. Where sound emissions are found to be tonal, impulsive, and intermittent or to have other sound characteristics that are readily distinctive against the residual acoustic environment, BS4142 advises that penalties be applied to the specific level to arrive at the rating level.

9.33 The subjective method for applying a penalty for tonal sound characteristics outlined in BS 4142 recommends the application of a 2dB penalty for a tone which is just perceptible at the receptor, 4dB where it is clearly perceptible, and 6dB where it is highly perceptible. In relation to intermittency, BS 4142 recommends that if the intermittency is readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied. The following definitions as discussed in BS 4142 are summarised below:

"*ambient sound level, $L_{Aeq,T}$*"	equivalent continuous A-weighted sound pressure level of the totally encompassing sound in a given situation at any given time, usually from many sources near and far, at the assessment location over a given time interval, T.
"*residual sound level, $L_{Aeq,T}$*"	equivalent continuous A-weighted sound pressure level of the residual sound (i.e. ambient sound remaining at the assessment location when the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound) at the assessment location over a given time interval, T.
"*specific sound level, $L_{Aeq,T}$*"	equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, T_r.
"*rating level, $L_{Ar,T}$*"	specific sound level plus any adjustment for the characteristic features of the sound.
"*background sound level, $L_{A90,T}$*"	A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, measured using time weighting F and quoted to the nearest whole number of decibels.

9.34 In order to establish an *initial estimate* of impact, BS 4142 states the following:

Obtain an initial estimate of the impact of the specific sound by subtracting the measured background sound level from the rating level, and consider the following.

a. *Typically, the greater this difference, the greater the magnitude of the impact.*
b. *A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.*
c. *A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.*
d. *The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.*

Adverse impacts include, but are not limited to, annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact.

9.35 The assessment methodology described above (i.e. comparison of rated sound level to background sound level) is quoted in BS4142 as representing a methodology to '*obtain an initial estimate'* of impact. It is important to note that BS4142 also comments that *'Where the initial estimate of the impact needs to be modified due to the context, take all pertinent factors into consideration'*. BS4142 provides a list of potential pertinent factors that can influence the *'initial estimate'*. The plant noise assessment conducted in the following sections has been carried out with consideration of the guidance contained in BS4142 as summarised above.

9.36 As part of the survey work undertaken to inform the current assessments (See Chapter 9 - Appendix 9.2 of the Appendix document), the average night-time background noise level identified in the vicinity of noise sensitive locations which are proximate to the Proposed Development, are as outlined in Table 9.8.

Table 9.8 Measured Background Levels & Target Design Criteria

Location	Period	Average Background Noise Level dB L_{AF90} (Measured)	Target Criterion dB $L_{Aeq,15min}$
A	Day (07:00 to 23:00hrs)	54	55 Note A
	Night (23:00 to 07:00hrs)	35	35
B	Day (07:00 to 23:00hrs)	61	55 Note A
	Night (23:00 to 07:00hrs)	38	38
C	Day (07:00 to 23:00hrs)	51	55 Note A
	Night (23:00 to 07:00hrs)	40	40
D	Day (07:00 to 23:00hrs)	50	55 Note A
	Night (23:00 to 07:00hrs)	38	38

Note A Adopted criterion limited to 55dB(A) during daytime in line with best practice and consideration of typical local authority planning condition applied to nearby development.

9.37 Based on the review it is proposed that the design criterion of 55dB $L_{Aeq,15min}$ during daytime periods and 35 to 40dB $L_{Aeq,15min}$ during night-time be adopted at the façades of nearby residential properties. The night-time criterion will dictate the design of the building from an acoustic perspective so this will be focused on in this assessment as compliance with the night time criterion infers compliance with the daytime one. This criterion is considered to be approximately equivalent to the lower existing background noise level measured during night-time periods at nearby residential properties and adverse impacts would not be considered likely should noise emissions be controlled to this level. Considering the L_{AF90} levels measured during various surveys it is considered that the above represents a robust design criterion.

9.38 In addition, typical planning conditions applied to developments of this nature by the relevant planning authority in terms of noise would state the following:

"Noise due to the normal operation of the Proposed Development, at the façade of a noise sensitive location, shall not exceed the daytime background level by more than 10dB(A) and shall not exceed the background level for evening and night time."

9.39 It is considered the approach outlined in this section result in an adopted operational noise criterion that complies with the intent of the typical local authority planning condition for developments of this nature.

Assessment of significance

9.40 The '*Guidelines for Environmental Noise Impact Assessment*' produced by the Institute of Environmental Management and Assessment (IEMA) (2014) have been referenced in order to categorise the potential effect of changes in the ambient noise levels during the operational phases of the Proposed Development.

9.41 The Guidelines state that for any assessment, the potential significance should be determined by the assessor, based upon the specific evidence and likely subjective response to noise. Due to varying factors which effect human response to environmental noise (prevailing environment, noise characteristics, time periods, duration and level etc.) assigning a subjective response must take account of these factors.

9.42 The scale adopted in this assessment is shown in Table 9.9 below is based on an example scale within the IEMA guidelines. The corresponding significance of impact presented in the Draft '*Guidelines on the Information to be Contained in Environmental Impact Assessment Reports*' (EPA, 2017) is also presented.

Table 9.9 Noise Impact Scale – Operational Noise Sources

Noise Level Change dB(A)	Subjective Response	Long Term Impact Classification (IEMA, 2014)	Impact Guidelines on the Information to be contained in EIA Report's (EPA)
≥ 0	No change	Negligible	Imperceptible
≥ 0 and < 3	Barely perceptible		Not Significant
≥ 3 and < 5	Noticeable	Minor	Slight – Moderate
≥ 5 and < 10	Up to a doubling or halving of loudness	Moderate	Moderate – Significant
≥10	More than a doubling or halving of loudness	Major	Significant – Profound

9.43 The significance table reflects the key benchmarks that relate to human perception of sound. A change of 3dB(A) is generally considered to be the smallest change in environmental noise that is perceptible to the human ear. A 10dB(A) change in noise represents a doubling or halving of the noise level. The difference between the minimum perceptible change and the doubling or halving of the noise level is split to provide greater definition to the assessment of changes in noise level.

9.44 It is considered that the ratings specified in the above table provide a good indication as to the likely significance of changes on noise levels in this case and have been used to assess the impact of operational noise.

Commercial properties

9.45 A number of commercial / industrial properties are located in the vicinity of the site. In terms of noise emissions from the site it is considered that an appropriate noise criterion at these locations is 55dB $L_{Aeq,15min}$. This criterion has been derived with consideration of BS 8233:2014 *Guidance on sound insulation and noise reduction for buildings* which recommends that for *Study and work requiring concentrations* in an *Executive office* a design range of 35 to 40 dB L_{Aeq} is desirable internally. Arriving at an external noise level of 55dB $L_{Aeq,15min}$ would ensure that this range of noise levels internally will be achieved.

Emergency operation

9.46 In order to provide continuity of service, back-up emergency generators will be provided as part of the Permitted Development. These generators will only operate in a situation where there is a failure in the electricity supply from the national grid and for routine testing. Routine testing will be conducted during regular weekday daytime periods only. 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'.*

9.47 It is therefore considered that the proposed noise criterion of 55dB $L_{Aeq,1hr}$ on these emergency units is appropriate. The generators of the Permitted Development will be designed and mitigated in order to achieve this design goal at nearby residential noise sensitive locations. In relation to commercial properties an emergency operation criterion of 65dB $L_{Aeq,1hr}$ is proposed.

Recommended criteria

9.48 Following review of relevant guidance, the following noise criteria are proposed for the development:

Day to Day Operation (Noise Sensitive) – **35 to 40dB $L_{Aeq,15min}$** (Ref. BS 4142:2014+A1:2019)
Generator Testing (Daytime) (Noise Sensitive) – **55dB $L_{Aeq,15min}$** (Ref. EPA NG4)
Day to Day Operation (Commercial) – **55dB $L_{Aeq,15min}$** (Ref. BS8233)
Emergency Operation (Noise Sensitive) – **55dB $L_{Aeq,15min}$** (Ref. EPA: NG4)
Emergency Operation (Commercial) – **65dB $L_{Aeq,15min}$**

9.49 Plant noise emissions are to be designed and plant selected such that they are not tonal and do not have impulsive characteristics at the nearest noise sensitive locations.

Operational Phase – Vibration Guidance

9.50 There will be no vibration emissions from the operation of the cable installation. Consequently, there is no requirement to assess any vibration impacts.

Forecasting Methods

9.51 Construction noise calculations have been conducted generally in accordance with BS 5228: 2009+A1:2014: *Code of practice for noise control on construction and open sites - Noise.*

9.52 Prediction calculations for operational building services noise, car park activity and vehicle movements on site have been conducted generally in accordance with ISO 9613 (1996): *Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation.*

9.53 Changes in road traffic noise on the local road network have been considered using prediction guidance contained within *Calculation of Road Traffic Noise (CRTN)* issued by the Department of Transport in 1988.

Receiving environment

9.54 A series of noise surveys have been undertaken as part of the EIA Report preparation for the Proposed Development. Table 9.10 reviews the findings of these surveys. Full details of the noise monitoring are presented in Chapter 9 - Appendix 9.2 of the Appendix document.

Survey and review of locations

9.55 Figure 9.2 illustrates the noise sensitive locations in the vicinity of the Proposed Development site at which noise monitoring was undertaken as part of the current assessment. These are summarised as:

Location A Located in the vicinity of the nearest noise sensitive locations to the south west of the development site.

Location B Located midway along the southern boundary of the site. The lands to the immediate south are currently being developed with construction ongoing at the time of survey work completed here. This located is chosen to be representative of those noise sensitive locations further south. A review of the planning assessment completed for the development under construction has been completed in order to inform expected levels of noise in the absence of these activities at this location.

Location C Located in the vicinity of the nearest residential noise sensitive location to the east of the Proposed Development site.

Location D Located in the vicinity of an existing structure associated with the existing pitch and putt course.

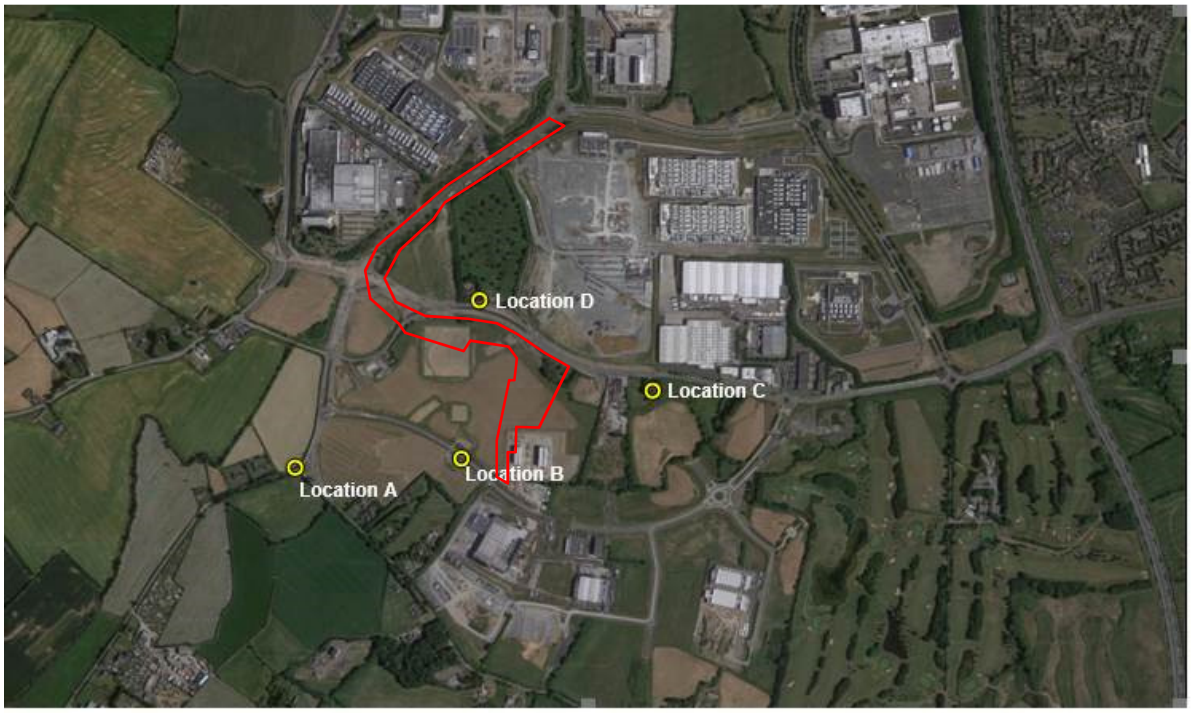

Figure 9.2 Noise Monitoring Locations

Comment on noise levels

9.56 Road traffic noise, both distant and local was noted as the most significant source of noise and typically dictated ambient noise levels (i.e. $L_{Aeq,T}$) at the nearest noise sensitive locations to the site during daytime and night-time periods. Background noise levels (e.g. $L_{A90,T}$) at the various locations were typically dictated by local and distant road traffic noise. These levels reduced as would be expected, into the early hours of the morning when the volume of traffic on the local and wider road network reduced. Distant plant noise from existing commercial sites was noted at Location B and D. Table 9.10 reviews the typical ambient and background noise levels at the monitoring locations discussed above.

Table 9.10 Review of typical noise levels

Location	Period	Start Time	Measured Noise Levels (dB re. $2x10^{-5}$ Pa)	
			L_{Aeq} (Ambient)	L_{AF90} (Background)
A	Day	11:48	71	53

Location	Period	Start Time	Measured Noise Levels (dB re. $2x10^{-5}$ Pa)	
			L_{Aeq} (Ambient)	L_{AF90} (Background)
		12:59	66	56
		14:23	63	54
	Night	23:55	44	35
		01:09	37	35
B	Day	11:31	66	61
		12:42	65	61
		14:06	64	59
	Night	23:36	45	36
		00:51	40	39
C	Day	10:51	71	49
		12:07	71	51
		13:25	72	54
	Night	23:00	66	39
		00:14	61	40
D	Day	11:08	72	54
		12:24	71	47
		13:43	71	50
	Night	23:17	60	36
		00:32	60	39

9.57 These typical noise levels have been considered when discussing appropriate noise criteria in relation to the development as outlined in Table 9.8. It is considered that these conservative assumptions ensured and will ensure that appropriate noise criteria are applied to Proposed Development. Traffic noise from the local road network and other roads in the study area dictated noise levels at all locations during the survey periods in question.

Characteristics of the Proposed Development

9.58 A variety of items of plant will be in use for the purposes of site preparation, construction and site works. There will be vehicular movements to and from the site that will make use of existing roads. Due to the nature of these activities, there is potential for generation of high levels of noise. The underground cable will be laid along a strip of land between the site along an existing public to the termination point on the to the existing 220kV / 110kV Castlebaggot Substation to the immediate south and an underground single circuit 110kV transmission line from the proposed Clutterland Substation connecting to the existing 110kV underground Kilmahud-Corkagh circuit c. 1.1km to the north-west using a methodology similar to the one detailed below:

- The area where excavations are planned will be surveyed, prior to the commencement of works, with a cable avoiding tool and all existing underground services will be identified;
- A team consisting of a rubber tracked excavator, a dumper and a tractor and stone cart with side-shoot will dig the trench and lay approximately 120m of the underground cabling per day;
- The excavators will open a trench, the trench will be a maximum of 600mm wide;
- Clay plugs will be installed at 50m intervals to prevent the trench becoming a conduit for surface water runoff;
- The excavated material will be loaded into the dumpers to be transported to a designated temporary stockpiling area to be reused as backfilling material where appropriate;
- Once the trench has been excavated, a base layer of blinding will be installed by the tractor and cart and compacted by the excavators;
- The ducting will then be placed in the trench as per relevant specifications;
- Blinding will be installed above the cable ducting and compacted;
- The remainder of the trench will be backfilled with granular material and compacted; and
- The trench will be reinstated as per existing surfacing i.e. landscaped in greenfield area where appropriate.

9.59 Construction activities will mostly be carried out during normal daytime working hours. Normal construction hours will be specified by planning conditions of a grant of permission for the Proposed Development, or by the local authority.

9.60 Once operational, there will be no significant off-site noise emissions from the operation of the cable installations or 110kV substations.

9.61 These issues are discussed in detailed in the following sections.

Potential impact of the Proposed Development

Construction phase

9.62 Construction noise predictions have been carried out using guidance set out in British Standard *BS BS 5228 – 1: 2009+A1:2014.*

9.63 Construction works associated with the underground cables will be temporary in duration. It is estimated that the civil works associated with this element of the Proposed Development will take approximately 13 months including cable installation, jointing and testing and reinstatement.

9.64 Table 9.11 outlines the noise levels associated with typical construction noise sources assessed in this instance along with typical sound pressure levels from *BS 5228 – 1: 2009+A1:2014* at various distances from these works.

Table 9.11 Indicative noise levels from construction plant at various distances from the cable installation works

Item (BS 5228 Ref.)	Highest Predicted Noise Level at Stated Distance from Edge of Works (dB $L_{Aeq,1hr}$)			
	20m	40m	60m	100m
Pneumatic breaker (C.8.12)	66	60	56	52
Wheeled loader (C.3.51)*	62	56	52	48
Tracked excavator (C.3.43)*	63	57	53	49
Dozer (C.3.30)*	64	58	54	50
Dump truck (C.3.60)*	60	54	50	46
Asphalt Spread (C.8.24)	70	64	60	56
Compressor (C.7.27)	61	55	51	47
Road Roller (C.3.114)	65	59	55	51
HGV Movements (10 per hour)	53	50	49	46

***Note ** Assume noise control measures as outlined in Table B1 of BS 5228 – 1 (i.e. fit acoustic exhaust).

9.65 Construction works associated with cable works will be the dominant source of noise at the nearest noise sensitive locations when they occur. Where this scenario occurs, it should be noted that at an assumed cable laying rate of 100m per day, the equipment associated with the cable works would be expected to be within 20 to 30m of a specific property for a maximum of some 6 hours if the construction works pass directly in front of the property. This limited time frame for construction works in the vicinity of a specific property results in a brief significant impact.

9.66 Where a property is within such proximity to the works and the noise criterion outlined here is expected to be exceeded for a brief period, the contractor shall be contractually obliged to advise the residents in advance of the works of date, time and duration of the expected works. The contractor will establish channels of communication between the contractor/developer, Local Authority and residents. Once

sufficient notice of works and their timeframe are communicated to affected residents and suitable mitigation is implemented, the overall impact will be significantly reduced

9.67 The noise levels presented in Table 9.11 are within the weekday daytime construction noise limit values shown in Table 9.5, at distances of 20m or greater from the works. At distances greater than 20m from the works, the construction activities are predicted to be below the 70dB $L_{Aeq,1hr}$ construction noise criterion adopted. A significant effect is therefore not predicted in relation to the nearest noise sensitive locations at these distances in terms of this aspect of potential construction noise. Note that all noise sensitive properties in the vicinity of the proposed works are at a distance greater than 100m

9.68 Other construction activity from the Proposed Development is at sufficient distance from a significant proportion of the proposed cable works, so that when they occur at the same time, cumulative issues would not be a material issue.

9.69 Considering the typical distance from works to noise sensitive locations, it is expected that the day and evening criteria for construction noise outlined here can be satisfied. Additional measures will need to be considered during periods where works are carried out during night-time periods to ensure night-time criterion are not exceeded. Specifically high impact activities will not be permitted during night-time hours. Various measures that can be considered are outlined in the mitigation section of this chapter.

9.70 In terms of noise associated with the construction activities for the grid option the associated effect is stated to be ***negative, minor and temporary***.

9.71 In the unlikely event that works are scheduled out of normal hours or at night, the range of calculated noise levels at the nearest noise sensitive (located at distances of greater than 100m) are also below a level that would lead to a significant impact at the distance . Given, however, the potential for cumulative noise impacts to occur if multiple items of plant operate at the same time, noise mitigation measures will need to be considered during these periods. As noted above, however, it is not anticipated that any works will be carried out during night-time periods. Various measures relating to the control of noise from the works are outlined in the mitigation section of this assessment.

Construction Traffic

9.72 In terms of the additional construction traffic on local roads that will be generated as a result of the Proposed Development the following comment is presented. In order to increase traffic noise levels by 1dB traffic volumes would need to increase by the order of 25% along the local road network. As outlined in the relevant sections of Chapter 12 relating to traffic, additional traffic introduced onto the local road network due to the construction phase of the Proposed Development will not result in a significant noise impact.

Review of Construction Impacts

9.73 In terms of noise associated with these construction activities the associated effect is stated to be:

Quality	***Significance***	***Duration***
Negative	Minor	Temporary

9.74 In terms of vibration, due to the distance of activities from the site to the nearest sensitive locations and controlling vibration levels, the associated effect is stated to be:

Quality	***Significance***	***Duration***
Neutral	Imperceptible	Temporary

Operational Phase

9.75 In terms of the transformers units, the EIA Report prepared previously for the Permitted Development considered noise impacts associated with the Proposed Development including the transformer units that form part of the Proposed Development. The emergency generator that forms part of the Proposed Development (less than 1 MW) will only be operated in emergency scenarios to provide back up power to the GIS substation, it has, therefore been screened out of the assessment. Two scenarios have been developed to consider the noise impact of the proposed operations. These are as follows:

- Scenario A – Permitted Development as well as the Proposed Development – Day to Day

- Scenario B – Permitted Development as well as the Proposed Development – Emergency

9.76 Scenario A would be considered to be the most representative of the day to day operation including the transformers. Scenario B is representative of emergency situation when a power outage or issue with supply from the national grid has occurred. It should be noted that such an event is an extremely rare occurrence.

9.77 Figure 9.3 highlights the nearest noise sensitive locations at which predictions have been carried out. Various noise contours are also presented for scenarios A and B in order to demonstrate the noise impact of the Proposed Development over a wider area.

Figure 9.3 Sample Sensitive Locations Considered for Assessment

9.78 The results of the iterations of the noise model are presented in Table 9.12. Note all plant will be selected such that no tonal noise emissions are evident at noise sensitive locations.

Table 9.12 Predicted Plant Noise Levels for Various Scenarios

Location	Predicted dB $L_{Aeq,T}$	
	Scenario A	Scenario B
R01	23	34
R02	25	35
R03	28	38
R04	29	38
R05	30	39
R06	33	45
R07	32	43
R08	31	43
R09	36	54
R10	36	53
R11	35	41
R12	35	41
R13	33	40

9.79 The above predicted levels are based on a situation where the receiver is downwind of all noise sources and that all plant is operating on full duty (which will rarely if ever be the case). For the purposes of the assessment against the adopted criteria this is a robust worst-case assumption.

Comment on adopted noise criteria day to day operations

9.80 The predicted noise levels presented in Table 9.12 have been compared to the relevant daytime noise criteria as adopted for this assessment.

Scenario A All locations are within the relevant adopted limits by a clear margin. All locations comply with the adopted criteria in relation to day to day operations. Figure 9.4 presents a noise contour for Scenario A.

Scenario B All locations are within the relevant adopted emergency operation limit in the rare event that a power loss to the site occurs. Figure 9.5 presents a noise contour for Scenario B.

Summary

9.81 Scenario A is representative of the typical day to day operations envisioned for the site. Review of the predicted noise levels and associated noise contours confirms that the site-specific levels comply with the noise criterion adopted for this assessment.

9.82 Scenario B is representative of emergency situations such as a power outage on the national grid. Review of the predicted noise levels and associated noise contours confirm that the site-specific levels comply with the noise criterion that has been adopted for these situations following review of relevant guidance.

Table 9.13 Comparison of Predicted Noise Levels vs. Adopted Noise Criteria

Location	Scenario A			Scenario B		
	Predicted dB $L_{Aeq,T}$	Criterion dB $L_{Aeq,T}$	Complies?	Predicted dB $L_{Aeq,T}$	Criterion dB $L_{Aeq,T}$	Complies?
R01	23	35	✓	34	55	✓
R02	25		✓	35		✓
R03	28	38	✓	38		✓
R04	29		✓	38		✓
R05	30		✓	39		✓
R06	33		✓	45		✓
R07	32		✓	43		✓
R08	31		✓	43		✓
R09	36		✓	54		✓
R10	36	55	✓	53		✓
R11	35		✓	41		✓
R12	35		✓	41		✓
R13	33	40	✓	40		✓

Review of increases in noise level

9.83 Table 9.14 presents the predicted changes in noise level associated with the development at the nearest noise sensitive locations to the site.

Table 9.14 Review of predicted changes in existing noise levels

Loc.	Scenario A – Typical Operation Daytime				
	Predicted dB $L_{Aeq,T}$	Background Level dB $L_{A90,T}$	Cumulative Noise Level dB(A)	Change in Noise Level (dB)	EPA Glossary of Impacts
R01	23	54	54	0	Imperceptible
R02	25	54	54	0	Imperceptible
R03	28	54 Note A	54	0	Imperceptible
R04	29	54 Note A	54	0	Imperceptible
R05	30	54 Note A	54	0	Imperceptible

R06	33	54 Note A	54	0	Imperceptible
R07	32	54 Note A	54	0	Imperceptible
R08	31	54 Note A	54	0	Imperceptible
R09	36	51	51.1	0.1	Not Significant
R10	36	51	51.1	0.1	Not Significant
R11	35	50	50	0	Imperceptible
R12	35	50	50	0	Imperceptible
R13	33	50	50	0	Imperceptible
Loc.	**Scenario A – Typical Operation Night**				
	Predicted dB $L_{Aeq,T}$	**Background Level dB $L_{A90,T}$**	**Cumulative Noise Level dB(A)**	**Change in Noise Level (dB)**	**EPA Glossary of Impacts**
R01	23	35	35.1	0.1	Not Significant
R02	25	35	35.1	0.1	Not Significant
R03	28	38	38.2	0.2	Not Significant
R04	29	38	38.2	0.2	Not Significant
R05	30	38	38.3	0.3	Not Significant
R06	33	38	38.4	0.4	Not Significant
R07	32	38	38.3	0.3	Not Significant
R08	31	38	38.3	0.3	Not Significant
R09	36	38	39.5	1.5	Not Significant
R10	36	38	39.2	1.2	Not Significant
R11	35	40	40.4	0.4	Not Significant
R12	35	40	40.4	0.4	Not Significant
R13	33	40	40.2	0.2	Not Significant

Note A Background level from Location A assumed due to influence of construction noise on background noise levels at this location during daytime periods.

9.84 Review of the predicted increases in noise level at the nearest noise sensitive locations conclude that the associated impact is '*not significant'* at all locations for Scenario A – Typical Operation night-time periods. An '*imperceptible'* or '*not significant*' impact is also predicted at all locations assessed during daytime periods. In essence the existing soundscapes that are encountered at the nearest noise sensitive locations are predicted to remain unchanged in terms of ambient noise levels with the development of Permitted Development introducing a low level of plant noise at the nearest locations assessed. In terms of noise associated with day to day activities the associated effect is stated to be as follows:

Quality	***Significance***	***Duration***
Negative	*Not Significant*	*Long Term*

9.85 There will be no noise or vibration emissions from the operation of the cable installation or the 110Kv substation off-site. Consequently, the operational effects are stated to be:

Quality	***Significance***	***Duration***
Neutral	Imperceptible	*Long Term*

Additional vehicular traffic on public roads

9.86 In terms of the additional traffic on local roads that will be generated as a result of this development the following comment is presented: Considering that in order to increase traffic noise levels by 1dB traffic volumes would need to increase by the order of 25% it is considered that additional traffic introduced onto the local road network due to this development will not result in a significant noise impact. The resultant noise impact is ***neutral***, ***imperceptible*** and ***long-term***.

Quality	***Significance***	***Duration***
Neutral	*Imperceptible*	*Long Term*

Figure 9.4 Noise Contour – Scenario A – Day to Day Operations of the Permitted Development as well as the Proposed Development

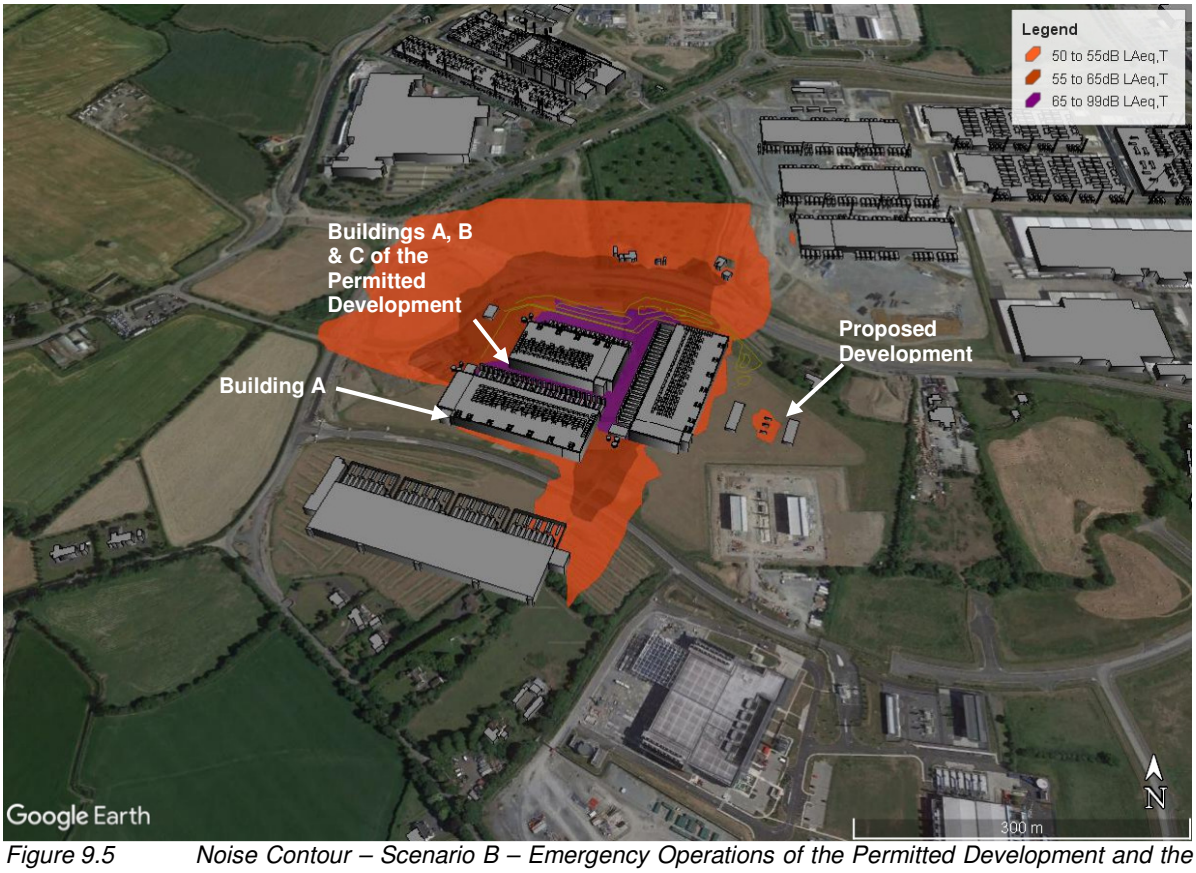

Figure 9.5 Noise Contour – Scenario B – Emergency Operations of the Permitted Development and the Proposed Development

Remedial and mitigation measures

9.87 In order to sufficiently ameliorate the likely noise impact, a schedule of noise control measures has been formulated for both construction and operational phases associated with the Proposed Development.

Construction phase

9.88 With regard to construction activities, reference has been made to BS5228 Parts 1 and 2, which offer detailed guidance on the control of noise and vibration from demolition and construction activities. Various mitigation measures will be considered and applied during the construction of the Proposed Development. As an example, the following measures will be implemented on site:

- limiting the hours during which site activities likely to create high levels of noise or vibration are permitted;
- establishing channels of communication between the contractor/developer, Local Authority and residents;
- appointing a site representative responsible for matters relating to noise and vibration;
- monitoring levels of noise and/or vibration during critical periods and at critical sensitive locations; and
- all site access roads will be kept even so as to mitigate the potential for vibration from lorries.

9.89 Furthermore, a variety of practicable noise control measures will be employed, such as:

- selection of plant with low inherent potential for generation of noise and/ or vibration;
- erection of barriers as necessary around items such as generators or high duty compressors;
- situate any noisy plant as far away from sensitive properties as permitted by site constraints and the use of vibration isolated support structures where necessary.

9.90 Vibration from construction activities to off-site residences will be limited to the values set out in Table 9.7. It should be noted that these limits are not absolute but provide guidance as to magnitudes of vibration that are very unlikely to cause cosmetic damage. Where there is existing building damage these limits may need to be reduced by up to 50%.

9.91 Chapter 9 - Appendix 9.4 of the EIA Report presents an indicative construction noise and vibration management plan that will be implemented in terms of the day to day operation of the site. This will focus on opening up and maintaining lines of communication with the local community to address issues in relation to noise and/or vibration and to advise the community of periods where specific activities take place that have an increased potential in giving rise to issues off site (Note: no rock breaking is anticipated as part of the Proposed Development). It is required that the appointed contractor monitor levels of noise and vibration during the construction phase at nearby sensitive locations and/or development site boundaries.

Operational Phase

Building services noise / emergency site operation

9.92 Once operational, there are no noise or vibration mitigation measures required.

9.93 With due consideration as part of the detailed design process, this approach will result in the site operating well within the constraints of the best practice guidance noise limits that have been adopted as part of this detailed assessment.

Additional vehicular traffic on public roads

9.94 The noise impact assessment outlined previously has demonstrated that mitigation measures are not required.

Cumulative assessment

9.95 The environmental noise survey takes account of noise emissions from existing developments. It was noted that the existing ambient noise levels in the area were dominated primarily by road traffic on the surrounding road network. The noise criteria proposed for new building services plant items has been derived with consideration of existing site noise emissions levels to ensure that cumulative noise

emissions do not exceed the relevant noise criteria.

9.96 The potential cumulative noise emissions from the Permitted Development, Proposed Development and neighbouring Google Ireland Data Centre and Cyrus One Data Centre have been considered. Reference is made to Section 9 of the Google Ireland EIS (PM Group ref. IE0311190-22-RP-0001, Issue A) (Google EIS Table 9.12) and Section 10 of the Cyrus One EIAR which presents noise predictions to nearby shared residential receptors.

9.97 The closest shared receptors to the two neighbouring sites are the receivers R2, R5 and R6. Table 9.15 presents the predicted cumulative noise levels to these two receivers and compares to the proposed noise criteria.

Table 9.15 Assessment of predicted noise levels at receptors for typical site operation

Receiver Reference (Ref. Figure 9.4)	Predicted Noise Level, (dB $L_{Aeq,T}$)				Noise Criteria (dB(A)) (Night)	Complies?
	DUB69	Cyrus One	Google Ireland	Cumulative		
R2 Note A	25	14	15	26	35	✓
R5 Note B	30	12	27	32	38	✓
R6 Note C	33	13	27	34	38	✓

Note A NSL R4 in Cyrus One assessment and NSL1 in Google assessment.
Note B NSL R1 in Cyrus One assessment and NSL6 in Google assessment.
Note C NSL R9 in Cyrus One assessment and NSL6 in Google assessment.

9.98 Predicted cumulative plant noise emissions are therefore within the adopted criteria.

Predicted impacts of the development

9.99 This section summarises the likely noise and vibration impact associated with the Proposed Development, taking into account the mitigation measures.

Construction phase

9.100 During the construction phase of the Proposed Development there will be some impact on nearby noise sensitive properties due to noise emissions from site traffic and other activities. The application of noise limits and hours of operation (i.e. as per Table 9.5, 10.6), along with implementation of appropriate noise and vibration control measures (as summarised in Sections 10.93 and 10.94), will ensure that noise and vibration impact is kept to a minimum. Also, it is reiterated that any construction noise impacts will be ***slight, negative*** and ***temporary*** in nature. Also, it is considered that as the Proposed Development progresses from initial ground works that construction noise impacts will reduce from slight to ***not significant***.

Operational phase

Building services noise / emergency site operation

9.101 Proprietary noise and vibration control measures will be employed in order to ensure that noise emissions from building services plant do not exceed the adopted criterion at the façade of any nearby noise sensitive locations. In addition, noise emissions should be broadband in nature and should not contain any tonal or impulsive elements. The resultant noise impact is ***negative***, ***not significant*** and ***long-term***.

Additional vehicular traffic on public roads

9.102 Any change in noise levels associated with vehicles at road junctions in the vicinity of the Proposed Development is expected to be ***imperceptible.*** The resultant noise impact is ***neutral, imperceptible*** and ***long-term.***

Cumulative Impacts

9.103 During construction of the Proposed Development it is anticipated that noise and vibrations associated with construction work on the proposed cable installation routes and substation will typically be lower than those generated by existing traffic movements on the local road network. The noise environments at the nearest noise sensitive locations to the proposed works are and will continue to be dominated by road traffic noise.

9.104 Construction being completed on the permitted data centre on the adjacent site or at other sites within the wider area, whilst potentially significant at locations in close proximity to these other sites will effectively be masked by the existing traffic noise at the nearest noise sensitive locations identified in this assessment. Such works would not be expected to increase ambient noise levels in the vicinity of the noise sensitive locations that are in the proximity of the works under consideration here. All sites will be expected to work within conditioned and or best practice noise and vibration limits such that the associated noise and vibration impacts and managed. Based on this it is reiterated that any construction noise impacts will be ***slight, negative*** and ***temporary*** in nature.

9.105 Once the mitigation measures outlined above are implemented there should be no significant cumulative impact as a result of the Proposed Development.

9.106 The cumulative noise impacts of the Proposed Development and the permitted data centre have been outlined in the assessment presented here. The resultant noise impact is ***negative***, ***not significant*** and ***long-term***.

9.107 There are no operational vibration impacts associated with the Proposed Development or the permitted data centre, hence cumulative impacts do not arise in this instance.

Residual impacts

9.108 The construction noise assessment has shown that in accordance with the 'significance' thresholds presented in the *British Standard BS 5228 – 1: 2009+A1:2014,* there are no significant impacts at the closest noise sensitive locations (including residential and commercial buildings), subject to the implementation of the mitigation measures outlined in Sections 10.93 and 10.94.

9.109 The robust analysis of potential operational phase plant has shown that in accordance with the scale in the EPA Draft EIA Report Guidelines 2017 that predicted impacts are ***not significant, negative, and long term*** at the closest residences identified on Figure 9.4. The predicted change in background noise level due to current application is the order of 1dB during night-time periods. Ambient noise levels are, and will continue to be, dictated by road traffic noise in the area while a low level of plant noise is expected to be audible during lulls in other sources (e.g. distant traffic noise).

9.110 In terms of the nearest commercial properties, impacts are predicted to be ***not significant, negative, and long-term***, as the character of the noise environment in the vicinity of these locations will not be altered.

9.111 The operational noise assessment of vehicle movements associated with the site has shown that in accordance with the scale in the EPA Draft EIA Report Guidelines 2017 there will be an ***imperceptible, neutral, long-term*** impact at off-site noise sensitive locations considering existing traffic volumes on the local road network.

9.112 The cumulative impact with other developments in the vicinity is addressed in Chapter 16 of this EIA Report.

9.113 Interactions are addressed in Chapter 17 of this EIA Report.

Do-Nothing Scenario

9.114 The existing noise climate will remain unchanged on site and at nearby noise sensitive locations until such time as the land is developed in accordance with the Permitted Development that has now commenced works on site. As the Proposed Development is located within the footprint of the Permitted Development the do-nothing scenario in this instance would be that the proposed substation site would remain as an undeveloped parcel of land within the Permitted Development site.

10. AIR QUALITY AND CLIMATE

Introduction

10.1 This chapter evaluates the impacts, which the Proposed Development may have on Air Quality & Climate as defined in the Environmental Protection Agency (EPA) documents Draft 'Guidelines on the Information to be contained in Environmental Impact Assessment Reports' (2017) and the EPA Draft 'Advice Notes for Preparing Environmental Impact Statements' (2015).

10.2 The Proposed Development is described in detail within Chapter 2 (Description of the Proposed Development) of this EIA Report.

Methodology

Criteria for Rating of Impacts

Ambient Air Quality Standards

10.3 In order to reduce the risk to health from poor air quality, National and European statutory bodies, the Department of the Environment, Heritage and Local Government in Ireland and the European Parliament and Council of the European Union, have set limit values in ambient air for a range of air pollutants. These limit values or "Air Quality Standards" are health or environmental-based levels for which additional factors may be considered. For example, natural background levels, environmental conditions and socio-economic factors may all play a part in the limit value which is set (see Table 10.1).

10.4 Air quality significance criteria are assessed based on compliance with the appropriate standards or limit values. The applicable standards in Ireland include the Air Quality Standards Regulations 2011, which incorporate European Commission Directive 2008/50/EC, which has set limit values for a number of pollutants with the limit values for NO_2, PM_{10}, and $PM_{2.5}$ being relevant to this assessment. Council Directive 2008/50/EC combines the previous Air Quality Framework Directive (96/62/EC) and its subsequent daughter directives (including 1999/30/EC and 2000/69/EC).

Table 10.1 Ambient Air Quality Standards

Pollutant	Regulation [Note 1]	Limit Type	Value
Dust Deposition	TA Luft (German VDI 2002)	Annual average limit for nuisance dust	350 mg/(m^2*day)
Nitrogen Dioxide	2008/50/EC	Hourly limit for protection of human health - not to be exceeded more than 18 times/year	200 µg/m^3
		Annual limit for protection of human health	40 µg/m^3
Particulate Matter (as PM_{10})	2008/50/EC	24-hour limit for protection of human health - not to be exceeded more than 35 times/year	50 µg/m^3 PM_{10}
		Annual limit for protection of human health	40 µg/m^3 PM_{10}
Particulate Matter (as $PM_{2.5}$)	2008/50/EC	Annual limit for protection of human health	25 µg/m^3 $PM_{2.5}$

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

Dust Deposition Guidelines

10.5 The concern from a health perspective is focused on particles of dust which are less than 10 microns and the EU ambient air quality standards outlined above have set ambient air quality limit values for PM_{10} and $PM_{2.5}$.

10.6 With regard to larger dust particles that can give rise to nuisance dust, there are no statutory guidelines regarding the maximum dust deposition levels that may be generated during the construction phase of a development in Ireland.

10.7 However, guidelines for dust deposition, the German TA-Luft standard for dust deposition (non-hazardous dust) (German VDI, 2002) sets a maximum permissible emission level for dust deposition

of 350 mg/(m²*day) averaged over a one year period at any receptors outside the site boundary. The TA-Luft standard has been applied for the purpose of this assessment based on recommendations from the EPA in Ireland in the document titled 'Environmental Management Guidelines - Environmental Management in the Extractive Industry (Non-Scheduled Minerals) (EPA, 2006). The document recommends that the Bergerhoff limit of 350 mg/(m²*day) be applied to the site boundary of quarries. This limit value can be implemented with regard to dust impacts from construction of the Proposed Development.

Gothenburg Protocol

10.8 In 1999, Ireland signed the Gothenburg Protocol to the 1979 UN Convention on Long Range Transboundary Air Pollution. The initial objective of the Protocol was to control and reduce emissions of Sulphur Dioxide (SO_2), Nitrogen Oxides (NO_X), Volatile Organic Compounds (VOCs) and Ammonia (NH_3). In 2012, the Gothenburg Protocol was revised to include national emission reduction commitments for the main air pollutants to be achieved in 2020 and beyond and to include emission reduction commitments for $PM_{2.5}$.

10.9 European Commission Directive 2001/81/EC and the National Emissions Ceiling Directive (NECD), prescribes the same emission limits as the 1999 Gothenburg Protocol. A National EPA Programme for the progressive reduction of emissions of these four transboundary pollutants has been in place since April 2005. The data available from the EPA in 2020 (EPA, 2020a) indicated that Ireland complied with the emissions ceilings for SO_2, NH_3, NO_X and NMVOCs in recent years. Directive (EU) 2016/2284 "*On the Reduction of National Emissions of Certain Atmospheric Pollutants and Amending Directive 2003/35/EC and Repealing Directive 2001/81/EC*", was published in December 2016. The Directive will apply the 2010 NECD limits until 2020 and establish new national emission reduction commitments, which will be applicable from 2020 and 2030 for SO_2, NO_X, NMVOC, NH_3, $PM_{2.5}$ and CH_4. In relation to Ireland, 2020 emission targets are 25.5 kt for SO_2 (65% on 2005 levels), 66.9 kt for NO_X (49% reduction on 2005 levels), 56.9 kt for NMVOCs (25% reduction on 2005 levels), 112 kt for NH_3 (1% reduction on 2005 levels) and 15.6 kt for $PM_{2.5}$ (18% reduction on 2005 levels). In relation to 2030, Ireland's emission targets are 10.9 kt (85% below 2005 levels) for SO_2, 40.7 kt (69% reduction) for NO_x, 51.6 kt (32% reduction) for NMVOCs, 107.5 kt (5% reduction) for NH_3 and 11.2 kt (41% reduction) for $PM_{2.5}$.

Climate Agreements

10.10 Ireland ratified the United Nations Framework Convention on Climate Change (UNFCCC) in April 1994 and the Kyoto Protocol in principle in 1997 and formally in May 2002 (UNFCCC, 1997). For the purposes of the EU burden sharing agreement under Article 4 of the Doha Amendment to the Kyoto Protocol, in December 2012, Ireland agreed to limit the net growth of the six Greenhouse Gases (GHGs) under the Kyoto Protocol to 20% below the 2005 level over the period 2013 to 2020 (UNFCCC, 2012). The UNFCCC is continuing detailed negotiations in relation to GHGs reductions and in relation to technical issues such as Emission Trading and burden sharing. The most recent Conference of the Parties to the Convention (COP25) took place in Madrid, Spain from the 2nd to the 13th of December 2019 and focussed on advancing the implementation of the Paris Agreement. The Paris Agreement was established at COP21 in Paris in 2015 and is an important milestone in terms of international climate change agreements. The Paris Agreement is currently ratified by 187 nations and has a stated aim of limiting global temperature increases to no more than 2°C above pre-industrial levels with efforts to limit this rise to 1.5°C. The aim is to limit global GHG emissions to 40 gigatonnes as soon as possible whilst acknowledging that peaking of GHG emissions will take longer for developing countries. Contributions to greenhouse gas emissions will be based on Intended Nationally Determined Contributions (INDCs) which will form the foundation for climate action post 2020. Significant progress was also made on elevating adaption onto the same level as action to cut and curb emissions.

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

10.12 In relation to the EU 20-20-20 targets for CO_2, Ireland has a target of a 20% reduction in non-Emission Trading Scheme (non-ETS) greenhouse gas emissions by 2020 relative to the 2005 levels. The Environmental Protection Agency (EPA) confirmed that the 2018 levels are 5.59 Mt CO_2eq over the target and projections to 2020 indicate that the target is unlikely to be met in future years (EPA, 2020b, 2019a).

10.13 The *Climate Action and Low Carbon Development Act 2015* specifies plans to be drafted and approved by the Government in relation to climate change for the purpose of pursuing the transition to a low carbon, climate resilient and environmentally sustainable economy. The act required the establishment of the Climate Change Advisory Council and the creation and approval by the government of a *National Mitigation Plan* (to be published every five years), *National Adaptation Framework* and an *Annual Transition Statement*. The first *National Mitigation Plan* for Ireland was published in July 2017 and outlines the central roles of the key Ministers responsible for the sectors covered by the Plan – Electricity Generation, the Built Environment, Transport and Agriculture. This first Plan outlines the initial foundations to be implemented to transition Ireland to a low carbon, climate resilient and environmentally sustainable economy by 2050. The Plan also includes over 100 individual actions for various Ministers and public bodies to take forward.

10.14 In addition to the publication of the *National Mitigation Plan*, the government subsequently published a *Climate Action Plan* in 2019. The *Climate Action Plan* outlines the current status across key sectors including Electricity, Transport, Built Environment, Industry and Agriculture and outlines the various broadscale measures required for each sector to achieve ambitious decarbonisation targets. The *Climate Action Plan* also details the required governance arrangements for implementation including carbon-proofing of policies, establishment of carbon budgets, a strengthened Climate Change Advisory Council and greater accountability to the Oireachtas.

Construction Phase

Air Quality

10.15 The Institute of Air Quality Management in the UK (IAQM) guidelines (2014) outline an assessment method for predicting the impact of dust emissions from demolition, earthworks, construction and haulage activities based on the scale and nature of the works and the sensitivity of the area to dust impacts. The IAQM methodology has been applied to the construction phase of the Proposed Development in order to predict the likely magnitude of the dust impacts in the absence of mitigation measures.

Climate

10.16 The impact of the construction phase of the Proposed Development on climate was determined by a qualitative assessment of the nature and scale of greenhouse gas generating construction activities associated with the Proposed Development.

Operational Phase

Air Quality

10.17 Operational phase traffic has the potential to impact air quality. The UK DMRB guidance (UK Highways Agency, 2019a), states that road links meeting one or more of the following criteria can be defined as being 'affected' by a proposed development and should be included in the local air quality assessment. The TII guidance (2011) was based on the previous version of the UK DMRB guidance (UK Highways Agency, 2007) and notes that the TII guidance should be adapted for any updates to the DMRB (see Section 1.1 of *Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes, 2011)*.

- Annual average daily traffic (AADT) changes by 1,000 or more;
- Heavy duty vehicle (HDV) AADT changes by 200 or more;
- A change in speed band; and
- A change in carriageway alignment by 5m or greater.

10.18 By definition of the criteria above, there are no road links impacted as a result of the Proposed Development. Therefore, no assessment using the DMRB model was required for the Proposed Development as there is no potential for significant impacts to air quality.

Climate

10.19 The UK Highways Agency has published an updated DMRB guidance document in relation to climate impact assessments *LA 114 Climate* (UK Highways Agency 2019b). The following scoping criteria are used to determine whether a detailed climate assessment is required for a proposed project during the operational stage. If any of the road links impacted by the proposed development meet or exceed the below criteria, then further assessment is required.

- A change of more than 10% in AADT;
- A change of more than 10% to the number of heavy duty vehicles; and
- A change in daily average speed of more than 20 km/hr.

10.20 None of the road links impacted by the Proposed Development meet the scoping criteria above and therefore a detailed assessment has been scoped out as there is no potential for significant impacts to climate.

Receiving environment

Meteorological Data

10.21 A key factor in assessing temporal and spatial variations in air quality is the prevailing meteorological conditions. Depending on wind speed and direction, individual receptors may experience very significant variations in pollutant levels under the same source strength (i.e. traffic levels) (WHO, 2006). Wind is of key importance in dispersing air pollutants and for ground level sources, such as traffic emissions, pollutant concentrations are generally inversely related to wind speed. Thus, concentrations of pollutants derived from traffic sources will generally be greatest under very calm conditions and low wind speeds when the movement of air is restricted. In relation to PM_{10}, the situation is more complex due to the range of sources of this pollutant. Smaller particles (less than $PM_{2.5}$) from traffic sources will be dispersed more rapidly at higher wind speeds. However, fugitive emissions of coarse particles ($PM_{2.5}$ - PM_{10}) will actually increase at higher wind speeds. Thus, measured levels of PM_{10} will be a non-linear function of wind speed.

10.22 The nearest representative weather station collating detailed weather records is Casement Aerodrome, which is located approximately 1 km south of the site. Casement Aerodrome met data has been examined to identify the prevailing wind direction and average wind speeds over a five-year period (see Figure 10.1). For data collated during five representative years (2015 – 2019) (Met Eireann, 2020), the predominant wind direction is westerly to south-westerly, with generally moderate wind speeds averaging 5.5 m/s for the period 1981 - 2019.

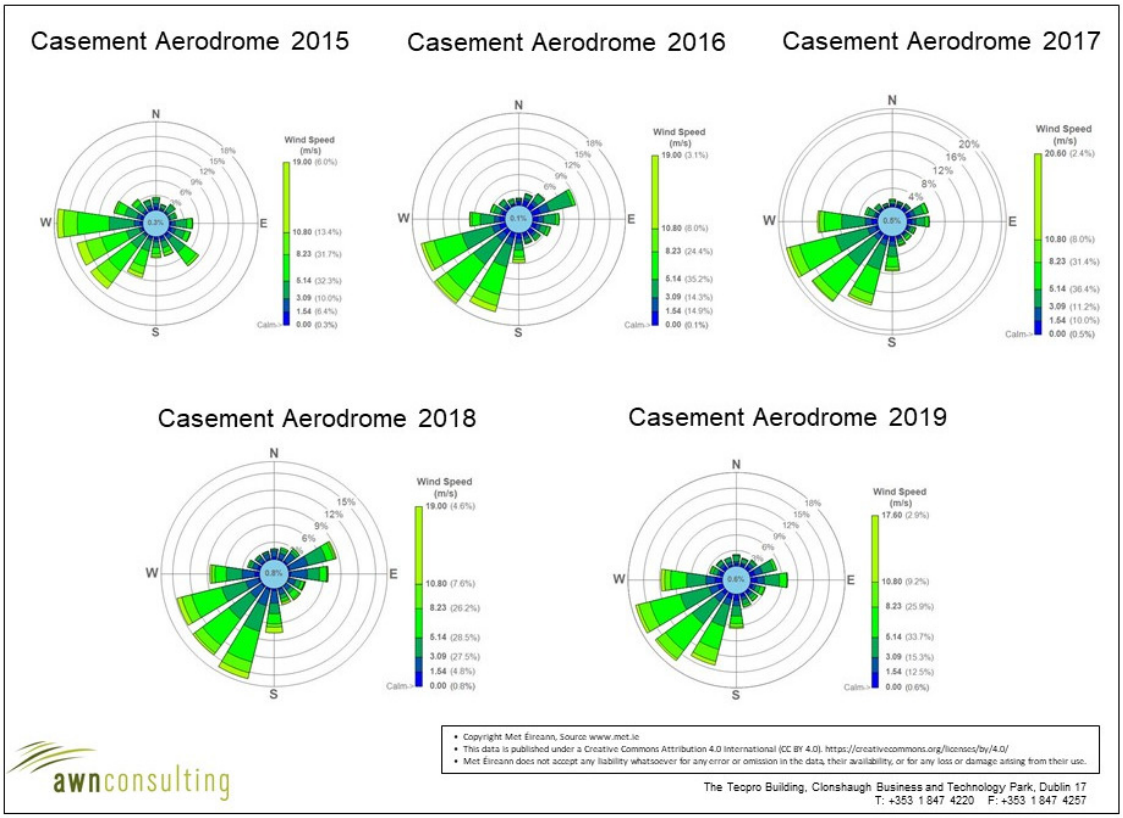

Figure 10.1 Casement Aerodrome Windrose 2015 – 2019 (MET, 2020)

Baseline Air Quality

10.23 Air quality monitoring programs have been undertaken in recent years by the EPA and Local Authorities. The most recent EPA published annual report on air quality "Air Quality in Ireland 2018" (EPA 2019) details the range and scope of monitoring undertaken throughout Ireland.

10.24 As part of the implementation of the Framework Directive on Air Quality (1996/62/EC), four air quality zones have been defined in Ireland for air quality management and assessment purposes as outlined within the EPA document titled 'Air Quality In Ireland 2018' (EPA 2019c). Dublin is defined as Zone A and Cork as Zone B. Zone C is composed of 23 towns with a population of greater than 15,000. The remainder of the country, which represents rural Ireland but also includes all towns with a population of less than 15,000 is defined as Zone D. In terms of air monitoring, the area of the Proposed Development in Grangecastle is categorised as Zone A as explained with the EPA document titled 'Air Quality in Ireland 2018' (EPA 2019c).

NO_2

10.25 With regard to NO_2, continuous monitoring data from the EPA (EPA 2020, 2019), at suburban Zone A background locations in Rathmines, Swords and Ballyfermot show that current levels of NO_2 are below both the annual and 1-hour limit values, with annual average levels ranging from 16 - 20 µg/m^3 in 2018 (see Table 10.2). Sufficient data is available for the station in Ballyfermot to observe long-term trends since 2014 (EPA 2019c), with annual average results ranging from 16 – 17 µg/m^3. Based on these results, an estimate of the current background NO_2 concentration in the region of the proposed development is 17 µg/m^3.

Table 10.2 Background No_2 Concentrations In Zone A Locations ($\mu g/m^3$)

Station	Averaging Period Notes 1,2	Year				
		2014	2015	2016	2017	2018
Rathmines	Annual Mean NO_2 ($\mu g/m^3$)	17	18	20	17	20
	Max 1-hr NO_2 ($\mu g/m^3$)	112	106	102	116	138
Swords	Annual Mean NO_2 ($\mu g/m^3$)	14	13	16	14	16
	Max 1-hr NO_2 ($\mu g/m^3$)	325	170	206	107	112
Ballyfermot	Annual Mean NO_2 ($\mu g/m^3$)	16	16	17	17	17
	Max 1-hr NO_2 ($\mu g/m^3$)	128	142	127	148	217

PM_{10}

10.26 Continuous PM_{10} monitoring carried out at the Ballyfermot, Rathmines, Tallaght and Phoenix Park Zone A locations in 2014 - 2018 showed annual mean concentrations ranging from 11 to 14 $\mu g/m^3$, with at most 5 exceedances (in Rathmines) of the 24-hour limit value of 50 $\mu g/m^3$ (35 exceedances are permitted per year) (EPA, 2019c). Based on this EPA data, an estimate of the background PM_{10} concentration in the region of the development is 14 $\mu g/m^3$.

Table 10.3 Background PM_{10} Concentrations In Zone A Locations ($\mu g/m^3$)

Station	Averaging Period	Year				
		2014	2015	2016	2017	2018
Ballyfermot	Annual Mean PM_{10} ($\mu g/m^3$)	11	12	11	12	16
	24-hr Mean > 50 $\mu g/m^3$ (days)	2	3	0	1	0
Tallaght	Annual Mean PM_{10} ($\mu g/m^3$)	15	14	14	12	15
	24-hr Mean > 50 $\mu g/m^3$ (days)	2	4	0	2	1
Rathmines	Annual Mean PM_{10} ($\mu g/m^3$)	14	15	15	13	15
	24-hr Mean > 50 $\mu g/m^3$ (days)	3	5	3	5	2
Phoenix Park	Annual Mean PM_{10} ($\mu g/m^3$)	12	12	11	9	11
	24-hr Mean > 50 $\mu g/m^3$ (days)	0	2	0	1	0

$PM_{2.5}$

10.27 Continuous $PM_{2.5}$ monitoring carried out at two Zone A locations at Rathmines and Finglas in 2018 showed annual mean concentrations ranging from 8 to 9 $\mu g/m^3$. The $PM_{2.5}/PM_{10}$ ratio in Rathmines in 2018 was 0.6. Based on this information, a ratio of 0.6 was used to generate a background $PM_{2.5}$ concentration in the region of the proposed development of 8.4 $\mu g/m^3$.

Sensitivity of the Receiving Environment

10.28 In line with the UK Institute of Air Quality Management (IAQM) guidance document '*Guidance on the Assessment of Dust from Demolition and Construction'* (2014) prior to assessing the impact of dust from a Proposed Development the sensitivity of the area must first be assessed as outlined below. Both receptor sensitivity and proximity to proposed works areas are taken into consideration. For the purposes of this assessment, high sensitivity receptors are regarded as residential properties where people are likely to spend the majority of their time. In terms of receptor sensitivity to dust soiling, there is single high sensitivity residential property to the direct north of the site within 50 m of the proposed works area. Therefore, the overall sensitivity of the area to dust soiling impacts is considered **low** based on the IAQM criteria outlined in Table 10.4.

Table 10.4 Sensitivity of the Area to Dust Soiling Effects on People and Property

Receptor Sensitivity	Number of receptors	Distance from source (m)			
		<20	<50	<100	<350
High	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	**Low**	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

10.29 In addition to sensitivity to dust soiling, the IAQM guidelines also outline the assessment criteria for determining the sensitivity of the area to human health impacts. The criteria take into consideration the current annual mean PM_{10} concentration, receptor sensitivity based on type (residential receptors are classified as high sensitivity) and the number of receptors affected within various distance bands from the construction works. A conservative estimate of the current annual mean PM_{10} concentration in the vicinity of the Proposed Development is estimated to be 14 µg/m^3 and there one residential property located within 50 m of the proposed construction works. Based on the IAQM criteria outlined in Table 10.5, the worst-case sensitivity of the area to human health is considered to be **low**.

Table 10.5 Sensitivity of the Area to Human Health Impacts

Receptor Sensitivity	Annual Mean PM_{10} Concentration	Number Of Receptors	Distance from source (m)			
			<20	<50	<100	<200
High	< 24 µg/m^3	>100	Medium	Low	Low	Low
		10-100	Low	Low	Low	Low
		1-10	Low	**Low**	Low	Low
Medium	< 24 µg/m^3	>10	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
Low	< 24 µg/m^3	>1	Low	Low	Low	Low

Climate Baseline

10.30 Anthropogenic emissions of greenhouse gases in Ireland included in the EU 2020 strategy are outlined in the most recent review by the EPA which details emissions up to 2018 (EPA, 2020b). 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 Mt. For 2018, total national greenhouse gas emissions are estimated to be 60.93 million tonnes carbon dioxide equivalent (Mt CO_2eq). This is 0.1% lower (0.07 Mt CO_2eq) than emissions in 2017. Agriculture is the largest contributor in 2018 at 33.9% of the total, with the transport sector accounting for 20.1% of emissions of CO_2.

10.31 The EPA 2019 GHG Emissions Projections Report for 2018 – 2040 (EPA 2019b) notes that there is a long-term projected decrease in greenhouse gas emissions as a result of inclusion of new climate mitigation policies and measures that formed part of the National Development Plan (NDP) which was published in 2018. Implementation of these are classed as a "*With Additional Measures scenario*" for future scenarios. A change from generating electricity using coal and peat to wind power and diesel vehicle engines to electric vehicle engines are envisaged under this scenario. While emissions are projected to decrease in these areas, emissions from agriculture are projected to grow steadily due to an increase in animal numbers. However, over the period 2013 – 2020 Ireland is projected to cumulatively exceed its compliance obligations with the EU's Effort Sharing Decision (Decision No. 406/2009/EC) 2020 targets by approximately 10 Mt CO_2eq under the 2With Existing Measures" scenario and 9 Mt CO_2eq under the "With Additional Measures" scenario (EPA, 2019b).

Characteristics of the Proposed Development

Construction Phase

10.32 The Proposed Development is described in detail within Chapter 2 (Description of the Proposed Development) of this EIAR. The key civil engineering works which will have a potential impact on air quality and climate during construction are summarised below:

- During construction, an amount of soil will be generated as part of the site preparation works and during excavation for building foundations and for the installation of ducting for the cable installations.
- Infilling and landscaping will be undertaken.
- Temporary storage of construction materials
- Construction traffic accessing the site will emit air pollutants and greenhouse gases during transport.

10.33 As outlined in the mitigation section of this chapter, a dust minimisation plan that forms part of the Draft Construction Environmental Management Plan (CEMP) undertaken by CSEA Consulting Engineers that is included with this application as part of the engineering package will be refined prior to construction commencing on site. The Draft CEMP for the construction phase of the Proposed Development will ensure no dust nuisance occurs at nearby sensitive receptors.

Operational Phase

10.34 During the operational phase, traffic accessing the site for maintenance purposes has the potential to impact on air quality and climate. However, this traffic will not be of the magnitude to cause a significant impact.

10.35 A small (less than 1 MWth) back-up generator will be located within the GIS substation building. The purpose of this generator is to provide back–up power in the event of a power failure to the GIS building. Diesel fuel will be supplied to this generator via a 1,000 Litre diesel tank. Due to its low capacity of less than 1MWth and infrequent use that will occur only in the case of a power failure it has been scoped out of this assessment

Potential Impacts of the Proposed Development

Construction Phase

Air Quality

10.36 The greatest potential impact on air quality during the construction phase of the Proposed Development is from construction dust emissions and the potential for nuisance dust. While construction dust tends to be deposited within 350m of a construction site, the majority of the deposition occurs within the first 50m. The extent of any dust generation depends on the nature of the dust (soils, peat, sands, gravels, silts etc.) and the nature of the construction activity. In addition, the potential for dust dispersion and deposition depends on local meteorological factors such as rainfall, wind speed and wind direction.

10.37 It is important to note that the potential impacts associated with the construction phase of the Proposed Development are short-term in nature. When the dust minimisation measures detailed in the mitigation section of this chapter are implemented, fugitive emissions of dust from the site will not be significant and will pose no nuisance at nearby receptors.

10.38 In order to determine the level of dust mitigation required during the proposed works, the potential dust emission magnitude for each dust generating activity needs to be taken into account, in conjunction with the previously established sensitivity of the area. The major dust generating activities are divided into four types within the IAQM guidance to reflect their different potential impacts. These are:

- Demolition;
- Earthworks;
- Construction; and
- Trackout (movement of heavy vehicles).

Demolition

10.39 There are no demolition activities associated with the Proposed Development. Therefore, there is no demolition impact predicted as a result of the works.

Earthworks

10.40 Earthworks primarily involve excavating material, loading and unloading of materials, tipping and stockpiling activities. Activities such as levelling the site and landscaping works are also considered under this category. The dust emission magnitude from earthworks can be classified as small, medium or large based on the definitions from the IAQM guidance as transcribed below:
Large: Total site area > 10,000 m^2, potentially dusty soil type (e.g. clay which will be prone to suspension when dry due to small particle size), >10 heavy earth moving vehicles active at any one time, formation of bunds > 8 m in height, total material moved >100,000 tonnes;

Medium: Total site area 2,500 m^2 – 10,000 m^2, moderately dusty soil type (e.g. silt), 5 - 10 heavy earth moving vehicles active at any one time, formation of bunds 4 – 8 m in height, total material moved 20,000 – 100,000 tonnes;

Small: Total site area < 2,500 m^2, soil type with large grain size (e.g. sand), < 5 heavy earth moving vehicles active at any one time, formation of bunds < 4 m in height, total material moved < 20,000 tonnes, earthworks during wetter months.

10.41 The level of dust emission that will be generated by the earthwork activities associated with the Proposed Development can be classified as medium as a worst case scenario, as the total material moved, including excavations and infill operations will be between 20,000 – 100,000 tonnes.

10.42 The sensitivity of the area is combined with the dust emission magnitude for each dust generating activity to define the risk of dust impact in the absence of mitigation. As outlined in Table 10.6, this results in an overall **low risk** of temporary dust soiling impacts and temporary human health impacts as a result of the proposed earthworks activities.

Table 10.6 Risk of Dust Impacts – Earthworks

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Construction

10.43 Dust emission magnitude from construction can be classified as small, medium or large based on the definitions from the IAQM guidance as transcribed below:

Large: Total building volume > 100,000 m^3, on-site concrete batching, sandblasting;

Medium: Total building volume 25,000 m^3 – 100,000 m^3, potentially dusty construction material (e.g. concrete), on-site concrete batching;

Small: Total building volume < 25,000 m^3, construction material with low potential for dust release (e.g. metal cladding or timber).

10.44 The dust emission magnitude for the construction activities associated with the Proposed Development can be classified as small as a worst-case as the total building volume for the substation will be 18,400m^3.

10.45 The sensitivity of the area is combined with the dust emission magnitude for each dust generating activity to define the risk of dust impacts in the absence of mitigation. As outlined in Table 10.7, this results in an overall **negligible risk** of temporary dust soiling impacts and temporary human health impacts as a result of the proposed construction activities.

Table 10.7 Risk of Dust Impacts – Construction

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Trackout

10.46 Factors which determine the dust emission magnitude are vehicle size, vehicle speed, number of vehicles, road surface material and duration of movement. Dust emission magnitude from trackout can be classified as small, medium or large based on the definitions from the IAQM guidance as transcribed below:

Large: > 50 HGV (> 3.5 t) outward movements in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length > 100 m;

Medium: 10 - 50 HGV (> 3.5 t) outward movements in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50 - 100 m;

Small: < 10 HGV (> 3.5 t) outward movements in any one day, surface material with low potential for dust release, unpaved road length < 50 m.

10.47 The dust emission magnitude for the proposed trackout can be classified as small as worst case as there will be 10 outward HGV movements per day associated with the Proposed Development.

10.48 As outlined in Table 10.8, this results in an overall **negligible risk** of temporary dust soiling impacts and temporary human health impacts as a result of the proposed trackout activities.

Table 10.8 Risk of Dust Impacts – Trackout

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Summary of Dust Emission Risk

10.49 The risk of dust impacts as a result of the Proposed Development are summarised in Table 10.9 for each activity. The magnitude of risk determined is used to prescribe the level of site-specific mitigation required for each activity in order to prevent significant impacts occurring.

10.50 While there is a low risk of dust soiling and human health impacts associated with the proposed works, best practice dust mitigation measures will be implemented to ensure there are no impacts at nearby sensitive receptors. When the dust mitigation measures detailed in the mitigation section of this chapter are implemented, fugitive emissions of dust from the site will be insignificant and pose no nuisance at nearby receptors.

Table 10.9 Summary of Dust Impact Risk used to Define Site-Specific Mitigation

Potential Impact	Dust Emission Magnitude			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	-	Low Risk	Negligible Risk	Negligible Risk
Human Health	-	Low Risk	Negligible Risk	Negligible Risk

Climate

10.51 There is the potential for greenhouse gas emissions to atmosphere during the construction of the Proposed Development. Construction vehicles, generators and other construction machinery, may give rise to CO_2 and N_2O emissions. The Institute of Air Quality Management document *Guidance on the Assessment of Dust from Demolition and Construction* (IAQM, 2014) states that site traffic and plant is unlikely to make a significant impact on climate. Therefore, the impact on climate is considered to be ***imperceptible*** and ***short-term.***

Operational Phase

Air Quality & Climate

10.52 During operation, the cables will be buried underground and therefore there will be no emissions to atmosphere. There is the potential for maintenance vehicles accessing the substation site to result in emissions of NO_2, PM_{10}/$PM_{2.5}$ and CO_2. However, due to the infrequent nature of maintenance activities and the low number of vehicles involved, as set down in Chapter 2 of this EIA Report (paragraghs 2.81 – 2.84) emissions are not predicted to be significant. A detailed air quality and climate assessment was scoped out for the operational stage of the Proposed Development as per the UK DMRB screening criteria. Operational stage impacts to air quality and climate are predicted to be ***imperceptible*** and ***long-term***.

Do Nothing Scenario

10.53 Under the Do Nothing Scenario no construction works will take place and the previously identified impacts of fugitive dust and particulate matter emissions and emissions from equipment and machinery will not occur. The ambient air quality at the site will remain as per the baseline and will change in accordance with trends within the wider area (including influences from new developments in the surrounding industrial estates, changes in road traffic, etc.). Therefore, this scenario can be considered ***neutral*** in terms of both air quality and climate.

Remedial and Mitigation Measures

Construction Phase

10.54 The objective of dust control at the site is to ensure that no significant nuisance occurs at nearby sensitive receptors. In order to develop a workable and transparent dust control strategy, the following management plan has been formulated by drawing on best practice guidance from Ireland, the UK and the USA based on the following publications:

- 'Guidance on the Assessment of Dust from Demolition and Construction' (IAQM, 2014);
- 'Planning Advice Note PAN50 Annex B: Controlling The Environmental Effects Of Surface Mineral Workings Annex B: The Control of Dust at Surface Mineral Workings' (The Scottish Office, 1996);
- 'Controlling the Environmental Effects of Recycled and Secondary Aggregates Production Good Practice Guidance' (UK Office of Deputy Prime Minister, 2002);
- 'Controlling Particles, Vapours & Noise Pollution From Construction Sites' (BRE, 2003);
- 'Fugitive Dust Technical Information Document for the Best Available Control Measures' and the USA (USEPA, 1997). ; and
- 'Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition' (periodically updated) (USEPA, 1986).

10.55 In advance of work starting on site, the works contractor will prepare a detailed Construction Environmental Management Plan (CEMP) based on the Draft CEMP prepared by CSEA that forms part of the planning application. The CEMP will set out the overarching vision of how the construction of the Proposed Development will be managed in a safe and organised manner by the Contractor. The CEMP will be a live document. It will set out requirements and standards which must be met during the construction stage and will include the relevant mitigation measures outlined in the EIA Report and any subsequent planning conditions relevant to the Proposed Development.

Site Management

10.56 The aim is to ensure good site management by avoiding dust becoming airborne at source. This will be done through good design and effective control strategies.

10.57 At the construction planning stage, the siting of activities and storage piles will take note of the location of sensitive receptors and prevailing wind directions in order to minimise the potential for significant dust nuisance (see Figure 10.1 for the wind rose for Casement Aerodrome). As the prevailing wind is predominantly westerly to south-westerly, locating construction compounds and storage piles downwind (to the east or north-east) of sensitive receptors will minimise the potential for dust nuisance to occur at sensitive receptors.

10.58 Good site management will include the ability to respond to adverse weather conditions by either restricting operations on-site or quickly implementing effective control measures before the potential for nuisance occurs. When rainfall is greater than 0.2mm/day, dust generation is generally suppressed (UK Office of Deputy Prime Minister (2002), BRE (2003)). The potential for significant dust generation is also reliant on threshold wind speeds of greater than 10 m/s (19.4 knots) (at 7m above ground) to release loose material from storage piles and other exposed materials (USEPA, 1986). Particular care should be taken during periods of high winds (gales) as these are periods where the potential for significant dust emissions are highest. The prevailing meteorological conditions in the vicinity of the site are favourable in general for the suppression of dust for a significant period of the year. Nevertheless, there will be infrequent periods were care will be needed to ensure that dust nuisance does not occur. The following measures shall be taken in order to avoid dust nuisance occurring under unfavourable meteorological conditions:

- The Principal Contractor or equivalent must monitor the contractors' performance to ensure that the proposed mitigation measures are implemented and that dust impacts and nuisance are minimised;

- During working hours, dust control methods will be monitored as appropriate, depending on the prevailing meteorological conditions;
- The name and contact details of a person to contact regarding air quality and dust issues shall be displayed on the site boundary, this notice board should also include head/regional office contact details;
- It is recommended that community engagement be undertaken before works commence on site explaining the nature and duration of the works to local residents and businesses;
- A complaints register will be kept on site detailing all telephone calls and letters of complaint received in connection with dust nuisance or air quality concerns, together with details of any remedial actions carried out;
- It is the responsibility of the contractor at all times to demonstrate full compliance with the dust control conditions herein;
- At all times, the procedures put in place will be strictly monitored and assessed.

10.59 The dust minimisation measures shall be reviewed at regular intervals during the works to ensure the effectiveness of the procedures in place and to maintain the goal of minimisation of dust, through the use of best practice and procedures. In the event of dust nuisance occurring outside the site boundary, site activities will be reviewed, and satisfactory procedures implemented, to rectify the problem. Specific dust control measures, to be employed, are described below.

Site Roads / Haulage Routes

10.60 Movement of construction trucks along site roads (particularly unpaved roads) can be a significant source of fugitive dust if control measures are not in place. The most effective means of suppressing dust emissions from unpaved roads is to apply speed restrictions. Studies show that these measures can have a control efficiency ranging from 25 to 80% (UK Office of Deputy Prime Minister, 2002).

- A speed restriction of 20 km/hr will be applied as an effective control measure for dust for on-site vehicles using unpaved site roads;
- Access gates to the site will be located at least 10m from sensitive receptors where possible;
- Bowsers or suitable watering equipment will be available during periods of dry weather throughout the construction period. Research has found that watering can reduce dust emissions by 50% (USEPA, 1997). Watering will be conducted during sustained dry periods to ensure that unpaved areas are kept moist. The required application frequency will vary according to soil type, weather conditions and vehicular use; and
- Any hard surface roads will be swept to remove mud and aggregate materials from their surface while any unsurfaced roads shall be restricted to essential site traffic only.

Land Clearing / Earth Moving

10.61 Land clearing / earth-moving works during periods of high winds and dry weather conditions can be a significant source of dust.

- During dry and windy periods, and when there is a likelihood of dust nuisance, watering will be conducted to ensure moisture content of materials being moved is high enough to increase the stability of the soil and thus suppress dust; and
- During periods of very high winds (gales), activities likely to generate significant dust emissions will be postponed until the gale has subsided.

Storage Piles

10.62 The location and moisture content of storage piles are important factors, which determine their potential for dust emissions.

- Overburden material will be protected from exposure to wind by storing the material in sheltered regions of the site. Where possible storage piles will be located downwind of sensitive receptors;
- Regular watering will take place to ensure the moisture content is high enough to increase the stability of the soil and thus suppress dust. The regular watering of stockpiles has been found to have an 80% control efficiency (UK Office of Deputy Prime Minister, 2002); and
- Where feasible, hoarding will be erected around site boundaries to reduce visual impact. This will also have an added benefit of preventing larger particles from impacting on nearby sensitive receptors.

Site Traffic on Public Roads

10.63 Spillage and blow-off of debris, aggregates and fine material onto public roads will be reduced to a minimum by employing the following measures:

- Vehicles delivering or collecting material with potential for dust emissions shall be enclosed or covered with tarpaulin at all times to restrict the escape of dust; and
- At the main site traffic exits, a wheel wash facility will be installed. All trucks leaving the site must pass through the wheel wash. In addition, public roads outside the site shall be regularly inspected for cleanliness, as a minimum on a daily basis, and cleaned as necessary.

Summary of Dust Mitigation Measures

10.64 The pro-active control of fugitive dust will ensure that the prevention of significant emissions, rather than an inefficient attempt to control them once they have been released, will contribute towards the satisfactory performance of the contractor. The key features with respect to control of dust will be:

- The specification of a site policy on dust and the identification of the site management responsibilities for dust issues;
- The development of a documented system for managing site practices with regard to dust control;
- The development of a means by which the performance of the dust minimisation plan can be regularly monitored and assessed; and
- The specification of effective measures to deal with any complaints received.

Operational Phase

10.65 There are no predicted impacts for the operational phase of the Proposed Development and therefore, no additional mitigation measures are proposed.

Residual Impacts of the Proposed Development

Construction Phase

Air Quality

10.66 When the dust mitigation measures detailed in the mitigation section of this report are implemented, fugitive emissions of dust and particulate matter from the site will be ***short term*** and ***imperceptible*** in nature, posing no nuisance at nearby receptors.

Climate

10.67 Based on the scale and temporary nature of the construction works and the intermittent use of the various equipment during the construction phase, the potential impact on climate change and transboundary pollution from the Proposed Development is deemed to be ***short-term*** and ***imperceptible*** in relation to Ireland's obligations under the EU 2020 target.

Human Health

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

Operational Phase

Air Quality & Climate

10.69 There are no predicted impacts to air quality or climate during the operational phase of the Proposed Development. Therefore, the operational phase is considered ***neutral*** for both air quality and climate. If the mitigation measures outlined in Section 8.6 are implemented, there will be no residual impacts of significance on air quality or climate from the construction or operational phases of the Proposed Development.

10.70 The cumulative impact with other developments in the vicinity is addressed in Chapter 16 of this EIA Report.

10.71 Interactions are addressed in Chapter 17 of this EIA Report.

11. LANDSCAPE AND VISUAL IMPACT

Introduction

11.1 This Landscape and Visual Assessment (LVIA) has been prepared by Kevin Fitzpatrick Landscape Architecture. The purpose of this assessment was to analyse the existing landscape and to assess the likely potential visual impacts arising from the Proposed Development on the existing landscape and any mitigation measures proposed. The LVIA is part of the Environmental Impact Assessment Report (EIAR) that will accompany the application for permission

11.2 The criteria as set out in the Draft "*Guidelines on the Information to be Contained in Environmental Impact Assessment Reports" (*2017) are used in the assessment of the likely impacts. The criteria for rating the significance of impacts are as defined in table 11.1 below:

Table 11.1 Criteria for significance of effects under EPA Guidelines

EPA Rating	
Imperceptible	An effect capable of measurement but without significant consequences
Not Significant	An effect which causes noticeable changes in the character of the environment 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 the existing and emerging baseline trends
Significant	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment
Very Significant	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment
Profound	An effect which obliterates sensitive characteristics

11.3 The ratings may have negative, neutral or positive application where:

- Positive impact - a change which improves the quality of the environment.
- Neutral impact – No effects of effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
- Negative impact - a change which reduces the quality of the environment.

11.4 Terms relating to the duration of impacts are as described in the EPA Guidelines as:

- 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

11.5 The significance of impacts on the perceived landscape will depend partly on the number of people affected, but also on judgments about how much the changes will matter and in relation to other senses i.e. sound, feeling, etc., experienced by those concerned.

11.6 Character, for the purposes of this assessment refers to the interaction of elements in the landscape that combine to give the area its particular identity. In this context, impacts on character include the effect on existing land uses and responses that are felt towards the combined effects of the new development.

Methodology

11.7 The assessment was carried out by visiting the site and its surroundings in July 2020 by analysis of the proposals through photomontages, plans, aerial photographs, the tree survey by The Tree File Ltd., historic maps and by reference to the South Dublin County Development Plan 2016-2022 and the Landscape Character Assessment of South Dublin County Council (June 2016 updated).

11.8 This chapter has been prepared having regard to the following guidelines:

- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Planning & Local Government, 2018);
- Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (European Commission, 2017);
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports – Draft (EPA, 2017); and
- Guidelines for Landscape and Visual Impact Assessment, 3rd Edition (Landscape Inst. + IEMA 2013).

11.9 A study of the environmental impact on the biodiversity of the Proposed Development is covered in Chapter 6 of this EIA Report.

Receiving environment

11.10 The Proposed Development site is situated on the western edge of the Grange Castle Business Park South. The Proposed Development site includes a narrow corridor that extends approximately 200m to the west to the south of the New Nangor Road (R134) to the junction of the Baldonnel Road. From that point it runs in a north easterly direction along the southern edge of the internal Grange Castle Business Park Road for 550m. This corridor will be subject to trenching and new ducts to provide the 110kV transmission line to connect to the existing 110kV underground Kilmahud - Corkagh circuit.

11.11 The ground levels within the main site area appear generally flat, however with a slow and gradual fall in a south to north direction. From the highest level in the south east (75.20m OD) near the access road the ground levels fall by over 7m towards the stream in the north of the site (68m OD at top of the bank). There are several small localised archaeological remnant mounds throughout the area associated with recent excavations. Other than these small mounds the slope across the Proposed Development site is quite consistent. The corridor extending form the main site runs adjacent to the public road where the levels are also generally flat.

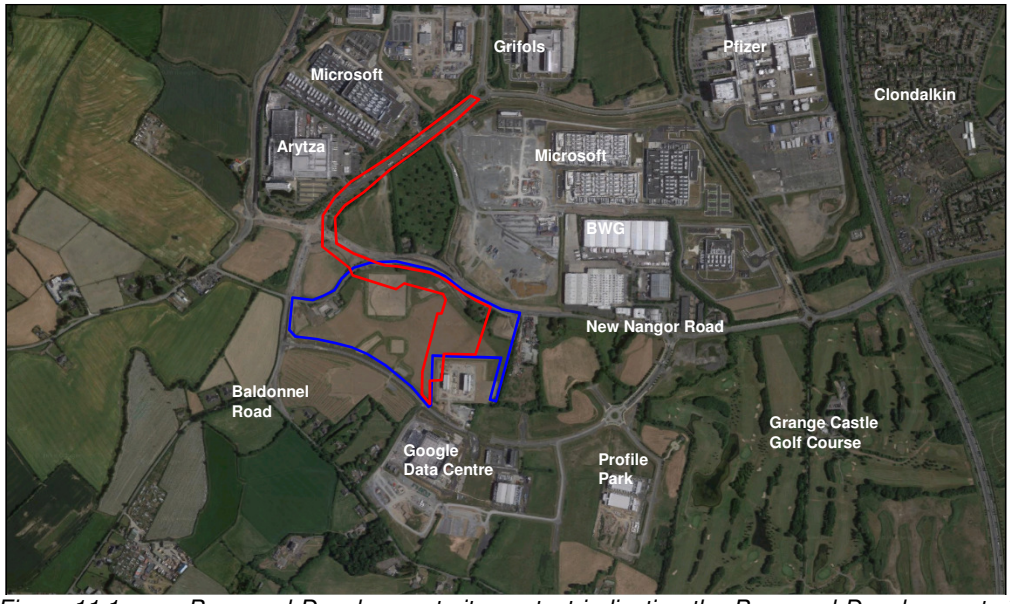

Figure 11.1 Proposed Development site context indicating the Proposed Development site (red line) and Permitted Development site (blue line)

11.12 The land use in most of the subject lands is currently relatively poor grassland with some remnant agricultural hedgerow field boundaries along eastern and southern perimeters and a small section along the Old Nangor road. The corridor section of the site is mostly roadside grass verge with occasional street trees. A house in the north-east corner of the Proposed Development site to the south of the New Nangor Road has recently been demolished as part of the new road works, however some hardstanding and fragments of garden vegetation remains. Along the northern edge of the Permitted Development site, which also sits within the Proposed Development site, the stream has been re-directed as part of the road widening works and is now a channel with no vegetation.

11.13 The Proposed Development site is in a generally flat landscape on the edge of two landscape types. The landscape to the east and north is characterised by very large built developments and new tree lined roads. Between these built developments are some large flat green areas that were used for agriculture and the landscape is still of a traditional field and hedgerow boundary typology. To the west and south the landscape is generally that of a rural landscape typical of the area with medium to large field patterns and individual residences. The local landscape to the south east is dominated by the Casement Aerodrome.

11.14 There is very little vegetation on the Permitted Development site and the Tree Survey and Report, by the Tree File Ltd. that accompanies this SID application (see Chapter 11 – Appendix 11.1 of the Appendix document) outlines that the tree cover is primarily contained within the remnant garden boundaries in the north-eastern corner of the Proposed Development site. A total of 50% of the trees on site are found in the north-east corner including the only trees classed above category C. These are two semi-mature Ash trees growing out of an old field drainage ditch.

11.15 The hedgerows on the Permitted Development site are from two different origins. The first is the thorn-based hedgerows which are remnants of the agricultural stock proof field boundaries such as along the eastern boundary of the wider site. The second type are the more managed and ornamental garden hedges that surround the vacant farmhouse and former house site along the northern boundary of the Permitted Development site. The tree survey report finds that due to the lack of management and subsequent deterioration the original Hawthorn is now very sparse in the thorn-based hedgerows, with the majority now infested by Bramble. This has led to most of these hedgerows being in a dilapidated state. This is except for the eastern perimeter boundary hedgerow which still has some structure and form.

11.16 The corridor section of the study area also contains little vegetation other than the roadside trees planted recently when the road improvement works were carried out.

Characteristics of the Proposed Development site

11.17 The character of the Proposed Development site and its environs has largely been determined by the following:

- flat topography in the site and its surrounding environs;
- the realigned stream on the northern perimeter of the site;
- the recently upgraded public road
- landscape history of agricultural use with grassland and a traditional hedgerow field boundary;
- the remnants of former residences and associated gardens
- number of very large industrial buildings in the local landscape; and
- local roads and tree lined internal roads in the business park.

11.18 The main part of the Proposed Development site, excluding the transmission line route to the north-west, has the character of being part of an agricultural field, however without the traditional hedgerow field boundaries and patterns found in the local landscape. The flat ground levels are characteristic of the wider landscape.

11.19 The surrounding environment with its contrast of new built structures and historic field patterns would be considered a ‘transitional landscape’.

11.20 Through a comparison of the historical Ordnance Survey maps within the main site and through analysis by site visits it is evident that there has been significant change to the study area in recent times. The majority of the hedgerows reflecting historic field patterns as recorded in the historic ‘6 inch’ and ‘25inch’ maps no longer exist. Only the eastern perimeter hedgerow and the few fragments of hedge along the original stream channel still exist. In the remainder of the Proposed Development site the field boundaries have been removed and the stream has recently been redirected as part of the upgrade to the Nangor Road (R134). The townland boundary hedgerow between Milltown and Ballybane once ran through the site but no longer exists.

11.21 The landscape of the Proposed Development site has no inherent aesthetic qualities of note. In the context of the surrounding landscape, landscape sensitivities and views, the northern and western sections of the site would be considered of no aesthetic value. The north eastern section of the

Proposed Development site does hold some aesthetic value due to the trees, hedgerows and original alignment of the Baldonnel stream within this area. The aesthetic qualities provided are limited however as this landscape is small and degraded.

11.22 The surrounding environment with its contrast of new built structures and historic field patterns would be considered a 'transitional landscape'.

11.23 The Permitted Development (SDCC Planning Reg. Ref. SD20A/0121) comprises the construction of three no. two storey data centre buildings (Buildings A, B and C) with mezzanine floors at each level with a gross floor area of 80,269sqm. The proposed Clutterland substation part of the Proposed Development is located within the eastern part of the Permitted Development site.

11.24 The proposed landscape treatment under the Permitted Development that will not be altered under the Proposed Development beyond minor changes to berm alignments, will create significant belts of native woodland linking the existing hedgerows and trees into a much larger ecological habitat, including a native wetland to the west of the site. The photomontages submitted with the application (See Chapter 11 – Appendix 11.3) indicate the proposed development with these minor changes to berming to facilitate the alignment of the proposed 110kV transmission line to the Kilmahud-Corkagh circuit.

11.25 There is a further Permitted Development, currently under construction, on the lands to the south of these lands on the opposite side of the access road for a two storey data centre with associated three storey office block and services that had a gross floor area of 35,426sqm that was permitted under SDCC Planning Reg. Ref. SD18A/0134.

11.26 The Proposed Development is situated mostly within the site of the Permitted Development SDCC Planning Reg. Ref. SD20A/0121) and is intrinsically and visually linked to the permitted data centre development. The Proposed Development is integrated into the Permitted Development site as follows:

- The proposed substation will be located deep within the wider site to the east and adjacent to the existing Castlebaggot Substation. It is proposed at a location of approximately 105m from the northern boundary and 150m from the eastern boundary of the Permitted Development site.
- The proposed substation is located to the immediate east of the 'Building C', which is part of the Permitted Development. To the north and east of the proposed substation a landscape scheme is proposed as part of the Permitted Development that includes berms, woodland screening, grassland meadows and attenuation ponds.
- An underground 110kV transmission line will run westwards from the Substation within the wider site towards the Baldonnel Rd and New Nangor road junction, and from this point it will run parallel to the internal Grange Castle Business Park road to connect to the existing 110kV underground Kilmahud-Corkagh circuit. The underground trenching is accommodated within the overall landscape scheme. The other underground 110kV transmission line will run from the proposed substation to the Castlebaggot substation within the Permitted Development site apart from its connection into the substation.

Landscape planning

11.27 Within the South Dublin County Development Plan 2016-2022 there are no landscape objectives that specifically apply to the Proposed Development site. There are a number of objectives that generally apply to the landscape within SDCC.

<u>Green infrastructure objectives</u>

- G2 Objective 1 states: *'To reduce fragmentation of the Green Infrastructure network and strengthen ecological links between urban areas, Natura 2000 sites, proposed Natural Heritage Areas, parks and open spaces and the wider regional Green Infrastructure network.'*
- G2 Objective 2 states: *'To protect and enhance the biodiversity value and ecological function of the Green Infrastructure network.'*

- G2 Objective 6 states: *'To protect and enhance the County's hedgerow network, in particular hedgerows that form townland, parish and barony boundaries, and increase hedgerow coverage using locally native species.'*

- G2 Objective 9 states: *'To preserve, protect and augment trees, groups of trees, woodlands and hedgerows within the County by increasing tree canopy coverage using locally native species and by incorporating them within design proposals and supporting their integration into the Green Infrastructure network.'*

- G3 Objective 3 states: *'To ensure the protection, improvement or restoration of riverine floodplains and to promote strategic measures to accommodate flooding at appropriate locations, to protect ground and surface water quality and build resilience to climate change.'*

Heritage Conservation & Landscape Objectives

- HCL15 Objective 3 states: *'To protect existing trees, hedgerows, and woodlands which are of amenity or biodiversity value and/ or contribute to landscape character and ensure that proper provision is made for their protection and management in accordance with Living with Trees: South Dublin County Council's Tree Management Policy 2015-2020.'*

11.28 There are no protected trees or tree groups within the Proposed Development site listed in the South Dublin County Development Plan 2016-2022.

11.29 There are no views or prospects that include the Proposed Development site listed in the South Dublin County Development Plan 2016-2022.

11.30 In the Landscape Character Assessment of South Dublin County Council (June 2016 updated), the Proposed Development site is designated as being in the 'Newcastle Lowlands Character Area'. This area is listed as having a medium landscape sensitivity, due to the vulnerability of the agricultural landscape to urban pressures. The Proposed Development site are located in the east of the area within the border area between the Urban Fringe character type and the Limestone Farmland character type.

Existing Visual Sensitivity

11.31 The location from which the proposed substation element of the Proposed Development site is most visually prominent is from the New Nangor Road directly to the north where the road abuts the Permitted Development site boundary. From this section of road the Proposed Development site is fully visible in the foreground as there is currently no vegetation due to the road widening works. While the Proposed Development site is visible in the foreground it is the existing Google data centre and the Cyrus One data centre that is under construction to the south that dominate this view. This view is expansive but due to the flat topography and vegetation, little of the wider landscape is visible. The Proposed Development site is also visible from the Grange Castle South Business Park access road to the south of the site. However, here it is only visible for the section where the Permitted Development site directly abuts the road due to the level of built development in this area.

11.32 The Proposed Development site is not visible from locations in the wider landscape due to the flat nature of the topography, the scale of the local built development and the significant number of trees in the area. In general the site is not considered to be sensitive from a landscape character or visual perspective. The lands are within a local and wider landscape of recently constructed large buildings. This Business Park environment is well established and is continually evolving including a large data centre under construction and an adjacent large data centre recently built to the south. Directly adjacent to this Proposed Development the Castlebaggot Substation has been built and there is an extant planning permission for the permitted data centre development on the wider site. A number of new roads and road upgrades have recently taken place in the local area.

Characteristics of the Proposed Development

11.33 The details of the Proposed Development are fully detailed in Chapter 2 of this EIA Report. The Proposed Development involves the following works that have the potential to impact on the landscape. listed below are in accordance with the proposed plans outlined as part of the drawings submitted as part of the planning application and can be summarised as:

- 110kV Gas Insulated Switchgear (GIS) Substation compound that will include a two storey GIS building, 4 no. transformer bays, a Client Control Building, and associated site infrastructure;
- an underground single circuit 110kV transmission line from the proposed Clutterland 110kV GIS Substation compound connecting to the existing 110kV underground Kilmahud Corkagh circuit c. 1.1kms to the north-west; and
- an underground single circuit 110kV transmission line from the proposed Clutterland 110kV GIS Substation compound to the existing 220kV / 110kV Castlebaggot Substation to the immediate south.

Potential impacts of the Proposed Development

Construction phase

Impact on Landscape Character

11.34 The initial construction operations created by the clearance of the site and the construction of the buildings and plant will give rise to temporary or short term impacts on the landscape character, through the introduction of new structures, machinery etc. and the removal of vegetation.

11.35 The conversion of the Proposed Development site from an agricultural field landscape type to a building site, is likely to be perceived in the short term as a negative 'loss' of landscape character, particularly by sections of the local community closest to it.

11.36 The construction compounds, temporary car parking and storage facilities etc. will be located sensitively to avoid any local visual sensitivities. Furthermore, as the Proposed Development site is located within and adjacent to the existing Grange Castle Business Park with recent built developments, including the data centres under the Permitted Development to the west; and those granted and under construction to the south, the visual elements associated with construction would be considered part of the existing urban landscape.

11.37 The construction of the underground transmission lines will require trenching and stockpiling of material along its route. The roads along which the 110kV transmission line passes to the Kilmahud-Corkagh circuit have recently been upgraded and wayleaves for the trenches are accommodated within these schemes. The temporary works required to install the cables would be similar to works that have been undertaken in this area recently and will require some recently planted trees alongside this road to be removed.

11.38 With the above considered the impact on the landscape character during construction would be negative and considered ***moderate*** in magnitude and ***temporary*** in its duration.

Visual Impacts

11.39 Visibility from most of the surrounding landscape will be limited by the existing buildings and vegetation and the buildings and landscape of the permitted data centre development. Views from the south and west of the site will be entirely screened by the existing Substation and the permitted Buildings A and C on the wider site. Further to these buildings the permitted scheme on the wider site include berms and tree planting along the south perimeter of the lands and directly to the south of the Substation proposed as part of this development. Therefore there will be no visual impact caused by this development to lands to the south and west.

11.40 The construction of the underground transmission lines will require trenching and stockpiling of material along its route. The temporary works required to install the cables would be similar to works that have recently been undertaken in this area.

11.41 With the above considered the impact on the landscape character during construction would be negative and considered ***moderate*** in magnitude and ***temporary*** in its duration.

Operational phase

Impact on Landscape Character

11.42 The operational phase will give rise to a noticeable change in the landscape character. The initial removal of an agricultural field landscape to be replaced with built development would be considered a negative impact on the landscape character. However, the Permitted Development on these lands

will significantly alter the landscape character and this new landscape will surround the substation that forms part of the Proposed Development.

11.43 The landscape measures under the Permitted Development will significantly improve the quality of the landscape character of this area. The significant amount of native woodland, wetland and grassland habitats to be created would have a very positive impact on the landscape character of this area and the wider environment. The initial impact of the built development on the landscape character could be perceived as negative in the short term due to the change in type from a field to a built structure. In the context of the surrounding development however, this impact would be significantly reduced. In the long term the level of this impact will continue to reduce further as the habitats establish and become integrated into the surrounding landscape.

11.44 The site is specifically zoned for this type of development and there have been recent built developments of a much larger scale in the local vicinity including a Substation. Many of these built developments are dominant in views from the Proposed Development site. In this context the Proposed Development would be considered a continuation of existing trends in the local area.

11.45 The landscape proposals include the establishment of a significant level of native woodland, hedgerows and native wetland and grassland meadows. This landscape treatment will contribute positively to the landscape character of the area.

11.46 The overall impact on the landscape character would therefore be considered **neutral**, **temporary and slight** due to the level of recently built and Permitted Development in the vicinity and the proposed development is located in a part of the site which has little value in terms of landscape character

Visual Impacts

11.47 Visibility from most of the surrounding landscape will be limited by the existing buildings and vegetation and the buildings and landscape of the Permitted Development. Views from the south and west of the site will be screened by the existing Castlebaggot Substation and the permitted Buildings A and C as granted under SDCC Planning Reg. Ref. SD20A/0121. The Permitted Development includes berms and tree planting along the south perimeter of the Permitted Development site and directly to the south of the proposed Clutterland substation that forms part of the Proposed Development. Therefore, there will be no visual impact caused by the Proposed Development to lands to the south and west.

11.48 The Proposed Development will not be visible from most of the surrounding areas as the Permitted Data Centre Development on these lands, landscape mitigation permitted as part of this and the existing Castlebaggot substation to the south will screen the Proposed Development from views from the south, west and most views from the north.

11.49 The Proposed Development will be visible in partial glimpsed views from the New Nangor road to the north east and in wider views from the lands to the immediate east. The development will not be prominent in the views and only partially visible between the existing and vegetation included in the Permitted Development. Any visual impact from this development will be significantly reduced due to the scale of the surrounding Permitted Development and as there have been recent built developments of a much larger scale in the local vicinity including a Substation. In this context the Proposed Development would be considered a continuation of existing trends in the local area.

11.50 The overall visual impact would therefore be considered ***negative***, ***long-term*** and ***not significant*** due to the level of recently built and Permitted Development in the vicinity and the proposed developments limited visibility.

Remedial and mitigation measures

11.51 The Proposed Development is situated on suitably zoned lands in a landscape where a number of large developments have been recently constructed or have recently acquired planning permission. The Permitted Data Centre Development (described in detail in chapter 2 of this EIAR) will precede the construction of the Proposed Development and the built development and the significant landscape scheme permitted as part of the Permitted Development will provide substantial mitigation of the proposed development.

11.52 The mitigation of potential negative landscape and visual impacts of the Proposed Development was considered in the application made for the Permitted Development under SDCC Planning Reg. Ref. SD20A/0121 (refer to the Permitted Landscape Mitigation Drawing, Kevin Fitzpatrick Landscape

Architecture included in Chapter 11 – Appendix 11.1 of this EIA Report). No additional landscape mitigation measures are therefore proposed as part of the Proposed Development beyond minor changes to the positioning of the berms permitted to the north of the permitted Buildings B and C under the Permitted Development. As a result of the mitigations measures, the following landscape design mitigation measures will be implemented:

- earth modelling and large tree planting, reinforced with woodland whip planting in belts is proposed to provide a high level of visual screening of the most sensitive views of the development; and
- set back of built development form the perimeter of the lands to accommodate significant landscape buffer zones; and
- incorporation of the stormwater attenuation systems as above ground wetlands and ponds to improve the amenity, visual and biodiversity value of the landscape.

Impact on landscape planning

11.53 The Green Infrastructure objectives that apply to the Proposed Development site and its environs, described under section 11.26 above, are mostly general objectives aimed at the protection of the existing green infrastructure network and strengthening ecological links in the wider landscape. The proposed landscape treatment under the Permitted Development that will not be altered under the Proposed Development beyond minor changes to berm alignments, will create significant belts of native woodland linking the existing hedgerows and trees into a much larger ecological habitat, including a native wetland to the west of the site. The height of the berms and level of planting will not be altered from that under the Permitted Deveopment. Most of the existing trees and hedgerows will be retained and improved by the additional native planting proposed and invasive species management. The level of tree cover and woodlands proposed will significantly increase the ecological value of the Proposed Development site and create strong ecological corridors through the site and connecting to wider landscape. The Proposed Development would be considered in accordance with these policy objectives.

'Do nothing' scenario

11.54 In the event of this scenario the lands would continue to be left in the 'transition state' as it is currently. Without proper management of the landscape it would go into decline as the fields reverts to scrub areas. As the area has a specific zoning for development it is likely that the site would be developed in the future in a similar scale and type as is currently proposed.

Monitoring

11.55 Contracts will ensure good working practices to reduce any negative impacts arising from construction to the lowest possible level and to ensure that all machinery operates within clearly defined construction areas. Storage areas will be located to avoid impacting on sensitive views, trees, hedgerows, drainage patterns etc. and such areas will be fully re-instated prior to, and at the end of the construction contract. The works will also have continuous monitoring to ensure adequate protection of areas outside of the construction works.

Residual Impacts

11.56 The residual impacts are assessed by reference to several specific views that have been visualised by verified photomontages. These locations are chosen to demonstrate the visual impact of the proposed development from all areas with the landscape where it may be visible. These visual representations are shown in Chapter 11 - Appendix 11.3 of the Appendix document with a view location map clearly indicating the viewpoint location and direction. For each view the baseline situation is shown (existing conditions) and the cumulative view of the full Permitted Development with the Proposed Development section of the view highlighted.

Visual impact assessment from specific locations

View 1 – From the Grange Castle South Access Road

Existing view

11.57 The view is from the public footpath to the south of the Proposed Development. Views in this vicinity towards the north are wide and expansive due to the flat topography and lack of any significant tree cover. There are no views of any value from this location. In this specific view towards the Proposed Development site the timber fence and existing Castlebaggot substation are prominent in the foreground. The Proposed Development site is visible in the centre of the view although mostly obscured by the timber fence.

Visual impact of Proposed Development during construction

11.58 The Proposed Development will result in a visual impact on this view during construction. The construction process, machinery, storage of materials, built structures will be partially screened from view by the existing vegetation and the Castlebaggot Substation. The distance from the viewpoint to the Proposed Development site will limit the level of visual impact. The level of this impact will also be limited due to the construction works being located close to recently constructed large buildings where similar construction activities were recently part of the visual landscape most notably building C directly adjacent to the Proposed Development. The impact of the Proposed Development during construction on the view from this location would be considered ***negative***, ***slight*** in magnitude, and ***temporary*** in duration.

Visual impact of Proposed Development during operation

11.59 The nature of the Proposed Development will result in an alteration to the existing view that would be considered negative in nature. The photomontage demonstrates accurately the extent of the alteration of the view on day 1 of operations. The proposed data facility buildings are visible in the centre of the view and the Proposed Development is visible to the right of the data halls. The Proposed Development is partially screened by the existing hedgerow trees and by the proposed earth berms and tree planting proposed as part of the adjacent permitted scheme. The level of the proposed screening will increase over time as the new trees mature. The level of the visual impact is mitigated due to the number of large buildings in the local landscape most notably building C and Castlebaggot Substation immediately adjacent to the Proposed Development. The Proposed Development is a small visual element amongst much larger elements in the view and therefore the level of resulting visual impact is reduced. The magnitude of the negative visual impact on this view would be considered ***slight*** and ***long-term*** in duration.

View 2 – From the entrance of Grange Castle South Business Park

Existing view

11.60 From this position expansive views are offered in most directions over the flat agricultural field landscape. Views of value in this vicinity are the long-distance views with the Dublin/Wicklow mountains visible in the background from some locations. Views to the mountains are to the south from this location. The assessed view is towards the north east where the Proposed Development site is visible in the centre beyond the Business Park entrance feature wall and fencing.

Visual impact of Proposed Development during construction

11.61 The Proposed Development will not result in a visual impact on this view during construction. The construction process, machinery, storage of materials will be screened by Building A of the Permitted Development under Reg. Ref. SD20A/0121, which will commence construction in Q3 2020, and the associated trees and planting installed as the first phase of the permitted scheme.

Visual impact of Proposed Development during operation

11.62 The Proposed Development will not result in a visual impact on this view during operation. The substation building will be screened by Building A of the Permitted Development under Reg. Ref. SD20A/0121, and the associated trees and planting installed as the first phase of the permitted scheme.

View 3 – From the Profile Park access road to the east of the Proposed Development site

Existing view

11.63 This view is not expansive due to the flat topography and the level of vegetation in the vicinity. Views of value in this location are views of the agricultural landscape with the Dublin and Wicklow Mountains in the background. The views of value are in the opposite direction to this view.

Visual impact of Proposed Development during construction

11.64 The Proposed Development will not result in any significant impact on this view during construction. The construction process, machinery, storage of materials, built structures will be mostly screened from view by the existing vegetation. Some of the visual elements associated with the building process may result in a visual intrusion into this view. However, the distance from the viewpoint and the context of the construction of larger structures in this area will limit the level of visual impact. The impact of the Proposed Development during construction on the view from this location would be considered ***negative*** but ***not significant*** in magnitude, and ***temporary*** in duration.

Visual impact of Proposed Development during operation

11.65 The nature of the Proposed Development will result in an alteration to the existing view that would be considered negative in nature. The photomontage demonstrates accurately the extent of the alteration of the view on day 1 of operations. The Proposed Development is partially visible in the centre of the view, however it is mostly screened by the existing trees and other vegetation. The level of this screening will increase over time as the new trees, planted as part of this application, mature. The level of the visual impact is mitigated by the small scale of the visual intrusion caused, the number of large buildings in the local landscape and the distance from the view location to the scheme. The magnitude of the ***negative*** visual impact on this view would therefore be considered ***not significant*** and ***long-term*** in duration.

View 4 – From the New Nangor Road to the north-west of the Proposed Development site

Existing view

11.66 From this section of the public road expansive views are offered towards the south over the flat agricultural field landscape. Views of value in this vicinity are the long-distance views with the Dublin/Wicklow mountains visible in the background from some locations. However, the recent data centre development to the south of the Proposed Development site and the Castlebaggot Substation buildings obscure most of the mountains from this view. The Proposed Development site is visible in the centre of the view as a very small element within the view. The recently constructed data centres are visually prominent in the centre of the view a distance back from the foreground.

Visual impact of Proposed Development during construction

11.67 The substation element of the Proposed Development will not result in a visual impact on this view during construction. The construction process, machinery, storage of materials will be screened by Buildings B and C of the Permitted Development under Reg. Ref. SD20A/0121, and the associated trees and planting installed as the first phase of the permitted scheme.

11.68 The installation of the underground transmission lines will not result in a visual impact on this view during construction as they sit within the site, and to the rear of the permitted berms along this part of the site. The impact of the proposals during construction on the view from this location would be considered ***negative***, ***moderate*** in magnitude, and ***temporary*** in duration.

Visual impact of Proposed Development during operation

11.69 The Proposed Development will not result in a visual impact on this view during operation. The transmission lines will be underground, and the substation building will be screened by buildings B and C of the Permitted Development and the associated trees and planting installed as the first phase of the permitted scheme.

View 5 – From the New Nangor Road to the north-east of the Proposed Development site

Existing view

11.70 Views of value in this vicinity are of the mature trees mostly located on the southern edge of the road and the expansive view over the flat agricultural landscape to the west.

Visual impact of Proposed Development during construction

11.71 The Proposed Development will not result in any significant impact on this view during construction. The construction process, machinery, storage of materials, built structures will be mostly screened from view by the existing vegetation. Some of the visual elements associated with the building process may result in a visual intrusion into this view. However, the distance from the viewpoint and the context of the construction of larger structures in this area will limit the level of visual impact. The impact of the Proposed Development during construction on the view from this location would be considered ***negative*** but ***not significant*** in magnitude, and ***temporary*** in duration.

Visual impact of Proposed Development during operation

11.72 The nature of the Proposed Development will result in an alteration to the existing view that would be considered negative in nature. The photomontage (Figure 11.16) demonstrates accurately the extent of the alteration of the view on day 1 of operations. Building C of the Proposed Development is visible at the end of the road. Building C is partially screened by the existing hedgerow trees and by the proposed earth berms and tree planting proposed as part of the scheme.

Conclusion

11.73 Landscape and visual effects arising from the Proposed Development will be ***not significant***, and will generally range from ***slight*** to ***moderate***, and from ***neutral to negative***. Landscape and visual effects from the wider locality, including from the nearest residential areas, will be ***not significant*** or ***imperceptible***.

11.74 The cumulative impact assessment is addressed Chapter 16 of this EIA Report. Interactions are addressed in Chapter 17 of this EIA Report.

12. TRAFFIC AND TRANSPORTION

Introduction

12.1 This chapter of the EIA Report assesses the likely traffic impacts of the Proposed Development (described in Chapter 2 of this EIA Report) to the road network in vicinity to the site. The contents of this section of the EIA Report provide an overview of the recent planning history relating to the site, as well as a description of the receiving surrounding environment. The characteristics of the Proposed Development in terms of physical infrastructure and the methodology utilised for assessing the development's traffic impacts are also set out within this Chapter.

12.2 The predicted traffic impact of the Proposed Development are presented for the construction and operational phases, taking into consideration the likely traffic implications of committed developments in the local area. Remedial or reductive measures required to prevent, reduce or offset any significant adverse effects are presented as part of the assessment.

Recent Planning History

12.3 A Final Grant of permission was issued by SDCC on the 3rd September 2020 for the development of 3 no. two storey data centre buildings and associated ancillary development with a gross floor area of 80,269sqm on a site located within the lands of the Grange Castle South Business Park under Reg. Ref. SD20A/0121. The Proposed Clutterland substation, and part of the transmission lines are located within the site of the Permitted Development. A full description of the Permitted Development is set out in Chapter 3 of this EIA Report.

12.4 The Permitted Development includes 150 no. car parking spaces and 78 no. sheltered bicycle parking spaces to accommodate the parking needs of the development. The permitted development is to be accessed from the south off the Grange Castle South Business Park Access road via the L2001 Baldonnel Road.

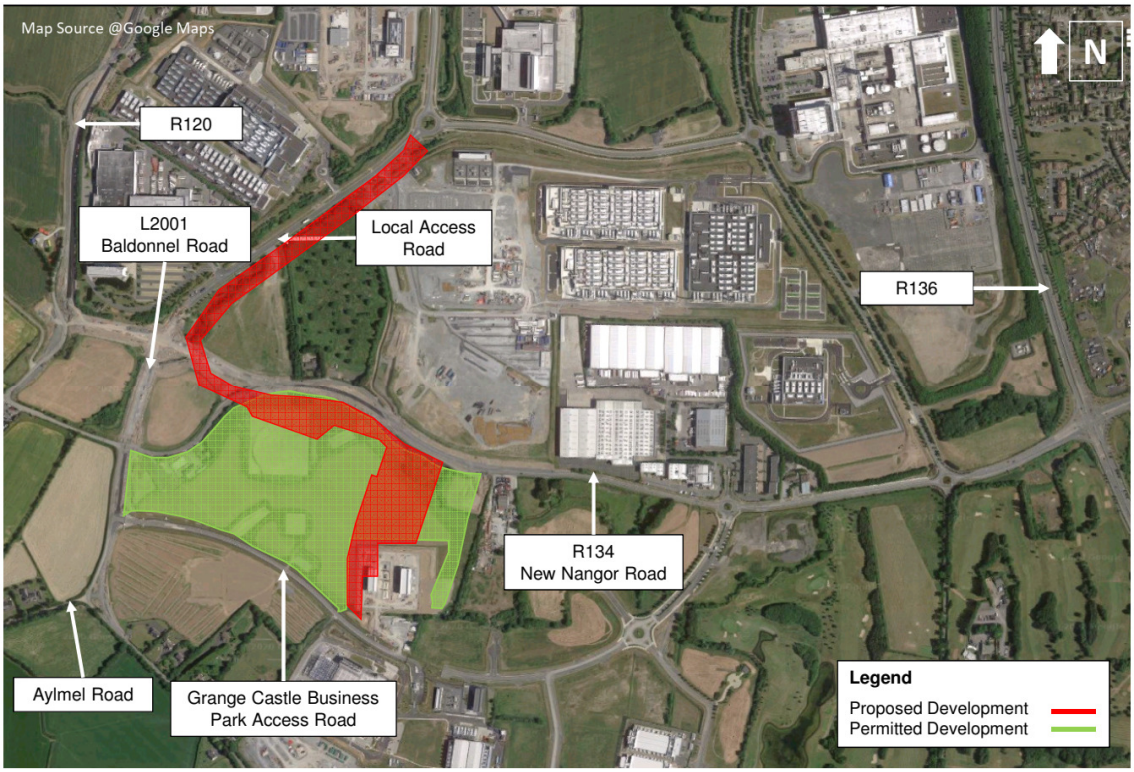

Figure 12.1 Site Location in context of local roads

Site Location and Use

12.5 The Proposed Development site is located within the Grange Castle South Business Park in Dublin 22. The site comprises a total of 7.7ha and is primarily greenfield, as well as including wayleaves along existing roads and within the Permitted Development site. The Proposed Development site sits primarily within the permitted development site granted under Reg. Ref. SD20A/0121, as described in

preceding section of this Chapter, and as outlined in Chapter 2 of this EIA Report. Figure 12.1 illustrates the Proposed Development in relation to the local road network and the permitted development under Reg. Ref. SD20A/0121.

12.6 As shown on Figure 12.1, the main part of the Proposed Development site is bounded by the R134 New Nangor Road to the north, a motor dealership to the east, Grange Castle South Business Park access road to the south, and L2001 Baldonnel Road further to the west. The extend of works required for the delivery of the Proposed Development expands outside of the permitted development's land due to the underground transmission line infrastructure required for the project. Detailed description of the Proposed Development is provided within Chapter 2 of the EIA Report and is summarised in the following section of this Report.

Description of the Proposed Development

12.7 The Proposed Development is described in full within Chapter 2 of this EIA Report.

12.8 The proposed substation will be served by 4 car parking space. The internal road layout of the permitted development and where it extends into the Proposed Development has been designed to give clear, legible routes for pedestrians, cyclists and motorists to enter and exit the development. Design of the Permitted Development's main site access junctions with Grange Castle South Business Park access road (permitted under Reg. Ref. SD20A/0121) has ensured that adequate sightlines are provided for all road users.

Traffic Impact Assessment Methodology

12.9 The methodology used to assess the traffic impacts of the Proposed Development is described below:

1. Establishing Baseline Conditions – To assess the Proposed Development's potential traffic impacts, an appreciation of the existing situation first needs to be established. The existing conditions recorded the description of surrounding road network, public transport services, and baseline (do-nothing) traffic volumes;
2. Review of Permitted Development– To assess the cumulative impact of the Proposed Development and permitted development on the local area, an analysis of the traffic impact assessment for the permitted development under SDCC Planning Reg. Ref. SD20A/0121 was carried out. The results of the assessment were extracted from the documentation prepared in support of this Planning Application. In addition, traffic associated with all other permitted and existing developments in vicinity to the site was taken into consideration.
3. Estimation of Proposed Development Traffic Generation–, a detailed estimation of the transport demand that will be generated by the development during construction and operation phases was undertaken. The morning and evening peak times were addressed, as well as an estimation of the construction traffic relating to the peak construction phase;
4. Assessment of the Cumulative Traffic Impact – An assessment was undertaken to establish the impact of the Proposed Development in the form of proportional percentage traffic increase through relevant junctions during the operational and construction phases. This part of the methodology uses the results of the estimated traffic for Permitted Development, adds the Proposed Development traffic generation, and presents a cumulative impact for the delivery of all works.
5. The worst case construction traffic impact is also discussed for the peak construction traffic movements; and
6. Mitigation measures are then be proposed to offset any impacts that may result from the develpment.

Local Road Network

Grange Castle South Business Park access road

12.10 Grange Castle Business Park Access road is a two-way local road located directly to the south of the Proposed Development site. It has 1 no. lane in each direction and an east-west alignment serving the lands within Grange Castle South Business Park. This road's carriageway measures c. 7.5 metres wide, with footpaths and cycle lanes provided on both sides of the road. A 50 km/h speed limit is currently in operation. This road will provide access to the Proposed Development site during construction and operational phases.

L2001 Baldonnel Road

12.11 L2001 Baldonnel Road is a two-way local road located directly to the west of the Proposed Development site. This road's carriageway measures c. 6 metres wide and contains 1 no. lane in each direction. It extends for approximately 4km connecting the N7 to the southeast with the R134 New Nangor Road to the north. A shared footpath/cycle track is provided on each side of the road and a 60km/h speed limit is currently in operation along its length adjacent to the Proposed Development site.

R134 New Nangor Road

12.12 R134 New Nangor Road is a two-way regional road connecting the R120 to the west with the R136 to the east. In the vicinity of the site, it contains 1 no. lane in each direction, with a shared footpath/cycle track facilities on both sides of the road. A 60Km/h speed limit is currently in operation.

Existing Public Transport Services

12.13 Dublin bus stops can be found along the R134 New Nangor Road, c. 1.0 km from the Proposed Development site's entrance (11 minutes walking). The following bus routes provide public transport services to the site:

- Dublin Bus Route 13: This bus provides services between Grange Castle and Harristown via Dublin City Centre, with the first and last services departing at 05:30 and 23:30, respectively. Buses operate on 10 minute intervals during peak periods, with services less frequent during off-peak times.; and
- Dublin Bus Route 68: This bus route provide services between Dublin City Centre and Newcastle/ Greenogue Business Park. Buses operate on 45 minute intervals throughout the day, with services slightly less frequent on Saturdays and Sundays.

Existing Traffic Volumes

Data Collection

12.14 Classified Junction turning counts were undertaken as part of the Traffic Impact Assessment (TIA) undertaken for the permitted development under planning registry SDCC Reg. Ref. SD20A/0121. The surveys were carried out on Tuesday 17th December 2019 over a period of 12-hours (07:00-19:00hrs). The surveys were undertaken by Irish Traffic Surveys (ITS), on behalf of CS Consulting. Figure 12.4 below, illustrates the location of the surveyed junctions in relation to the Proposed Development site.

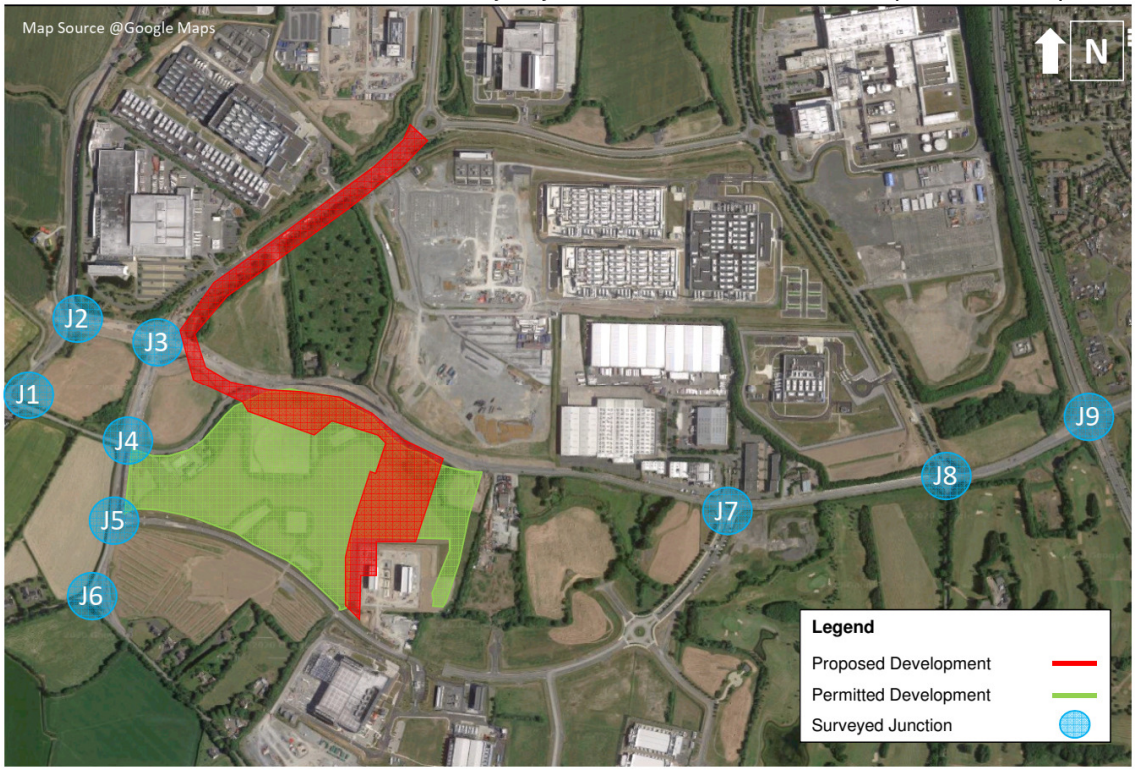

Figure 12.2 Traffic Survey Locations

12.15 As shown on Figure 12.4 above, the surveys were undertaken at the following junctions:

- J1: Adamstown Road (R120) / Old Nangor Road / Peamount Road (R120) (former 3-arm priority-controlled junction; now cul de sac access only);
- J2: 3-arm Adamstown Road (R120) / R134 New Nangor Road signal-controlled junction;
- J3: 3-arm R134 New Nangor Road / Baldonnel Road (L2001) signal-controlled junction;
- J4: Baldonnel Road (L2001) / Old Nangor Road (former 4-arm priority-controlled junction; now defunct);
- J5: 3-arm Baldonnel Road (L2001) / Grange Castle South Business Park priority-controlled junction;
- J6: 3-arm Baldonnel Road (L2001) / Aylmer Road (L6003) priority-controlled junction;
- J7: 4-arm R134 New Nangor Road / Kilcarbery Park / Profile Park priority-controlled roundabout;
- J8: 4-arm R134 New Nangor Road / Grange Castle Business Park North / Grange Castle Golf Course priority-controlled roundabout; and
- J9: 4-arm R136 Grange Castle Road / R134 New Nangor Road signal-controlled junction.

12.16 Junction 1 and Junction 4 have not been taken into consideration in the traffic impact assessment for permitted development, as they are no longer active junctions. As consequence, they will not be considered in the Traffic Impact Assessment associated with the 110kV GIS Substation.

Survey Results

12.17 Following the analysis of the surveys, network peak hours were determined to occurs between 07:30-08:29hrs for the AM peak, and 16:30-17:29hrs for the PM peak. Table 12.1 below, summarises the total flows recorded to transit through the junctions during the critical periods described above. Traffic figures presented in the following table are in Passenger Car Units (PCUs) with the following factors assumed: medium goods vehicles 1.5, bus 2.0, and HGV 2.3. Source: TII, Project Appraisal Guidelines for National Roads Unit 5.2 (October 2016).

Table 12.1 Traffic Survey Results

Time Period	Total Junction Traffic Movements (PCUs)						
	J2	J3	J5	J6	J7	J8	J9
AM Peak (07:30-08:29hrs)	1630	1606	791	855	1424	1881	3528
PM Peak (16:30-17:29hrs)	1574	1353	701	798	1240	1578	2904

Source: TIA for Proposed Datacentre SDCC Planning Reg. Ref. SD20A/0121, CS Consulting Group, 2020

Road Safety

12.18 Data from the Road Safety Authority (RSA) collision database was used to assess the safety performance characteristics of the local road network. The database contains information on all reported collisions by severity of injury incurred (i.e. fatal, serious or minor) and by year the collision occurred. The following Figure 12.3 illustrates all collisions recorded on the road network surrounding the site during the 12-year period from 2005 to 2016 inclusive.

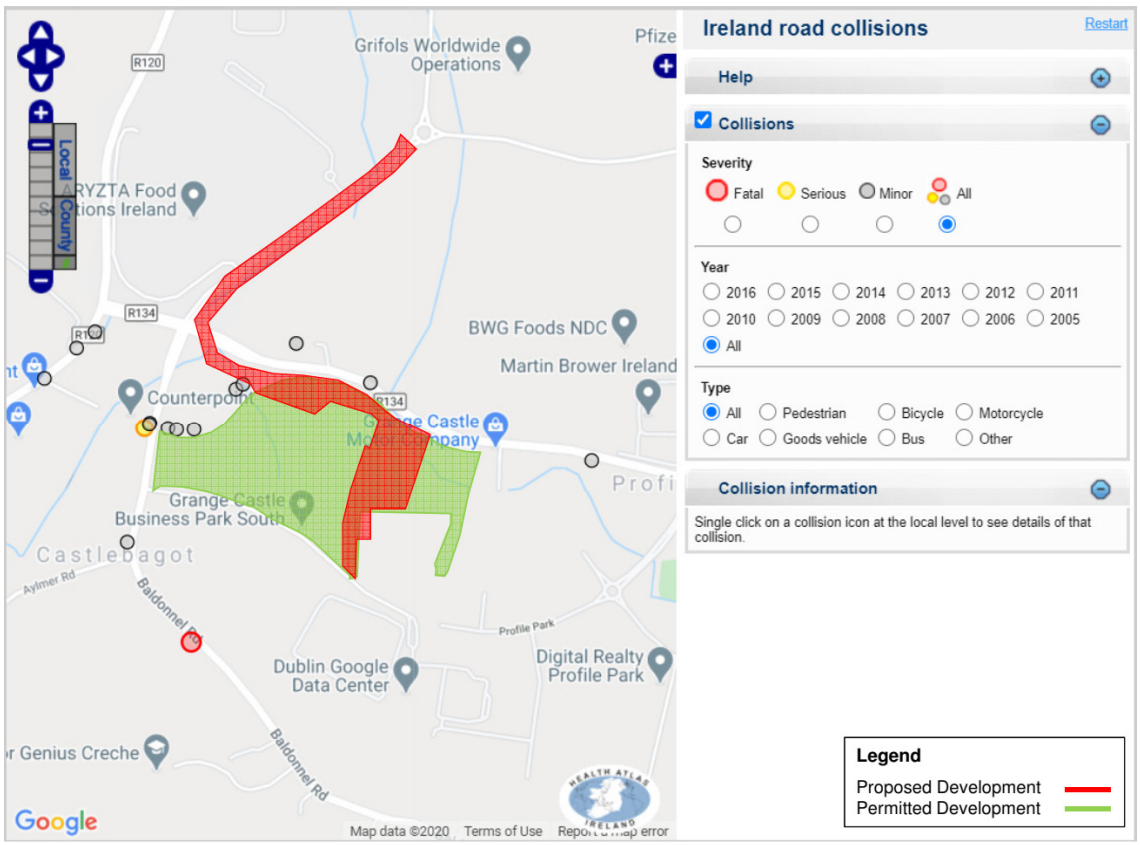

Figure 12.3 RSA Collision Map

12.19 As it can be seen on Figure 12.3, several collisions have been registered on the road network in vicinity to the Proposed Development site during the 12-year assessment period. A cluster of minor accidents is observed on the previous alignment of the R134 Nangor Road directly to the west of the side. Additional minor collisions were registered along R134 New Nangor Road and on the approach to the R134/R120 junction.

12.20 A serious collision was recorded on the L2001 Baldonnel Road c. 150 metres to the north of the Grange Castle South Business Park access road junction. This accident registers from 2010 and occurred as a result of a rear-end collision involving 2 casualties. A fatal collision was also recorded on this road c. 300 metres to the south of the access road junction. This was a single vehicle accident registered on 2009 with 1 no. casualties. Figure 12.4 below charts the trends in collision between 2005-2016 on the area in vicinity to the Proposed Development site.

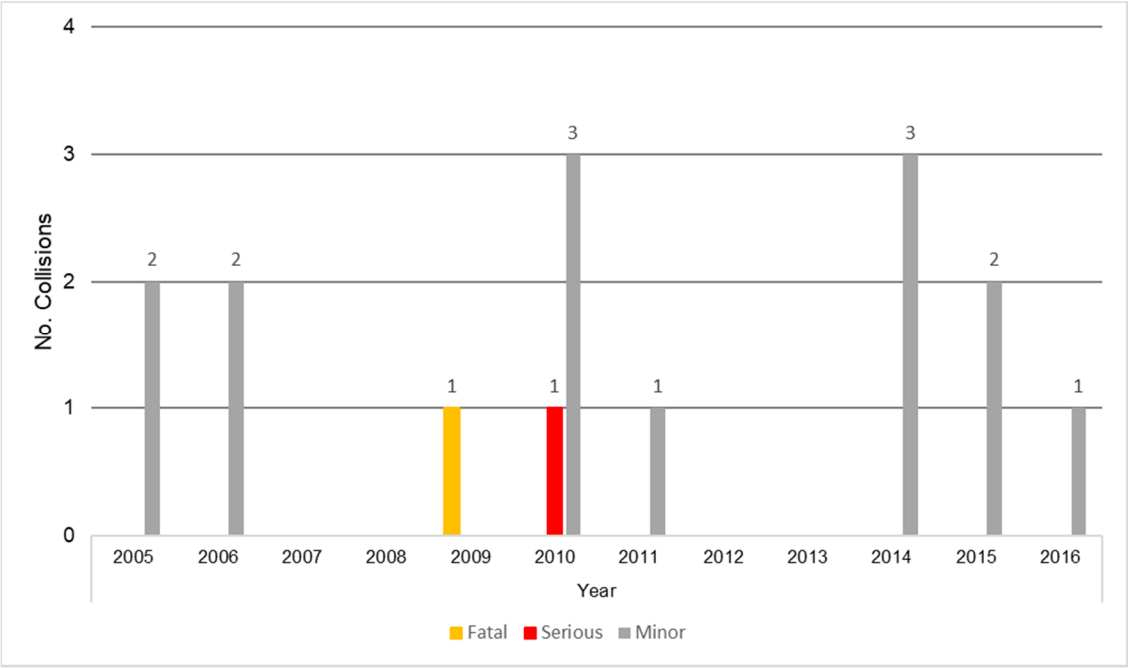

Figure 12.4 Collision Statistics Trends in vicinity to Proposed Development site

12.21 Even though the collisions presented above have occurred in vicinity to the Proposed Development site, the available data indicates that there are no location-specific road safety concerns of relevance to the Proposed Development particularly given the recent road improvements in the area.

Car Parking Provision

12.22 The proposed Clutterland substation element of the Proposed Development will contain 4 no. car parking spaces to exclusively accommodate all maintenance personnel attempting to service the proposed Substation. These will be provided in addition to the 150 no. car parking spaces permitted under SDCC Planning Reg. Ref. SD20A/0121. These spaces will be located to the south of the 110kV GIS building within the substation compound.

Cycle Parking provision

12.23 It is envisaged that all maintenance personnel associated with the Proposed Development will access the site via car. Therefore, no cycle parking is proposed for the operational phase of Proposed Development.

Pedestrian Facilities

12.24 The Proposed Development includes internal footpaths providing safe passage for pedestrians. The internal footpaths will connect to pedestrian facilities within the permitted development and the wider pedestrian network.

12.25 No access will be required by pedestrians to these underground cables following completion of the works, apart from 2 ESB staff, who as part of their inspection work will intermittently walk sections of the two routes while carrying out testing of the infrastructure, typically once every 3 years. Due to this, no pedestrian facilities are proposed along the routes of the 110kV and 49kVa cable installations.

Committed Developments

Overview

12.26 As described within Chapter 2 and Chapter 3, and previously within this Chapter, planning permission was granted for the development of 3 no. data centre buildings and associated ancillary development on a site that is located within the lands of the Grange Castle South Business Park, SDCC Planning Reg. Ref. SD20A/0121 on the 3rd September 2020. The proposed substation is located within the red line of this application.

12.27 A Traffic Impact Assessment (TIA) was undertaken by CS Consulting Group to evaluate the permitted development's traffic implications on the road network in vicinity to the Permitted Development site. The assessment determined the expected traffic impact during the operational and construction

phases. A description of the methodology and the traffic impact results of the assessment is presented within the remainder of this Chapter.

Permitted Development TIA Methodology

12.28 The assessment methodology for this TIA first established the traffic conditions of the road network surrounding the site via the 12-hour classified junction turning counts described in previous sections of this Report. TII growth factors were used to establish future year traffic forecasts, that allowed an estimate of expected traffic patterns for the year 2021, which has been assumed to be the 'Year of Opening', in addition to Year of Opening +5, +10 and +15.

12.29 The Permitted Development's trip generation was estimated from the analysis of surveys undertaken at similar sites on behalf of CS Consulting Group. The surveys register all trips accessing and egressing the site over a 12-hour period (07:00-19:00hrs), that allowed a calculation of trip rates per square metre and established the total number of trips in and out throughout the day. Once the development's potential trip generation was established, the vehicular trips were assigned into the network following existing traffic patterns.

12.30 A PICADY model was developed for the existing Grange Castle South Business Park access junction on the L2001 Baldonnel Road. This model assessed the junction's performance without and with the development in place, using existing (2019) and forecasted traffic volumes.

Permitted Development Traffic Generation and Distribution

Construction Phase

Traffic Generation

12.31 The assessment undertaken by CS Consulting Group estimated that construction works will reach a peak during the preliminary earthworks. These works will require the transport to site of approximately 95,000m^3 of fill material, which will be transported by HGV with a typical load capacity of 12m^3. This equates to approximately 7,900 HGV journeys to the site during this period.

12.32 The worst case scenario for construction works, estimates it is possible that up to 10 no. delivery trips will be made to the site each hour during this phase (one HGV arrival and one HGV departure every 6 minutes). It is also estimated that up to 300 no. vehicular trips may be made by construction personnel to access/egress the site, with c. 100 no. trips happening during the peak hours. Table 12.2 below summarises the estimated construction traffic generation for this development.

Table 12.2 Permitted Development Traffic Generation (Construction Phase)

Time Period	Arrivals		Departures		Total PCUs[15]
	LV	HV	LV	HV	
AM Peak (07:30-08:29)	100	10	10	23	**146**
PM Peak (16:30-17:29)	0	10	10	123	**146**
Total 12-hours	**300**	**120**	**300**	**120**	**1152**

Source TIA for Proposed Datacentre SDCC Planning Reg. Ref. SD20A/0121, CS Consulting Group, 2020.

Traffic Distribution

12.33 During the construction phase, it is envisaged that HGV traffic will travel via the M50 and the N7, via the R136 and R134 New Nangor Road. Construction traffic will use the same route for access and egress to/from the site. Figure 12.5 below, sets out the HGV routes on the network in the vicinity to the site.

[15] *PCU Factors: medium goods vehicles 1.5, bus 2.0, and HGV 2.3. Source: TII, Project Appraisal Guidelines for National Roads Unit 5.2 (October 2016).*

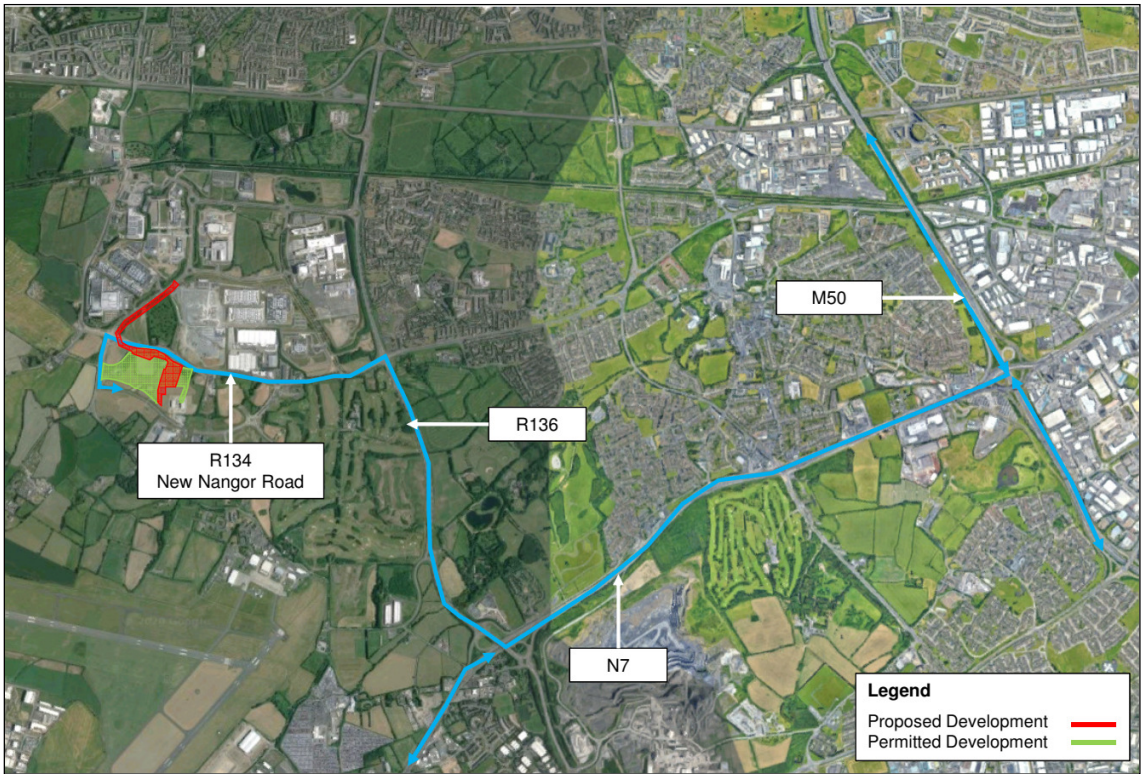

Figure 12.5 Permitted Development HGV Construction Traffic Routes

12.34 Construction's staff commuting trips from/to the site will follow the traffic distribution estimated for the operational phase.

Operational Phase

12.35 Table 12.3 below, sets out the total traffic, i.e. Light Vehicles (LV) and Heavy Vehicles (HV)., estimated to transit from/to the permitted facilities during the operational phase.

12.36 The traffic projections under the TIA for Reg. Ref. SD20A/0121 as set out under Table 12.3 indicate that the permitted development will generate a total of 386 no. arrivals and 487 no. departures over a 12-hour period, comprising a total of 873 no. vehicles movements throughout the day. During the AM peak, 66 no. vehicles shall access the site and 17 no. vehicles shall exit. The trip generation for the PM peak is estimated to be 4 no. arrivals and 74 no. departures from/to the development.

Table 12.3 Permitted Development Traffic Generation (Operational Phase)

Time Period	Arrivals		Departures		Total PCUs[16]
	LV	HV	LV	HV	
	Total Daily				
07:00-08:00	99	0	13	0	**112**
08:00-09:00	49	0	6	0	**55**
09:00-10:00	51	0	36	0	**87**
10:00-11:00	49	0	26	0	**75**
11:00-12:00	34	0	38	0	**72**
12:00-13:00	30	0	32	0	**62**
13:00-14:00	28	0	32	0	**60**
14:00-15:00	17	0	31	0	**48**
15:00-16:00	14	0	87	0	**101**
16:00-17:00	11	0	84	0	**95**
17:00-18:00	4	0	102	0	**106**
18:00-19:00	0	0	0	0	**0**
12 hours Total	**386**	**0**	**487**	**0**	**873**
	Total Peak Hours				
07:30-08:29	66	0	17	0	**83**
16:30-17:29	4	0	74	0	**78**

Source TIA for Proposed Datacentre SDCC Planning Reg. Ref. SD20A/0121, CS Consulting Group, 2020.

Operational Phase Traffic Distribution

12.37 The assessment undertaken by CS Consulting Group assumed that traffic generation during the operational phase will follow the existing traffic patterns obtained from the junction surveys. Figure 12.6 and Figure 12.7 on the following page illustrates the turning proportions at surveyed junctions during the network peak periods for arrival and departures, respectively.

12.38 As shown on Figure 12.6 and Figure 12.7 on the following page, during the AM peak it is projected that 57% of arrivals to the site shall proceed from the R134 New Nangor Road, with the majority of traffic originating from the R120 to the west. The remaining traffic (43%) is projected to access from the south via the Baldonnel Road L2001. The departure profile for the AM peak is projected that 67% of the traffic will proceed northbound on L2001 Baldonnel Road from the Grange Castle South Business Park access road junction, and the remaining 33% will head south.

12.39 The traffic distribution for the PM peak is projected that 100% of the traffic arriving to the site will be from the north via the junction with the R134 New Nangor Road. This projection is broken down with 52% of the traffic projected to originate from the R120 (west), and the remaining 48% originating from the R136 (east). Projected departure traffic during the PM peak is estimated to be broken down with 51% of the departing traffic heading northbound on the L2001 Baldonnel Road from the Grange Castle South Business Park Junction, and the remaining 49% proceeding southbound. Once the traffic reaches the R134 New Nangor Road / L2001 Baldonnel Road Junction, it is projected that 47% will turn left towards the R120 and 53% will turn right towards the R136.

[16] *PCU Factors: medium goods vehicles 1.5, bus 2.0, and HGV 2.3. Source: TII, Project Appraisal Guidelines for National Roads Unit 5.2 (October 2016).*

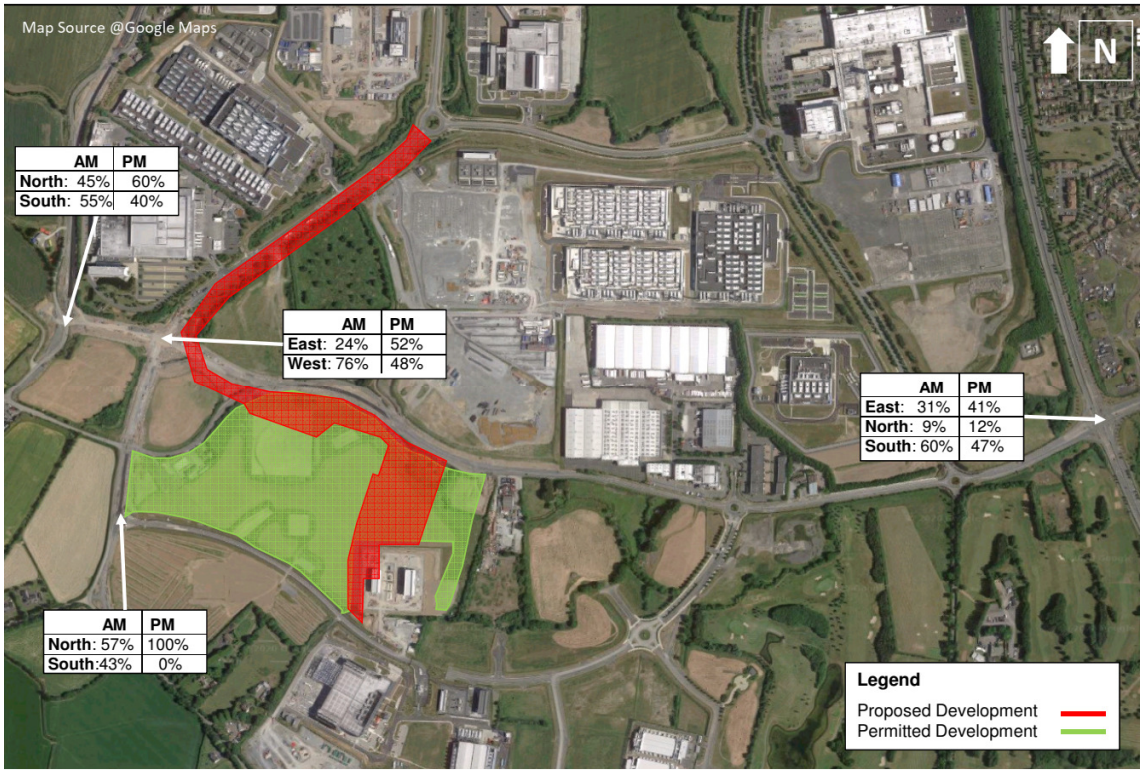

Figure 12.6 Permitted Development Arrival Turning Proportions

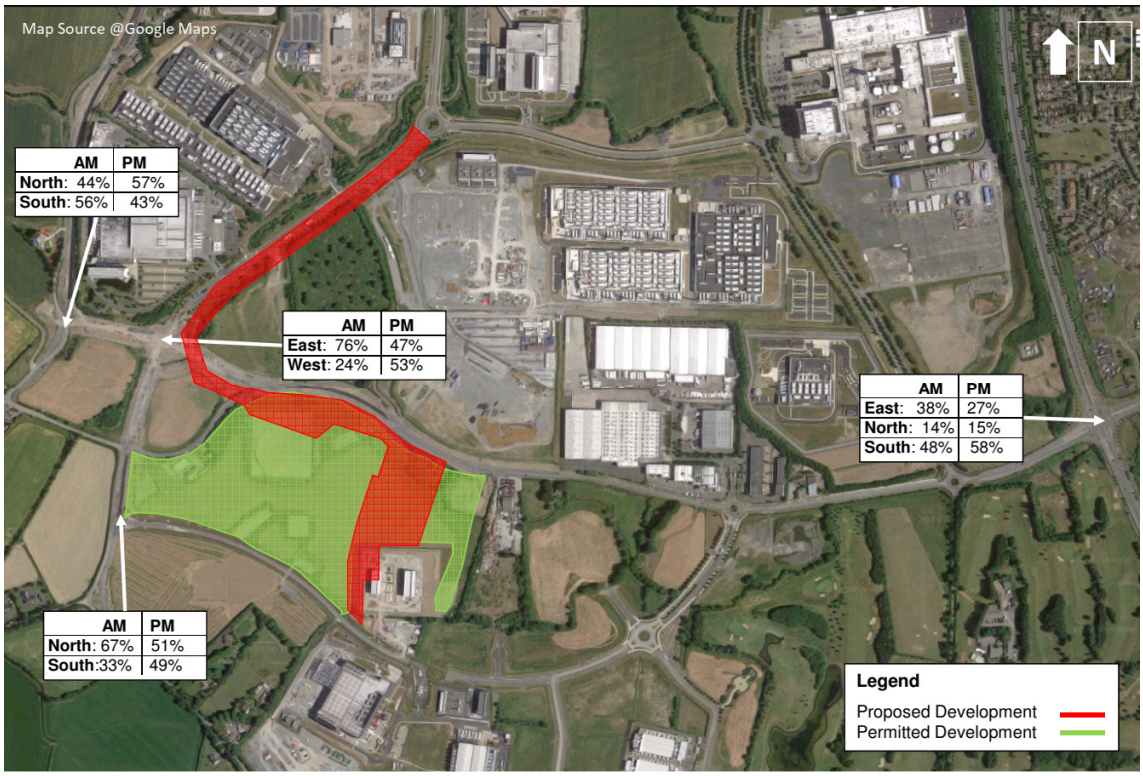

Figure 12.7 Permitted Development Departures Turning Proportions

Permitted Development TIA Results

12.40 Following the distribution of traffic generated by the permitted development, the percentage (%) traffic increase at each surveyed junction was estimated. Table 12.4 below sets out the proportional traffic increase during the operational and construction phases on the critical time periods.

Table 12.4 Proportional Traffic Increase with Permitted Development.

Junction No.	Operational Phase*				Construction Phase			
	AM Peak	Percentage Increase	PM Peak	% Increase	AM Peak	Percentage Increase	PM Peak	% Increase
2	31	1.8%	22	1.4%	43	2.6%	27	1.7%
3	49	3.0%	42	3.0%	103	6.4%	97	7.2%
5	83	10.1%	78	10.8%	146	18.5%	146	20.8%
6	34	3.9%	36	4.4%	43	5.0%	49	6.1%
7	18	1.0%	20	1.6%	60	4.2%	70	5.6%
8	18	0.9%	20	1.2%	60	3.2%	70	4.4%
9	18	0.5%	20	0.7%	60	1.7%	70	2.4%

*Source TIA for Permitted Development under SDCC Planning Reg. Ref. SD20A/0121, CS Consulting Group, 2020. * Percentage Increase Has Been Estimated In Relation To 2021 Forecast Background Traffic.*

12.41 As shown on Table 12.4 above, junction no. 5 (Baldonnel Road L2001 / Grange Castle South Business Park access road junction) will be the interception with the highest traffic increase during both phases, as it will accommodate all traffic accessing/egressing the development. Traffic increase during the construction period is expected to be significantly higher when compared to the operational phase traffic generation.

Other Committed Development in the local area

12.42 The assessment undertaken by CS Consulting Group under the Permitted Development also takes into consideration the traffic associated with other committed development in the area in vicinity to the site. The assessment undertaken in September 2020 identified 1 no. committed development within the Grange Castle South Business Park for the construction of a data centre (Planning Reference SDCC Reg. Ref. SD18A/0134) that is located on lands to the south of the permitted development.

12.43 The traffic associated with the development to the south and the Permitted Development will also access the Business Park off the L2001 Baldonnel Road, and will utilise similar access patterns as the ones discussed for the permitted development under *SDCC Planning Reg. Ref. SD20A/0121*. The committed development is currently under construction and is expected to be part operational by 2021. Table 12.5 below, sets out the traffic associated with the operational phase of this data centre during the critical time periods, i.e. 07:30-08:29hr and 16:30-17:29hrs.

Table 12.5 Traffic Generation for other committed developments in the local area

Time Period	Arrivals	Departures	Total Trips
AM Peak (07:30-08:29)	48	29	**77**
PM Peak (16:30-17:29)	18	37	**55**

Source: Traffic and Transport Chapter of EIAR for Proposed Data Centres, SDCC Planning Reg. Ref. SD18A/0134, Marston Planning Consultancy (2018).

12.44 The traffic generation figures are taken from Chapter 13 undertaken by Martin Peters and Associates, contained in the EIA Report prepared by Marston Planning Consultancy for the committed development under Reg. Ref. SD18A/0134.

Operational Phase

12.45 The cumulative traffic impacts of all permitted developments discussed in preceding sections has been estimated. Table 12.6 below, sets out the total additional traffic that is projected during the operational phase with the Permitted Development and the data centre to the south in place.

Table 12.6 Permitted Developments Cumulative Traffic Impact on Local Road Network.

Junction no.	Additional Traffic Through Junctions Operational Phase*			
	AM Peak	Percentage Increase	PM Peak	Percentage Increase
2	56	3.3%	41	2.5%
3	96	5.8%	79	5.6%
5	160	19.5%	133	18.4%
6	64	7.3%	54	6.6%
7	39	2.2%	38	3.0%
8	39	2.0%	38	2.3%
9	39	1.1%	38	1.3%

**Percentage Increase Has Been Estimated In Relation To 2021 Forecast Background Traffic.*

12.46 As shown on Table 12.6 above, vehicles movements through junction no. 5 will increase up to 19.5% in the AM peak and 18.4% in the PM peak with both permitted developments in place. Lower traffic percentage increase (%) is estimated at other junctions in the surrounding network.

Proposed Development Traffic Generation

Construction Phase

12.47 Construction associated with the Proposed Development will take place over a period of approximately 13 months from the commencement of construction for site development works. Construction activities related to the proposed GIS substation compound will be undertaken jointly with Phase 1 (Building A) of the permitted development under SDCC Reg. Ref. SD20A/0121. The works will be undertaken within the hours of 07:00 to 19:00 Monday to Friday; and 09:00 to 13:00 on Saturdays fully in accordance with Planning Condition no. 2 of the Permitted Development.

12.48 The route of the 110kV underground cables is mostly off-road, with the exception of a short section when crossing below the existing New Nangor Road in the vicinity to the L2001 Baldonnel Road / New Nangor Road junction. This may require the incremental closure of one or more lanes. The section of works requiring lane closures will be subject to a T2 licence application to South Dublin County Council, which will inform the construction methodology and timing for these works.

12.49 In general, the impact of the construction period associated with the Proposed Development will be short-term in nature. Construction traffic will 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); and
- Excavation plant and dumper trucks used for site development works.

12.50 Construction traffic has been estimated based on contractor experience of similar substation works and underground cable installation works, taking into account the scale of the proposed Clutterland substation and the length of underground cables to be installed, also noting that the underground cable routes are mostly off-road. The following construction data has been used to estimate peak daily construction traffic associated with the Substation:

- Peak construction staff (peak staff levels during Civil Works): 30;
- Peak cars (LV) entering/exiting site per day: 30; and
- Peak HGVs (HV) entering/exiting site per day: 10.

12.51 Table 12.7 below sets out the estimate traffic generation associated with the proposed GIS Substation compound during the construction phase. For the purpose of this assessment, it has been assumed that 50% of the LV traffic will arrive and depart from the site during critical time periods, and up to two no. HGV vehicles will access/egress the site every hour.

Table 12.7 Proposed Development Traffic Generation - Construction Phase (Peak)

Time Period	Arrivals		Departures		Total PCUs[17]
	LV	HV	LV	HV	
AM Peak (07:30-08:29)	15	2	0	2	24
PM Peak (16:30-17:29)	0	2	15	2	24
Total 12-hours	**30**	**10**	**30**	**10**	**106**

12.52 As shown on Table 12.7, during the peak construction stage, a total of 24 no. PCUs trips associated with the Proposed Development are expected to occur during both critical periods. HGV trips are expected to arrive and leave during the same hour.

Operational phase

12.53 The proposed Clutterland substation does not require any full time staff to operate it on a daily basis. However, maintenance of the substation will be required, including a routine weekly inspection, and a more comprehensive inspection once per year. The weekly inspection will take a maximum of 8 hours on a single day and will be conducted by up to two ESB staff.

12.54 In addition to the weekly inspections, more comprehensive maintenance works will take place annually on each cubicle. This will require up to 4 ESB staff to conduct testing at the substation over a maximum period of 15 days (120 hours). This represents the worst case scenario for traffic generation related to the proposed Substation during the operational phase. Table 12.8 below sets out the estimated traffic generation during the worst case scenario. For the purpose of this assessment, it has been assumed that 50% of the traffic will arrive and depart during critical time periods.

Table 12.8 Proposed Development Traffic Generation - Operational Phase (Worst Case Scenario)

Time Period	Arrivals		Departures		Total PCUs[18]
	LV	HV	LV	HV	
AM Peak (07:30-08:29)	2	0	0	0	2
PM Peak (16:30-17:29)	0	0	2	0	2
Total 12-hours	**4**	**0**	**4**	**0**	**8**

12.55 The traffic generation estimated for the Proposed Development as set out in Table 12.6 above, indicates that up to two no. vehicles trips are estimated to be generated by the proposed 110kV GIS Substation compound on critical time periods. These number of vehicles movements shall be expected only during the worst case scenario which shall happen once per year.

Proposed Development Traffic Modal Split

12.56 For the purpose of this assessment, a worst-case scenario has been assumed for traffic generation by assuming all trips to the site are by private car or HGV.

Proposed Development Traffic Distribution

12.57 For the purpose of this assessment, it has been assumed that all construction traffic associated with the Proposed Development will follow the traffic patterns presented for the permitted development under SDCC Planning Reg. Ref. SD20A/0121. Due to the low volume of operational traffic it is assumed that traffic generation during the operational phase has been assumed to access the site via the R134 New Nangor Road and R136.

[17] *PCU Factors: medium goods vehicles 1.5, bus 2.0, and HGV 2.3. Source: TII, Project Appraisal Guidelines for National Roads Unit 5.2 (October 2016).*
[18] *PCU Factors: medium goods vehicles 1.5, bus 2.0, and HGV 2.3. Source: TII, Project Appraisal Guidelines for National Roads Unit 5.2 (October 2016).*

Traffic Impact Analysis

Construction Phase

12.58 During the construction peak period the Proposed Development will generate up to 20 no. HGV movements per day, of which 4 no. movements will occur during each peak period i.e. 4 no. in AM peak and 4 no. PM peak. In addition to that, 60 no. LV one-way trips associated with staff commuting patterns will access the Proposed Development site throughout the day, of which, 15 no. trips are expected during the AM and 15 no. trips are expected during the PM peak. These figures have been added to the construction traffic associated with the permitted development under SDCC Planning Reg. Ref. SD20A/0121 to obtain the cumulative impact on the road network in the vicinity of the site. Table 12.9 below sets out the proportional traffic increase through the network at the peak of construction activities, comparing the traffic impacts 'with the permitted development only' to the traffic impact 'with the Proposed Development included'.

Table 12.9 Proportional traffic increase at relevant junctions during the Construction Phase (as per Table 12.4)

Junction No.	Construction Phase with Permitted Development Only*				Construction Phase with Permitted Development and GIS Substation			
	AM Peak	Percentage Increase	PM Peak	% Increase	AM Peak	Percentage Increase	PM Peak	% Increase
2	43	2.6%	27	1.7%	52	3.2%	35	2.2%
3	103	6.4%	97	7.2%	117	7.3%	112	8.2%
5	146	18.5%	146	20.8%	170	21.5%	170	24.3%
6	43	5.0%	49	6.1%	53	6.2%	59	7.3%
7	60	4.2%	70	5.6%	65	4.6%	77	6.2%
8	60	3.2%	70	4.4%	65	3.5%	77	4.9%
9	60	1.7%	70	2.4%	65	1.8%	77	2.7%

12.59 As it can be seen on Table 12.9 above, the impacts of the traffic associated with the construction of the Proposed Development are minimum. When comparing both scenarios, an increase is seen at junction no. 5 (3-arm Baldonnel Road (L2001) / Grange Castle South Business Park priority-controlled junction) from 18.5% to 21.5%. This traffic increase has been estimated in relation to existing traffic conditions as shown on Table 12.1. The remaining junctions on the network will also experience a slight increase, however this is expected to be ***not significant, negative*** and ***short-term*** in duration.

12.60 Given the short-term nature of the peak construction phase, the overall impact of the construction phase involving both developments is considered ***not significant*** and shall not affect the performance of the junctions assessed under this EIA Report.

Operational Phase

Assessment Years and Time Period

12.61 In order to establish the traffic impact of the operational phase of the Proposed Development on the local road network, it is first necessary to understand the without development or 'do-nothing' scenario. As recommended by TII's TTA Guidelines, three assessment years are considered, namely: base year (2019), year of opening (YoO) which is assumed to be 2021; and a horizon year (YoO+15), i.e. 2036. The assessment will focus on assessing the Proposed Development traffic impact during the critical time periods for the local road network, i.e. the AM peak hour (07:30-08:29hrs) and the PM peak hour (16:30-17:29hrs). Furthermore, a cumulative impact is also presented, taking into consideration the traffic associated with the permitted development under SDCC Planning Reg. Ref. SD20A/0121, and all others committed development in the area.

Assessment Scenarios

12.62 The following scenarios have been developed in assessing the Proposed Development's traffic impacts:

- **Do-Nothing Scenario**: To assess the traffic impact of the Proposed Development on the local road network, first, the background traffic conditions without the Proposed Development, also referred to as the 'do-nothing' scenario, were established. Such background traffic flows have been determined from the traffic survey detailed in preceding sections of this Report.

- **Do-Minimum Scenario:** The with-permitted developments or 'do-minimum' scenario represents the traffic conditions with all permitted developments under *SDCC Planning Reg. Ref. SD20A/0121, SD18A/0134 and SD19A/0300. i.e.* do-nothing plus permitted developments traffic generation.
- **Do-Something Scenario:** The with-Proposed Development or 'do-something' scenario represents traffic conditions following completion of the all developments (Permitted and Proposed), i.e. do-nothing plus do-minimum, plus additional traffic generated by the Proposed Development.

Background Traffic Growth Forecasting

12.63 Existing traffic flows on the surrounding road network, have been adjusted through application of appropriate growth factors to determine YoO (2021) and YoO+15 (2036) traffic flows. For this assessment, growth factors were determined from the Transport Infrastructure Ireland (TII) Project Appraisal Guidelines for National Roads Unit 5.3 – Travel Demand Projections, May 2019. Information within these guidelines is provided for Dublin Metropolitan Area from 2016-2030 and from 2030-2040 for low, central and high sensitivity growth scenarios. Central growth factors were assumed for this assessment to determine future year background traffic flows on the surrounding road network. These factors are set out in Table 12.10, which follows.

Table 12.10 TII Growth Factors – Central- Dublin Metropolitan Area

Years	Annual Growth Factor - LV	Annual Growth Factor – HV
2016-2030	1.0162	1.0295
2030-2040	1.0051	1.0136

12.64 The TII central growth factors in the preceding Table 12.10, has been used to provides an overview of the do-nothing base year, YoO and YoO+15 total traffic volumes (in PCUs) for the identified AM and PM peak hours. The results of this analysis are presented in the following Table 12.11.

Table 12.11 Existing and Forecast Background Approach Flow Traffic on Relevant Junction.*As per Table 12.1

Junction No.	Time Period	Total Forecasted Junction Traffic Movements (PCUs)[19]		
		Base Year* 2019	YoO 2021	YoO+15 2036
J2	AM Peak	1,630	1,685	2,040
	PM Peak	1,574	1,626	1,977
J3	AM Peak	1,606	1,659	2,008
	PM Peak	1,353	1,398	1,696
J5	AM Peak	791	821	997
	PM Peak	701	723	878
J6	AM Peak	855	882	1,071
	PM Peak	798	824	1,003
J7	AM Peak	1,424	1,783	2,458
	PM Peak	1,240	1,282	1,555
J8	AM Peak	1,881	1,946	2,372
	PM Peak	1,578	1,634	1,986
J9	AM Peak	3,527	3,650	4,413
	PM Peak	2,899	2,999	3,617

Do-Minimum Scenario

12.65 The traffic associated with all permitted developments has been added to the forecasted traffic flows presented within the preceding section of this Chapter. The do-minimum traffic flows are presented within Table 12.12, which follows.

Table 12.12 Do-minimum Traffic Flows at Relevant Junctions

Junction No.	Time Period	Total Junction Traffic Movements (PCUs)	
		YoO 2021	YoO+15 2036
J2	AM Peak	1,742	2,097
	PM Peak	1,667	2,018
J3	AM Peak	1,755	2,104
	PM Peak	1,477	1,775
J5	AM Peak	981	1,157
	PM Peak	856	1,011
J6	AM Peak	946	1,135
	PM Peak	878	1,057
J7	AM Peak	1,822	2,497
	PM Peak	1,320	1,593
J8	AM Peak	1,985	2,411
	PM Peak	1,672	2,024
J9	AM Peak	3,689	4,452
	PM Peak	3,037	3,655

Do Something Traffic Flows

12.66 The 'do-something' scenario, represents the sum of future background traffic or 'do-nothing' traffic, 'do-minimum' traffic or with permitted developments, and traffic associated with the Proposed

[19] *PCU Factors: medium goods vehicles 1.5, bus 2.0, and HGV 2.3. Source: TII, Project Appraisal Guidelines for National Roads Unit 5.2 (October 2016).*

Development. Table 12.13 below, sets out the figures estimated with the Proposed Development in place

Table 12.13 Do-Something Traffic Flows at Relevant Junctions.

Junction No.	Time Period	Total Junction Traffic Movements (PCUs)	
		YoO 2021	YoO+15 2036
J2	AM Peak	1,742	2,097
	PM Peak	1,667	2,018
J3	AM Peak	1,757	2,106
	PM Peak	1,479	1,777
J5	AM Peak	983	1,159
	PM Peak	858	1,013
J6	AM Peak	946	1,135
	PM Peak	878	1,057
J7	AM Peak	1,824	2,499
	PM Peak	1,322	1,595
J8	AM Peak	1,987	2,413
	PM Peak	1,674	2,026
J9	AM Peak	3,691	4,454
	PM Peak	3,039	3,657

12.67 As shown on Table 12.13 above, traffic flows for the 'do-minimum' and do-something scenario are very similar, as only 2 no. of additional vehicle movements are expected to be generated by the Proposed Development during the critical time periods. The additional 2 no. trips have been assumed to access the development via the R134 New Nangor Road, therefore, they have been added to junctions no. 3, 5, 7, 8, and 9.

Cumulative Impact

Committed and Proposed Development

12.68 Based on the traffic generation and distribution discussed in preceding sections of this chapter, the cumulative impact of the permitted developments and Proposed Development has been estimated. The total traffic percentage increase at relevant junctions, is presented in Table 12.14, which follows.

Table 12.14 Proportional Traffic Increase at Relevant Junctions with Permitted and Proposed Developments

Junction no.	Additional Traffic Through Junctions Operational Phase			
	AM Peak	Percentage Increase	Additional Traffic PM Peak	Percentage Increase
2	56	3.3%	41	2.5%
3	98	5.9%	81	5.8%
5	162	19.7%	135	18.7%
6	64	7.3%	54	6.6%
7	41	2.3%	40	3.1%
8	41	2.1%	40	2.5%
9	41	1.1%	40	1.3%

12.69 As shown on table 12.14 above, due to the low number of vehicles trips associated with the Proposed Development, the traffic percentage increase through the junctions shall remain similar as the permitted developments as outlined in the preceding section of this chapter. With the Proposed Development in place, the cumulative traffic movements through junction no. 5 will increase by 19.7%, which compares to 19.5% with the permitted developments only. The percentage increase through

other junctions under this assessment will remain similar, with only a 0.1% increase at junctions no. 3, 7, 8, and 9 in comparison with the 'do-minimum' scenario.

12.70 This demonstrates that the traffic impact in the operational phase of the Proposed Development is ***long-term, neutral*** and ***imperceptible***. The proportional traffic increase through the relevant junctions with the Proposed Development are significantly below the thresholds stated in the TII Guidelines for Traffic and Transport Assessments, 2014 for junction analysis.

Remedial and Mitigation Measures

Construction Phase

12.71 The following measures will be put in place during the construction works to ensure the effective traffic management during this period:

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

Operational Phase

12.72 The potential traffic impact associated with the operational phase of the Proposed Development will be ***long-term, neutral*** and ***imperceptible***. The traffic impact assessment for the operational phase are significantly below the thresholds stated in the TII Guidelines for Traffic and Transport Assessments, 2014 for junction analysis. Therefore, no mitigation measures in the form of junction modifications are proposed on the public road to facilitate the Proposed Development.

Predicted Impacts of the Proposed Development

12.73 Mitigation measures discussed above will be put in place to offset any potential traffic impacts associated with the Proposed Development. Therefore, the predicted impact of the development will be ***short-term, negative*** and ***not significant*** for the construction phase, and ***long-term, neutral*** and i***mperceptible*** for the operational phase.

Residual Impacts

12.74 The residual traffic impacts of the Proposed Development will be ***neutral*** and ***imperceptible***. The operational traffic impact assessment discussed in preceding sections takes cumulative impacts into account.

13. CULTURAL HERITAGE

Introduction

13.1 This chapter has been prepared on behalf of the Applicant to assess the impact, if any, on the archaeological, architectural, and cultural heritage resource of the Proposed Development located in the townlands of Ballybane, Ballybane and Aungierstown and Grange, County Dublin (ITM 703303/730884, Figure 13.1). The assessment has been undertaken by Faith Bailey and Jacqui Anderson of IAC Archaeology.

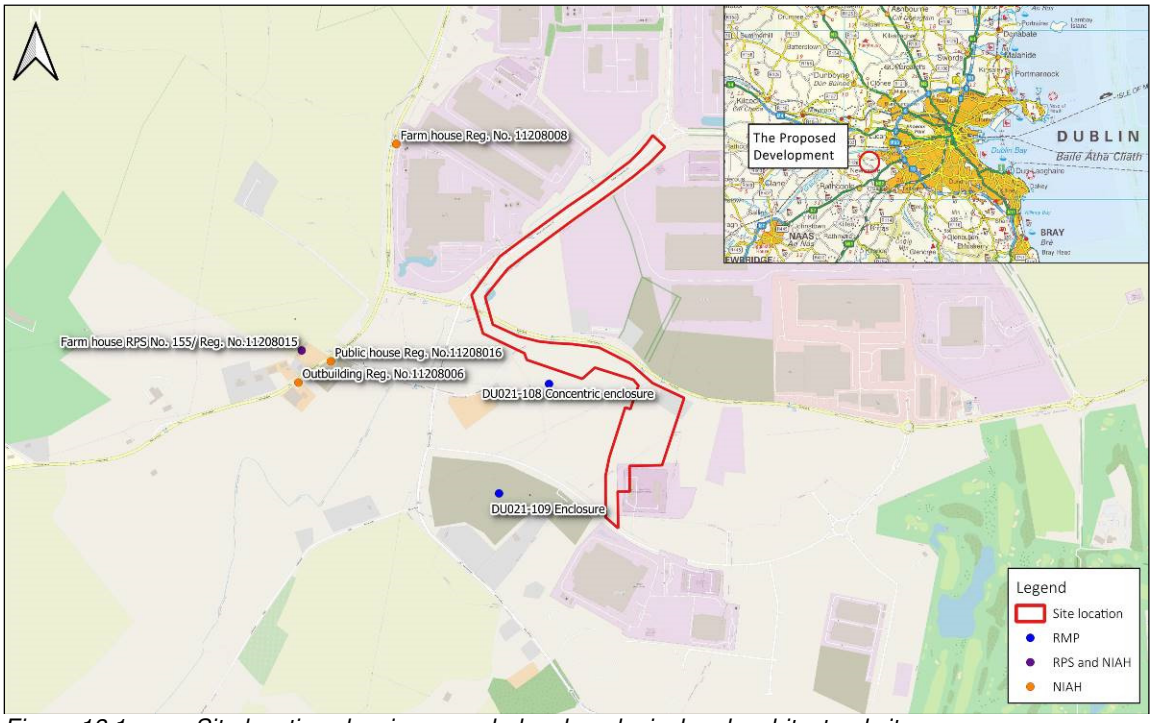

Figure 13.1 Site location showing recorded archaeological and architectural sites

Characteristics of the Proposed Development

13.2 The Proposed Development is described in greater detail within Chapter 2 of this EIA Report.

Methodology

13.3 Research for this report was undertaken in two phases. The first phase comprised a paper survey of all available archaeological, historical and cartographic sources. The second phase involved a field inspection of the site.

Desktop study methodology

13.4 ***Record of Monuments and Places (RMP)*** is a list of archaeological sites known to the National Monuments Section, which are afforded legal protection under Section 12 of the 1994 National Monuments Act and are published as a record.

13.5 **Sites and Monuments Record (SMR)** holds documentary evidence and field inspections of all known archaeological sites and monuments. Some information is also held about archaeological sites and monuments whose precise location is not known e.g. only a site type and townland are recorded. These are known to the National Monuments Section as 'un-located sites' and cannot be afforded legal protection due to lack of locational information. As a result, these are omitted from the Record of Monuments and Places. SMR sites are also listed on a website maintained by the Department of Culture, Heritage and the Gaeltacht (DoCHG) – www.archaeology.ie.

13.6 **National Monuments in State Care Database** is a list of all the National Monuments in State guardianship or ownership. Each is assigned a National Monument number whether in guardianship or ownership and has a brief description of the remains of each Monument.

13.7 The Minister for the DoCHG may acquire national monuments by agreement or by compulsory order. The state or local authority may assume guardianship of any national monument (other than dwellings). The owners of national monuments (other than dwellings) may also appoint the Minister or the local authority as guardian of that monument if the state or local authority agrees. Once the site is in ownership or guardianship of the state, it may not be interfered with without the written consent of the Minister.

13.8 **Preservation Orders List** contains information on Preservation Orders and/or Temporary Preservation Orders, which have been assigned to a site or sites. Sites deemed to be in danger of injury or destruction can be allocated Preservation Orders under the 1930 Act. Preservation Orders make any interference with the site illegal. Temporary Preservation Orders can be attached under the 1954 Act. These perform the same function as a Preservation Order but have a time limit of six months, after which the situation must be reviewed. Work may only be undertaken on or in the vicinity of sites under Preservation Orders with the written consent, and at the discretion, of the Minister.

13.9 **The topographical files of the National Museum of Ireland** are the national archive of all known finds recorded by the National Museum. This archive relates primarily to artefacts but also includes references to monuments and unique records of previous excavations. The find spots of artefacts are important sources of information on the discovery of sites of archaeological significance.

13.10 **Cartographic sources** are important in tracing land use development within the development area as well as providing important topographical information on areas of archaeological potential and the development of buildings. Cartographic analysis of all relevant maps has been made to identify any topographical anomalies or structures that no longer remain within the landscape.

- *Down Survey Maps of the Barony of Newcastle and the Parish of Kilmactalway, c. 1655;*
- *Rocque's An Actual Survey of County Dublin, 1760;*
- *Taylor's Map of the Environs of Dublin, 1816; and*
- *Ordnance Survey Maps of Dublin, 1843 and 1906–9.*

13.11 **Documentary sources** were consulted to gain background information on the archaeological, architectural and cultural heritage landscape of the Proposed Development site.

13.12 **Development Plans** contain a catalogue of all the Protected Structures and archaeological sites within the county. The South Dublin County Development Plan (2016–2022) was consulted to obtain information on cultural heritage sites in and within the immediate vicinity of the Proposed Development site.

13.13 **Aerial photographic coverage** is an important source of information regarding the precise location of sites and their extent. It also provides initial information on the terrain and its likely potential for archaeology. A number of sources were consulted including aerial photographs held by the Ordnance Survey and Google Earth.

13.14 **Excavations Bulletin** is a summary publication that has been produced every year since 1970. This summarises every archaeological excavation that has taken place in Ireland during that year up until 2010 and since 1987 has been edited by Isabel Bennett. This information is vital when examining the archaeological content of any area, which may not have been recorded under the SMR and RMP files. This information is also available online (www.excavations.ie) from 1970–2019.

13.15 **The National Inventory of Architectural Heritage (NIAH)** is a state initiative established under the provisions of the Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act 1999 tasked with making a nationwide record of significant local, regional, national and international structures, which in turn provides county councils with a guide as to what structures to list within the Record of Protected Structures.

Field Inspection Methodology

13.16 Field inspection is necessary to determine the extent and nature of archaeological and historical remains, and can also lead to the identification of previously unrecorded or suspected sites and portable finds through topographical observation and local information.

13.17 The archaeological and architectural field inspection entailed:

- Walking the Proposed Development and its immediate environs.
- Noting and recording the terrain type and land usage.
- Noting and recording the presence of features of archaeological or historical significance.
- Verifying the extent and condition of any recorded sites.
- Visually investigating any suspect landscape anomalies to determine the possibility of their being anthropogenic in origin.

13.18 The impact definitions set out in this Chapter are as per draft EPA Guidelines (pg 23, 2017); and as outlined on Table 1.1 of Chapter 1 of this EIA Report.

Guidance and Legislation

13.19 The following legislation, standards and guidelines were consulted as part of the assessment:

- National Monuments Acts, 1930-2014;
- The Planning and Development (Strategic Infrastructure) Bill, 2006;
- Planning and Development Act, 2000;
- Heritage Act, 1995;
- Environmental Protection Agency (EPA) 2015 Advice Notes on Current Practice (in the preparation of Environmental Impact Statements) (Draft Sept. 2015). Dublin, Government Publications Office;
- Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EIAR) (EPA 2017). Dublin: Government Publications Office;
- Guidelines on the Information to be Contained in Environmental Impact Statements, (EPA, 2002);
- Advice notes on Current Practice in the Preparation of Environmental Impact Statements, (EPA, 2003);
- Frameworks and Principles for the Protection of the Archaeological Heritage, 1999, (formerly) Department of Arts, Heritage, Gaeltacht and Islands; and
- Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act, 2000 and the Local Government (Planning and Development) Act 2000.

Receiving Environment

Archaeological and Architectural Background

13.20 The Proposed Development site is located in the townlands of Ballybane, Ballybane and Aungierstown and Grange, Dublin 22. There are two recorded monuments within the immediate vicinity of the Proposed Development site: two enclosures (DU021-108, DU021-109). Concentric enclosure (DU021-108) extend into the northern extension of the Proposed Development site from the south; while enclosure (DU021-109) is recorded c. 260m west of the southern end of the Proposed Development site. Both DU021-108 and DU021-109 have been subject to archaeological excavation and have been fully preserved by record. There are no National Monuments or sites subject to preservation orders within the vicinity of the Proposed Development site. There is one protected structure in the environs of the site: a farm house (RPS 155/ NIAH Reg. No. 11208015), located c. 410m south-west of the nearest boundary of the Proposed Development site where it crosses the New Nangor Road. A total of four structures are included in the NIAH in the vicinity of the Proposed Development site, including the protected structure.

Prehistoric Period

Mesolithic Period (c. 7000–4000 BC)

13.21 Although recent discoveries have suggested the possibility of human activity in the southwest of Ireland as early as the Upper Palaeolithic (Dowd and Carden 2016), the Mesolithic period is the first time for which there is widespread evidence of human occupation. Mesolithic people led a mobile lifestyle, hunting, foraging and fishing for sustenance and migrating to exploit seasonal resources. As a result, coastal and riverine resources were of particular importance to these communities. Such transient ways of life leave little trace in the archaeological record. Often the only indication of Mesolithic activity are scatters of flint implements and debitage. Occasionally shell middens have been found to date to this period. Although Mesolithic activity has been identified in County Dublin, there are no recorded sites of Mesolithic date within the vicinity of the Proposed Development site.

Neolithic Period (c. 4000–2500 BC)

13.22 The Neolithic period began with the introduction and adoption of agriculture to Ireland. This period was revolutionary. Neolithic groups turned to cereal cultivation and the rearing of stock to support themselves. There was no longer a need to move frequently and as a result settlement became more permanent. Pottery was being produced possibly for the first time. A new preoccupation with claiming

territory to farm contributed to the megalithic tomb tradition that emerged in the Neolithic. There are four main types of megalithic tombs; court cairns, portal tombs, passage tombs and the later wedge tombs of the early Bronze Age. These monuments served as tombs for the dead, ceremonial centres for the living and territorial markers in the landscape. They would have required significant organisation and cooperation to construct. The Proposed Development site would have remained favourable for settlement into the Neolithic period although there are no recorded Neolithic sites in the vicinity of the site. It is worth noting that a number of fragments of a Neolithic carinated bowl and flint debitage were recovered from unsecure contexts during the excavation of enclosure DU021-108, which extends into the Proposed Development site from the south (Delaney et. al. 2020, Licence Ref.:17E0590).

Bronze Age Period (c. 2500–800 BC)

13.23 The Bronze Age was marked by the widespread use of metal for the first time in Ireland. As with the transition from Mesolithic to Neolithic, the transition into the early Bronze Age was accompanied by changes in society. The megalithic tomb tradition went into decline and ended by the middle Bronze Age and the burial of the individual became typical. Cremated or inhumed individuals were often placed in a cist, which is a stone-lined grave, usually built of slabs set upright to form a box-like construction and capped by a large slab or several smaller lintels (Buckley and Sweetman 1991). Barrows and pit burials are also funerary monuments associated with this period.

13.24 Another site type thought to reveal of glimpse of domestic life at this time is the burnt mound or *fulacht fia*. A common site within the archaeological record, they are normally interpreted as temporary cooking sites but it has been suggested that they may have had other functions such as brewing, dyeing and bathing. They survive as low mounds of charcoal-enriched soil mixed with an abundance of heat-shattered stones. They are usually horseshoe-shaped and located in low-lying areas near a water source and are often found in clusters. Even when levelled by an activity such as ploughing, they are identifiable as burnt spreads in the landscape (Brindley and Lanting, 1990).

13.25 Two *fulachaí fia* and associated features such as troughs, pits and stakeholes were excavated c. 450m north-northeast of the Proposed Development site under licence 13E0471 (Bennett 2016:083, 2017:411). Nine cremation pits of Bronze Age date were identified in two clusters and excavated under licence 14E0453, c. 644m east-northeast of the Proposed Development site (Bennett 2016:084). A *fulacht fia* (DU017-084) is also recorded c. 1km north-east of the site. There was further Bronze Age activity noted c. 1.14km north-east of the Proposed Development site, where a ring-barrow (DU017-080) was excavated. Taken together, this evidence suggests the vicinity of the Proposed Development site was settled and utilised by Bronze Age communities.

Iron Age Period (c. 800 BC – AD 400)

13.26 The Iron Age was traditionally seen as a period for which there was little evidence in comparison to the preceding Bronze Age and the succeeding early medieval period. However, development-led excavation in recent decades and projects such as the Late Iron Age and Roman Ireland Project have added significantly to our knowledge of the Irish Iron Age. In Europe, there are two stages to the Iron Age, the earlier Hallstatt and the later La Tene. While in Ireland, evidence of a Hallstatt phase is rare, La Tene influences are reflected strongly in the style of metalwork of this period. It is clear that there was significant contact and interaction between the Continental Europe, Britain and Ireland at this time. There are no recorded sites of Iron Age date in the vicinity of the Proposed Development site.

Early Medieval Period (AD 400–1100)

13.27 The early medieval period is depicted in the surviving sources as largely rural characterised by the basic territorial unit known as *túath*. Byrne (1973) estimates that there were probably at least 150 kings in Ireland at any given time during this period, each ruling over his own *túath*, of between 1,700 and 3,300 subjects according to most recent estimates (Stout 2017). One of the most common indicators of settlement during this period is the ringfort. Ringforts were often constructed to protect rural farmsteads and are usually defined as a broadly circular enclosure. They are typically enclosed by an earthen bank and exterior ditch and range from 25m to 50m in diameter. Ringforts can be divided into three broad categories – univallate sites, with one bank or ditch; multivallate sites with as many as four levels of enclosing features and platform or raised ringforts, where the interior of the ringfort has been built up. Multivallate ringforts are generally believed to reflect the higher status of the occupants (Edwards 1996). Many sites recorded as enclosures may represent ringforts or similar sites.

13.28 An enclosure (DU021-108) is recorded within and to the immediate south of the northern arm of the Proposed Development site. This site was initially identified through aerial photography and geophysical survey. The presence of a circular double-ditched enclosure was confirmed by testing.

This site, (AH1), was excavated under licence 17E0590 in 2019. Initial results suggest the site was occupied in the medieval period (Delaney et. al. 2020). A second enclosure (AH2) was also excavated to the southeast of AH1. No datable finds were recovered from this feature, and it is possible that it may date to the early medieval period or be prehistoric in nature. A kiln located external to the enclosure is of early medieval type but it is unclear if the kiln and enclosure are contemporary (Delany and Bayley 2019). Post-excavation analyses for both enclosures are ongoing.

13.29 An enclosure (DU021-109) is recorded c. 260m west of the southern end of the Proposed Development site. The site was identified through geophysical survey (Licence Ref.: 15R0116) undertaken by Earthsound (2015) and Leigh (2016); previous testing carried out by ACSU (2016) and pre-excavation works (Licence Refs.: 17E0591) carried out by Rubicon Heritage (2017). It was subject to full archaeological excavation during 2018. The enclosure consisted of a multivallate enclosure with inner circular ditch and outer kidney-shaped ditch. A dense cluster of internal features were identified as well as features between the two enclosing ditches. The site was provisionally dated to the early medieval period based on the artefacts recovered which included a baluster headed pin from the 10th century AD.

13.30 This period was also characterised by the introduction of Christianity to Ireland. Early churches tended to be constructed of wood or post-and-wattle. Between the late 8th and 10th centuries, mortared stone churches gradually replaced these earlier structures. Many of the sites, some of which were monastic foundations, were probably originally defined by an enclosing wall or bank similar to that found at the coeval secular sites. This enclosing feature was probably built more to define the sacred character of the area of the church than as a defence against aggression. An inner and outer enclosure can be seen at some of the more important sites; the inner enclosure surrounding the sacred area of church and burial ground and the outer enclosure providing a boundary around living quarters and craft areas. Where remains of an enclosure survive, it is often the only evidence that the site was an early Christian foundation. An ecclesiastical enclosure (DU021-003003) is recorded c. 790m south-southwest of the southern extent of the Proposed Development site at Kilmactalway.

Medieval Period (AD 1100–1600)

13.31 The beginning of the medieval period was characterised by political unrest that originated from the death of Brian Borumha in 1014. In AD 1171, Dublin was besieged and taken by Diarmait MacMurchada and his Leinster forces supported by a force of Anglo-Norman knights led by Strongbow (Richard Fitz-Gilbert de Clare) and Raymond le Gros. Diarmait MacMurchada, deposed King of Leinster, sought the support of mercenaries from England, Wales and Flanders to assist him in his challenge for kingship. Norman involvement in Ireland began in AD 1169, when Richard de Clare and his followers landed in Wexford to support MacMurchada. Two years later de Clare (Strongbow) inherited the Kingdom of Leinster and by the end of the 12th century the Normans had succeeded in conquering much of the country (Stout and Stout 1997). The initial stage of the invasion of the country was marked by the construction of motte and bailey castles, which were later replaced with stone castles.

13.32 In the later medieval period, a total of seven tower houses were constructed in the wider environs of the Proposed Development site. These include Grange Castle (DU017-034), from which the area takes its name, Kilbride Castle (DU021-004), c. 760m southeast of the southern extent of the Proposed Development site and Nangor Castle (DU017-037), c. 1.1km to the east.

Post-medieval Period (AD 1600–1900)

13.33 With the onset of the 18th century, the political climate settled and this saw a dramatic rise in the establishment of large residential houses around the country. This was largely due to the fact that after the turbulence of the preceding centuries, the success of the Protestant cause and effective removal of any political opposition, the country was at peace. The large country house was only a small part of the overall estate of a large landowner and provided a base to manage often large areas of land that could be dispersed nationally. During the latter part of the 18th century, the establishment of a parkland context (or demesnes) for large houses was the fashion. Although the creation of a parkland landscape involved working with nature, rather than against it, considerable construction effort went into their creation. Major topographical features like rivers and mountains were desirable features for inclusion into, and as a setting, for the large house and parkland. The nearest large demesne landscape to the Proposed Development site is Castle Bagot, c. 570m to the south-southwest of the site. The principal building survives however the parkland has lost much of its character. A small demesne associated with Milltown House is located c. 450m south-west of the Proposed Development site where it crosses the New Nangor Road. While the main building has been demolished, an outbuilding survives and is

listed in the NIAH (NIAH Reg. No. 11208006), c. 460m to the west of the northern arm of the Proposed Development site where it crosses the New Nangor Road.

13.34 A public house dating to between 1780 and 1810, is also listed in the NIAH, c. 370m south-west of the northern arm of the Proposed Development site (NIAH Reg. No. 11208016). However, this structure has been demolished and is no longer extant.

13.35 A vernacular farm house (RPS 155/ NIAH Reg. No. 11208015) is recorded c. 410m south-west of the northern arm of the Proposed Development site where it crosses the old Nangor Road. Its dates to the 18th century and consists of a four-bay, two-storey structure with associated outbuildings. It is visible on the first edition OS map of 1843.

13.36 A farm house (NIAH Reg. No. 11208008) was located c. 375m south-west of the Proposed Development site where it crosses the New Nangor Road. The house dated to c. 1850 but appears to have been removed during works for the modern factory on the site.

Previous Archaeological Investigations

13.37 A number of previous archaeological investigations have taken place within the Proposed Development site and the surrounding environs. Archaeological features were identified in a geophysical survey undertaken by Earthsound in 2015 and Leigh in 2016 (Licence Ref: 15R0116) and confirmed by archaeological test trenching undertaken by ACSU in October 2016 (Licence Ref: 16E0531*)* and pre-excavation works undertaken by Rubicon Heritage in 2017 (Licence Ref: 17E0578). These features, which were subject to archaeological excavation during 2019, included a bivallate enclosure (AH1), numerous related features and a series of post-medieval agricultural features, designated Area 1 (Figure 13.2). The inner enclosure ditch measured approximately 50m in diameter, with the ditch averaging 3m in width and 1.50m in depth. The outer enclosure ditch measured approximately 100m in diameter and averaged 2.85m in width and was 1.50m deep (Delaney et. al. 2020). Large sections of these ditches had been re-used as modern drainage features, with ceramic or plastic drains noted at the base. A large area in the eastern part of the site appeared to have been quarried in recent decades. A number of pits were identified within the interior of the enclosure, one of which was enclosed by four linear features which may represent evidence of a wind-break or structure (Bayley, pers. comm.). The excavated area extended into the Proposed Development site from the south.

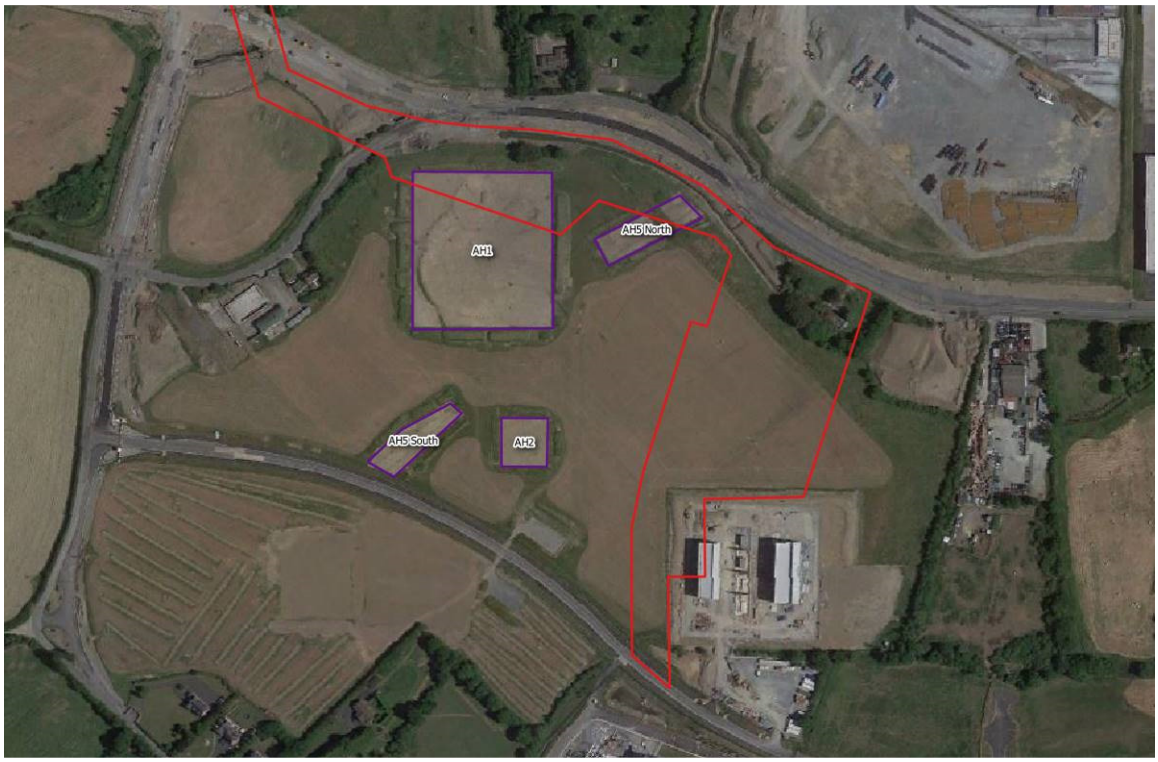

Figure 13.2 Previously excavated areas within the main part of the Proposed Development site (Source: Google Earth 2018)

Figure 13.3 Mid-excavation aerial photograph of Area 1 (see AH1 of Figure 13.2), facing northwest

13.38 Area 2 (AH2), also excavated during 2019, (Figure 13.2) consisted of a roughly circular enclosure or ring ditch measuring approximately 27.5m north–south by 26m east–west, 1.2–1.4m in width and 0.65m in depth (minimum). Three features within the enclosed area and an external figure-of-eight kiln were also identified (Delaney and Bayley 2019a). The kiln is of a type commonly dating to the early medieval period. However, it is unclear if the enclosure was contemporary with the kiln and no date has yet been established for the enclosure. Post-excavations analyses are ongoing.

13.39 The focus of the excavations in Area 5 (AH5) were five linear ditches, identified in the geophysical survey and testing (Delaney and Bayley 2019b, Figure 13.2). These features were excavated in two cuttings. Four of these ditches were oriented northeast–southwest, with the fifth running northwest–southeast at the north-eastern end of the southern cutting. In Area 5 north (AH5 north), within the Proposed Development site, it was determined that large portions of these linear ditches had been disturbed and recut by modern drainage activity and very little of the original fabric of the ditches remained in-situ. The exception was in the north-west corner of the cutting, where one 10m length of the ditch appeared to be relatively undisturbed. One sherd of medieval pottery was recovered from the fill of this portion of the ditch. An additional north-northeast–south-southwest oriented ditch was identified in the north-eastern part of Area 5 north. Sixteen sherds of medieval pottery were recovered from the fill of this ditch. In Area 5 south (AH5 south), the linear ditches that were identified by the geophysical survey were noted, but as with the ditches in Area 5 north, it appears that these were recut at least once and re-used as drainage features, with no traces of the original ditch or fills surviving. A dog-leg shaped kiln, possibly dating to the early medieval period was identified adjacent to the northern ditch. A modern drainage ditch was recorded at the north-eastern end of the cutting and another northeast-southwest oriented linear feature, interpreted as an agricultural furrow, was also identified within the site area.

13.40 Monitoring was carried out as part of the construction of the Grange Castle Link Road, within the Proposed Development site where it extends north along the Grange Castle Link Road. Nothing of archaeological significance was identified as the area was heavily disturbed by a previous realignment of the River Griffeen (Licence Ref.: 06E0777, Bennett 2006:659).

13.41 Archaeological testing and monitoring was carried out along the Nangor Road and Adamstown Road, which includes an area within the Proposed Development site, under licence 16E0520 (Bennett 2016:340, 2017:042). The structural remains of a post-medieval building were recorded but nothing of earlier date was uncovered.

13.42 Archaeological monitoring was carried out to the immediate west of the southern section of the Proposed Development site, immediately to the north of the road (Licence Ref.: 18E0484, Bennett 2018:538). In addition to the linear features previously identified by Rubicon Heritage, a sub-circular deposit was noted which yielded a possible granite quernstone fragment. A total of 60 sherds of pottery were recovered during the monitoring, 41 of which were confirmed to be medieval in date.

13.43 An enclosure was also excavated to the immediate southwest of the Proposed Development site during 2017. The enclosure consisted of a multivallate enclosure with inner circular ditch and outer kidney-shaped ditch. A dense cluster of internal features were identified as well as features between the two enclosing ditches. The site was provisionally dated to the early medieval period based on the artefacts recovered which included a baluster headed pin from the 10th century AD.

13.44 Archaeological monitoring at the site of a geophysical anomaly, immediately west of the Proposed Development site where it extends along the roadway to the north, identified a modern pit and spread of stone but nothing of archaeological significance (Licence Ref.: 06E1161, Bennett 2006:581).

13.45 Archaeological testing was also carried out under licence 19E0370 for the Grange Castle West Access Road, c. 323m west-northwest of the Proposed Development site (Kavanagh and Piera 2019). A number of areas of archaeological significance were identified. These comprise an enclosure consisting of two concentric enclosing ditches (AA1), a possible kiln (AA2) and a pit filled with charcoal and heat shattered stone, likely associated with burnt mound activity (AA3). Phase 2 testing identified a further three areas of archaeological significance, which were designated as Archaeological Areas 4–6. These comprise a cluster of ditches and linear features (AA4) (which is located the closest to the Proposed Development site), two linear ditches (AA5 and AA6). Two further areas of archaeological potential were identified in the Phase 3 works under the same licence, but these lie significantly to the west of the Proposed Development site and are of limited relevance to this assessment.

13.46 Archaeological investigation of features discovered during geophysical survey 450m north-northeast of the Proposed Development site, identified two main areas of archaeological significance (Licence Ref.: 13E0471, Bennett 2016:083, 2017:411). Area 11 consisted of a number of associated enclosures. The earliest enclosure comprised a penannular ditch with finds including iron knives, quernstones and cow skulls. This enclosure was dated to cal. AD 656–727 and 737–768. This first enclosure was enclosed by a second penannular ditch. There was a D-shaped enclosure attached to the southern extent of the second enclosure, within which the burial of a male and female, aligned north–south was identified. A pit containing the articulated remains of a sheep or goat was also identified within the enclosure. There were also two concentric ditches with associated kiln, postholes and stakeholes. The remains of a wattle fence were identified within a recut ditch within the enclosure. Area 9 consisted of two *fulachtaí fia* including associated troughs, pits and stakeholes.

Cartographic sources

Down Survey Maps of the Barony of Newcastle and the Parish of Kilmactalway, c. 1655

13.47 There is little detail provided for the Proposed Development site in these early maps. A water mill is depicted on the river at Milltown to the west. The accompanying terrier details a castle, a mill and 'some cabins' were present at Milltown. It is likely the Proposed Development site was in use as agricultural land at this time.

Rocque's An Actual Survey of County Dublin, 1760 *(Figure 13.4)*

13.48 By the time of this mapping in 1760, the Proposed Development site is open agricultural land. A small group of structures is depicted at Milltown. Grange Castle (DU017-034) and Nangor (DU017-037) are shown as well as the church at Kilmactalway (DU021-003001), annotated as in ruins.

Figure 13.4 Extracts from historic maps Rocque (1760) and Taylor (1816) showing the approximate location of the Proposed Development site

Taylor's Map of the Environs of Dublin, 1816 *(Figure 13.4)*

13.49 There is little detail of the Proposed Development site shown in this mapping. The village of Milltown has expanded to the west. A small number of structures are shown in the area of Ballybawn, in the vicinity of the Proposed Development site. Grange Castle (DU017-034) and Nangor (DU017-037) are shown again. The Castle Bagot demesne to the south is shown for the first time.

First edition Ordnance Survey Map, 1843, scale 1:10,560 *(Figure 13.5)*

13.50 By the time of this mapping in 1843, the Proposed Development site is located within an agricultural landscape. There are no structures depicted within the Proposed Development site. To the west, Milltown House, a very small demesne is marked. The farm house (RPS 155/NIAH Reg. No.11208015) is shown, c. 410m south-west of the substation part of the Proposed Development site. The townland boundaries between Milltown and Ballybane and between Ballybane and Aungierstown and Ballybane are shown along with a number of field boundaries. The river Griffeen acts as the townland boundary between the townlands of Grange and Ballybane.

Ordnance Survey Map, 1906–9, scale 1:2,500 *(Figure 13.5)*

13.51 There are no significant changes to the Proposed Development site or the immediate surroundings depicted in this mapping.

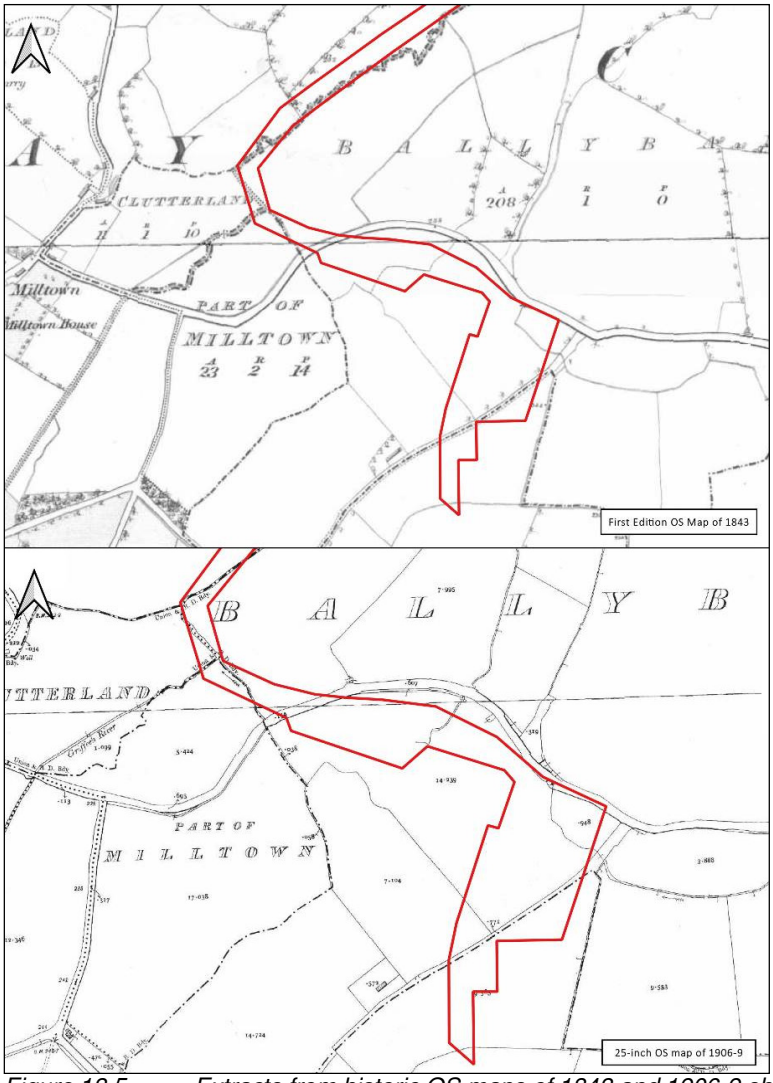

Figure 13.5 Extracts from historic OS maps of 1843 and 1906-9 showing the Proposed Development site

Aerial Photography

13.52 The earliest available aerial photography for the Proposed Development site dates to 1995 (OSI). It shows the enclosure (DU021-108) as a clear cropmark and to the south, enclosure DU021-109 is also visible. The townland boundary between Milltown and Ballybane is partially intact and appears to be adapted to a drainage feature. The townland boundary respects/incorporates the outer ditch of the bivallate enclosure (DU021-108). Numerous former field boundaries, some corresponding to those shown on the historic OS mapping and the townland boundary between Ballybane and Aungierstown and Ballybane, are also discernible. By the 2005 imagery, the surviving townland boundary has been removed, likely as a result of land improvement as the site is situated in an agricultural landscape. By 2016, the Grange Castle South Business Park access road, which runs directly to the south of the Proposed Development site, has been constructed (Google Earth 2016) (See Figure 13.2). In the satellite imagery from 2018, the locations of the excavations at Area 1, Area 2 and Area 5 are visible as well as the archaeological works to the immediate south of the substation part of the Proposed Development site. The New Nangor Road is also under construction at this time. A house and garden were located in the northeast of the Proposed Development site, but this had been removed by 2019 as part of the road improvement scheme. No previously unrecorded features of archaeological potential were identified within the Proposed Development site or its environs.

Topographical Files

13.53 Information on artefact finds from the study area in County Dublin has been recorded by the National Museum of Ireland since the late 18th century. Location information relating to these finds is important in establishing prehistoric and historic activity in the study area. A review of the topographical files for the study area revealed that no stray finds have been recorded for the Proposed Development site or the surrounding environs.

County Development Plan

Record of Monuments and Places

13.54 The South County Dublin Development Plan (2016–2022) recognises the statutory protection afforded to all RMP sites under the National Monuments Legislation (1930–2014). The development plans list a number of aims and objectives in relation to archaeological heritage (see Chapter 13 - Appendix 13.3).

13.55 It is a policy of the South County Dublin Development Plan (2016–2022) to promote the in-situ preservation of archaeology as the preferred option where development would have an impact on buried artefacts. Where preservation in situ is not feasible, sites of archaeological interest shall be subject to archaeological investigations and recording according to best practice, in advance of redevelopment.

13.56 There is one recorded monument within the Proposed Development site and another in the vicinity of the site. Both records represent enclosures which have been subject to full archaeological excavation (preservation by record).

Table 13.1 Recorded monuments within or close to the Proposed Development site

SMR No.	Classification	Location	Distance to Proposed Development
DU021-108	Enclosure	Ballybane	Partially within site
DU021-109	Enclosure	Ballybane	c. 262m west

Record of Protected Structures

13.57 The South Dublin County Development Plan (2016–2022) recognises the statutory protection afforded to all protected structures under the Planning and Development Act. The plan also lists a number of aims and objectives in relation to architectural heritage (Chapter 13 - Appendix 13.4).

13.58 There is one protected structure (RPS 155) within the environs of the Proposed Development site, a farm house, c. 410m to the south-west of the proposed substation site. The site is also listed in the NIAH (Reg. No. 11208015).

Architectural Conservation Areas

13.59 There are no Architectural Conservation Areas within the receiving environment of the Proposed Development site.

National Inventory of Architectural Heritage

13.60 A review of both the architectural survey and garden survey was undertaken as part of this assessment. An area up to 500m that surrounds the Proposed Development site was examined in order to identify any buildings or areas of architectural significance. The results of this survey are summarised below.

Building Survey

13.61 There are four structures listed in the NIAH for the vicinity of the Proposed Development site, one of these is also a protected structure.

Table 13.2 List of structures listed in the NIAH within 500m of the Proposed Development site

NIAH Reg. / RPS No.	Classification	Location	Distance to Development
11208008	Farm house	Milltown	c. 375m south-west
11208016	House	Milltown	c. 370m south-west
11208015/ 155*	Farm house	Milltown	c. 410m south-west
11208006	Outbuilding	Milltown	c. 460m south-west

*Also recorded as a protected structure

Garden Survey

13.62 There are no designed landscapes in the immediate vicinity of the Proposed Development site.

Cultural Heritage Background

Toponomy of Townlands

13.63 Townland and topographic names are an invaluable source of information on topography, land ownership and land use within the landscape. They also provide information on history; archaeological monuments and folklore of an area. A place name may refer to a long-forgotten site, and may indicate the possibility that the remains of certain sites may still survive below the ground surface. The Ordnance Survey surveyors wrote down townland names in the 1830's and 1840's, when the entire country was mapped for the first time. Some of the townland names in the study area are of Irish origin and through time have been anglicised. The main reference used for the place name analysis is Irish Local Names Explained by P.W Joyce (1870). A description and possible explanation of each townland name in the environs of the Proposed Development site are provided in the below table.

Townland boundaries

13.64 The townland is an Irish land unit of considerable longevity as many of the units are likely to represent much earlier land divisions. However, the term townland was not used to denote a unit of land until the Civil Survey of 1654. It bears no relation to the modern word 'town' but like the Irish word *baile* refers to a place. It is possible that the word is derived from the Old English *tun* land and meant 'the land forming an estate or manor' (Culleton 1999, 174).

13.65 Gaelic land ownership required a clear definition of the territories held by each sept and a need for strong, permanent fences around their territories. It is possible that boundaries following ridge tops, streams or bog are more likely to be older in date than those composed of straight lines (ibid. 179).

13.66 The vast majority of townlands are referred to in the 17th century, when land documentation records begin. Many of the townlands are mapped within the Down Survey of the 1650s, so called as all measurements were carefully 'laid downe' on paper at a scale of forty perches to one inch. Therefore, most are in the context of pre-17th century landscape organisation (McErlean 1983, 315).

Table 13.3 List of local townlands their derivation and meaning

Placename	Derivation	Possible Meaning
Milltown	-	Anglicised name relating directly to the presence of a mill.
Ballybane	*An Baile Bán*	The white homestead
Aungierstown and Ballybane	-	Aungier's Town/The white homestead
Kilmactalway	*Cill Mhic Thalmhaigh*	Mac Shalwy's Church
Clutterland	*Talamh Chlutair*	The land of le Clutere/ Clutere/ Clouter
Grange	-	Grange or monastic farm

13.67 In the 19th century, some demesnes, deer parks or large farms were given townland status during the Ordnance Survey and some imprecise townland boundaries in areas such as bogs or lakes, were given more precise definition (ibid.). Larger tracks of land were divided into a number of townlands, and named Upper, Middle or Lower, as well as Beg and More (small and large) and north, east, south and west (Culleton 1999, 179). By the time the first Ordnance Survey had been completed a total of 62,000 townlands were recorded in Ireland.

13.68 Although not usually recorded as archaeological monuments in their own right, townland boundaries are important as cultural heritage features as they have indicated the extents of the smallest land division unit in the country—the townland—which have been mapped since the 19th century. It remains unclear how old these land units actually are, though it has been convincingly argued that they date to at least the medieval period and may be significantly older than this (McErlean 1983; MacCotter 2008).

13.69 The townland boundary between Aungierstown and Ballybane, and Ballybane runs through the main body of the Proposed Development site. This boundary is no longer extant but is visible as a crop mark in the landscape on the aerial photographic coverage from OSI 1995 to Google Earth 2019. A number of townland boundaries are crossed by the Proposed Development site as it extends northwards following the line of the internal Grange Castle Business Park access road; however, these have seen extensive disturbance during the development of the Grange Castle Business Park and associated road network.

Cultural Heritage Sites

13.70 The term 'cultural heritage' can be used as an over-arching term that can be applied to both archaeology and architectural. However, it also refers to more ephemeral aspects of the environment, which are often recorded in folk law or tradition or possibly date to a more recent period. No specific cultural heritage sites have been identified during the course of this assessment that relate to the Proposed Development site; however, the archaeological and architectural sites within the study area identified in this Chapter should also be considered as cultural heritage.

Field Inspection

13.71 The main section of the Proposed Development site is currently under scrub (Figure 13.6). A strip of land within the Proposed Development site bordering the road to the south has been previously disturbed by cable laying associated with the ESB substation to the southeast. This area was previously archaeologically monitored under licence 18E0484. The house in the northeast of the Proposed Development site, visible on aerial photography prior to 2019, has been demolished (Figure 13.7) as part of the road widening works along the Nangor Road.

Figure 13.6 Undisturbed area in the Proposed Development site, facing east

Figure 13.7 Site of demolished house in the northeast of the Proposed Development site, facing south

Conclusions

13.72 The Proposed Development site is located in the townlands of Ballybane, Ballybane and Aungierstown and Grange, County Dublin. There are two recorded monuments within the immediate vicinity of the Proposed Development site, two enclosures (DU021-108, DU021-109). A concentric enclosure (DU021-108) extends into the Proposed Development site from the south; while enclosure (DU021-109) is recorded c. 262m west of the Proposed Development site. Both DU021-108 and DU021-109 have been subject to archaeological excavation and have been fully preserved by record. There are no National Monuments or sites subject to preservation orders within the vicinity of the Proposed Development site.

13.73 There is one protected structure in the environs of the site: a farm house (RPS 155/ NIAH Reg. No. 11208015), located c. 410m south-west of the Proposed Development site. A total of four structures are included in the NIAH in the vicinity of the Proposed Development site, including the protected structure.

13.74 Extensive archaeological investigations have taken place within the Proposed Development site and the surrounding environs in recent years. The enclosure (DU021-108) within the site was defined using geophysical survey and targeted test trenching and designated AH1. It was subsequently subject to pre- excavation works and later fully excavated and recorded, under licence 17E0590 in 2019. It consisted of a double-ditched enclosure and associated features with post-excavation works currently ongoing. One additional area within the Proposed Development site has been subject to excavation. AH5 which consisted of a number of disturbed linear features of possible medieval date, based on the retrieval of medieval pottery from some of the features, excavated under licence 17E0578.

13.75 Cartographic analysis and aerial photographic coverage suggest the Proposed Development site was formerly in use as agricultural land. Aerial photography shows the enclosures DU021-108 and DU021-109 as well as the AH2 enclosure or ring-ditch. Satellite imagery from Google Earth 2019 shows a modern house which was located in the northeast of the Proposed Development site has been removed. This was confirmed by field inspection.

13.76 No specific cultural heritage sites were identified in the vicinity of the Proposed Development site, with the townland boundaries which ran through the site, removed in the past.

Potential Impacts of the Proposed Development

Construction phase

Archaeology

13.77 While the Proposed Development site has been subject to extensive archaeological testing and subsequent excavation in a number of areas (AH1 and AH5 North), there is potential for small or isolated archaeological features to survive beneath the existing ground level outside the footprint of the test trenches and the excavated areas. Ground disturbances associated with the Proposed Development site have the potential to directly and negatively impact on any such remains. Dependant on the nature, extent and significance of archaeological deposits, impacts (prior to the application of mitigation) may range from moderate negative to significant negative.

Architecture

13.78 No potential negative impacts upon the architectural resource are predicted as a result of the construction of the Proposed Development.

Cultural Heritage

13.79 No potential negative impacts upon the cultural heritage resource are predicted as a result of the construction of the Proposed Development.

Operational phase

13.80 No significant impacts during operation are predicted upon the archaeological, architectural and cultural heritage resource.

Potential Cumulative Impacts

13.81 As it is proposed to monitor construction activity and preserve any identified archaeological features by record, no cumulative impacts are predicted upon the archaeological, architectural or cultural heritage resource.

Mitigation measures

Archaeology

13.82 It is recommended that archaeological monitoring of topsoil stripping associated with the construction of the Proposed Development be carried out in all areas outside the footprint of the previously excavated areas. If any features of archaeological potential are discovered during the course of the works further archaeological mitigation may be required, such as preservation *in-situ* or by record. Any further mitigation will require approval from the National Monuments Service of the DoCHG.

Architecture

13.83 As there are no potential impacts on the architectural resource, no mitigation is deemed necessary.

Cultural Heritage

13.84 As there are no potential impacts on the cultural heritage resource, no mitigation is deemed necessary.

13.85 The cumulative impact assessment is addressed in greater detail within Chapter 16 of this EIA Report. Interactions are addressed in Chapter 17 of this EIA Report.

Residual Impacts

Construction Phase

13.86 Should the mitigation measures, recommended above, be carried out fully and successfully there will be no predicted residual impact to the archaeological, architectural and cultural heritage resource by the Proposed Development.

Operational Phase

13.87 There are no predicted residual impacts for the operational phase of the Proposed Development upon the archaeological, architectural and cultural heritage resource.

'Worst case' scenario

13.88 Under a worst-case scenario, the Proposed Development would disturb previously unidentified and unrecorded deposits and artefacts without appropriate excavation and recording being undertaken.

'Do nothing' scenario

13.89 If the Proposed Development were not to proceed, there would be no negative impact on the archaeological, architectural or cultural heritage resource.

Monitoring & Reinstatement

13.90 The mitigation measures recommended above would also function as a monitoring system during construction to allow the further assessment of the scale of the impacts and the effectiveness of the recommended mitigation measures.

Difficulties in Compiling Information

13.91 No difficulties were encountered in compiling information.

14. WASTE MANAGEMENT

Introduction

14.1 This chapter has been prepared to address the issues associated with waste management during the construction and operational phases of the Proposed Development.

14.2 A site-specific outline Construction & Demolition Waste Management Plan (C&D WMP) has been prepared to deal with waste generation during the construction phase of the Proposed Development and is included as Chapter 14 - Appendix 14.1 of the Appendix document. The C&D WMP has been prepared in accordance with the '*Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects'* document produced by the National Construction and Demolition Waste Council (NCDWC) in conjunction with the Department of the Environment, Heritage and Local Government in July 2006. This document will be implemented by the contractor for all site works.

Methodology

14.3 The assessment of the impacts of the Proposed Development arising from the consumption of resources and the generation of waste materials, was carried out taking into account the methodology specified in relevant guidance documents (as set out in Sections 14.11 – 14.13 of this Chapter, along with an extensive document review to assist in identifying current and future requirements for waste management including national and regional waste policy, waste strategies, management plans, legislative requirements and relevant reports. A summary of the documents reviewed, and the relevant legislation is provided in Chapter 14 - Appendix 14.1.

14.4 This Chapter is based on the Proposed Development, as described in Chapter 2 (Description of the Proposed Development) and considers the following aspects:

- Legislative context;
- Construction phase (including site preparation, excavation and levelling); and
- Operational phase.

14.5 A desk study was carried out which includes the following tasks:

- Review of applicable policy and legislation which creates the legal framework for resource and waste management in Ireland;
- Description of the typical waste materials that will be generated during the construction and operational phases; and
- Identification of mitigation measures to prevent waste generation and promote management of waste in accordance with the waste hierarchy.

14.6 Estimates of construction waste generation during the construction phase of the Proposed Development have been calculated. The waste types and estimated quantities are based on published data by the EPA in *National Waste Reports*, data recorded from similar previous developments, Irish and US EPA waste generation research, other available research sources.

14.7 Estimates of surplus made ground and soils and stones generated during the construction phase of the Proposed Development have been calculated by the project engineers Clifton Scannell Emerson Associates (CSEA).

14.8 There will be a very small amount of waste generated during the operation phase.

14.9 Mitigation measures are proposed to minimise the effect of the Proposed Development on the environment during the construction and operational phases, to promote efficient waste segregation and to reduce the quantity of waste requiring disposal. This information is presented in Sections 14.55 – 14.64 of this Chapter.

14.10 A detailed review of the existing ground conditions on a regional, local and site-specific scale are presented in Chapter 7 - Land, Soils, Geology and Hydrogeology. Chapter 7 of the EIA Report also discusses the environmental quality of soils which will have to be excavated to facilitate construction of the Proposed Development.

Legislation and Guidance

14.11 Waste management in Ireland is subject to EU, national and regional waste legislation which defines how waste materials must be managed, transported and treated. The overarching EU legislation is the Waste Framework Directive (2008/98/EC) which is transposed into national legislation in Ireland. The cornerstone of Irish waste legislation is the Waste Management Act 1996 (as amended).

14.12 In addition, the Irish government issues regular policy documents which outline measures aimed to improve waste management practices in Ireland and help the country to achieve EU targets in respect of recycling and disposal of waste. The most recent policy document *A Resource Opportunity – Waste Management Policy in Ireland* was published in 2012 and stresses the environmental and economic benefits of better waste management, particularly in relation to waste prevention.

14.13 The strategy for the management of waste from the construction phase is carried out in line with the requirements of the *Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects* published by the Department of Environment, Heritage and Local Government (DoEHLG) in 2006. The guidance document published by FAS and the Construction Industry Federation (CIF) *Construction and Demolition Waste Management: A handbook for Contractors and Site Managers* were also consulted in the preparation of this assessment.

Receiving Environment

14.14 In terms of waste management, the receiving environment is largely defined by South Dublin County Council (SDCC) as the local authority responsible for setting and administering waste management activities in the area. This is governed by the requirements set out in the Eastern-Midlands Region (EMR) Waste Management Plan 2015 – 2021.

14.15 The waste management plan sets the following targets for waste management in the region:

- A 1% reduction per annum in the quantity of household waste generated per capita over the period of the plan;
- Achieve a recycling rate of 50% of managed municipal waste by 2020; and
- Reduce to 0% the direct disposal of unprocessed residual municipal waste to landfill (from 2016 onwards) in favour of higher value pre-treatment processes and indigenous recovery practices.

14.16 The Regional Plan sets out the strategic targets for waste management in the region and sets a specific target for C&D waste of "*70% preparing for reuse, recycling and other recovery of construction and demolition waste*" (excluding natural soils and stones and hazardous wastes) to be achieved by 2020. The National Waste Statistics update published by the EPA in October 2019 identifies that Ireland's current progress against this C&D waste target is at 71% and our progress against 'Preparing for reuse and recycling of 50% by weight of household derived paper, metal, plastic & glass (includes metal and plastic estimates from household WEEE)' is at 45%. Both of these targets are required to be met by 12 December 2020 in accordance with the requirements of the Waste Framework Directive.

14.17 The *South Dublin County Council Development Plan 2016 – 2022* sets out a number of objectives and actions for the South Dublin area in line with the objectives of the waste management plan.

14.18 Waste objectives and actions with a particular relevance to the Proposed Development are as follows:

Objectives:

- **IE5 Objective 1:** To support the implementation of the Eastern–Midlands Region Waste Management Plan 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.

Actions:

- Support and facilitate the separation of waste at source into organic and non-organic streams or other waste management systems that divert waste from landfill and maximise the potential for each waste type to be re-used and recycled or composted and divert organic waste from landfill, in accordance with the National Strategy on Biodegradable Waste (2006).
- Implement the objectives of the National Waste Prevention Programme at a local level with businesses, schools, householders, community groups and within the Council's own activities.
- Promote an increase in the amount of waste re-used and recycled consistent with the Regional Waste Management Plan and Waste Hierarchy and facilitate recycling of waste through adequate provision of facilities and good design in new developments.
- Implement the South Dublin Litter Management Plan 2015 - 2019).

14.19 In terms of physical waste infrastructure, three municipal solid waste landfills remain operational in the Eastern Midlands Region (EMR) and are all operated by the private sector. There are a number of other licensed and permitted facilities in operation in the EMR including waste transfer stations, hazardous waste facilities and integrated waste management facilities. There are two existing thermal treatment facilities, one in Duleek, Co. Meath and a second facility in Poolbeg in Dublin.

Characteristics of the Proposed Development

14.20 The Proposed Development is described in detail in Chapter 2 (Description of the Proposed Development) of this EIA Report. The aspects relevant to this chapter are described in the following sections.

Construction Phase

14.21 The construction of foundations for the GIS substation, and Client Control Building, the 49kVa cable installation, the two underground single circuit 110kV transmission lines, will require the excavation of made ground, topsoil, subsoil and possibly bedrock (if encountered).

14.22 The optimum depth of excavation required to facilitate installation of the 110kV ducting for the transmission line is 1.3m below ground level (bgl) but may increase to up to c. 3.5m at utility crossings. The typical width of each trench is 0.85m, however this may vary depending on ground conditions and existing services.

14.23 The optimum depth of excavation required to facilitate installation of the ducting for the 49kVa cable installation is c. 0.95-1m below ground level (bgl). The optimum width of each trench is c.0.525m, however this may vary depending on ground conditions and existing services to up to c. 1-2m.

14.24 Horizontal directional drilling is proposed for a c. 100m length of the 110kV transmission line from the Kilmahud-Corkagh circuit. The location of the directional drilling is under the culverted Griffeen River where the 110kV transmission line from the Kilmahud-Corkagh circuit crosses under the New Nangor Road. The depth of the drilling is expected to be c. 6m in depth and require four separate directional drillings that will be c. 1m apart.

14.25 CSEA have estimated that c. 24,300m^3 of excavated material will be generated, i.e. c. 2,000m^3 of made ground (predominantly tarmacadam, concrete and engineering fill) and c. 22,300m^3 of soils/stones (refer to Table 14.1). Suitable soils and stones will be reused on site as backfill in the grassed areas, where possible. However, it is currently envisaged that majority of the excavated material will require removal offsite. The importation of fill materials will be required for construction of foundations and to reinstate the trenches. This fill material will be specified by the Operator, and is designed such that the maximum amount of protection is afforded to the electrical infrastructure beneath it.

14.26 The surplus excavated material will be removed off-site either as 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 will be done in accordance with Article 27 of the *European Communities (Waste Directive) Regulations 2011*. EPA agreement will be obtained before re-using the excess soils as a by-product. However, it is not currently anticipated that any excavated material will be removed offsite for reuse as a by-product.

14.27 If any excavated material requires removal from site and is deemed to be a waste, removal and reuse/recycling/recovery/disposal of the material will be carried out in accordance with the *Waste Management Act 1996* (as amended), the *Waste Management (Collection Permit) Regulations 2007*

(as amended) and the *Waste Management (Facility Permit & Registration) Regulations 2007* (as amended). The volume of waste requiring recovery/disposal will dictate whether a Certificate of Registration (COR), permit or licence is required by the receiving facility.

14.28 A geotechnical site investigation was conducted at the site in May 2019 by IGSL Limited on behalf of O'Connor Sutton Cronin that informed the permitted development under Reg. Ref. SD20A/0121. The ground investigation report shows there was no evidence of subsurface contamination encountered during the site investigation works. It is not anticipated that subsurface contamination will be encountered along the proposed services routes.

14.29 Nonetheless, in order to establish the appropriate reuse, recovery and/or disposal route for the surplus soils and stones to be removed off-site as a waste, it will first need to be classified. The material will initially need to be classified as hazardous or non-hazardous in accordance with the EPA publication Waste Classification – List of Waste & Determining if Waste is Hazardous or Non-Hazardous. Environmental soil analysis will be carried out on a number of representative soil samples for a range of parameters to allow the soil to be accurately classified as hazardous or non-hazardous. In addition, soil analysis will also be carried out in accordance with the requirements for acceptance of waste at landfills (Council Decision 2003/33/EC Waste Acceptance Criteria). This legislation sets limit values for acceptance of waste at landfills based on properties of the waste including potential pollutant concentrations and leachability. (Note: Clean inert soils and stones excavated from greenfield sections of the route would generally not require classification/testing but would require a letter of suitability to be provided to the receiving facility.)

14.30 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.

14.31 It is expected that wastes generated (other than excavated material and trees/shubbery) from other construction activities will be negligible and will generally comprise waste generated from construction workers. These wastes would generally be organic/food waste, dry mixed recyclables (waste paper, newspaper, plastic bottles, packaging, aluminium cans, tins and Tetra Pak cartons), mixed non-recyclables and potentially sewage sludge from temporary welfare facilities provided at the site compound during the construction phase. Waste printer/toner cartridges, waste electrical and electronic equipment (WEEE) and waste batteries may also be generated infrequently from site offices. The welfare facilities and site office for the Proposed Development will be located in a site compound on an existing data centre site to the south of the Proposed Development where construction works are currently ongoing.

14.32 Further detail on the waste materials likely to be generated during the excavation and construction works are presented in the project-specific C&D WMP included as Chapter 14 - Appendix 14.1. The C&D WMP provides an estimate of the main waste types likely to be generated during the construction phase of the Proposed Development and these are summarised in Table 14.1. Volumes of surplus excavated material are based on estimates by the project engineers CSEA.

Table 14.1 Estimates for construction waste

Waste Type	Tonnes
Soils & Stones	22,300
Made ground (tarmacadam, concrete and engineering fill)	2,000
Trees/shrubbery	10
Other	10
Total	**24,320**

14.33 It should be noted that until final materials and detailed construction methodologies have been confirmed it is difficult to predict with a high level of accuracy the construction waste that will be generated from the construction of the Proposed Development as the exact materials and quantities may be subject to some degree of change and variation during the construction process. However, the above estimates are considered to be the worst-case scenario.

14.34 A Draft Construction Environmental Management Plan (CEMP) has been prepared to accompany the planning application by CSEA Consulting Engineers. The appointed main contractor will be required

to prepare a detailed CEMP prior to commencement of construction which may refine the above waste estimates.

Operational Phase

14.35 Once operational, it is anticipated that a very small amount of waste will be generated at the GIS substation building from ESB networks staff during their inspections and maintenance works.

14.36 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.

Potential Impacts of the Proposed Development

14.37 This section details the potential waste impacts associated with the Proposed Development.

Construction Phase

14.38 As detailed in Section 14.25 of this Chapter, the Proposed Development will generate surplus excavated material, as well as waste from the welfare facilities and site office at the site compound.

14.39 Surplus excavated material classified as waste (as opposed to a by-product) will be segregated at source and transferred directly from site by a suitably permitted waste contractor(s) to suitably authorised receiving facilities.

14.40 Waste materials generated at the site compound from the welfare facilities and site office will be temporarily stored in dedicated receptacles at the site compound pending collection by a suitably permitted waste contractor(s). The waste storage area will need to be easily accessible to waste collection vehicles.

14.41 If waste material is not managed and stored correctly on the site or at the site compound, it is likely to lead to litter or pollution issues at site, site compound and/or on adjacent properties. The knock-on effect of litter issues is the presence of vermin on the site, site compound and the surrounding areas. Waste material will be appropriately managed on site so as to avoid these issues.

14.42 The use of non-permitted waste contractors for transportation or unauthorised receiving facilities could give rise to inappropriate management of waste and result in negative environmental impacts or pollution. Removal and reuse/recycling/recovery/disposal of waste material from site will be carried out in accordance with the Waste Management Act 1996 (as amended), the Waste Management (Collection Permit) Regulations 2007 (as amended) and the Waste Management (Facility Permit & Registration) Regulations 2007 (as amended). 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.

14.43 Wastes will be collected by a suitably permitted contractor(s) and be transferred to suitably registered/permitted/licenced waste facilities for processing and segregation, reuse, recycling, recovery and/or disposal. There are numerous authorised waste facilities in the Leinster region which can accept non-hazardous and hazardous waste materials and acceptance of waste from the Proposed Development would be in line with daily activities at these facilities. At present, there is sufficient capacity for the acceptance of the predicted construction waste materials at facilities in the region.

14.44 Where offsite reuse of the wastes generated is not feasible, recycling and/or recovery of the waste will be carried where possible. Recovery and recycling of construction waste has a positive impact on sustainable resource consumption, for example where waste trees/shrubbery is mulched into a landscaping product or waste asphalt is recycled for use in new pavements. The use of recycled materials, where suitable, reduces the consumption of natural resources.

14.45 There is a quantity of material (made ground and soils and stones) which will need to be excavated to facilitate the Proposed Development. Clean inert soils and stones excavated will be reused on site as backfill, where practical. In the event that potentially contaminated material is encountered, correct classification and segregation of the excavated material is required to ensure that any potentially contaminated materials are identified and handled in a way that will not impact negatively on the health

and safety of workers as well as on the receiving environment, both on and off-site. Contaminated material will need to be removed off-site for appropriate treatment and/or disposal.

14.46 Reuse of suitable clean inert excavated material onsite, where practical, will reduce consumption of natural quarry resources.

14.47 The potential effect of construction waste generated from the Proposed Development is considered to be ***short-term*** and ***not significant***.

Operational Phase

14.48 No waste will be generated from the operation of the proposed 110kV transmission line, and 49kVa cable line.

14.49 Small volumes of waste will be generated at the proposed Clutterland substation. The potential impacts on the environment of improper, or a lack of, waste management during the operational phase would be a diversion from the priorities of the waste hierarchy which would lead to small volumes of waste being sent unnecessarily to landfill.

14.50 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 in recycled products (e.g. paper mills and glass recycling).

14.51 The waste materials generated on a weekly basis will require site storage within the substation prior to collection by an authorised waste contractor. Waste collection vehicles will be required to service the development on a regular basis to remove waste.

14.52 If waste material is not managed and stored correctly, it is likely to lead to litter or pollution issues at the development and on adjacent developments. The knock-on effect of litter issues is the presence of vermin within the development and the surrounding areas.

14.53 The use of non-permitted waste contractors or unlicensed facilities could give rise to inappropriate management of waste and result in negative environmental impacts or pollution. It is essential that all waste materials are dealt with in accordance with regional and national legislation, as outlined previously, and that time and resources are dedicated to ensuring efficient waste management practices.

14.54 The potential impact of operational waste generation from the development is considered to be ***long-term, negative*** and ***not significant***.

Do Nothing Scenario

14.55 If the Proposed Development was not to proceed there would be no additional construction or operational waste generation at the site until such time as an alternative development to facilitate provision of permanent power supply to the site is granted permission and constructed..

Remedial and Mitigation Measures

14.56 This section outlines the measures that will be employed in order to reduce the amount of waste produced, manage the wastes generated responsibly and handle the waste in such a manner as to minimise the effects on the environment.

Construction Phase

14.57 A project specific outline C&D WMP has been prepared in line with the requirements of the *Best Practice Guidelines for the Preparation of Waste Management Plans for Construction and Demolition Projects* guidance document issued by the Department of Environment, Heritage and Local Government (DoEHLG). Adherence to the high-level strategy presented in this C&D WMP will ensure effective waste management and minimisation, reuse, recycling, recovery and disposal of waste material generated during the construction phase of the Proposed Development. Prior to commencement of construction, the contractor(s) will be required to refine/update this document to detail specific measures to minimise waste generation and resource consumption and provide details of the proposed waste contractors and destinations of each waste stream.

14.58 The project engineers, CSEA, have estimated that 24,300m^3 of excavated material will be generated. Suitable soils and stones will be reused on site as backfill in the grassed areas, where possible. However, it is currently envisaged that majority of this material will require removal offsite. It will be reused offsite where practical and where it cannot be reused, it will be recycled/recovered.

14.59 In addition, the following mitigation measures will be implemented:

- On-site segregation of waste materials will be carried out to increase opportunities for off-site reuse, recycling and recovery – it is anticipated that the following waste types, at a minimum, will be segregated:
  - Made ground
  - Soils and stones
  - Trees/shrubbery
  - In addition, the following wastes will be segregated at the site compound:
    - Organic (food) waste
    - Packaging (paper/card/plastic)
    - Mixed dry recyclables
    - Mixed non-recyclable waste
- All excavations will be carefully monitored by a suitably qualified person to ensure that potentially contaminated soil is identified and segregated, if encountered. In the event that any potentially contaminated material is encountered, it will 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, which establishes the criteria for the acceptance of waste at landfills.
- Waste materials generated at the site compound will be stored in suitable receptacles in designated areas of the site compound;
- Any hazardous wastes generated (such as chemicals, solvents, glues, fuels, oils) will also be segregated and will be stored in appropriate receptacles (in suitably bunded areas, where required);
- A waste manager will be appointed by the main contractor to ensure effective management of waste during the excavation and construction works;
- All construction staff will be provided with training regarding the waste management procedures;
- All waste leaving site will be reused, recycled or recovered where possible to avoid material designated for disposal;
- All waste leaving the site will be transported by suitable permitted contractors and taken to suitably registered, permitted or licenced facilities; and
- All waste leaving the site will be recorded and copies of relevant documentation maintained.

14.60 As surplus soils and stones will require removal from site, any nearby sites requiring clean fill material will be contacted to investigate reuse opportunities for clean and inert material, which requires removal off-site. If any of the material is to be reused on another site as by-product (and not as a waste), this will be done in accordance with Article 27 of the *EC (Waste Directive) Regulations (2011)* as previously referred to in this chapter, and detailed in the C&D WMP (Chapter 14 - Appendix 14.1).

14.61 These mitigation measures will ensure that the waste arising from the construction phase of the development is dealt with in compliance with the provisions of the *Waste Management Act 1996*, as amended, associated Regulations, the *Litter Pollution Act 1997 to 2009* and the *EMR Waste Management Plan (2015 - 2021)*. It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved and will encourage sustainable consumption of resources.

Operational Phase

14.62 Small volumes of waste will be generated at the proposed GIS substation. No waste will be generated from the operation of the proposed 110kV transmission lines and 49kVa cable installation.

14.63 Any waste materials will be segregated into appropriate categories and will be temporarily stored in appropriate bins or other suitable receptacles in a designated, easily accessible areas of the substation.

14.64 In addition, the following mitigation measures will be implemented:

- On-site segregation of all waste materials into appropriate categories including (but not limited to):
  - Dry Mixed Recyclables;
  - Organic food/green waste;

- Mixed Non-Recyclable Waste;
- Batteries (non-hazardous and hazardous);
- Waste electrical and electronic equipment (WEEE) including computers, printers and other ICT equipment; and
- Cleaning chemicals (solvents, pesticides, paints, adhesives, resins, detergents, etc.).

• All waste materials will be stored in colour coded bins or other suitable receptacles in designated, easily accessible locations. Bins will be clearly labelled with the approved waste type to ensure there is no cross contamination of waste materials;
• All waste collected from the development will be reused, recycled or recovered where possible, with the exception of those waste streams where appropriate facilities are currently not available;
• All waste leaving the site will be transported by suitable permitted contractors and taken to suitably registered, permitted or licensed facilities; and
• All waste leaving the site will be recorded and copies of relevant documentation maintained.

14.65 These mitigation measures will ensure the waste arising from the development is dealt with in compliance with the provisions of the *Waste Management Act 1996*, as amended, associated Regulations, the *Litter Pollution Act 1997* and the *EMR Waste Management Plan (2015 - 2021)*. It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved.

Predicted Impacts of the Proposed Development.

14.66 This section describes the predicted impact of the Proposed Development following the implementation of the remedial and mitigation measures.

Construction Phase

14.67 A carefully planned approach to waste management as set out in Sections 14.57 – 14.61 and adherence to the outline C&D WMP during the construction and demolition phase will ensure that the impact on the environment will be ***short-term, neutral*** and ***imperceptible***.

Operational Phase

14.68 During the operational phase, a structured approach to waste management as set out in Sections 14.62 – 14.65 will promote resource efficiency and waste minimisation. Provided the mitigation measures are implemented and a high rate of reuse, recycling and recovery is achieved, the predicted impact of the operational phase on the environment will be ***long-term, neutral*** and ***imperceptible***.

Residual Impacts

14.69 Adherence to the mitigation measures outlined in Sections 14.55 - 14.65 will ensure that there are no significant impacts on resource or waste management from the Proposed Development. The management of waste during the construction phase in accordance with the Construction & Demolition Waste Management Plan (C&D WMP) and during the operational phase in accordance with the mitigation measures will meet the requirements of regional and national waste legislation and promote the management of waste in line with the priorities of the waste hierarchy. The residual impact will be ***neutral*** and ***imperceptible***.

14.70 The cumulative impact assessment is addressed in Chapter 16 of this EIA Report. Interactions are addressed in Chapter 17 of this EIA Report.

15. MATERIAL ASSETS

Introduction

15.1 This chapter evaluates the impacts, if any, which the Proposed Development may have on Material Assets as defined in Directive 2014/52/EU, the EPA Draft EIA Report Guidelines 2017 and EPA Draft Advice Notes for EIS 2015.

Methodology

15.2 The chapter includes 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.

15.3 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. In this EIA Report, the impacts on some of the material assets described above have been considered in the following chapters:

- Chapter 5, Population and Human Health;
- Chapter 10, Air Quality & Climate;
- Chapter 12, Traffic & Transportation; and
- Chapter 14, Waste Management.

15.4 The European Commission Guidance on Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report (2017) 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 of this EIA Report:

- Chapter 7, Land, Soils, Geology & Hydrogeology; and
- Chapter 8, Hydrology.

15.5 This chapter assesses ownership and access (including buildings and other structures), built services and infrastructure. The potential impacts on built services and infrastructure, if any, are assessed in terms of the following:

- Power and Electricity supply;
- Telecommunications;
- Surface water infrastructure;
- Foul drainage infrastructure; and
- Water supply.

15.6 The Proposed Development will not impact on any other structures. Assessment of impact on utilities has been undertaken by confirmation of supply with the various key utility suppliers of South Dublin County Council (SDCC), Eirgrid, ESB Networks, and Irish Water (IW). Mitigation measures are proposed where required

Ownership and access

15.7 The EPA Draft Advice Notes 2015 refer to the need to consider the ownership and accessibility of the site. This section addresses ownership and accessibility of the site for the Proposed Development.

15.8 The site of the Proposed Development as described in Chapter 2 Description of the Proposed Development is under the following ownership:

- GIS substation compound and the majority of the 110kV transmission line to the Castlebaggot substation, and c. 450m of the 110kV transmission line to the Kilmahud-Corkagh circuit is within lands that are being purchased by UBC Properties LLC (the applicant) from SDCC but remain in the ownership of SDCC;

- The rest of the 110kV transmission line to the Kilmahud-Corkagh circuit continues through SDCC lands outside the Permitted Development site and along a wayleave through the Grange Castle Business Park;
- The lands for the remaining portion of the 110kV transmission line route to the existing Castlebaggot substation are owned by the TAO (ESB Networks);
- The 49kVa cable installation route is mostly within the Permitted Development site that are being purchased by UBC Properties LLC (the applicant) from SDCC, but remain in SDCC ownership, with its connection into existing infrastructure being within the Grange Castle South Business Park lands owned by SDCC.

15.9 Letters of consent, to apply for development on the lands have been obtained from ESB Networks and SDCC and are included with the Proposed Development planning application documents.

15.10 As detailed in Chapter 2, the GIS substation compound is located within the overall Permitted Development site (Reg. Ref. SD20A/0121). Figure 2.1 in Chapter 2 illustrates the lands being purchased by the Applicants, which is the main data centre and substation site area. It is intended that the commencement of construction of Building A, as part of the first phase of the development of this site, will commence in Q4 2020.

15.11 The main access to the GIS substation compound will be via the permitted main access-controlled entrance from the Grange Castle South Business Park access road to the south. A secondary access is located to the east of the main access and to the immediate west of the Castlebaggot substation compound. This will also be accessed from the Grange Castle South Business Park access road to the south. The Permitted Development site will be fully secured with a 3m high security fence, CCTV and surveillance systems with a 2.6m high fence around the proposed 110kV GIS substation compound. There is good visibility on approach to both access points as detailed in Chapter 12 - Traffic and Transportation.

Receiving environment

15.12 The proposed drainage infrastructure has been described in Chapter 2 (Description of the Proposed Development) and Chapter 8 (Hydrology). Detailed water supply and drainage design information is provided in the stand alone Engineering Services Report, prepared by CSEA Consulting Engineers, which accompanies the planning application. The associated built services and infrastructure in the vicinity of the site are summarised in the following sections.

Power and electrical supply

15.13 The availability of power is a key consideration in site selection for the permitted data centre developments of Buildings A, B and C. One of the key reasons the site was chosen for the Permitted Development was the relative proximity to the existing Castlebaggot substation and the Kilmahud-Corkagh circuit. Interim power demand for the Permitted Development, and power for the Proposed Development will be provided by a connection through existing ducting and cables to the east of the Proposed Development site and described in more detail within Chapter 2 of this EIA Report (see paragraph 2.104).

Telecommunications

15.14 A fibre optic cable distribution network will be installed within the site for the Permitted Development to serve Buildings A, B and C. The connection into the wider telecommunications network will be undertaken by a statutory telecommunications operator. The requirement for telecoms is minor for this Proposed Development and there is sufficient capacity in the network already being installed for the Permitted Development.

Surface water infrastructure

15.15 There is existing surface water drainage system running along the R134, Baldonnel Road and the Grange Castle South access road. An open stream bounds the site to the north and the site is serviced by a surface water sewer to the west. The stream to the north has a South Dublin County Council requirement of a 10m Riparian corridor along the length of the stream. This equates to a 10m wide zone on either side of the top of the banks of the stream. No development is therefore permitted in this zone. The Site Specific Flood Risk assessment by AWN Consulting forms an appendix of this EIA Report (see Chapter 8 - Appendix 8.2) and reviews the existing, permitted and proposed surface water environment.

15.16 The surface water drainage infrastructure for the Permitted Development was designed to accommodate surface water drainage from the Proposed Development, (SDCC Ref. SD20A/0121). The Proposed Development will connect to surface water pipe network permitted under SDCC Planning Ref. SD20A/0121. This pipe network discharges to a permitted attenuation basin to the east of the site which has been designed to facilitate the Proposed Development. As such, there is capacity for the Permitted Development to accommodate runoff from the Proposed Development. This attenuation basin will ultimately outfall into the Baldonnel Stream to the immediate north of the eastern attenuation pond.

15.17 The proposed and permitted Surface Water Drainage layout relating to the proposed substation part of the Proposed Development site is indicated on Drawing No. CLDHV -CSE-00-DR-C-2110 that forms part of the drawing package by CSEA Consulting Engineers submitted with this application. The detail design outlined within the Engineering Services Report undertaken by CS Consulting under the Permitted Development forms an appendix of the Engineering Planning Report (Ref. RPT-20_055-006) submitted by CSEA Consulting Engineers under this application

Foul drainage infrastructure

15.18 The Proposed Development will connect to a foul water network permitted under Reg. Ref. SD20A/0121. This permitted gravity pipe network outfalls to the 375mm diameter Irish Water foul sewer to the south east of the site.

15.19 As noted in Chapter 2 (Description of the Development), a pre-connection enquiry (PCE) form was submitted to Irish Water (IW) as part of the Permitted Development application (Reg. Ref. SD20A/0121) which as well as addressing the water demand for the Permitted Development also addressed water demand for the Proposed Development. IW provided a confirmation of feasibility (CoF) for the development on the 20th May 2020 (IW Reference Number: CDS20000724).

15.20 As detailed in the *Engineering Planning Report – Drainage and Water Services*, prepared by CSEA, the estimated average daily foul water demand for the Proposed Development has been determined by CSEA to be 1 litre per day which represents a negligible volume in terms of the volume permitted by IW for the entire landholding.

15.21 Welfare facilities (canteen, toilets etc.) will be available within the construction compound for the construction of Building A and it is proposed that can be utilised for the c. 15 – 30 staff required for the construction phase of the Proposed Development.

15.22 The allowance is based on a single toilet and tea -station. The demand from the Proposed Development on wastewater infrastructure will not affect the ability of any existing or future developments in the area to access wastewater discharge.

Water supply

15.23 The water demand for the Proposed Development will be minimal. The Proposed Development will connect to a water main permitted under Reg. Ref. SD20A/0121. The water main is connected to the 150mm diameter Irish Water supply to the west of the overall site. The proposed Water Supply Network is indicated on Drawing no. CLDHV-CSE-00-DR-C-2112, prepared by CSEA Consulting Engineers and included in the planning documentation pack as part of the Proposed Development planning application documentation. The Proposed Development will be served by fire hydrants connected to the permitted water main network which are connected to a permitted 400cum fire sprinkler tank.

15.24 A pre-connection enquiry (PCE) form was submitted to Irish Water (IW) as part of the Permitted Development application (Reg. Ref. SD20A/0121) which as well as addressing the water demand for the Permitted Development also addressed water demand for the Proposed Development. IW provided a confirmation of feasibility (CoF) for the development on the 20th May 2020 (IW Reference Number: CDS20000724).

15.25 The allowance for the Proposed Development is minimal and is based on a single toilet and tea -station. The demand from the Proposed Development on water supply will not affect the ability of any existing or future developments in the area to access water through this water supply

Characteristics of the Proposed Development

Construction phase

Power and Electrical Supply

15.26 During construction, contractors will require power for heating and lighting of the site and their onsite construction compound. In addition, on site construction equipment/plant will require power. The construction compound and temporary power supply established for the construction of Building A of the Permitted Development will be utilised for the Proposed Development. The power requirements for the construction phase will be relatively minor.

15.27 The excavation of trenches within the vicinity of existing electrical services will be carried out in consultation with ESB Networks to ensure that there is no impact on existing users. Once the construction of the Proposed Development is completed, ESB Networks personnel will be mobilised to complete the commissioning.

Telecommunications

15.28 Telecommunications including fibre required during the construction phase will be provided via a temporary mobile connection. The fibre optic cable distribution network for the permitted Building A development will be extended to the GIS substation. The proposed 110kV transmission line, 49kVa cable installation will not require the provision of telecommunications services. The extension of the network within the overall landholding will have a temporary imperceptible effect on the environment.

Surface water and foul drainage infrastructure and water supply

15.29 The route of the 110kV transmission line to the Kilmahud-Corkagh circuit traverses an existing culverted part of the Griffeen River. It is proposed to cross under this culvert via horizontal directional drilling (HDD). The use of HDD methodology removes the potential for hydrological pathways and as such impacts on the Griffeen River. The implementation of construction mitigation measures detailed in Chapter 2 will ensure that there is no predicted impact on the Griffeen River.

15.30 If any stormwater collects in the trenches during construction, it will need to be discharged to the sewer network. Any discharge water will be treated using a siltbuster or similar to remove suspended solids prior to discharge.

15.31 Welfare facilities (canteens, toilets etc.) will be available within the construction compound for the construction of Building A and it is proposed that they can be utilised for the small number of staff required for the construction phase of the Proposed Development. The increase in water demand and wastewater discharges, if any, will be imperceptible and will not affect existing users.

Operational phase

Power and electrical supply

15.32 The Proposed Development will supply the permanent power supply to the adjacent data centre development. The Proposed Development includes a 49kVA house supply which will supply the GIS substation.

Telecommunications

15.33 There is sufficient capacity available in the network to accommodate the Proposed Development.

Surface Water and Foul Drainage Infrastructure and Water Supply

15.34 Rainwater runoff from the proposed 110kV GIS substation compound will discharge to the surface water drainage network for the Permitted Development (Reg. Ref. SD20A/0121). As discussed in paragraphs 15.15 – 15.17, the surface water drainage network for the Permitted Development was designed to accommodate surface water drainage from the Proposed Development.

15.35 Full details of the surface water infrastructure of the Proposed Development are provided within the Engineering Planning Report, prepared by CSEA Consulting Engineers that accompanies the application for the Proposed Development. The Permitted Development contains 'forebays' through which storm water will pass to further aid in the removal of deleterious material in line with best practice. The drainage design also includes oil separator interceptor systems to ensure the quality of storm water discharge is controlled prior to attenuation and discharge offsite.

15.36 The attenuated storm water will be discharged at the SDCC allowable greenfield run off rate of 2.0 l/s/ha. to the existing storm water system as was permitted under the Permitted Development (see Chapter 2 – Description of the Proposed Development and Chapter 8 – Hydrology for further details). The attenuation design granted under the Permitted Development allowed for the Proposed Development in its calculations.

15.37 Chapter 8 Hydrology addresses the impacts of the Proposed Development on storm water drainage. The underground single circuit 110kV transmission lines from the proposed substation to the existing Castlebaggot 220kV / 110kV substation and to the Kilmahud-Corkagh circuit, the underground 49kVa cable installation from the existing cabling to the south of the site do not require any surface water drainage infrastructure.

15.38 Once operational, a small number of ESB Networks staff will undertake operational activities from the substations with only interim inspections required along the underground 110kV transmission lines and 49kVa cable installation. Two ESB maintenance staff will carry out a routine inspection of the 49kVa and 110kV cable installations one year after completion and once every three years thereafter.

15.39 Domestic effluent arising from the welfare facilities for staff at the GIS substation building will be collected in the permitted foul drainage network within the site and discharged to the local foul drainage network. The wastewater discharged from the site will ultimately discharge to the municipal Waste Water Treatment Plant (WWTP) at Ringsend. The wastewater contribution from the Proposed Development will be minimal. Chapter 6 Hydrology addresses the impacts on foul water drainage.

15.40 The underground single circuit 110kV transmission lines from the proposed substation to the existing Castlebaggot 220kV110kV substation and to the Kilmahud Corkagh circuit, the underground 49kVa cable installation from the existing cabling to the south of the site; and by the nature of the developments, will not generate any wastewater and as such do not require any foul drainage infrastructure.

15.41 Water will be required for the welfare facilities for staff at the GIS substation. This will be provided via a connection to the watermain for the permitted Building A development. The water demand for the Proposed Development will be minimal. Chapter 8 Hydrology addresses the impacts on water supply.

15.42 By nature of the developments, the underground single circuit 110kV transmission lines from the proposed substation to the existing Castlebaggot 220kV110kV substation and to the Kilmahud Corkagh circuit, the underground 49kVa cable installation from the existing cabling to the south of the site, do not require any water supply.

Potential impacts of the Proposed Development

Construction phase

Power and electrical supply

15.43 The construction compound and temporary power supply that will be established for the construction of Building A will be utilised for the Proposed Development. The power requirements for the construction phase will be relatively minor and therefore the power demand for the construction phase would have a potential ***short-term, neutral, imperceptible*** impact.

15.44 The excavation of trenches within the vicinity of existing electrical services will be carried out in consultation with ESB Networks to ensure there is no impact on existing users.

Telecommunications

15.45 Telecommunications including fibre required during the construction phase will be provided via a mobile connection. A fibre optic cable distribution network will be installed within the site, for the entire Permitted Development to serve Buildings A, B and C.

15.46 As the connection works required by the Proposed Development are entirely within permitted and proposed site boundaries, there will be no potential offsite impact. There are no potential impacts associated with telecommunications for the Proposed Development for the construction phase.

Surface water infrastructure

15.47 As discussed earlier in this chapter, the surface water drainage network for the Permitted Development was designed to accommodate surface water drainage from the Proposed Development. As such, there is capacity for the Permitted Development to accommodate surface water runoff from the Proposed Development and no potential impacts on the surface water infrastructure.

15.48 The route of the 110kV transmission line to the Kilmahud-Corkagh circuit traverses under an existing culverted part of the Griffeen River. The transmission line will pass beneath the culvert by way of horizontal directional drilling (HDD). Chapter 8 Hydrology addresses the impacts on the River associated with this transmission line. There are no predicted impacts on the Griffeen River. There are no potential impacts associated with surface water infrastructure for the Proposed Development for the construction phase.

15.49 The potential impact associated with surface water for the construction phase is ***short-term, neutral and imperceptible***.

Foul drainage infrastructure

15.50 Welfare facilities (canteens, toilets etc.) will be available within the construction compound for the permitted data centre development on the site approved under Reg. Ref. SD20A/0121 and it is proposed that it can be utilised for the small number of staff required for the construction phase of the Proposed Development. The increase in wastewater discharges, if any, will be imperceptible and will not affect existing users. There may be a requirement to discharge stormwater collected in the trenches for the 110kV transmission lines and/or 49kVa cable installation to sewer. Any discharge water will be treated using a siltbuster or similar to remove suspended solids to ensure there is no impact on the foul drainage network. There will be no impact from construction works on the existing foul sewer network during construction.

15.51 The connection to the existing foul drainage network is entirely within the red line boundary of the site. It not anticipated that the connection to this sewer would have any offsite impact. The potential impact associated with foul drainage for the construction phase is ***short-term, neutral and imperceptible***.

Water supply

15.52 Welfare facilities (canteens, toilets etc.) will be available within the construction compound for the permitted data centre development on the site approved under Reg. Ref. SD20A/0121 and it is proposed that it can be utilised for the small number of staff required for the construction phase of the Proposed Development. The increase in water demand, if any, will not be significant enough to impact existing users.

15.53 The potential impact associated with water supply for the construction phase is ***short-term, neutral and imperceptible.***

Operational phase

Power and electrical supply

15.54 The proposed 110kV GIS substation, 110kV transmission lines are designed to support power demand for Buildings A, B and C within the overall landholding. The 49kVa cable installation is intended to provide a house power supply to the proposed GIS substation. In this instance the nature of the Proposed Development ensures that rather than utilising electricity, the Proposed Development will ensure continuity of supply of electricity to the Permitted Development.

15.55 There are **no potential impacts** associated with power and electrical supply for the Proposed Development for the operational phase.

Telecommunications

15.56 There are ***no potential impacts*** associated with telecommunications for the Proposed Development for the operational phase as outlined in paragraph 2.34 of Chapter 2.

Surface water

15.57 It is proposed to collect the surface water runoff from the Proposed Development and discharge an attenuated flow via two of the four proposed attenuation ponds and their associated forebays permitted

under Reg. Ref. SD20A/0121 to its immediate north and east into the Baldonnel Stream and the existing surface water drainage network. The surface water drainage network for the Permitted Development was designed to accommodate surface water drainage from the Proposed Development. As such, there is capacity for the Permitted Development to accommodate runoff from the Proposed Development.

15.58 The underground single circuit 110kV transmission lines from the proposed substation to the existing Castlebaggot 220kV / 110kV substation and to the Kilmahud-Corkagh circuit, the underground 49kVa cable installation from the existing cabling to the south of the site; do not require any surface water drainage infrastructure. The cable installations are underground and the joint bays will be constructed on a primarily permeable gravel surface.

15.59 There are no potential impacts associated with surface water infrastructure for the Proposed Development for the operational phase.

Foul drainage infrastructure

15.60 Domestic effluent arising from the welfare facilities at the GIS substation will be minimal and will be collected within the permitted foul drainage network within the site and discharged to the local foul drainage network. The underground single circuit 110kV transmission lines from the proposed substation to the existing Castlebaggot 220kV / 110kV substation and to the Kilmahud-Corkagh circuit, the underground 49kVa cable installation from the existing cabling to the south of the site; do not require any foul drainage infrastructure. There are **no potential impacts** associated with foul drainage infrastructure for the Proposed Development for the operational phase.

Water Supply

15.61 A pre-connection enquiry (PCE) form was submitted to Irish Water (IW) as part of the Permitted Development application (Reg. Ref. SD20A/0121) which as well as addressing the water demand for the Permitted Development also addressed water demand for the Proposed Development. IW provided a confirmation of feasibility (CoF) for the development on the 20th May 2020 (IW Reference Number: Reference No CDS20000724).

15.62 The underground single circuit 110kV transmission lines from the proposed substation to the existing Castlebaggot 220kV / 110kV substation and to the Kilmahud-Corkagh circuit, the underground 49kVa cable installation from the existing cabling to the south of the site; do not require any water supply. There are **no potential impacts** associated with water supply for the Proposed Development for the operational phase.

Remedial and mitigation measures

Construction phase

15.63 Construction of the proposed GIS substation will require connections to power, telecommunications, drainage infrastructure and water supply but will not require any connections outside the Permitted Development site and Proposed Development site boundaries.

15.64 Construction of the 110kV transmission lines and 49kVa cable installation will not require any power, telecommunications, drainage infrastructure and water supply from existing services.

15.65 Completed surveys have identified where short term diversion of any services will be required. Ongoing consultation with EirGrid, ESB Networks, SDCC, Irish Water and other relevant utility providers within the locality and compliance with any requirements or guidelines they may have will ensure a smooth construction schedule without disruption to the local and business community. Such diversions are common practice.

Power and Electricity Supply

15.66 The power demand for the construction phase will be relatively minor and the temporary connection works are entirely within the Permitted and Proposed Development site, and there will therefore be no offsite impact. The excavation of trenches within the vicinity of existing electrical services will be carried out in consultation with ESB Networks to ensure there is no impact on existing users. Once the construction of the Proposed Development is completed, ESB Networks will be mobilised to complete the commissioning in accordance with the ESB Network requirements. As stated in Chapter 2, there

is no requirement for chemicals usage and minimal access to the route by personnel and there is no likely environmental effect as a result of commissioning.

Telecommmunications

15.67 The telecommunications will be extended from Building A and the Permitted Development granted under Reg. Ref. SD20A/0121 to accommodate the Proposed Development. As these works are entirely within permitted and proposed site boundaries, it is predicted that there will be no offsite impact as result of these works.

15.68 No remedial or mitigation measures are required in relation to telecommunications.

Surface Water and Foul Drainage Infrastructure and Water Supply

15.69 Welfare facilities (canteens, toilets etc.) will be available within the construction compound of the Permitted Development during the construction of Building A and it is proposed that this will be in place for the construction of the Proposed Development.

15.70 No remedial or mitigation measures are required in relation to foul drainage infrastructure and water supply.

15.71 Surface water run-off water containing silt will be contained on site and treated (using a siltbuster or temporary on-site settlement ponds/tanks) to ensure adequate silt removal. The construction works will not require any interruptions to service in existing surface water sewers.

Operational phase

Power and electricity supply

15.72 The Proposed Development has been designed in accordance with ESB Networks requirements. Eirgrid has confirmed that there is sufficient power available from the existing area network for the Proposed Development.

15.73 The nature of the Proposed Development ensures that it will facilitate continuity of supply of electricity to the Permitted Development.The proposed substation will only use a minimal amount of electricity provided by the 40kVa Connection.

15.74 No remedial or mitigation measures are required in relation to power and electricity supply.

Telecommunications

15.75 As there are no potential effects on telecommunications during the operational phase of the Proposed Development, no remedial or mitigation measures are required.

Surface Water and Foul Drainage Infrastructure and Water Supply

15.76 There are no potential effects associated with surface water and foul drainage infrastructure or water supply for the Proposed Development for the operational phase and as such no remedial or mitigation measures are deemed necessary.

Predicted impacts of the Proposed Development

Construction phase

15.77 The implementation of mitigation measures detailed in paragraphs will ensure that the predicted impacts on the material assets assessed in this chapter will be ***short-term, neutral*** and ***imperceptible*** for the construction phase.

Operational phase

Power and electrical supply and Telecommuncations

15.78 The Proposed Development has been designed in accordance with the requirements of ESB Networks. Eirgrid has confirmed that there is sufficient power available from the existing area network for the Proposed Development. There are no predicted impacts associated with power and electrical supply, and telecommunications for the Proposed Development for the operational phase.

Surface Water and Foul Drainage Infrastructure and Water Supply

15.79 The surface water and foul drainage and water supply requirements for the Proposed Development have already been incorporated into the design of the surface water and foul drainage and water supply infrastructure for the Permitted Development (Reg. Ref. SD20A/0121). There are no predicted impact on water supply, surface water infrastructure and foul drainage infrastructure post construction.

Predicted impact – operational phase

15.80 The predicted impacts on power and electrical supply, telecommunications, surface water infrastructure, foul drainage infrastructure and water supply will be ***long-term, neutral*** and ***imperceptible.***

Residual impacts

15.81 The Proposed Development entails minimal use of material assets examined in this chapter (i.e. power and electrical supply, telecommunications, surface water infrastructure, foul drainage infrastructure and water supply) during construction with no impact once operational. The overall predicted residual impact of the Proposed Development can be classed as ***long-term*** and ***not significant*** with respect to material assets.

15.82 The cumulative impact assessment is assessed in Chapter 16 of this EIA Report.

15.83 Interactions are addressed in Chapter 17 of this EIA Report.

16. CUMULATIVE IMPACTS

Introduction

16.1 This chapter of the EIA Report considers the potential cumulative impacts or effects on the environment. Cumulative impacts or effects are changes in the environment that result from numerous human-induced, small-scale alterations. Cumulative impacts can be thought of as occurring through two main pathways: first, through persistent additions or losses of the same materials or resource, and second, through the compounding effects as a result of the coming together of two or more effects.

16.2 The cumulative effects are analysed in this chapter in accordance with the requirements of the EPA Draft EIA Report Guidelines 2017 and the EIA Directives (2011/92/EU and 2014/52/EU). Cumulative effects are defined in the aforementioned Guidelines as "the addition of many minor or significant effects, including effects of other projects, to create larger, more significant effects".

16.3 The chapter assesses whether the Proposed Development, when combined with other impacts (minor or significant), result in a cumulative impact that is collectively significant. (see section 3.7.3 of Draft Guidelines on the Information to be contained in Environmental Impact Assessment Reports (2017)). This chapter of the EIA Report considers the potential cumulative effects on the environment of existing, planned and permitted developments. Potential cumulative effects includes the cumulative impact of the Proposed Development with the Permitted Development granted under SDCC Reg. Ref. SD20A/0121; the MV temporary connection to be undertaken by the statutory undertaker to the east; and the ongoing construction of the Cyrus One data centre to the immediate south of the Proposed Development site

16.4 The Proposed Development is described in Chapter 2 (Description of Proposed Development) of this EIA Report.

Permitted development

16.5 The Permitted Development (SDCC Planning Ref. SD20A/0121), as described in Chapter 2 (Description of Proposed Development) of this EIA Report, received its Final Grant of permission on the 3rd September 2020. The permission, which was subject to 23 condition, was for the development of 3 no. two storey data centres and associated ancillary development with a gross floor area of 80,269sqm.

16.6 The majority of the Proposed Development is located within the Permitted Development site. The northern part of the proposed 110kV transmission line to the Kilmahud-Corkagh Circuit, from where it crosses the old Nangor Road, is the only part of the Proposed Development outside of the Permitted Development site (Please refer to Figure 2.1 in Chapter 2 of this EIA Report for a detailed plan indicating the development boundary of the Proposed and Permitted Development).

16.7 This chapter considers the potential cumulative impact of the Proposed Development with the Permitted Development of the three data centres known as Buildings A, B and C. Building A commenced construction in late Q3, 2020; with the first data hall estimated to be in operation by Q3, 2021 with Q1, 2024 targeted for full operations.

16.8 The Proposed Development is targeted to commence construction in Q2, 2021 (subject to a grant of planning permission), with completion of construction and commissioning by Q3, 2022. Therefore, the construction of Building A of the Permitted Development and the Proposed Development will be carried out concurrently.

16.9 Building B of the Permitted Development will commence construction in Q2, 2023; and Building C of the Permitted Development will commence construction in Q1, 2026. The Proposed Development will be completed prior to both the completion of Building A that commenced construction in Q3 2020; and will be completed and will be in full operation in Q1, 2024; and prior to the commencement of construction on either Building's B or C of the Permitted Development. Therefore, construction of the Proposed Development and Building's B and C of the Permitted Development will not overlap. However, the Proposed Development will be in operation and therefore there will be a cumulative impact associated with the construction phases of Buildings B and C of the Permitted Development and the Operational Phase of the Proposed Development.

16.10 The residual impacts of the Proposed Development, once operational, as set out in Chapters 4-15 of this EIA Report, are generally imperceptible with the exception of the landscape and visual effects from the wider locality, which were determined to be not significant or imperceptible. The reason for the residual magnitude of environmental impacts is that suitable mitigation measures will be implemented for the Proposed Development.

16.11 The operational phase of both the Permitted Development and the Proposed Development has the potential to cumulatively increase noise; generate additional traffic that has the potential to impact on traffic flows; and impact air quality of the area. The cumulative effect of both the operational phase of both the Permitted Development and the Proposed Development is considered to be ***not significant*** or ***imperceptible, long-term*** in duration and ***neutral*** in quality

MV temporary connection works

16.12 The MV temporary connection is required to provide the temporary power supply for Building A of the Permitted Development. These works will establish this temporary power connection through existing ducting and cables to a point near the junction of the R134 and south-eastern entrance into the Grange Castle Business Park, and will be in place prior to the construction phase of the Proposed Development.

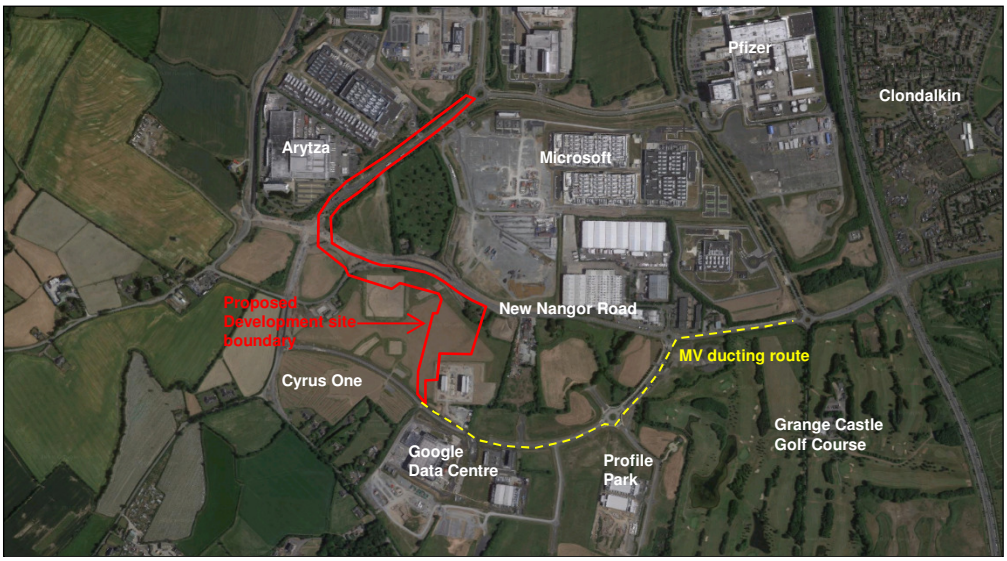

Figure 16.1 MV temporary connection route (yellow dashed line)

16.13 MV ducting along the route has already been installed as part of various permitted road works undertaken by SDCC under various Part 8 planning permissions along the New Nangor Road; by developers within Profile Park (Reg. Ref. SD06A/0568 and others) and by South Dublin County Council (SDCC) within the Grange Castle South Business Park. All of these applications were assessed and considered by the Planning Authority prior to issuing a decision to grant permission in each instance.

16.14 It is proposed that the pulling through of cables through the MV ducting will be facilitated by the creation of joint holes at the junction of the R134 and the south-east entrance into the Grange Castle Business Park; and within Profile Park. These works will commence in Q1, 2021 and will be completed in Q2, 2021. The works on the MV cable are targeted to be completed in advance of the commencement of works relating to the Proposed Development and there are therefore no cumulative impacts during the construction phase relating to the construction or operation of the Proposed Development.

16.15 The operational phase of these cable installations will be managed by ESB Networks. Operational activities will require only interim maintenance works along the underground cable route. In general, two ESB Networks maintenance staff will carry out a routine inspection of the assets one year after completion and once every three years thereafter. As the operational activities are very limited, it is considered that there will be no perceptible cumulative impact associated with the operation of the temporary MV connection and the construction or operation of the Proposed Development.

Fibre Network Installations

16.16 A fibre optic cable distribution network will be installed within the Permitted Development site to serve the Permitted Development. The fibre network will be extended to the GIS substation under this application. The connection into the wider telecommunications network will be undertaken by a statutory telecommunications operator.

16.17 There will be no environmental impacts during the operational phase of the fibre installation (i.e. once the fibre ducting is installed and the ground re-instated). The residual impacts of the Proposed Development, once operational, as set out in the chapters of this EIA Report, is generally imperceptible with the exception of the landscape and visual effects from the wider locality, which were determined to be not significant or imperceptible. Therefore, the cumulative impact of the operational phase of the fibre installation and the Proposed Development (during its construction and operational phase) is considered to be not significant or imperceptible.

Other planned and Permitted Developments

16.18 A list of other developments in the area that have been granted planning permission in the past five years, the length of a standard permission that applied to all of the permissions listed (unless stated), is provided in Chapter 3 – Planning and Development Context. This assessment considers the cumulative impacts of the Proposed Development with other permitted and committed developments in the area. This excluded small residential permissions and minor amendments to previously granted developments. Most of the permitted developments listed within Chapter 3 have been deemed to be not significant, in terms of cumulative impacts with the Proposed Development due to their lack of proximity to the Proposed Development site; and that other factors such as access points are not shared. However, there is one ongoing development with which the Proposed Development with the Permitted Development, due to its immediately adjoining nature and use of the same access road that has the potential to have a cumulative effect. The details of this development are summarised below.

CyrusOne Irish Datacentres Holdings Ltd. (Reg. Ref. SD18A/0134 / ABP Ref. ABP-302813-18)

16.19 Permission was granted by South Dublin County Council, which was upheld following a third party appeal, by An Bord Pleanála, for a two storey data centre with associated three storey office block and services that had a gross floor area of 35,426sqm on an overall site of 9.2 hectares on the lands to the immediate south of the Proposed Development site. Development commenced on this development in Q2, 2019 and the first phase of development is nearing completion. For the purposes of this cumulative assessment it is assumed that the construction of the Cyrus One development will continue throughout the construction of the Proposed Development.

Cumulative impacts

16.20 The potential cumulative effects are considered and assessed for each environmental aspect in the following sections of this chapter. Where the cumulative effects are also dealt with in the relevant Chapters within this EIA Report, this has been crossed referenced where applicable.

Population and human health

Construction phase

16.21 Building A of the Permitted Development, as set out in this Chapter as well as the ongoing construction of the CyrusOne development (refer to section 16.18 for a description of this development) will be undertaken at the same time as the 13 month construction phase of the Proposed Development. These projects will create additional employment in the area with 15-30 construction workers associated with the Proposed Development. The CyrusOne EIA Report outlined that on average 100 construction workers, and 250 at its peak, would be employed; and the EIA Report associated with the Permitted Development outlined that on average 250 construction workers, and 400 at its peak, would be employed.

16.22 The cumulative effect of all these construction activities on local businesses during the construction phase of the Proposed Development will be a ***short-term, imperceptible, positive effect***.

16.23 The potential impact of the construction of the Proposed Development on population and human health in terms of air quality and climate; as well as noise and vibration are discussed in the relevant sections of the population and human health chapter (Chapter 5 as well as the relevant Chapters 9 and 10) of this EIA Report. There is potential for an increase in dust generation; and construction noise from machinery due to the cumulative impact of all of the permitted and committed developments with the

Proposed Development. The cumulative impact of the Proposed Development on population and human health in terms of air quality and climate; as well as noise and vibration will be ***negative, short-term*** and ***not significant.***

16.24 The potential impact of the construction of the Proposed Development on population and human health in terms of Traffic & Transportation is set out in Chapter 12 of this EIA Report. The potential impact as a result of additional traffic on human health during construction relates to added congestion, noise and pollution. The ongoing nature of cumulative development will mean that there, there will be ***short-term***, ***neutral*** and ***not significant*** effect on population and human health due to traffic during the construction phase of the Proposed Development.

16.25 A number of the Permitted Developments listed in Chapter 3 generally refer to projects within the Grange Castle Business Park to the north, which due to their greater distance from the nearest residential properties will have an imperceptible effect on the local population. The predicted cumulative impact associated with the construction phases of these projects with the Proposed Development will be ***short-term*** and ***not significant.***

Operational phase

16.26 Once in full operation, the Permitted Development will coincide with that of the operational phase of the Proposed Development and Cyrus One development. The EIA Reports submitted with both applications indicated that they would employ 300 and 150 people, respectively, once in operation. The cumulative effect of these permitted developments with the Proposed Development will be a ***long-term, imperceptible, positive effect*** on local businesses.

16.27 The Proposed Development will be in Operation at the same time as the construction of the Permitted Development is ongoing, although the Cyrus One development is projected as set out under its EIA Report to have been completed and in operation by then. This will generate the potential for noise impacts associated with the construction phase of the Permitted Development to occur at the same time as the operation of other development. Due to the larger scale nature of the Permitted Development compared to the Proposed Development and other permitted and committed developments the cumulative impact as a result of such a scenario would be the same as projected under the construction phase with a ***neutral, short-term*** and ***not significant*** impact.

16.28 The assessment under Chapter 9 (Noise and Vibration) of this EIA Report undertook a cumulative modelling exercise that took into consideration the noise generated by the Proposed Development, Permitted Development and the Cyrus One development once in operation. The cumulative impact of the Proposed Development with other committed or permitted developments will be ***long-term*** and ***not significant.***

16.29 There are no significant effects associated with the operation of the Proposed Development on population and human health in terms of air quality and climate. Therefore, the cumulative impact with the construction phases of the CyrusOne development and Building A of the Permitted Development, and the underground cable installations will be ***long-term*** and ***not significant.***

16.30 The cumulative impact with the operational phases of the CyrusOne development and the Permitted Development, and the underground cable installations will be ***long-term*** and ***not significant.***

16.31 As described in Chapter 12 Traffic & Transportation, considering local planned and Permitted Developments, there will be a ***long-term, neutral*** and ***imperceptible*** cumulative effect due to the low trip generation during the operational phase of the Proposed Development with other planned and permitted development that also have low levels of operational traffic generation.

16.32 The predicted cumulative impact associated with the operational phases of the CyrusOne development and Permitted Development, and the underground cable installations with the Proposed Development will be a ***long-term, neutral*** and ***imperceptible*** cumulative effect.

16.33 The Proposed 110kV GIS Substation element of the Proposed Development, subject to agreements being reached, has the potential to provide power to other future developments outside the Proposed and Permitted Development site that has the potential to create additional employment as a ***long-term*** and ***positive*** cumulative effect on the immediate hinterland.

Biodiversity

16.34 As part of the Screening for an Appropriate Assessment (AA), in addition to the Proposed Development, other relevant projects, including the Permitted Development, Cyrus One development were also considered as set out in the AA Screening document undertaken by Scott Cawley, Consulting Ecologists. This step aims to identify at an early stage any possible significant cumulative effects / impacts of the Proposed Development with other plans and projects on the Natura 2000 sites and the biodiversity of the Proposed Development site and surrounding area.

16.35 A search of the SDCC Planning database was undertaken for the Grange Castle Business Park areas for significant applications that have been granted planning permission within the last five years. The developments outlined in Chapter 3 (Planning and Development Context) will have no predicted impacts on Natura 2000 sites and the Proposed Development will have no predicted impacts on Natura 2000 sites cumulative impacts can be ruled out.

16.36 The South Dublin County Development Plan in complying with the requirements of the Habitats Directive requires that all permitted and committed Projects and Plans that could affect the Natura 2000 sites in the same zone of influence of the Proposed Development site would be initially screened for Appropriate Assessment and if requiring Stage 2 AA, that appropriate employable mitigation measures as outlined within Chapter 6 of this EIA Report would be put in place to avoid, reduce or ameliorate negative impacts. In this way any, cumulative impacts with Plans or Projects for the development area and surrounding townlands in which the development site is located, would be avoided. Any new applications for the project area will initially be assessed on a case by case basis by South Dublin County Council which will determine the requirement for AA Screening as per the requirements of Article 6 of the Habitats Directive: Guidance for Planning Authorities, Circular NPW 1/10 and PSSP 2/10.

Land, Soils, Geology and Hydrogeology

16.37 The anticipated cumulative effects of the Proposed Development, Permitted Development and future Indicative Masterplan Development and other Permitted Developments in the locality as outlined in Chapter 3 on land soils and geology are presented below.

16.38 In relation to the potential cumulative impact on the land geological or hydrogeological environment during the construction phases, those key engineering works could result in cumulative impact if not adequately mitigated Are as follows:

- Overall loss of agricultural soils: Development of the area will result in a ***not significant*** impact on agricultural soils. As this area has been zoned for development this is consistent with the intended development of the area and is small in scale relative to Ireland's overall agricultural soil resources;
- Overall increase in hardstanding: Cumulatively the committed and permitted developments as set out earlier in this chapter will result in localised reduced recharge to ground and increase in surface run-off and has the potential without suitable mitigation and SUDS measures to increase the potential for flooding. The aquifer underlying the site is a locally important aquifer which is moderately productive only in local zones. Based on site specific and regional geological investigations there is circa >2 metres of overburden overlying the bedrock aquifer classifying it as "High" to "Extreme" vulnerability (GSI classification). The cable line trenches will be backfilled in most areas as current with the substation having a relatively small footprint in comparison to the underlying aquifer. As such, the impact is considered to be Low; and
- Localised contamination of soils and groundwater underlying the site from accidental spillage and leakage from construction traffic and construction materials may occur unless project-specific Construction Environmental Management Plans (CEMPs) are put in place and complied with. It is proposed that project-specific CEMP's will be put in place for the Proposed Development. A CEMP is in place for the Permitted Development.
- Accidental releases from fuel storage/unloading could contaminate groundwater or soil environments unless mitigated adequately i.e. bunded tanks and delivery areas. Localised accidental discharge of hydrocarbons could occur in car parking areas and along roads unless diverted to surface water drainage system with petrol interceptors. However, all developments are required to ensure they do not have an impact on the receiving water environment in accordance with the relevant legislation (primarily the Local Government (Water Pollution) Act, 1977 and 1990 as amended) such that they would be required to manage runoff and fuel leakages in accordance with a project-specific Construction Environmental Management Plan (CEMP).

16.39 In relation to the potential cumulative impacts from the operational stages, the following could result in a cumulative impact if not adequately mitigated:

- Accidental releases from fuel storage/unloading could contaminate groundwater or soil environments unless mitigated adequately i.e. bunded tanks and delivery areas. Localised accidental discharge of hydrocarbons could occur in car parking areas and along roads unless diverted to surface water drainage system with petrol interceptors. However, all developments are required to ensure they do not have an impact on the receiving water environment in accordance with the relevant legislation (primarily the Local Government (Water Pollution) Act, 1977 and 1990 as amended) such that they would be required to manage runoff and fuel leakages. The cumulative impact is considered to be imperceptible.
- There will be a further loss of greenfield area locally as a result of the Proposed Development, the permitted developments. However, the area of development is small in the context of the overall agricultural land available in the broader region and the land park is already zoned for development, subject to grant of permission for the Proposed Development.

16.40 The permitted and committed developments as set out at the start of this Chapter were each accompanied by an EIA Report that contained suitable mitigation measures. As a result the cumulative impact of these developments will be minimal and they are predicted to have an ***imperceptible, long term, neutral*** impact on land, soils, geology and hydrogeology. Sufficient mitigation measures will be in place at the Proposed Development site (as detailed in Chapter 7), and provided that sufficient mitigation measures and the CEMP are in place at each of the other development sites (i.e. other planned and Permitted Developments) the overall impact on soils and groundwater will be ***neutral***.

Hydrology

16.41 The impact of the Proposed Development has been considered cumulatively with relevant developments currently permitted within the vicinity of the site (Details of the developments considered as part of this cumulative assessment are discussed in paragraphs 16.1-16.18 of this Chapter).

16.42 In relation to the potential cumulative impact on hydrology during the construction phases, the potential cumulative impacts include:

- Surface water run-off during the construction phase may contain increased silt levels or become polluted from construction activities. Run-off containing large amounts of silt can cause damage to surface water systems and receiving watercourses. The Baldonell Stream runs along the boundary of the Proposed Development in two locations;
- Horizontal directional drilling is proposed for a c. 100m length of the 110kV transmission line from the Kilmahud-Corkagh circuit. The location of the directional drilling is under the culverted Griffeen River where the 110kV transmission line from the Kilmahud-Corkagh circuit crosses under the New Nangor Road. The depth of the drilling is expected to be c. 6m in depth and require four separate directional drillings that will be c. 1m apart. This depth of the drilling and the fact that the Griffeen is culverted at this location means that there will be no impact on the existing culvert or river hydrology; and
- Contamination of local water sources from accidental spillage and leakage from construction traffic and construction materials. However each project has an associated EIA Report and mitigation measures have been included in each EIA Report which have formed a condition of each respective grant of permission.

16.43 In terms of hydrology, the cumulative impacts which are relevant to the Proposed Development and planned and Permitted Developments during the operational phase include the following:

- Increase in hard standing: This will result in localised reduced recharge to ground and increase in run-off rate. However, each development is required to provide suitable attenuation storage on site to ensure greenfield run-off rates are maintained and, therefore, that there is no increase in flood risk;
- Increase in potential for contamination of watercourses during operation; and
- Increase in wastewater loading and water supply requirement: Each development will require written confirmation from the IDA/Irish Water that there is available capacity in the water and wastewater infrastructure.

16.44 Overall, the cumulative impact on the hydrological environment is predicted to be ***long-term, imperceptible*** and ***neutral***, provided mitigation measures are implemented at each of the developments as set out in the EIA Reports and CEMPs of the each of the permitted and committed developments. Chapter 8 of this EIA Report outlines the mitigation measures to be implemented for the Proposed Development,

Noise and vibration

16.45 The construction phase of the Proposed Development is anticipated to coincide with the construction of Building A of the Permitted Development, and installation of fibre network. It may also coincide with other permitted developments within close proximity of the Proposed Development. There is a possibility for cumulative noise and vibration impacts.

16.46 During construction of the Proposed Development noise and vibration associated with construction work on the Proposed Development will typically be lower than those generated by existing traffic movements on the local road network. The noise environments at the nearest noise sensitive locations to the proposed works are and will continue to be dominated by road traffic noise (see Chapter 9, Noise and Vibration of this EIA Report for analysis).

16.47 The application of appropriate noise and vibration mitigation measures outlined in Chapter 9 of this EIA Report during construction and similar mitigation measures applied for other permitted developments will avoid significant cumulative impacts on noise and vibration. Overall, the cumulative construction noise impacts are likely to be ***negative*** in terms of quality and ***slight*** in terms of significance (due to short term duration and expected compliance with outlined criteria and **short term** in nature.

16.48 It should be noted that the 110kV transmission lines and 49kVA cable installation will be underground once construction is completed and there will be no noise and/or vibration emissions from these installations during the operational phase.

16.49 Considering the distance between the proposed GIS substation and the nearest off-site locations of some 300m, noise from this installation is not predicted to be an issue off site. Therefore, there are no predicted cumulative impacts on noise and/or vibration from the operational phase of the Proposed Development.

16.50 There are no operational vibration impacts associated with the Proposed Development, the Permitted Development. Any development with vibration impacts will be required to comply with guidance levels as a condition of planning hence cumulative impacts do not arise in this instance.

Air quality and Climate

16.51 There is the potential for cumulative dust impacts to nearby sensitive receptors. The dust mitigation measures outlined in Chapter 10, paragraphs 10.53 -10.66 during construction and similar mitigation measures applied for other permitted and committed developments, will avoid significant cumulative impacts on air quality. With appropriate mitigation measures in place, the predicted cumulative impacts on air quality and climate associated with the construction phase of the Proposed Development and the permitted and committed developments outlined previously in this chapter (Section 16.1) are deemed ***short-term*** and ***imperceptible***.

16.52 It should be noted that the 110kV transmission line and 49kVA cable installation will be underground once construction is completed. There will be no notable emissions to air quality or climate during the operational phase of the 110kV transmission lines, 49kVA cable installation, or the proposed substation beyond that from cars used by maintenance staff. Therefore, there are no cumulative impacts on air quality or climate from the operational phase of the Proposed Development.

16.53 Indirect air emissions from electricity power generating stations are covered under the individual licences for these sites which are monitored and enforced by the EPA, ensuring emissions do not impact on ambient air quality.

Landscape and visual assessment

16.54 Cumulative effects were considered with regard to the Proposed and Permitted Developments as well as the ongoing development to the south (CyrusOne). The operational phase of these developments will give rise to a noticeable change in the landscape character. The initial removal of an agricultural field landscape to be replaced with built development would be considered a negative impact on the landscape character. The proposed landscape treatment under the Permitted Development will not be altered under the Proposed Development beyond minor changes to berm alignments to facilitate the alignment of the proposed 110kV transmission line to the Kilmahud-Corkagh circuit, The landscape plan will create significant belts of native woodland linking the existing hedgerows and trees into a much larger ecological habitat, including a native wetland to the west of the site. Similar treatment has been permitted, including a wetland area associated with the Cyrus One Development. The photomontages submitted with the Planning Application for the Proposed Development (See Chapter 11 – Appendix 11.3) present a view of the Proposed Development with these minor changes to berming.

16.55 The Proposed Development will not extend the overall duration of construction activity within the area as it will be undertaken at the same time as the construction phases of the Cyrus One development as well as the Permitted Development.

16.56 Construction activity will move as different developments are completed in advance of others commencing. Cumulative effects will also intensify the change in character of the landscape from greenfield land to high-tech developments. Cumulative landscape and visual impacts for the construction phase will be ***significant/moderate*** and ***negative*** as the existing land use changes to that anticipated by the land use zoning, however these impacts will reduce to ***moderate*** and ***neutral*** as developments are completed and landscape mitigation measures establish. Mitigation measures for the Proposed Development are set out in Chapter 11 of the EIA Report.

16.57 Cumulative effects during operation will gradually intensify the high-tech character of the development area and will introduce additional structures that will become visible to a greater or lesser extent depending on their location and the location of the viewer. Cumulative landscape and visual effects for the operational phase are likely to be perceived initially as significant/moderate and negative as the existing land use changes to that anticipated by the land use zoning, however these will reduce to moderate and neutral as developments are completed and landscape mitigation measures establish. Cumulative landscape and visual effects are illustrated in the series of Accurate Visual Representations included in Chapter 11 - Appendix 11.3 for each of the representative views described in Chapter 11. Cumulative impacts are illustrated in the proposed version of each view and show the Proposed Development in combination with other permitted developments.

Traffic and transportation

16.58 The traffic impacts of the Proposed Development were assessed, in Chapter 12 - Traffic and Transportation, taking the cumulative traffic impacts, including impacts associated with the Permitted Development and the Cyrus One development. Other ongoing operational and construction projects were taken into consideration and were picked up in the traffic surveys undertaken as part of the Permitted Development.

16.59 Potential impacts during construction relate to additional construction traffic on the surrounding road network, and potential road closures in order to facilitate completion of the works. The construction phase of the Proposed Development will occur at the same time as the Permitted Development and the Cyrus One developments in particular thus increasing the potential for additional construction traffic on the local road network. Given the short-term nature of the peak construction phase, the overall impact of the construction phase involving permitted and committed developments is considered ***not significant*** and shall not affect the performance of the junctions assessed under this EIA Report.

16.60 The traffic impact in the operational phase of the Proposed Development when combined with the other permitted and committed developments is ***long-term, neutral*** and ***imperceptible***. The proportional traffic increase through the relevant junctions with the Proposed Development are significantly below the thresholds stated in the TII Guidelines for Traffic and Transport Assessments, 2014 for junction analysis.

Cultural heritage

16.61 The construction of the Proposed Development and other committed and permitted developments, has the potential to encounter small or isolated archaeological features beneath the existing ground level outside the footprint of the test trenches and the excavated areas undertaken at each of the sites. Given the proximity of the sites to each other this has the potential to be more significant than at more isolated sites.

16.62 Ground disturbances associated with the Proposed Development and other sites has the potential to directly and negatively impact on any such remains. Dependant on the nature, extent and significance of archaeological deposits, impacts (prior to the application of mitigation) may range from moderate negative to significant negative. However, as it is proposed to monitor construction activity and preserve any identified archaeological features by record on all sites, no cumulative impacts are predicted upon the archaeological, architectural or cultural heritage resource during the construction phase.

16.63 An assessment of the potential for cumulative effects on archaeological, architectural and cultural heritage to arise as result of other developments in the vicinity was undertaken by considering the existing and permitted projects in the vicinity of the Proposed Development and the Permitted Development. Where appropriate these developments were subject to archaeological, architectural and cultural heritage impact assessment as part of the environmental impact assessment or planning processes. With mitigation measures outlined in these impact assessments, no cumulative impact on archaeological or architectural or cultural heritage will occur.

16.64 There are no cumulative impacts upon the archaeological, architectural and cultural heritage resource during the operational phase of the Proposed Development.

Waste management

16.65 The construction of the Proposed Development and Building A of the Permitted Development will require site clearance, excavations and levelling which will generate waste. Mitigation measures as set out in Chapter 14 of this EIA Report will be carried out for the Proposed Development, and provided that mitigation measures set out in the EIA Reports for these developments are implemented during construction of the Proposed Development, the cumulative impact will be ***short term*** and ***imperceptible***.

16.66 The waste quantities to be generated from the operation of the proposed and Permitted Development as set out within Chapter 14 of this EIA Report and Chapter 14 of the Permitted Development EIA Report are anticipated to be relatively small. As such, the predicted impact of the build out of the site on waste management will be ***long term*** and ***imperceptible***.

16.67 Other developments in the area will be required to manage waste in compliance with national and local legislation, policies and plans which will minimise/mitigate any potential cumulative impacts associated with waste generation and waste management. As such it is considered that the cumulative impact will be ***long-term*** and ***imperceptible***.

Material assets

16.68 The Proposed Development entails minimal use of material assets during construction. Once operational, the Proposed Development will result in minimal impact on surface water, foul drainage and water infrastructure. The Proposed Development will connect to the surface water, foul drainage and water supply infrastructure for the Permitted Development and the requirements for the Proposed Development has already been considered in terms of the design of the infrastructure for the Permitted Development. (SDCC Planning Ref. SD20A/0121.)

16.69 The Applicant has previously engaged with IW to ensure that there is sufficient capacity to cater for the water supply and wastewater for the Proposed Development and the Permitted Development. As noted in this chapter and the Engineering Planning Report – Drainage and Water Services prepared by CSEA (and included as part of the Proposed Development planning submission), a PCE form was submitted to IW which addressed water and wastewater demand for these developments Irish Water (IW) provided a confirmation of feasibility (CoF) for the overall development (including the

requirements of the proposed development) on the 20th May 2020 (IW Reference Number: Reference No CDS20000724).

16.70 The Proposed Development will have a negligible demand on power. Based on this, it is predicted that the cumulative impact of the Proposed Development with other permitted and planned developments is considered to be imperceptible during the construction and operational phases.

16.71 The Proposed Development entails minimal use of material assets (i.e. power and electrical supply, telecommunications, surface water infrastructure, foul drainage infrastructure and water supply) during construction with no impact once operational. The overall predicted cumulative impact of the Proposed Development with other permitted developments can be classed as ***long-term*** and ***not significant*** with respect to material assets during the construction and operational phases.

17. INTERACTIONS

Introduction

17.1 This chapter of the EIA Report addresses potential interactions and inter-relationships between the environmental factors discussed in the preceding chapters. This covers both the construction and operational phase of the Proposed Development.

17.2 As a requirement of the EIA Directive, the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018, the EPA Draft EIA Report Guidelines 2017 and EPA Draft Advice Notes for EIS 2015, not only are the individual significant impacts required to be considered when assessing the impact of a development on the environment, but so must the interrelationships between these factors be identified and assessed.

17.3 In the main, the majority of EIA Report chapters have already included and described assessments of potential interactions between aspects, however this section of the assessment presents a summary and assessment of the identified interactions. These interactions have been identified and considered by the various specialists contributing to this impact assessment.

Discussion – Positve Impacts

17.4 The reasoning behind the interactions that are considered to have a positive effect (i.e. a change which improves the quality of the environment) is outlined in this section.

Planning and Alternatives on:

Population and Human Health

17.5 The Proposed Development will be designed to provide a permanent power supply for the Permitted Developments and future growth within the Grange Castle South area.

17.6 The Proposed Development will create between 15-30 temporary jobs during the construction phase, which will have a short term, positive, not significant effect on employment and business in the area.

Discussion – Neutral Impacts

17.7 The reasoning behind the interactions that are considered to have a neutral effect (i.e. no effects or effects that are imperceptible, within the normal bounds of variation or within the margin of forecasting error) is outlined in this section.

Land, Soils, Geology and Hydrogeology on:

Population and Human Health

17.8 There will be a loss of soil available for agricultural use due to the development. However, within the overall context of Ireland's available farmland, the loss is considered negligible. However, as the lands are already zoned for development there is no overall loss of agricultural land use. This *change of land use has already been established for the Permitted Development (SDCC Reg. Ref. SD20A/0121).* In addition, the employment created by the construction and operation of the Proposed Development counterbalances this economic loss and so the impact is ***long-term, imperceptible*** and ***neutral***.

Hydrology

17.9 The main potential impact of the construction works proposed is on surface water quality (due to sediment laden run-off, material spillages) and groundwater quality (due to removal of protective soil for the construction of the proposed substation). However, the implementation of a CEMP as detailed in Chapter 3 (Description of the Proposed Development) and Chapter 8 (Hydrology), as well as mitigation measures under the Permitted Development that included surface water attenuation for the overall site, including the proposed substation site, will ensure the effect on Hydrology will be ***short term, imperceptible*** and ***neutral***.

Biodiversity

17.10 The surrounding area is being extensively developed and the majority of its natural flora and fauna has been removed/displaced. Notwithstanding the loss of soil environment during construction; the mitigation measures in the form of addition vegetation and planting granted under the Permitted Development, also considered the Proposed Development, will maintain habitat for flora and fauna and therefore the effect on biodiversity will be ***long-term, moderate*** and ***neutral***. The impact of local loss of arable land of no significant ecological value is negligible.

Air Quality and Climate

17.11 There is a potential for the construction activity to impact on air quality in terms of dust generated but mitigation measures outlined in both Chapter 7 (Land, Soils, Geology & Hydrogeology) and Chapter 10 (Air Quality & Climate) of this EIA Report, implemented through the CEMP, will ensure a ***short term, imperceptible*** and ***neutral*** effect. There are no predicted perceptible impact during operation.

Waste Management

17.12 As detailed in Chapter 14 (Waste Management), c. 24,300m3 of excavated material may be generated during construction. The majority of the excavated material will need to be removed off-site either as a waste or, where appropriate, as a by-product. The management of waste during the construction phase in accordance with the Construction & Demolition Waste Management Plan (C&D WMP) will meet the requirements of regional and national waste legislation and promote the management of waste in line with the priorities of the waste hierarchy. Therefore, the effect of generation of soils/stones in terms of waste management will be ***neutral***.

Hydrology on:

Population and Human Health

17.13 Once operational, the Proposed Development will generate minimal wastewater emissions (foul water) from the GIS substation welfare facilities. This will discharge via the local sewer network to the Local Authority wastewater treatment plant (WWTP) at Ringsend. As treated wastewater discharges from the WWTP to Dublin Bay, which is a public amenity, there is a potential for impact on the human beings using this amenity. However, the Ringsend WWTP will provide treatment for wastewater emissions, the effect is considered to be ***long-term, imperceptible*** and ***neutral***.

Land, Soils, Geology and Hydrogeology

17.14 Surface water run-off collected in excavations during the construction phase of the Proposed Development will be pumped out and treated prior to discharge (see Chapter 8 Hydrology). The effect will be ***short-term***, ***imperceptible*** and ***neutral***. Surface water run-off from the site once operational will be collected within attenuation ponds that were permitted under the Permitted Development. The attenuation pond to the east, into with the Proposed Development will drain, was adequately sized during the design of the Permitted Development to accommodate surface water run-off from the Proposed Development. The effect will be ***long-term***, ***imperceptible*** and ***neutral***.

17.15 The 110kV transmission line will cross under the Griffeen Stream culvert by horizontal directional drilling. The implementation of mitigation measures will ensure the impact on the stream is ***imperceptible*** and ***neutral.***

Biodiversity

17.16 Surface water from the Proposed Development substation will drain to the eastern attenuation pond of the Permitted Development via hydrocarbon interceptors and outfall into the existing stream that is located to the immediate north of the proposed 110kV GIS substation. The attenuation pond was adequately sized during the design of the Permitted Development to accommodate surface water run-off from the Proposed Development. The effect will be ***long-term***, ***imperceptible*** and ***neutral***.

17.17 There is no formal designation on the Proposed Development lands and the development area may be considered of Low Local Ecological Value. The Proposed Development is hydrologically linked to the Baldonnel Stream that runs to its north. Designated sites that this stream ultimately runs into (River Liffey) are located a 5.5kms distance downstream as outlined in Chapter 6 of the EIA Report. The impact on biodiversity will be ***long-term, imperceptible*** and ***neutral***.

Waste Management

17.18 Hydrocarbon sludge waste and debris will be generated in the hydrocarbon interceptors which will treat the surface water run-off from the Proposed Development during the operational phase. This waste stream will be managed in accordance with the relevant legislation identified in Chapter 14 such that the effect of the waste generation will be ***long-term, imperceptible*** and ***neutral***.

Air Quality and Climate on:

Population and Human Health

17.19 The mitigation measures that will be put in place at the Proposed Development for the construction phase will ensure that the impact of construction dust emissions in the form of nuisance dust are ***short-term*** and ***imperceptible***. Further detail on human health and air quality is presented in Chapter 5.

Biodiversity

17.20 Mitigation measures during the construction phase of the Proposed Development will ensure that dust generation is minimised and the effect on biodiversity will be ***short term***, ***imperceptible*** and ***neutral***. There is no interaction between Air Quality and Climate on Biodiversity during the Operational Phase due to the low level of maintenance traffic that will be generated by all aspects of the Proposed Development.

Hydrology

17.21 Mitigation measures implemented during the construction phase will ensure that the deposition of dust is minimised and therefore the predicted effect from air (including dust) on the water environment during construction is ***short-term, imperceptible*** and ***neutral***. There is no interaction between Air Quality and Climate on Hydrology during the Operational Phase.

Noise and Vibration on:

Population and Human Health

17.22 The potential impact of noise and vibration on the local population is discussed in Chapter 5 (Population and Human Health) and Chapter 9 (Noise & Vibration). Noise emissions associated with the construction phase of the development are expected to be less than the prevailing ambient noise level at the nearest sensitive locations. In addition, due to the distance between the site and the nearest sensitive locations, vibration impacts generated during construction are expected to be ***negligible***. There are no predicted noise impacts beyond the emergency generator that will only operate in emergency circumstances to provide back-up power to the GIS building, and has been scoped out of this assessment. The level of traffic generated by maintenance traffic to the Proposed Development is very low and will be imperceptible and therefore once operational there will not be a significant impact on human health as a result of noise emissions.

Landscape and Visual on:

Population and Human Health

17.23 The predicted impact of the Proposed Development on the landscape is described in Chapter 11. The Proposed Development is well-sited and was fully considered as part of the design and planning of the Permitted Development. The Permitted Development includes architectural and permitted landscape proposals that will ensure the Proposed Development is integrated into its setting, including the use of landscaped berms which will provide visual screening as granted under the Permitted Development. Residual landscape and visual effects from the wider locality will be ***not significant*** or ***imperceptible***, will be ***long-term***.

17.24

Biodiversity

17.25 The construction of the Proposed Development will involve the removal of some of the existing landscape. *The mitigation measures in the form of additional planting and landscaping features such as berms, granted under the Permitted Development, and only to be minimally altered under the Proposed Development, will maintain habitat for flora and fauna and therefore the effect on biodiversity will be* **long-term**, **moderate** *and* **neutral**.

Material Assets on:

Population and Human Health

17.26 The Proposed Development will not have a significant impact on material assets such as surface water drainage, water supply, wastewater drainage, power supply and road infrastructure. The individual chapters of this EIA Report (Chapter 12 Traffic and Transportation and Chapter 15 Material Assets) have assessed the capacities of the available infrastructure to accommodate the Proposed Development and the implementation of the mitigation measure proposed in each of these chapters will ensure there are no residual negative impacts on the local population. The predicted effect is therefore ***imperceptible*** and ***neutral***.

Hydrology

17.27 The Proposed Development will result in minor changes to surface water drainage, water supply and wastewater networks. However, a combination of mitigation measures to be implemented as detailed in Section Chapter 8 (Hydrology), as well as the capacity already built into these networks, will ensure that these changes will result in a ***long-term, imperceptible*** and ***neutral*** impact.

Discussion – Negative Impacts

17.28 *The reasoning behind the interactions that are considered to have a negative effect (i.e. a change which reduces the quality of the environment) is outlined in this section.*

Noise on:

Biodiversity

17.29 Noise generated during the construction phase of the Proposed Development will have a ***short term negative*** impact on fauna which are likely to be displaced during construction works. As the area is already in a developing commercial/industrial area the overall operational noise levels will not change significantly.

Land, Soils, Geology and Hydrogeology on:

Noise

17.30 Impacts associated with excavation works will be transient in nature and have a short term negative impact on the noise environment, which will be mitigated by the implementation of the CEMP. The effect will be ***slight, negative*** and ***short term*** in duration***.***

Landscape and Visual on:

Traffic and Transportation

17.31 The establishment of site enclosures, construction traffic access routes, construction vehicular activity, site lighting and temporary traffic management regimes will cause disruption during the construction of the Proposed Development. Effects on landscape character during construction will be ***temporary*** to ***short term*** and will generally vary from ***slight/not significant*** to ***significant/moderate***, and from ***neutral to negative.*** Effects on views during construction will be ***temporary*** to ***short-term***, and will vary from ***moderate*** to ***imperceptible***, and from ***neutral*** to ***negative***. Residual impacts on landscape and visual effects from the wider locality will be not significant or imperceptible.

Summary

17.32 In summary, the interactions between the environmental factors and impacts discussed in this EIA Report have been assessed and the majority of interactions are ***neutral.***

Table 17.1 Overview of potential interactions

Interaction	Planning and alternatives	Population and human health	Biodiversity	Land, Soils, Geology and Hydrogeology	Hydrology	Noise & vibration	Air Quality & Climate	Landscape and visual impact	Traffic	Cultural Heritage	Waste Mngmnt	Material assets
Planning and alternatives		✓	x	x	x	x	x	x	x	x	x	x
Population and human health			✓	✓	✓	✓	✓	x	x	x	x	✓
Biodiversity				✓	✓	✓	✓	x	x	x	x	x
Land, Soils, Geology and Hydrogeology					✓	✓	✓	x	x	x	✓	x
Hydrology						x	✓	x	x	x	✓	✓
Noise & vibration							x	x	x	x	x	x
Air Quality & Climate								x	x	x	x	x
Landscape and visual impact									✓	x	x	x
Traffic										x	x	x
Cultural Heritage											x	x
Waste management												x
Material Assets												

✓ - positive interactions between factors
✓ - neutral interactions between factors
✓ - negative interactions between factors
X – no interaction of note

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