

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

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

**Aungierstown Substation and transmission lines
Grange Castle South Business Park**

January 2021

MARSTON

PLANNING CONSULTANCY

CONTENTS

1. INTRODUCTION	1
Proposed Development	1
Context.....	2
Reason for the EIA Report.....	4
Format of the EIA Report.....	4
Need for the Proposed Development	5
Company background.....	5
Consultation.....	5
Regulatory control.....	5
Description of effects	Error! Bookmark not defined.
Additional assessments required.....	6
Forecasting methods and difficulties in compiling the specified information... ..	Error! Bookmark not defined.
Contributors to the EIA Report	8
2. DESCRIPTION OF THE PROPOSED DEVELOPMENT	10
Characteristics of the Application	10
Existence of the Project.....	17
Description of other developments	22
Sustainability energy efficiency and resource use	22
Health & safety	23
Potential impacts of the Proposed Development	23
Major accidents / disasters	23
Related development and cumulative effects.....	24
3. PLANNING AND DEVELOPMENT CONTEXT	25
Strategic Infrastructure Development	25
National Planning Framework	25
Regional Spatial and Economic Strategy for the Eastern and Midlands Regional Assembly.....	26
Regional Planning Guidelines – Greater Dublin Area, 2010-2022	26
South Dublin County Development Plan 2016-2022.....	27
Sustainable Development.....	28
Consultation.....	28
Relevant Planning history	28
4. ALTERNATIVES	35
Do nothing alternative.....	35
Alternative project locations.....	35
Alternative designs / layout.....	40
Alternative processes	40
Alternative mitigation	41
Conclusions on Alternatives	41
5. POPULATION AND HUMAN HEALTH	42
Methodology	44
Receiving Environment.....	44
Potential Impact of the Proposed Development	49
Remedial and mitigation measures	51
Residual impacts	51
Cumulative Impacts	52
6. BIODIVERSITY	54
Methodology	54
Ecological evaluation and impact assessment methodology	55
Receiving environment	56
Characteristics of the Proposed Development	67
Potential impacts of the Proposed Development	68
Remedial and mitigation measures	71
Residual impacts	73
Cumulative Impacts	73
7. LAND, SOIL, GEOLOGY AND HYDROGEOLOGY	75

Methodology	75
Receiving environment	76
Characteristics of the Proposed Development	87
Potential impact of the Proposed Development	88
Remedial and mitigation measures	89
Predicted impact of the Proposed Development	91
Residual impacts	92
Cumulative Impacts	92
8. HYDROLOGY	94
Methodology	94
Receiving Environment	95
Characteristics of the Proposed Development	98
Potential impacts of the Proposed Development	99
Remedial and Mitigation Measures	101
Predicted Impact of the Proposed Development	104
Residual Impacts	104
Cumulative Impacts	104
9. NOISE AND VIBRATION	106
Methodology	106
Receiving environment	113
Characteristics of the Proposed Development	116
Potential impact of the Proposed Development	116
Remedial and mitigation measures	122
Cumulative Impact	123
Predicted impacts of the Proposed Development	124
Cumulative Impacts	124
Residual impacts	125
10. AIR QUALITY AND CLIMATE	126
Methodology	126
Receiving environment	129
Characteristics of the Proposed Development	133
Potential Impacts of the Proposed Development	133
Remedial and Mitigation Measures	136
Residual Impacts of the Proposed Development	139
Cumulative Impacts	140
11. LANDSCAPE AND VISUAL IMPACT	142
Methodology	142
Receiving environment	143
Characteristics of the Proposed Development	146
Potential impacts of the Proposed Development	146
Remedial and mitigation measures	148
Residual Impacts	149
Visual impact assessment from specific locations	149
12. TRAFFIC AND TRANSPORTION	154
Methodology	154
Receiving Environment	154
Charcteristics of the Proposed Development	163
Potential Impacts of the Proposed Development	166
Remedial and Mitigation Measures	167
Predicted Impacts of the Proposed Development	168
Cumulative Impact	168
Residual Impacts	171
13. CULTURAL HERITAGE	172
Methodology	172
Receiving Environment	176
Characteristics of the Proposed Development	182
Potential Impacts of the Proposed Development	182

Remedial and Mitigation measures	183
Residual Impacts	184
14. WASTE MANAGEMENT	185
Methodology	185
Receiving Environment.....	186
Characteristics of the Proposed Development	187
Potential Impacts of the Proposed Development	189
Remedial and Mitigation Measures	190
Predicted Impacts of the Proposed Development.....	192
Residual Impacts	192
Cumulative Impacts	192
15. MATERIAL ASSETS.....	193
Methodology	193
Ownership and access	193
Receiving environment	194
Characteristics of the Proposed Development	195
Potential impacts of the Proposed Development	197
Remedial and mitigation measures	199
Predicted impacts of the Proposed Development	200
Residual impacts	200
Cumulative Impacts	201
16. INTERACTIONS.....	202
Discussion – Positive Impacts	202
Discussion – Neutral Impacts	202
Discussion – Negative Impacts	205
17. REFERENCES.....	207

LIST OF FIGURES

Figure 1.1	Proposed site layout plan illustrating red line boundary in context of permitted development under SD18A/0134 on overall site (Source: <i>TOT Architects, December 2020</i>)
Figure 1.2	Proposed site layout plan illustrating red line boundary (Source: <i>TOT Architects, December 2020</i>)
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)
Figure 2.2	Proposed site layout plan of the Proposed Development site (<i>red line</i>) indicating proposed 110kV transmission lines (<i>green lines</i>) (Source: Drawing no. KG-PI278-CD001, Kirby Group, Consulting Engineers)
Figure 2.3	Typical cross-section of 110kV Trefoil Trench detail adjacent to the Castlebaggot Substation (Source: Drawing no. KG-PI278-CD004, Kirby Group, Consulting Engineers)
Figure 2.4	Typical cross-section of 110kV flat formation trench detail under the Grange Castle South Business Park access road (Source: Drawing no. KG-PI278-CD004, Kirby Group, Consulting Engineers)
Figure 3.1	Permitted AIG Substation in north-east corner of Permitted Development site (shaded cream)
Figure 4.1	Permitted Development site layout plan (application boundary outlined in red) as granted under SDCC Planning Ref. SD18A/0134 / An Bord Pleanála Ref. ABP-302813-18 indicating future substation compound site (Source: Hyphen Architects April 2018)
Figure 4.2	Grid Connection Route Option B-A, from the Castlebaggot substation to the proposed Aungierstown substation (Source: <i>Kirby Engineering and Construction, September 2020</i>)
Figure 4.3	Grid Connection Route Option B-B, from the Castlebaggot substation to the proposed Aungierstown substation (Source: <i>Kirby Engineering and Construction, September 2020</i>)
Figure 4.4	Grid Connection Route Option B-C, from the Castlebaggot substation to the proposed Aungierstown substation (Source: <i>Kirby Engineering and Construction, September 2020</i>)
Figure 4.5	Grid Connection Route Option B-D, from the Castlebaggot substation to the proposed Aungierstown substation (Source: <i>Kirby Engineering and Construction, September 2020</i>)

Figure 4.6	Preferred Grid Connection Route from the Castlebaggot substation to the proposed Aungierstown substation (<i>Source: Kirby Engineering and Construction, December 2020</i>)
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 (or proposed to be demolished subsequent to a grant of permission under Reg. Ref. SD20A/0295 outlined in green)
Figure 6.1	The indicative red line boundary for the Proposed Development site and surrounding lands.
Figure 6.2	Proposed Natural Heritage Areas (pNHAs) within 15km of the Proposed Development
Figure 6.3	European Designated Sites located within 15km of the Proposed Development
Figure 6.4	Map showing the habitat types identified within the indicative red line boundary.
Figure 6.5	Buildings and artificial surfaces (BL3) within the Proposed Development site
Figure 6.6	Area of spoil and bare ground (ED2) and improved agricultural grassland (GA1) to the west of the existing Castlebaggot 220/110kV substation within the grid connection route for the Proposed Development.
Figure 6.7	Results of 2018 bat activity surveys and the indicative redline boundary
Figure 7.1	Soils map for the Proposed Development site (boundary indicated in red) (GSI, 2020)
Figure 7.2	Subsoils map for the Proposed Development site (boundary indicated in red) (GSI, 2020)
Figure 7.3	Site Investigation Sample Locations (Source: IGSL, 2018).
Figure 7.4	Aquifer Classification map (GSI, 2020)
Figure 7.5	Aquifer Vulnerability map (GSI, 2020)
Figure 7.6	GSI Well Search (GSI, 2020)
Figure 7.7	Dublin Groundwater Body Current WFD Status “ <i>Not at Risk</i> ” (EPA, 2020). Proposed Development area is shown with a red cross.
Figure 7.8	X - X’ cross section of Proposed Development site
Figure 7.9	Y – Y’ cross section of region located around the proposed site.
Figure 8.1	Local hydrological environment.
Figure 8.2	Surface Water Quality Monitoring Point (EPA, 2020) (Site location indicated with red cross).
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).
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))
Figure 9.2	Site plan indicating baseline noise monitoring locations B1 to B3
Figure 9.3	Sample Sensitive Locations Considered for Assessment (labelled as R1 – R9) with red
Figure 9.4	Predicted Noise Contour – Scenario A – Day to Day Operations
Figure 9.5	Predicted Noise Contour – Scenario B – Emergency Operations
Figure 10.1	Casement Aerodrome Windrose 2015 – 2019 (MET, 2020)
Figure 10.2	Location of Sensitive Receptors within 350m of Site
Figure 11.1	Proposed Development site outlined in red with the Permitted Development outlined in blue in context of surrounding development and land uses (Source: Google Earth)
Figure 12.1	Recent Infrastructure Improvement Works
Figure 12.2	Extract from Map 4 of the South Dublin Development Plan 2016-2022
Figure 12.3	Traffic survey locations
Figure 12.4	2020 Base AM and PM peak hour flows (PCUs) on the approach to junctions
Figure 12.5	Forecasted 2021 AM and PM peak hour flows (PCUs) on the approach to junctions
Figure 12.6	Forecasted 2022 AM and PM peak hour flows (PCUs) on the approach to junctions (Data centre and GIS Substation is scheduled to be open in 2022. Figure 12.6 does not include Development Traffic Flows)
Figure 12.7	Existing cycle routes (Source: NTA)
Figure 12.8	Bus Route 13 (Source: Dublin Bus)
Figure 12.9	Bus Route 68 (Source: Dublin Bus)
Figure 12.10	Existing bus route no. 151 (Source: Dublin Bus)
Figure 12.11	Development AM and PM peak hour period trip distribution to the surround road network (PCUs)

LIST OF TABLES

Table 1.1	Description of Effects as per EPA Guidelines (Draft, 2017)
Table 1.2	Roles and responsibilities in the EIA Report

Table 2.1	Lighting mitigation design for bats
Table 5.1	Description of magnitude of predicted impacts
Table 5.2	Matrix illustrating the significance of effects as determined by the relationship between the magnitude of impact and the sensitivity of receptors
Table 5.3	Population levels in the study area in 2006, 2011 and 2016
Table 5.4	At work by industry type 2006, 2011 and 2016 (source: CSO, 2006, 2011 and 2016)
Table 6.1	Maximum level of impact significance for Sensitive Ecological Receptors
Table 6.2	Designated sites located within 15km of the Proposed Development site and proposed Natural Heritage Areas within 15km of Proposed Development site.
Table 6.3	Ecological evaluation of key ecological receptors
Table 7.1	GSI Well Index Table from well search (GSI, 2019)
Table 7.2	Site Activities Summary
Table 9.1	Quality of Potential Effects
Table 9.2	Significance of Effects
Table 9.3	Duration of Effects
Table 9.4	Example Threshold of Significant Effect at Dwellings
Table 9.5	Rounded Baseline Noise Levels and Associated Categories
Table 9.6	Maximum Permissible Noise Levels at the Facade of Dwellings during Construction
Table 9.7	Allowable vibration during construction phase
Table 9.8	Noise Impact Scale – Operational Noise Sources
Table 9.9	Baseline noise levels at location B1
Table 9.10	Baseline noise levels at location B2
Table 9.11	Baseline noise levels at location B3
Table 9.12	Indicative Noise Levels from Construction Plant at Various Distances from the cable installation Works - star indicating location of proposed substation
Table 9.13	Predicted Plant Noise Levels for Various Scenarios
Table 9.14	Comparison of Predicted Noise Levels vs. Adopted Noise Criteria
Table 9.15	Review of predicted changes in existing noise levels
Table 9.16	Assessment of predicted noise levels at receptors for typical site operation
Table 10.1	Ambient Air Quality Standards
Table 10.2	Background NO ₂ Concentrations In Zone A Locations (µg/m ³)
Table 10.3	Background PM ₁₀ Concentrations In Zone A Locations (µg/m ³)
Table 10.4	Sensitivity of the Area to Dust Soiling Effects on People and Property
Table 10.5	Sensitivity of the Area to Human Health Impacts
Table 10.6	Risk of Dust Impacts – Earthworks
Table 10.7	Risk of Dust Impacts – Construction
Table 10.8	Risk of Dust Impacts – Trackout
Table 10.9	Summary of Dust Impact Risk used to Define Site-Specific Mitigation
Table 11.1	Criteria for significance of effects under EPA Guidelines
Table 12.1	Junction 1 - Traffic flows at the Baldonnel Road and Grange Castle Business Park South Road Junction
Table 12.2	Junction 2 - Traffic flows at the R134 Nangor Road / Baldonnel Road Junction
Table 12.3	Junction 3 - Traffic flows at the Baldonnel Road and Aylmer Road Junction
Table 12.4	Junction 4 - Traffic flows at the Nangor Road and Adamstown Road Junction
Table 12.5	Junction 5 - Traffic flows at the Nangor Road / Kilcarbery Park access roundabout
Table 12.6	Junction 6 - Traffic flows at the Nangor Road / Grange Castle Business Park North roundabout
Table 12.7	Junction 7 - Traffic flows at the Nangor Road / Grange Castle Road junction
Table 12.8	Junction 8 - Traffic flows at R136 / Baldonnel Road junction
Table 12.9	Existing Dublin Bus services to Grange Castle Business Park
Table 12.10	Predicted staffing requirements of CyrusOne Data Centre – Operation Phase
Table 12.11	Predicted traffic generation CyrusOne Data Centre – Operation Phase
Table 12.12	Percentage cumulative impact of development traffic at the Baldonnel Road / Grange Castle Business Park South Access Road junction (Junction 1)
Table 12.13	Percentage cumulative impact of development traffic at the Baldonnel Road / Nangor Road junction (Junction 2)
Table 12.14	Percentage cumulative impact of development traffic at the Baldonnel Road / Aylmer Road junction (Junction 3)
Table 12.15	Percentage cumulative impact of development traffic at the Nangor Road / Adamstown Road junction (Junction 4)

Table 12.16	Percentage cumulative impact of development traffic at the Nangor Road / Kilcarbery Park roundabout junction (Junction 5)
Table 12.17	Percentage cumulative impact of development traffic at the Nangor Road / Grange Castle Business Park North access roundabout junction (Junction 6)
Table 12.18	Percentage impact of development traffic at the Nangor Road / Grange Castle Road (R136) junction (Junction 7)
Table 12.19	Percentage impact of development traffic at the Grange Castle Road (R136) / Baldonnel Road junction (Junction 8)
Table 13.1	Dimensions of Study Area
Table 13.2	Baseline values of sites
Table 13.3	Baseline values of sites
Table 13.4	Criteria used for rating magnitude of impacts
Table 13.5	Criteria for assessing significance level of impacts
Table 13.6	Derivation of townland names
Table 16.1	Overview of potential interactions

NON-TECHNICAL SUMMARY (see separate document)

APPENDICES (see separate document)

		Page
CHAPTER 2	DESCRIPTION OF THE PROPOSED DEVELOPMENT	1
Appendix 2.1	Proposed site layout plan (not to scale)	1
Appendix 2.2	Schedule of mitigation measures	2
CHAPTER 6	BIODIVERSITY	15
Appendix 6.1	Legislation, policy and Guidelines	15
Appendix 6.2	Criteria for ecological evaluation	16
Appendix 6.3	Flora species list	18
Appendix 6.4	Records of Protected, Red-Listed or Notable Fauna from the desktop study in the vicinity of the Study Area	19
CHAPTER 7	LAND, SOIL, GEOLOGY AND HYDROGEOLOGY	21
Appendix 7.1	Criteria for Rating Site Attributes – Estimation of Importance of Hydrogeological Attributes (NRA, 2009)	21
Appendix 7.2	Trial Pit Logs – IGSL Ltd. 2017/2018 (IGSL, 2018)	24
Appendix 7.3	Soil Chemical Test Analysis Results IGSL Ltd 2017/2018 (IGSL, 2018)	44
CHAPTER 8	HYDROLOGY	61
Appendix 8.1	Criteria for rating Site Attributes - Estimation of Importance of Hydrology Attributes (NRA)	61
CHAPTER 9	NOISE AND VIBRATION	62
Appendix 9.1	Glossary of acoustic terminology	62
Appendix 9.2	Noise modelling details & assumptions	64
Appendix 9.3	Indicative construction noise & vibration management plan	67
Appendix 9.4	Noise model parameters	71
CHAPTER 11	LANDSCAPE AND VISUAL IMPACT	72
Appendix 11.1	Proposed Landscape master plan in relation to the proposed 110kV substation	72
Appendix 11.2	Photomontages	73
Appendix 11.3	Tree survey	85
CHAPTER 13	CULTURAL HERITAGE	105
Appendix 13.1	Inventory of identified sites of cultural heritage significance and/or potential within study area	105
Appendix 13.2	Previous archaeological excavations	107
Appendix 13.3	National Museum of Ireland (NMI) topographical files	114
Appendix 13.4	Legislative Framework	115
Appendix 13.5	Cultural Heritage graphics	117
CHAPTER 14	WASTE MANAGEMENT	125
Appendix 14.1	Outline Construction and Demolition Waste Management Plan	125

INTRODUCTION

- 1.1 This Environmental Impact Assessment Report (EIA Report) has been prepared on behalf of CyrusOne Irish Data Centres Holdings Ltd. (herein referred to as the ‘Applicant’) to accompany a Strategic Infrastructure Development (SID) planning application to An Bord Pleanála (ABP). Planning permission is being sought for the provision of a new 110kV Gas Insulated Switchgear (GIS) Substation (known as Aungierstown), 2 no. transformer bays, associated compounds and site infrastructure to be located on lands at Grange Castle South Business Park, Baldonnel, Dublin 22. Planning permission is also being sought for two underground single circuit 110kV transmission lines from the proposed Aungierstown Substation to the existing 220kV / 110kV Castlebaggot Substation the north-east. These works are described in detail within Chapter 2 (Description of the Proposed Development) of this EIAR.

Proposed Development

- 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 1.31 of this Chapter).

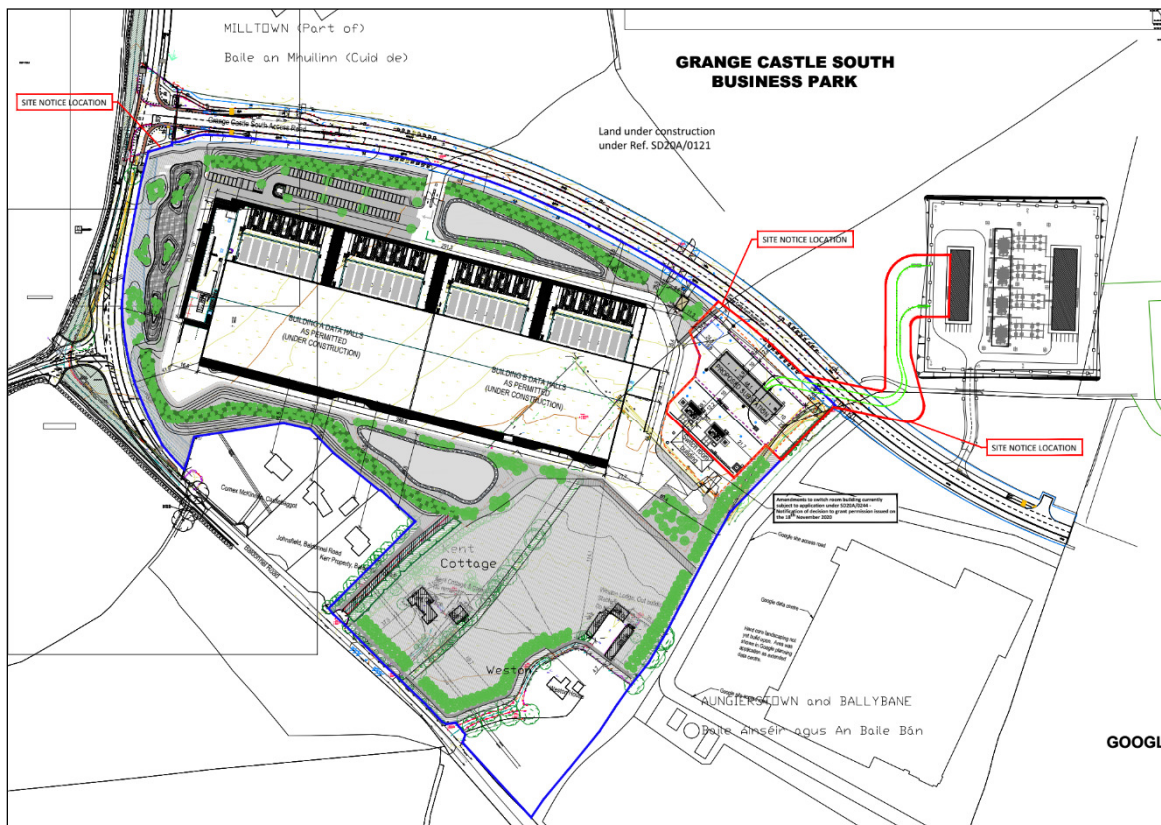


Figure 1.1 Proposed site layout plan illustrating red line boundary in context of permitted development under SD18A/0134 on overall site (Source: TOT Architects, December 2020)

- 1.3 Figure 1.1 presents the route of the proposed underground 110kV transmission lines, the proposed GIS substation. 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. SD18A/0134 / An Bord Pleanála Ref. ABP-302813-18. The Proposed Development will be located primarily within the overall site of this permitted data centre development.

Permitted Development of the data centre granted under SDCC Planning Ref. SD18A/0134 / An Bord Pleanála Ref. ABP-302813-18 and the Permitted Development required an EIA Report to accompany the planning application.

- 1.11 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

- 1.12 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).
- 1.13 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.
- 1.14 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).
- 1.15 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.
- 1.16 A Non-Technical Summary of the findings of the EIA Report is provided as a separate document.
- 1.17 A Schedule of Mitigation measures to be implemented as part of the Proposed Development is included in Appendix 2.2.
- 1.18 Cumulative impacts for each environmental topic are assessed within each individual chapter of this EIA Report.
- 1.19 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 16 shows where interactions have been identified and how they have been addressed.

Reason for this Environmental Impact Assessment Report

- 1.20 This application is being made under the Planning and Development (Strategic Infrastructure) Act 2006, Section 182A to 182E. The requirement for EIA for certain types and scales of development is set out in the EIA Directives (85/337/EEC, 97/11/EC, 2003/35/EC, 2008/1/EC and most recently 2014/52/EU) and given primary effect in Ireland by the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018, European Communities (Environmental Impact Assessment) Regulations 1989-2006, Planning and Development Act 2000 (as amended) and the Planning and Development Regulations 2001-2020. It should be noted that this EIA Report is prepared in accordance with the 2014 EIA Directive (2014/52/EU) and associated Irish legislation (referred to above).
- 1.21 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. The Proposed Development is not listed under Annex I EIA Directives.
- 1.22 An EIA Report has been provided as the Proposed Development is required to provide the permanent power supply for the permitted development that has been granted under Reg. Ref. SD18A/0134 / An Bord Pleanála Ref. ABP-302813-18. This permitted development was also accompanied by an EIA Report that assessed its cumulative impact with the elements being applied for under this Proposed Development.
- 1.23 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 (previously referred to as an Environmental Impact Statement or EIS) 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 Environmental Impact Assessment Report

- 1.24 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);
 - *Advice Notes on Current Practice in the Preparation of Environmental Impact Statements* Draft September 2015 (Environmental Protection Agency).
- 1.25 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). 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.
- 1.26 Using the Grouped Format Structure, the EIA Report examines each environmental aspect in a separate chapter. Each chapter generally covers the following:
- Receiving Environment;
 - Description 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.

1.27 A Schedule of Mitigation measures to be implemented as part of the Proposed Development is included in Appendix 2.2. Cumulative effects for each environmental topic are assessed within each chapter of this EIA Report. Interactions i.e. the interrelationship between each environmental aspect, are assessed as they occur in each chapter. Chapter 16 shows where interactions have been identified and how they have been addressed.

Need for the development

1.28 The need for the Proposed Development, designed to be made under this application, is to provide the necessary infrastructure to support the permanent power supply for the permitted development of a two-storey data centre with associated three storey office block that has a gross floor area of 35,426sqm that has been granted under Reg. Ref. SD18A/0134 / An Bord Pleanála Ref. ABP-302813-18. This application was accompanied by a separate EIA Report.

Company background

1.29 The Applicant provides data storage, management and dissemination. The subject site forms their first data centre development 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.

1.30 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. Eirgrid and ESB Networks are committed to running their businesses in the most environmentally friendly way possible.

Consultation

1.31 The Applicant and the project team have liaised with An Bord Pleanála (ABP) in advance of lodgement of the application for the Proposed Development on 25th June 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. 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

1.32 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

- 1.33 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 on the following page.

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

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

Appropriate Assessment Screening Report

- 1.35 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.
- 1.36 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

- 1.37 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

- 1.38 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

- 1.39 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		Kirby, Consulting Engineers
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 – input from design team
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
Chapter 7	Land, Soil, Geology and Hydrogeology	AWN Consulting – Paul Conaghan
Chapter 8	Hydrology	AWN Consulting - Paul Conaghan
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	Martin Peters, Consulting Engineers – John Ahearne
Chapter 13	Cultural heritage	CRDS – Dr. Stephen Mandal
Chapter 14	Waste Management	AWN – Jonathan Gauntlett
Chapter 15	Material Assets	MPC – Anthony Marston
Chapter 16	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.

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.

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 with AWN specialising in the field of Air Quality. She holds a BSc (Hons) in Energy Systems Engineering from University College Dublin and has also completed an MSc in Applied Environmental Science at UCD. She is an Associate Member of the Institute of Air Quality Management. She specialises in the fields of air monitoring, air dispersion modelling and EIA. She has been active in the field of air quality for 4 years with a primary focus on consultancy.

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 – *John Ahearne.* John is a Transportation Engineer with a degree in Civil and Environmental Engineering with several years of experience the traffic and transportation field. He has been involved in a variety of projects involving transport planning, Modelling, Traffic and Transport assessments, sustainable mobility planning, and engineering design.

Cultural heritage – *Dr. Stephen Mandal.* Dr Stephen Mandal MIAI PGeo EurGeol is co-founder (in 1997) and managing director of CRDS Ltd. Stephen holds an honours science degree in Geology and a PhD in Geoarchaeology on the petrology of the Irish stone axe from (TCD). He also holds Certificates in Safety and Health and Occupational First Aid (UCD). On completion of his PhD, Stephen spent two years as a post-doctoral research fellow in the Archaeology Department, UCD, during which time he also undertook a three-month research fellowship in Cineca, Bologna, Italy. Since 1991 Stephen has been petrologist for the Irish Stone Axe Project. He is professional member of the Institute of Archaeologists of Ireland, the Institute of Geologists of Ireland, and the European Federation of Professional Geologists. Between 2009 and 2014 Stephen Vice Chairperson of the Archaeology Committee of the Royal Irish Academy Committee.

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.

DESCRIPTION OF THE PROPOSED DEVELOPMENT

- 2.1 As described in Chapter 1 (Introduction), the Applicant is applying to ABP for planning permission for planning permission for the provision of a new 110kV Gas Insulated Switchgear (GIS) Substation (known as Aungierstown), 2 no. transformer bays, associated compounds and site infrastructure to be located on lands at Grange Castle South Business Park, Baldonnel, Dublin 22. The application also includes 2 no. underground single circuit 110kV transmission lines from the proposed Aungierstown Substation to the existing 220kV / 110kV Castlebaggot Substation to the immediate north-east 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 13th 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; 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

- 2.3 The Proposed Development is to be located on a site of c. 0.9163 hectares that is located within the Grange Castle South Business Park. The proposed 110kV GIS substation; the 2 no. transmission lines to the existing 220kV / 110kV Castlebaggot Substation to the north-east are located on lands that at the time of making this application are in the ownership of the Applicant; South Dublin County Council and ESNB. 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 Google data centre development to the east; the Grange Castle South Access Road that provides access off the Baldonnel Road into Grange Castle South Business Park to the north; and the permitted and under construction data centre development of the applicant to the south and west.

110kV transmission lines to the Castlebaggot Substation

- 2.5 The route of the 2 no. underground 110kV transmission lines to the Castlebaggot Substation pass from the northern part of the proposed substation and will pass under the Grange Castle South Business Park Access Road, and under the culverted stream beneath it before passing along the SDCC wayleave around the Castlebaggot substation where it will pass under the culverted stream for a second time; before passing into the substation approximately half way along its western boundary. The length of the 110kV cable routes are c. 140m and 120m
- 2.6 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.

Permitted development

- 2.7 The lands to the west of the Proposed Development are currently under construction under the parent permission granted under Reg. Ref. SD18A/0134 / An Bord Pleanála Ref. ABP-302813-18. The site has subsequently been expanded to include a former scaffolding yard at the south-east corner of the overall landholding along the Baldonnel Road that expanded the site from 9.2 to 9.7 hectares.
- 2.8 Construction has commenced on the western part of the site to develop the two storey data centre facility (31,785sqm) and a three storey office block (2,882sqm) plus ancillary elements that included a

new Air Insulated Switch Gear (AIS) substation with associated transformer yard and Client Control building (125sqm). All elements of this original substation are being replaced.

- 2.9 The Client Control building (switch room) was subject to a recent retention application under Reg. Ref. SD20A/0244 as it was constructed to reflect the current substation layout. A Final Grant of Permission was issued on this application on the 4th January 2021.
- 2.10 In order to provide power for part of the Permitted Development an ESB temporary substation was applied for, and was granted permission with conditions under SDCC Reg. Ref. SD19A/0300.
- 2.11 An application for slight modifications to the parent permission as well as the demolition of the houses and other structures on the Permitted Development site was lodged with the Planning Authority on the 16th November 2020 under Reg. Ref. SD20A/0295. None of these works are affected by the Proposed 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.

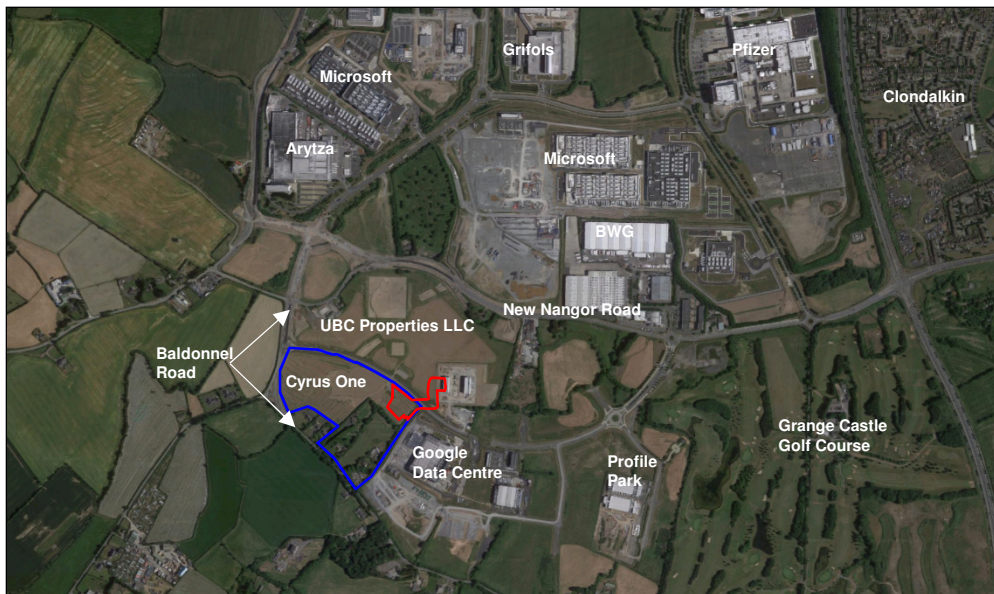


Figure 2.1 Proposed Development site outlined in red with the Permitted Development outlined in blue in context of surrounding development and land uses (Source: Google Earth)

Proposed Development description

- 2.12 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 north-east of the two storey data centre facility and associated three storey office block that was permitted under SDCC Reg. Ref. SD18A/0134 / An Bord Pleanála Ref. ABP-302813-18, and within an overall landholding bound to the north by the Grange Castle South Business Park access road; to the west by the Baldonnell Road and to the south by 3 no. residential properties and the Baldonnell Road; and to the east by the Google data centre facility within Baldonnell, Dublin 22. The site of the Proposed Development has an area of c. 0.9163 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 1,307.2sqm) (known as the Aungierstown Substation), two transformers, lighting and lightning masts, car parking, associated underground services and roads within a 2.6m high fenced compound and all associated construction and ancillary works.

- Two proposed underground single circuit 110kV transmission lines will connect the proposed Aungierstown 110kV GIS Substation to the existing 220kV / 110kV Castlebaggot Substation to the immediate north-east. The proposed transmission lines cover a distance of approximately 120m and 140m within the townlands of Ballybane, and Aungierstown and Ballybane.
- The development includes the connections to the two substations (existing and proposed), changes to landscaping permitted under SDCC Reg. Ref. SD18A/0134 / An Bord Pleanála Ref. ABP-302813-18 and all associated construction and ancillary works.

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

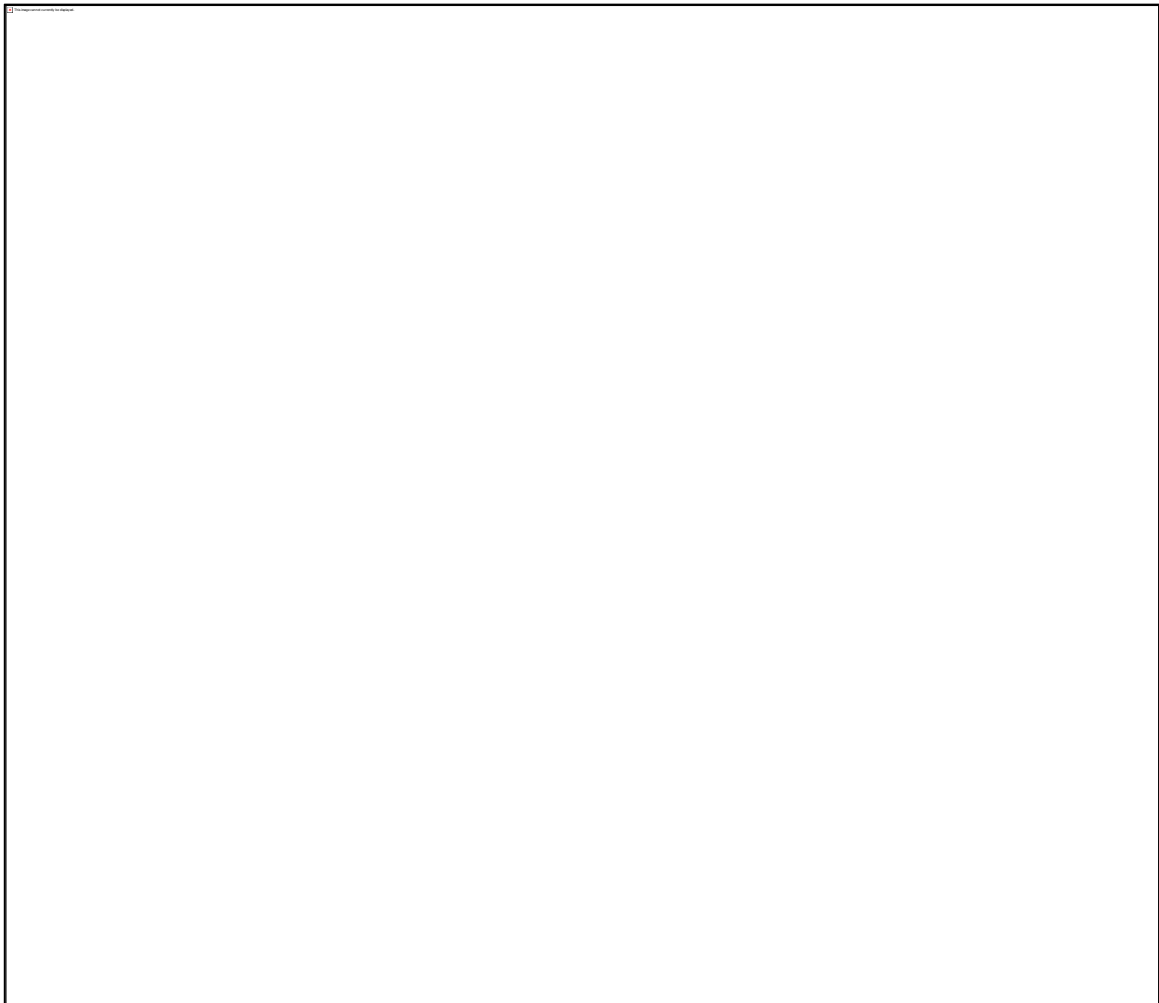


Figure 2.2 Proposed site layout plan of the Proposed Development site (red line) indicating proposed 110kV transmission lines (green lines) (Source: Drawing no. KG-PI278-CD001, Kirby Group, Consulting Engineers)

110kV GIS Substation Compound

- 2.14 The proposed 110kV Gas Insulated Switchgear (GIS) Substation Compound is to be located on lands which are currently greenfield in nature, to the north-east of Permitted Development granted under SDCC Planning Reg. Ref. SD18A/0134. The overall landholding is bound to the north by the Grange Castle South Business Park access road; to the west by the realigned Baldonnel Road; to the south by the Baldonnel Road; and to the east by the Google Data Centre within Baldonnel, Dublin 22.
- 2.15 The proposed 110kV GIS Substation Compound includes the provision of a two storey GIS Substation building (with a gross floor area of 1,307.2sqm) (to be known as the Aungierstown Substation), two transformers, Lighting and lightning Masts, Car Parking and Roads within a 2.6m high fenced compound and all associated construction and ancillary works. The Client Control Building (switch room) (with a gross floor area of 248.5sqm) is located outside of the Proposed Development site but within the overall compound. No changes to the Client Control Building (switch room) are proposed under this application than outlined under Reg. Ref. SD20A/0244.

material to specified requirements to ensure underside of utilities and culverts are fully supported for load bearing purposes on completion.

- 2.22 The ducting, bedding, surrounding fill material, warning marker boards and tape will be installed as per design in accordance with Eirgrid specification while maintain safe clearance from existing utilities. Chambers and sandpits to be installed as per design in accordance with Eirgrid specifications. Trench will be backfilled with suitable material and surface finishes will be returned to original state.
- 2.23 The depth of the trenches is expected to be up to c. 3m in depth and will require two separate trenches. A typical cross section of the 1.5m wide trench arrangement is illustrated in Figure 2.4.

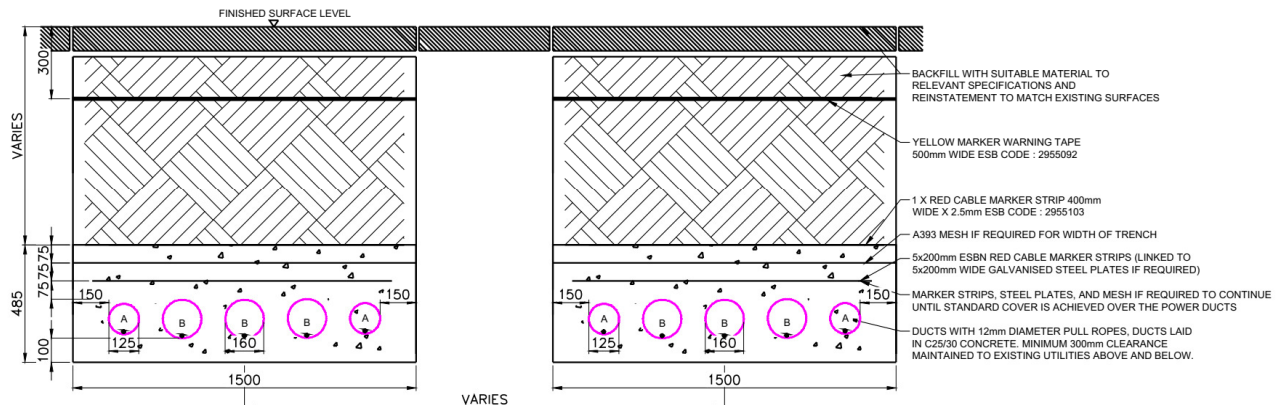


Figure 2.4 Typical cross-section of 110kV flat formation trench detail under the Grange Castle South Business Park access road (Source: Drawing no. KG-PI278-CD004, Kirby Group, Consulting Engineers)

- 2.24 The entire installed duct route will be cleaned, tested and roped to ensure suitability. Cables will be pulled from substation to substation through the duct by setting up cable drums at one end and pulling the cables with a winch set up at the other. Sandpits, where required, will be completed and surface finishes returned to original state.

Proposed Site Infrastructure and Secondary Facilities

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

- 2.25 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 drainage design requirements state that any development must restrict post development run-off rates to the pre-development, greenfield rates. This requires any new development to restrict storm water flows leaving the site to pre-developed rates. In practice, to accommodate this requirement, on-site storage must be provided to temporarily store rainwater generated on site.
- 2.26 The proposed surface water measures are aimed at improving the general surface water management of the site, by introducing interceptors, attenuation measures and by restricting the ultimate discharge, etc. Storm water from the roof area of the 110kV substation, will be directed via rain water pipes into an on-site reticulation system. The outflow from this system will be discharged directly into a Stormtech, or similar, attenuation system, located in the north-west of the site, near the access road off Grange Castle South Access Road (Please refer to Drawing no. P200401– 200 Rev. D, Pinnacle Consulting Engineers).
- 2.27 Storm water from all other hardstanding areas, except for the roof and surrounds of the client control building that sits outside of the application site, and transformer yard, will be drained into the proposed attenuation tank. Prior to discharge into the mains network, the runoff will be directed through appropriately sized petrol interceptors to comply with the general principles of sustainable urban drainage. This will enhance its overall quality prior to discharge.
- 2.28 Run-off from the adjacent Client Control building, transformer yard was permitted under Reg. Ref. SD18A/0134 / An Bord Pleanála Ref. ABP-302813-18. This development commenced construction in the summer of 2019. This included for the construction of the Client Control building of the substation was granted under the Permitted Development.

- 2.29 Further to extensive site investigations, the existing sub-soil provides inadequate soil infiltration rates and thus it is not practical to install a soakaway system. The storm water drainage within the development has been designed to accommodate a 1:2 year storm frequency. The attenuation system has been designed to accommodate a 1:100 year storm event + 20% climate change, based on a total hardstanding area of 0.253ha., which is the total fenced off area of the proposed Substation.
- 2.30 This area constitutes a surface water storage volume of 208m³. It is also proposed to restrict the outflow from the subject site by installing a Hydrobrake / orifice plate, limiting the ultimate discharge to 0.5l/s.
- 2.31 It is proposed to ultimately discharge surface water from the Proposed Development, post attenuation and outflow restrictions, via a 300mm Ø gravity sewer network and connect into existing manhole, EX SWMH, with a Cover Level of circa 74.02m and an Invert Level of circa 72.07m located adjacent to the temporary ESB sub-station, to the north of the Proposed Development site. Full details are provided within the *Engineering Planning Report*, prepared by Pinnacle Consulting Engineers.
- 2.32 The underground 110kV transmission lines from the proposed substation to the existing Castlebaggot 220kV / 110kV substation do not require any surface water drainage infrastructure. The transmission lines are underground and will be constructed on a primarily permeable gravel surface (with some concrete bases which will drain to the gravel area) at the substation. Rainfall will drain to ground, as it currently does in these areas.

Foul Drainage

- 2.33 Domestic effluent arising from the welfare facility (single WC) at the GIS substation will be collected in a foul drain within the site and discharged via a new 225mm gravity foul sewer spur to the north of the site 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 and will form via a separate connection to the Permitted Development.
- 2.34 The underground 110kV transmission lines from the proposed substation to the existing Castlebaggot 220kV / 110kV substation do not require any foul drainage infrastructure.
- 2.35 Further detail in relation to wastewater emissions is presented in the Engineering Planning Report by Pinnacle Consulting Engineers, 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

- 2.36 Water will be required for the welfare facility at the GIS substation. It is proposed that this will be provided via a separate connection to the Permitted Development off the water main spur along the Grange Castle South Business Park access road. The water demand for the Proposed Development will be minimal. Chapter 8 Hydrology and Chapter 15 Material Assets address the impacts on water supply.
- 2.37 The underground 110kV transmission lines from the proposed substation to the existing Castlebaggot 220kV / 110kV substation do not require any water supply.
- 2.35 A pre-connection enquiry (PCE) form was submitted to Irish Water (IW) as part of the Permitted Development application (Reg. Ref. SD18A/0134) which as well as addressing the water demand for the Permitted Development also addressed water demand for the Proposed Development. IW provided a Connection Offer for the development on the 5th September 2019 (IW Reference Number: Reference No CDS1900460401).

Electricity

- 2.38 The proposed 110kV GIS substation, and 110kV transmission lines are designed to support power demand for the Permitted Development of two data centres and offices under Reg. Ref. SD18A/0134

/ An Bord Pleanála Ref. ABP-302813-18. The Permitted Development was subject to a separate planning application and EIA Report and is located to the west of the proposed 110kV GIS (Aungierstown) substation. A full description of the Permitted Development is set out under Chapter 3 of this EIA Report.

Telecommunications

- 2.36 A fibre optic cable distribution network will be installed to serve the Permitted Development Reg. Ref. SD18A/0134. The fibre network for the permitted development will be extended to the GIS substation.

Fire water system

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

Security and lighting

- 2.39 Other than during construction, the traffic accessing the GIS substation will approach and access the site through a new entrance to be constructed off the Grange Castle South access road along the northern boundary (the new southern entrance will be constructed as part of the development as proposed under Reg. Ref. SD18A/0134 / An Bord Pleanála Ref. ABP-302813-18). A maximum speed limit of 15km/hour will be in place on the access road. No access is proposed internally beyond the access to the Client Control Building from the internal road.
- 2.40 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. An additional entrance to the Substation, which will remain in place following completion of the development, will be utilised to the east of this main access for maintenance purposes.
- 2.41 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.
- 2.42 A 2.4m high security fence will be constructed around the perimeter of the Permitted Development site that will sit 2m inside the base of the berms that will bound the application site. The Proposed Development will be partly screened from the Baldonnel Road to the west by the Permitted Development, berms and planting. The permitted boundary berms and planting will be significant as set out under the landscape master 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.
- 2.33 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.
- 2.43 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 in Table 2.1.
- 2.44 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.

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

Site roads and parking

- 2.45 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 Baldonnell 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 proposed new entrance to be constructed off the Grange Castle South access road along the northern boundary of the Permitted Development site that was granted under Reg. Ref. SD18A/0134. 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 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

- 2.46 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 developments.
- 2.47 The following sections present a description of each of these aspects.

Description of Construction

- 2.48 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.
- 2.49 The construction of the 110kV transmission lines will comprise three main stages, namely:
- Site preparation works and excavations;
 - Cable installation, jointing and testing; and
 - Reinstatement.

Working Hours

- 2.50 It is anticipated that the construction of the GIS substation, and the 110kV transmission lines 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.
- 2.51 A portion of the 110kV transmission line crosses under the Grange Castle South Business Park access road. Construction of this portion of the route will require the temporary closure of one of the traffic lanes for short periods. Construction of this portion of the route will be carried out between the hours of 10am and 4pm to minimise impact on the ongoing construction works on this and the adjacent site

to the north. Construction works associated with the underground cable will be temporary in duration. It is estimated that the civil works will take approximately 2-3 months, with a further 2 weeks estimated for cable installation, jointing and testing and reinstatement. Construction works associated with the substation will be 13-15 months.

- 2.52 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

- 2.53 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 - January 2021;
- Commence Site Construction works (subject to grant of planning permission) - Q3, 2021; and
- Completion of Construction and Commissioning - Q4, 2022.

Site preparation

- 2.54 The construction of the first data centre on site (Reg. Ref. SD18A/0134 / An Bord Pleanála Ref. ABP-302813-18) has already commenced. The first data hall is estimated to be in operation by Q2, 2021, with the completion of construction and commissioning of the remaining data centre targeted for completion by Q1, 2023.
- 2.55 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 will be utilised for the Proposed Development. The construction compound will facilitate office, portable sanitary facilities, equipment storage, parking etc. for contractors. It will be used for the duration of the works.
- 2.56 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.
- 2.57 The site preparation required for the 110kV transmission lines will be limited with minimal site clearance required. 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

- 2.58 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

- 2.59 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).
- 2.60 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. SD18A/0134 will require the importation of 12,400m³ of fill material. The Proposed Development will not require the importation of fill material and will generate c. 12,300m³ of construction waste. The fill material will be sourced from various locations within the Greater Dublin Area to facilitate construction of the Permitted Development.
- 2.61 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

- 2.62 The outer finishing of the building envelopes are intended to be of a similar quality and appearance to the Permitted Development. Reinstatement along the 110kV transmission lines will be as current, i.e. grassed in greenfield areas and hardstand along paved areas and roads.

Roads, services and landscaping

- 2.63 The internal road system will be completed as part of the Permitted Development under Reg. Ref. SD18A/0134 / An Bord Pleanála Ref. ABP-302813-18. Landscaping will be undertaken in accordance with the landscape masterplan for the Permitted Development apart from to the immediate north and east of the GIS Substation (refer to Chapter 11 Landscape and Visual Impact) and as proposed, outside of the application site under Reg. Ref. SD20A/0259.

Material sourcing, transportation and storage materials

- 2.64 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 on site.

Sourcing

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

Storage

- 2.66 Aggregate materials such as sands and gravels will be stored in clearly marked receptacles 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

- 2.67 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

2.68 Chapter 14 contains a detailed description of waste management relating to construction 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 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

2.69 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. Various mitigation measures have been considered and will be implemented during the construction of the Proposed Development, such as:

- 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.

2.70 Furthermore, it is proposed that a variety of 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.

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

2.72 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.

2.73 In order to ensure that no dust nuisance occurs, a series of measures will be implemented 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 15km/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.

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

Water discharges

2.35 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.

2.74 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.

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

Construction impacts

2.76 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 Structuretone 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.

2.77 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.

2.78 Mitigation measures to address each of these potential short to medium term effects are presented in each individual EIA Report chapter.

Description of commissioning

2.79 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

- 2.80 As stated in Chapter 1 of this EIA Report, 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 110kV transmission lines and cable installation.
- 2.81 The estimated staff required are outlined in the following paragraphs.

110kV GIS substation

- 2.82 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.
- 2.83 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 2 new transformers (to be located south of and adjacent to the 110kV GIS substation) will also be inspected during this time.

Underground 110kV Transmission Lines

- 2.84 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. These inspections are likely to be conducted at the same time the underground 110kV transmission line is inspected.
- 2.85 Traffic relating to staff movements have been assessed as part of the traffic and transportation chapter of this EIA Report (Chapter 13).

Decommissioning of the Proposed Development

- 2.86 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.

Description of other developments

- 2.87 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 & resource use

- 2.88 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

- 2.89 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.
- 2.90 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

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

Potential impacts of the Proposed Development

- 2.92 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.
- 2.93 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 implement a CEMP to ensure each of these potential impacts are minimised.
- 2.94 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

- 2.95 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 site has also been considered with reference to Seveso/COMAH.

Landslides, Seismic Activity and Volcanic Activity

- 2.96 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

- 2.97 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 1 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

- 2.98 The Proposed Development will not be a Seveso/COMAH facility. Fuel oil storage (diesel) is required for the operational phase. Fuel oil will be stored within a c. 800 L capacity tank for the supply of the backup generator for the substation, within an adequately sized bund. Diesel will also be stored on the Permitted Development site for the emergency back-up generators. The volumes of diesel to be stored within the Proposed and Permitted Developments does not exceed the relevant thresholds of the Seveso Directive.

Minor accidents/leaks

- 2.99 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 of this EIA Report 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

- 2.100 The Proposed Development is designed to support power demand for the Permitted Development (Reg. Ref. SD18A/0134 / An Bord Pleanála Ref. ABP-302813-18). A detailed description of this Permitted Development and other applications on the Permitted Development site is provided in paragraph 2.7-2.11 of this Chapter and in Chapter 3 – Planning and Development Context. This separate planning application was also subject to an EIA Report. The Proposed Development will be constructed at approximately the same time as Building B of the Permitted Development.
- 2.101 The cumulative impact of the Proposed Development with Building B of the Permitted Development during the construction phase; and the entire Permitted Development as granted under Reg. Ref. SD18A/0134 during the operational phase have been considered in each of the Chapters of this EIA Report.
- 2.102 As part of the assessment of the impact of the Proposed Development, the cumulative impacts of the Proposed Development with other developments that are currently permitted or under construction within the vicinity of the site, neighbouring industrial parks and surrounding areas have been assessed. A list of the other developments considered is provided in Chapter 3 (Planning and Development Context). The cumulative impact assessment of the Proposed Development with these other developments is provided in each chapter 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.

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 to the west of the proposed GIS substation that received its Final Grant of permission under Reg. Ref. SD18A/0134 / An Bord Pleanála Ref. ABP-302813-18 as detailed in Chapter 2 and within this chapter and was subject to a separate planning application and EIA as detailed in Chapter 2.

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 25th June 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-307074-20).

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 facilities. This sector underpins Ireland’s international position as a location for ICT and creates added benefits in relation to establishing a threshold of demand for sustained development of renewable energy sources.”

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 and its supporting infrastructure 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 is the statutory planning document that covers the entire South Dublin administrative area. The Plan was adopted in June 2016. 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.”

- 3.17 The Proposed Development is required to provide permanent power to the Permitted Development that received its Final Grant permission on the 18th April 2019 under Reg. Ref. SD18A/0134 / ABP Ref. ABP-302813-18.

- 3.18 The County Development Plan 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 formulating 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. SD18A/0134 / ABP Ref. ABP-302813-18. 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 Pleanála (ABP) on the 25th June 2020 in advance of lodgement of the Proposed Development. 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.
- 3.29 EIA contributors/authors have incorporated advice and comments received into the relevant chapters of this EIA Report.

Planning history

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

- 3.30 The permission granted by the Board on the 18th April 2019 was for a two-storey data centre with associated three storey office block that has a gross floor area of 35,426sqm on an overall site of 9.2 hectares. The site has been further increased to a total of 9.7hectares following the purchase of a property to the south-east of the permitted development site.
- 3.31 The permitted data centre development is split across three primary components that will consist of two data centre blocks and associated offices. The two storey data centre of 32,419sqm will be separated into two adjoined blocks over two floors with data halls on each floor of each data centre with service space around each data hall; and the data centre will be bookended to the east by a two storey delivery bay. The data hall buildings and office will have a general dimension of being 292.2m in length by some 65.2m in width.
- 3.32 The associated offices will be three storey in height and will comprise some 2,882sqm of gross floor area of offices and support spaces. It incorporates a second two storey delivery bay to its south. The office building will have a general dimension of being 77.1m in length by some 16.6m in width.
- 3.33 Containerised electrical plant containing generators, transformers and switch-rooms are located externally within four louvre-screened compounds along the northern side of the data hall block, with cooling plant located on gantries at first floor level. There is no internal floor area within these compounds.
- 3.34 There are 32 containerised standby diesel generators, located at ground level in the louvred plant compounds to the north of the data hall block (eight in each compound). Cooling is provided by radiators mounted on top of the containers. Fuel is stored in bunded belly tanks located below the containers, and filled via individual fill points (one for each tank), located within the louvre screen wall.
- 3.35 There will be 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. The flue towers are situated between each pair of generators, each housing four stainless steel flues that have a 650mm diameter.

- 3.36 There will be 32 acoustically attenuated chillers located on the upper level plant gantries to the north of the data hall block (eight on each gantry). Air is drawn in from underneath the gantry and exhausted vertically upwards.
- 3.37 A single storey 110kV Air Insulated Switch gear (AIS) substation with associated transformer compound and client control building (125sqm) is permitted at the north-east corner of the site (see highlighted area below). It is this part of the site, with amendments to the compound boundary, that forms the 110kV GIS Substation under this application.



Figure 3.1 Permitted AIS Substation in north-east corner of Permitted Development site (shaded cream)

- 3.38 The Permitted Development was accompanied by a full and robust Environmental Impact Assessment Report (EIA Report) that was undertaken in accordance with the Environmental Protection Agency (EPA) Draft “*Guidelines on the Information to be Contained in Environmental Impact Assessment Reports*” (2017). This included an assessment of the impact of the construction of an AIS substation and transformers on the site of the now proposed 110kV GIS Substation that forms part of this application. This included mitigation measures relating to reducing the impact of the permitted substation that were accepted by the Planning Authority and the Board. These were mainly relating to light pollution on both existing and proposed new hedgerow and trees permitted under this scheme.

Reg. Ref. SD19A/0300

- 3.39 In order to provide temporary power for part of the Permitted Development granted under Reg. Ref. SD18A/0134 / An Bord Pleanála Ref. ABP-302813-18 an ESB temporary substation was applied for, and received its Final Grant on the 9th January 2020.

Reg. Ref. SD20A/0244

- 3.40 This application for the retention of the single storey client control room (248.5sqm) associated with the proposed substation that will be located to the north-east of the Permitted Development granted under Reg. Ref. SD18A/0134 / ABP Ref. ABP-302813-18 received a Final Grant of Permission on the 4th January 2021. The development will form an amendment and modification of the permission granted for a single storey transformer building (125sqm) under Reg. Ref. SD18A/0134 / ABP Ref. ABP-302813-18.

Reg. Ref. SD20A/0295

- 3.41 This application for several different elements was lodged with the Planning Authority on the 16th November 2020. This application is for several different components that amount to amendments and modifications to the permitted data centre development granted under Reg. Ref. SD18A/0134 / ABP Ref. ABP-302813-18 and the temporary substation permission granted under SD19A/0300 to include:

- demolition of the two storey dwelling of Weston House; the single storey dwelling and outbuildings /stables of Weston Lodge; and the single storey dwelling and converted garage of Kent Cottage.

3.42 The development also consists of:

- Retention of sprinkler tank and pump house to the south-west of Building A Data Centre to replace 4 no. sprinkler tanks;
- Retention of 40kW(p) PV panels on the roof of Building A Data Centre;
- Retention of revised size of northern attenuation pond and loss of permitted landscaping to its south;
- Retention of ramped access to rear of temporary substation permitted under SD19A/0300;
- Retention of revised flue arrangement for Building A Data Centre from 2 no. associated flues per generator to 1 no. associated flue per generator (16 in total) and grouped into 8 towers of two flues each (each 20m high);
- Retention of revised position of security fence to north, west and south of Building A Data Centre; and
- Retention and modifications of landscape berm along Baldonnel Road and to east of Weston House.

3.43 The development will consist of new works to include:

- Modification of permitted vehicular entrance to the data centre to include a new single storey guard house (37sqm) and two internal entrance gates;
- Modification to car parking so that the permitted entrance to the parking area from the east is closed off;
- Modification of flue arrangement for Building B Data Centre from 2 no. associated flues per generator to 1 no. associated flue per generator (16 in total) and grouped into 8 towers of two flues each (each 20m high);
- Modification of permitted landscape scheme to north and south of Building A Data Centre;
- Removal of roadside entrances to Erganagh House (demolished), Kent Cottage, and the former scaffolding yard; and
- Removal of roadside entrance to Weston House and its replacement with a new agricultural gate and fence to be erected to facilitate access for maintenance and security purposes only.

3.44 A decision on this application is due on the 19th January 2021. No works that form part of this application are located within or affect the Proposed Development site in any material way.

3.45 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

3.46 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.

3.47 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.
- 3.48 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).
- 3.49 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.

UBC Properties site

Reg. Ref. SD20A/0121

- 3.50 This application on the site to the north of the Cyrus One site, was made for three no. two storey data centre buildings on the 26th May 2020 and received its Final Grant of Permission on the 3rd September 2020. The Proposed Development description, which was granted in its entirety, is to seek permission for a period of ten years for a development with a gross floor area of 80,269sqm that 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 with a gross floor area of 78,871sqm;
 - 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 include 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 Baldonnell 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.

3.51 An SID application for a proposed 110kV substation and 2 no. single circuit transmission lines, to provide permanent power to the development granted under Reg. Ref. SD20A/0121, has recently been applied for to An Bord Pleanála under ABP Ref. PL06S.308585. The case is due to be decided by the 13th May 2021.

Google

Reg. Ref. SD14A/0023

3.52 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 subject 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

3.53 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

3.54 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

3.55 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

3.56 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

3.57 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*
- 3.58 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*
- 3.59 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*
- 3.60 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*
- 3.61 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 subject 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*
- 3.62 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*
- 3.63 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*
- 3.64 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

- 3.65 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.
- 3.66 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.

3.67 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.

ALTERNATIVES

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, and due to the design requirements of EirGrid in terms of the lack of landscape treatment surrounding the proposed substation. 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 Development (SDCC Reg. Ref. SD18A/0134), 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 Building B 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 EIAR.

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. SD18A/0134 (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.

4.8 Alternative sites were considered for the Proposed Development under the Permitted Development. However, the need for a strong architectural expression facing the Business Park entrance generated the architectural response of locating the offices to this elevation; and the substation in the north-east corner of the Proposed Development site. 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 and was soon dismissed as a viable alternative.

- 4.9 Currently, two data centre buildings detailed in the Permitted Development have been granted planning permission (i.e. Buildings A and B) with construction on Building A having commenced in Q3, 2019. It was not deemed practicable or necessary therefore, to consider an alternative location for the Proposed Development's 110kV GIS Substation compound during the assessment of this Proposed Development.

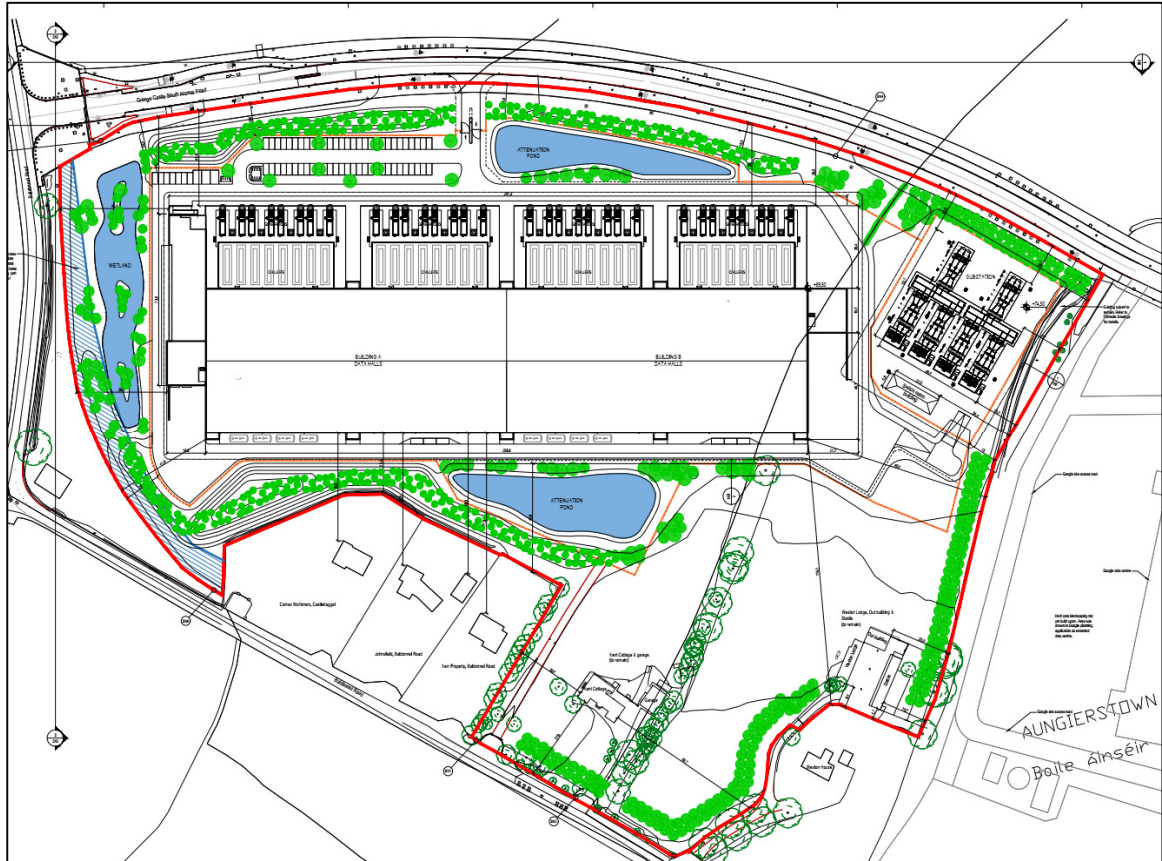


Figure 4.1 Permitted Development site layout plan (application boundary outlined in red) as granted under SDCC Planning Ref. SD18A/0134 / An Bord Pleanála Ref. ABP-302813-18 indicating future substation compound site (Source: Hyphen Architects April 2018)

110kV Transmission Line Routes

- 4.10 The assessment of the alternative routes for the two 110kV transmission lines considered five route options from the Castlebaggot 220kV / 110kV substation to the proposed substation. Given the short distance between the proposed substation and the Castlebaggot 220kV / 110kV substation the variation in the routes are minimal, and can be described as follows:
- 4.11 **Option B-A** – These route options extend from the western side of the Castlebaggot substation building and adjoin and run parallel to each other some 40m to the west before passing under the Grange Castle South Business Park access road to the proposed substation. The estimated length of both these routes are 140m and 130m (see Figure 4.2). These routes run under lands in the control of a third party.

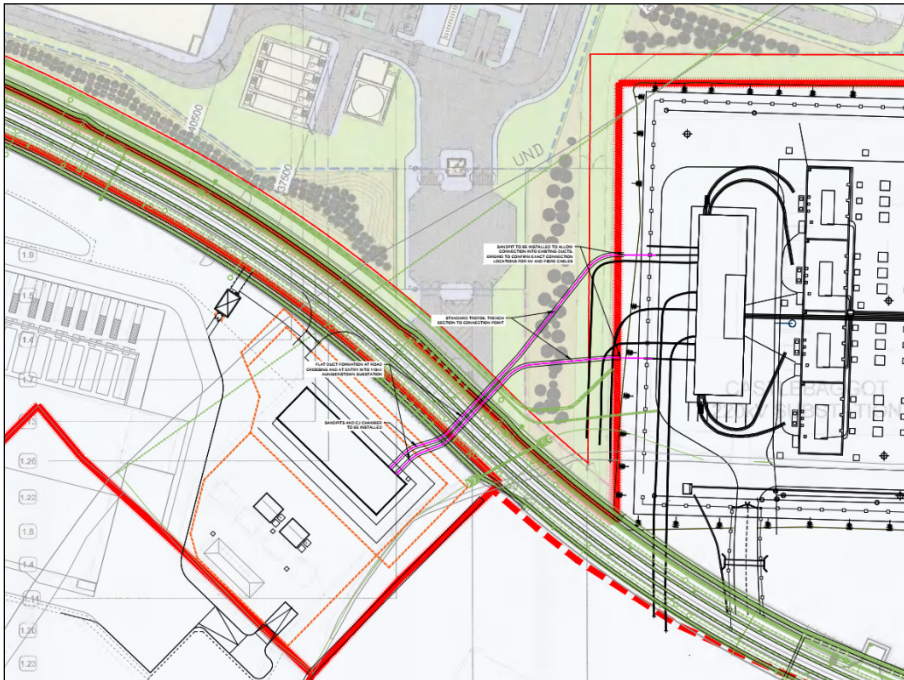


Figure 4.2 Grid Connection Route Option B-A, from the Castlebaggot substation to the proposed Aungierstown substation (Source: Kirby Engineering and Construction, September 2020)

- 4.12 **Option B-B** - These route options extend from the western side of the Castlebaggot substation. The northern transmission line passes along just outside of the SDCC wayleave before aligning with the southern transmission line to run parallel to each other some 20m to the west of the Castlebaggot substation compound before passing under the Grange Castle South Business Park access road to connect into the northern elevation of the proposed substation. The estimated length of both these routes are 140m and 120m (see Figure 4.3). These routes run under lands in the control of a third party.
- 4.13 **Option B-C** - These route options extend from the western side of the Castlebaggot substation. The northern transmission line passes along just outside of the SDCC wayleave before aligning with the southern transmission line to run parallel to each other some 20m to the west of the Castlebaggot substation compound before passing under the Grange Castle South Business Park access road to the eastern elevation of the proposed substation. The estimated length of both these routes are 145m and 120m (see Figure 4.4). These routes run under lands in the control of a third party.
- 4.14 **Option B-D** - These route options extend from the western side of the Castlebaggot substation. The northern transmission line passes along just outside of the SDCC wayleave before aligning with the southern transmission line to run parallel to each other some 12m to the west of the Castlebaggot substation compound before passing under the Grange Castle South Business Park access road to the northern elevation of the proposed substation. The estimated length of both these routes are 140m and 120m (see Figure 4.5 below). These routes run under lands in the control of a third party.

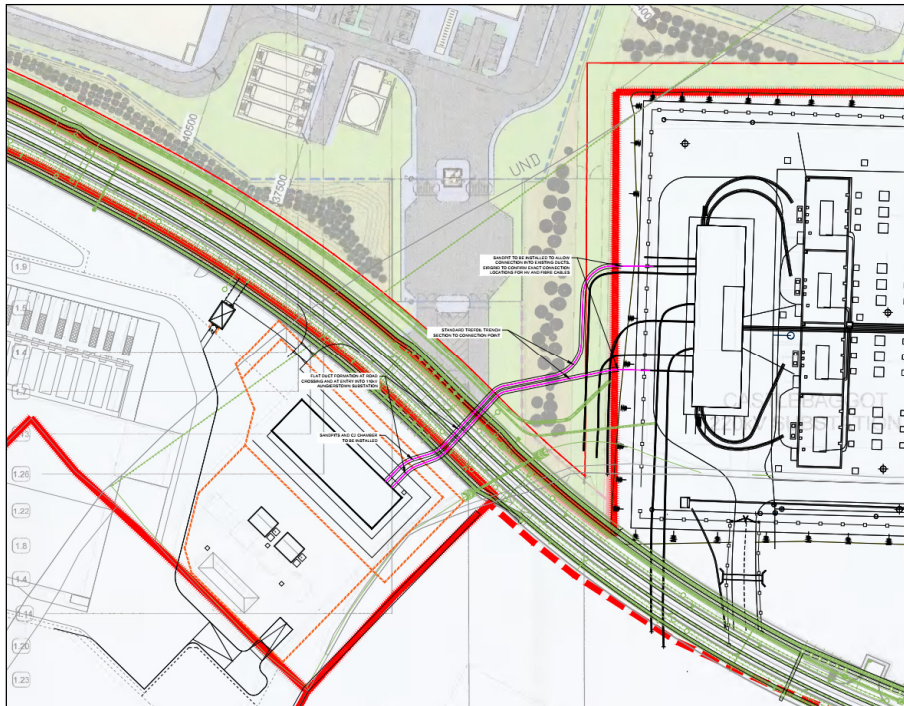


Figure 4.3 Grid Connection Route Option B-B, from the Castlebaggot substation to the proposed Augierstown substation (Source: Kirby Engineering and Construction, September 2020)

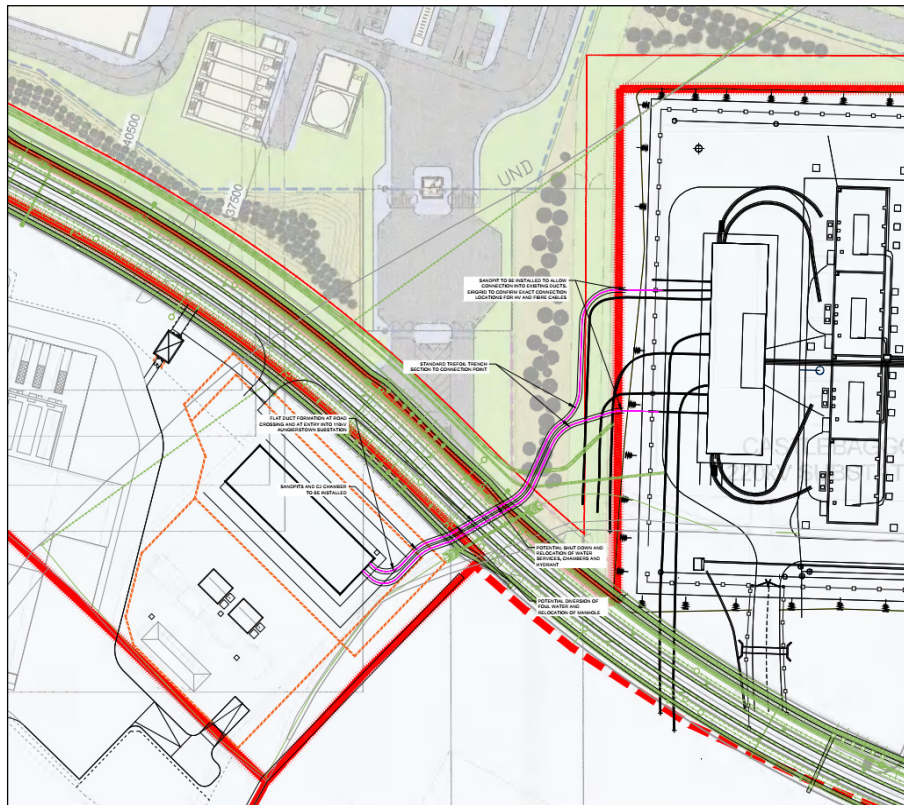


Figure 4.4 Grid Connection Route Option B-C, from the Castlebaggot substation to the proposed Augierstown substation (Source: Kirby Engineering and Construction, September 2020)

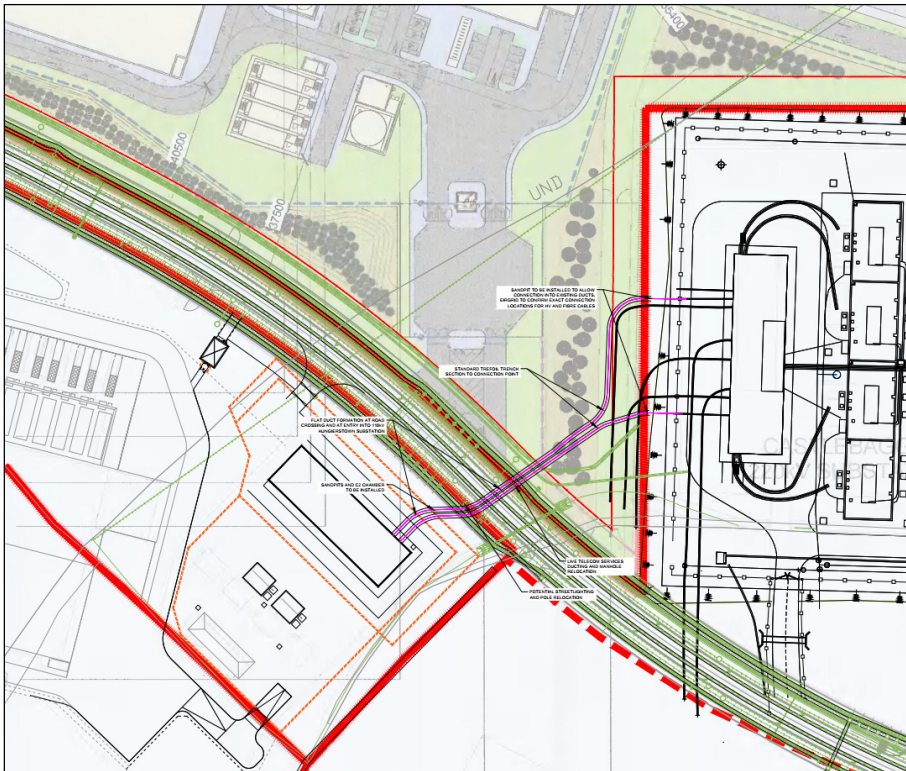


Figure 4.5 Grid Connection Route Option B-D, from the Castlebaggot substation to the proposed Aungierstown substation (Source: Kirby Engineering and Construction, September 2020)

4.15 A preliminary appraisal of the environmental effects of all Options was undertaken as part of the route selection process. As Option B-D was deemed to be not viable due to the need to pass through third party lands an alternative solution was sought. This required a route that needed to avoid conflicts with existing power lines and culverted stream. This enabled all works to be located either on lands within the control of the applicant; SDCC or a wayleave of SDCC; as well as the connection into the Castlebaggot substation infrastructure. Whilst this route provided a slightly more complex route it enabled the applicant to move forward with certainty of delivering this key infrastructure.

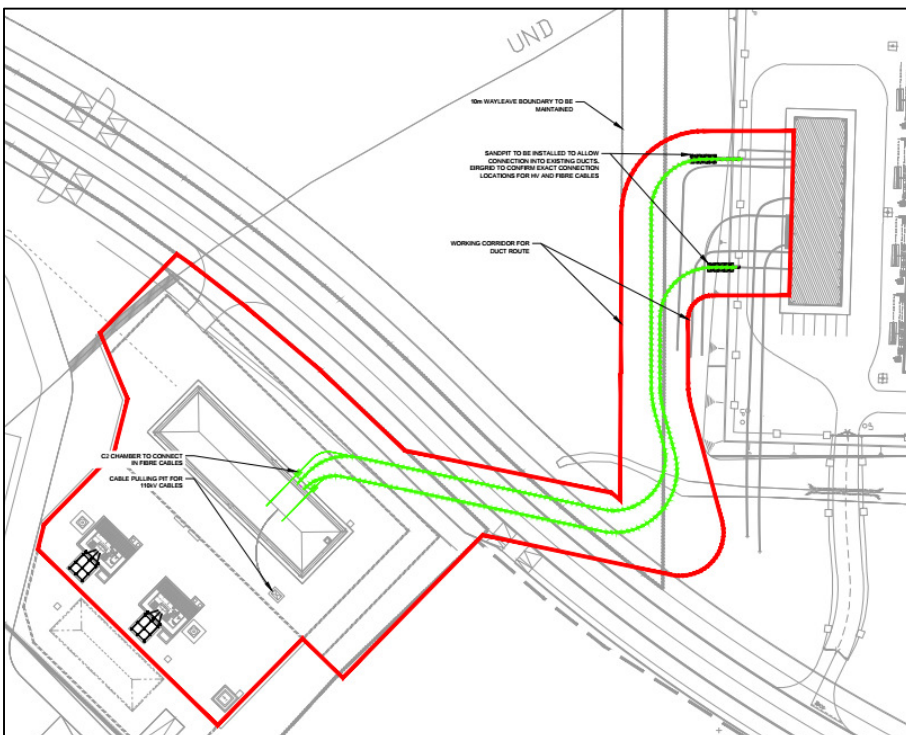


Figure 4.6 Preferred Grid Connection Route from the Castlebaggot substation to the proposed Aungierstown substation (Source: Kirby Engineering and Construction, December 2020)

- 4.16 A preliminary appraisal of the environmental effects of all these options was undertaken as part of the route selection process prior to options being discounted. All routes were determined as having minimal short or long-term impacts on the environment. In terms of the operational phase for either of the route options, each of the environmental factors were considered to have a **long-term, neutral** and **imperceptible** impact on the environment.
- 4.17 For the construction phase, the duration of impacts for all route options would be **short term** as the works for the transmission line will have a duration of less than 1 year. There are no significant environmental effects predicted for the construction phase for the chosen route as set out in the subsequent chapters of this EIA Report. Based on a high-level environmental assessment of the alternative route, it is considered that the construction phase would not result in any significant environmental effects.
- 4.18 Each of the environmental factors were assessed for the construction phase using a similar methodology to determine the more preferred and less preferred route option, and in some cases there was no discernible difference between the two options and are considered neutral.
- 4.19 There were no environmental constraints which would preclude development of any of the above route options. A review of relevant environmental criteria by each specialist show a preference for the Preferred Route based on certainty of delivery and also the shorter length of the Preferred Route. This also reduces waste generation as a result of the construction phase as well as a shorter construction period.
- 4.20 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*).
- 4.21 The assessment of the alternative routes for the 110kV transmission line to the 220kV / 110kV Castlebaggot substation was defined by the layout of the proposed Aungierstown 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 beyond that outlined as the preferred route that forms the Proposed Development. The route passes along the SDCC wayleave outside of the Castlebaggot substation from the proposed 110kV substation. The length of these route are c. 120m and 140m.

Alternative design / layout

- 4.22 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. The Permitted Development included for an Air Insulated Switch-Gear (AIS) substation that was deemed as not acceptable by ESB Networks and Eirgrid.
- 4.23 Alternative design options for the 110kV transmission cables did not include overhead lines due to the short distance of the lines. By their very nature, overhead lines require corridors to run along alignments that must be clear of all other development. This would effectively sterilise the land in this corridor.
- 4.24 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

- 4.25 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 will become an integral part of the national high voltage electricity grid which is currently operated by ESB Networks.

- 4.26 The underground cable installations must meet ESB Network'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.
- 4.27 In terms of the proposed processes, the proposed GIS substation 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 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 5-16 and are summarised in Chapter 2 – Appendix 2.2.

Conclusions on Alternatives

- 4.31 The selected route for the 110kV transmission lines were deemed to be most suitable route for the Proposed Development from an engineering perspective taking into account access to land, cost and environmental effects. During construction the proposed 110kV routes will have a **short-term, neutral** and **imperceptible** environmental effect during the construction phase. It is noted that the Preferred Route is considered to have a **neutral, imperceptible, long-term** environmental effect during the operational phase.
- 4.32 The design of the proposed GIS substation 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.

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 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 16 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 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

- 5.12 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

- 5.13 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

- 5.14 The Proposed Development is to be located on a site of c. 0.9163 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 Chapter 2 (Description of the Proposed Development). The nearest occupied residential properties are located c. 200m to the south-west of the Proposed Development site; and c.250m from the proposed 110kV GIS substation.
- 5.15 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

- 5.16 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

- 5.17 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.

- 5.18 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 Baldonnell 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.
- 5.19 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	+5.6%
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%

- 5.20 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.
- 5.21 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

- 5.22 The economic conditions in Ireland that stemmed from 2008 resulted in higher unemployment levels over the following five 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 186,900 in November 2020. In addition, a further 351,424 were on the Pandemic Unemployment Payment Scheme.
- 5.23 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 49,381 at the end of November 2020. Significant levels of people were also on the Pandemic Unemployment benefit within the region. The long term implications on employment across the State and in Dublin at the time of making the application are unclear.
- 5.24 The 2016 Census figures demonstrate that a similar decrease in unemployment has occurred within the Clondalkin-Village ED and Clondalkin Local Electoral Area.
- 5.25 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 2016 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 Covid-19 pandemic will have significantly altered this.

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.

- 5.26 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 continued 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 has 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

- 5.27 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. Three residential properties are currently proposed for demolition under the concurrent application on the Permitted Development site made under Reg. Ref. SD20A/0295. These are located 120m 170m and 180m from the southern boundary of the Proposed Development site. The nearest occupied residential properties are located c. 200m to the south-west of the Proposed Development site. Residential properties and other sensitive receptors within c.1km area of the Proposed Development site are shown in Figure 5.1 below.

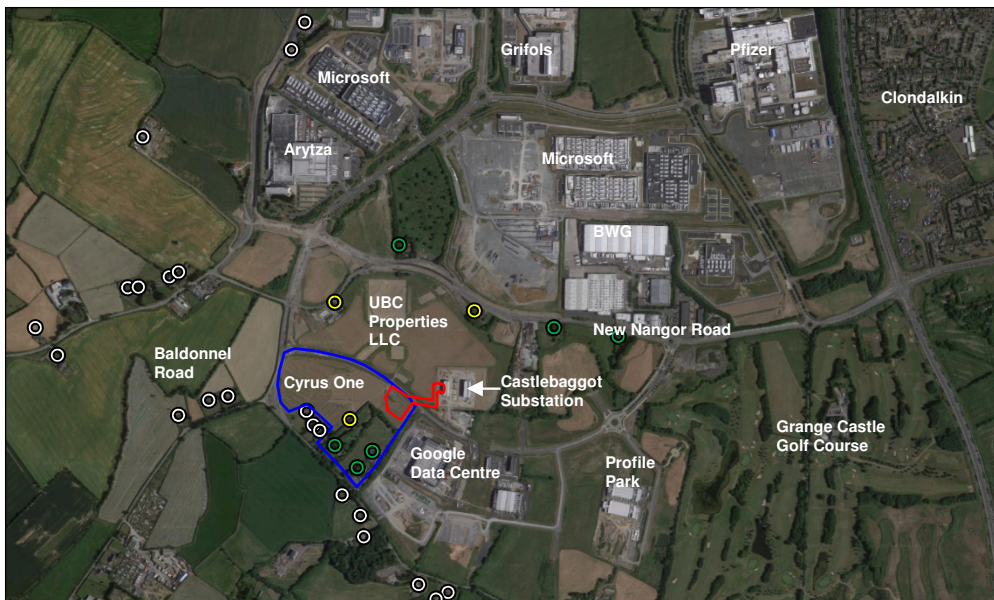


Figure 5.1 Existing land use in vicinity and outside of the subject site (Nearest existing residential properties outlined by white ring; those permitted to be demolished or already demolished outlined in yellow; and existing properties that have been abandoned (or proposed to be demolished subsequent to a grant of permission under Reg. Ref. SD20A/0295 outlined in green)

- 5.28 Residential development is primarily located to the south-west of the site (see Figure 5.1). There are three dwellings at a distance of 200m away from the Proposed Development site and abounding the Permitted Development site along the Baldonnell Road. Three former dwellings that are now abandoned are located within the southern part of the wider site and are proposed to be demolished under the concurrent planning application under Reg. Ref. SD20A/0295. An additional dwelling was permitted to be demolished under the Permitted Development. These properties have become abandoned as a result of their purchase by the applicant to facilitate future development.
- 5.29 A group of three occupied residential properties are located on Aylmer Road to the west of the main data centre development. The nearest of these properties is located some 460m from the western extent of the Proposed Development site.
- 5.30 Further occupied residential properties are located to the north-west on the R120; a travellers site lies further to the north-west of the main site; with further residential properties located to the east of the R120 as it heads towards the Grand Canal.

Schools

- 5.31 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 Baldonnell Road some 500m to the south-west of the southern extent of the application site boundary.

Health and security

- 5.32 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

- 5.33 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 730m from the eastern boundary of the Proposed Development site.

- 5.34 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 1.7km 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

- 5.35 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

- 5.36 Land use outside of the developing employment zones to the wider north, and immediate east and south is primarily greenfield 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 Baldonnell Road are some 1km to the south-east of the Proposed Development site.
- 5.37 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.
- 5.38 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 landscaped corporate park models.
- 5.39 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 east of the wider Data Centre site; the recently permitted data centres to the north (Reg. Ref. SD20A/0121) that lies on the opposite side of the Grange Castle South access road to the north; and the Microsoft data centre campus within the Grange Castle Business Park 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.
- 5.40 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. The new Castlebaggot Substation lies on lands to the immediate north-east of the Proposed Development site.

- 5.41 To the west of the Permitted Development site is the recently realigned Baldonnel Road that connects from the R134 to the north with the N7 corridor to the south. A small length of the old Baldonnel Road bounds the wider Permitted Development site to the south.
- 5.42 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) relate to the protection of amenity and townland boundaries.
- 5.43 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

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

Potential Impacts on Human Beings

- 5.45 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

- 5.46 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 been designed to avoid harmful effects to health.

Construction phase

- 5.47 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

- 5.48 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 NO₂, PM₁₀/PM_{2.5} and CO₂. 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 **neutral**.

Potential Impacts on Human Health from Noise & Vibration

- 5.49 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

- 5.50 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

- 5.51 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

- 5.52 There will be no impact on the local parks or larger amenity areas. It is not anticipated that the Proposed Development will have any 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).

- 5.53 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 Assessment.

Potential Impacts from Additional Traffic

- 5.54 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.

- 5.55 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

- 5.56 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.

- 5.57 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.

- 5.58 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.
- 5.59 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.
- 5.60 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 (Refer to Flood Risk Assessment undertaken by Pinnacle Consulting Engineers that accompanies this application). 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.
- 5.61 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

- 5.62 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

- 5.63 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.
- 5.64 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.

Cumulative impacts

- 5.65 The Permitted Development, as set out in this Chapter as well as the ongoing construction of the UBC Properties development will be undertaken at the same time as the 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 UBC Properties Development outlined that on average 250 construction workers, and 400 at its peak, would be employed. The Permitted Development EIA Report outlined that on average 100 construction workers, and 250 at its peak, would be employed.
- 5.66 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**.
- 5.67 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**.
- 5.68 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.
- 5.69 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**.
- 5.70 Once in full operation, the Permitted Development will coincide with that of the operational phase of the Proposed Development and UBC Properties development. The EIA Reports submitted with both applications indicated that they would employ 150 and 300 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.
- 5.71 The Proposed Development will be in Operation at the same time as the construction of the Permitted Development and the UBC Properties development is ongoing 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.
- 5.72 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 and Permitted Development once in operation. The cumulative impact of the Proposed Development with other committed or permitted developments will be **long-term and not significant**.
- 5.73 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 Permitted Development, and the underground cable installations will be **long-term and not significant**. The cumulative impact with the operational phases of the Permitted Development, and the underground cable installations will be **long-term and not significant**.
- 5.74 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.

- 5.75 The predicted cumulative impact associated with the operational phases of the Permitted Development, and the underground cable installations with the Proposed Development will be a **long-term, neutral** and **imperceptible** cumulative effect.

BIODIVERSITY

- 6.1 Scott Cawley Ltd. was commissioned to undertake an assessment of impacts on biodiversity (flora and fauna) of a Proposed Development in Grange Castle Business Park South, Co. Dublin (see Figure 6.1 below for location of proposed site). 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 The indicative red line boundary for the Proposed Development site and surrounding lands.

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 as outlined in Chapter 6 – Appendix 6.1 of this report where relevant.
- 6.3 In addition to those listed in the Reference section, key resources included Ordnance Survey Ireland mapping and aerial photography¹ and rare/protected/threatened species and designated sites data held online by the National Park and Wildlife Service (NPWS)² and the National Biodiversity Data Centre (NBDC)³.

¹ Available online at <http://map.geohive.ie/>. Accessed on the 18 December 2020.

² Available online at <https://www.npws.ie/protected-sites> and <https://www.npws.ie/maps-and-data>. Accessed on the 18 December 2020.

³ Available online at www.biodiversityireland.ie. Accessed on the 18 December 2020.

Field survey methodology

Habitats and flora survey

- 6.4 A habitat survey was undertaken of the Proposed Development site on the 14th July 2020 by Lorna Gill of Scott Cawley Ltd. following the methodology described in *Best Practice Guidance for Habitat Survey and Mapping*⁴. All habitat types were classified using the *Guide to Habitats in Ireland*⁵, recording the indicator species and abundance using the DAFOR scale⁶ and recording any species of conservation interest. Vascular and bryophyte plant nomenclature generally follow that of *The National Vegetation Database*⁷, having regard to more recent taxonomic changes to species names after the *New Flora of the British Isles*⁸ and the British Bryological Society's *Mosses and Liverworts of Britain and Ireland: A Field Guide*⁹. Annex I habitat types were classified after the *Interpretation manual of European Union Habitats EUR28*¹⁰ with reference to the corresponding national habitat survey reports and NPWS wildlife manuals, as applicable. The nomenclature for Annex I habitats follows that of the *Interpretation manual of European Union Habitats EUR28* with abbreviated names after those used in *The Status of EU Protected Habitats and Species in Ireland. Volume 1: Summary Overview*¹¹.

Fauna survey

- 6.5 A terrestrial fauna survey (excluding bats) was undertaken on the 14th July 2020 by Lorna Gill of Scott Cawley Ltd. The presence/absence of terrestrial fauna species 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 their potential to support these species.
- 6.6 Bat surveys were undertaken on the 21st June, 1st July and 10th July 2018 respectively by Scott Cawley Ltd. Both post-sunset and pre-sunrise surveys and transects were undertaken across the entirety of the Cyrus One Grange Castle site (see Figure 7.1) including the Proposed Development site. These surveys were undertaken using direct observation and handheld ultrasound detectors (Elekon BatLogger M). These surveys were focused on the Potential Roost Features (PRFs) in the buildings and trees to the south of the Proposed Development site to capture bats re-entering/exiting PRFs. For the remainder of the survey time, a walkover of lands across the entirety of the Cyrus One Grange Castle site (see Figure 6.1) including the Proposed Development site was carried out to capture bat activity across the site. The dawn survey commenced 1.5 hours prior to sunrise until 15 minutes after sunrise, while the dusk survey commenced 15 minutes prior to sunset and lasted for 1.5 hours. The data generated from the surveys was analysed using Elekon BatExplorer software to differentiate species by their sonograms. Calls were identified against species descriptions within *British Bat Calls: A Guide to Species Identification* (Russ, 2012).
- 6.7 Three static bat detectors (SM2BAT ultrasound detector) were left in place for eight consecutive nights from the 21st June to the 28th June 2018. One of these statics was located on the HV Substation Proposed Development site, along the treeline, which has since been removed following the approval of the data centre, Reg. Ref. SD18A/0134 / An Bord Pleanála Ref. ABP-302813-18.

Ecological evaluation and impact assessment methodology

Site evaluation criteria

- 6.8 The criteria used to assess the ecological value (Appendix 6.2) 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*,

⁴ Smith, G.F., O'Donoghue, P., O'Hora, K. & Delaney, E. (2011) *Best Practice Guidance for Habitat Survey and Mapping*. The Heritage Council Church Lane, Kilkenny, Ireland.

⁵ Fossitt, J.A. (2000) *A Guide to Habitats in Ireland*. Heritage Council, Kilkenny.

⁶ The DAFOR scale is an ordinal or semi-quantitative scale for recording the relative abundance of plant species. The name DAFOR is an acronym for the abundance levels recorded: Dominant, Abundant, Frequent, Occasional and Rare.

⁷ Weekes, L.C. & FitzPatrick, Ú. (2010) *The National Vegetation Database: Guidelines and Standards for the Collection and Storage of Vegetation Data in Ireland*. Version 1.0. Irish Wildlife Manuals, No. 49. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.

⁸ Stace, C. (2019) *New Flora of the British Isles. 4th Edition*. C&M Floristics.

⁹ Atherton, I., Bosanquet, S. & Lawley, M. (2010) *Mosses and Liverworts of Britain and Ireland: A Field Guide*. Latimer Trend & Co., Plymouth.

¹⁰ CEC. (Commission of the European Communities) (2013) *Interpretation manual of European Union Habitats EUR28*. European Commission, DG Environment.

¹¹ NPWS (2019). *The Status of EU Protected Habitats and Species in Ireland. Volume 1: Summary Overview*. Unpublished NPWS report.

Freshwater, Coastal and Marine version 1.1. Chartered Institute of Ecology and Environmental Management, Winchester CIEEM (2018).

Impact assessment criteria

- 6.9 In accordance with *NRA guidelines (2009)*, impact assessment is only undertaken of ‘Key Ecological Receptors’ (KERs). KERs are within the zone of influence¹² 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 Appendix B.2. Features of lower ecological value are not assessed. The highest levels of impact significance for each Sensitive Ecological Receptor ‘value’ rating is shown in Table 6.1.

Table 6.1 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

- 6.10 With regards to habitats, surveys were conducted during the optimal season for grassland habitat surveys (May – September inclusive), based on Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes (NRA, undated). Timing was not considered to be a limiting factor with regard the habitat survey.
- 6.11 Dedicated breeding bird surveys were not carried out, however a site suitability assessment for breeding birds and ad-hoc bird observations were noted during the site survey in July 2020. Therefore, sufficient information is available to predict impacts on breeding birds as a result of the permitted development. A conservative approach has been adopted to presume birds seen in suitable habitat could have nested within the site. In light of the above, this limitation is not considered to have compromised the baseline prediction or the impact assessment.
- 6.12 Dedicated bat surveys were not carried out, however a site suitability assessment for roosting or foraging bats was undertaken during the site survey in July 2020, and bat activity data for the site from 2018 was also utilised to inform the assessment. Therefore, sufficient information is available to predict impacts on bats as a result of the Proposed Development. The 2018 bat surveys remain relevant and valid for the additional assessment undertaken in July 2020 and that additional bat surveys were not required prior to submitting this application.
- 6.13 Surveys of the lands for terrestrial fauna were undertaken outside of the optimal survey season for the detection of signs of badger or otter. According to Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes (NRA, undated), the months of June to August are suboptimal for these species, as signs may be obscured by dense vegetation growth. Suitability of the site for terrestrial mammals was recorded during the site visit in July 2020. The aforementioned factors are not considered to pose any limitation on the ecological assessment of the Proposed Development for mammals due to the limited extent of suitable habitat within the Proposed Development site. Therefore, sufficient information is available to predict impacts on terrestrial mammals as a result of the Proposed Development.
- 6.14 Despite the limitations noted above, sufficient survey data was gathered to fully inform the assessment of impacts.

Receiving environment

- 6.15 The Proposed Development site is located in Grange Castle South Business Park, Dublin 22 and is adjacent to Grange Castle South Access Road to the northern periphery of the site. At the time of the habitat survey in July 2020, the Proposed Development site was being used as a construction compound for the construction works of the data centre to the west of the site (Figure 6.1). The grid

¹² 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.

connection will cross the Grange Castle Business Park Access Road including a small area of amenity grassland on either side of the road. The grid connection extends north beyond this road into an agricultural field before connecting to the existing Castlebaggot substation.

Protected areas

- 6.16 Special Areas of Conservations (SAC) are designated under the EC Habitats Directive (92/43/EEC) as amended, which is transposed into Irish law through a variety of legislation including the Birds and Habitats Regulations and the Planning and Development Acts. The 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, e.g. regularly occurring populations of migratory species (such as ducks, geese or waders), and areas of international importance for birds.
- 6.17 Natural Heritage Areas (NHAs) are designations under the Wildlife Acts in order to protect habitats, species or geology of national importance. Many of the NHAs in Ireland overlap with Natura 2000 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 due regard to their protection in planning policies and decisions¹³.
- 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). 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. 5.7km downstream and the pNHAs in Dublin Bay, South Dublin Bay pNHA (000210); c. 16km east of the Proposed Development, North Dublin Bay pNHA(000206); c. 15.7km northeast of the Proposed Development and Dolphins, Dublin Docks pNHA(000201); c. 17.2km east of the Proposed Development. See Figure 6.2 for a map of proposed Natural Heritage Areas located within 15km of the Proposed Development site.
- 6.19 There are no European sites within or directly adjacent to the boundaries of the Proposed Development site. The nearest European site to the Proposed Development is Rye Valley/Carton SAC (001398); c. 5.8km to the north west and upstream in terms of the Liffey catchment. The Rye Water Valley/Carton SAC is designated for the priority Annex I habitat Petrifying springs with tufa formation (*Cratoneurion*) [*7220] and populations of the Annex II narrow-mouthed whorl snail *Vertigo angustior* and Desmoulin's whorl snail *Vertigo moulinsiana*. See Figure 6.3 for a map of European Sites located within 15km of the proposed site.
- 6.20 The Proposed Development site is located within the Liffey and Dublin Bay catchment and River Liffey sub-catchment. According to the EPA Envision Map Viewer, the Milltown Stream emerges close to the Proposed Development site on the far side of the adjacent road to the north of the site Grange Castle South Access Road and converges with the River Griffeen c. 520m downstream of the Proposed Development site. The Milltown Stream is a small stream running through the site from south-east to north-west which has been culverted beneath the east of the Proposed Development site and culverted under Grange Castle South Access Road where it outfalls to the River Griffeen. The River Griffeen converges with the River Liffey c. 5.5km downstream of the Proposed Development site. The River Liffey discharges into a complex of marine and intertidal European sites in Dublin Bay. According to EPA online Envision Maps, the water quality of the surface, transitional and coastal water is as follows:
- The water quality of the Milltown Stream is currently unknown;
 - River Griffeen is classified as of "Poor" water quality status (i.e. Q3) at 'the Griffeen - First Bridge East of Milltown' station c. 260m upstream of the Proposed Development site;
 - The River Liffey is classified as of "Good" water quality status (i.e. Q4) c. 5.5km downstream of the Proposed Development site;
 - The Upper Liffey Estuary is classified as "Eutrophic" transitional water;
 - The Lower Liffey Estuary is classified as "Unpolluted" transitional water; and,
 - Dublin Bay is classified as "Unpolluted" coastal water.
- 6.21 The River Liffey is classified as "at risk of not achieving good status" under the Water Framework Directive (WFD) risk scoring system.

¹³ Source: NPWS Website. Available online at <http://npws.ie/protected-sites/nha> Accessed 20th May 2016

- 6.22 The Appropriate Assessment Screening Report for the Proposed Development undertaken by Scott Cawley Ltd. (2020) assessed Qualifying Interests, their threats, and their underpinning conditions for all European Sites potentially affected by the development, and concluded there would be no likelihood of significant effects on any European Sites as a result of the development, either alone or in combination with other plans or projects.

Figure 6.2 Proposed Natural Heritage Areas (pNHAs) within 15km of the Proposed Development

Figure 6.3 European Designated Sites located within 15km of the Proposed Development

Table 6.2 Designated sites located within 15km of the Proposed Development site and proposed Natural Heritage Areas within 15km 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)	
<p>Rye Water Valley/Carton SAC [001398]</p> <p>7220 Petrifying springs with tufa formation (<i>Cratoneurion</i>)*</p> <p>1014 Narrow-mouthed Whorl Snail <i>Vertigo angustior</i></p> <p>1016 Desmoulin's Whorl Snail <i>Vertigo moulinsiana</i></p> <p>NPWS (2020) <i>Conservation objectives for Rye Water Valley/Carton SAC [001398]</i>. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.¹⁴</p>	<p>Located c. 5.8km northwest of the Proposed Development site.</p>
<p>Glenasmole Valley SAC [001209]</p> <p>6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites)</p> <p>6410 <i>Molinia</i> meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinion caeruleae</i>)</p> <p>7220 Petrifying springs with tufa formation (<i>Cratoneurion</i>)*</p> <p>NPWS (2020) <i>Conservation objectives for Glenasmole Valley SAC [001209]</i>. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.</p>	<p>Located c. 8.4km southeast of the Proposed Development site.</p>
<p>Wicklow Mountains SAC [002122]</p> <p>3110 Oligotrophic waters containing very few minerals of sandy plains (<i>Littorelletalia uniflorae</i>)</p> <p>3160 Natural dystrophic lakes and ponds</p> <p>4010 Northern Atlantic wet heaths with <i>Erica tetralix</i></p> <p>4030 European dry heaths</p> <p>4060 Alpine and Boreal heaths</p> <p>6130 <i>Calaminarian</i> grasslands of the <i>Violetalia calaminariae</i></p> <p>6230 Species-rich <i>Nardus</i> grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe)</p> <p>7130 Blanket bogs (* if active bog)</p> <p>8110 Siliceous scree of the montane to snow levels (<i>Androsacetalia alpinae</i> and <i>Galeopsietalia ladani</i>)</p> <p>8210 Calcareous rocky slopes with chasmophytic vegetation</p> <p>8220 Siliceous rocky slopes with chasmophytic vegetation</p> <p>91A0 Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles</p> <p>1355 <i>Lutra lutra</i> (Otter)</p> <p>NPWS (2017) <i>Conservation Objectives: Wicklow Mountains SAC 002122</i>. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs.</p>	<p>Located c. 10.1km southeast of the Proposed Development site.</p>
<p>Red Bog Kildare SAC [000397]</p> <p>7140 Transition mires and quaking bog</p> <p>NPWS (2019) <i>Conservation Objectives: Red Bog, Kildare SAC 000397</i>. Version 1. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht.</p>	<p>Located c. 14.2km southwest of the Proposed Development site.</p>
<p>South Dublin Bay SAC [000210]</p> <p>[1140] Mudflats and sandflats not covered by seawater at low tide</p> <p>[1210] Annual vegetation of drift lines</p>	<p>Located c. 16km east of the Proposed Development site.</p>

¹⁴ 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
<p>[1310] <i>Salicornia</i> and other annuals colonising mud and sand [2110] Embryonic shifting dunes</p> <p>NPWS (2013) <i>Conservation Objectives: South Dublin Bay SAC 000210</i>. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.</p>	
<p>North Dublin Bay SAC [000206]</p> <p>[1140] Mudflats and sandflats not covered by seawater at low tide [1210] Annual vegetation of drift lines [1310] <i>Salicornia</i> and other annuals colonising mud and sand [1330] Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>) [1395] Petalwort <i>Petalophyllum ralfsii</i> [1410] Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [2110] Embryonic shifting dunes [2120] Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2130] Fixed coastal dunes with herbaceous vegetation (grey dunes) [2190] Humid dune slacks</p> <p>NPWS (2013) <i>Conservation Objectives: North Dublin Bay SAC 000206</i>. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.</p>	<p>Located c. 18.6km northeast of the Proposed Development site.</p>
Special Protection Area (SPA)	
<p>Wicklow Mountains SPA [004040]</p> <p>A098 Merlin <i>Falco columbarius</i> A103 Peregrine <i>Falco peregrinus</i></p> <p>NPWS (2020) <i>Conservation objectives for Wicklow Mountains SPA [004040]</i>. Generic Version 7.0. Department of Culture, Heritage and the Gaeltacht.</p>	<p>Located c. 13.3km southeast of the Proposed Development site.</p>
<p>South Dublin Bay and River Tolka Estuary SPA [004024]</p> <p>[A046] Light-bellied Brent Goose <i>Branta bernicla hrota</i> [A130] Oystercatcher <i>Haematopus ostralegus</i> [A137] Ringed Plover <i>Charadrius hiaticula</i> [A141] Grey Plover <i>Pluvialis squatarola</i> [A143] Knot <i>Calidris canutus</i> [A144] Sanderling <i>Calidris alba</i> [A149] Dunlin <i>Calidris alpina</i> [A157] Bar-tailed Godwit <i>Limosa lapponica</i> [A162] Redshank <i>Tringa totanus</i> [A179] Black-headed Gull <i>Croicocephalus ridibundus</i> [A192] Roseate Tern <i>Sterna dougallii</i> [A193] Common Tern <i>Sterna hirundo</i> [A194] Arctic Tern <i>Sterna paradisaea</i> [A999] Wetland and Waterbirds</p> <p>NPWS (2015) <i>Conservation Objectives: South Dublin Bay and River Tolka Estuary SPA 004024</i>. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.</p>	<p>Located c. 16km east of the Proposed Development site.</p>
<p>North Bull Island SPA [004006]</p> <p>[A046] Light-bellied Brent Goose <i>Branta bernicla hrota</i> [A048] Shelduck <i>Tadorna tadorna</i> [A052] Teal <i>Anas crecca</i> [A054] Pintail <i>Anas acuta</i> [A056] Shoveler <i>Anas clypeata</i></p>	<p>Located c. 18.6km northeast of the Proposed Development</p>

Designated Site Name [Code] and its nature conservation features	Location Relative to the Proposed Development Site
<p>[A130] Oystercatcher <i>Haematopus ostralegus</i> [A140] Golden Plover <i>Pluvialis apricaria</i> [A141] Grey Plover <i>Pluvialis squatarola</i> [A143] Knot <i>Calidris canutus</i> [A144] Sanderling <i>Calidris alba</i> [A149] Dunlin <i>Calidris alpina</i> [A156] Black-tailed Godwit <i>Limosa limosa</i> [A157] Bar-tailed Godwit <i>Limosa lapponica</i> [A160] Curlew <i>Numenius arquata</i> [A162] Redshank <i>Tringa totanus</i> [A169] Turnstone <i>Arenaria interpres</i> [A179] Black-headed Gull <i>Croicocephalus ridibundus</i> [A999] Wetlands & Waterbirds</p> <p>NPWS (2015) <i>Conservation Objectives: North Bull Island SPA 004006</i>. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.</p>	
proposed Natural Heritage Area (pNHA)	
<p>Grand Canal pNHA [002104]</p> <p>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.</p>	c. 1.6km north of the Proposed Development
<p>Liffey Valley pNHA [000128]</p> <p>Diversity of flora and fauna species the river ecosystem supports, including rare and/or legally protected plant species (hairy St. John's wort <i>Hypericum hirsutum</i>, green figwort <i>Scrophularia umbrosa</i> and yellow archangel <i>Lamiastrum galeobdolon</i>)</p>	c. 4.4km north of the Proposed Development
<p>Rye Water Valley/Carton pNHA [001398]</p> <p>Diversity of flora and fauna species the river ecosystem supports – <i>see also Rye Water Valley/Carton SAC in Table 1 above</i></p>	c. 5.7km northwest of the Proposed Development
<p>Slade of Saggart and Crooksling Glen pNHA [000211]</p> <p>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 (<i>Lamiastrum galeobdolon</i>) has been recorded from this site.</p>	c. 5.7km south of the Proposed Development
<p>Lugmore Glen pNHA [001212]</p> <p>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 (<i>Lamiastrum galeobdolon</i>).</p>	c. 5.8km southeast of the Proposed Development
<p>Royal Canal pNHA [002103]</p> <p>Diversity of flora and fauna species the canal ecosystem supports and the presence of legally protected plant species, opposite-leaved pondweed <i>Groenlandia densa</i>.</p>	c. 6.1km north of the Proposed Development
<p>Dodder valley pNHA [00991]</p> <p>Diversity of flora and fauna species the river ecosystem supports, including plant species such as Early-purple Orchid (<i>Orchis mascula</i>) and Bugle (<i>Ajugareptans</i>) and protected bird species such as Kingfisher and Grey Wagtail</p>	c. 7.7km southeast of the Proposed Development
<p>Glenasmole Valley pNHA [001209]</p> <p>Listed under similar conservation objectives as it's SAC/SPA designations.</p>	c. 8.4km southeast of the Proposed Development
<p>Kilteel Wood pNHA [001394]</p> <p>The site is a small healthy wood of mostly oak (<i>Quercus</i> spp.) and Downy Birch (<i>Betula pubescens</i>) with a diversity of flora.</p>	c. 10.1km southwest 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. 14km southwest 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 mid-east 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 northeast of the Proposed Development
South Dublin Bay pNHA [000210] Listed under similar conservation objectives as it's SAC/SPA designations.	c. 16km northeast 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 northeast of the Proposed Development

Records of protected, and red-listed flora and fauna species

- 6.23 Records within 2km of the subject lands were obtained from the online database of the National Biodiversity Centre on www.biodiversityireland.ie.

Previous Scott Cawley Surveys at Grange Castle Business Park

- 6.24 Scott Cawley have previously undertaken ecological surveys within the Grange Castle Business Park since 2011. Evidence of badgers and otters feeding and commuting along the River Griffeen corridor was noted in 2013. No holts or setts were found during these surveys. Bat activity surveys in 2011, 2013, 2014 and 2018 recorded Common Pipistrelle, Soprano Pipistrelle (*Pipistrellus pygmaeus*, Leisler's bat (*Nyctalus leisleri*) and Daubenton's bat (*Myotis daubentoni*). Other bat surveys carried out along the Grand Canal have recorded these same species and also the less common Nathusius pipistrelle bat (*Pipistrellus nathusii*) (SDCC Heritage Officer, pers. comm).
Likelihood of occurrence of protected species within the Proposed Development site

Flora

- 6.25 Ribbonwort (*Pallavicinia lyellii*) is unlikely to occur at the Proposed Development site as it is associated with either wet areas on the fringes of bogs or grows scattered in woodlands, either on sandstone, damp, sandy soil or leaf litter. Neither of these habitats occur within the Proposed Development site. Many-seasoned Thread-moss (*Bryum intermedium*) is unlikely to occur at the proposed site as there is no suitable habitat and any non-artificial habitat on site is highly managed.

Fauna

- 6.26 There is very limited potential for any mammal and amphibian fauna, including those listed in Chapter 6 - Appendix 6.4, to occur within the Proposed Development site. The potential occurrence of all species is elaborated upon in the field survey results section, and potential impacts and mitigation subsequently addressed as relevant.

Field survey results

Habitat and flora survey

- 6.27 The following habitat types (following Fossitt 2000) were identified within the Proposed Development site (see Figure 6.4 below for habitat map). A full flora species list for habitats recorded within the site are included in Chapter 6 - Appendix 6.3.

- Improved agricultural grassland (GA1);
- Amenity grassland (improved) (GA2);
- Spoil and bare ground (ED2); and
- Buildings and artificial surfaces (BL3).

Figure 6.4 Map showing the habitat types identified within the indicative red line boundary.

- 6.28 Most of the Proposed Development site consisted of buildings and artificial surfaces as this area is currently being used as a construction compound for the construction works of the Permitted Development to the west of the Proposed Development site. There is gravel paving down for the car park and porta-cabins in place to the east of the site, used as offices by the Contractor and site security, see figure 6.5.
- 6.29 As this habitat is artificial it holds no ecological value.



Figure 6.5 Buildings and artificial surfaces (BL3) within the Proposed Development site

- 6.30 There was an area of spoil and bare ground (ED2) to the west of the existing Castlebaggot 220/110kV substation. This area was associated with the construction of another development at the time of the survey. An area of the Proposed Development was located within the spoil and bare ground habitat see figure 6.6.
- 6.31 This habitat that has developed as a result of disturbance holds no ecological value.



Figure 6.6 Area of spoil and bare ground (ED2) and improved agricultural grassland (GA1) to the west of the existing Castlebaggot 220/110kV substation within the grid connection route for the Proposed Development.

- 6.32 There is an area of improved agricultural grassland (GA1) where the proposed grid connection will cross the agricultural field to the north of Grange Castle Business Park Access Road, see figure 7.6. This area contains the species perennial rye grass *Lolium perenne*, ribwort plantain *Plantago lanceolata* Yorkshire fog *Holcus lanatus*, ragwort *Jacobaea vulgaris*, broad-leaved dock *Rumex obtusifolius*, white clover *Trifolium repens*, poppy *Papaver sp.* and creeping thistle *Cirsium arvense*.
- 6.33 As this habitat is relatively species poor, this habitat is valued as being of a local importance (low value).
- 6.34 Where the proposed grid connection will cross the Grange Castle South Business Park Access Road, there is a small area of amenity grassland (GA2) on either side of the road. This area contains the species perennial rye grass *Lolium perenne*, ribwort plantain *Plantago lanceolata*, poppy *Papaver sp.* and white clover *Trifolium repens*.
- 6.35 As this habitat is heavily managed and is species poor, this habitat is valued as being of a local importance (low value).
- 6.36 There is a culverted stream onsite where the proposed grid connection will cross the Grange Castle Business Park Access Road.
- 6.37 This habitat holds no ecological value onsite as the stream is culverted. Although the water quality of this stream has the potential to affect the downstream environment, given the lack of ecological value of a culverted stream this habitat is valued as being of a local importance (low value).

Notable and rare flora

- 6.38 No protected, Red Data Book (Curtis & McGough, 2005) or rare flora species were recorded.

Invasive flora

- 6.39 No invasive species were recorded within the boundary of the Proposed Development site.

Fauna survey results*Terrestrial mammals (excl. bats)*

- 6.40 Badger, and their breeding and resting places, are protected under the Wildlife Acts. No evidence of badger *Meles meles* activity, i.e. setts, tracks, latrines or feeding signs, were made during site surveys of the subject lands in July 2020.
- 6.41 Otter, and their breeding and resting places, are protected under the Wildlife Acts. Otter are also listed on Annex II and Annex IV of the EU Habitats Directive and are afforded strict protection under the Habitats Directive and the European Communities (Birds and Natural Habitats) Regulations, 2011. No evidence of otter *Lutra lutra* was noted within the proposed site.
- 6.42 No signs of small mammals or suitable habitats were noted during the site surveys within the Proposed Development site in July 2020.
- 6.43 As such, the mammal populations are assessed as being of a local importance (low value).

Bats

- 6.44 Bats, and their breeding and resting places, are protected under the Wildlife Acts. All bat species are also listed on Annex IV of the EU Habitats Directive (with the Lesser horseshoe bat also listed on Annex II) and are afforded strict protection under the Habitats Directive and the European Communities (Birds and Natural Habitats) Regulations, 2011.
- 6.45 Three walked transects were undertaken on 21st June, 30th June and 10th July 2018 across the Proposed and Permitted Development site. The transects all followed the same route from the south-east of the Permitted Development site near the houses along the treeline, to the eastern boundary then north to the access road and westwards to the western side of the site and then turning eastwards to the starting point. Transects were commenced one hour after sunset. The results of the transects are shown in Figure 6.7.
- 6.46 The walked transects confirmed that the treelines offer the best foraging habitat for bats. Three species of bats were recorded, Leisler's bat *Nyctalus leisleri*, common pipistrelle *Pipistrellus pipistrellus* and soprano pipistrelle bat *Pipistrellus pygmaeus*. Small numbers (1-2) of bat were recorded at any particular time. No bats were encountered foraging in the open field.
- 6.47 The relatively low number of bat species recorded within the lands, the relatively small number of bats observed during the walked transect and the lack of roosting bats within the Proposed Development site suggests that the Proposed Development site was being used by a small population of bat species for commuting and foraging purposes only.
- 6.48 The Proposed Development site has been valued as being of local importance (low value) for bats as the site was found to be used by small numbers of common bat species for foraging and commuting. The site visit in July 2020 found site suitability for roosting and foraging bats has declined as the Proposed Development site has changed since the surveys in 2018, with the removal of the treeline associated with other permitted developments, and the remaining habitats on site in 2020 are considered of negligible suitability for commuting, foraging and/or roosting bats.

Figure 6.7: Results of 2018 bat activity surveys and the indicative redline boundary

Breeding birds

- 6.49 All wild birds, and their nests and eggs, are protected under the Wildlife Acts. Some bird species are also listed on Annex I of the EU Birds Directive. No bird activity was recorded on site. Due to the unsuitability of the habitats within the Proposed Development site for breeding birds, the subject lands are considered to be of local importance (low value) for birds.

Summary of ecological evaluation

- 6.50 Table 6.3 summarises all identified key ecological receptors. Key ecological receptors have been identified as at risk of potentially significant impacts via a source-pathway-receptor link. KER's are valued as local importance (high) or above per the criteria set out in Appendix 6.2.

Table 6.3 Ecological evaluation of key ecological receptors

Ecological Receptor	Ecological Valuation	KER?
Designated Sites		
Rye Water Valley/Carlton SAC	International	Yes
South Dublin Bay SAC	International	Yes
North Dublin Bay SAC	International	Yes
South Dublin Bay and River Tolka Estuary SPA	International	Yes
North Bull Island SPA	International	Yes
Rockabill to Dalkey Island SAC	International	Yes
Liffey Valley pNHA	National	Yes
South Dublin Bay pNHA	National	Yes
North Dublin Bay pNHA	National	Yes
Dolphins, Dublin Docks pNHA	National	Yes
All other SAC or SPA sites	International	No
All other NHA or pNHA sites	National	No
Habitats		
Buildings and artificial surfaces (BL3)	As this habitat is artificial it holds no ecological value.	No
Spoil and Bare Ground (ED2)	This habitat that has developed as a result of disturbance and holds no ecological value.	No
Improved agricultural grassland (GA1)	Local importance (lower value)	No
Amenity grassland (GA2)	Local importance (lower value)	No
Culverted stream	Local importance (lower value)	No
Fauna Species		
Bats	Local importance (lower value)	No
Breeding birds	Local importance (lower value)	No
Terrestrial mammals (excl. bats)	Local importance (lower value)	No

Characteristics of the Proposed Development

- 6.51 Full details of the Proposed Development are provided in chapter 2 of this EIA Report. In brief, the Proposed Development comprises: an amendment to the Permitted Development under Reg. Ref. SD18A/0134 / An Bord Pleanála Ref. ABP-302813-18 to replace the previously permitted Air Insulated substation with a 110kV Gas Insulated Switchgear (GIS) substation compound and two no. 110kV transmission lines to the Castlebaggot substation.
- 6.52 The two transmission lines will be constructed using an excavator and hand digging where required and will pass within two trenches under the culvert at a depth of 3m under the Grange Castle South Business Park Access Road and at a depth of c. 1.5m close to the south-west corner of the Castlebaggot substation. These works will include:
- All surveying, CAT scanning and trial holes will be carried out in advance of the works.
 - Sawcut (where appropriate) and remove the existing surface.
 - All trenching will be constructed using an excavator and hand digging where required in accordance with safe work procedures and HSA Code of Practice for Avoiding Danger From Underground Services. Trenches will be excavated with stable sloping, benching where required and a suitable access and egress point. A suitable pump will be available on site and installed if groundwater is encountered to ensure trench stability and worker safety. All trenching will be constructed in accordance with guidance outlined within the Environmental Impact Assessment included within this application. Particular attention will be provided to the outlined requirements while working on the existing stream culverts crossing as well as in close proximity to the existing stream.
 - Where existing utilities are encountered along the route and require supporting in place, the following process will be implemented. Note that two stream culvert crossings have been identified along the route:
 - Exploratory works will be carried out to assess existing utilities and/or culverted structure.
 - Where required Temporary Works Designs and Certificates will be completed and confirmed by the PSDP. The temporary works design will be installed as specified. Currently envisaged that the support of the existing stream culverts will require steel beams with support strapping to protect in place.
 - Excavate and hand dig below existing utilities and culverts to required depth.
 - Install ducting trench as described below.
 - Reinstatement backfill and surrounding material to specified requirements to ensure underside of utilities and culverts are fully supported for load bearing purposes on completion.
 - Ducting, bedding, surrounding fill material, warning marker boards and tape will be installed as per design in accordance with EirGrid specification while maintain safe clearance from existing utilities.
 - Chambers and sandpits to be installed as per design in accordance with EirGrid specifications.
 - Trench will be backfilled with suitable material and surface finishes will be returned to original state
 - Furthermore, where the path of the trenches for the grid connection intersect the stream culvert, the excavations will be performed by hand beneath the culvert with the appropriate supports and measures in place as per the project Construction Environmental Management Plan (CEMP) has been prepared by CSEA for the Proposed Development. There is no direct hydraulic link to the Griffeen of Liffey Rivers or the Grand Canal pNHA to the north.
- 6.53 Storm water from the roof area of the 110Kv sub-station, will be directed via rain water pipes into an on-site reticulation system. The outflow from this system will be discharged directly into a Stormtech, or similar, attenuation system, located in the north-west of the site, near the access road off Grange Castle South Access Road. Storm water from all other hardstanding areas, except for the roof and surrounds of the MV switch (client control) building will be drained into the aforementioned attenuation tank. Prior to discharge into the mains network, the run-off will be directed through appropriately sized Conder Separator(s) CNSB3s/21 (or similar approved) petrol interceptors.
- 6.54 Run-off from the MV switch (client control) building and surrounds was permitted under Reg. Ref. SD18A/0134 / An Bord Pleanála Ref. ABP-302813-18. The Permitted Development commenced construction in the summer of 2019. Further to extensive site investigations, it would appear that the existing sub-soil would provide inadequate soil infiltration rates and thus it is not practical to install a soakaway system. It is proposed to ultimately discharge surface water from the Proposed Development, post attenuation and outflow restrictions, via a 300mm diameter gravity sewer network and connect into existing manhole located adjacent to the ESB sub-station, to the north of the subject site.
- 6.55 It is proposed to discharge foul water from the Proposed Development, via a 225mm gravity foul sewer network and connect into the 225mm diameter sewer, located along the Grange Castle South Access

Road adjacent to the northern boundary of the property. There is an existing manhole located at the property boundary near the site access to the north. This gravity sewer connection was laid to facilitate development of these lands and for other lands within Grange Castle South Business Park. This sewer then connects into a 375mm diameter pipe on Baldonnell Road and ultimately drains via gravity, into the Grange Castle Business Park pumping station, circa 1.9km to the north.

Potential impact of the Proposed Development

6.56 As per relevant guidelines, potential significant impacts have only been assessed for key ecological receptors (KERs), as listed in the table above. 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

6.57 The existing management of the amenity grassland, improved agricultural grassland habitats and treelines is expected to maintain the existing habitat types close to their current form.

European Sites

6.58 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 proposed HV Substation and Grid Connection at Grange Castle, Co. Dublin, Scott Cawley Ltd. (2020) for the Proposed Development that accompanies this application.

6.59 As described in Table 1, Section 3.3.6 of the Appropriate Assessment Screening Report, Scott Cawley Ltd (2020), the potential impacts associated with the Proposed Development, listed below, do not have the potential to affect the receiving environment and, consequently, do not have the potential to affect the conservation objectives supporting the qualifying interest/special conservation interests of any European sites either alone or in combination with any other plans or projects. Therefore, the Proposed Development is not likely to have significant effects on any European sites.

Habitat loss and fragmentation

6.60 The Proposed Development does not overlap with the boundary of any European site. Therefore, there are no European sites at risk of direct habitat loss impacts. As the Proposed Development does not traverse any European sites there is no potential for habitat fragmentation to occur. The Proposed Development site does not support populations of any fauna species linked with the QI/SCI populations of any European site(s). As the Proposed Development will not result in habitat loss or habitat fragmentation within any European site, there is no potential for any in combination effects to occur in that regard.

Habitat degradation as a result of downstream hydrological impacts

6.61 Hydrologically connected European sites downstream of the Proposed Development are those of Dublin Bay, with the closest site being c. 16km east of the Proposed Development site. Considering the following, the Proposed Development will not have any measurable effects on water quality in the Dublin Bay or the Irish Sea.

- Given the scale and location of the Proposed Development relative to the receiving surface water network;

- The relatively low volume of any potential surface water run-off or discharge events relative to the receiving surface water and marine environments (due to the small scale of this development); and
- The level of mixing, dilution and dispersion of any surface water run-off/discharges from the Proposed Development site in the receiving watercourses.

Habitat degradation as a result of downstream hydrogeological impacts

6.62 The Proposed Development lies within the Dublin Groundwater Body (Dublin GWB). The only European site within the Dublin GWB that is designated for groundwater dependant habitats and/or species is the Rye Water Valley/Cartron SAC. All of the qualifying interests of the Rye Water Valley/Cartron SAC, the priority Annex I habitat Petrifying springs and the two whorl snail species, are dependent upon the existing condition and functioning of the groundwater regime. Information published by GSI on the Dublin GWB¹⁵ states that “The general groundwater flow direction in this aquifer is towards the coast and also towards the River Liffey and Dublin City”. As the Proposed Development will not interact directly with the underlying groundwater body, and lies down gradient of the Rye Water Valley/Cartron SAC, it cannot influence groundwater conditions in the European site.

6.63 Additional European sites with ground water dependant habitats within 15km of the Proposed Development include Glenasmole Valley SAC, Wicklow Mountains SAC, and Red Bog, Kildare SAC however these sites are located in different GWB and therefore not considered to be affected.

6.64 Therefore, there is no possibility of the Proposed Development undermining the conservation objectives of any of the qualifying interests or special conservation interests of any European sites, either alone or in combination with any other plans or projects, as a result of hydrogeological effects.

Habitat degradation as a result of introducing/spreading non-native invasive species

6.65 There are no non-native invasive species present on the Proposed Development site and, therefore, no risk associated with the Proposed Development to any European sites from the spread/introduction of non-native invasive species.

Disturbance and displacement impacts

6.66 There are no European sites within the potential zone of influence of disturbance effects associated with the construction or operation of the Proposed Development

European Sites- Mitigation Measures

6.67 As set out in the Appropriate Assessment Screening Report by Scott Cawley Ltd (2020), in concluding that the Proposed Development is not likely to have a significant effect on any European sites, mitigation measures intended to avoid or reduce any harmful effects of the Proposed Development on European sites were not required or taken into account.

European Sites- Significance of Residual Effects

6.68 The assessment presented in the Appropriate Assessment Screening Report, Scott Cawley Ltd (2020) concluded that there was no risk of the Proposed Development resulting in a likely significant effect on any European site, either alone or in combination with other plans or projects. Therefore, the Proposed Development is not likely to have significant residual effects on any European sites.

Nationally Designated Sites

6.69 In the case of NHAs and pNHAs the assessment considers whether the integrity of any such site would be affected by the Proposed Development with reference to the ecological features for which the site is designated or is proposed for designation.

Nationally Designated Sites- Potential Impacts

6.70 The following proposed Natural Heritage Areas (pNHAs) fall within the potential zone of influence of the Proposed Development as they have a hydrological connection to the Proposed Development site:

- Liffey Valley pNHA [000128] c. 4.4km north

¹⁵ https://secure.dccae.gov.ie/GSI_DOWNLOAD/Groundwater/Reports/GWB/DublinGWB.pdf

- North Dublin Bay pNHA [000206] c. 18.6km northeast
- South Dublin Bay pNHA [000210] c. 16km northeast
- Dolphins, Dublin Docks pNHA [000201] c. 17.2km northeast

6.71 Given the distance of the aforementioned designated sites in relation to 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.

Nationally Designated Sites- Mitigation Measures

6.72 As set out in the previous section, in concluding that the Proposed Development will not have a significant effect on any nationally designated sites, mitigation measures intended to avoid or reduce any harmful effects of the Proposed Development on these sites are not required.

Nationally Designated Sites- Significance of Residual Effects

6.73 There is no risk of the Proposed Development resulting in a likely significant effect on any nationally designated site, either alone or in combination with other plans or projects. Therefore, the Proposed Development will not have any residual effects on any nationally designated sites.

Construction phase

Impacts on habitats and flora during construction

6.74 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.

Impacts on bats during construction

6.75 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 birds during construction

6.76 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.

6.77 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.

Impacts on Common Frog during construction

6.78 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. 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.

Operational phase

6.79 Potential impacts could arise from:

- Artificial lighting impacts; and
- Disturbance impacts results from increased human presence.

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 birds during operation

6.81 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.

Remedial and mitigation measures

Construction phase

Pollution prevention

6.82 A draft CMP is included as part of the Proposed Development planning application documents. The CMP 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;
- 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).

6.83 The Outline Construction Management Plan (Structuretone, 2020) specifies a range of general pollution prevention measures that will be implemented. The mitigation measures outlined in the Hydrology chapter (Chapter 8) of this EIAR will prevent pollution of 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.

Bats

6.84 Construction phase lighting will be designed to be sensitive to the presence of bats commuting and foraging bats along the eastern boundary of the 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).

6.85 No further mitigation measures are required.

Birds

6.86 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.

Common frog

6.87 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. 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.

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

Operational phase

Pollution prevention

6.89 In summary, all surface waters from hardstanding areas within the Proposed Development site will pass through an oil interceptor to remove detritus from the water. These waters will be retained onsite in the attenuation tank prior to controlled release into the surface water system.

Operational lighting

6.90 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).

6.91 No further mitigation measures are required.

Residual impacts

Designated sites

- 6.92 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

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

Bats

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

Breeding birds

- 6.95 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

- 6.92 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

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

Conclusion

- 6.96 Given that no significant impacts are predicted, no significant residual impacts are predicted.

Development Plan Objectives

- 6.97 The local authority for this Proposed Development is South Dublin County Council. Plans and developments within South Dublin must comply with the policies and objectives of the *South Dublin County Council Development Plan 2016-2022* (South Dublin County Council, 2016), including the plans objectives for biodiversity and green infrastructure, which apply to ecological features within the lands.

Cumulative Impact

- 6.98 The surrounding lands are largely zoned as ‘EE- Enterprise and Employment’ in the South Dublin County Council Development Plan 2016-2022 (South Dublin County Council, 2016). There are numerous granted planning permissions for industrial developments in the vicinity of the Proposed Development site which are likely to be in construction at the same time as the Proposed Development. In this case, there is potential for cumulative impacts to arise, as a consequence of the Proposed Development acting in-combination with other plans and projects, on water quality in the immediate downstream surface water environment and on disturbance to birds and bats. It is considered that these potential cumulative impacts would be temporary and could occur at a local geographical scale, in the absence of mitigation.
- 6.99 There is potential for “in-combination” effects on water quality in Dublin Bay from any other projects carried out within the functional areas of the South Dublin County Council Development Plan 2016-2022 (South Dublin County Council, 2016), Dublin City Development Plan 2016-2022 (Dublin City Council, 2016), the Dún Laoghaire-Rathdown County Development Plan 2016-2022 (Dún Laoghaire-Rathdown County Council, 2016), the Fingal Development Plan 2017-2023 (Fingal County Council, 2017), or any other county level land use plans which can influence conditions in Dublin Bay via rivers and other surface water features. As noted within the AA Screening Report accompanying this report (Scott Cawley 2020), Dublin Bay is currently unpoluted and the Proposed Development will not result in any measurable effect on water quality in Dublin Bay. There are also protective policies and

objectives in place at a strategic planning level to protect water quality in Dublin Bay. Therefore, there is no possibility of any other plans or projects acting in combination with the Proposed Development to undermine the conservation objectives of any of the qualifying interests or special conservation interests of the European or nationally designated sites in, or associated with, Dublin Bay as a result of water quality effects.

Conclusion

- 6.100 The assessment presented in the AA Screening Report concluded that the Proposed Development poses no risk of likely significant effects on any European sites, either alone or in combination with any other plans or projects. The Proposed Development also will not result in any significant effects on any nationally designated sites for nature conservation (i.e. pNHA or NHA sites).

LAND, SOIL, GEOLOGY AND HYDROGEOLOGY

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 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.

7.3 The rating of potential environmental effects on the land, soil, geological and hydrogeological environment is based on the matrix presented in Table 1.1 in Chapter 1 which takes account of the quality, significance, duration and type of effect characteristic identified (in accordance with impact assessment criteria provided in the Draft EPA Guidelines (2017) publication).

7.4 The National Road Authority (NRA) criteria for rating the magnitude and significance of impacts on the geologically related attributes and the importance of hydrogeological attributes at the site during the EIA stage are also relevant in assessing the impact and are presented in Table 1 in Chapter 7 - Appendix 7.1.

Guidelines

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

- Guidelines on the Information to be Contained in Environmental Impact Assessments EPA (Draft) 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).

7.6 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

- 7.7 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;
 - Research papers referred to in this chapter.
- 7.8 Site specific data was derived from the following sources:
- IGSL Ltd. Cyrus One – Grange Castle Business Park Geotechnical Investigation Report – Project no. 20544 January 2018;
 - Soil Chemical Test Analysis Results IGSL Ltd 2017/2018 (IGSL, 2018);
 - Various design site plans and drawings; and
 - Consultation with civil engineers, Pinnacle Consulting Engineers (2020).

Receiving Environment

- 7.9 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 (Enterprise and Employment) zoned lands with the objective “*To provide for enterprise and employment related uses*”. The development, when operational, will generate limited additional traffic, air, noise and water emissions and waste generation from activities etc..

Topography and setting

- 7.10 The site falls generally from south to north, with topographical levels ranging from c. 75mAOD in the south-east to c. 70 mAOD in the north-west of the Permitted Development site. This area surrounding the proposed substation location is currently a mix of greenfield industrial buildings 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 since the earliest mapping available (1837-1842).
- 7.9 The Proposed Development will be designed to provide a permanent power supply for the Permitted Development that was granted by the Board under Reg. Ref. SD18A/0134 / An Bord Pleanála Ref. ABP-302813-18 that was accompanied by a separate EIAR. This permission was granted on the 18th April 2019 for a two-storey data centre with associated three storey office block that has a gross floor area of 35,426 m² on an overall site of approximately 9.2 hectares. The overall site has been further increased to approximately 9.7 hectares following the purchase of a property to the south-east of the Permitted Development site. The Proposed Development site measures 0.9163ha. See Chapter 2 for a detailed description of development.
- 7.10 The site is in the catchment of the Griffeen River and the existing drainage is discussed in Chapter 8 of this EIAR.

Areas of Geological Interest & Historic Land-Use

- 7.11 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 circa 3 km to the south-east of the site.
- 7.12 The Proposed Development is located on lands that are bounded by the realigned Baldonnell Road to

the west; by the 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.

- 7.13 The application site can be divided into two within the Grange Castle South Business Park that is accessed off the Baldonnell Road within the administrative area of South Dublin County Council. The first part is the north-east corner of the Cyrus One site that formed the application that was permitted under Reg. Ref. SD18A/0134 / An Bord Pleanála Ref. ABP-302813-18. This development commenced construction in the summer of 2019.
- 7.14 The second part of the application site forms the 2 no. transmission lines between the Castlebaggot 220 kV/110 kV Substation and the 110 kV GIS Substation that forms part of this application. This forms a connection across the Grange Castle South Access Road and will pass under the service strip to the north of this road, and across the corner of the site to the north to the western edge of the Castlebaggot Substation where it will connect into existing infrastructure on its western boundary.
- 7.15 The proposed 110 kV GIS substation is located on lands that are bounded by the Google data centre development to the east; the Grange Castle South Access Road that provides access off the Baldonnell Road into Grange Castle South Business Park to the north; and the permitted and under construction data centre development of the applicant to the south and east.
- 7.16 The lands to the west of the Proposed Development are currently under construction under the permission granted under Reg. Ref. SD18A/013 / An Bord Pleanála Ref. ABP-302813-18. Construction has commenced on the western part of the site to develop the two storey data centre facility (c. 31,785 m²) and a three storey office block (circa 2,882 m²) plus ancillary elements that included a new AIG substation, transformer yard and Client Control building (125 m²). All elements of this original substation are being replaced apart from the Client Control building that has been built as per the original grant of permission.
- 7.17 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

- 7.18 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.

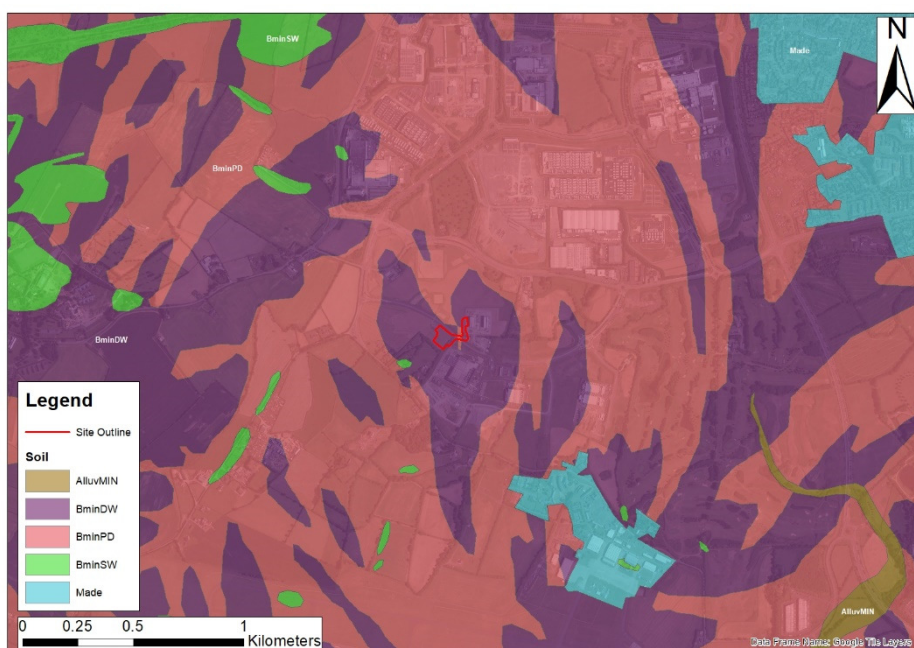


Figure 7.1 Soils map for the Proposed Development site (boundary indicated in red) (GSI, 2020)

- 7.19 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.
- 7.20 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.

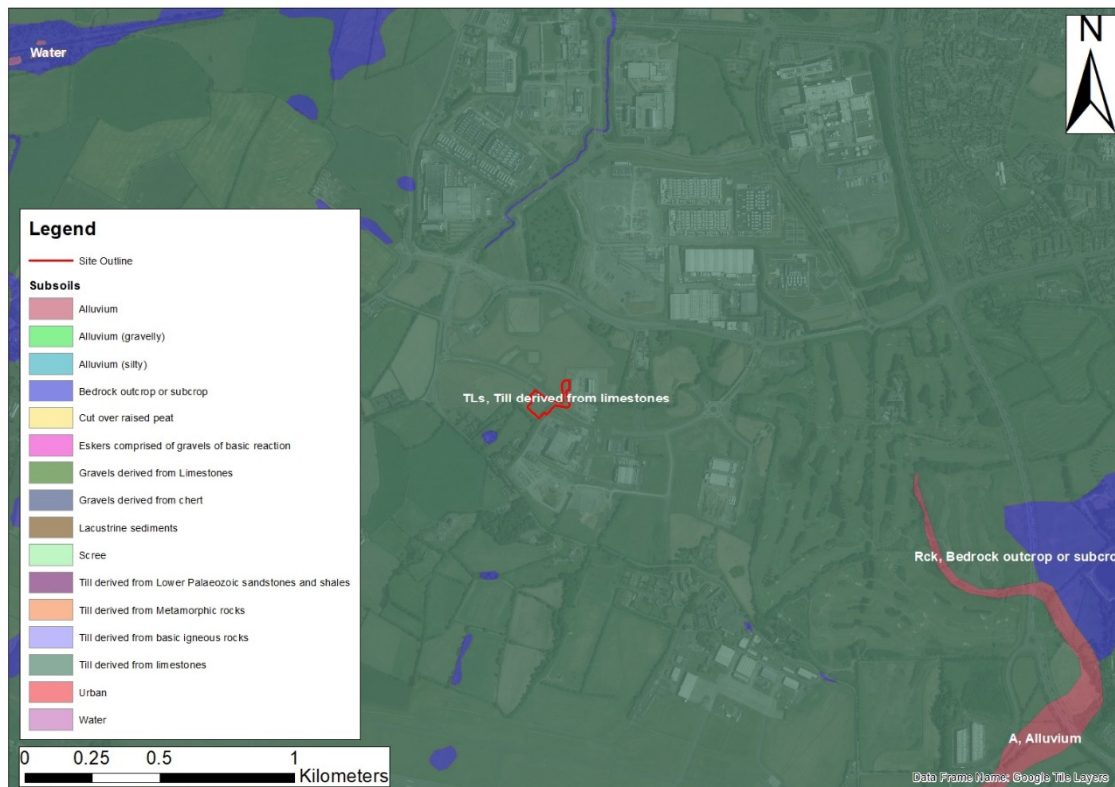


Figure 7.2 Subsoils map for the Proposed Development site (boundary indicated in red) (GSI, 2020)

- 7.21 The following ground conditions were encountered in the site-specific investigations undertaken by IGSL on the current Cyrus One site from November 2017 and March 2018. Twenty-four trial pits were excavated to a maximum depth of 2.85m. 8 No. representative soil samples were also recovered from a number of the pits for laboratory analysis (Figure 7.3 shows the borehole/trial pit locations).
- 7.22 The Proposed Development and the surrounding site is underlain by 0.4 metres of topsoil. This is underlain by natural till made up of stiff to very stiff gravelly sandy clay. Weathered rock depth varied between 1.2 m and 2.45 mbgl with more competent bedrock encountered <3 metres below ground level (mbgl) across the site. Trial pit logs are included in Chapter 7 - Appendix 7.2.

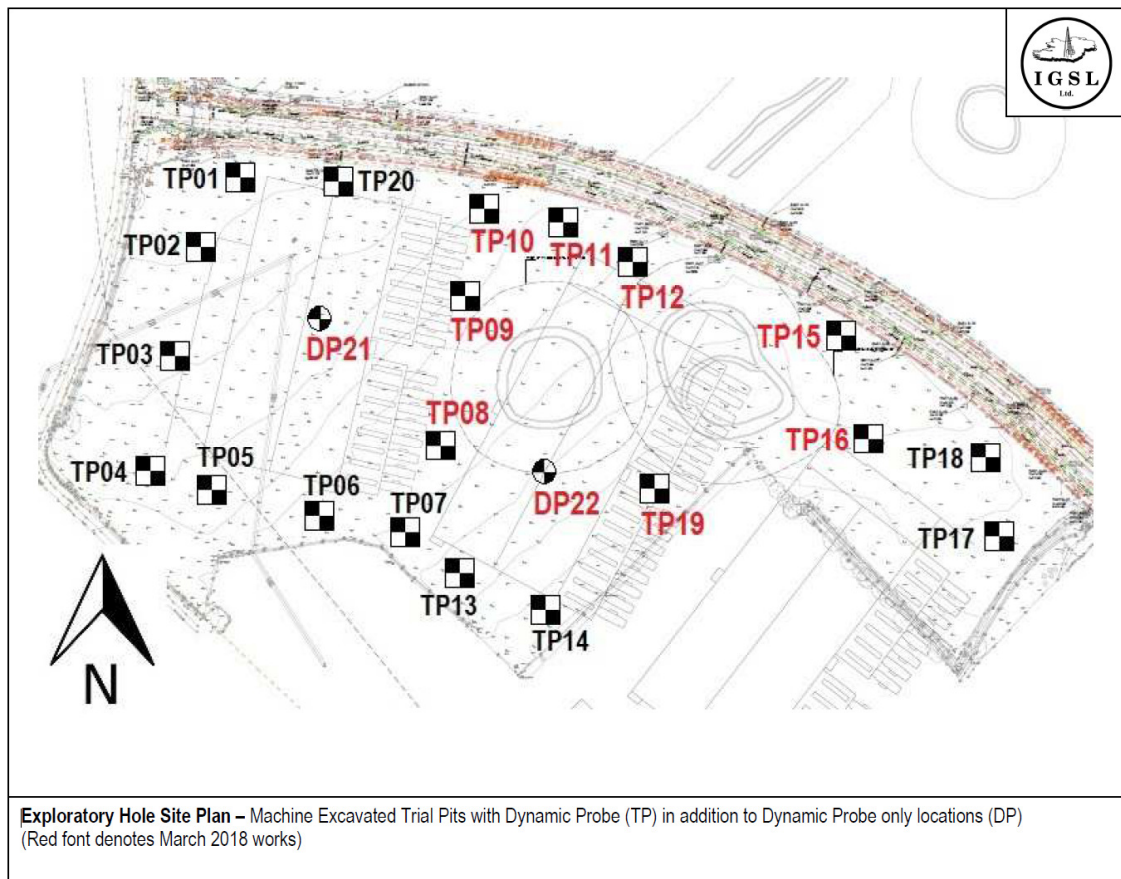


Figure 7.3 Site Investigation Sample Locations (Source: IGSL, 2018).

- 7.23 During the site investigation, a number of samples taken from 8 No. trial pits (TP1, 2, 5, 8, 9, 10, 11, 16) excavated throughout the site and were analysed to confirm soil quality on site. Samples were analysed for contaminants of concern i.e. mineral oils, Benzene, Toluene Ethyl Benzene and Xylene (BTEX), Poly-aromatic Hydrocarbons (PAHs), Poly-chlorinated Bi-Phenols (PCBs), Metals and Total Phenols. There are no legislative thresholds for soil in Ireland and therefore results were compared with UK CLEA threshold screening values which allow assessment based on health risk and use of the site. LQM (Land Quality Management) and the CIEH (Chartered Institute of Environmental Health) developed a document in July 2009 detailing their own research and derivation of their own 'LQM GACs'. A total of 82 substances including many organic substances had LQM GACs derived, for the standard land uses of residential, commercial/industrial and allotments.
- 7.24 This was updated in 2015 following further research and the derived results are now called LQM/CIEH Suitable 4 Use Level (S4UL). The LQM/CIEH S4ULs are intended for use in assessing the potential risks posed to human health by contaminants in soil and as transparently -derived and cautious "trigger values" above which further assessment of the risks or remedial action may be needed. For each contaminant S4ULs have been derived for six land use scenarios based on assessing exposure pathways in each planning scenario. In this instance the commercial scenario has been considered. Soil type and soil organic matter (SOM) has an influence on the behaviour of contaminants. S4ULs have been derived for three SOM contents (1%, 2.5% and 6%) to cover the likely range in soils. A prudent approach has been taken by considering the lower 1% SOM content. A review of the representative 8 soil quality analysis results does not indicate any contamination across the site and indicate that the site is suitable for a commercial development. Laboratory results are presented in Chapter 7 - Appendix 7.3.

Regional Geology

- 7.25 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.

- 7.26 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.
- 7.27 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.

Regional Hydrogeology

Description of the Groundwater Body

- 7.28 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 (km²), well yield (m³/d), specific capacity (m³/d/m) and groundwater throughput (mm³/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 (LI). Similarly, poor aquifers are classed as either generally unproductive except for local zones (PI) or generally unproductive (Pu).
- 7.29 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 (LI) i.e. an aquifer which is moderately productive only in local zones. Figure 7.4 presents the bedrock aquifer map for the Proposed Development area.

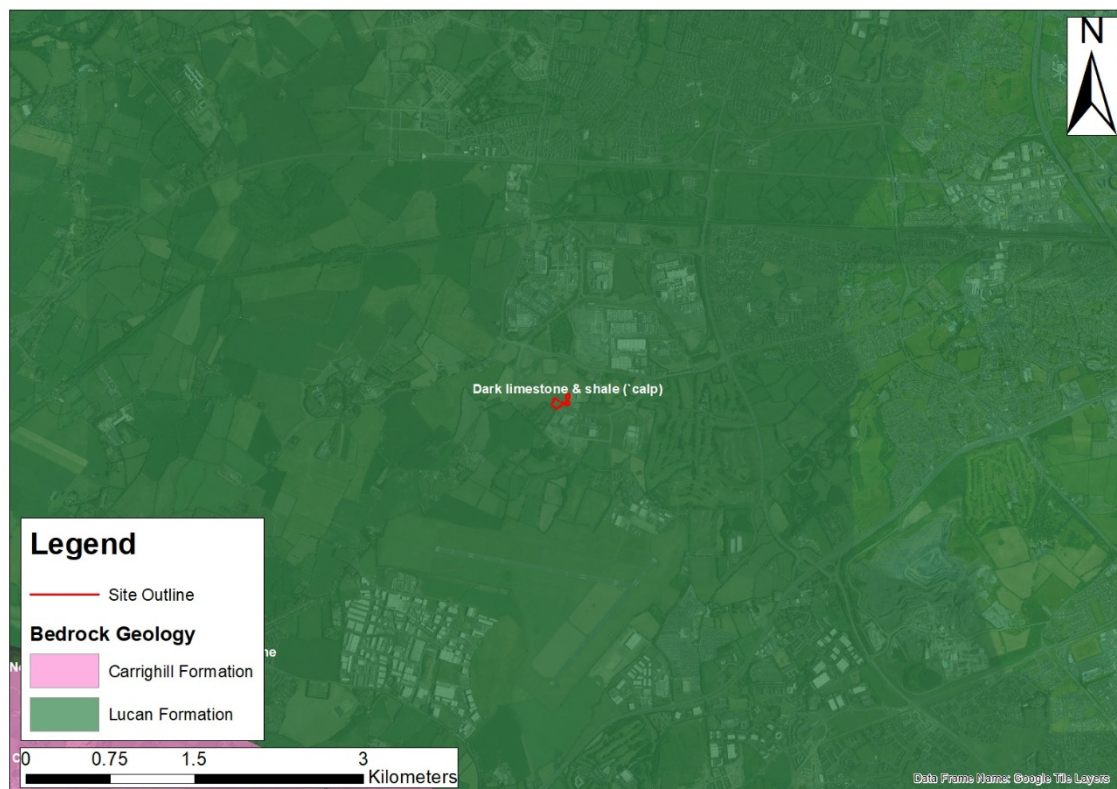


Figure 7.4 Aquifer Classification map (GSI, 2020)

- 7.30 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).
- 7.31 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 the 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 7.5 found below.



Figure 7.5 Aquifer Vulnerability map (GSI, 2020)

Groundwater Wells and Flow Direction

- 7.32 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.
- 7.33 Figure 7.6 below presents the GSI well search for the area surrounding the site (Note this source does not include all wells) and Table 7.1 below summarises the details of wells recorded within this search area.



Figure 7.6 GSI Well Search (GSI, 2020)

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

- 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 for the permitted development to the north – Reg. Ref. SD20A/0121 (OCSC, 2019) 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 were 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 As there is no evidence of soil contamination based on visual assessment and laboratory analysis it is not likely that there is any resultant groundwater contamination leaching from the soil on the subject site. However, a review of groundwater quality immediately up-gradient (EdgeConnex site) and down-gradient (Google site) were undertaken to confirm any evidence of groundwater contamination migrating on to or off the site. No visible or olfactory evidence of groundwater contamination was recorded during the site investigation for the Proposed Development.
- 7.33 A total of nine groundwater samples were collected from the EdgeConnex site which is upgradient and 1.1kms north of the Proposed Development site in June 2016. The samples were submitted to a UKAS accredited laboratory for analysis for contaminants of concern (COCs) comprising suites of metals, speciated PAH, speciated TPH, BTEX, total phenols and inorganics. Following analysis, it was concluded that there was no evidence of any significant groundwater contamination evident on the EdgeConnex Site (Marston Planning Consultancy, 2016).
- 7.34 Groundwater analysis was also completed as part of the Google Data Centre development to the east and upgradient of the proposed site as part of a wider Environmental Impact Statement (now EIAR). Samples were recovered from 2 boreholes onsite and sampled for metals, hydrocarbons (EPHs), Gasoline Range Organics (GRO) pH, sulphate, chloride, ammonia, total coliforms, nitrate and nitrite. Results from the analysis were compared to Interim Guideline Values (IGV) published by the EPA and the Groundwater Threshold Values (GTV) set out in the European Communities Environmental Objectives (Groundwater) Regulations (S.I. 9 of 2010).
- 7.35 The groundwater at the Google Date Centre site was found to be of good quality with the majority of parameters analysed below or within acceptable ranges of the relevant quality standards. Total coliforms show values above the standards for both borehole locations. It is believed these high results are due to the historical land use of the site for agriculture (PM Group, 2014).
- 7.36 Based on these investigations to the north and east, the non-industrial nature of the site and the lack of soil/groundwater contamination encountered during onsite investigations, it can be concluded that groundwater is of relatively good quality and there is no likely significant contamination of the groundwater on the site.
- 7.40 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 7.7 shows the current Dublin GWB WFD mapping for the Proposed Development area.

south-east boundary of the site to approximately +71mAOD to the north probably due to artificial infilling to aid in the construction of the houses to the south of the site.

- Groundwater was encountered in the majority of exploratory pits, typically as seepage with some moderate flows encountered at times (see Ground Investigation Report). Where water was encountered, this was typically at depths ranging between 1.3m and 2.6m. Development of the site does not require any basement structure and therefore no significant dewatering of the bedrock aquifer will be required.
- 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.
- No evidence of disposal of waste material was identified during the site investigation undertaken in this area or surrounding land. Any excavated material would be acceptable at an inert landfill or suitable for re-use as landscaping fill for the final development based on WAC analysis
- Regional groundwater flows are in a northerly direction, towards the Griffeen River, 195 m 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 7.8 X - X' cross section of Proposed Development site

Figure 7.9 Y – Y' 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 Chapter 7 - 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 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. 4km 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 it is estimated that between 5% - 10% of dwellings will exceed the Reference Level of 200 Bq/m³. 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, mudflows, bog bursts (in Ireland) and debris flows are a result. In general, Ireland suffers few landslides. Landslides are more common in unconsolidated material than in bedrock, and where the sea constantly erodes the material at the base of a cliff and leads to recession of the cliffs. Landslides have also occurred in Ireland in recent years in upland peat areas due to disturbance of peat associated with construction activities. The GSI landslide database was consulted and the nearest landslide to the Proposed Development was 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 South Dublin County Council 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.

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.
 - 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 below.

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	<p>Cut and fill will be required to facilitate construction of the substation and the installation of the 110 kV transmission lines from the to the Castlebaggot substation to the proposed substation to the north.</p> <p>The installation of the HDPE ducting will require the excavation of one trench along each of the 2 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 1.3 m below ground level but may increase to up to c. 3.5 m at utility crossings. The typical width of each trench is 0.85 m; however, this may vary depending on ground conditions and existing services.</p> <p>Subsoil stripping and localised stockpiling of soil will be required during construction. It is estimated that approximately 11,250m³ of soils will be excavated to facilitate construction of the development of the substation while 1,050m³ will be excavated for the grid connections. Suitable soils and stones will be reused on-site as backfill in the grassed areas, where possible. However, it is currently envisaged that the majority of the excavated material will require removal offsite.</p>
	Storage of hazardous Material	Bunded fuel storage and wet concrete during the construction phase.
	Import/Export of Materials	<p>Suitable soils and stones will be reused on site as backfill in the grassed areas, where possible. However, it is currently envisaged that the 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.</p> <p>Fill material will not be required to facilitate construction.</p>
	Increase in hard standing area	Altering of local recharge due to increase in hard standing area.
Operation	Storage of hazardous Material	Fuel oil storage (diesel) is required for the operational phase. Fuel oil will be stored within a c. 800 L capacity tank for the 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 SD18A/0134

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 gas insulated switch substation and associated high voltage cable routes.

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 Chapter 7 and 8 of the EIAR. Remediation and mitigation measures included in the design of this project to address these potential impacts are presented in sections 7.56 – 7.74.

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. SD18A/0134 will minimise the potential for contamination of the aquifers beneath the site: The Locally Important Bedrock Aquifer (LI) 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 agricultural land available in the region and has been zoned for industrial development. These potential impacts are not anticipated to occur following the implementation of mitigation measures outlined in sections 7.56 – 7.71.

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 (bulk storage and local storage at the back-up generators) to occur on site. In addition to this there is a potential for leaks and spillages from vehicles along access roads, loading bays and in parking areas. Any accidental emissions of oil, petrol or diesel could cause 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 Groundwater abstraction does not form part of the Proposed Development. There will be no impact on local or regional groundwater resources (abstraction) as a result of the Proposed Development. These potential impacts are not anticipated to occur following the implementation of mitigation measures outlined in section 7.72 – 7.74.

Do Nothing Scenario

7.53 Adjacent to the proposed substation, permission has been granted for the development of a data centre and associated ancillary development (SDCC Planning Ref. SD18A/0134 / An Bord Pleanála Ref. ABP-302813-18) as well as a number of other similar facilities in the area (see Chapter 3 for further 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(s). Once construction of the permitted developments 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 or Reductive 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 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 the 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 reduce, 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 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 appropriate

earthworks handling protocol 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 12,300m³ 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 Permitted Development will be sourced from reputable suppliers. No fill is required for the Proposed Development that cannot be sourced from the overall Proposed Development site. 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 watercourses/ 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, 20 m 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.

Environmental procedures

- 7.70 As detailed in Chapter 2 ESB Networks 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.

Operational Phase

Fuel storage

- 7.71 The primary potential impact relates to a failure or accidental spill of diesel fuel which is stored and used on-site for back-up power generation.
- 7.72 The following mitigation measures will be undertaken at the operational stage to manage any leaks from vehicles resulting in soil and/or groundwater quality impacts:
- Provision of spill kit facilities and training of operatives in use of same;
 - Where mobile fuel bowsers are used the following measures will be taken:
 - Any flexible pipe, tap or valve will be fitted with a lock and will be secured when not in use;
 - The pump or valve will be fitted with a lock and will be secured when not in use;
 - All bowsers to carry a spill kit;
 - Operatives must have spill response training; and
 - Portable generators or similar fuel containing equipment will be placed on suitable drip trays.

Increase in hardstand

- 7.73 A proportion of the Proposed Development site will be covered in hardstand (c. 40% - 2530sqm). This protects the underlying aquifer but also reduces local recharge in this area of the aquifer. As the area of the aquifer is large this reduction in local recharge will have no significant change in the natural hydrogeological regime.

Predicted impact of the Proposed Development

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

Construction phase

- 7.75 The implementation of mitigation measures 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

- 7.76 The implementation of mitigation measures 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

- 7.77 Based on the natural conditions present and with appropriate mitigation measures (see Section 7.61) 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.
- 7.78 There is 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.
- 7.79 Following the NRA criteria for rating the magnitude and significance of impacts on the geological and hydrogeological related attributes, the magnitude of the impact is considered **negligible** for the construction and operational phases.

Cumulative impacts

- 7.80 The anticipated cumulative effects of the Proposed Development, the development of the adjacent data centre facilities and other known developments as outlined in Chapter 3 are addressed below.
- 7.81 In relation to the potential cumulative impact on the geological or hydrogeological environment during the construction phases, those key engineering works which would have additional impacts above are:
- Construction works will require additional removal of topsoil and subsoil cover and will further increase the vulnerability of the underlying bedrock. Although this is minimized due to the underlying clayey overburden. Capping of significant areas of the sites by hardstand / buildings following construction and installation of drainage will minimise the potential for contamination of groundwater.
 - Run-off containing large amounts of silt could cause damage to surface water systems and receiving watercourses. Run-off for the datacentre development and the proposed substation/ cable routes development will therefore need to be managed using the methods described for the Proposed Development; and
 - 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 and Permitted Development.
- 7.82 In relation to the potential cumulative impacts from the operational stages, the following would apply:
- Overall increase in hardstanding: Cumulatively these developments will result in localised reduced recharge to ground and increase in surface run-off. The aquifer underlying the site is a locally important aquifer which is moderately productive only in local zones. 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.
 - 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.

- There will be a further loss of greenfield area locally however, the area of development is small in the context of the overall agricultural land available in the region and the site is already secured and unavailable for agricultural use, subject to a grant of permission for the Proposed Development.
- The residual cumulative effect on land, soils, geology and hydrogeology for the construction and operation phases are anticipated to be long-term, neutral in terms of quality and of imperceptible significance, once the appropriate mitigation measures are put in place for each development

Monitoring

- 7.83 There will be no monitoring required for the Proposed Development.

Reinstatement

- 7.84 Following the installation of the ducting excavated section to the north and south of the Grange Castle South Business Park Access road will be reinstated as current.

HYDROLOGY

- 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 stormwater drainage.

Methodology

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

- Guidelines on the Information to be Contained in Environmental Impact Assessments EPA (Draft) 2017
- European Commission '*Environmental Impact Assessment of Projects – Guidance on the Preparation of the Environmental Impact Assessment Report*' 2017
- 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, an 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.

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 (GSDSDS): 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);
- Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors" (CIRIA 532, 2001);

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

- IGSL Ltd. Cyrus One – Grange Castle Business Park Geotechnical Investigation Report – Project no. 20544 January 2018;
- Various design site plans and drawings; and
- Consultation with project engineers, Pinnacle Consulting Engineers.

Receiving Environment

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

Hydrology (Surface Water)

- 8.7 The Permitted Development site falls generally from south to north, with topographical levels ranging from c. 75 mAOD in the south east to c. 70 mAOD in the north west of Permitted Development boundary. The Proposed Development is reasonably flat around 74-75mAOD.
- 8.8 The Proposed Development is within the River Liffey catchment, which encompasses an area of approximately 1,369 km². 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 and west. 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.
- 8.10 The Baldonnel Stream runs roughly east to west 300m to the north of the proposed substation. The river is in three distinct forms. The eastern section, is in its natural condition and runs at the surface for approximately 200m from the boundary with Boland's Grangecastle in an open ditch. The central 280m has been realigned and runs on the surface in a newly formed channel parallel to the Nangor Road. The final, western reach is in a 200m culvert that continues north-wards to outfall to the Griffeen River at a point southeast of the junction of the New Nangor and Baldonnel roads.



Figure 8.1 Local hydrological environment.

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 northeast, 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 13.6km² and is steep 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 south-east to north-west and has been culverted discharging to the Griffin to the northeast. The local hydrological environment is shown in Figure 8.1 on the previous page.

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). It 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 quality monitoring points in the context of the subject site and other regional drainage settings.

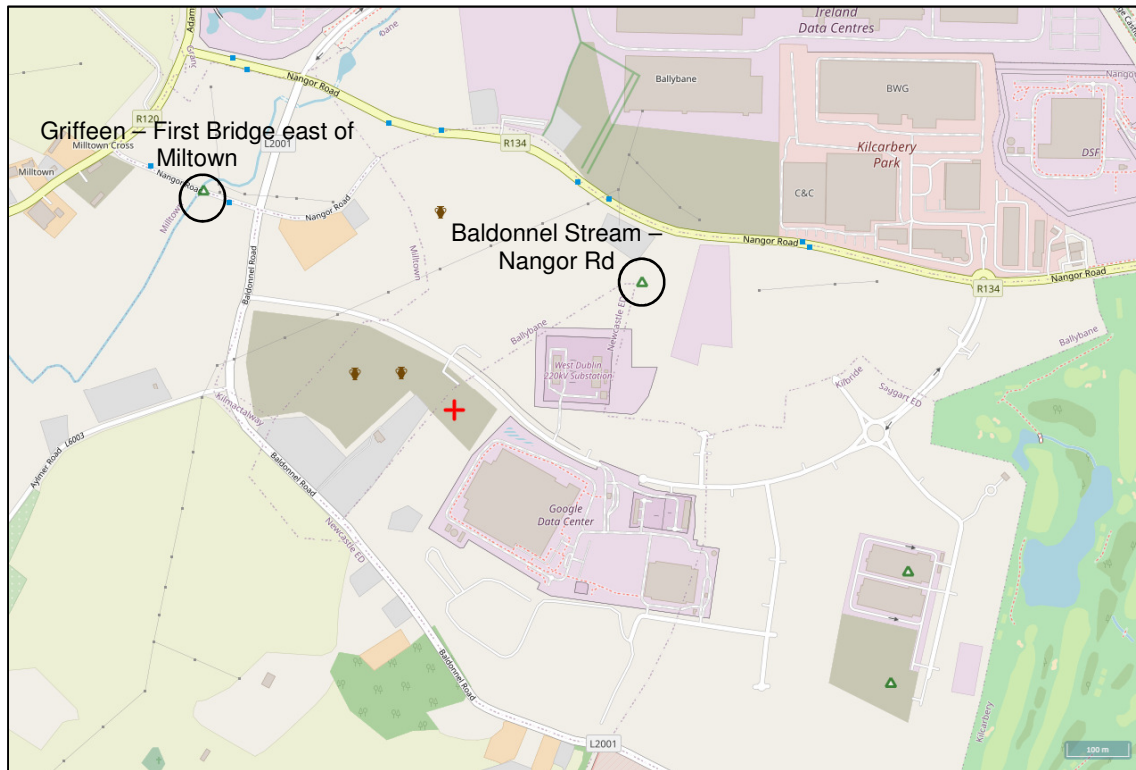


Figure 8.2 Surface Water Quality Monitoring Point (EPA, 2020) (Site location indicated with red cross).

- 8.17 Surface water quality is monitored periodically by the EPA at various regional locations along with 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 Balldonnell Stream (RS09B090400), located at Nangor Road. The status of 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 the 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.

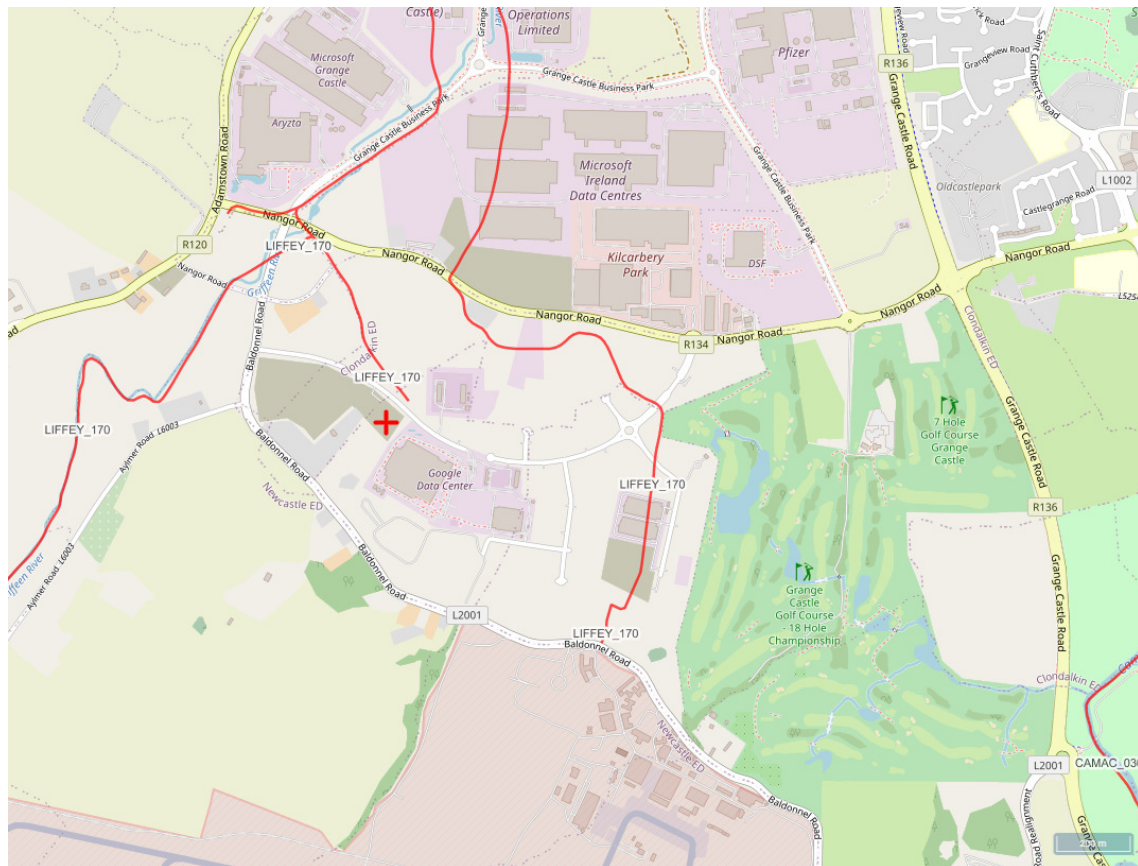


Figure 8.3 River Waterbody Score – The Griffeen River (Liffey_170 in the figure above) is currently considered ‘at risk’ (Site location indicated with red cross).

Flood Risk

- 8.20 Project Engineers Pinnacle Consulting undertook a flood study which is included as a separate document to this EIA Report. Indicative flood mapping (contained within the Pinnacle Consulting Engineers report) shows the development site is located within Flood Zone C “Low Probability”. Therefore, the Proposed Development is classified as appropriate.
- 8.21 Drainage is designed to 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

- 8.22 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, Milltown Stream and Baldonnel Stream) has been considered as having low-quality significance or value on a local scale.

Characteristics of the Proposed Development

- 8.23 The Proposed Development comprises a new 110 kV Gas Insulated Switchgear (GIS) Substation (known as Aungierstown), 2 no. transformer bays, associated compounds and site infrastructure to be located on lands at Grange Castle South Business Park, Baldonnel, Dublin 22, and two underground single circuit 110 kV transmission lines from the proposed Aungierstown Substation to the existing 220 kV / 110 kV Castlebaggot Substation to the immediate north-east. These works are described in detail within Chapter 2 (Description of the Proposed Development) of this EIA Report.
- 8.24 The Baldonnel Stream runs east to west c. 300-350m to the north of the proposed substation. The stream originally (and indeed currently) runs under the Boland’s site westwards. 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. As part of the realignment of the

Nangor Road, and as part of flood alleviation works, South Dublin City Council (SDCC) have realigned the watercourse to continue along the southern edge of the Nangor Road, at the 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.

- 8.25 The Milltown stream is located to the west of the site and is a tributary of the Griffeen River. It is culverted through the Grange Castle South Business Park and beneath the New Nangor Road where it flows into the Griffeen.
- 8.26 The characteristics of the Proposed Development regarding the hydrological environment, related to both construction and operation activities are described below.

Construction Phase

- 8.27 The key civil engineering works which will have a 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 110 kV 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.

Operational Phase

- 8.28 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 for backup generation at the substation (c. 800litres). Fuel will be stored in a single tank and will be bunded to 110% of its capacity. However, accidental releases may occur during transport/filling etc. if not adequately mitigated. Localised accidental discharge of hydrocarbons (likely small quantities) could also occur in car parking areas and along roads;
 - (ii) Increase in local overall hardstand by c. 2530sqm;
 - (iii) Surface water will be discharged to the business park surface water system via a new connection as well as utilising attenuation installed during the works permitted under permission (SDCC Reg. Ref. 18A/0134/An Bord Pleanála Ref. ABP – 302813-18). Potential contamination of surface water with hydrocarbons from vehicle movements and other areas could cause downstream contamination if no controls in place;
 - (iv) Wastewater generation will be minimal (Design peak flow of 0.018 l/s) and will be discharged via a new connection to the foul water drainage system within the Business Park, (no discharges to ground/surface waters); and
 - (v) Water supply (minimal requirement) will be from the public water main (via a connection to an existing 500 mm Ø main located along the Grange Castle South Access Road, adjacent to the northern boundary of the property) and will not require surface water/groundwater abstraction. The water supply will be utilised for the welfare facilities in the substation. See project engineers Pinnacle Consulting's Aungierstown 110kV Substation Engineering Planning Report (December 2020) attached to this application for more information.

Potential Impacts of the Proposed Development

- 8.29 The potential impacts in relation to surface water during the construction and operational phases are outlined below. The assessment of effects defined is based on the description of effects as set out in the EPA Draft EIA Report Guidelines (2017) (refer to Table 1.2 in Chapter 1) and the NRA criteria detailed in Chapter 8 - Appendix 8.1.

Construction Phase

- 8.30 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.

- 8.31 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.
- 8.32 The Baldonnel Stream flows in a westerly direction c. 300m north of the proposed substation and within 150m of the red line application boundary. This stream is a tributary of the Griffeen River which outfalls to the River Liffey c. 4.3 km north of the site and ultimately flows into Dublin Bay. This site does not have 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
- 8.33 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 on site settlement before release.
- 8.34 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.
 - Storage of chemical on site.
- 8.35 Machinery activities on site during the construction phase may result in contamination of runoff/surface water. Potential impacts could arise from accidental spillage of fuels, oils, paints etc. which could impact surface water if allowed to infiltrate to runoff to surface water systems and/or receiving watercourses. However, implementation of the mitigation measures detailed in Sections 8.48 – 8.70 will ensure that this does not occur.
- 8.36 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 Sections 8.48 – 8.70 will ensure that any impact will be mitigated.

Operational Phase

Surface Water

- 8.37 Rainwater runoff from the substation roof and yard will be collected in stormwater drainage channels and diverted to an onsite reticulation system into a Stormtech or similar attenuation system (sized for a 1 in 100-year rainfall event +20% climate change). This surface water drainage system is being proposed as part of the Proposed Development. Stormwater from all other hard standing areas around the client control room (outside of the Proposed Development site) will be drained with the Permitted Development to the attenuation ponds and system granted under the Permitted Development
- 8.38 The drainage design for the permitted data centre development (SDCC Reg. Ref. SD18A/0134) includes an oil separator interceptor system to ensure the quality of stormwater discharge is controlled prior to attenuation.
- 8.39 The attenuated stormwater will be discharged at the allowable greenfield runoff rate of 0.5 l/s into the storm water drain to the north of the site running along the Grange Castle South Business Park Access Road. It is proposed to use 'Hydrobrake' flow control systems to achieve the required discharge rates. Further detail on the stormwater drainage system and the basis of its design is provided for in the Engineering Planning Report by Pinnacle Consulting Engineers that accompanies this application.

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

Wastewater

- 8.41 As stated above, a separate connection to the wastewater network can be facilitated via a private connection to the existing public foul sewer that runs along the Grange Castle South Business Park access road. It is proposed to use 225mm uPVC pipes & precast manholes for the connection to the external drainage network.
- 8.42 This sewer then connects into a 375 mm Ø pipe on Baldonnel Road and ultimately drains via gravity, into the Grange Castle Business Park pumping station, circa 1.9 km to the north. The effluent from this pumping station is then pumped via 3 No. rising mains, i.e. 100 mm Ø, 200 mm Ø & 450 mm Ø, into the local infrastructural network.
- 8.43 The existing foul sewer reticulation network has adequate capacity to cater for the proposed effluent discharge from the subject site and there are no known issues noted with the sewer reticulation network. 3 no. 225mm Ø spur connections have been provided off the main sewer for future connection of these lands. There is the capacity for the network to accommodate wastewater from the Proposed Development which will be minimal.

Water Supply

- 8.44 The water supply for the Proposed Development will be off the existing 200mm Ø water main spur located adjacent to Grange Castle South Business Park access road some 85m to the west of the access into the Proposed Development site. The aforementioned existing watermain connects into existing infrastructure, i.e. a 450mm Ø main, located just north of the junction access into Grange Castle South Business Park, on Baldonnel Road. This main then connects into the 700mm Ø D.I. trunk main located along the New Nangor Road, circa 130m to the north. From discussions with the South Dublin County Council, it is understood that there is adequate capacity within the existing water main network to supply the Proposed Development. See project engineers Pinnacle Consulting's Engineering Planning Report attached to this application for more information.

Fuel and Other Accidental Spills

- 8.45 There is a potential for leaks and spillages from the fuel tanks for the onsite generator. 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.
- 8.46 There is no direct pathway to surface water from this site, furthermore, based on design and mitigation measures discussed in this chapter there will be no impact on the receiving surface water bodies i.e. Milltown Stream, the Baldonnel Stream and Griffeen River.

Do Nothing Scenario

- 8.47 Should the Proposed Development not take place, sections of the overall landholding will be subject to clearance, development and landscaping as part of the Permitted Development granted under SDCC Reg. Ref. SD18A/0134/An Bord Pleanála Ref. ABP – 302813-18. The land to the north will also be similarly developed as permitted under SDCC Reg. Ref. SD20A/0121. These and other developments are outlined in further detail in Chapter 3 of this EIA Report. Once construction of the developments previously permitted is complete, the hydrological environment would not be subject to further changes.

Remedial and Mitigation Measures

General

- 8.48 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.

- 8.49 There are two watercourses (Milltown & Baldonnel Streams) to the north and west, which are tributaries of the River Liffey, therefore caution is required to mitigate the potential effects on the local water environment. The Baldonnel Stream is largely culverted through the Grange Castle Business Park and directly north of the proposed substation development and there will be no impact to the quality or flow of this watercourse. Furthermore, where the path of the trenches intersect the culverted local stream the excavations will be performed by hand beneath the culvert with the appropriate supports and measures in place as per the project Construction Management Plan (CMP). There is no direct hydraulic link to the Griffeen of Liffey Rivers or the Grand Canal pNHA to the north. The following 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)

- 8.50 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.
- 8.51 All contractors will be required to implement the CEMP.

Surface Water Run-off

- 8.52 As there is potential for run-off to enter current stormwater systems and indirectly discharge to a watercourse, mitigations 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).
- 8.53 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 stormwater 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.
- 8.54 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

- 8.55 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.

- 8.56 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.
- 8.57 All ready-mixed concrete will be brought to site by truck. A suitable risk assessment for wet concreting will be completed prior to works being carried out which will include measures to prevent discharge of alkaline wastewaters or contaminated stormwater to the underlying subsoil. Wash-down and washout of concrete transporting vehicles will take place at an appropriate facility offsite.

Accidental Releases

- 8.58 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

- 8.59 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.
- 8.60 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.
- 8.61 Site investigations carried out at the site in 2017 & 2018 (see Chapter 7) 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

- 8.62 ESB Networks 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

- 8.63 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

- 8.64 Storm water from the Proposed Development has been designed in accordance with the GSDSDS and ensures that Best Management Practice has been incorporated into the design. Storm water from all other hardstanding areas, except for the roof and surrounds of the MV switch (client control) building & transformer yard (that will drain to the attenuation system of the Permitted Development), will be drained into a new attenuation tank. Further information of the surface and foul water drainage for the Proposed Development is included in the Engineering Planning Report (*Aungierstown 110 kV Sub-Station Engineering Planning Report December 2020*) which is provided as a separate document to this application. The allowable discharge rate (QBAR) according to project Engineers. The allowable discharge rate (QBAR) applicable to the Proposed Development is 0.5 l/s.
- 8.65 It is proposed to ultimately discharge surface water from the Proposed Development, post attenuation and outflow restrictions, via a 300mm Ø gravity sewer network and connect into the existing manhole, EX SWMH, with a Cover Level of c. 74.02 m and an Invert Level of circa 72.07 m located adjacent to the ESB sub-station, to the north of the subject site. It is proposed to discharge foul water from the Proposed Development, via a 225mm gravity foul sewer network and connect into the aforementioned existing 225mm Ø foul sewer spur to the north of the site. There is an existing manhole, EX FMH, located at the property boundary near the site access to the north, with a Cover Level of circa 74.13m & an Invert Level of circa 72.83m - refer Drawing No. P200401– 200 Rev. D by Pinnacle Consulting Engineers.

Water Supply

- 8.66 It is intended to serve the proposed Substation off the existing (8") 200 mm Ø water main spur located adjacent to Grange Castle South Access Road, circa 85m to the west from the site access into the application site. Hydrants will be installed in accordance with Part B of the building regulations, and these are detailed on our engineering drawings - refer Drawing No. P200401-200 Rev. A. Water demand for the development has been based on design loadings as indicated by Irish Water, i.e. 150 ltr/person/day, giving an estimated average water demand of 3,000litres/day (0.004 litres/second). The peak water demand is calculated as being circa 0.02litres/second.
- 8.67 Water meters in line with South Dublin County Council & Irish Water requirements and specifications, will be installed at the connections onto the aforementioned existing water mains as required.

Predicted Impact of the Proposed Development

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

Construction Phase

- 8.69 The implementation of mitigation measures highlighted in this Chapter 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-neutral**.

Operational Phase

- 8.70 The implementation of mitigation measures highlighted in this Chapter 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- neutral**.

Residual Impacts

- 8.71 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 **long term, imperceptible** and **neutral** i.e. an impact capable of measurement but without noticeable consequences.

Cumulative Impact

- 8.72 In relation to the potential cumulative impact on hydrology during the construction phases, the construction works which would have potential cumulative impacts include:

- Surface water run-off during the construction phase may contain increased silt levels or become polluted from construction activities. Run-off containing large amounts of silt can cause damage to surface water systems and receiving watercourses.
- Contamination of local water sources from accidental spillage and leakage from construction traffic and construction materials unless project-specific CEMPs are put in place for each development and complied with.

8.73 Potential cumulative impacts included in the operational phase include:

- Increased hard standing areas will reduce local recharge to the ground and increase surface water run-off potential if not limited to the green field run-off rate from the site.
- Increased risk of accidental releases from fuel storage/delivery unless mitigated adequately i.e. bunded tank.
- Increased risk of accidental discharge of hydrocarbons from car parking areas and along roads and unless diverted to surface water system with petrol interceptor; and
- Any additional foul discharges should be treated where appropriate and/or diverted to the foul sewer system and not directly to ground.

8.74 Similar mitigation measures to those described in this Chapter will need to be implemented to protect water quality.

8.75 Increase in wastewater loading and water supply requirement is an impact of all development: Each development will require approval confirming available capacity in the water and wastewater infrastructure. The surface water and foul drainage infrastructure and water supply requirements for the data centre development (SDCC Reg. Ref. SD18A/0134) has been designed to accommodate the Proposed Development site. However, the proposal will now connect via separate private connections to the Business Park network. The proposed water usage for the substation is minimal.

8.76 Development will result in an increase in hard standing which will result in localised reduced recharge to ground and increase in run-off rate. However, each permitted development is required by the Local Authority and IW to comply with the Greater Dublin Strategic Drainage Strategy (GDSDS) and Local Authority and IW requirements by providing suitable attenuation on site to ensure greenfield run-off rates and that there is no increase in offsite flooding as a result of development.

8.77 There is a potential for contamination of watercourses during construction and operation: Mitigation measures are required to manage sediment run-off and fuel leakages during construction and operation. All developments are required to ensure they do not have an impact on the receiving water environment in accordance with the relevant legislation (Local Government (Water Pollution) Act, 1977 and 1990 as amended) such that they would be required to manage runoff and fuel leakages.

8.78 The residual cumulative impact on water and hydrology for the construction and operation phases is anticipated to be **long-term, neutral** in terms of quality and of **imperceptible** significance, once appropriate mitigation measures to manage water quality runoff in compliance with legislative requirement are put in place for each development.

NOISE AND VIBRATION

- 9.1 As detailed in Chapter 1 Introduction, this EIAR has been prepared to accompany an application for the provision of a new 110kV Gas Insulated Switchgear (GIS) Substation (known as Aungierstown), 2 no. transformer bays, associated compounds and site infrastructure to be located on lands at Grange Castle South Business Park, Baldonnell, Dublin 22. The Proposed Development also includes 2 no. underground single circuit 110kV transmission lines from the proposed Aungierstown Substation to the existing 220kV / 110kV Castlebaggot Substation to the immediate north-east (hereafter referred to as the 'Proposed Development').
- 9.2 The Proposed Development has been assessed and discussed in terms of potential noise and vibration impacts on the surrounding environment.

Methodology

- 9.3 The following methodology has been adopted for this assessment:
- review appropriate guidance and planning conditions applicable to the associated site, 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 levels against the appropriate criteria and existing noise levels and outline required mitigation measures (if any).
- 9.4 Chapter 9 - Appendix 9.1 of this document 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

- 9.5 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.
- 9.6 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).
- 9.7 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.
- 9.8 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.
- 9.9 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.

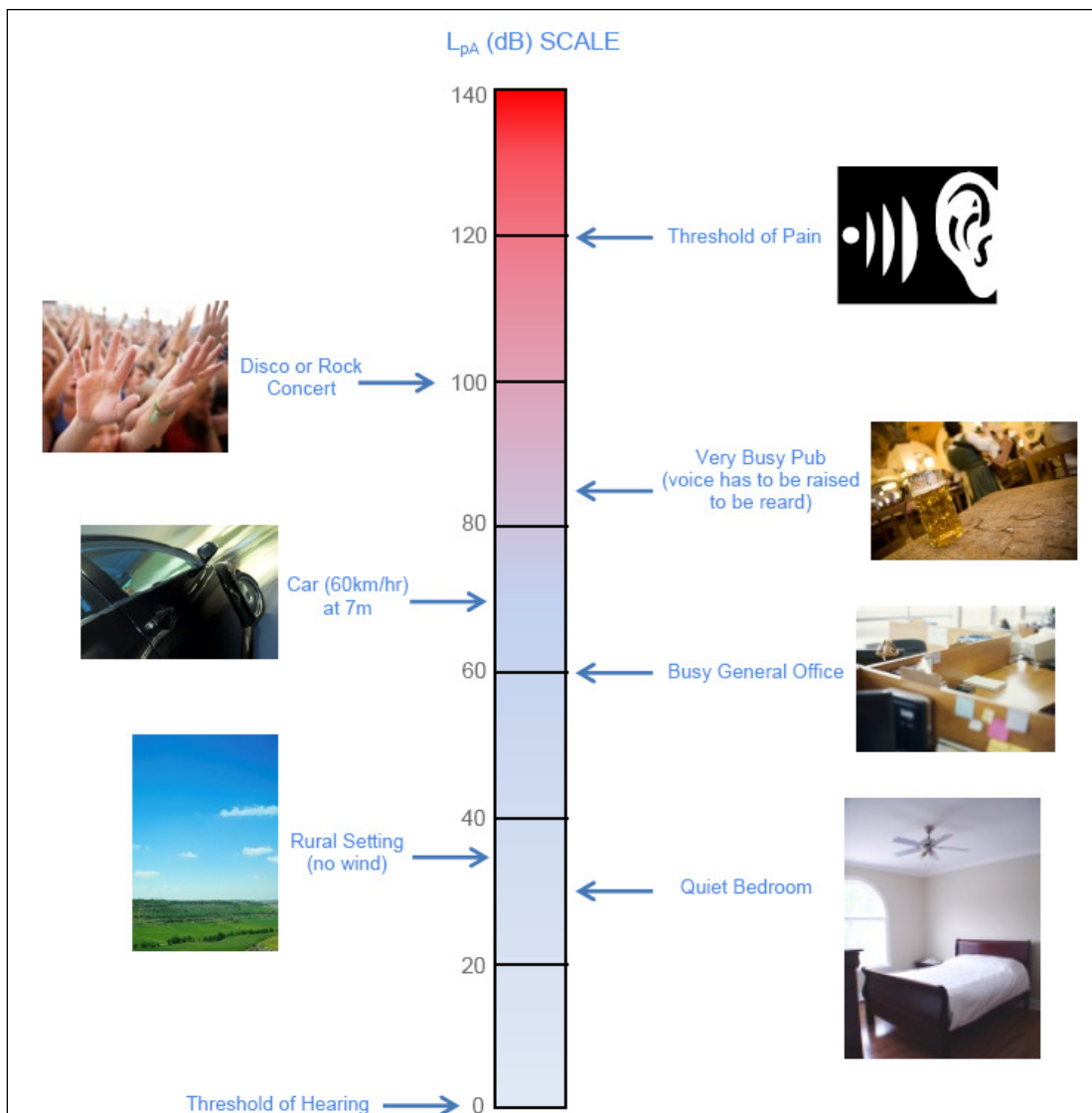


Figure 9.1 dB(A) Scale & Indicative Noise Levels – (EPA: Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4 – 2016))

Significance of Impacts

9.10 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).

9.11 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).

9.12 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.

9.13 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

- 9.14 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.
- 9.15 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*.
- 9.16 The approach adopted in BS 5228 – 1, calls for the designation of a noise sensitive location into a specific category (A, B or C) based on existing ambient noise levels in the absence of construction noise. This then sets a threshold noise value that, if exceeded at this location, indicates a significant noise impact is associated with the construction activities.
- 9.17 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.

- 9.18 It should be noted that this assessment method is only valid for residential properties.
- 9.19 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)	A	65
Evening (19:00 to 23:00hrs)	A	55
Night time (23:00 to 07:00hrs)	A	45

- 9.20 If the construction noise level exceeds the appropriate category value, then a significant effect is deemed to occur. See Section 9.61 for the construction noise assessment in relation to this site.
- 9.21 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*¹⁶, 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. 2×10^{-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.

- 9.22 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 $L_{Aeq,1hr}$) and night time (50dB $L_{Aeq,1hr}$) will apply.
- 9.23 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:

¹⁶ *Guidelines for the Treatment of Noise and Vibration in National Road Schemes, Revision 1, 25 October 2004*, Transport Infrastructure Ireland

65dB L_{Aeq,1hr} at noise sensitive location
75dB L_{Aeq,1hr} at commercial property

Criteria for Rating Vibration Impacts

- 9.24 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).
- 9.25 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. This guidance is applicable to the daytime only; it is unreasonable to expect people to be tolerant of such activities during the night.
- 9.26 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*.
- 9.27 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.
- 9.28 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.
- 9.29 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

- 9.30 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 110kV 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.”

- 9.31 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. >220m) noise from this installation is not predicted to be an issue off site.
- 9.32 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.

ABP Planning Condition

- 9.33 In relation to the Permitted Development (datacentre) site, these works are associated with An Bord Pleanála (ABP) has applied a noise condition to its decision made under SDCC Ref. SD18A/0134 / An Bord Pleanála Ref. ABP – 302813-18, that is applicable to the subject site that is as follows:

Condition 16. The operational noise level shall not exceed 55 dB(A) Leq 1 hour (corrected for any tonal or impulsive component) at the nearest noise sensitive locations, including dwellings, between 0800 and 2000 hours, Monday to Friday inclusive, and shall not exceed 45 dB(A) Leq 1 hour at any other time. All sound measurement shall be carried out in accordance with ISO 1996-1:2016 “Acoustics – Description, measurement and assessment of environmental noise – Part 1: Basic quantities and assessment procedures”. Procedures for the purpose of determining compliance with this limit shall be submitted to, and agreed in writing with, the planning authority prior to commencement of development.

Reason: To protect the amenities of property in the vicinity of the site.

- 9.34 It is proposed that the cumulative effect of the day to day operations of the datacentres and the Proposed Development comply with the ABP noise criteria.

Assessment of Significance

- 9.35 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.
- 9.36 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.
- 9.37 The scale adopted in this assessment is shown in Table 9.8 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 in Table 9.8 below.

Table 9.8 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

- 9.38 The significance table above 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.
- 9.39 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

- 9.40 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

- 9.41 In order to provide continuity of service a back-up emergency generator will be provided as part of the current proposal to serve the substation. The generator 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.'

- 9.42 It is therefore considered that the proposed noise criterion of 55dB $L_{Aeq,1hr}$ on these emergency units is appropriate. Generators 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

- 9.43 Following review of relevant guidance, the following noise criteria are proposed for the development:

Day to Day Operation (Noise Sensitive) –45dB $L_{Aeq,15min}$ (Ref. ABP)

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** $L_{Aeq,15min}$

- 9.44 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

- 9.45 There will be no vibration emissions from the operation of the proposed cable installation. Consequently, there is no requirement to assess any vibration emissions.

Forecasting Methods

- 9.46 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*.
- 9.47 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*.
- 9.48 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

- 9.49 An environmental noise survey has been conducted at the site in order to quantify the existing noise environment. The survey was conducted in general accordance with ISO 1996: 2017 *Acoustics – Description, Measurement and Assessment of Environmental Noise*. Specific details are set out below.

Monitoring locations

- 9.50 Three measurement locations were selected as shown in Figure 9.2 and described below.

Location B1 is located along the southern boundary of the site. This location was chosen to represent noise levels at the closest dwellings to the Proposed Development along the southern boundary of the site. Noise measurements at this location consisted of unattended measurements covering day, evening and night-time periods over a 4-day period.

Location B2 is located to the west of the site in the vicinity of nearby dwellings. Noise measurements at this location consisted of attended daytime measurements.

Location B3 is located to the north of the site in the vicinity of nearby dwellings. Noise measurements at this location consisted of attended daytime measurements.



Figure 9.2 Site plan indicating baseline noise monitoring locations B1 to B3

Survey periods

- 9.51 Noise measurements were conducted between 12:00hrs on 23rd February and 13:30hrs on 27th February 2018. The weather during the surveys was generally dry and calm with wind speeds in the range 0 to 4m/s. Temperatures were in the range 0 to 6 degrees Celsius. It is also to be noted that the noise criteria applied for this stage of the development are based on noise data and assessment obtained before the data centre on site were operational and therefore addresses any concern of 'background creep'.

Instrumentation

- 9.52 The noise measurements were conducted by using the following equipment:

- NTi Audio XL2 Sound Level Meter Type (Location B1); and
- Brüel & Kjaer Type 2250 Sound Level Meter (Locations B2 and B3).

- 9.53 The measurement apparatus was check calibrated both before and after the measurement survey using a Brüel & Kjaer Type 4231 Sound Level Calibrator. Calibration Certificates are available on request.

Procedure

- 9.54 Measurements were conducted over a continuous 4-day period at Location B1. Attended spot-check measurements were conducted at Locations B2 and B3 on a cyclical basis during daytime hours. Sample periods for the noise measurements were 15 minutes. The results were noted onto a Survey Record Sheet immediately following each sample, and were also saved to the instrument memory for later analysis where appropriate. Survey personnel noted all primary noise sources contributing to noise build-up.

Measurement parameters

- 9.55 The noise survey results are presented in terms of the following parameters:

- L_{Aeq} is the equivalent continuous sound level. It is a type of average and is used to describe a fluctuating noise in terms of a single noise level over the sample period.
- L_{AFmax} is the instantaneous maximum sound level measured during the sample period.
- L_{AFmin} is the instantaneous minimum sound level measured during the sample period.

- L_{AF10} is the sound level that is exceeded for 10% of the sample period. It is typically used as a descriptor for traffic noise.
- L_{AF90} is the sound level that is exceeded for 90% of the sample period. It is typically used as a descriptor for background noise.

9.56 The “A” suffix denotes the fact that the sound levels have been “A-weighted” in order to account for the non-linear nature of human hearing. All sound levels in this report are expressed in terms of decibels (dB) relative to 2×10^{-5} Pa.

Noise survey results – Location B1

9.57 Table 9.9 presents a summary of the average daytime (i.e. 07:00 to 19:00), evening (i.e. 19:00 to 23:00) and night-time (i.e. 23:00 to 07:00hrs) noise levels measured at Location B1.

Table 9.9 Baseline noise levels at location B1

Date	Period	Measured Noise Levels (dB re. 2×10^{-5} Pa)				
		L_{Aeq}	L_{AFmax}	L_{AFmin}	L_{AF10}	L_{AF90}
23/02/2018	Day	51	85	43	52	46
23/02/2018	Evening	50	79	40	48	44
23-24/02/2018	Night	45	76	35	43	39
24/02/2018	Day	49	84	39	48	43
24/02/2018	Evening	53	80	40	50	44
24-25/02/2018	Night	44	68	37	45	41
25/02/2018	Day	47	76	37	47	42
25/02/2018	Evening	46	64	37	46	43
25-26/02/2018	Night	42	59	33	42	39
26/02/2018	Day	53	82	43	54	48
26/02/2018	Evening	49	83	39	48	43
26-27/02/2018	Night	47	73	37	45	41
27/02/2018	Day	53	82	46	54	50

Note : The L_{Aeq} values presented represent the logarithmic average of logged 15-minute samples for the relevant period, the L_{AFmax} values represent the maximum value measured and the L_{A10} and L_{A95} values represent the arithmetic average of the logged 15-minute samples.

Noise survey results – Location B2

9.58 Table 9.10 presents the measured daytime noise levels measured at Location B2.

Table 9.10 Baseline noise levels at location B2

Date	Period	Measured Noise Levels (dB re. 2×10^{-5} Pa)				
		L_{Aeq}	L_{AFmax}	L_{AFmin}	L_{AF10}	L_{AF90}
23/02/2018	12:18 – 12:33	58	85	46	63	53
	13:11 – 13:26	61	87	47	65	52
	14:10 – 14:25	59	88	45	65	53

Noise survey results – Location B3

9.59 Table 9.11 presents the measured daytime noise levels measured at Location B3.

Table 9.11 Baseline noise levels at location B3

Date	Period	Measured Noise Levels (dB re. 2×10^{-5} Pa)				
		L_{Aeq}	L_{AFmax}	L_{AFmin}	L_{AF10}	L_{AF90}
23/02/2018	12:45 – 13:00	64	92	51	68	57
	13:40 – 13:55	63	86	49	69	55
	14:34 – 14:49	67	91	50	70	56

Noise survey results – summary

- 9.60 At all of the measurement locations the noise levels were influenced primarily from distant and local road traffic movements. Other noise sources included Aircraft from Baldonnel, wind generated noise, birdsong, distant commercial activities and occasional distant construction activity.

Characteristics of the Proposed Development

- 9.61 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 cables will be laid along a strip of land to the existing 220kV / 110kV Castlebaggot Substation to the north-east 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 for 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.

- 9.62 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.

- 9.63 Once operational, there will be no significant off-site noise emissions from the operation of the cable installations or 110kV substations and associated cable bays.

- 9.64 These issues are discussed in detailed in the following sections.

Potential impact of the Proposed Development**Construction phase**

- 9.65 Construction noise predictions have been carried out using guidance set out in British Standard *BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Noise*.
- 9.66 Construction works associated with the underground cable will be temporary in duration. It is estimated that the civil works will take approximately 2-3 months, with a further 2 weeks estimated for cable installation, jointing and testing and reinstatement.
- 9.67 Table 9.12 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 9.12 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).

- 9.68 Construction works associated with cable works will be the dominant source of noise at the nearest noise sensitive locations when they occur. 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 The noise levels presented in Table 9.12 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 200m
- 9.70 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.
- 9.71 In terms of noise associated with the construction activities for the Proposed Development the associated effect is stated to be **negative** and **minor**.
- 9.72 In the unlikely event that works are scheduled out of normal hours or at night, the range of calculated noise levels are also below a level that would lead to a significant impact. 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 at night time. Various measures relating to the control of noise from the works are outlined in the mitigation section of this assessment.

Construction Traffic

- 9.73 In terms of the additional construction traffic on local roads that will be generated as a result of this 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

- 9.74 In terms of noise associated with these construction activities the associated effect is stated to be:

Quality	Significance	Duration
Negative	Minor	Temporary

- 9.75 In terms of vibration, due to the distance of activities from the site to the nearest sensitive locations and controlling vibration levels to those detailed in 9.7 the associated effect is stated to be:

Quality	Significance	Duration
Neutral	Imperceptible	Temporary

Operational Phase

- 9.76 In terms of the transformers the units the EIAR prepared previously of the overall development site considered noise impacts associated with the site including the proposed transformer units. Two scenarios have been developed to consider the noise impact of the proposed operations. These are as follows:
- Scenario A – Proposed Data Storage Facility – Day to Day
 - Scenario B – Proposed Data Storage Facility – Emergency
- 9.77 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.
- 9.78 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 (labelled as R1 – R9) with red star indicating location of proposed substation

- 9.79 The results of the iterations of the noise model are presented in Table 9.13. Note all plant will be selected such that no tonal noise emissions are evident at noise sensitive locations.

Table 9.13 Predicted Plant Noise Levels for Various Scenarios

Location	Predicted dB L _{Aeq,T}	
	Scenario A	Scenario B
R01	21	43
R02	20	43
R03	19	43
R04	18	40
R05	17	39
R06	22	38
R07	22	39
R08	26	41
R09	21	43

- 9.80 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

- 9.81 The predicted noise levels presented in Table 9.13 have been compared to the relevant 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

- 9.82 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.
- 9.83 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 9.14 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	21	55 (Day) 55 (Night)	✓	43	55	✓
R02	20		✓	43		✓
R03	19		✓	43		✓
R04	18		✓	40		✓
R05	17		✓	39		✓
R06	22		✓	38		✓
R07	22		✓	39		✓
R08	26		✓	41		✓
R09	21		✓	43		✓

Review of Increases in Noise Level

- 9.84 Table 9.15 presents the predicted changes in noise level associated with the development at the nearest noise sensitive locations to the site.

Table 9.15 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	21	46	46	0	Imperceptible
R02	20	46	46	0	Imperceptible
R03	19	46	46	0	Imperceptible
R04	18	52	52	0	Imperceptible
R05	17	52	52	0	Imperceptible
R06	22	46	46	0	Imperceptible
R07	22	46	46	0	Imperceptible
R08	26	46	46	0	Imperceptible
R09	21	46	46	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	21	39	39	0	Imperceptible
R02	20	39	39	0	Imperceptible
R03	19	39	39	0	Imperceptible
R04	18	39	39	0	Imperceptible
R05	17	39	39	0	Imperceptible
R06	22	39	39	0	Imperceptible
R07	22	39	39	0	Imperceptible
R08	26	39	39	0	Imperceptible
R09	21	39	39	0	Imperceptible

9.85 Review of the predicted increases in noise level at the nearest noise sensitive locations conclude that the associated impact is *'imperceptible'* at all locations for Scenario A – Typical Operation night-time periods. An *'imperceptible'* 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 the data storage facility 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
<i>Negative</i>	<i>Imperceptible</i>	<i>Long Term</i>

9.86 There will be no noise or vibration emissions from the operation of the proposed cable installation or the 110Kv substation. Consequently, the operational effects are stated to be:

Quality	Significance	Duration
<i>Neutral</i>	<i>Imperceptible</i>	<i>Long Term</i>

Additional vehicular traffic on public roads

9.87 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
<i>Neutral</i>	<i>Imperceptible</i>	<i>Long Term</i>



Figure 9.4 Predicted Noise Contour – Scenario A – Day to Day Operations



Figure 9.5 Predicted Noise Contour – Scenario B – Emergency Operations

Remedial and mitigation measures

9.88 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

9.89 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.

9.90 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.

9.91 The 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. Magnitudes of vibration slightly greater than those in the table are normally unlikely to cause cosmetic damage, but construction work creating

such magnitudes should proceed with caution. Where there is existing damage these limits may need to be reduced by up to 50%.

- 9.92 Appendix 9.3 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).

Operational Phase

Building services noise / emergency site operation

- 9.93 Once operational, there are no noise or vibration mitigation measures required.
- 9.94 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

- 9.95 The noise impact assessment outlined previously has demonstrated that mitigation measures are not required.

Cumulative impact

- 9.96 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.
- 9.97 The noise criteria proposed for new building services plant items (i.e. chillers etc.) has been derived with consideration of existing site noise emissions levels to ensure that cumulative noise emissions do not exceed the relevant noise criteria.
- 9.98 The potential cumulative noise emissions from the Proposed Development and neighbouring Google Ireland Data Centre and Grange Castle 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
- 9.99 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 receivers and compares to the proposed noise criteria.

Table 9.16 Assessment of predicted noise levels at receptors for typical site operation

Receiver Reference (Ref. Figure 9.3)	Predicted Noise Level, (dB L _{Aeq,T})				Noise Criteria (dB(A)) (Night)	Complies?
	Cyrus One	DUB69	Google Ireland	Cumulative		
R4 ^{Note A}	18	25	15	26	45	✓
R1 ^{Note B}	21	30	27	32		✓
R9 ^{Note C}	21	33	27	34		✓

Note A NSL R2 in DUB69 assessment and NSL1 in Google assessment.

Note B NSL R5 in DUB69 assessment and NSL6 in Google assessment.

Note C NSL R6 in DUB69 assessment and NSL6 in Google assessment.

9.100 Predicted cumulative plant noise emissions are therefore within the adopted criteria.

Predicted impacts of the Proposed Development

9.101 This section summarises the likely noise and vibration impact associated with the Proposed Development, taking into account the mitigation measures.

Construction phase

9.102 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 9.6, along with implementation of appropriate noise and vibration control measures (as summarised in Section 9.90), will ensure that noise and vibration impact is kept to a minimum. Also, it is reiterated that any construction noise impacts will be **minor, negative** and **short-term** in nature.

Operational phase

Building services noise / emergency site operation

9.103 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

9.104 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

9.105 During construction of the Proposed Development it is anticipated that noise and vibrations associated with construction work on the proposed cable installation routes, cable bays 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.

9.106 Construction being completed on the permitted datacentre on the adjacent site and at other sites within the wider area. Whilst construction noise from these sites is potentially significant at locations in close proximity to them, the construction noise associated with them 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.

9.107 Once the mitigation measures outlined above are implemented there should be no significant cumulative impact as a result of the Proposed Development.

9.108 The cumulative noise impacts of the Proposed Development and the data centre and associated elements permitted under SDCC SD18A/0134/An Bord Pleanála Ref. ABP -302813 have been outlined in the assessment presented here. The resultant noise impact is **negative, not significant** and **long-term**.

9.109 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

- 9.110 The construction noise assessment has shown that in accordance with the ‘significance’ thresholds presented in the *British Standard BS 5228 – 1: 2009+A1:2014: Code of practice for noise and vibration control on construction and open sites – Noise* there is not a significant impact at residential locations, subject to the implementation of the mitigation measures outlined in Section 9.90.
- 9.111 The robust analysis of potential operational phase plant has shown that in accordance with the scale in the EPA Draft EIA Report Guidelines 2017 there will be a **not significant, negative, long term** impact at the closest residences identified on Figure 9.3. 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).
- 9.112 In terms of the nearest commercial properties **not significant, negative, long-term** impacts are predicted as the character of the noise environment in the vicinity of this location will not be altered.
- 9.113 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 off site noise sensitive locations considering existing traffic volumes on the local road network.

Monitoring

- 9.114 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.

Do-Nothing Scenario

- 9.115 The existing noise climate will remain unchanged on site and at nearby noise sensitive locations.

AIR QUALITY AND CLIMATE

- 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 will involve the installation of a 110kV Gas Insulated Switchgear (GIS) Substation (known as Aungierstown), 2 no. transformer bays, associated compounds and site infrastructure to be located on lands at Grange Castle South Business Park, Baldonnel, Dublin 22. The Proposed Development also includes the provision of 2 no. underground single circuit 110kV transmission lines from the proposed Aungierstown Substation to the existing 220kV / 110kV Castlebaggot Substation to the immediate north-east. These works are described in detail within Chapter 2 (Description of the Proposed Development) of this EIAR.

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 on the basis of compliance with the appropriate standards or limit values. The applicable standards in Ireland include the Air Quality Standards Regulations 2011, which incorporate European Commission Directive 2008/50/EC which has set limit values for a number of pollutants with the limit values for NO₂, PM₁₀, 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 (CAFE) 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 PM₁₀ 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 (SO₂), Nitrogen Oxides (NO_x), Volatile Organic Compounds (VOCs) and Ammonia (NH₃). 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 SO₂ but failed to comply with the ceilings for NH₃, 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 SO₂, NO_x, NMVOC, NH₃, PM_{2.5} and CH₄. In relation to Ireland, 2020 emission targets are 25.5 kt for SO₂ (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 NH₃ (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 SO₂, 40.7 kt (69% reduction) for NO_x, 51.6 kt (32% reduction) for NMVOCs, 107.5 kt (5% reduction) for NH₃ 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 focused 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 adaptation 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 CO₂, 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 CO₂eq 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 this 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 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 in the vicinity of 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 PM₁₀, 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} - PM₁₀) will actually increase at higher wind speeds. Thus, measured levels of PM₁₀ 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 - 2018.

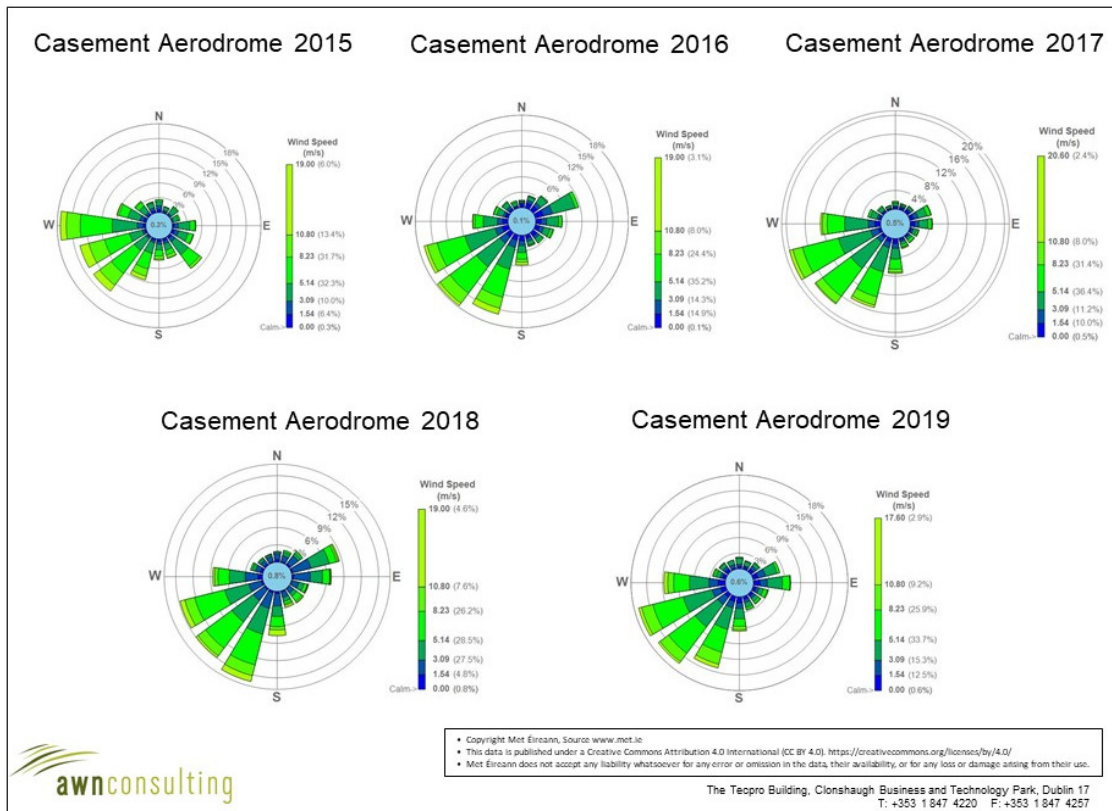


Figure 10.1 Casement Aerodrome Windrose 2015 – 2019 (MET, 2020)

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 2019” (EPA 2020b) 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 2019’ (EPA 2020b). Dublin is defined as Zone A and Cork as Zone B. Zone C is composed of 23 towns with a population of greater than 15,000. The remainder of the country, which represents rural Ireland but also includes all towns with a population of less than 15,000 is defined as Zone D. In terms of air monitoring, the area of the Proposed Development in Grangecastle is categorised as Zone A as explained with the EPA document titled ‘Air Quality in Ireland 2019’ (EPA 2020b).

NO₂

- 10.25 With regard to NO₂, continuous monitoring data from the EPA (EPA 2020b), at suburban Zone A background locations in Rathmines, Swords and Ballyfermot show that current levels of NO₂ are below both the annual and 1-hour limit values, with annual average levels ranging from 15 - 22 µg/m³ in 2019 (see Table 10.2). Sufficient data is available for the station in Ballyfermot to observe long-term trends since 2015 (EPA 2020b), with annual average results ranging from 16 – 20 µg/m³. Based on these results, an estimate of the current background NO₂ concentration in the region of the Proposed Development is 17 µg/m³.

Table 10.2 Background NO₂ Concentrations In Zone A Locations (µg/m³)

Station	Averaging Period Notes 1,2	Year				
		2015	2016	2017	2018	2019
Rathmines	Annual Mean NO ₂ (µg/m ³)	18	20	17	20	22
	Max 1-hr NO ₂ (µg/m ³)	106	102	116	138	183
Swords	Annual Mean NO ₂ (µg/m ³)	13	16	14	16	15
	Max 1-hr NO ₂ (µg/m ³)	170	206	107	112	108
Ballyfermot	Annual Mean NO ₂ (µg/m ³)	16	17	17	17	20
	Max 1-hr NO ₂ (µg/m ³)	142	127	148	217	124

PM₁₀

- 10.26 Continuous PM₁₀ monitoring carried out at the Ballyfermot, Rathmines, Tallaght and Phoenix Park Zone A locations in 2015 - 2019 showed annual mean concentrations ranging from 9 to 16 µg/m³, with at most 5 exceedances (in Rathmines) of the 24-hour limit value of 50 µg/m³ (35 exceedances are permitted per year) (EPA, 2020b). Based on this EPA data, an estimate of the background PM₁₀ concentration in the region of the development is 14 µg/m³.

Table 10.3 Background PM₁₀ Concentrations In Zone A Locations (µg/m³)

Station	Averaging Period	Year				
		2015	2016	2017	2018	2019
Ballyfermot	Annual Mean PM ₁₀ (µg/m ³)	12	11	12	16	14
	24-hr Mean > 50 µg/m ³ (days)	3	0	1	0	7
Tallaght	Annual Mean PM ₁₀ (µg/m ³)	14	14	12	15	12
	24-hr Mean > 50 µg/m ³ (days)	4	0	2	1	3
Rathmines	Annual Mean PM ₁₀ (µg/m ³)	15	15	13	15	15
	24-hr Mean > 50 µg/m ³ (days)	5	3	5	2	9
Phoenix Park	Annual Mean PM ₁₀ (µg/m ³)	12	11	9	11	11
	24-hr Mean > 50 µg/m ³ (days)	2	0	1	0	2

PM_{2.5}

- 10.27 Continuous PM_{2.5} monitoring carried out at two Zone A locations at Rathmines and Finglas in 2019 had annual mean concentrations of 9 µg/m³. The PM_{2.5}/PM₁₀ ratio in Rathmines in 2019 was 0.53. 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 µg/m³.

Sensitivity of the Surrounding 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.
- 10.29 In terms of receptor sensitivity to dust soiling, there 6 no. high sensitivity residential properties within 350 m of the proposed works area (see Figure 10.2). 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

10.30 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 PM₁₀ 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 PM₁₀ concentration in the vicinity of the Proposed Development is estimated to be 14 µg/m³ and there are 6 no. residential properties located within 350 m of the proposed construction works (see Figure 10.2). 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	<350
High	< 24 µg/m ³	>100	Medium	Low	Low	Low	Low
		10-100	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Medium	< 24 µg/m ³	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Low	< 24 µg/m ³	>1	Low	Low	Low	Low	Low

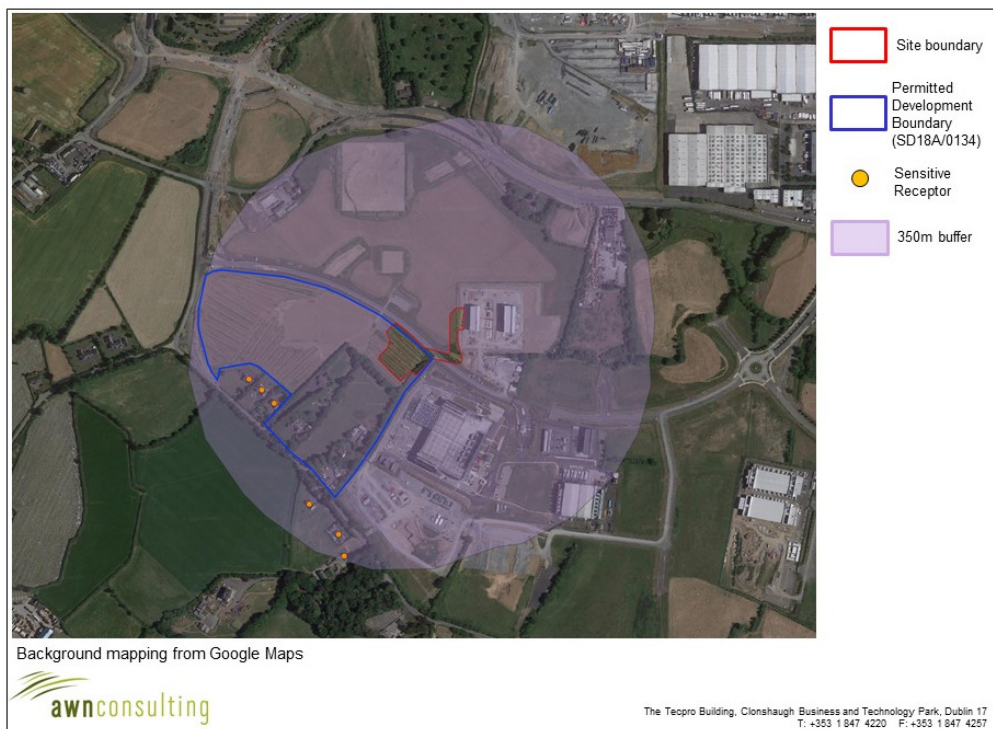


Figure 10.2 Location of Sensitive Receptors within 350m of Site

Climate Baseline

- 10.31 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 CO₂eq). This is 0.1% lower (0.07 Mt CO₂eq) 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 CO₂.
- 10.32 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 2018-2027 (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 CO₂eq under the “*With Existing Measures*” scenario and 9 Mt CO₂eq under the “*With Additional Measures*” scenario (EPA, 2019b).

Characteristics of the Proposed Development***Construction Phase***

- 10.33 The Proposed Development will involve installation of a 110kV Gas Insulated Switchgear (GIS) Substation (known as Aungierstown), 2 no. transformer bays, associated compounds and site infrastructure to be located on lands at Grange Castle South Business Park, Baldonnel, Dublin 22. The Proposed Development will also consist of 2 no. underground single circuit 110kV transmission lines from the proposed Aungierstown Substation to the existing 220kV / 110kV Castlebaggot Substation to the immediate north-east. These works are 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:
- (i) 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.
 - (ii) Infilling and landscaping will be undertaken.
 - (iii) Temporary storage of construction materials
 - (iv) Construction traffic accessing the site will emit air pollutants and greenhouse gases during transport.
- 10.34 As outlined in the mitigation section of this chapter, a dust minimisation plan will be formulated for the construction phase of the Proposed Development to ensure no dust nuisance occurs at nearby sensitive receptors.

Operational Phase

- 10.35 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.

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 m², 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 m² – 10,000 m², 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 m², 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 dust emission magnitude for the proposed earthwork activities can be classified as small as the total excavated material will be significantly less than 20,000 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 impacts in the absence of mitigation. As outlined in Table 10.6, this results in an overall **negligible 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 m³, on-site concrete batching, sandblasting;

Medium: Total building volume 25,000 m³ – 100,000 m³, potentially dusty construction material (e.g. concrete), on-site concrete batching;

Small: Total building volume < 25,000 m³, construction material with low potential for dust release (e.g. metal cladding or timber).

- 10.44 The dust emission magnitude for the proposed construction activities can be classified as small as a worst-case as the total building volume for the substation will be significantly less than 25,000 m³.
- 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 there will be less than 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 negligible 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	-	Negligible Risk	Negligible Risk	Negligible Risk
Human Health	-	Negligible Risk	Negligible Risk	Negligible Risk

Climate

- 10.51 There is the potential for a number of greenhouse gas emissions to atmosphere during the construction of the development. Construction vehicles, generators etc., may give rise to CO₂ and N₂O 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 NO₂, PM₁₀/PM_{2.5} and CO₂. However, due to the infrequent nature of maintenance activities and the low number of vehicles involved emissions are not predicted to be significant. A detailed air quality and climate assessment was scoped out for the operational stage of the 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). 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 where care will be needed to ensure that dust nuisance does not occur. The following measures shall be taken in order to avoid dust nuisance occurring under unfavourable meteorological conditions:

- The Principal Contractor or equivalent 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; and
- 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;
- Browsers 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;
- 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;
- 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;
- 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 No mitigation is proposed for the operation phase of the Proposed Development as it is predicted to have an imperceptible impact on air quality and climate.
- 10.66 Cumulatively, in relation to climate mitigation, the Proposed Development has been designed to minimise the impact on climate. The Proposed Development will allow for the permitted development (SDCC Reg. Ref.SD18A/0134 / An Bord Pleanála Ref. ABP-302813-18) to source electricity from the national grid.
- 10.67 Data centres are typically 84% more efficient than on-premises servers. In addition, in terms of total forecasted capacity, it is predicted that 1,700MW of data centres capacity will be operational by 2025. However, the carbon intensity of electricity is predicted to decrease from 331 gCO₂/kWh in 2019 to 100 gCO₂/kWh in 2030 as a result of the increase in renewables to 70% of the electricity market by 2030. Overall, it is predicted that data centres will peak at 2.2% of total GHG emissions in 2024 and will fall or level off after this date (Host In Ireland, 2020).

Residual Impacts of the Proposed Development

Construction Phase

Air Quality

- 10.68 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

- 10.69 Based on the scale and temporary nature of the construction works and the intermittent use of equipment, 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

- 10.70 Best practice mitigation measures are proposed for the construction phase of the Proposed Development which will focus on the pro-active control of dust and other air pollutants to minimise generation of emissions at source. The mitigation measures that will be put in place during construction of the Proposed Development will ensure that the impact of the development complies with all EU ambient air quality legislative limit values which are based on the protection of human health. Therefore, the impact of construction of the Proposed Development is likely to be **short term** and **imperceptible** with respect to human health.

Operational Phase

Air Quality & Climate

- 10.71 Operational phase impacts associated with the Proposed Development are predicted to be **long-term** and **imperceptible** as the cables will be buried underground once constructed and there will be minimal emissions associated with maintenance vehicles accessing the substation site.

Cumulative Impacts

Construction Phase

- 10.72 According to the IAQM guidance (2014), there is the potential for cumulative dust impacts to any nearby sensitive receptors should the construction phase of the Proposed Development coincide with the construction phase of other permitted developments within 350m of the site. There is the potential for cumulative construction dust impacts associated with construction works associated with the data centre development (permitted under SDCC Reg. Ref.SD18A/0134/An Bord Pleanála Ref. ABP-302813-18) on the wider site should these works coincide with the construction of the Proposed Development.
- 10.73 There is a negligible risk of dust soiling and human health impacts associated with the Proposed Development. The dust mitigation measures outlined in this chapter will be applied during the construction phase which will avoid significant cumulative impacts on air quality. With appropriate mitigation measures in place, the predicted cumulative impacts on air quality associated with the construction phase of the Proposed Development and the permitted and Proposed Developments on the site and / or simultaneous construction of any other developments within 350m of the site are deemed **short-term** and **imperceptible**.
- 10.74 Due to the relatively small scale of the Proposed Development and the short-term construction stage significant cumulative impacts to climate are not predicted.
- 10.75 With appropriate mitigation measures in place, the predicted cumulative impacts on air quality and climate associated with the construction phase of the Proposed Development are deemed short-term and imperceptible.

Operational Phase

- 10.76 Operational phase direct impacts on air quality associated with the Proposed Development are predicted to be imperceptible. As there are no emissions to atmosphere associated with the cables once constructed as they will be buried underground there are no potential impacts associated with this aspect of the development. Cumulative traffic emissions associated with site maintenance vehicles and vehicles on the local road network have the potential to impact air quality. However, as the number of vehicles required for maintenance activities is low and infrequent in nature cumulative impacts are considered **imperceptible** and **long-term**.
- 10.77 The Proposed Development was considered within the cumulative air dispersion modelling assessment for the permitted development. The results indicated emissions of NO₂ associated with the back-up diesel generators were in compliance with the ambient air quality standards. Therefore, cumulative impacts to air quality will be **long-term, localized, negative** and **imperceptible**.
- 10.78 In relation to climate, there will be no direct operational CO₂ emissions as electricity will be sourced from the national grid. The indirect CO₂ emissions associated with the electricity to operate the permitted data centre development (SD18A/0134 / An Bord Pleanála Ref. ABP-302813-18) were determined within the EIAR for the Permitted Development and were found to be insignificant in relation to climate.
- 10.79 As the Permitted Development is over 20 MW, a greenhouse gas emission permit will be required for the facility which will be regulated under the EU-wide Emission Trading Scheme (ETS). Electricity providers form part of the ETS and thus greenhouse gas emissions from these electricity generators are not included when determining compliance with the targeted 30% reduction in the non-ETS sector i.e. electricity associated greenhouse gas emissions will not count towards the Effort Sharing Decision target. Thus, any necessary increase in electricity generation due to data centre demand will have no impact on Ireland's obligation to meet the EU Effort Sharing Decision. On an EU-wide basis, where the ETS market in 2018 is approximately 1,655 million tonnes CO₂eq, the impact of the emissions associated with the permitted data centre development will be less than 0.01% of the total EU-wide ETS market which is imperceptible.
- 10.80 Overall, the impact to air quality and climate as a result of the proposed cumulative development will be **negative, long-term** and **imperceptible**.

Monitoring

- 10.81 Monitoring is not proposed for the construction phase of the Proposed Development as impacts are predicted to be imperceptible. There is a negligible risk of dust soiling and human health impacts as a result of the construction phase. Once the dust mitigation measures outlined in the mitigation section are implemented construction dust emissions will be imperceptible.
- 10.82 There is no monitoring recommended for the operational phase of the development as impacts to air quality and climate are predicted to be imperceptible.

LANDSCAPE AND VISUAL IMPACT

- 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 current EPA Guidelines on Information to be contained in Environmental Impact Assessment Reports (2017, Draft) 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	
<i>Imperceptible</i>	An effect capable of measurement but without significant consequences
<i>Not Significant</i>	An effect which causes noticeable changes in the character of the environment without significant consequences
<i>Slight</i>	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities
<i>Moderate</i>	An effect that alters the character of the environment in a manner that is consistent with the existing and emerging baseline trends
<i>Significant</i>	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment
<i>Very Significant</i>	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment
<i>Profound</i>	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 or 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.

Methodology

- 11.6 The assessment was carried out by originally visiting the site and its surroundings in February and July 2018 and on a continual basis since that time to the present day and 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 (June 2016 updated).
- 11.7 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).

11.8 A study of the environmental impact on the biodiversity of the site will be covered in other sections of the EIAR.

Receiving environment

11.9 The Proposed Development site is situated on the western edge of the Grange Castle South Business Park. It forms an irregular shaped area measuring approximately 102m on both its longest north-south axis and east-west axis. The northern and southern boundaries are quite straight, while there are some turns in the eastern and western boundaries. The site boundary extends across the access road to connect with a neighbouring substation via two no. 100kV transmission lines (Refer to Section 11.28). The total land area of the site measures 0.9163ha..

11.10 The ground levels within the site area are generally flat other than a small localised ditch running along the eastern boundary. From the top of this ditch, there is a slow and gradual rise in a north-east to north-west direction. From the lowest level in the north-west (73.83m OD) near the access road the ground levels rise by 1.14m towards the southern corner of the site (74.97m OD).

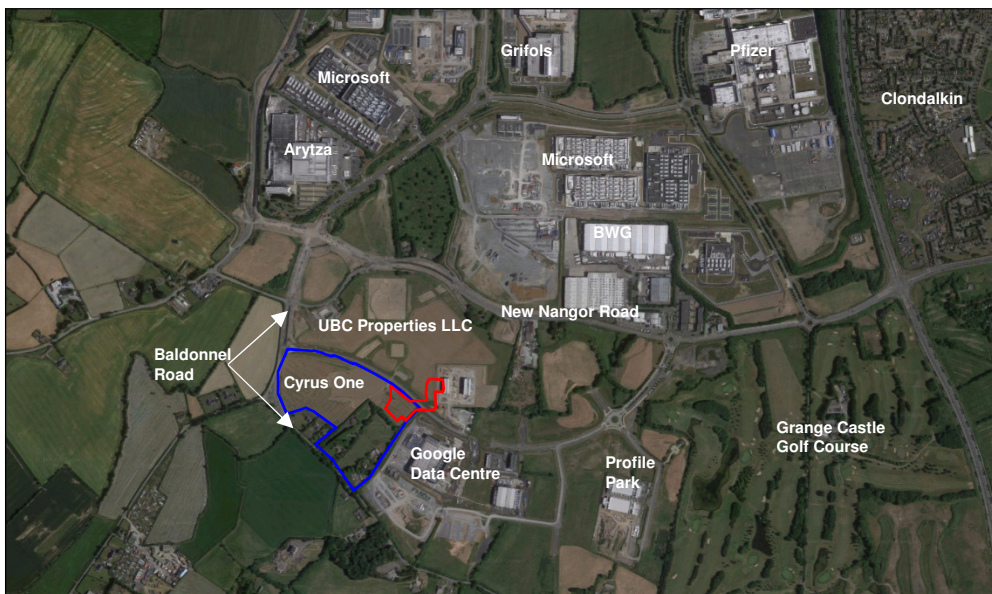


Figure 11.1 Proposed Development site outlined in red with the Permitted Development outlined in blue in context of surrounding development and land uses (Source: Google Earth)

- 11.11 The land use of the subject lands was originally relatively flat grassland with some remnant agricultural hedgerow field boundaries around the eastern perimeter only. However, at present, due to recent industrial developments on neighbouring lands, the lands are part of a construction site and are being utilised for site storage and vehicular parking.
- 11.12 The lands are bounded on the north by the Grange Castle South Business Park internal access road, physical boundaries in this area include a timber post and rail fence along with various temporary fences such as site hoarding, security fencing and so on. The southern and part of the western boundary is with the Permitted Development, of which the Proposed Development was originally part of. There are no physical boundaries to be found here. The eastern boundary is comprised of an existing ditch and scrub vegetation along with temporary construction site fencing. The Google data centre development is located to the east of this boundary.
- 11.13 In the wider landscape the 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. This excludes the recent developments on the lands to the immediate west of the subject site and the recently commenced development to the north. The local landscape to the south east is dominated by the Casement Aerodrome.

- 11.14 A tree survey was undertaken as part of the application for the permitted development (Refer to Sections 11.18 – 11.20). This informed the design and layout of the Permitted Development and the location of the proposed substation. According to the Tree Survey and Report, by the Tree File Ltd. the tree cover on the site of the Permitted Development site, that included the Proposed Development site, was primarily contained within the perimeter hedgerows on the southern boundaries of the site and the garden boundaries in the south-eastern corner, much of which is still in existence. The trees originally surveyed on site were from two different origins. The first was the thorn-based hedgerows which were remnants of the agricultural stock proof field boundaries. The second type were the more managed and ornamental garden hedges. The trees of value were mostly Ash, Elm and Sycamore with a line of good quality Lime trees on the south eastern perimeter of the wider site, that remains in situ. The only part of the original survey which applies to the subject lands of the Proposed Development site is the section of ditch and scrub vegetation along the eastern boundary.

Characteristics of the Proposed Development site

- 11.15 The character of the site and its environs has largely been determined by the following:
- flat topography in the site and its surrounding environs;
 - landscape history of agricultural use with grassland and a traditional hedgerow field boundary;
 - number of very large industrial buildings in the local landscape;
 - number of very large industrial buildings and infrastructure works which are currently under construction in the local landscape.
 - local roads and tree lined internal roads in the business park.
- 11.16 The Proposed Development site has the character of a transitional landscape which is in the process of changing from an agricultural field with traditional hedgerow field boundaries to a built industrial development, typical of that to be found in the local area and conforming with recent development trends in the Grange Castle South Business Park. At present the subject lands forms a section of a large construction site (Permitted Development site) and is bounded by another large construction site to the north.
- 11.17 The surrounding environment with its contrast of new built structures and historic field patterns would be considered a 'transitional landscape'.
- 11.18 Through a comparison of the historical Ordnance Survey maps with the current site and through analysis by site visits it is evident that there has been considerable change to the study area in recent times. The site was formerly part of a larger area of traditional agricultural field, which was consistent with the landscape typology of the local area until recent history. In this time many major industrial developments have taken place. At present the subject lands form a section of a larger construction site which takes in the subject lands and the construction of a neighbouring data centre as permitted and amended under planning ref.
- 11.19 The landscape of the subject lands has no inherent aesthetic qualities of note. In the context of the surrounding landscape, landscape sensitivities and views from all aspects surrounding the lands would be considered of no aesthetic value.
- 11.20 The wider site, including the proposed substation site; are the subject of a permitted development of a two-storey data centre facility and three-storey office block that was permitted under SDCC Reg. Ref SD18A/0134 and recently amended under SDCC Reg. Ref. SD20A/0295. A planning decision on this recent amendment application is currently pending.

- 11.21 The Proposed Development is situated mostly within the site of the Permitted Development and both are intrinsically and visually linked. The Proposed Development is integrated into the overall development as follows:
- The proposed Substation will be located in the north-eastern corner of the Permitted Development along the eastern boundary with the existing Google Data Centre.
 - To the east of the Substation a landscape scheme is proposed including native woodland tree planting and grass verges.
 - Perimeter boundary fencing and landscaping in line with Eirgrid requirements is proposed along the northern boundary with the Grange Castle Business Park South internal access road and includes both palisade and wire mesh fencing.
 - Elements of the permitted development such as the earth berms and woodland planting which surround the site and the existing data halls will have a visual effect on the Proposed Development.

Landscape planning

- 11.22 Within the South Dublin County Development Plan 2016-2022 there are no specific landscape objectives that apply to the subject lands. There are a number of objectives that apply to the general environs of the site.

Green infrastructure objectives

- 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.'*
- 11.23 There are no protected trees or tree groups within the subject lands listed in the South Dublin County Development Plan 2016-2022.
- 11.24 There are no views or prospects that include the subject lands listed in the South Dublin County Development Plan 2016-2022.
- 11.25 In the Landscape Character Assessment of South Dublin County (June 2016 updated), the subject lands are 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 subject lands 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

- 11.26 The location from which the site is most visually prominent is from the Grange Castle South Business Park internal access road, at the north-eastern corner of the lands where the road almost abuts the site boundary. From this section of road, the site is fully visible in the foreground as there is currently no vegetation due to the relatively recent road construction and the fact that the Proposed and Permitted Development are both part of an evolving construction site. While the site is visible in the foreground it is the data halls and associated site works which are under construction as part of the permitted development which dominate the view. This view is expansive but due to the very flat topography and vegetation little of the wider landscape is visible. The site is also visible from the main entrance of the Grange Castle Business Park South internal access road, although this view is dominated by the partly built data halls in the permitted development along with associated site structures and earthworks. The entrance feature also dominated this view.
- 11.27 Views of the subject lands are possible from the New Nangor Road on the southern edge of Profile Park. The lands are visible however, due to the flat topography of the site and surrounding vegetation and built structures, the view is not prominent.
- 11.28 The subject lands are not visible from the residential gateway on the Baldonnel Road on the southern perimeter of the neighbouring lands.
- 11.29 The site is not visible from the junction of the R120 and the New Nangor Road at Clutterstown.

Characteristics of the Proposed Development

- 11.30 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 GIS Substation compound including a two storey GIS substation building with a gross floor area of 1,307.2sq.m, two transformers, lighting, car parking, associated underground services, access roads and associated perimeter fencing;
 - two no. underground single circuit 110kV transmission lines from the proposed Aungierstown 110kV GIS substation compound to the existing 220kV / 110kV Castlebaggot Substation to the immediate north-east; and
 - Proposed native tree planting to site boundary

Potential impacts of the Proposed Development***Construction phase****Impact on landscape character*

- 11.31 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.
- 11.32 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.
- 11.33 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 been undertaken in this area recently and will require some recently planted trees alongside this road to be removed.
- 11.34 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

- 11.35 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 west of the site will be entirely screened by the existing Permitted Development 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 west 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.
- 11.36 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.
- 11.37 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*

- 11.38 The operational phase will give rise to a noticeable change in the landscape character. 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.
- 11.39 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.
- 11.40 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.
- 11.41 The landscape proposals as part of the Permitted Development include the establishment of a significant level of native woodland, hedgerows and native wetland and grassland meadows. Due to the requirements of the substation operators there has been a need to reduce this to the north and east of the proposed substation. The overall landscape treatment will contribute positively to the landscape character of the area.
- 11.42 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

- 11.43 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 north of the site will be screened by the existing Castlebaggot Substation and the recently permitted development under SDCC Planning Reg. Ref. SD20A/0121. The Permitted Development includes berms and tree planting to the immediate west and along the south perimeter of the Permitted Development site.
- 11.44 The Proposed Development will not be visible from most of the surrounding areas as the Permitted Development on these lands, landscape mitigation permitted as part of this and the existing Castlebaggot substation and ongoing development to the north will screen the Proposed Development from views from the south, west and most views from the north.
- 11.45 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 and north-west. 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.

- 11.46 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

- 11.47 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 EIA) 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.

- 11.48 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. SD18A/0134. No additional landscape mitigation measures are therefore proposed as part of the Proposed Development beyond minor changes to the minimal planting to the north and east of the proposed substation that will increase the visibility of the substation in localised views from the north and east. As a result of the mitigations measures, the following landscape design mitigation measures will continue to be implemented as part of the Permitted Development:

- 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;
- set back of built development from 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

- 11.49 The Green Infrastructure objectives that apply to the Proposed Development site and its environs, 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 only be minimally altered under the Proposed Development to its immediate north and east due to EirGrid design requirements, 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 beyond that outlined above, will not be altered from that under the Permitted Development. 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 Permitted 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

- 11.50 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

- 11.51 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

- 11.52 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 11.2 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

- 11.53 In order to achieve a realistic representation of the visual impacts of the Proposed Development, the permitted development on neighbouring lands to the South and West has been included in the photomontages. Parts of this development have already been constructed or are under construction and are therefore visible in the existing views. Therefore, this section of the LVIA assesses both the proposed and permitted developments together.
- 11.54 For the purposes of this section, the permitted development with its amendments will be referred to as the Permitted Development. The development being applied for under this application will be referred to as the Proposed Development.

View 1 – From the junction of the R120 and the Old Nangor Road at Clutterstown

Existing view

- 11.55 The proposed development site is c.677m from this view location.
- 11.56 Views in this vicinity are mostly short-range views due to the surrounding ground levels, buildings and hedgerow vegetation. There are no views of any value from this location. In this specific view towards the site the railings, walls and signage associated with the car sales business is prominent in the foreground along with temporary site fencing. A section of the under construction Permitted Development is visible in the background of this view.

Visual impact of Proposed Development during construction

- 11.57 The Proposed Development will not result in any visual impact on this view during construction. The distance from the viewpoint paired with various elements in the foreground of the view will result in the Proposed Development being completely screened from this location. The level of this impact will also be limited due to the construction works being located close to recently constructed and currently under construction large buildings where similar construction activities are part of the visual landscape, most notably the Permitted Development adjacent to the Proposed Development.
- 11.58 Much of the Permitted Development is already visible in the existing view and it is still currently under construction, therefore there will be no additional impact associated with it. The impact of the Proposed Development during construction on the view from this location would be considered **neutral**, **imperceptible** in magnitude, and **temporary** in duration as there will be no perceivable change to the existing view.

Visual impact of Proposed Development during operation

- 11.59 The Proposed Development will not result in a visual impact on this view during operation. The substation building will be screened by the Permitted Development under Reg. Ref. SD18A/0134, and the associated trees and planting installed under the permitted scheme.

View 2 – From the entrance of Grange Castle South Business Park*Existing view*

- 11.60 The proposed development site is located 398m from this view location.
- 11.61 The Proposed Development is not visible in this view due to the existing entrance wall, earth berms and perimeter fencing associated with the Permitted Development and Grange Castle South Business Park access road. The partially constructed Permitted Development, earth berms, perimeter fencing and associated construction machinery are all visible beyond the Grange Castle South entrance wall. The Google data centre is partially visible in the centre background of the view. There are no views of inherent value in this view.

Visual impact of Proposed Development during construction

- 11.62 The Proposed Development will not result in any visual impact on this view during construction. The distance from the viewpoint paired with various elements in the foreground of the view such as the existing earth berms, entrance wall and perimeter fencing will result in the Proposed Development being completely screened from this location. The level of this visual impact will also be limited due to the construction works being located close to recently constructed and currently under construction large buildings where similar construction activities are part of the visual landscape, most notably the ongoing Permitted Development on the wider site.
- 11.63 The impact during construction on the view from this location would be considered **neutral, imperceptible** in magnitude, and **temporary** in duration as there will be no perceivable change to the existing view.

Visual impact of Proposed Development during operation

- 11.64 The Proposed Development will not result in a visual impact on this view during operation. The substation building will be screened by the Permitted Development under Reg. Ref. SD18A/0134, and the associated trees and planting installed under the permitted scheme.

View 3 – From the New Nangor Road on the southern edge of Profile Park, Business Park*Existing view*

- 11.65 The proposed development site is c. 411m from this view location.
- 11.66 From this section of the public road expansive views are offered towards the south over the flat landscape. Views of value in this vicinity are the long-distance views with the Dublin/Wicklow mountains visible in the background from some locations. The Proposed Development site is defined by the ongoing Permitted Development that is visible in the right background of the view. Some existing tree lines and hedgerow vegetation are also visible. Further construction work is also visible in the foreground that is currently being undertaken under Reg. Ref. SD20A/0121 to the north of the Proposed Development site.
- 11.67 The recently constructed Google data centre and Castlebaggot substation are visually prominent on the left side of the view. A recently constructed stub wall and railing along the public road is visible in the foreground of the view.

Visual impact of Proposed Development during construction

- 11.68 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 visible however the level of this impact will also be limited due to the construction works being located both within and beyond ongoing construction activities on the site the north as well as the ongoing construction works related to the Permitted Development.
- 11.69 Some of the visual elements associated with the building process will result in a visual intrusion into this view. However, the distance from the viewpoint 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, slight** in magnitude, and **temporary** in duration.

Visual impact of Proposed Development during operation

- 11.70 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 substation building is prominent in the centre of the view and it will alter the ridgeline of the view, blocking views of the existing trees in the background of the view. The lack of screening required by EirGrid to the northern façade of the substation building contributes to the negative impact on this view.
- 11.71 The level of the visual impact is mitigated due to the number of large buildings in the local landscape most notably the large data centre immediately adjacent to this scheme to the scheme as well as the permitted development and the localised nature of this view. This development would therefore be considered as consistent with existing and emerging trends in the area.

The concurrent development would have no impact on the existing view. The existing data hall in the concurrent development already blends in well with the skyline and is barely visible, the introduction of the amended earth berms is likewise scarcely visible in the view. In summary, the magnitude of the **negative** visual impact on this view would be considered **moderate** in the **short term**; but as the permitted development to the north of the Proposed Development is built, this will become **imperceptible**, **neutral** and **long-term** in duration.

View 4 – From the Grange Castle South Road in line with the North-West corner of the Google Data Centre*Existing view*

- 11.72 The proposed development site is c. 25m from this view location.
- 11.73 In this specific view, views over the subject lands of the Proposed Development and the lands and built structures of the Permitted Development are both prominent. As the substation part of the Proposed Development was originally part of the Permitted Development site, it forms part of one construction site. The view is dominated by the existing data centre of the Permitted Development in the right foreground of the view. Existing trees and vegetation both within the wider site and within the wider landscape can also be seen in the background of the view. The foreground is dominated by perimeter fencing, temporary site structures and parking areas, site hoarding and the access road.

Visual impact of Proposed Development during construction

- 11.74 The Proposed Development will result in a visual impact on this view during construction. The construction process, machinery, storage of materials will be visible from this location. Some of the visual elements associated with the building process will result in a visual intrusion into this view. However, the magnitude of this impact of the works associated with the proposed substation will also be mitigated due to the construction works being located within an overall construction site of the Permitted Development and the ongoing construction works on the lands to the north. The road works will also result in a visual intrusion into this view. The impact of the proposals 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

- 11.75 The nature of the Proposed Development will result in an alteration to the existing view that would be considered negative in nature due to proximity of the viewpoint to the proposed substation building. The photomontage demonstrates accurately the extent of the alteration of the view on day 1 of operations. The proposed substation building is prominent in the centre of the view, with the northern façade abutting the public road and footpath. The proposed perimeter fencing somewhat screens the building façade, although the lack of vegetation required by EirGrid leaves the perimeter fencing and substation building exposed and very visible in the foreground. The view of the eastern façade of the building is mitigated by the proposed tree planting to the site boundary, which in time will mature to provide a tall visual screen. The impact is mitigated further by the close range and very localised nature of this view within a business park. This development would therefore be considered as consistent with existing and emerging trends in the area. The magnitude of the **negative** visual impact on this view would be considered **moderate** and **long-term** in duration.

View 5 – From the residential gateway on the Baldonnel Road on the southern perimeter of the subject lands

Existing view

- 11.76 The proposed development site is c. 279m from this view location that is located at the boundary along the Baldonnel Road to the south-west.
- 11.77 The existing vegetation on the overall site of the Permitted Development and along the Baldonnel Road are prominent in this view along with temporary site perimeter fencing and an earth berm on the southern boundary of the site. As a result of this, the views of the Proposed Development site are completely screened from view. There are no views of value in this vicinity where expansive views are restricted by the earth berms, built structures and mostly vegetation.

Visual impact of Proposed Development during construction

- 11.78 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 screened from view by the existing vegetation and bunds.

Visual impact of Proposed Development during operation

- 11.79 The proposed substation in the Proposed Development will have no impact on the view from this location. The photomontage demonstrates accurately the extent of the alteration of the view on day 1 of operations. The new building will not be visible due to the level of existing vegetation between the viewpoint and the proposed building along with the earth berms and proposed woodland planting under the concurrent application.
- 11.80 The proposed strengthening of the existing hedgerows and the new earth berms and woodland planting proposed along the southern edge of the wider site under the concurrent application would result in a positive impact on the view from this location.

Conclusion

- 11.81 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***.

Cumulative impacts

- 11.82 Cumulative effects were considered with regard to the Proposed and Permitted Developments as well as the ongoing development to the north (UBC Properties). 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 be altered under the Proposed Development to ensure no planting is proposed to the immediate north or east of the substation compound as is required by EirGrid.
- 11.83 The landscape plan of the Permitted Development 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 UBC Properties Development.
- 11.84 The photomontages submitted with the Planning Application for the Proposed Development (See Chapter 11 – Appendix 11.2) present a view of the Proposed Development with the landscaping treatment removed from the north and east of the substation compound.
- 11.85 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 UBC Properties development as well as the Permitted Development.

- 11.86 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.
- 11.87 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 11.2 for each of the representative views described in this chapter. 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

- 12.1 This chapter of the EIAR assesses the likely impacts in terms of vehicular, pedestrian and cycle access during the construction and operational phases of the Proposed Development.
- 12.2 The chapter describes the methodology used; the receiving environment at the application site and surroundings; the characteristics of the Proposed Development; the potential impact which proposals of this kind would be likely to produce during both the construction and operational phases; the remedial or reductive measures required to prevent, reduce or offset any significant adverse effects; and, any residual impacts that may remain.
- 12.3 This chapter has been prepared by John Ahearne MIEI from Martin Peters Associates Consulting Engineers (MPA Consulting Engineers).

Methodology

- 12.4 The following methodology has been adopted for this assessment:
- Review of relevant available information including proposal plans, existing traffic information and other relevant studies;
 - Review planning documentation associated with the approved Data Centre (SD18A/0134 / An Bord Pleanála Ref. ABP-302813-18);
 - Site visit to gain an understanding of the existing traffic and land use conditions;
 - Detailed estimation of the transport demand that will be generated by the development both during the construction and operation phases. The morning and evening peak times will be addressed as well as an estimation of the construction stage traffic; and
 - Assessment of the percentage impact of traffic on local roads and junctions, car parking requirements and accessibility of the site by sustainable modes including walking, cycling and public transport.

Receiving Environment

- 12.5 This section considers the baseline conditions, providing background information for the site in order to determine the significance of any traffic implications. This section also considers the existing accessibility of the site by sustainable modes of transport.

Site Location

- 12.6 The Proposed Development site is located within the South Dublin County Council administrative area, approximately 15km west of Dublin city centre, and around 3km west of Clondalkin Village. The site is located within the Grange Castle South Business Park, Dublin 22. To the North is Grange Castle Business Park, to the east is a Google Data Centre and Profile Park; and to the south and west is agricultural land and one off housing. Grange Castle South Business Park Access Road runs along the northern boundary of the site from Baldonnel Road to the west, allowing for access to the site during construction and in the permanent operational phase of the development.

Local Road Network

- 12.7 Grange Castle South Business Park Access Road extends east from Baldonnel Road to its terminus, approximately 300 metres east of the development site. Along the site frontage, the road has an approximate carriageway width of 7.7 metres and provides one traffic lane in each direction. The main entrance into the Grange Castle Business Park South is along the Grange Castle South Access Road. The access road has a priority T-Junction with the Baldonnel Road. There is a 1.5m cycle track and 1.5m footway set back from the carriageway on either side along the Access Road.
- 12.8 Baldonnel Road (L2001) is a local road that extends in a north-south alignment between Nangor Road (R134) and Aylmer Road (L6003). South of Aylmer Road, the road narrows and extends in a south east alignment towards Grange Castle Road (R136) near Corkagh Park.

- 12.9 The Baldonnell Road and Nangor Road (R134) junction has recently been signalised. A raised combined footway and cycle track is present along both sides of the Baldonnell Road (extending from the Nangor Road junction to the Aylmer Road junction).
- 12.10 Nangor Road (R134) extends in a west east alignment between Adamstown Road (R120) and the Naas Road (R810) / Long Mile Road junction in Walkinstown. Nangor Road, west of the Kilcarbery Park roundabout, has recently been re-aligned and new signalised junctions have been constructed at the Baldonnell Road and Adamstown Road junctions. Raised combined footway and cycle tracks are provided along both sides of the road (extending between the new Adamstown Road junction and the Grange Castle Business Park access road roundabout junction).
- 12.11 The R136 (Outer Ring Road) links Tallaght to Lucan. The R136 forms a grade separated junction with the N4 approximately 3km north of its roundabout junction with Grange Castle Business Park, as well as the N7 approximately 3km to the south.
- 12.12 The M50 is located approximately 5km to the east of the site and forms an orbital motorway ring road around Dublin. The M50 is intersected by the principal radial routes, including the N4 at Junction 7, and the N7 at Junction 9, also known as the Red Cow Interchange.
- 12.13 It is concluded that the site is strategically situated to facilitate trips by vehicle, with road infrastructure in place and built to a high standard.

Recent Local Infrastructure Works

- 12.14 Significant recent improvements have been made to the surrounding road network, including
- Re-alignment and widening of the Nangor Road (R134), east of Adamstown Road (R120);
 - Construction of a new three-arm signalised junction of Nangor Road (R134) and Adamstown Road (R120), replacing the previous priority controlled junction;
 - Re-alignment and widening of the R120 (Adamstown Road) northward from its former junction with the Old Nangor Road;
 - Widening of the northernmost section of Baldonnell Road (L2001) and its extension north to meet the new alignment of Nangor Road;
 - Delivery of a new signalised junction of Baldonnell Road with Nangor Road, replacing the previous priority-controlled junction; and
 - Reconfiguration of the three-arm priority junction of Baldonnell Road with Aylmer Road (L6003).
- 12.15 Figure 12.1 details the recent infrastructure improvement works in the locale.

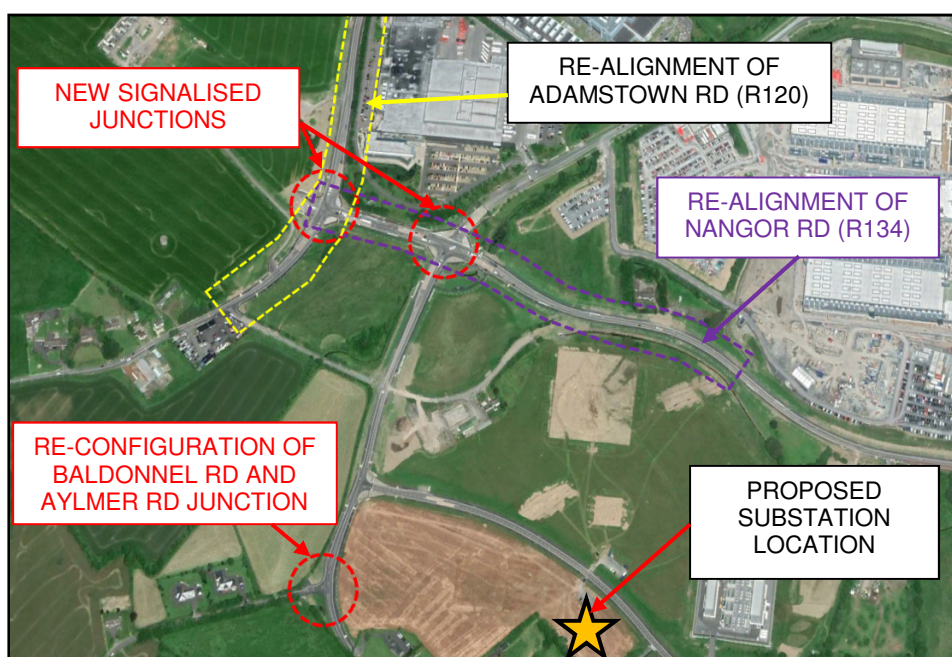


Figure 12.1 Recent Infrastructure Improvement Works

Future Local Infrastructure Works

- 12.16 The *South Dublin Development Plan 2016-2022* includes, as a future transport objective, the westward extension of Nangor Road (R134), between Ballybane and Brownstown (refer to Figure 12.2). This will connect Grange Castle to a proposed future Western Orbital Route between the N7 and the N4.

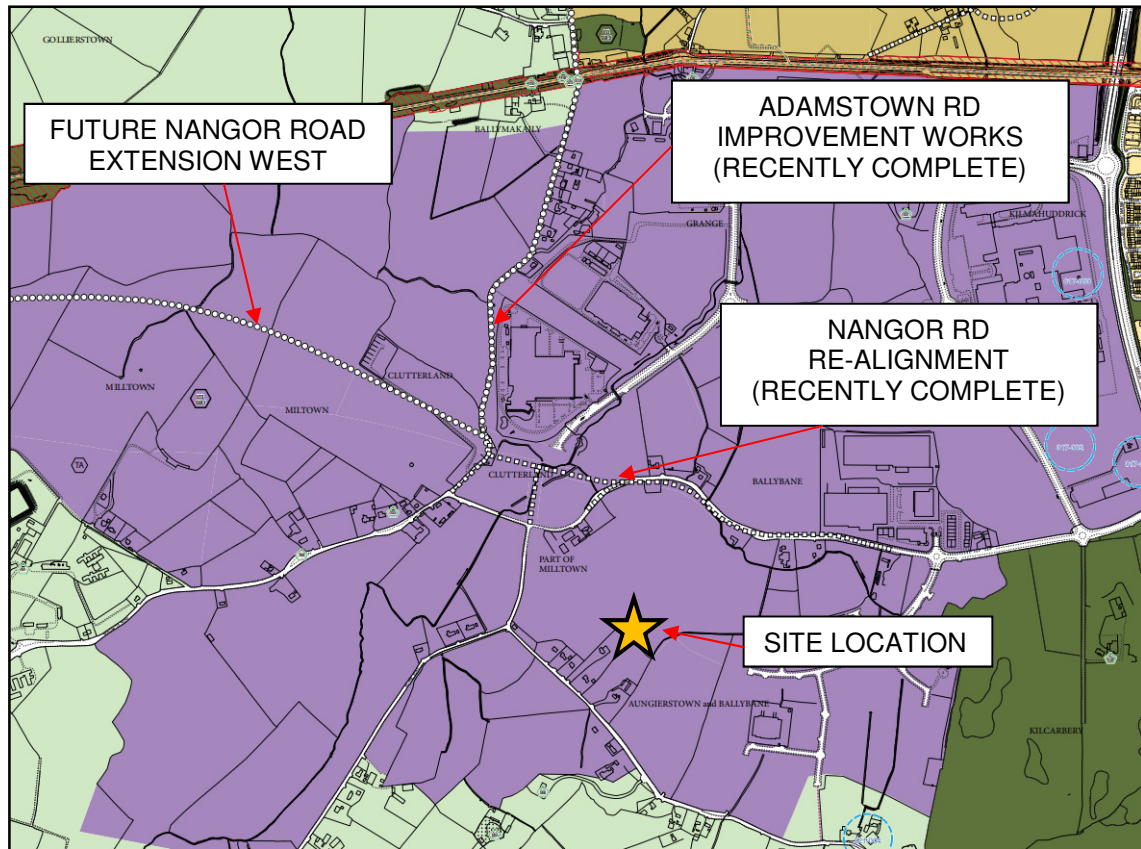


Figure 12.2 Extract from Map 4 of the South Dublin Development Plan 2016-2022

Baseline Traffic Data

- 12.17 Due to recent traffic pattern changes, triggered by the COVID-19 Public Health Emergency, 2020 traffic surveys have not been commissioned. The analysis relies on the following traffic survey information:
- Traffic surveys commissioned by MPA Consulting Engineers in October 2019 at the Nangor Road and Adamstown Road junction;
 - Extensive traffic surveys carried out in December 2019 by Irish Traffic Surveys. The surveys have been commissioned to support a recent Planning Application for a Data Centre (Planning Ref SD20A/0121) in Grange Castle Business Park South; and
 - Traffic surveys commissioned in February 2016 at the Baldonnell Road / Grange Castle Road (R136) roundabout. The survey was carried out to support the Microsoft Data Centre (Ref SD16A/0088) in Grange Castle Business Park.
- 12.18 The information has enabled an Area Wide Traffic Model to be developed to identify the percentage impact of development traffic at each of the critical junctions identified in Figure 12.3.

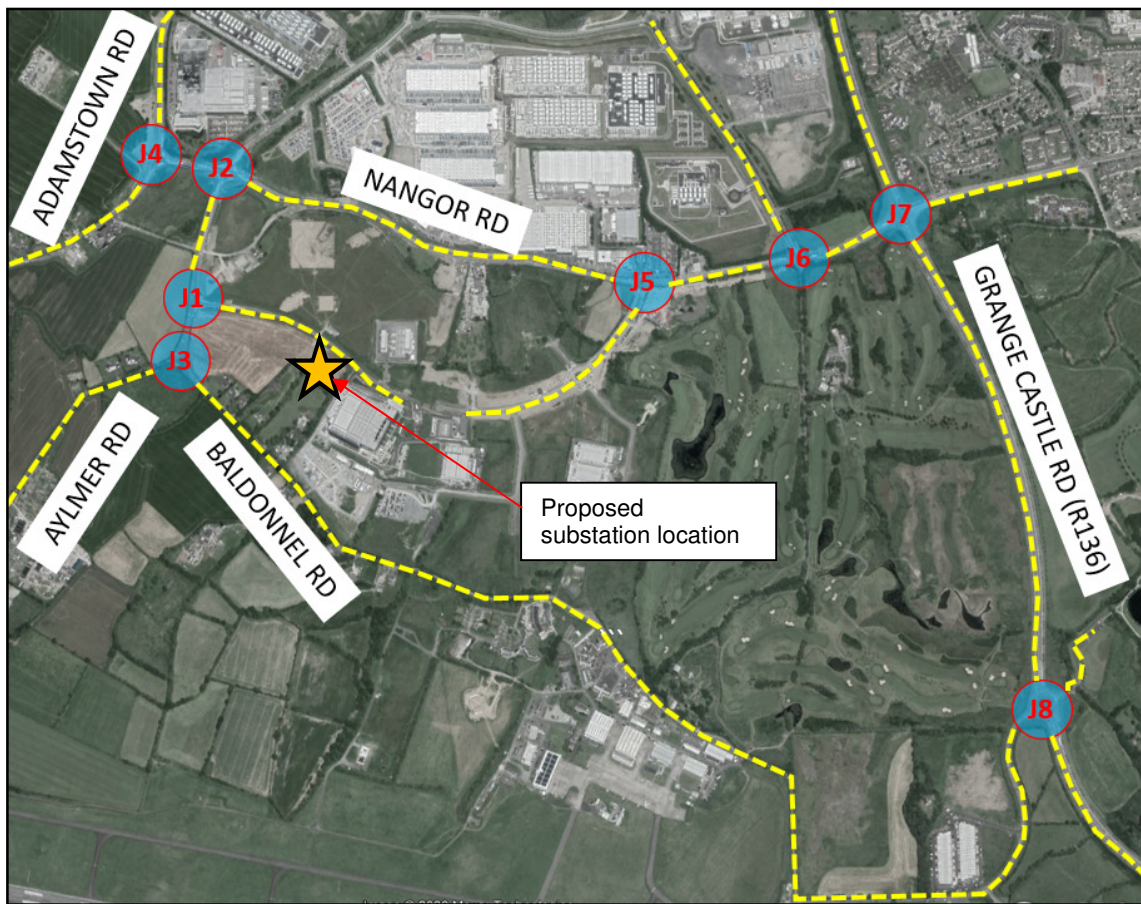


Figure 12.3 Traffic survey locations

- 12.19 Recent on-site observations indicate that each of the junctions are working within capacity, with minimal queuing and delays observed on site.
- 12.20 From the above count data and referencing the TII document *Project Appraisal Guidelines for National Node Roads Unit 5.3 – Travel Demand Projections (May 2019)*, using the TII derived growth factors for the ‘Medium Growth’ scenario and the growth factor for LV’s to represent the highest growth rates, the 2016 and 2019 traffic count data have been converted to the 2020, 2021 and 2022 (construction and operation) base traffic flows, for assessment purposes.
- 12.21 A summary of the survey results (2016 and 2019) and factored up junction flows (2020 - 2022) is presented on Table 12.1 to 12.8.

Table 12.1 Junction 1 - Traffic flows at the Baldonnell Road and Grange Castle Business Park South Road Junction

	Existing Total Junction Flow (PCUs) 2019	Factored Total Junction Flow (PCUs) 2020	Factored Total Junction Flow (PCUs) 2021	Factored Total Junction Flow (PCUs) 2022 (Opening Year)
AM Peak Hour	791	804	817	830
PM Peak Hour	701	712	724	736

Table 12.2 Junction 2 - Traffic flows at the R134 Nangor Road / Baldonnell Road Junction

	Existing Total Junction Flow (PCUs) 2019	Factored Total Junction Flow (PCUs) 2020	Factored Total Junction Flow (PCUs) 2021	Factored Total Junction Flow (PCUs) 2022 (Opening Year)
AM Peak Hour	1606	1632	1658	1685
PM Peak Hour	1353	1375	1397	1420

Table 12.3 Junction 3 - Traffic flows at the Baldonnell Road and Aylmer Road Junction

	Existing Total Junction Flow (PCUs) 2019	Factored Total Junction Flow (PCUs) 2020	Factored Total Junction Flow (PCUs) 2021	Factored Total Junction Flow (PCUs) 2022 (Opening Year)
AM Peak Hour	855	869	883	897
PM Peak Hour	798	811	824	837

Table 12.4 Junction 4 - Traffic flows at the Nangor Road and Adamstown Road Junction

	Existing Total Junction Flow (PCUs) 2019	Factored Total Junction Flow (PCUs) 2020	Factored Total Junction Flow (PCUs) 2021	Factored Total Junction Flow (PCUs) 2022 (Opening Year)
AM Peak Hour	1591	1617	1643	1670
PM Peak Hour	1240	1260	1281	1301

Table 12.5 Junction 5 - Traffic flows at the Nangor Road / Kilcarbery Park access roundabout

	Existing Total Junction Flow (PCUs) 2019	Factored Total Junction Flow (PCUs) 2020	Factored Total Junction Flow (PCUs) 2021	Factored Total Junction Flow (PCUs) 2022 (Opening Year)
AM Peak Hour	1424	1447	1471	1494
PM Peak Hour	1240	1260	1281	1301

Table 12.6 Junction 6 - Traffic flows at the Nangor Road / Grange Castle Business Park North roundabout

	Existing Total Junction Flow (PCUs) 2019	Factored Total Junction Flow (PCUs) 2020	Factored Total Junction Flow (PCUs) 2021	Factored Total Junction Flow (PCUs) 2022 (Opening Year)
AM Peak Hour	1881	1911	1942	1974
PM Peak Hour	1578	1604	1630	1656

Table 12.7 Junction 7 - Traffic flows at the Nangor Road / Grange Castle Road junction

	Existing Total Junction Flow (PCUs) 2019	Factored Total Junction Flow (PCUs) 2020	Factored Total Junction Flow (PCUs) 2021	Factored Total Junction Flow (PCUs) 2022 (Opening Year)
AM Peak Hour	3528	3585	3643	3702
PM Peak Hour	2904	2951	2999	3047

Table 12.8 Junction 8 - Traffic flows at R136 / Baldonnell Road junction

	Existing Total Junction Flow (PCUs) 2016	Factored Total Junction Flow (PCUs) 2019	Factored Total Junction Flow (PCUs) 2020	Factored Total Junction Flow (PCUs) 2021	Factored Total Junction Flow (PCUs) 2022 (Opening Year)
AM Peak Hour (8:00 - 9:00am)	4818	4937	5017	5098	5181
PM Peak Hour (5:00 - 6:00pm)	4646	4762	4839	4918	4997

12.22 The 2020, 2021 and 2022 (Data Centre and GIS Substation will be fully operational) baseline traffic flow models for the AM peak and PM peak traffic flows, at the surrounding junctions, has been developed. The traffic flows (PCUs) are presented on Figures 12.4 to 12.6.

12.23 It has been found in previous traffic counts that the AM peak varies from 7:30AM to 9:15AM and the PM peak hour varies between 4:30PM and 6:30PM. For the purposes of assessment, the AM peak hour period has been taken as being between 7:30AM and 08:30AM and the PM peak hour period as being taken as been between 4:30PM and 5:30PM.

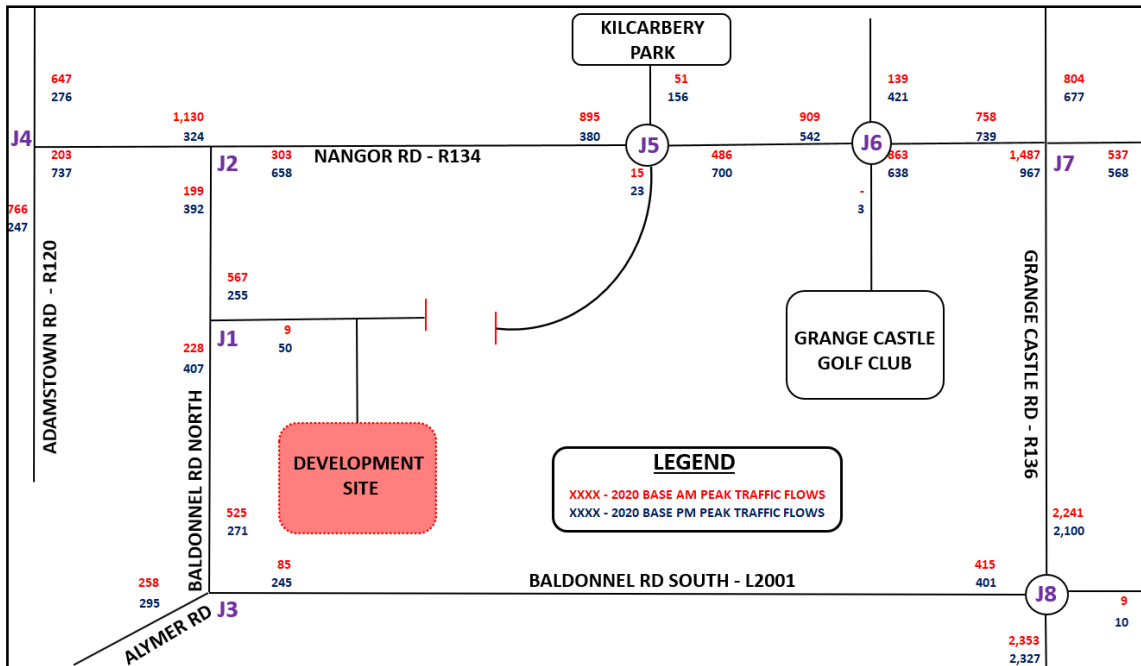


Figure 12.4 2020 Base AM and PM peak hour flows (PCUs) on the approach to junctions

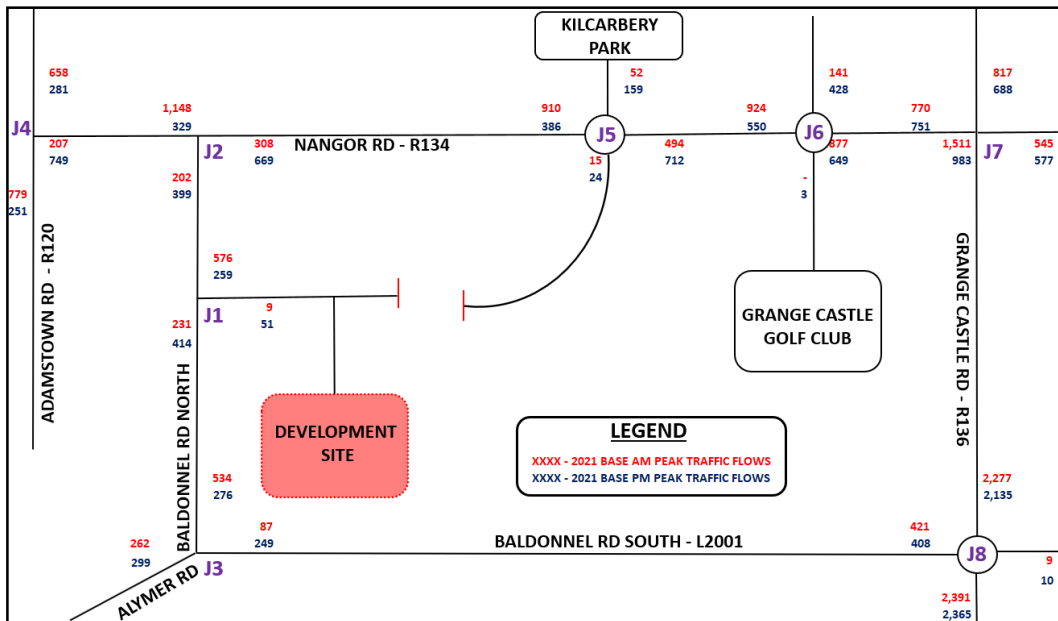


Figure 12.5 Forecasted 2021 AM and PM peak hour flows (PCUs) on the approach to junctions

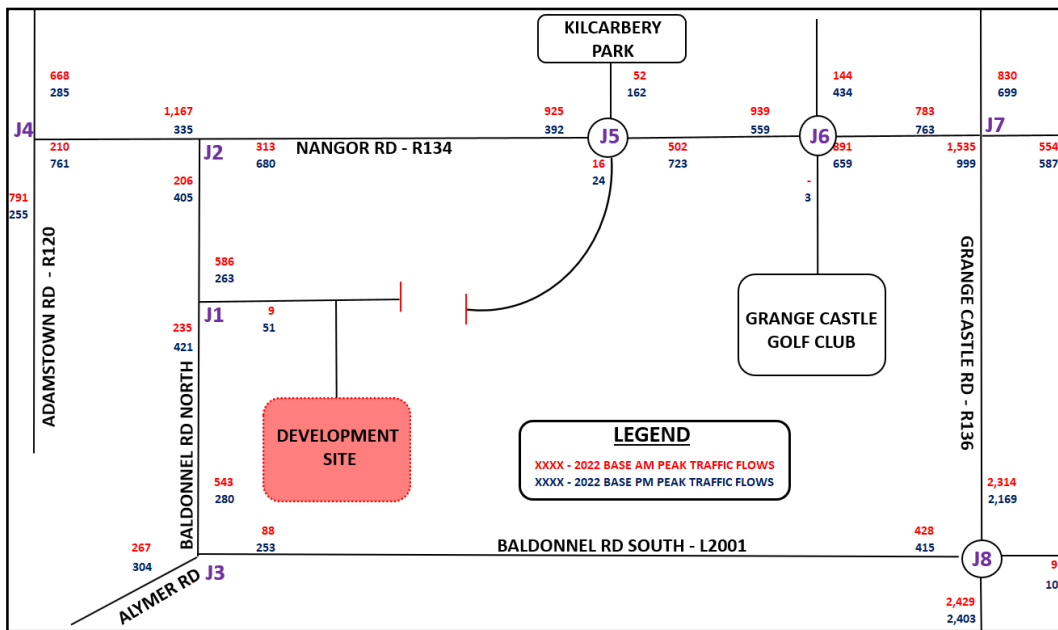


Figure 12.6 Forecasted 2022 AM and PM peak hour flows (PCUs) on the approach to junctions (Data centre and GIS Substation is scheduled to be open in 2022. Figure 12.6 does not include Development Traffic Flows)

Pedestrian and Cycling Facilities

- 12.24 Footway and cycleways are available on roads within Grange Castle South Business Park, including on the road which is to be used for access to the site. These routes are approximately 1.5m wide for pedestrians and 1.5m wide for cyclists, separated from the road by a verge of around 2m.
- 12.25 Segregated cycle and pedestrian routes are also available on the Baldonnell Road to the north of the entrance into the Business Park; and along the R134 and R136 Outer Ring Road. East of the R136/R134 junction, cyclists are permitted to use the bus lane on Nangor Road, towards Clondalkin and Dublin city centre. The proposed realignment of the Nangor and Newcastle/Lucan Road includes the provision of new footpaths and cycle tracks in both directions. Existing cycle routes identified by the National Transport Authority (NTA) in the vicinity of Grange Castle Business Park South are indicated in Figure 12.7 below.

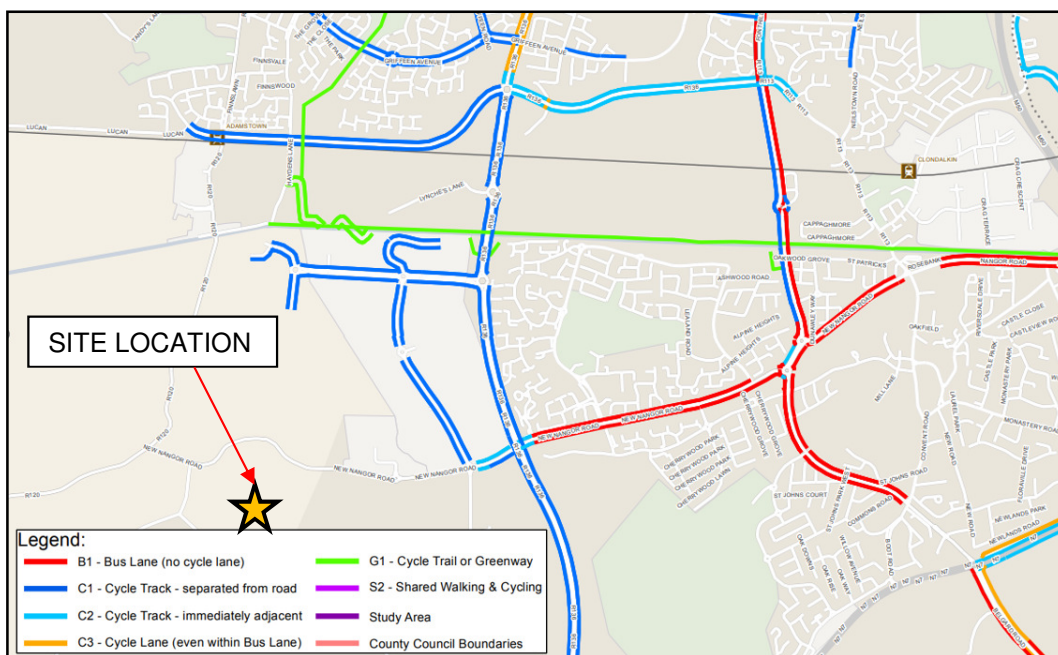


Figure 12.7 Existing cycle routes (Source: NTA¹⁷)

¹⁷ National Transport Authority (December 2013), Greater Dublin Area Cycle Network Plan,

12.26 The Grand Canal Greenway runs from east – west, approximately 1.8km north of the site. This pedestrian and cycle route provides an 8.5km off-road route from 12th Lock, Newcastle Road to Davitt Road, Inchicore. The route also links north to Adamstown and Lucan, via a walking and cycling bridge over the Grand Canal. The route can be accessed from the R136, approximately 3.7 km from the site.

Public transport accessibility

12.27 The site has good access to the bus network with Bus Routes 68, 13 and 151 located nearby.

12.28 Bus Route 68 bus serves Grange Castle South Business Park, with an hourly service running throughout the day. The nearest stop is located approximately 650 metres north of the development site, near the Nangor Road and Adamstown Road junction. Refer to Figure 12.9 for details of the bus route and to Table 12.6 for details of the bus schedule.

12.29 Bus Route 13 also serves Grange Castle South Business Park and operates at a frequency of 15 minutes. The nearest stop is located near the Nangor Road and Grange Castle Business Park Road, approximately 900 metres north of the subject site. Refer to Figure 12.8 for details of the bus route and to Table 12.9 for details on the bus times.

12.30 Bus Route 151 operates at a frequency of approximately 20 minutes and the closest bus stop is located near the Nangor Road and Grange Castle Business Park Road junction, approximately 2.4km north east of the site. Refer to Figure 12.10 for details of the bus route and to Table 12.9 for details of the bus schedule.

Table 12.9 Existing Dublin Bus services to Grange Castle Business Park

No.	Route	Service	Mon-Fri	Sat	Sun	
13	Harristown – Dublin City Centre – Clondalkin Village – Grange Castle	Harristown	First	05:30	06:05	08:00
			Last	22:45	22:45	23:00
		Grange Castle	First	06:00	06:00	08:00
			Last	23:30	23:30	23:30
Frequency			15min	15min	20min	
68	Hawkins St. – Newcastle / Greenogue Business Park	Hawkins St	First	06:25	07:05	10:40
			Last	23:30	22:50	23:00
		Newcastle / Greenogue Business Park	First	06:45	07:05	10:40
			Last	23:05	22:50	23:00
Frequency			60min (typ.)	60min (typ.)	Varies 60min-120min	
151	Docklands – Dublin City Centre – Clondalkin – Grange Castle Business Park – Foxborough	Docklands	First	06:30	07:10	08:30
			Last	23:20	23:20	23:20
		Grange Castle	First	06:00	06:30	07:30
			Last	23:30	23:30	23:30
Frequency			20min	20min	30min	

12.31 The above table illustrates that there are regular services on all days that service the existing bus stops. The route of the 13, 68 and 151 bus services are shown on Figure 12.8 to 12.10.

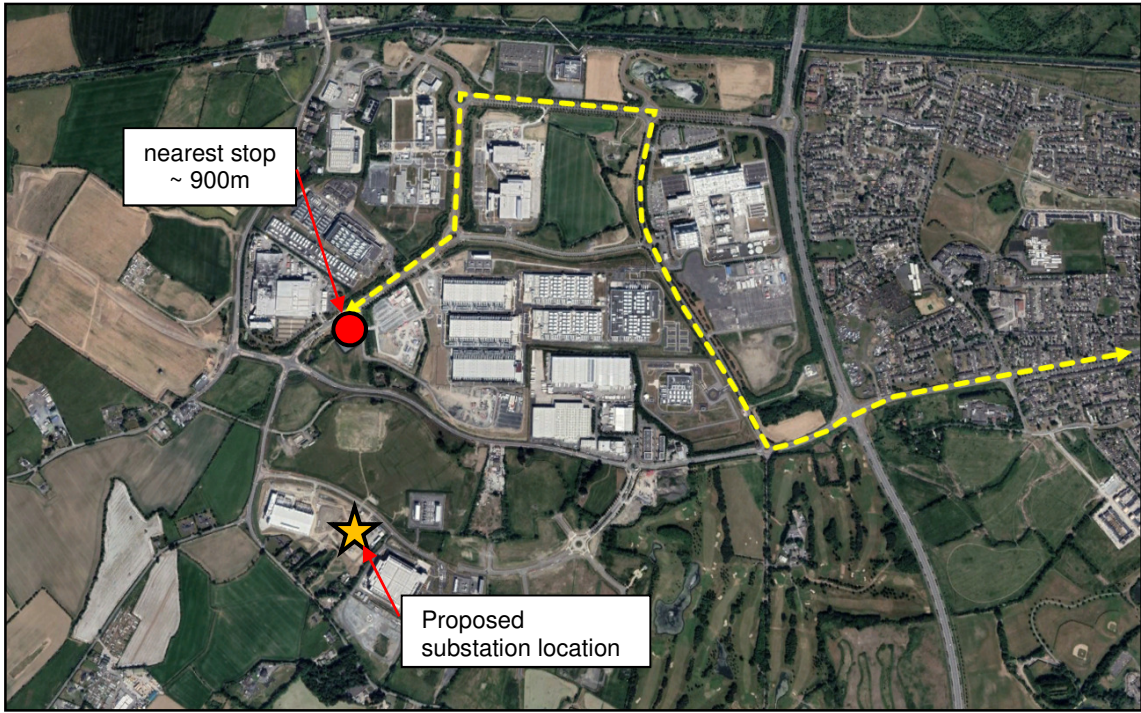


Figure 12.8 Bus Route 13 (Source: Dublin Bus)

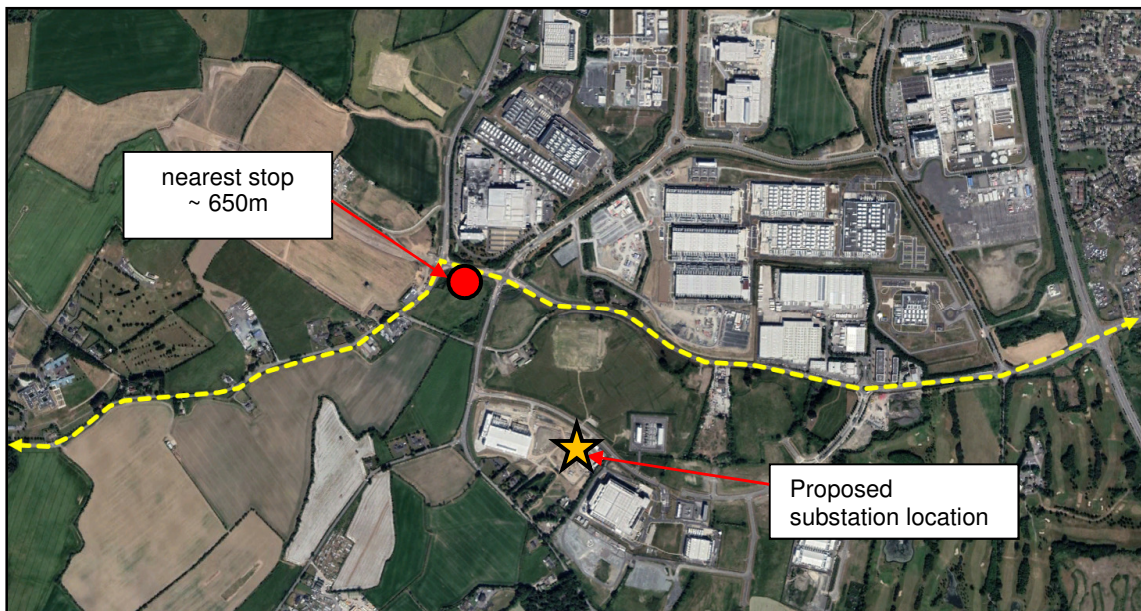


Figure 12.9 Bus Route 68 (Source: Dublin Bus)

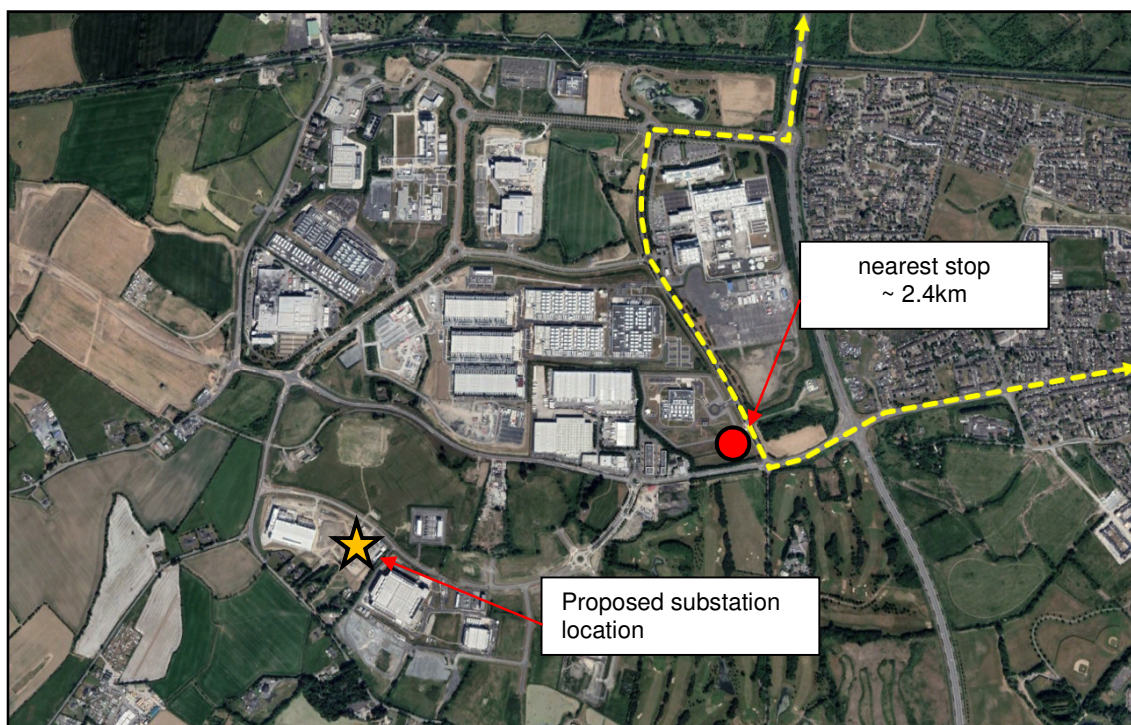


Figure 12.10 Existing bus route no. 151 (Source: Dublin Bus)

- 12.32 Dedicated bus lanes are provided in both directions on the R136 Outer Ring Road and the R134 Nangor Road, east of the Grange Castle Business Park Roundabout. These routes are part of Dublin's Quality Bus Corridor (QBC) network.
- 12.33 The nearest railway line runs east-west approximately 3 km north of the site. Intercity services to Cork and Limerick run on this line, as well as commuter railway services to Portlaoise. The nearest station is Adamstown, to the north-west of the site. These stations are served by around 20 suburban commuter trains in each direction during weekdays.
- 12.34 A new railway station has been constructed at Kishogue, approximately 4.2 km north east of the site. However, although Kishogue Station was completed in 2009 it is not operational, and additional infrastructure is required at the station.

Characteristics of the Proposed Development

- 12.35 A full description of the proposal is set out in Chapter 2 of this EIAR.
- 12.36 In brief, planning permission was granted in 2019 (Reg. Ref. SD18A/0134 / An Bord Pleanála Ref. ABP-302813-18) to develop the site for the purpose of a Data Centre (Permitted Development), with a gross floor area (GFA) of approximately 35,426 square metres. The Permitted Development included an ancillary Substation and associated transformer yard.
- 12.37 It is proposed to amend the permitted scheme and replace the permitted 110kV Air Insulated substation with a new 110kV Gas Insulated Switchgear (GIS) substation (to be known as Aungierstown Substation), two transformer bays, associated compounds and site infrastructure to be located on lands at Grange Castle South Business Park and two (2) underground single circuit 110kV transmission lines from the proposed Aungierstown Substation to the existing 220kV / 110kV Castlebaggot Substation to the immediate north east of the Proposed Development site.
- 12.38 This Traffic and Transport chapter has assessed the cumulative traffic and parking impact of the proposed Substation and the approved Data Centre (granted permission under Reg. Ref. SD18A/0134 / An Bord Pleanála Ref. ABP-302813-18).

- 12.39 Give that the Data Centre (Building A and B) is being completed as permitted, the Data Centre's operational phase trip generation and parking requirements will remain as permitted under Reg. Ref. SD18A/0134 / An Bord Pleanála Ref. ABP-302813-18.
- 12.40 The applicant has advised that the proposed GIS substation will generate negligible traffic movements. Traffic and parking associated with the substation will be limited to occasional maintenance workers accessing the Substation for maintenance works.

Opening of Proposed Development and Permitted Development

- 12.41 The applicant has advised that Building A will partially open (half the first floor) by the end of the 2020. Building A, Building B and the proposed GIS substation is scheduled to be complete by Q4 of 2022.

Physical Infrastructure – Site Access

- 12.42 The Permitted Development and proposed GIS Substation will be accessed from a priority junction that connects with Grange Castle South Business Park Access Road. The Access Road currently serves the Google Ireland Data Centre. This access road is approximately 7.5m wide and has footways and cycle tracks on both sides of the road.
- 12.43 The site access been approved under SD18A/0134 / An Bord Pleanála Ref. ABP-302813-18. No changes are proposed to the approved priority junction access from Grange Castle South Business Park Access Road. A concurrent application under Reg. Ref. SD20A/0295 proposes some minor amendments to the entrance gate arrangement. This application is due for a decision by the 19th January 2021.

Physical Infrastructure – Car Parking for the Permitted Development

- 12.44 The Permitted Development will deliver a total of 70 formal car parking spaces, including three (3) accessible spaces.

Physical Infrastructure – Car Parking for the Proposed GIS Substation

- 12.45 Car parking for the proposed GIS Substation will be limited to occasional maintenance workers visiting the Substation. Informal parking is available to the front of and within the GIS Substation compound with direct access proposed off the Grange Castle South Business Park Access Road. Given the infrequent demand for parking, this arrangement is deemed to be satisfactory.
- 12.46 It should be pointed out that maintenance workers will typically arrive in either vans or specially equipped maintenance vehicles and will not utilise formal car parking spaces granted under the Permitted Development.

Physical Infrastructure – Bicycle Parking for the Permitted Development

- 12.47 Bicycle parking for the Permitted Development will be provided in accordance with the South Dublin County Council Development Plan. Bicycle parking is permitted to be provided at a rate of 1:200sqm of office space.
- 12.48 Bicycle parking is to be split into short stay and long stay (long stay being covered and secured), taking an office GFA of 2,882sqm, this gives 14 short stay and 14 long stay bicycle parking spaces. An additional two spaces are provided to facilitate changes in shift etc. The 30 covered secure bicycle parking spaces will be provided to the front of the offices, within close proximity of the car park. The bicycle parking provision has been approved under SD18A/0134 / An Bord Pleanála Ref. ABP-302813-18.

Physical Infrastructure – Bicycle Parking for the Proposed GIS Substation

- 12.49 The proposed substation is not expected to generate a demand for bicycle parking. Nevertheless, there is ample space available within the GIS Compound to park a bicycle, should someone decide to cycle to the Substation.

Trip Generation

- 12.50 In order to understand the expected trip generation of the Data Centre, suitable assumptions have been made on the level of staff associated with the Proposed Development, based on information provided by CyrusOne. Appropriate estimates have been made, where necessary, in order to provide a robust analysis of the impact of traffic associated with the Proposed Development on the local road network. The predicted level of staffing requirements at the facility is shown in Table 12.10.

Table 12.10 Predicted staffing requirements of CyrusOne Data Centre – Operation Phase

Staff	Normal Working Hours (08:30 – 17:30)	Outside of Normal Working Hours (17:30 – 08:30)
Data Centre	32	16
Offices	60	20
Total	92	36

Traffic generation – Operation phase

- 12.51 In terms of traffic, the most significant effect of the Proposed Development would be if all daytime staff arrived at the site during the AM peak hour and leave the site in the PM peak hour, whilst those working outside of normal working hours do the opposite. Whilst this is unlikely to happen, this is the scenario which will be used to determine the traffic impact of the Proposed Development, in order to ensure a robust assessment.
- 12.52 Additionally, the traffic assessment assumes that all staff will travel by car, with an occupancy rate of one per vehicle. Again, this is considered unlikely, however, it will provide a robust assessment. A small number of deliveries such as post, couriers, IT equipment and general office supplies will likely occur during the operational phase of the development. Although these are likely to be made at various times throughout the day, a small number of deliveries have been assumed in each of the peak hours, as a worst-case scenario.
- 12.53 Similarly, visitors to the Permitted Development will be spread throughout the day, a small number of these have been assumed in the peak hours, as a worst-case scenario. Traffic flows associated with the proposed Substation are expected to be limited to occasional maintenance workers accessing the Compound. The applicant has advised that these trips will be infrequent and spread throughout the day.
- 12.54 On this basis, trips associated with the GIS Substation have not been considered during the AM and PM peak hour periods. A similar assumption has been used in the traffic assessment under Reg. Ref. SD18A/0134 / An Bord Pleanála Ref. ABP-302813-18, which also included an ancillary Substation.
- 12.55 Table 12.11 indicates that the Permitted Development will generate up to 148 trips in the AM peak hour and up to 136 in the PM peak hour.

Table 12.11 Predicted traffic generation CyrusOne Data Centre – Operation Phase

	AM Peak Hour			PM Peak Hour		
	Arrivals (PCU)	Departures (PCU)	Two-way (PCU)	Arrivals (PCU)	Departures (PCU)	Two-way (PCU)
Data Centre	32	16	48	16	32	48
Offices	60	20	80	20	60	80
Deliveries	5	5	10	2	2	4
Visitors	5	5	10	2	2	4
Total	102	46	148	40	96	136

Traffic distribution

- 12.56 It is expected that the origins and destinations of traffic to / from the development and Grange Castle South Business Park will be similar to the distribution of traffic currently accessing Grange Castle Business Park.

- 12.57 For the purpose of assessment, it is assumed that all development traffic (arrivals and departures) is distributed in accordance with the splits observed at junctions 1, 2, 3, 4 and 7 (refer to Figure 12.3 for the locations of Junctions 1, 2, 3, 4 and 7).
- 12.58 It is assumed that all development traffic will continue through the Kilcarbery Park and Grange Castle Business Park Access Road roundabout junctions (Junctions 5 and 6 – Refer to Figure 12.3 for the location of Junction 5 and 6).

Potential impacts of the Proposed Development

- 12.59 This section considers the possible types of effects a development proposal of this kind is likely to produce. The potential traffic and transport impacts of the development are considered below.

Construction phase

- 12.60 The construction traffic impacts of the Proposed Development are dependent on the capacity of the local road network to facilitate access to the development by staff cars and vans as well as HGV's and heavy construction machinery associated with the construction phase. The ability to accommodate temporary parking for contractors and storage of materials on site is another key consideration.
- 12.61 The Main Contractor has advised that approximately three (3) heavy goods vehicles (HGVs) presently visit the site on a daily basis. This is expected to increase to approximately 15 (HGVs) after work commences on Building B (mid-2021) and the proposed GIS Substation.
- 12.62 An estimated average workforce of approximately 80-100 is currently on site. This is expected to remain constant through to the completion of Building B although may increase for short periods.
- 12.63 The Contractor has advised that an additional c. 30 construction personnel will be on-site during the construction of the proposed GIS substation (2021 – mid 2022). The following construction traffic assessment has assumed:
- 95 percent of construction personnel will travel to and from the site by car / van; and
 - 1.5 occupancy factor for cars / vans
- 12.64 In light of the above, the development in conjunction with the Permitted Development is expected to generate the following construction traffic:

Heavy Goods Vehicles (HGVs)

- Approximately three (3) inbound and outbound HGV movements on a daily basis in early 2021; and
- Approximately 15 inbound and outbound HGV movements on a daily basis in 2021 and 2022.

Car / Vans

- Approximately 63 inbound and outbound car / van movements on a daily basis; and
- At the peak (140 construction personnel on-site), approximately 89 inbound and outbound car / van movements on a daily basis.

Operational phase

- 12.65 The Proposed Development will generate a number of trips by various modes of travel including vehicular, pedestrian, cycle and public transport. These trips may have an impact on the surrounding road network. Specific impacts are identified below.
- 12.66 The traffic impact of the Proposed Development is dependent upon the background traffic on the local road network, the capacity of the existing road network, and the amount of additional traffic generated as a result of the development proposals.
- 12.67 Traffic count data was obtained from a number of planning applications in the area. In addition, MPA Consulting Engineers commissioned a detailed junction turning movement count out at the Nangor Road and Adamstown Road junction in October 2019.

- 12.68 A robust estimation of the development's traffic generation and distribution has been set out in the previous section. This will be compared to the background traffic counts in order to ascertain the impact the development will have on the local road network.
- 12.69 It is important to note that the development's trip generation (operational phase) and impacts on the surrounding road network have previously been assessed and approved under SD18A/0134 / An Bord Pleanála Ref. ABP-302813-18.

Car parking for the Permitted Development

- 12.70 One of the key principles of an employment development is the sufficient provision of car parking spaces within the development so as to avoid the need for excessive on-street parking in the vicinity of the site. The 70 on-site car parking spaces, including three accessible spaces will be provided as part of the Permitted Development, as approved under Reg. Ref. SD18A/0134 / An Bord Pleanála Ref. ABP-302813-18.

Car parking for the Proposed GIS Substation

- 12.71 The car parking requirements for the proposed GIS Substation will be limited to occasional maintenance workers. Informal parking for maintenance workers is available to the front of and within the GIS Substation compound.

Walking and cycling infrastructure

- 12.72 It is also necessary to ensure that the proposal incorporates access facilities for pedestrians, cyclists and public transport users in order to facilitate trips by these modes.

Remedial and mitigation measures

Construction phase

- 12.73 A detailed Construction Traffic Management Plan (CTMP) has been prepared by the Main Contractor to minimise the potential impact of the construction phase of the Permitted Development that is currently under construction.
- 12.74 The Detailed Construction Traffic Management Plan (CTMP) will be updated by the Main Contractor and will consider the potential impact of any additional construction phase traffic associated with the proposed GIS Substation and transmission lines.
- 12.75 The Updated Detailed CTMP will consider:
- 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.
- 12.76 The construction contractor will be required to appoint a dedicated construction manager and construction traffic manager. The construction traffic manager will be required to coordinate and schedule all deliveries to the site, ensure that roadways are kept clear of mud and debris, advise haulage contractors on routes and adhere to good traffic management principles.
- 12.77 During the construction phase, the Contractor will be required to appoint a Construction Traffic Manager who will ensure that car sharing is encouraged and that the use of single occupancy vehicles to access the site is minimised.

12.78 Further, construction personnel will be made aware of the public transport options in the locale at staff induction stage. Public transport timetables and information will be posted on notice boards, at appropriate locations, within the Site Compound.

Operational phase

12.79 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

12.80 When considering a development of this nature, the potential traffic impact on the surroundings must be considered for each of two stages; the Construction Phase and the Operational Phase. These two distinct stages are considered separately.

12.81 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 **imperceptible** for the operational phase.

Cumulative impacts

12.82 Given that the Permitted Development is already under construction, it is likely that the majority of the construction traffic discussed above, is already distributed across the surrounding road network.

Construction phase

12.83 Provided that suitable mitigation measures and management procedures are incorporated during the construction phase, the residual impact on the local receiving environment is expected to be temporary in nature and slight in terms of effect. Given that the Permitted Development is already under construction, it is likely that the majority of the construction traffic discussed above, is already distributed across the surrounding road network.

Operational Phase

12.84 The existing background traffic flows has been set out in earlier sections of this chapter and the predicted cumulative operational phase trip generation and distribution onto the surrounding road network is presented in Figure 12.11.

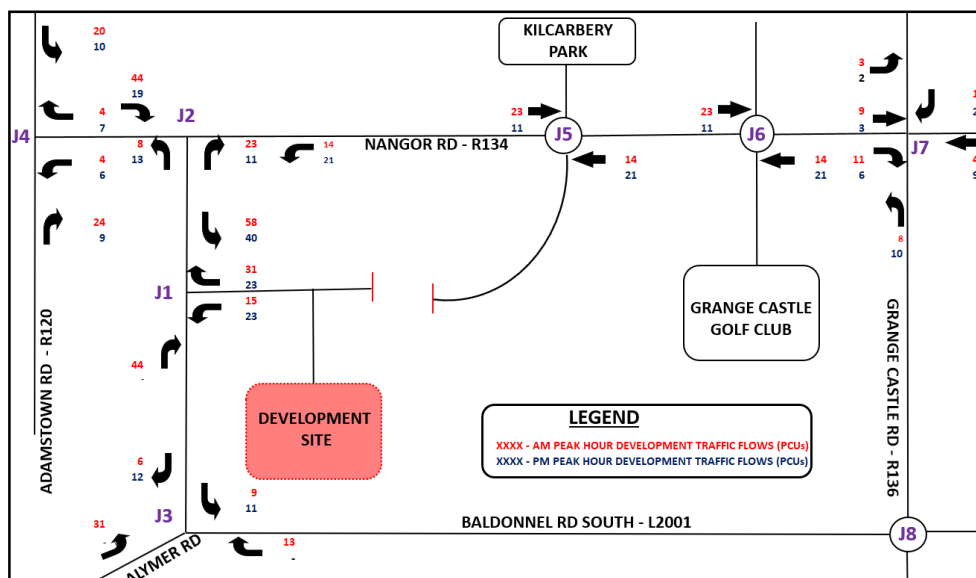


Figure 12.11 Development AM and PM peak hour period trip distribution to the surround road network (PCUs)

12.85 Tables 12.12 to 12.19 indicates the percentage cumulative impact of the operational phase traffic of the Proposed and Permitted Development at the following critical junctions in 2022:

- Junction 1 – Baldonnel Road / Grange Castle Business Park South Access Road Junction;
- Junction 2 – Baldonnel Road / Nangor Road Junction;
- Junction 3 – Baldonnel Road / Aylmer Road Junction;
- Junction 4 – Nangor Road / Adamstown Road Junction;
- Junction 5 – Nangor Road / Kilcarbery Park Roundabout;
- Junction 6 – Nangor Road / Grange Castle Business Park North Access Roundabout;
- Junction 7 – Nangor Road / Grange Castle Road Junction; and
- Junction 8 – Grange Castle Road / Baldonnel Road Junction.

Table 12.12 Percentage cumulative impact of development traffic at the Baldonnel Road / Grange Castle Business Park South Access Road junction (Junction 1)

	2022 Junction Traffic Flows (Without development traffic)	Development Flows at the Junction	Proportional Increase (Percentage)
AM Peak Hour	830	148	17.8
PM Peak Hour	736	136	18.5

Table 12.13 Percentage cumulative impact of development traffic at the Baldonnel Road / Nangor Road junction (Junction 2)

	2022 Junction Traffic Flows (Without development traffic)	Development Flows at the Junction	Proportional Increase (Percentage)
AM Peak Hour	1685	89	5.3
PM Peak Hour	1420	64	4.5

Table 12.14 Percentage cumulative impact of development traffic at the Baldonnel Road / Aylmer Road junction (Junction 3)

	2022 Junction Traffic Flows (Without development traffic)	Development Flows at the Junction	Proportional Increase (Percentage)
AM Peak Hour	897	59	6.6
PM Peak Hour	837	23	2.7

Table 12.15 Percentage cumulative impact of development traffic at the Nangor Road / Adamstown Road junction (Junction 4)

	2022 Junction Traffic Flows (Without development traffic)	Development Flows at the Junction	Proportional Increase (Percentage)
AM Peak Hour	1670	52	3.1
PM Peak Hour	1301	32	2.5

Table 12.16 Percentage cumulative impact of development traffic at the Nangor Road / Kilcarbery Park roundabout junction (Junction 5)

	2022 Junction Traffic Flows (Without development traffic)	Development Flows at the Junction	Proportional Increase (Percentage)
AM Peak Hour	1494	37	2.5
PM Peak Hour	1301	32	2.5

Table 12.17 Percentage cumulative impact of development traffic at the Nangor Road / Grange Castle Business Park North access roundabout junction (Junction 6)

	2022 Junction Traffic Flows (Without development traffic)	Development Flows at the Junction	Proportional Increase (Percentage)
AM Peak Hour	1974	37	1.9
PM Peak Hour	1656	32	1.9

Table 12.18 Percentage impact of development traffic at the Nangor Road / Grange Castle Road (R136) junction (Junction 7)

	2022 Junction Traffic Flows (Without development traffic)	Development Flows at the Junction	Proportional Increase (Percentage)
AM Peak Hour	3702	36	1.0
PM Peak Hour	3047	32	1.1

Table 12.19 Percentage impact of development traffic at the Grange Castle Road (R136) / Baldonnel Road junction (Junction 8)

	2022 Junction Traffic Flows (Without development traffic)	Development Flows at the Junction	Proportional Increase (Percentage)
AM Peak Hour	5181	41	0.8
PM Peak Hour	4997	27	0.5

- 12.86 The *TII document 'Traffic & Transport Assessment Guidelines'* state that the impact of any Proposed Development upon the local road network is considered material when the level of traffic it generates surpasses 10 percent and five (5) percent on normal and congested networks respectively. When such levels of impact are generated a more detailed assessment should be undertaken to ascertain the specific impact upon the networks operational performance.
- 12.87 In accordance with the TII guidelines, an assessment has been undertaken to establish the potential impact upon the proposed junctions on the local road network and the analysis is based upon the 2022 opening year traffic scenario.
- 12.88 These criteria are widely considered to be best practice in determining the scope for road capacity impacts.
- 12.89 As set out previously in this chapter, it is understood from site visits, that the network locally operates within capacity with minimal queuing and delay. Therefore, the 10 percent threshold is used to identify any material impacts.
- 12.90 It is acknowledged that under the cumulative impact assessment Junction 1 exceeds the 10 percent threshold. Nevertheless, An Bord Pleanála should note that the Proposed and Permitted Development will generate a similar number of trips on the surrounding road network as the previously approved application (SD18A/0134 / An Bord Pleanála Ref. ABP-302813-18).
- 12.91 Furthermore, a detailed cumulative assessment has been carried out of Junction 1 as part of the recently approved data centre development under Reg. Ref. SD20A/0121 that took into consideration the Permitted Development on the subject site. The assessment concluded that Junction 1 will continue to operate well within capacity, past the year 2043. In light of the above, it is not considered necessary to undertake any further traffic assessment of Junction 1.

Monitoring

Construction Phase

12.92 During the construction stage, the following monitoring exercises will be carried out. The specific compliance exercises to be undertaken regarding the range of measures detailed in the final Detailed Construction Management Plan and will be agreed with South Dublin County Council.

- Compliance with construction vehicle routing practices;
- Compliance with construction vehicle parking practices;
- External road conditions and monitoring;
- Compliance with road cleaning and sweeping requirements, and
- Timings of construction activities.

Operational Phase

12.93 During the operation phase, the Appointed Mobility Manager will be required, on a continual basis, to update the public transport timetables, other travel data and to disseminate the information to Data Centre employees.

Residual impact

12.94 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.

CULTURAL HERITAGE

- 13.1 Rubicon Heritage Services Ltd has prepared this chapter of the Environmental Impact Assessment Report (EIAR) which details the archaeological, architectural and cultural heritage issues that need to be addressed in respect of the Proposed Development site at Grange Castle South Business Park South, in Baldonnel, Dublin 22 (Figure 13.1 of Chapter 13 – Appendix 13.5).
- 13.2 This study aims to assess the baseline archaeology and cultural heritage environment, to evaluate the likely significant impacts that the Proposed Development will have on this environment and to provide mitigation measures, in accordance with the policies of the Department of Housing, Local Government and Heritage (DoHLGH) and South Dublin County Council, the National Monuments Acts 1930-2004 and best practise guidelines, to ameliorate these impacts.

Study Area

- 13.3 The study area has been defined in respect of two factors:
1. the ability of sites/information sources to provide information pertaining to the archaeological potential of the Proposed Development site, and
 2. the potential physical impact, as well as impact on setting, that the proposed scheme may have on sites of cultural heritage significance.
- 13.4 Taking these factors into account the study area has been defined as follows:

Table 13.1 Dimensions of Study Area

Subject	Study area
National Monuments	Within approx. 500m of Proposed Development site
Recorded archaeological monuments (RMPs)	Within approx. 500m of Proposed Development site
Protected Structures and/or their curtilage	Within approx. 500m of Proposed Development site
Architectural Conservation Areas (ACAS)	Within approx. 500m of Proposed Development site
Structures recorded in the NIAH	Within approx. 500m of proposed cable route or landfall
Unregistered features of cultural heritage	Within Proposed Development site
Townland boundaries	Within Proposed Development site
Areas of archaeological potential	Within Proposed Development site
Previous Excavations	Within townlands encompassed by and adjacent to the Proposed Development site including Aungierstown and Ballybane, Ballybane, Clutterland, Kilbride, Kilmactalway and Milltown
Topographical files	Within townlands encompassed by and adjacent to the Proposed Development site including Aungierstown and Ballybane, Ballybane, Clutterland, Kilbride, Kilmactalway and Milltown

Methodology

- 13.5 This section presents the methodology used in assessing the baseline cultural heritage environment. The scope and methodology for the baseline assessment has been devised in consideration of the following guidelines:
- EirGrid (2015) 'Cultural Heritage Guidelines for Electricity Transmission Projects. A standard approach to archaeological, architectural and cultural heritage impact assessment of high voltage transmission projects.';
 - Environmental Protection Agency (2002) 'Guidelines on the information to be contained in Environmental Impact Statements';
 - Environmental Protection Agency (2003) 'Advice notes on current practice (in the preparation of Environmental Impact Statements)';
 - Environmental Protection Agency (2017) 'Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports (EIAR)';
 - Department of Arts, Heritage, Gaeltacht and the Islands (DAHGI) (1999) 'Frameworks and Principles for the Protection of the Archaeological Heritage';

- Department of the Environment, Heritage and Local Government (2004) 'Architectural Heritage Guidelines';
- National Roads Authority (2005) 'Guidelines for the Assessment of Architectural Heritage Impacts of National Road Schemes'; and
- National Roads Authority (2005) 'Guidelines for the Assessment of Archaeological Heritage Impacts of National Road Schemes'.

Desktop Study Methodology

13.6 The present assessment of the archaeological, architectural and cultural heritage of the Proposed Development area is based on a desktop study of a number of documentary and cartographic sources. The desktop study was further augmented by an examination of aerial photography as well as a field survey. The main sources consulted in completing the desktop study are listed here.

- Sites and Monuments Record (SMR) and Record of Monuments and Places (RMP);
- National Inventory of Architectural Heritage;
- South Dublin County Development Plan 2016–2022;
- National Museum of Ireland (NMI) Topographical Files;
- Excavations Bulletin;
- Dublin County Archaeology GIS;
- Aerial Photographs; and
- Cartographic Sources.

Methodology used for assessing baseline value of sites

13.7 In order to categorise the baseline environment in a systemised manner, 'baseline values' have been assigned to each identified site of cultural heritage significance and/or potential within the study area. The baseline value of a site is determined with reference to the 'importance' and 'sensitivity' of the site.

13.8 In accordance with NRA Guidelines, the importance of a site is determined based on the following criteria: legal status, condition, historical associations, amenity value, ritual value, specimen value, group value and rarity. The sensitivity of a site is determined based on its susceptibility to physical impact, as well as susceptibility to impact on setting.

13.9 It should be noted that the National Monuments Act 1930-2004 does not differentiate between recorded archaeological sites on the basis of relative importance or sensitivity. In addition, the Local Government (Planning and Development) Act, 2000 (as amended) does not differentiate between Protected Structures or Areas of Architectural Conservation on the basis of relative importance or sensitivity either. Consequently, professional judgement has been exercised to rate these features based on their perceived importance and sensitivity in relation to physical impacts and impacts on setting.

13.10 Taking the above factors into consideration, the criteria that have been defined are provided in Table 13.2 below.

Table 13.2 Baseline values of sites

Subject	Baseline Value
<ul style="list-style-type: none"> - Recorded Archaeological Monuments - Protected Structures - Architectural Conservation Areas (ACAs) - Shipwrecks known to be more than 100 years old or whose date is uncertain 	Very High
<ul style="list-style-type: none"> - Sites listed in the NIAH that are not Protected Structures - Shipwrecks that are known to be less than 100 years old. - Unregistered built heritage sites that comprise extant remains which are in good condition and/or which are regarded as constituting significant cultural heritage features - Unrecorded features of archaeological potential 	High
<ul style="list-style-type: none"> - Unregistered built heritage sites that comprise extant remains which are in poor condition - Unregistered cultural heritage sites (not including built heritage sites) that comprise extant remains - Townland boundaries that comprise extant remains 	Medium/High

Subject	Baseline Value
- Marshy/wetland areas	
- Unregistered cultural heritage sites for which there are no extant remains but where there is potential for associated subsurface evidence	Medium/Low
- Townland boundaries for which there are no extant remains	
- Unregistered cultural heritage sites for which there are no extant remains and where there is little or no potential for associated subsurface evidence	Low

Note: 'All other areas' collectively refers to the areas within the Proposed Development site that do not contain or comprise features of cultural heritage significance.

Types of Impact

- 13.11 The following table lists the type of impacts that a Proposed Development may have on the cultural heritage resource:

Table 13.3 Baseline values of sites

Type of Impacts	Definition
Direct	Direct impacts arise where an archaeological, architectural and/or cultural heritage feature or site is physically located within the footprint of the Proposed Development, or its associated physical impact zone, whereby the removal of part, or all of the feature or site is thus required.
Indirect	Indirect impacts arise when an archaeological, architectural or cultural heritage feature is not located within the footprint of the Proposed Development, or its associated physical impact zone, and thus is not impacted directly. Such an impact could include impact on setting or impact on the zone of archaeological potential of site whereby the actual site itself is not physically affected.
Cumulative	The addition of many impacts to create a large, significant impact.
Undeterminable	Whereby the full consequence that the Proposed Development may have on the cultural heritage resource is not known
Residual	The degree of environmental change that will occur after the proposed mitigation measures have taken effect.

Methodology Used for Assessing Magnitude of Impacts

- 13.12 The methodology used to assess the magnitude of potential pre-mitigation impacts, as well as residual impacts, of the Proposed Development on the baseline environment is presented in Table 13.4 below.

Table 13.4 Criteria used for rating magnitude of impacts

Impact magnitude	Criteria
Severe	<p>Applies where mitigation would be unlikely to remove adverse effects. Reserved for adverse, negative effects only. These effects arise where an archaeology site is completely and irreversibly destroyed.</p> <p>An impact that obliterates the architectural heritage of a structure or feature of national or international importance. These effects arise where an architectural structure or feature is completely and irreversibly destroyed by the Proposed Development. Mitigation is unlikely to remove adverse effects.</p>
Major	<p>An impact which, by its magnitude, duration or intensity, alters an important aspect of the environment. An impact like this would be where part of a site would be permanently impacted upon, leading to a loss of character, integrity and data about an archaeological feature/site.</p> <p>An impact that by its magnitude, duration or intensity alters the character and/or the setting of the architectural heritage. These effects arise where an aspect or aspects of the architectural heritage is/are permanently impacted upon leading to a loss of character and integrity in the architectural structure or feature. Appropriate mitigate is likely to reduce the impact</p> <p>A beneficial or positive effect that permanently enhances or restores the character and/or setting of a feature of archaeological or cultural heritage significance in a clearly noticeable manner.</p>
Moderate	<p>A medium impact arises where a change to a site/monument is proposed which though noticeable, is not such that the archaeological integrity of the site is compromised and which is reversible. This arises where an archaeological feature can be incorporated into a modern day development without damage and that all procedures used to facilitate this are reversible.</p> <p>A medium impact to a site/monument may also arise when a site is fully or partly excavated under license and all recovered data is preserved by record.</p> <p>An impact that results in a change to the architectural heritage which, although noticeable is not such that alters the integrity of the heritage. The change is likely to be consistent with existing and emerging trends. Impacts are probably reversible and may be of relatively short duration. Appropriate mitigation is very likely to reduce the impact.</p> <p>A beneficial or positive effect that results in partial or temporary enhancement of the character and/or setting of a feature of archaeological or cultural heritage significance in a clearly noticeable manner.</p>
Minor	<p>An impact which causes changes in the character of the environment, such as visual impact, which are not high or very high and do not directly impact or affect an archaeological feature or monument.</p> <p>An impact that causes some minor change in the character of architectural heritage of local or regional importance without affecting its integrity or sensitivities. Although noticeable, the effects do not directly impact on the architectural structure or feature. Impacts are reversible and of relatively short duration. Appropriate mitigation will reduce the impact.</p> <p>A beneficial or positive effect that causes some minor or temporary enhancement of the character of an architectural heritage significance which, although positive, is unlikely to be readily noticeable.</p>
Negligible	<p>An impact on archaeological features or monument capable of measurement but without noticeable consequences.</p> <p>An impact on architectural heritage of local importance that is capable of measure merit but without noticeable consequences.</p> <p>A beneficial or positive effect on architectural heritage of local importance that is capable of measurement but without noticeable consequences.</p>

Methodology used for assessing significance level of impacts

- 13.13 The significance level of a construction or operation impact on a feature is assessed by combining the magnitude of the impact and baseline value of the feature. The matrix in Table 13.5 provides a guide to decision-making, but is not a substitute for professional judgement and interpretation, particularly where the baseline value or impact magnitude levels are not clear or are borderline between categories. The permanence of the effects are also taken into account, with irreversible effects being more significant while temporary or reversible changes are likely to be less significant

Table 13.5 Criteria for assessing significance level of impacts

Magnitude of Impact	Baseline Value				
	Very High	High	Medium/High	Medium/Low	Low
Severe	Very significant	Very significant	Significant	Moderate	Slight
Major	Very significant	Significant	Moderate	Slight	Slight
Moderate	Significant	Moderate	Slight	Slight	Negligible
Minor	Moderate	Slight	Slight	Negligible	Negligible
Negligible	Slight	Slight	Negligible	Negligible	Negligible

Receiving environment*Site Description*

- 13.14 The Proposed Development site of c. 0.9163 ha. 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. It is located in the townland of Aungierstown & Ballybane, generally bounded by a two storey data centre facility and associated three storey office block – the Permitted Development as granted under Reg. Ref. SD18A/0134 / An Bord Pleanála Ref. ABP-302813-18 to the west and south, Grange Castle South Access Road on the north and Google data centre site on the east (see Figure 13.1 of Chapter 13 – Appendix 13.5). A further data centre has been recently granted to the north of the access road under Reg. Ref. SD20A/0121. It is formally greenfield but is in temporary use as a construction compound and car park for Phase 1 of the Permitted Development. Analysis of historic mapping (see below) suggests that the site was agricultural land until this current phase of development commenced.

Record of Monuments and Places (RMPs)

- 13.15 Section 12 (1) of the National Monuments Act 1994 made provision the establishment and maintenance of a Record of Monuments & Places (RMP). Under this Act, each site recorded in the Record of Monuments and Places is granted statutory protection. When the owner or occupier of a property, or any other person proposes to carry out, or to cause, or to permit the carrying out of any work at or in relation to a recorded archaeological monument they are required to give notice in writing to the Minister for Housing, Local Government and Heritage 2 months before commencing that work.
- 13.16 There are two recorded archaeological monuments incorporated by the study area (see Figure 13.2; Chapter 13 - Appendix 13.5). Both are enclosure sites (CH001–002) that have been fully archaeologically excavated and in both cases post-excavation analysis is still on-going.

National Monuments

- 13.17 National monuments are broken into two categories; National Monuments in the ownership or guardianship of the state and National Monuments in the ownership or guardianship of a local authority. Section 8 of the National Monuments (Amendment) Act 1954 provides for the publication of a list of monuments, the preservation, of which, are considered to be of national importance. Two months notice must be given to the Minister for Culture, Heritage and the Gaeltacht where work is proposed to be carried out at or in relation to any National Monument.
- 13.18 There are no National Monuments incorporated by the study area.

Sites with Preservation Orders

- 13.19 The National Monuments Act 1930-2004 provide for the making of Preservation Orders and Temporary Preservation Orders in respect of National Monuments. Under Section 8 of the National Monument Act 1930 (as amended) the Minister for Housing, Local Government and Heritage, can place a Preservation Order on a monument if, in the Ministers' opinion, it is a National Monument in danger of being or is actually being destroyed, injured or removed or is falling into decay through neglect. The Preservation Order ensures that the monument shall be safeguarded from destruction, alteration, injury, or removal, by any person or persons without the written consent of the Minister.
- 13.20 There are no sites with preservation orders incorporated by the study area.

Record of Protected Structures

- 13.21 The South Dublin County Development Plan (2016–2022) was consulted for schedules of Protected Structures. These are buildings that a planning authority considers to be of special interest from an architectural, historical, archaeological, artistic, cultural, scientific, social, and/or technical point of view. Protected Structures receive statutory protection from injury or demolition under Section 57 (1) of the Local Government (Planning and Development) Act 2000 (as amended). Protected structure status does not exclude development or alteration but requires the developer to consult with the relevant planning authority to ensure that elements which make the structure significant are not lost during development.
- 13.22 There is one Protected Structure within the study area (see Figure 13.2 of Chapter 13 – Appendix 13.5)—Castle Bagot House (CH003).

Architectural Conservation Areas

- 13.23 The South Dublin County Development Plan (2016–2022) was consulted for records relating to Architectural Conservation Areas ((hereinafter 'ACAs'). The stated objective of ACAs is to conserve and enhance the special character of the area, including traditional building stock and material finishes, spaces, streetscapes, landscape and setting.
- 13.24 There are no ACAs within the study area.

National Inventory of Architectural Heritage (NIAH)

- 13.25 The National Inventory of Architectural Heritage (hereinafter the 'NIAH') is a state initiative under the administration of the Department of Housing, Local Government and Heritage and was established on a statutory basis under the provisions of the Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act 1999. Its purpose is to identify, record and evaluate the post-1700 architectural heritage of Ireland, uniformly and consistently, as an aid in the protection and conservation of the built heritage. NIAH surveys provide the basis for the recommendations of the Minister for Housing, Local Government and Heritage to the planning authorities for the inclusion of particular structures in their Record of Protected Structures (RPS).
- 13.26 There is one structure within the study area that is listed in the NIAH (see Figure 13.2 in Chapter 13 – Appendix 13.5)—Castle Bagot House (CH003).

Undesignated Cultural Heritage Sites that Comprise Extant Remains

- 13.27 Undesignated cultural heritage sites which comprise extant remains are typically, though not always, post-1700 in date. The majority of these sites are represented on the 6" and/or 25" Ordnance Survey maps. Many constitute country houses and associated lodges, while others may be bridges or industrial features, hollow-ways, mass rocks etc.
- 13.28 There are no undesignated cultural heritage sites that comprise extant remains present within the study area.

Undesignated Cultural Heritage Sites that do not Comprise Extant Remains

- 13.29 Undesignated cultural heritage features which do comprise extant remains typically include features such as lime kilns, dwellings, outhouses, trackways etc which are identifiable on maps such as the 6" and/or 25" Ordnance Surveys but which no longer have an above-ground presence.
- 13.30 There is one undesignated cultural heritage features which does not comprise extant remains present within the study area (Chapter 13 – Appendix 13.5 – Figure 13.4). John Rocque's map of county Dublin (1756) shows a road or trackway extending north/south and linking the Baldonnel Road to the Old Nangor Road, roughly half way between the north/south section of the Baldonnel Road and Kilbride Church (CH008) (Appendix H.5; Figure H4). This roadway does not appear on later mapping, though a double field boundary along the route of the townland boundary for Ballybane/Aungierstown & Ballybane (CH007) may reflect its route Chapter 13 – Appendix 13.5 – Figure 13.5). Test trenches undertaken in 2016 (Stirland 2016) identified a trackway defined by parallel ditches along the route of this townland boundary. This was assumed to be a modern farm track (based on the presence of relict terracotta drainage pipes). However, the cartographic evidence suggests that, if it does correspond to the roadway on Rocque's map that it must be pre-1750 in date and could potentially date back to the medieval period. Further test trenching undertaken in May-June 2018 (O'Dowd 2018) identified a wide linear ditch to the west of and running parallel to the upstanding section of the Ballybane/Aungierstown & Ballybane townland boundary in the south of the site. Following on from this archaeological monitoring of topsoil stripping south of the Grange Castle South Access Road (Hession 2020b) uncovered and recorded further section of these parallel ditches. This supports this interpretation of the cartographic evidence.

Archaeological Sites identified during test trenching (2016) and archaeological excavation

- 13.31 A series of archaeological investigations were carried out on behalf of South Dublin County Council. These investigations confirmed the nature and extent of the RMP sites (CH001–002). In addition, these investigations have confirmed the presence of three further archaeological sites—two enclosures (CH004–005) and a series of linear ditches (CH006) (Figure 13.1 of Chapter 13 – Appendix 13.5).

Features of archaeological potential identified during geophysical survey (2018)

- 13.32 A geophysical survey was undertaken in March 2018 of a c. 2.8 ha area to the south of the development site (O'Flaherty & Bolger 2018). This area lay outside the section of the site where investigations have been previously undertaken on behalf of South Dublin County Council (Stirland 2016).
- 13.33 This survey revealed a number of anomalies of moderate archaeological potential (M:01–015). These were subsequently assessed during archaeological testing in 2018 and 2019 (see below) and established to be non-archaeological in character.

Features of archaeological potential identified during archaeological test trenching (2018)

- 13.34 A further programme of archaeological test trenching was carried out in May-June 2018 (Licence No. 18E0292; O'Dowd 2018). This involved blanket test trenching of all areas of the overall development site on the south side of Grange Castle with the exception of the two sections undergoing full archaeological excavation and an area in the southeast quadrant of the development site where access for test trenching was curtailed. In addition, targeted test trenches were positioned to assess some of the anomalies identified during the March 2018 geophysical survey. The anomalies not assessed were located in the area where works were curtailed.
- 13.35 None of the geophysical anomalies that could be directly investigated (M:01–03; M04–07; M:15) proved to be archaeological features (O'Dowd 2018). However, those that were not assessed could still prove to represent sub-surface archaeological remains. The only feature of potential interest encountered was the wide linear ditch running parallel to the townland boundary between Ballybane and Aungierstown & Ballybane. This ditch appears to represent the sub-surface remains of the earlier (pre-1900) configuration of this townland boundary (CH007). It appears on historic mapping as a double field boundary and possibly an earlier trackway or laneway (CH008).

Features of archaeological potential identified during archaeological test trenching (2019)

- 13.36 A third programme of archaeological test trenching was carried out at the site in November 2019 (Licence No. 18E0292ext; Hession 2020a). Eight targeted test trenches were positioned to assess some of the anomalies identified during the March 2018 geophysical survey.
- 13.37 None of the geophysical anomalies that could be directly investigated (M:010–011; M:012; M:14) proved to be archaeological features (Hession 2020a). Two intercutting pits filled by heat shattered stone were identified in Trench 44 (CH009) and may date to the Bronze Age.

Features of archaeological potential identified during archaeological monitoring (2019)

- 13.38 A programme of archaeological monitoring of topsoil removal was carried out in conjunction with the construction of Phase 1 of the Permitted Development at the site in July and December 2019 (Licence No. 18E0292ext; Hession 2020b). Eight features of archaeological significance were identified and recorded. The original townland boundary between Ballybane and Aungierstown/ Ballybane comprising two parallel linear ditches was investigated as part of the monitoring works. Two new archaeological sites—both burnt mounds (CH010–011)—were identified. One of these sites (CH011) was subsequently fully archaeologically excavated (see below), while the other (CH010) was preserved *in situ*.

Townland Boundaries

- 13.39 A townland is the smallest official land unit in the country. Ireland is made up of approximately 60,000 townlands. Research into the name of these land units frequently provides information relating to its archaeology, history, folklore, ownership, topography or land use. Most place names were anglicised by the time the Ordnance Survey began in the 1830s. Despite some inaccuracies in translation, the Gaelic, Viking, Anglo-Norman and English origins of place names are generally recognisable.
- 13.40 Examination of the First Edition 6" Ordnance Survey map demonstrates that one townland boundary (CH007)—between Ballybane and Aungierstown & Ballybane—is incorporated by the study area (Figures 13.5–13.6; Chapter 13 – Appendix 13.5).

Cultural Heritage Background

- 13.41 In order to provide a framework within which to evaluate the archaeological significance and/or potential of the Proposed Development site and the archaeological landscape within which it is situated, an overview of the cultural heritage of the Proposed Development site and its receiving environment is provided here. The findings of a detailed desktop study, which included a review of literary and cartographic sources, results of previous archaeological investigation, as well as a field inspection of the study area are presented here.

Archaeological and historical context

- 13.42 *Prehistoric Period:* Previous archaeological excavations to the north of the Proposed Development site have uncovered evidence for settlement from the Neolithic to the Iron Age, suggesting that this general area of south county Dublin was continuously occupied. Excavations in the townland of Kishoge (O'Donovan 2004) identified the remains of an early Neolithic house (radiocarbon dated to 3759–3656 BC). Investigations in advance of various phases of construction at the Grange Castle Business Park identified four fulachta fiadh/burnt mounds, which have a general prehistoric date range (Courtney 2005). Archaeological excavation was also carried out at the site of a ploughed-out ring barrow, revealing that while the barrow itself was constructed in the Early Bronze Age, use of the site for burial had continued into the Early Iron Age (Doyle 2005). Preliminary results of the recent excavations adjacent to the site indicate that the RMP enclosure site (CH002) was most likely originally constructed in the Bronze Age, though its exact purpose and function remains opaque (Johnston and Hession 2018a).
- 13.43 *Early medieval period:* By the early medieval period south county Dublin formed part of the over-kingdom of Laigin (Leinster). The region within which the study area is located was controlled by the Uí Dúinchada branch of the Uí Dúnlainge, whose territory was centred on Newcastle Lyons. Throughout this period Ireland was a predominantly rural society characterised by dispersed settlement. The

economy was based on mixed agriculture though the rearing of cattle was seen as very important. Ringforts and enclosures are indicative of settlement at this time. It is likely that all the RMP enclosure site (CH001) as well as the two enclosure sites uncovered during recent archaeological investigations (CH004–005) are early medieval in date. Archaeological investigation indicates that while the RMP enclosure site (CH002) was constructed in the Bronze Age, it was reutilised or repurposed during the early medieval period also. Archaeological investigations in advance of various phases of construction at the Grange Castle Business Park to the north and north-east identified an extensive early medieval field system complex (Courtney 2005). Church sites at Kilbride (RMP DU021-005001–003) to the east and Kilmactalway (DU021-003001–003) to the south were both likely to have been established in the early medieval period. Archaeological investigations associated with the Lucan to Palmerstown Water Supply Scheme uncovered a previously unknown inhumation cemetery at Milltown, which is likely to date to either the early or later medieval periods (Kehoe 2003).

- 13.44 *Late medieval period:* The arrival of the Anglo-Normans at the end of the 12th century brought changes to the settlement landscape of south County Dublin. The tower houses at Grange (RMP DU017-134-- --), Nangor (RMP DU017-037----) and Kilbride (RMP DU021-004----) attest to settlement during this period. However, surviving documentary evidence suggests that the townlands of Ballybane and Aungierstown & Ballybane were the property of the St Patrick's Cathedral (forming part of the demesne land of the Dean of the Cathedral) for most of this period (Mason 1820). This would suggest that the lands were primarily in agricultural use. The nearby churches of Kilmactalway and Kilbride were also in the possession of St Patrick's Cathedral.
- 13.45 *Post-medieval and early modern periods:* Evidence from the 17th century suggests that some of the lands of Ballybane and Aungierstown & Ballybane had passed at least partially into private hands—probably on foot of the dissolution of the monasteries in the mid-16th century—though the deanery of St Patrick's Cathedral did still retain landed interests in this part of County Dublin (Simington 1945). Archaeological excavation of a mill site on the Griffeen River to the north in the townland of Grange indicated that it was in use for the mid-18th to 19th centuries (Tobin 2004). Along with the development of the Grand Canal—also to the north of the development site—this attests to the encroaching industrialisation of the landscape of south county Dublin during the post-medieval to early modern period. However, it is likely that the development site remained largely in agricultural use until the mid-20th century. Historic mapping suggests that a roadway or trackway (CH008) crossed the site until the mid to late 19th century. This roadway was pre-1750 in origin and could date back to the medieval period (though this is not certain). Cartographic evidence indicates only one building near the site in the mid-19th century. The domestic dwellings to the south of the site all appear to date to the mid to late 20th century.
- Cartographic sources*
- 13.46 Cartographic sources are important in tracing land use patterns within a study area as well as providing important information on the topography and archaeological potential of a region. A number of maps were consulted for these purposes as well as for information regarding unregistered sites considered to be of cultural heritage significance.
- 13.47 *Down Survey Map of Barony of Newcastle (1656-1658):* The approximate location of the site can be identified. The settlement at Milltown to the west is shown as is the castle (tower house) at Grangecastle to the north.
- 13.48 *John Rocque's Map of County Dublin (1756):* The Baldonnel Road can be clearly identified along with the Old Nangor Road to the north. The location of the Proposed Development site appears as undeveloped green fields. An unnamed road to east of and parallel to the north-south section of the Baldonnel Road may correspond to the townland boundary between Ballybane and Aungierstown & Ballybane as shown on later mapping (see below).
- 13.49 *1st Edition Ordnance Survey 6-inch series (1838):* Both the Baldonnel and Old Nangor Roads are shown and the development site is shown within a field located on the north side of the Baldonnel Road. The townland boundary between Ballybane and Aungierstown & Ballybane is demarcated by a doubled field boundary or laneway.

- 13.50 *Ordnance Survey 25-inch series map (1910-11)*: This shows no great changes from the previous 19th century mapping. The development site is shown within a field located on the north side of the Baldonnell Road. However, the townland boundary between Ballybane and Aungierstown & Ballybane is now demarcated by just a single field boundary.
- 13.51 *Ordnance Survey Cassini 6-inch series (1930–40)*: This shows no great changes from the previous 19th and early 20th century mapping. The development site is shown within a field located on the north side of the Baldonnell Road. The townland boundary between Ballybane and Aungierstown & Ballybane is demarcated by a single field boundary.

Toponymy of Townlands

- 13.52 Research into the names (toponymy) of these land units frequently provides information relating to the townland's archaeology, history, folklore, ownership, topography or landuse. Most placenames were anglicised by the time the OS began in the 1830s. However, despite some inaccuracies in translation, the Gaelic, Viking, Anglo-Norman and English origins of place names are generally recognisable.

Table 13.6 Derivation of townland names

Townland	Irish Name	Derivation	Comments
Aungierstown & Ballybane	Baile Áinséir agus An Baile Bán	Baile: townland, town, homestead Bán: white; lea-ground, grassy	References from at least the 16th century
Ballybane	An Baile Bán	Baile: townland, town, homestead Bán: white; lea-ground, grassy	Possible references to townland from 14th century; confirmed references from 16th century onwards
Clutterland	Talamh Chluthair	Talamh: land or ground (of) Clutair: The English surnames <i>le Clutere, Clutere, Clouter</i> are attested in the Middle Ages; this placename probably contains one of these or similar	References from at least the 17th century
Kilbride	Cill Bhríde	Cill: church Brid: personal name; reflects a dedication to St Brigid.	References from at least the 15 th century to the church, but dedication may indicate an earlier foundation.
Kilmactalway	Cill Mhic Thalmhaigh	Cill: church Mac Thalmhaigh: personal name, perhaps indicating a dedication or patron	References from at least the late 12 th century to the church. Probably an early medieval foundation.
Milltown	Baile an Mhuilinn	Baile: townland, town, homestead Muileann: mill	References from at least the 17th century

Recent Excavations

- 13.53 A number of archaeological investigations have been undertaken at adjacent sites (see Appendix 13.2).
- 13.54 The most pertinent investigations, however, have taken place at lands in Ballybane townland that border the present site from north-west to north-east. The geophysical survey and programme of test excavation at the site confirmed the presence of both enclosure sites listed in the RMP (CH001–002), along with two further additional enclosures—one circular and one oval—and two (possibly related) sets of parallel linear ditches (CH004–006) (Stirland 2016).
- 13.55 Full archaeological excavation of two of these sites—CH002 and CH004—was carried out by Rubicon Heritage Services Ltd between December 2017 and June 2018 (Johnston and Hession 2018a; 2018b). No scientific dates are available for any of the site sites as yet, but diagnostic artefacts recovered suggest that the RMP enclosure site (CH002) was a prehistoric enclosure (possibly Middle Bronze Age) that was reused in the early medieval period, while the second enclosure (CH004) was of early medieval date.
- 13.56 The enclosure site CH002 was defined by a ditch (c. 44m diameter) with an entrance causeways at ESE and WSW. The function of the enclosure remains obscure as there was very little evidence to

suggest that it was used for settlement or for funerary practices. The presence of prehistoric—possibly Middle Bronze Age—ceramics suggests that the enclosure was initially constructed for some form of non-settlement related activity sometime in the Bronze Age. This prehistoric enclosure was then reused or repurposed in the early medieval period, possibly in association with the occupation of the adjacent enclosure site (CH004).

- 13.57 The multivallate enclosures site CH004 comprised an inner circular ditch with an outer kidney-shaped ditch, and the arc of a third ditch between them. A dense concentration of archaeological features was noted towards the centre of the site, largely within the inner enclosing ditch, with others between the inner and outer enclosure, and sporadic additional features outside the outer enclosure. A baluster headed pin has been recovered which is provisionally dated to the 10th century suggesting a general early medieval date for the site.
- 13.58 Three further sites (CH001; CH005–006) were the subject of initial investigations by Rubicon Heritage Services in late 2017 and early 2018 but then suspended. Full archaeological excavation of these sites was carried out on behalf of South Dublin County Council in 2019.
- 13.59 Partial excavation of the southmost section of the linear ditch site (CH006) was carried out in 2018 (Nelis 2018). This revealed two roughly parallel ditches, on average 5m apart associated with a number of smaller miscellaneous features. The associated ceramic assemblage suggests a later medieval date for the site.
- 13.60 Archaeological monitoring was carried out by Rubicon Heritage Services within a development site on the south side of the Grange Castle South Access Road (encompassing the locations of the excavated sites CH002 and CH004) (Hession 2020b). Eight features of archaeological significance were identified and recorded consisting of; three pits of uncertain date, a stake-hole, two medieval ditches, a post medieval field drain and the remnants/ gateposts of a post medieval field boundary gate/ entrance. The original townland boundary between Ballybane and Aungierstown/ Ballybane comprising two parallel linear ditches was investigated as part of the monitoring works. Two new archaeological sites—both burnt mounds (CH010–011)—were identified. One of these sites (CH010) was preserved in situ.
- 13.61 The second burnt mound site (CH011) was fully archaeologically excavated (Hession 2020c). This revealed a small deposit of burnt mound material, three pits, three stake-holes, two troughs and one possible well.

Impact Assessment

- 13.62 It is not proposed to consider any impacts on any sites that have been fully archaeological excavated. As such sites will have been fully preserved by record, no further impacts can occur in relation to them.

Characteristic of the Proposed Development

- 13.63 The Proposed Development involves the construction a two storey GIS Substation building (with a gross floor area of 1,307.2sqm) (known as the Aungierstown Substation), two transformers, lighting masts, car parking, associated underground services and roads within a 3.5m high fenced compound and all associated construction and ancillary works. Two proposed underground single circuit 110kV transmission lines will connect the proposed Aungierstown 110kV GIS Substation to the existing 220kV / 110kV Castlebaggot Substation to the immediate north-east. The proposed transmission line covers a distance of approximately 150m within the townlands of Ballybane, and Aungierstown and Ballybane.

Potential impacts of the Proposed Development

Construction Phase

- 13.64 *Direct Impacts:* Most impacts during construction phase are likely to be direct impacts as a result of sub-surface disturbance or construction works. All impacts at this phase are considered to be negative and permanent.
- 13.65 Construction of the two storey GIS Substation building, 2 no. transformer bays, lighting masts, car parking, associated underground services and roads will require the removal of topsoil and localised

deeper ground reduction to accommodate structural foundations and service conduits. However, the entire compound site was already stripped of topsoil during construction of Phase 1 of the Permitted Development. This groundworks programme was the subject of a programme of archaeological monitoring and any sub-surface archaeological features surviving were identified and preserved by record (Hession 2020b; 2020c). Therefore, the construction works within the compound for the proposed sub-station should have no further direct impacts on archaeological features or deposits.

- 13.66 The two underground 110kV transmission lines that will link the proposed substation to the existing 220kV / 110kV Castlebaggot Substation will require removal of topsoil and ground reduction within the cable connection corridor under and to the north of the Grange Castle South Business Park Access Road. This area has not been directly investigated during any of the previous phases of archaeological works. Therefore, there is a generalised potential that unknown sub-surface archaeological features could be present. Such features would be directly impacted by construction groundworks.
- 13.67 *Indirect Impacts:* It is not proposed to consider any impacts on setting for any sites either within the study area during the construction phase, as construction works constitute a short-term alteration to the landscape.

Operational Phase

- 13.68 *Direct Impacts:* There should be no direct impacts on archaeological, architectural or cultural heritage sites at operational phase.
- 13.69 *Indirect Impacts:* Indirect impacts at operation stage would largely occur as a result of impacts on the setting of site (notably visual impacts) and on the integrity and character. No visual or indirect impacts have been identified at operational phase.
- 'Worst case' scenario*
- 13.70 Not applicable in the case of archaeological, architectural or cultural heritage.
- 'Do nothing' scenario*
- 13.71 The 'do-nothing' scenario will have no impact on archaeological, architectural or cultural heritage.

Remedial and Mitigation Measures

- 13.72 The mitigation strategies outlined in this section detail the techniques to be adopted in order to ameliorate the impacts that the Proposed Development may have on features of archaeological, architectural and/or cultural heritage within the study area during both the construction and operation phases of the scheme.
- 13.73 The following proposed mitigation measures are subject to approval by South Dublin County Council and the National Monuments Service, Department of Housing, Local Government and Heritage:
1. A programme of archaeological monitoring of groundworks associated with the cable connection route to the north of the Grange Castle South Business Park Access Road will be carried out. This should be carried out by a suitably qualified archaeologist under license and in accordance with the provisions of the National Monuments Acts 1930-2004.
 2. If archaeological material is encountered, then it will be investigated and fully recorded. However, if significant archaeological material is encountered then the National Monuments Service (DoHLGH) will be notified. Resolution of any such significant material will be determined in consultation with the National Monuments Service (DoHLGH).
 3. No further archaeological works are required in relation to development works within the sub-station compound site on the south side of the Grange Castle South Access Road.
 4. A written report will be prepared detailing the results of all archaeological work undertaken.

Residual Impacts***Construction Phase***

- 13.74 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

- 13.75 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

- 13.76 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

- 13.77 If the Proposed Development were not to proceed, there would be no negative impact on the archaeological, architectural or cultural heritage resource.

Monitoring & Reinstatement

- 13.78 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.

WASTE MANAGEMENT

- 14.1 This chapter deals 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 in 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.
- 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, 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 Appendix 14.1 C&D WMP of the appendix document.
- 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 desktop 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.
- 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.
- 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 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 2020 - 2022.

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 at Duleek, Co. Meath and a second facility at 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 110kV GIS Substation Compound and 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 1.5m below ground level (bgl) but may increase to up to c. 3.5m at utility crossings. The maximum width of each trench is 1.5m, however this may vary depending on ground conditions and existing services.

14.23 The project engineers have estimated that c. 1,050m³ of excavated material will be generated by the trench and a further 11,250m³ by the construction of the proposed substation, of made ground, soils/stones. Suitable soils and stones will be reused on site as backfill in the grassed areas, where possible. However, it is currently envisaged that the 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.

14.24 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.

14.25 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.

14.26 A geotechnical site investigation was conducted at the site in November 2017 and March 2018 by IGSL Limited on behalf of Cyrus One. The ground investigation report shows there was no evidence of subsurface contamination encountered during the site investigation works. This is discussed further in Chapter 7 of this EIA and are set out in Chapter 7 – Appendix 7.2 and 7.3. It is not anticipated that subsurface contamination will be encountered along the proposed services routes.

- 14.27 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.
- 14.28 In addition, soil analysis will also be carried out in accordance with the requirements for acceptance of waste at landfills in accordance with *Council Decision 2003/33/EC, establishing criteria and procedures for the acceptance of waste at landfills pursuant to Article 16 of and Annex II to Directive 1999/31/EC*, commonly known as 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.)
- 14.29 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.
- 14.30 It is expected that wastes generated (other than excavated material and trees/shrubbery) 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 to the south of the Proposed Development where construction works are currently ongoing.
- 14.31 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 Appendix 14.1. Volumes of surplus excavated material are based on estimates by the project engineers.
- 14.32 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.
- 14.33 An outline Planning Stage Construction Management Plan (CMP) has been prepared to accompany the planning application and is include with the application documentation. 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

- 14.34 Once operational, it is anticipated that very small amount of waste will be generated at the proposed GIS substation from ESB networks staff during their inspections and maintenance works.
- 14.35 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

14.36 This section details the potential waste impacts associated with the Proposed Development.

Construction Phase

- 14.37 As detailed in Section 14.21-14.33, the Proposed Development will generate surplus excavated material, as well as waste from the welfare facilities and site office at the site compound.
- 14.38 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.
- 14.39 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.
- 14.40 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.
- 14.41 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.
- 14.42 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.
- 14.43 Where offsite reuse of the wastes generated is not feasible, recycling and/or recovery of the waste will be carried out 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.
- 14.44 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.
- 14.45 Reuse of suitable clean inert excavated material onsite, where practical, will reduce consumption of natural quarry resources.
- 14.46 The potential effect of construction waste generated from the Proposed Development is considered to be **short-term** and **not significant**.

Operational Phase

14.47 No waste will be generated from the operation of the proposed 110kV transmission lines.

- 14.48 Small volumes of waste will be generated at the proposed GIS 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.
- 14.49 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).
- 14.50 The waste materials generated 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.
- 14.51 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.
- 14.52 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.
- 14.53 The potential impact of operational waste generation from the development is considered to be **long-term, negative** and **not significant**.

Do Nothing Scenario

- 14.54 If the Proposed Development was not to proceed there would be no additional construction or operational waste generation.

Remedial and Mitigation Measures

- 14.55 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

- 14.56 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 the C&D WMP enclosed in Appendix 14.1 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.
- 14.57 The project engineers have estimated that 1,050m³ of excavated material will be generated by the trench of the transmission lines and 11,250m³ by the proposed substation. 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.
- 14.58 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.
- 14.59 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 Section 14.24 and detailed in the C&D WMP (Appendix 14.1).
- 14.60 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

- 14.61 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.
- 14.62 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.
- 14.63 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.

14.64 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

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

Construction Phase

14.66 A carefully planned approach to waste management as set out in Sections 14.55 – 14.60 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

14.67 During the operational phase, a structured approach to waste management as set out in Sections 14.61 – 14.64 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

14.68 Adherence to the mitigation measures outlined in Sections 14.55 - 14.64 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**.

Cumulative Impact

14.69 The anticipated cumulative effect of the Proposed Development with any/all relevant other planned developments as outlined in Chapter 2 or permitted developments as outlined in Chapter 3 are discussed in below for construction and operational phases respectively. This consideration has included the data centre development (Permitted under SDCC Reg. Ref. SD18A/0134 / An Bord Pleanála Ref. ABP-302813-18).

14.70 The construction of the Proposed Development and other surrounding proposed and permitted developments require site clearance, excavations and levelling which will generate a requirement for soil removal and/or import. The developments cumulatively require a net import of soil which is readily available. Provided mitigation measures set out in the planning permissions / EIA Reports for these developments are implemented during construction of the Proposed Development, the cumulative impact will be **short-term** and **imperceptible**.

14.71 The waste quantities to be generated from the operation of the Proposed Developments within the overall landholding are anticipated to be relatively small.

14.72 The Proposed Development and 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 relating to waste management will be **long-term** and **imperceptible**.

MATERIAL ASSETS

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 110kV transmission lines to the Castlebaggot substation to the south of the Grange Castle South Business Park access road, is subject to a 999 year lease to Cyrus One from SDCC;

- The rest of the 110kV transmission lines continues through SDCC lands outside the Permitted Development site, under the Grange Castle South Business Park access road and along a wayleave to the boundary of the Castlebaggot 110kV / 220kV substation; and
- The lands for the remaining portion of the Proposed Development site are within the existing Castlebaggot substation and are owned by the TAO (ESB Networks).

- 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. SD18A/0134). The construction of the Permitted Development commenced in the summer of 2019.
- 15.11 The main access to the GIS substation compound will be via and directly off the Grange Castle South Business Park access road. A secondary access to the compound is via the main access of the Permitted Development that provides vehicular access to the client control room and transformers.
- 15.12 The Permitted Development site will be fully secured with a 3.5m 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

- 15.13 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

- 15.14 The availability of power is a key consideration in site selection for the Permitted Development. One of the key reasons the site was chosen for the Permitted Development was the relative proximity to the existing Castlebaggot substation. 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 temporary ESB substation to the west of the proposed GIS substation and described in more detail within Chapter 2 of this EIA Report (see paragraph 2.104).

Telecommunications

- 15.15 A fibre optic cable distribution network is being installed within the site of the Permitted Development. 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

- 15.16 A Site Specific Flood Risk Assessment by Pinnacle Consulting Engineers forms a stand- alone report to this EIA Report and reviews the existing, permitted and proposed surface water environment.
- 15.17 The surface water drainage infrastructure for the Permitted Development was designed to accommodate surface water drainage from the entire site (SDCC Ref. SD18A/0134). The new form of the substation will require additional attenuation. The Proposed Development will connect via a new connection to the immediate north to surface water pipe network along the Grange Castle South Business Park access road. Storm water from the substation will be drained into an on-site reticulation system. The outflow from this system will be discharged directly into Stormtech, or similar system, located to the north-west of the substation compound. Prior to discharge into the mains network, the run-off will be directed through petrol interceptors or similar.

15.18 The proposed and permitted Surface Water Drainage layout relating to the proposed substation part of the Proposed Development site is indicated on Drawing No. P200401-200 Rev. D that forms part of the drawing package by Pinnacle Consulting Engineers submitted with this application. Further detail design is outlined within the Engineering Planning Report by Pinnacle Consulting Engineers.

Foul drainage infrastructure

15.19 The Proposed Development will connect via a 225mm gravity foul sewer into the existing 225mm private foul sewer spur to the north of the site within the Business Park.

15.20 A pre-connection enquiry (PCE) form was submitted to Irish Water (IW) as part of the Permitted Development application (Reg. Ref. SD18A/0134) which as well as addressing the water demand for the Permitted Development also addressed water demand for the Proposed Development. IW provided a Connection Offer for the development on the 5th September 2019 (IW Reference Number: Reference No CDS1900460401).

15.21 As detailed in the *Engineering Planning Report*, prepared by Pinnacle Consulting Engineers, the estimated peak daily foul water flow for the Proposed Development has been determined by Pinnacle to be 0.018 litre per second which represents a negligible volume in terms of the volume permitted by IW for the entire landholding.

15.22 Welfare facilities (canteen, toilets etc.) are available within the construction compound for the construction of the Permitted Development and it is proposed that can be utilised for the c. 15 – 30 staff required for the construction phase of the Proposed Development.

15.23 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

15.24 The water demand for the Proposed Development will be minimal. The Proposed Development will connect to an existing 200mm water main spur located adjacent to the Grange Castle South Business Park Access Road. The Proposed Development will be served by fire hydrants connected to the water main network. The proposed Water Supply Network is indicated on Drawing no. P200401-200 Rev. D prepared by Pinnacle Consulting Engineers and included in the planning documentation pack as part of the Proposed Development planning application documentation.

15.25 A pre-connection enquiry (PCE) form was submitted to Irish Water (IW) as part of the Permitted Development application (Reg. Ref. SD18A/0134) which as well as addressing the water demand for the Permitted Development also addressed water demand for the Proposed Development. IW provided a Connection Offer for the development on the 5th September 2019 (IW Reference Number: Reference No CDS1900460401).

15.26 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

15.27 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 the Permitted Development will be utilised for the Proposed Development. The power requirements for the construction phase will be relatively minor.

- 15.28 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

- 15.29 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 Development will be extended to the GIS substation. The proposed 110kV transmission lines 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

- 15.30 The route of the 110kV transmission line to the Castlebaggot 110kV / 220kV substation traverses underneath two culverts as well as under various other infrastructure. There will be a requirement to excavate and hand dig below existing utilities and culverts to the required depth. The implementation of construction mitigation measures detailed in Chapter 2 will ensure that there is no predicted impact on the culvert or infrastructure.
- 15.31 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.
- 15.32 Welfare facilities (canteens, toilets etc.) will be available within the construction compound for the construction of the Permitted Development 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

- 15.33 The Proposed Development will supply the permanent power supply to the adjacent data centre development.

Telecommunications

- 15.34 There is sufficient capacity available in the network to accommodate the Proposed Development.

Surface Water and Foul Drainage Infrastructure and Water Supply

- 15.35 Full details of the surface water infrastructure of the Proposed Development are provided within the Engineering Planning Report, prepared by Pinnacle Consulting Engineers that accompanies the application for the Proposed Development. The drainage design 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 0.5 l/s/ via the attenuation system on site, to the existing storm water system to the north along the Grange Castle South Business Park Access Road.
- 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 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. Two ESB maintenance staff will carry out a routine inspection of the 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 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 8 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 220kV/110kV substation 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 water main. 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 220kV/110kV substation 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 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 by hand and 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.
- 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 will include, interceptors, attenuation measures and by restricting the ultimate discharge into the local network. As such, there is no potential impacts on the surface water infrastructure.
- 15.48 The route of the 110kV transmission line to the Castlebaggot substation traverses under an existing culvert in two locations as well as crossing under various other transmission lines and similar infrastructure.
- 15.49 There will be a requirement to excavate and hand dig below existing utilities and culverts to the required depth. Chapter 7 and 8 addresses the impacts associated with this transmission lines. There are no predicted impacts on the culverted stream. There are no potential impacts associated with surface water infrastructure for the Proposed Development for the construction phase.
- 15.50 The potential impact associated with surface water for the construction phase is **short-term, neutral and imperceptible**.

Foul drainage infrastructure

- 15.51 Welfare facilities (canteens, toilets etc.) will be available within the construction compound for the permitted development on the site approved under Reg. Ref. SD18A/0134 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 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.
- 15.52 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

- 15.53 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. SD18A/0134 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.
- 15.54 The potential impact associated with water supply for the construction phase is **short-term, neutral and imperceptible**.

Operational phase*Power and electrical supply*

- 15.55 The proposed 110kV GIS substation, and 110kV transmission lines are designed to support power demand for the Permitted Development. 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.
- 15.56 There are **no potential impacts** associated with power and electrical supply for the Proposed Development for the operational phase.

Telecommunications

- 15.57 There are **no potential impacts** associated with telecommunications for the Proposed Development for the operational phase as outlined in Chapter 2.

Surface water

- 15.58 It is proposed to collect the surface water runoff from the Proposed Development and discharge an attenuated flow via a Stormtech attenuation system into the storm water sewer to the north that has capacity for the Proposed Development. The underground single circuit 110kV transmission lines from the proposed substation to the existing Castlebaggot 220kV / 110kV substation do not require any surface water drainage infrastructure as they will be underground.
- 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 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 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. SD18A/0134) which as well as addressing the water demand for the Permitted Development also addressed water demand for the Proposed Development. IW provided a Connection Offer for the development on the 5th September 2019 (IW Reference Number: Reference No CDS1900460401).
- 15.62 The underground single circuit 110kV transmission lines from the proposed substation to the existing Castlebaggot 220kV / 110kV substation 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 by hand and 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.

Telecommunications

- 15.67 The telecommunications will be extended from the Permitted Development granted under Reg. Ref. SD18A/0134 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 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 temporary ESB substation.
- 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 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 Telecommunications*

- 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 can easily be accommodated within the Business Park infrastructure providing such services. 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.

Cumulative impacts

- 15.82 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 within the Business Park.
- 15.83 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 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.
- 15.84 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.
- 15.85 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.

INTERACTIONS

- 16.1 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.
- 16.2 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.
- 16.3 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 – Positive Impacts

- 16.4 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

- 16.5 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. 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

- 16.6 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

- 16.7 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. SD18A/0134). 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

- 16.8 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 2 (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

- 16.9 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

- 16.10 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

- 16.11 As detailed in Chapter 14 (Waste Management), c. 12,300m³ 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

- 16.12 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

- 16.13 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**.
- 16.14 The 110kV transmission lines will cross under a culvert that will be undertaken by hand digging. The implementation of mitigation measures will ensure the impact on the stream is **imperceptible** and **neutral**.

Biodiversity

- 16.15 Surface water from the Proposed Development substation will drain into the Stormtech attenuation system and into the storm water sewer to the north of the site. The attenuation system is adequately designed and sized to accommodate surface water run-off from the Proposed Development. The effect will be **long-term, imperceptible** and **neutral**.
- 16.16 There is no formal designation on the Proposed Development lands and the development area may be considered of Low Local Ecological Value. Designated sites that site 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

- 16.17 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*

- 16.18 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

- 16.19 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

- 16.20 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*

- 16.21 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*

- 16.22 The predicted impact of the Proposed Development on the landscape is described in Chapter 11. The Proposed Development is well-sited and was considered as part of the design and planning of the Permitted Development. The Permitted Development includes architectural and permitted landscape proposals, which whilst reduced to the north and east of the proposed substation due to the operators requirements, will ensure the Proposed Development is integrated into its setting from the public domain from the west and south, 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**.

Material Assets on:*Population and Human Health*

- 16.23 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 measures 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

- 16.24 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 Chapter 2 and 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

- 16.25 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*

- 16.26 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*

- 16.27 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*

- 16.28 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.

Biodiversity

- 16.29 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 to its north and east, will substantially maintain the permitted habitat for flora and fauna and therefore the effect on biodiversity will be **long-term, slight** and **negative**.

Summary

- 16.30 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 16.1 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 Mgmt	Material assets
Planning and alternatives		✓	x	x	x	x	x	x	x	x	x	x
Population and human health			✓	✓	✓	✓	✓	✓	x	x	x	✓
Biodiversity				✓	✓	✓	✓	✓	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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