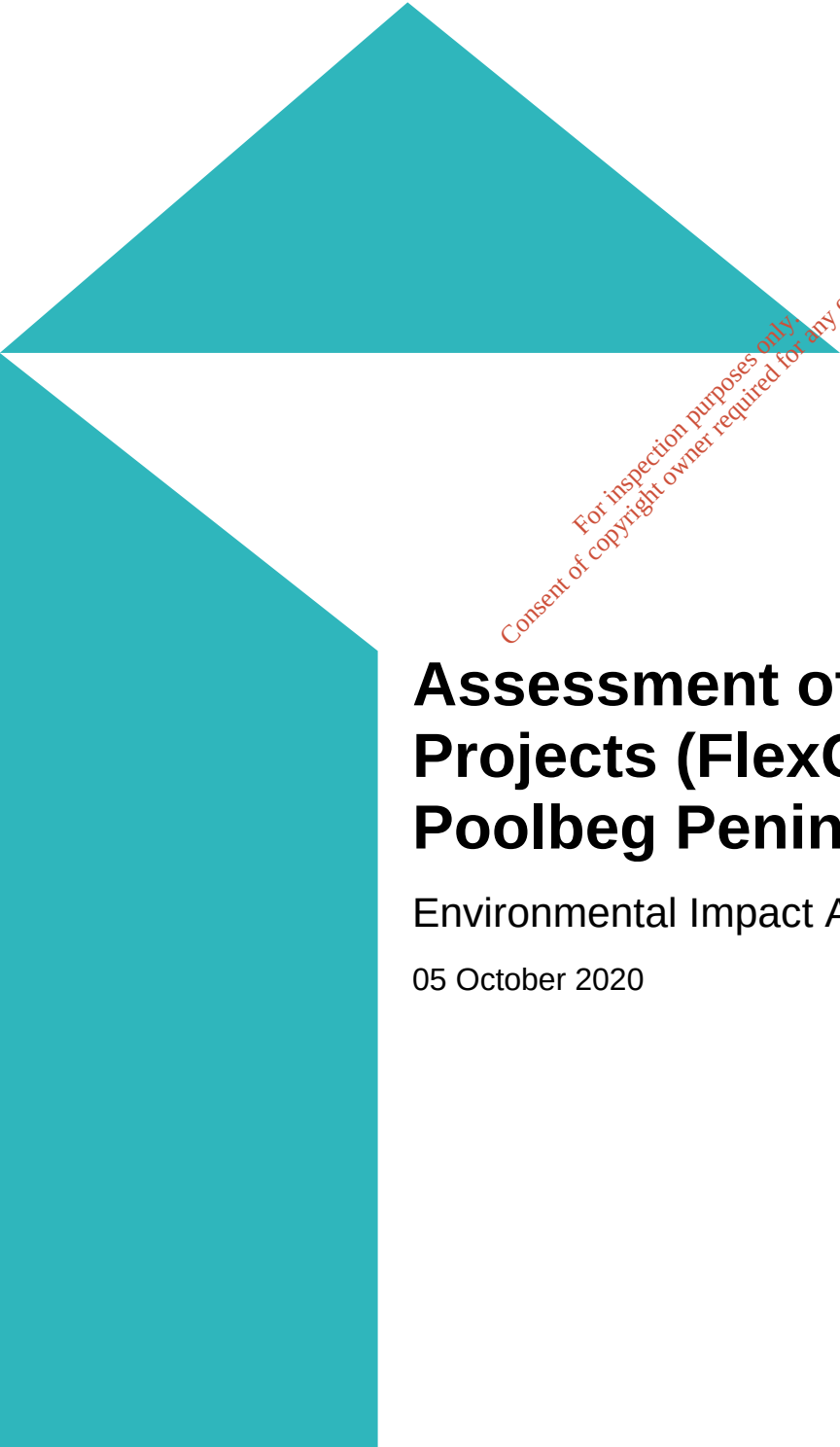




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Assessment of Four ESB Projects (FlexGen & BESS), Poolbeg Peninsula

Environmental Impact Assessment Report (EIAR)

05 October 2020

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Assessment of Four ESB Projects (FlexGen & BESS), Poolbeg Peninsula

Environmental Impact Assessment Report (EIAR)

05 October 2020

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Issue and Revision Record

Revision	Date	Originator	Checker	Approver	Description
A	10/08/20	Various			Issued for Client Comment
B	09/09/20	Various	C. Lew	E. O'Mullane	Final Draft
C	05/10/20	Various	C. Lew	E. O'Mullane	For Issue

Document reference: 229100662 | 1 | C

Information class: Standard

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1 Introduction

The Electricity Supply Board (ESB) is proposing to develop two 75MWe (megawatts electrical) flexible thermal generation (FlexGen) and two (one 75MW and one 30MW) battery energy storage systems (BESS) on the Poolbeg Peninsula, Dublin. Figure 1.1 illustrates the geographical location of the four proposed developments, within their wider industrial setting on the Poolbeg Peninsula. These facilities have been proposed to support the wider move towards generating electricity using renewable energy sources.

The purpose of the FlexGen units is to provide additional generating capacity during periods of high demand or when weather conditions means renewable sources cannot meet demand. The BESS will store surplus energy generated during low demand periods and release this when demand is greater. Both the FlexGen and BESS are designed to come on stream quickly as demand on the grid changes.

Each of these developments are subject to separate planning applications. Each are independent of the other and can be built and commissioned in isolation. Following consultation with Dublin City Council and given the proximity of the four projects and their location within the environment of Dublin Bay a combined voluntary Environmental Impact Assessment Report (EIAR) for the combined projects has been prepared.

To make references within this report simpler the four components are described as follows:

- Poolbeg FlexGen
- Poolbeg BESS
- Ringsend FlexGen
- South Wall BESS.

Natural gas supplied from the Gas Networks Ireland (GNI) national grid will be the primary fuel for the Poolbeg FlexGen and the Ringsend FlexGen plants. There is currently a GNI dedicated Above Ground Installation (AGI) gas compound within the Poolbeg Generating station complex. The proposed Poolbeg FlexGen plant will receive gas from the GNI plant. For the Ringsend FlexGen site the incoming gas supply will be from the Bord Gais facility adjacent to the Ringsend FlexGen site.

In order to comply with Commission for Regulation for Utilities requirements, low sulphur diesel oil will be required as a backup fuel. For the Poolbeg FlexGen plant, diesel will be supplied from existing Poolbeg CCGT tanks. There will be a diesel tank within the facility which will provide backup fuel to operate FlexGen (c.182m³) on the Poolbeg FlexGen site. For the Ringsend FlexGen facility, diesel will be supplied from the existing Dublin Bay Power Station tanks or the existing NORA tanks situated to the east of Ringsend FlexGen. There will be an on-site back up fuel tank to operate Ringsend FlexGen (c.477m³).

The proposed Ringsend FlexGen plant and the South Wall BESS will be connected via a combined underground connection to the existing Irishtown 220 kV substation. Similarly, the proposed Poolbeg FlexGen plant and Poolbeg BESS will be connected via a combined underground connection to the existing Poolbeg 220 kV substation.

1.1 Applicant and Landowner

The applicant seeking to develop the facilities described in this EIAR is the ESB. ESB was established in 1927 as a statutory corporation in the Republic of Ireland under the Electricity (Supply) Act 1927. ESB operates across the electricity market: from generation, through transmission and distribution to supply.

1.2 Applications for Approval

Four separate planning applications are being made directly to Dublin City Council under *Planning and Development Act 2000*, as amended, and the *Planning and Development Regulations 2001*, as amended. The four applications are for the following and each application will include all associated ancillary works associated with each proposed development:

- Poolbeg FlexGen - 75MWe (megawatts electrical) of flexible thermal generation
- Ringsend FlexGen - 75MWe (megawatts electrical) of flexible thermal generation
- Poolbeg BESS - 75MW battery energy storage system (BESS)
- South Wall BESS – 30MW battery energy storage system (BESS)

The boundaries for the four proposed developments and the temporary associated construction corridors, access routes and lay down areas are shown in Figure 1.1. The footprints of the four developments are listed in section Chapter 5 – Description of the Proposed Developments.

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Figure 1.1: Poolbeg Peninsula



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1.3 Statutory consents overview

S182A(1) – Strategic Infrastructure Development

Under the strategic infrastructure provisions of the 2000 Act, as amended, electricity transmission development referred to in section 182A (1) is strategic infrastructure development.

In relation to electricity transmission, transmission is defined in the 2000 Act as being construed in accordance with section 2(1) of the Electricity Regulation Act 1999 but, for the purpose of the Act, the foregoing expression, in relation to electricity, will 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.

An Bord Pleanála has confirmed (ref ABP-307080-20 and Ref ABP-307081-20) that the relevant parts of the plant, equipment and cabling associated with the connection of the proposed developments to the national transmission grid are not considered to be Strategic Infrastructure Development, and therefore these elements of the developments are included in the planning applications made to Dublin City Council as the planning authority. All grid connections are assessed in this EIAR.

1.3.1 Industrial Emissions Licencing

Both Poolbeg FlexGen and Ringsend FlexGen plants will require an Industrial Emissions (IE) Licence from the Environmental Protection Agency (EPA) as both operations fall into the categories of industrial activity referred to in the First Schedule of the Environmental Protection Agency Act 1992, as amended, i.e.;

‘Combustion of fuels in installations with a total rated thermal input of 50 MW or more’.

The proposed Poolbeg FlexGen development is located within the boundary of an existing IE licenced facility: the Poolbeg Generating Station (EPA registration no. P0577-03). Should the application for planning consent be successful, an application to the EPA for a licence review of this existing licence will be progressed to incorporate Poolbeg FlexGen and Poolbeg BESS within its boundary.

The proposed Ringsend FlexGen and South Wall BESS sites are not located within an existing IE licenced site. Should the application for planning consent be successful, an application to the EPA for an IE licence for Ringsend FlexGen will be progressed.

The proposed BESS is not a scheduled activity, as outlined in the EPA Acts 1992 to 2013.

1.3.2 Greenhouse Gas Permits

Poolbeg Generating Station operates in accordance with the European Union's Emission Trading Scheme (ETS) and associated Greenhouse Gas Permit (IE-GHG160-10425-2) as administered by the EPA. Should the application for planning consent be successful, a review of this permit or a new permit application will be required for Poolbeg FlexGen.

A Greenhouse Gas Permit will be required for the proposed Ringsend FlexGen and will be progressed should the application for planning consent be successful.

There is no requirement for the BESS developments to obtain Greenhouse Gas Permits.

1.3.3 CRU Authorisations and Licences

The Electricity Regulation Act, 1999 provided for the establishment of the Commission for Energy Regulation (CER), renamed to the Commission for Regulation of Utilities (CRU), and the necessary powers to licence and regulate the supply, distribution, transmission and supply of electricity in Ireland.

In order to construct FlexGen and BESS developments, it is necessary to have an Authorisation to Construct from the CRU. Similarly, it is necessary to have a Licence to Generate in order to generate electricity. It is the CRU's role to grant, monitor the performance of, modify, revoke and enforce these Authorisations and Licences.

Should the applications for planning consent be successful, ESB will apply to the CRU for the necessary authorisations and licences.

1.3.4 Screening for EIA

An EIAR is required to accompany a planning application for development of a class set out in Schedule 5 of the Planning and Development Regulations 2001 (PDR), as amended which equals or exceeds, as the case may be, a limit, quantity or threshold set out for that class of development.

In determining the requirement for EIA, the PDR differentiates between the projects that always require EIA and those for which an EIA may be required. These projects are listed in Schedule 5 Part 1 and Part 2 of the PDR.

Schedule 5, Part 1 Projects, are projects which are considered as having significant effects on the environment and require a mandatory EIA.

Schedule 5, Part 2 Projects, are in general those not included in Part 1 which may be considered to have a lesser environmental impact. This is done by the "screening procedure", which determines the effects of projects based on thresholds/criteria or a case by case examination. If a project exceeds the thresholds as indicated the a mandatory EIAR is required.

If a project of 'of a type' of project identified in either Part 1 or Part 2 of the PDR but falls below the specified thresholds, then it should also be subject to a 'sub-threshold' EIA Screening in accordance with the requirements of Schedule 7A of the PDR.

In the context of the above requirements, it should be noted Schedule 5 Part 1(2)(A) requires a mandatory EIA for the following project type:

A thermal power station or other combustion installation with a heat output of 300 megawatts or more; and

Whilst each of the FlexGen developments fall within a class where EIA could be a requirement it falls well below the relevant threshold where EIA is mandatory, as outlined in Schedule 5 of the of the Planning and Development Regulations 2000, as amended, i.e. development for which mandatory Environmental Impact Assessment (EIA) is required.

BESS developments do not involve the generation of electricity; its purpose is similar to a regular domestic rechargeable battery i.e. to store electricity. Therefore, it does not fall within Schedule 5 of the Planning and Development Regulations 2000, as amended, i.e. development for which mandatory Environmental Impact Assessment (EIA) is required.

Each of the four developments are distinct and stand alone, however all four are located within the Poolbeg Peninsula. Following consultation with Dublin City Council, a voluntary EIAR has been prepared to assess each of the four developments and accompanies each of the four planning applications.

1.3.5 Appropriate Assessment

A single Natura Impact Statement (NIS) has been completed for the four proposed developments within the Poolbeg Peninsula. The Natura Impact Statement (NIS) accompanies each planning application for approval.

1.4 Locations of the Proposed Developments

The developments are proposed at four locations within the Poolbeg Peninsula to the south of Dublin docks (Figure 1.1) in Dublin Bay.

The Poolbeg peninsula is generally developed with a variety of industrial activities such as power generation, oil storage, wastewater treatment and various businesses associated with the docks to the north.

Dublin Bay forms a C shaped inlet of the Irish Sea on the east coast of Ireland. The mouth is approximately 10km wide, stretching from Howth Head in the north to Dalkey Point in the south. Dublin Bay features relatively productive and shallow waters with numerous sandbanks and rocky outcrops, creating a habitat for a wide range of marine flora and fauna. There are several Natura 2000 sites, both Special Protection Areas (SPAs) and Special Areas of Conservation (SACs) in Dublin Bay:

- North Dublin Bay SAC and Marine Protected Area (MPA);
- North Bull Island SPA;
- South Dublin Bay SAC
- South Dublin Bay and River Tolka Estuary SPA
- Dalkey Islands SPA
- Howth Head SAC; and
- Howth Head Coast SPA.

All of these sites combine to form the Dublin Bay Biosphere recognising the environmental and cultural value of the Bay area.

1.5 Need for the Projects

Ireland's key target under the European Union (EU) Renewable Energy Directive (2009/28/EC) is for 16% of the country's total energy consumption to come from renewable energy sources by 2020. In order to achieve this 40 % of the electricity is required to come from renewable sources on the Island of Ireland by 2020. In response to this target EirGrid began a multi-year programme, "Delivering a Secure, Sustainable Electricity System", known as the DS3 Programme. The aim of the DS3 Programme is to meet the challenges of operating the electricity system in a secure manner while achieving these 2020 renewable electricity targets. This programme is designed to ensure that the power system can securely operate with increasing amounts of variable non-synchronous renewable generation over the coming years.

Achieving this level of renewable integration on a synchronous system is unprecedented and presents significant challenges for the real time operation of the power system.

The Climate Action Plan 2019 sets out a 'roadmap' comprised of 183 no. actions to achieve net zero carbon energy system by 2050, and in the process, create a resilient, vibrant and sustainable country. The targets and objectives established by the Europe 2030 Climate and Energy Framework and the Paris Agreement on climate change requires a transformational shift in the Irish economy and society in order facilitate climate resilience and sustainable development. As noted previously, Ireland will miss the target set for the period 2013 to 2020.

The Draft 2030 National Energy and Climate Plan envisages a target of at least 55% renewable energy in electricity by 2030. As of June 2019, the Irish government has confirmed that Ireland will now aim for at least 70% of Ireland's electricity supply to be generated from renewables by 2030 with no generation from peat and coal.

In parallel, the ESB Brighter Future Strategy aims that by 2030 ESB will cease generating power from burning coal and peat. Accordingly, Irish electricity demands are gradually expected to be met by increasing levels of intermittent renewables. This increase in intermittent renewables creates a demand for increased flexibility from the rest of the national generation fleet.

EirGrid Group's East Coast Generation Opportunity Assessment (ECGOA), published in February 2019, assessed the potential locations for new capacity generation along the eastern coast. The approach advocated in the ECGOA is to locate new power sources close to the growing demand.

Dublin City area opportunities are identified as either Finglas or Poolbeg. Poolbeg benefits from five 220 kV circuits and two 220/110 kV transformers. Poolbeg also has an interbus reactor which helps to facilitate the splitting of the Dublin 220 kV network into North and South transmission network.

FlexGen and BESS developments are well suited to providing this flexibility in a cost-effective manner. The ESB proposal to establish two 75MW FlexGen and two (one 75MW and one 30MW) BESS within this area, will complement the increasing development of electricity generation from renewable sources in Ireland.

1.6 Preparation of this EIAR

1.6.1 Structure of this Report

A standalone Non-Technical Summary and Natura Impact Statement (NIS) have also been produced in accordance with the requirements of the *EIA Directive (2014/52/EU)*, *Habitats Directive 92/43/EEC* (European Commission, 2001) and the *European Communities (Birds and Natural Habitats) Regulations 2011*.

The Structure of this EIAR is presented in Table 1.1.

This EIAR has been prepared in accordance with *EIA Directive 2014/52/EU* (the EIA Directive) on the assessment of the effect of certain public and private projects on the environment and Environmental Protection Agency's "*Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports*" (2017).

Table 1.1: Structure of this Report

Chapter	Title
1	Introduction
2	Assessment of Alternatives
3	EIA Report Methodology
4	Need for the Development
5	Description of the Proposed Developments
6	Planning Policy Considerations
7	Biodiversity
8	Land, Soils and Ground Conditions
9	Water
10	Landscape and Visual
11	Noise and Vibration
12	Cultural Heritage
13	Air Quality and Climate
14	Waste
15	Traffic, Transportation and Material Assets
16	Population and Human Health
17	Interactions of the Foregoing
18	Summary of Mitigation and Monitoring

1.6.2 Competency of EIA Report Production Team

Mott MacDonald is a multidisciplinary consultancy with over 20 years' experience of undertaking complex and challenging environmental impact assessments and of writing environmental impact assessment reports for a wide range of projects. These include some of the world's largest infrastructure, engineering and development projects. Mott MacDonald maintains high professional standards amongst staff both individually and across technical areas of Practice.

Mott MacDonald is a corporate member of the Institute of Environmental Management and Assessment and holds its EIA Quality Mark. The Quality Mark Scheme allows organisations that lead the co-ordination of statutory EIAs to make a commitment to excellence in their EIA activities and have this commitment independently reviewed. This Quality Mark Scheme is a clear indication that that Mott MacDonald can fully demonstrate the requirements for a 'competent expert'.

Individually Mott MacDonald's technical staff are subject to annual performance reviews which evaluate their Continued Professional Development. As a business Mott MacDonald maintains technical "Practices" which are internal professional networks that span organisational and geographical boundaries. These help to maintain high professional standards across technical disciplines as well as facilitating contribution to the wider development of the Environmental Consulting industry.

The specialist contributors to the EIAR and their competencies are summarised in Table 1.2.

Table 1.2: Specialist Contributors

Specialist Contributors	Company	EIA Topic	Summary of Qualifications
Eoin O' Mullane	Mott MacDonald	Project Manager	Eoin is a Senior Project Manager and Chartered Engineer with a BEng in Mechanical & Manufacturing Engineering. Eoin has approximately 18 years of experience in the areas of quality, design, engineering management and project management in the energy and construction sectors in both Ireland and Canada.
Clive Williams	Mott MacDonald	Geology and Soils Water Waste	27 years' environmental consultancy experience. Chartered Geologist, Qualified Person under CL: AIRE Definition of Waste CoP
Rita Mansfield	Mott MacDonald	Biodiversity	Rita is a Senior Ecologist with a BSc in Applied Ecology and has approximately 16 years' experience in environmental impact assessment, planning applications (conventional and strategic infrastructure development), climate adaptation, Appropriate Assessment, foreshore licensing, Water Framework Directive, integrated catchment management, and stakeholder engagement.
Andrew Monk-Steel	Mott MacDonald	Noise and Vibration	Andrew is a Chartered Engineer with an MSc Automotive Dynamics, Noise and Vibration. Andrew has approximately 20 years of experience in the field of noise and vibration within the automotive and rail industries and the assessment of the environmental noise and vibration impacts particularly regarding transportation, industrial and power and energy projects.
Marguerite Murphy	Mott MacDonald	Traffic and Transportation	Marguerite is a Chartered Engineer with an MSc in Civil Engineering, with approximately 20 years' experience. Marguerite has experience in Experience in EIS/EIA, route selection, road design, contract document preparation and supervision of construction projects. Experience in traffic modelling, traffic impact assessments and road safety auditing
Dr. Edward Porter.	AWN Consulting Ltd	Air Quality and Climate	Dr. Edward Porter of AWN Consulting Ltd. Edward is a Director of the Air Quality section of AWN Consulting with over 27 years of experience in assessing air quality issues for a wide range of clients. He holds a BSc (Hons) in Chemistry from University of Sussex and has completed an PhD in Air Quality in UCD. He specialises in the fields of air dispersion modelling, ambient air monitoring and emission inventory. He is a Charter Chemist (C Chem MRSC) and a Full Member of the Institute of Air Quality Management (MIAQM)
Jenny Timothy	Mott MacDonald	Cultural Heritage	Jenny is the Team Leader Heritage and has a BA, MScCHE (Conservation of the Built Environment). She has 17 years' experience working for Chichester,

Specialist Contributors	Company	EIA Topic	Summary of Qualifications
			Daventry, Kettering and Leicester City Councils, and Mott MacDonald since 2015.
Richard Barker	MacroWorks	Landscape & Visual	Richard is the Principle Landscape Architect at MacroWorks. He holds a master's in landscape architecture and has approximately 14 years' experience Ireland and has considerable experience in the fields of both Landscape and Visual Impact Assessment (LVIA) and landscape design, covering all stages from project feasibility through to construction.
Rob Goodbody		Built Heritage	Rob is an Historic building consultant since 2003 previously a Planner with local authorities in London and Dublin, 1974 to 2003. Rob's Specialties include: Planning consultant, Building recording, Building conservation assessments, Architectural historian, Architectural Conservation Areas, Environmental Impact Assessment - built heritage, Bridges – heritage, Local history, Building history, Dublin history, Dun Laoghaire history and Irish Quaker history
Maira Lewis	AWN Consulting Ltd	COMAH	Dr. Maira Lewis is a Senior Consultant with AWN. She has a BSc (Hons) in Chemistry from the University of Glasgow, a MSc in Process Engineering and a PhD in Chemical Engineering from the Queens University of Belfast. Maira has over 7 years' experience in providing consultancy services to the operators of lower and upper tier Seveso III establishments including preparation of land use planning assessments of individual and societal risk for development proposals in the vicinity of Seveso establishments, firewater risk assessments, preparation and submission of notification documents, preparation of Explosion Protection Documents, preparation of COMAH Safety Reports, preparation of internal emergency plans, consequence modelling and quantitative risk assessment.

1.6.3 Difficulties Encountered

There were no significant difficulties encountered in the preparation of the EIAR.

2 Assessment of Alternatives

2.1 Introduction

This chapter provides an analysis of alternatives which have been considered as part of the four developments in terms of the following;

- Do - Nothing Scenario;
- Alternative Technologies;
- Alternative Locations;
- Alternative Layouts; and
- Alternative Mitigations Measures.

2.2 Do – Nothing Scenario

The East Coast Generation Opportunity Assessment (EirGrid, 2018) identified a steady increase in demand for power within the Greater Dublin Area. The DS3 programme which was developed by EirGrid in response to the binding European and national energy consumption targets is designed to ensure that the power system can meet future demand, achieve Ireland's renewable energy targets and ensure that the power system can operate securely with increasing amounts of variable non-synchronous renewable generation in the future. This increase in intermittent renewables creates a demand for increased flexibility from the rest of the national generation fleet.

. In the case of the proposed FlexGen plants the likely consequence of the do-nothing scenario could include power shortages during periods of insufficient renewable generation to meet the demand.

The purpose of the BESS units is to store surplus generated power and make it available to the grid during periods of increased demand. If these units are not built the effect will be similar to the FlexGens in that the ability of the remaining generation infrastructure to cope with variations in demand and possible reductions in supply will be compromised.

In the absence of the proposed FlexGen and BESS or similar energy generation and storage then there would be:

- Less integration of renewable technologies onto the Irish Grid which is one of the key strategic European and national objectives for the transition to a low carbon economy; and
- The decarbonisation of the power generation portfolio would slow across Ireland, and potentially result in extending the operation of fossil fuel power plants scheduled for closure.

2.2.1 Poolbeg FlexGen

In the event of the do-nothing scenario the proposed site would remain an undeveloped open area brown field site. The Poolbeg Generating Station would continue to operate under the existing licence (EPA registration no. P0577-03). There would be no additional emissions, and no requirement for the licence review process for this activity. ESB have identified this site as being strategic for electricity generation due to its proximity to grid and gas networks as well as

being close to the electricity load centre of Dublin city. If this project does not go ahead ESB would most likely look to consider options for the landholding in that context.

2.2.2 Poolbeg BESS

In the event of the do-nothing scenario, the proposed site would remain a brownfield site. These redundant buildings would remain on site as there would be no requirement for demolition.

ESB have identified this site as being strategic for electricity generation due to its proximity to grid as well as being close to the electricity load centre of Dublin city. If this project does not go ahead ESB would most likely look to consider options for the landholding in that context.

2.2.3 Ringsend FlexGen

In the event of the do-nothing scenario the proposed site would remain an open area brown field site. This site was originally granted planning permission (reg ref. 3373/18) for the BESS development so this site is considered in principle suitable for an energy use. There would be no emissions from this site relating to FlexGen, and there would be no requirement for an industrial emissions licence for this purpose.

ESB have identified this site as being strategic for electricity generation due to its proximity to grid and gas networks as well as being close to the electricity load centre of Dublin city. If this project does not go ahead ESB would most likely look to consider options for the landholding in that context.

2.2.4 South Wall BESS

In the event of the do-nothing scenario the proposed site would remain an open area brown field site.

ESB have identified this site as being strategic for electricity generation due to its proximity to grid as well as being close to the electricity load centre of Dublin city. If this project does not go ahead ESB would most likely look to consider options for the landholding in that context.

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2.3 Alternative Technologies

2.3.1 Technology types

EirGrid Group is the licensed electricity Transmission System Operator and Market Operator across the island of Ireland. Under its "Delivering a Secure, Sustainable Electricity System", known as the DS3 Programme, it aims to provide safe, secure and sustainable delivery of electricity generation in line with the EU Directive renewable energy targets. In parallel to DS3, under ESB's Brighter Future Strategy, the "Dimensions to a Solution" report was published and states that the future of the Irish electricity system will be provided by a combination of gas generation, carbon capture systems and biomass. Several alternative gas technologies were considered for the proposed development.

2.3.1.1 Combustion Technologies

Combustion technologies available to provide the performance requirement of a rapid response peaking plant include reciprocating (gas) engines or gas turbines. The CRU in Ireland require all generating units with a generating capacity greater than 10MWs to have a back-up fuel source which is typically a fuel oil (diesel).

Reciprocating engines are a mature technology with high reliability. Reciprocating gas engines are typically spark ignition engines (Otto cycle) or compression ignition, utilising a spark plug or high compression to ignite a pre-mixed air fuel mixture introduced into the cylinder. As the burning mixture of fuel and air expands, a piston is pushed transferring energy released from combustion to an engine crankshaft/ flywheel which is coupled to an electrical generator to generate electricity. The net electrical power outputs of reciprocating engines are limited, with larger dual fuel (natural gas and diesel) engines providing <20 MW, consequently, for the proposed peaking power plant developments several engines would be required at each site.

Gas turbine engines are available in three different types, heavy frame, industry and aero-derivative and each can be configured to operate in open or combined cycle plants. Gas turbines consist of a compressor, a combustion chamber and an expansion turbine. After combustion, the gas expands through the turbine and produces electrical power for the generator and compressors with excess electrical power available for export. Aero-derivative gas turbines are the ideal solution in applications where a small footprint and lightweight equipment is required. Unlike the reciprocating engine, a single dual fuel (natural gas and diesel) gas turbine is sufficient to provide the 75MWe (electrical output) requirement for each peaking plant.

Due to the greater application of gas turbines for gas peaking plants and the requirement for multiple engines for the proposed development, reciprocating engines were not considered to be a suitable combustion engine technology for the proposed development.

As the annual operating hours on a peaking plant are envisaged to be low, gas turbines also offer a more economical solution from a maintenance perspective as maintenance regimes are based on operational hour where-as in contrast gas engine maintenance at present is based on time interval leading to higher maintenance costs.

2.3.1.2 Peaking Plant Types

Various conventional thermal technologies were reviewed for the proposed development, namely, Combined Cycle Gas Turbine (CCGT) and FlexGen. It is essential that the selected technology is able to perform to its intended function by providing fast, flexible and efficient responses to changes in electricity demand during morning and evening peak demand periods.

CCGT power plants use the waste heat from the primary gas turbine to generate steam that drives a steam turbine. The typical thermal efficiency of CCGT's operating in Ireland is 55%. As the level of renewable electricity generation increases on the electricity grid this will pose challenges to the performance of CCGT's as greater operational flexibility will be required in responses to fluctuations in electricity generation. This will result in technical performance changes and corresponding operational cost increases. Conventional CCGT designs have operational start up times of approx. 30 minutes to 90 minutes depending on whether a cold or warm start up is initiated. The utilisation of CCGT for the proposed development would not provide the necessary peaking response times.

FlexGen gas peaking plants utilise Open Cycle Gas Turbine (OCGT) technology which provides quicker duty standby start up times than CCGT's, typically approximately 5-20 minutes depending on the type of OCGT. The proposed FlexGen developments will use aero-derivative gas turbines, these flexible, compact, and lightweight have their origins in the aviation industry which leads to high reliability and fast start up times. Aero-derivative gas turbines are ideally suited for flexible power generation due to their exceptionally fast start up time of 5 minutes. FlexGen peaking plants are specifically designed to react quickly to changes in demand and can provide fast start up ramp up rates, with high cycling capability avoiding thermal fatigue and

providing a commercially viable peaking plant able to fulfil its design capability to provide morning and evening peak electricity demand.

2.3.1.3 Energy Storage Technologies

Numerous energy storage technologies (pumped-storage hydroelectricity, lithium ion battery, flow battery, flywheel energy storage, supercapacitor and thermal storage) are suitable for grid-scale applications, however their characteristics and stage of development differ.

Pumped-storage hydroelectricity is operating successfully on the Irish grid. This technology requires a specific geography and a large area to install. Additionally, the potential environmental impact of the construction of a pumped-storage facility could be considered to be more significant than Lithium Ion battery developments. In terms of electrical performance, Lithium Ion batteries can react to the grid more rapidly than pumped hydroelectricity which supports the deployment of renewables on the Irish grid. It is not commercially feasible to install a new pumped storage facility to meet the energy needs of Dublin.

Flow batteries, supercapacitor and thermal storage technology are still in the prototype phase of their development and are not suitable for commercial deployment at scale.

Flywheel storage technology provide instant reaction to the grid, similar to Lithium ion batteries, however the storage duration of a flywheel is measured in seconds and is not dispatchable to the grid. Flywheels do not generate electricity and so cannot provide the energy capacity required by the Irish grid to support the deployment of renewables.

Lithium ion BESS are a proven technology. These can be constructed on a small site and requires minimal ground works to install. This type of storage has also become the most economically viable option as result of the development of lithium ion batteries for the electric vehicle market reducing the cost of these batteries for use in grid energy storage. Lithium ion BESS also has the characteristics required (response time, energy density and flexibility) to meet EirGrid's DS3 needs in the Dublin region.

2.3.2 Preferred Technology parameters and metrics considered

2.3.2.1 FlexGen

The Aero derivative OCGT technology was specifically selected for its fast start-up times. The system operator can influence the type of new generation required on the system by incentivising elements of the DS3 revenue. In the case of OCGT's one of the key selection criteria was the ability to start from cold and be a full generating capacity within 5 minutes therefore capable of meeting the DS3 service requirements for Tertiary Operating reserve 2(TOR2). With these fast start up times Aeroderivative OCGT's can remain off load for long durations while renewable generation is sufficient to meet the grid's demands. However once required by the grid operator they will reliably be able to deliver significant generation onto the system to ensure demands are met and thereby preventing power shortages.

Diesel engines were considered as an alternative as they could be located where gas connection infrastructure was unavailable. However, these were not considered viable for a number of reasons namely:

- The emissions from diesel only engines did not comply with the Clean Energy Package (CEP) limits; and
- Large quantities of diesel storage would be required to be stored on site.

Gas only engines were also considered utilising stored gas in the form of either liquid natural gas (LNG) or liquid petroleum gas (LPG) as an alternative to diesel as a backup fuel. This was not considered viable for a number of reasons, namely:

- The supply chain for liquified gas was not at an advanced stage; and
- The quantities of gas to be stored and the infrastructure to support the re-gasification was not economical.

The FlexGen developments have secured a 10-year capacity contract under the Capacity Auction mechanism to ensure that the Irish system has enough generation capacity to meet peak demand into the future.

2.3.2.2 BESS

The BESS technology has been specifically selected to provide a number of the system services EirGrid requires to operate the grid securely. The BESS will be capable of meeting the DS3 service requirements for Fast Frequency Response (FFR), Primary Operating Reserve (POR), Secondary Operating Reserve (SOR), Tertiary Operating Reserve 1 (TOR1), Tertiary Operating Reserve 2 (TOR2) and Replacement Reserve.

In order to provide further system security to the Irish grid the BESS duration of 2 hours has been selected. The BESS system has secured a 10-year capacity reliability contract under the Capacity Auction mechanism to ensure the Irish system has enough generation capacity to meet peak demand into the future.

2.3.3 Alternative Technology Environmental Impacts

Each of the technology options was considered initially in terms of its key environmental impacts under the following main operational parameters. These parameters were selected on the basis that any significant risk issue identified could present a significant design, consenting or operational constraint.

2.3.3.1 Atmospheric Emissions

Natural gas is a clean fuel with negligible sulphur and particulate matter content. The fuel can be piped directly to the site negating the requirement for transportation of a primary fuel source by road. The emission limit values for nitrogen oxides (NO_x), carbon dioxide (CO), sulphur dioxide (SO₂) for any new gas peaking power plant are prescribed with the Industrial Emission Directive 2010/75/EU.

For the purpose of the alternative assessment all considered technologies fall under the same category "Gas turbines (including Combined Cycle Gas Turbines), using natural gas as fuel" and assessed under the same thermal output. The proposed development will be regulated by the Environmental Protection Agency under an IE Licence. All options will also be required to operate on low sulphur diesel oil as a backup fuel in the event of interruption to the natural gas supply.

There are no atmospheric emissions from BESS developments.

2.3.3.2 Noise Emissions

Due to the existing industrial and port activities within the Poolbeg Peninsula all technologies will have a limited impact on background noise levels or sensitive receptors. The baseline

environment is categorised as a Non-Quiet Area as per EPA Guidance Note for Noise, Licence Applications, Surveys and Assessments in Relation to Scheduled Activities NG4 (2016). All noise limit levels for the FlexGen developments will be agreed and regulated under Industrial Emissions Licences to ensure that no nuisance occurs at the closest sensitive receptors due to the operation of either FlexGen development.

Noise emissions from BESS developments are limited and are not expected to generate substantial levels of noise. Noise modelling completed for the Poolbeg BESS and South Wall BESS concluded that no noise mitigation is required and that cumulative noise levels would not exceed the noise limit guidance in EPA Guidance Note NG4.

2.3.3.3 Spatial Requirements

Gas only reciprocating engines with stored liquified gas being utilised as the backup fuel option were considered. The spatial requirements of this option are considerably larger as large tanks to contain the liquified gas would be required along with auxiliary plant to re-gasify the fuel when compared to more traditional diesel storage.

Pumped storage is a viable alternative technology to BESS however the spatial requirement is significantly greater. Trough Hill, Irelands existing pumped storage plant resides inside a mountain in a cavern measuring 76×21×27 metres. The upper reservoir is 19.4 metres deep, has a capacity of 2.3 million cubic metres and covers an area of 160,000 square metres. To be economically viable a facility of this scale is required.

2.4 Alternative Locations

2.4.1 Poolbeg Peninsula

EirGrid Group's East Coast Generation Opportunity Assessment (ECGOA), published in February 2019, assessed the potential locations for new capacity generation along the eastern coast. The approach advocated in the ECGOA is to locate new power sources close to the growing demand. Within the assessment it was calculated that increasing interest in data centre development connections in the Dublin area would total 1,100MVA alone.

Dublin City area opportunities are identified as either Finglas or Poolbeg. Poolbeg benefits from five 220 kV circuits and two 220/110 kV transformers. Poolbeg also has an interbus reactor which helps to facilitate the splitting of the Dublin 220 kV network into North and South transmission network. The assessment analysis shows that a 450 MW high-merit conventional thermal generator could be accommodated at Poolbeg (North and South) and Finglas. This ensures that excessive power flows do not occur on certain critical circuits such as between Inchicore and Poolbeg and between Finglas and Corduff.

The Poolbeg Peninsula has adequate grid connections already in place to allow the FlexGen developments (both Poolbeg FlexGen and Ringsend FlexGen) to connect to the existing grid and there is already a gas supply which is capable of supplying all the various power generation facilities with some network upgrades required to meet the capacity demand. The Peninsula also has readily available diesel supplies which are required by legislation to provide backup fuel should the gas supply be compromised at any time. The existing electricity and gas connections to the FlexGen sites in the Poolbeg Peninsula provides an efficient use of existing resources which avoids their replication elsewhere that would otherwise lead to a less sustainable outcome with increased environmental impacts. Preliminary planning and environmental feasibility internal assessment for energy uses was undertaken for the wider

existing Poolbeg Generation Station site. Regarding the proposed Ringsend FlexGen site, this has previously been granted consent for an energy related use. Ultimately the zoning and physical characteristics of the Poolbeg Peninsula and surrounding industrial and energy infrastructure (transmission and generation) were deemed compatible with energy related developments.

A Land Management and Development Strategy (attached as Appendix 2) has been prepared to support the ESB's continued management and future development of its land bank on the Poolbeg Peninsula, taking into account the existing and future operational needs.

This Strategy principally relates to the continued management of ESB assets – namely infrastructure associated with the generation, transmission and distribution of electricity. ESB's landbank on the Peninsula was considered in terms of land that was available for development in the context of energy related uses.

2.4.1.1 Poolbeg Land Block

The Poolbeg Land Block is an established industrial site characterised by the presence of a regionally significant electricity generation facility, and significant grid infrastructure, accommodating the following uses (refer to Figure 2.1):

- Site A – site accommodating former administration and storage buildings, all of modern construction, and associated area of hand standing / car parking;
- Site B - Poolbeg Power Station (decommissioned) and the Poolbeg chimneys;
- Site C - Poolbeg CCGT Generation Station and Shellybanks 220Kv substation;
- Site D - NORA facility – accommodating oil storage for the national reserve;
- Site E - Brownfield / open areas;
- Site F – Gas Networks Ireland (GNI) Infrastructure; and
- Site G – Poolbeg 220 kV substation and associated ESBN infrastructure.

Figure 2.1: The Poolbeg Land Block – Land Management and Development Zones



Source: Poolbeg Land Management and Development Strategy

Poolbeg FlexGen Facility

Areas within the existing Poolbeg Land Block were evaluated for suitability for locating the Poolbeg FlexGen facility.

Site E is the only parcel of land in the Poolbeg Land Block which is not currently in use for a specified purpose. The choice of Site E for the FlexGen development was informed by the availability of the land within the overall holding and proximity to the gas connection.

Site B contains the Poolbeg Power Station (decommissioned), the Poolbeg chimneys and the maintenance area for the existing CCGT (which is on Site C). The infrastructure required for thermal generation (gas, diesel, water) is located in Site C and this area is therefore considered best suited to thermal development so that the existing infrastructure can be reused ensuring minimal impact on the wider site for future thermal development. There are currently no fixed proposals for Site B however consideration is being given to its use in parallel with future generation on Site C.

Site D is currently occupied by NORA subject of a long-term lease, and no changes to that operation are envisaged in the near future, therefore this area is not available for development.

Site F accommodates GNI infrastructure, while Site G is taken up with the existing Poolbeg 220 kV substation. Although Site G appears to be undeveloped land, this area contains numerous High Voltage (HV) underground cables. It is not viable to relocate all high voltage cables due to the cost of relocation and spacing requirements of HV cables.

Poolbeg BESS Facility

Areas within the existing Poolbeg Land Block were evaluated for suitability for locating the BESS facility.

Site A proved to be the most suitable for BESS development. This site contains 1970s buildings associated with generating activity which have been disused for a number of years and are no longer fit for purpose. The design of the BESS facility was selected to minimise the overall impact of the development and minimise the required demolition of the existing buildings as much as possible. Through consultation with DCC and detailed evaluation of the BESS layout a design was selected which minimise the space required for development and reduces the impact of demolition as much as possible. It was acknowledged that any new development at this location would require demolition works. The design of the BESS development, and the demolition works required will be undertaken in such a manner as to reduce the impact on existing structures on the existing Poolbeg Generation site and the adjacent Conservation Area around the former Pigeon House Hotel.

The BESS development was considered most suitable for this location as the associated plant and equipment are relatively small in scale and would not be discernible from the adjoining Conservation Area. Furthermore, the form and scale of battery units are suited to a non-standard site as the layout of these units can be adapted to suit the site conditions.

2.4.1.2 Ringsend Land Block

The Ringsend Land Block is an established industrial site characterised by the presence of a regionally significant electricity generation facility, and significant grid infrastructure.

This land accommodates a range of existing uses, including (refer to Figure 2.2):

- **Site A** - Ringsend 110 kV substation and the nearby 38kV substation– both owned by ESB Networks and part of the electricity transmission and distribution network,
- **Site B** - The former ESB Training Centre and associated area of hand-standing / car parking,
- **Site C** - Dublin Bay Power Station,
- **Site D** - Brownfield / open areas,
- **Site E** - NORA facility – accommodating oil storage for the national reserve, and
- **Site F** – Irishtown 220 kV Substation.

Figure 2.2: Ringsend Land Block – Land Management and Development Zones



Source: Poolbeg Land Management and Development Strategy

FlexGen Ringsend and South Wall BESS

Being primarily led by the availability of the land, and in the case of the FlexGen development the proximity to a gas connection, Site D was the natural choice for BESS and FlexGen facilities within the Ringsend Land Block. Within Sites A and F continued and future uses are envisaged to be characteristic of an operational substation and general activities associated with network infrastructure, while in relation to Site B it is understood that there are ongoing discussions between ESB and Dublin Bus relating to development to support the decarbonisation of public transport. Continued and future uses within Site C will be characteristic of an operational generating station, while Site E is currently occupied by NORA subject of a long-term lease.

The South Wall BESS development had originally been granted planning permission (reg ref. 3373/18), on the site now proposed for the FlexGen development (western portion of site D, refer to Figure 2.2) and therefore it was considered that in principle this site was suitable for an energy use, acknowledging the requirement for assessment. After consideration of the utility connection requirements of the FlexGen (Gas, water, diesel) the BESS is now proposed on its current site to the east. There is existing underground infrastructure on the southern half of the proposed BESS site in the form of underground HV cables. Due to the modular nature of BESS development the site layout has been specifically designed so that the underground cables can

remain in place. This reduces the overall impact of both developments as there is a reduced requirement for new infrastructure development and relocation of existing infrastructure.

2.5 Alternative Layouts

2.5.1 Poolbeg FlexGen

On the Poolbeg FlexGen site, the location of the liquid fuel tank is determined by the connections to the existing liquid fuel facilities. The water tanks were located away from the southern boundary of the site and the beach amenity in order to reduce environmental impacts (particularly visual impact from Poolbeg beach and the Irishtown Nature Park). The size of the liquid fuel tank has reduced and includes connections to the existing liquid fuel facilities.

2.5.2 Ringsend FlexGen

On the Ringsend FlexGen site there is existing underground infrastructure on the southern half of the site in the form of underground HV cables and Irish Water infrastructure. The development has been specifically designed so that the underground cables can remain in place. This reduces the overall impact of this development as there is a reduced requirement for new infrastructure and relocation of existing infrastructure.

2.5.3 Poolbeg BESS

At Poolbeg BESS, the design of the BESS facility was chosen to minimise the impact of the development on the existing buildings. Through detailed evaluation of the BESS layout a design was selected which accommodated the existing Administration Building on the site however this layout means that the BESS equipment cannot be installed around the existing workshop and storage buildings. In order to install the plant around the workshop and storage buildings while maintaining safe working distances, a significant portion of the site would be rendered unusable. The BESS facility would need to expand into Area G of Poolbeg (as per Figure 2.1) and require the removal of the existing vegetation and HV cables. The construction impact would increase as the HV cables would need to be moved around the Poolbeg site. Overall, this would have a higher environmental impact and would increase the project cost to the point where it would not be cost effective to construct the facility.

Rather than demolish the Poolbeg workshop and storage buildings, consideration has been given to retrofitting the BESS units into these buildings. BESS systems in other locations in Europe have been housed indoors however these have generally been in purpose-built facilities. The Poolbeg Workshop building is in a state of disrepair and has significant water damage having been unmanned for over 10 years. The Poolbeg workshop and storage buildings were not designed with BESS in mind and as such installing the BESS units would require significant retrofit works, large doorways to be built into the walls in order to allow access for the large container sized units and industrial HVAC and Fire Suppression systems to be installed to ensure safe operation of the BESS. The BESS systems need to be pushed into place and would require extensive modification to the building fabric. Due to the direct connection of these buildings with the decommissioned Poolbeg station, suitable fire suppression and protection systems would need to be installed in the decommissioned Poolbeg station which was not designed with BESS systems in mind. The upper floor of the workshop building would remain redundant and pose a continuous maintenance burden as the building deteriorated with age. The utility connections required would also require extensive demolition of the underlying floor slab which could have consequences for maintaining the integrity of the

building's fabric. It is considered that the remedial works required to secure the stability of the buildings would be onerous and would make the installation of a BESS facility not commercially viable.

2.5.4 South Wall BESS

On the South Wall BESS site there is existing underground infrastructure on the southern half of the site in the form of underground HV cables and Irish Water infrastructure. Due to the modular nature of BESS development the site layout has been specifically designed so that the underground cables can remain in place. This reduces the overall impact of this development as there is a reduced requirement for new infrastructure development and relocation of existing infrastructure.

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3 EIA Report Methodology

This chapter of the EIAR establishes the requirement for Environmental Impact Assessment (EIA) for the proposed FlexGen and BESS developments and provides a description of the methodology applied to the preparation of this EIA Report (EIAR).

3.1 EIA Context and Screening

3.1.1 EIA Directive Context

The primary objective of the of the EIA Directive 2014/52/EU, is to ensure a high level of protection of the environment and human health, through the establishment of minimum requirements for environmental impact assessment (EIA), prior to development consent being awarded, of public and private developments that are likely to have significant effects on the environment.

Directive 2014/52/EU provides a definition of environmental impact assessment as being a process consisting of:

- The preparation of an environmental impact assessment report (EIAR);
- The carrying out of consultations required to inform the EIAR;
- The examination by the competent authority of the information presented in the EIAR and any supplementary information provided, where necessary, by the developer and relevant information received through consultations with the public, prescribed bodies and any affected Member States;
- The reasoned conclusion by the competent authority on the significant effects of the project on the environment; and
- The integration of the competent authority's reasoned conclusion into any development consent decision.

3.1.2 EIA and Planning Legislation in Ireland

As of the 1st of September 2018, the *European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018* (S.I. No. 296 of 2018) transpose the requirements of the 2014 EIA Directive (Directive 2014/52/EU) into existing Irish planning consent procedures, i.e. the *Planning and Development Regulations 2001*, as amended.

In determining the requirement for EIA, the Directive differentiates between the projects that always require EIA and those for which an EIA may be required. These projects are listed in Schedule 5 Part 1 and Part 2 of the *Planning and Development Regulations 2001*, as amended.

Schedule 5, Part 1 Projects, are projects which are considered as having significant effects on the environment and require an automatic EIA.

Schedule 5, Part 2 Projects, are projects where national authorities have to decide whether an EIA is needed. This is done by the "screening procedure", which determines the effects of projects on the basis of thresholds/criteria or a case by case examination. The projects listed in Part 2 are in general those not included in Part 1 which may be considered to have a lesser environmental impact.

3.2 EIA Process

European Communities Directive 85/337/EEC, on the assessment of the effects of certain public and private projects on the environment, was adopted on 27th June 1985. It was later amended by *Directives 97/11/EC*, *2003/35/EC* and *2009/31/EC*. The 1985 Directive and its amendments were codified in 2011 by *Directive 2011/92/EU*.

The current *Directive 2014/52/EU* amends the 2011 codified Directive but does not replace it. The *European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2001 (as amended by the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (S.I. No. 296 of 2018))* transpose the requirements of the 2014 EIA Directive into existing planning consent procedures.

3.3 EIA Screening of Proposed Developments

Screening is the first stage in EIA which seeks to determine whether or not a project triggers a relevant threshold due to its size or the potential environmental effects that are considered significant and likely. The Fifth Schedule of the Planning & Development Regulations 2001 (S.I. No. 600 of 2001) (as amended) (Part 1 and Part 2) provides mandatory thresholds for the undertaking of EIA for a project type of relevance to the proposed FlexGen developments.

Whilst each individual project within the scheme falls outside the thresholds for a mandatory EIA, following consultation with DCC and given the proximity of the four projects and their location within the environment of Dublin Bay a voluntary EIAR for the combined projects has been prepared.

3.4 Consultation and Engagement

3.4.1 Stakeholder Consultation

Table 3.1 lists the bodies notified via email of the EIAR on the four developments as described in this EIAR. The letters to the bodies listed are provided in Appendix 3. Letters 1-15 were sent on the 7th August 2020 a similar letter was subsequently sent to the Health and Safety Authority (HSA) dated 31st August 2020.

Table 3.1: Summary of Stakeholder Consultation

No.	Stakeholder Organization
1	Department of Culture, Heritage and the Gaeltacht, Development Applications Unit
2	Department of Housing, Planning and Local Government, Planning Section
3	Transport Infrastructure Ireland, Land Use Planning Department
4	An Chomhairle Ealaíon / The Arts Council
5	Fáilte Ireland
6	Heritage Council
7	Environmental Protection Agency
8	Commission for Regulation of Utilities, Water and Energy
9	Irish Water
10	Office of Public Works
11	Eastern Regional Fisheries Board
12	Birdwatch Ireland
13	Bat Conservation Ireland
14	Minister for Communications, Climate Action and Environment

15	An Taisce
16	Health and Safety Authority

Table 3.2 lists the relevant correspondence and meetings held between the ESB and various stakeholders to date in respect of the previous withdrawn applications on the ESB lands and also in respect of the current applications in the form of project update letters and meetings.

Table 3.2: Summary of Stakeholder Consultation (for both previous planning applications and current applications)

Poolbeg FlexGen			
Date	Stakeholder	Key Points Raised	Result
Feb-19	Meeting DCC	Pre-Planning meeting for previous applications	
02-Dec-19	Meeting DCC	Withdrawn Application Further Information (FI) Queries	FI comments have been considered in design, layouts and assessments
16-Dec-19	Meeting DCC	Withdrawn Application Further Information (FI) Queries	FI comments have been considered in design, layouts and assessments
06-May-20	Meeting DCC	Construction methodology, EIAR	Have been addressed in Construction methodology, EIAR Impact assessments and design layouts
Oct-19	Meeting EPA	1. Licence Approach 2. BAT 3. Air Emissions Model	Addressed in licence approach, air modelling & BAT requirements
Mar-19	Meeting Birdwatch Ireland	Provided survey and assessment information	Addressed in Biodiversity Chapter within baseline & impact assessment. Also considered in NIS.
Ongoing	Meetings NORA	Backup fuel supply	Connection points and fuel quality to be stored. Link to existing tanks resources ensures backup fuel supplied without requiring construction of significant additional storage tanks.
Ongoing	Irish Water	Update on project details	No comments
Ongoing	EirGrid	Grid connection and existing substation	BESS and FlexGen will share single bay within existing substation, enabling EirGrid more flexibility to expand network without need for construction of new substation. Design changes undertaken to optimise connection process and minimise impact. EirGrid have determined compact switchgear is available and can be installed which removes requirement for constructing extension of Poolbeg Substation.
Ongoing	GNI	Availability of Gas, updates required to the existing AGI and agreement of interface point between ESB/GNI.	Downstream pipework designed in accordance with GNI design requirements. Installation of equipment will ensure efficient use of space and cost. GNI requirements have been addressed in design.
Ongoing	Covanta	Update on project details	No comments
Ongoing	Dublin Port Authority	Update on project details	No comments
28/05/2020	Elected Representatives	Update on project details	General queries received on a local heritage interest at Poolbeg – (canons)

Scoping Letters			
Jan-19	An Taisce	N/A as no responses received	N/A as no responses received
Jan-19	DCC- Environ & Planning	N/A as no responses received	N/A as no responses received
Jan-19	EPA	N/A as no responses received	N/A as no responses received
Jan-19	HSA	N/A as no responses received	N/A as no responses received
Jan-19	Irish Water	N/A as no responses received	N/A as no responses received
Jan-19	National Monuments	N/A as no responses received	N/A as no responses received
Jan-19	NPWS	N/A as no responses received	N/A as no responses received
Mar-19	DCC Scoping Request	N/A as no responses received	N/A as no responses received
08/04/2020	ABP SID Screening	Screening Request	ABP confirmed that the relevant parts of the development associated with the grid connection are not considered to be Strategic Infrastructure Development.

Ringsend FlexGen			
Date	Stakeholder	Key Points Raised	Result
Feb-19	Meeting DCC	Pre-Planning meeting for previous applications	
02-Dec-19	Meeting DCC	Withdrawn Application Further Information (FI) Queries	FI comments have been considered in design, layouts and assessments
16-Dec-19	Meeting DCC	Withdrawn Application Further Information (FI) Queries	FI comments have been considered in design, layouts and assessments
06-May-20	Meeting DCC	Construction methodology & Boundary Treatments	Have been addressed in Construction methodology, EIAR Impact assessments and design layouts
Oct-19	Meeting EPA	1. Licence Approach 2. BAT 3. Air Emissions Model. 4. DBP Connections	Comments considered in licence approach, connection design, air modelling & BAT requirements
Nov-19	Meeting & Letter HSA re COMAH	COMAH assessments should consider proposed development in the vicinity of an existing establishment (ESB DBP and NORA Ringsend).	COMAH assessment report updated.
On-going	Meeting NORA	Backup fuel supply	Connection points and fuel quality to be stored. Link to existing tanks resources ensures backup fuel supplied without requiring construction of significant additional storage tanks.
Ongoing	Irish Water	Existing IW asset on site	Consideration of existing IW asset in both design, construction and operation to ensure no impact on same.

Ongoing	Liaison EirGrid	Grid connection and existing substation	BESS and FlexGen will share single bay within substation, enabling EirGrid more flexibility to expand network without need for the construction of new substation. Design changes undertaken to optimise connection process and minimise impact. EirGrid have determined compact switchgear is available and can be installed which removes requirement for constructing extension of Irishtown Substation.
Ongoing	Liaison ESBN	Extensive network cables on site	Consideration of existing networks assets in both design, construction and operation to ensure no impact on same.
Ongoing	GNI	Availability of Gas, updates required to the existing AGI and agreement of interface point between EBS/GNI.	Downstream pipework designed in accordance with GNI design requirements. Installation of equipment will ensure efficient use of space and cost. GNI requirements have been addressed in design.
Ongoing	Covanta	Update on project details	No comments
Ongoing	Dublin Port Authority	Update on project details	No comments
28/05/2020	Elected Representatives	Update on project details	General queries received on a local heritage interest at Poolbeg – (canons)
29/07/2020	TII	Update on project details/ Discussion on proposals	
Scoping Letters			
Jan-19	An Taisce	N/A as no responses received	N/A as no responses received
Jan-19	DCC- Environ & Planning	N/A as no responses received	N/A as no responses received
Jan-19	EPA	N/A as no responses received	N/A as no responses received
Jan-19	HSA	N/A as no responses received	N/A as no responses received
Jan-19	Irish Water	N/A as no responses received	N/A as no responses received
Jan-19	National Monuments	N/A as no responses received	N/A as no responses received
Jan-19	NPWS	N/A as no responses received	N/A as no responses received
	Irish Water Planning Observations	Potential Impact on existing asset	SI programme identified same and ongoing liaison with IW on location.
	TII Planning Observations	Dublin Eastern bypass	Consultation Ongoing
	HSA Planning Observations	Consultation	Consultation Undertaken
08/04/2020	ABP SID Screening	Screening Request	ABP confirmed that the relevant parts of the development associated with the grid connection are not considered to be Strategic Infrastructure Development.

Poolbeg BESS			
Date	Stakeholder	Key Points Raised	Result
Feb-19	Meeting DCC	Pre-Planning meeting	
02-Dec-19	Meeting DCC	Pre Planning Meeting	Comments have been considered in design, layouts and assessments
16-Dec-19	Meeting DCC	Pre Planning Meeting	Comments have been considered in design, layouts and assessments
06-May-20	Meeting DCC	Construction methodology, EIAR	Have been addressed in Construction methodology, EIAR Impact assessments and design layouts
27 May-20	Meeting DCC	Cultural Heritage Meeting Onsite at Poolbeg BESS site	DCC comments addressed in design
On-going	Meeting NORA	Update on project details	No comments
Ongoing	Irish Water	Location and capacity of water mains in the area of the site and ESB water needs	Low volumes of water required, and connections included in design.
Ongoing	Liaison EirGrid	Grid connection and existing substation	BESS and FlexGen will share single bay within existing substation, enabling EirGrid more flexibility to expand network without need for construction of new substation. Design changes undertaken to optimise connection process and minimise impact. EirGrid have determined compact switchgear is available and can be installed which removes requirement for constructing extension of Poolbeg Substation.
Ongoing	Covanta	Update on project details	No comments
Ongoing	Dublin Port Authority	Update on project details	No comments
28/05/2020	Elected Representatives	Update on project details	General queries received on a local heritage interest at Poolbeg (canons)
Scoping Letters			
Jan-19	An Taisce	N/A as no responses received	N/A as no responses received
Jan-19	DCC- Environ & Planning	N/A as no responses received	N/A as no responses received
Jan-19	EPA	N/A as no responses received	N/A as no responses received
Jan-19	HSA	N/A as no responses received	N/A as no responses received
Jan-19	Irish Water	N/A as no responses received	N/A as no responses received
Jan-19	National Monuments	N/A as no responses received	N/A as no responses received
Jan-19	NPWS	N/A as no responses received	N/A as no responses received
Mar-19	DCC Scoping Request	N/A as no response received	N/A as no response received
08/04/2020	ABP SID Screening	Screening Request	ABP confirmed that the relevant parts of the development associated with the grid connection

are not considered to be Strategic Infrastructure Development.

Poolbeg BESS Demolition

Date	Stakeholder	Key Points Raised	Result
02-Dec-19	Meeting DCC	Cultural Heritage issues raised by DCC	DCC Comments on Cultural Heritage have been addressed in Cultural Heritage Chapter and Construction Methodology
16-Dec-19	Meeting DCC		
06-May-20	Meeting DCC	Cultural Heritage issues raised by DCC	DCC Comments on Cultural Heritage have been addressed in Cultural Heritage Chapter and Construction Methodology
27-May-20	Meeting DCC	Cultural Heritage Meeting Onsite at Poolbeg BESS site	DCC comments addressed in design
Ongoing	Covanta	Update on project details	No comments
Ongoing	Dublin Port Authority	Update on project details	No comments
28/05/2020	Elected Representatives	Update on project details	General queries received on a local heritage interest at Poolbeg (canons)
08/04/2020	ABP	Screening Request	ABP confirmed that the relevant parts of the development associated with the grid connection are not considered to be Strategic Infrastructure Development.

South Wall BESS

Date	Stakeholder	Key Points Raised	Result
2018	DCC	FI Requests for application Reg ref. 3373/18.	Addressed in responses to FI and planning permission granted by DCC.
06-May-20	Meeting DCC	Construction methodology & Boundary Treatments	Have been addressed in Construction methodology, EIAR Impact assessments and design layouts
Feb-20	Meeting NORA	Proximity to NORA and Fire Safety	Addressed in design and COMAH assessment
Ongoing	Irish Water	Existing IW asset on site. Irish water sought confirmation of IW asset on site.	SI programme identified location of asset and liaised with IW on same. Consideration of existing IW asset in both design, construction and operation to ensure no impact on same.
Ongoing	Liaison EirGrid	Grid connection and existing substation	BESS and FlexGen will share single bay within substation, enabling EirGrid more flexibility to expand network without need for the construction of new substation. Design changes undertaken to optimise connection process and

			minimise impact. EirGrid have determined compact switchgear is available and can be installed which removes requirement for constructing extension of Irishtown Substation.
Ongoing	Liaison ESNB	Extensive network cables on site	Consideration of existing networks assets in both design, construction and operation to ensure no impact on same.
Aug-19	Meeting Gas Networks	Location of GNI asset and proposed SI project works	GNI and ESB agreed safety protocol for SI in the area of the GNI Asset.
Ongoing	Covanta	Update on project details	No comments
Ongoing	Dublin Port Authority	Update on project details	No comments
28/05/2020	Elected Representatives	Update on project details	General queries received on local heritage interest at Poolbeg - Canons
29/07/2020	TII	Update on project details	Discussion on proposals
Aug-18	Irish Water Planning Observations	Potential Impact on existing asset	SI programme identified same and ongoing liaison with IW on location.
Mar-18	Letter ABP	SID Screening	Considered not to be SID
08/04/2020	ABP	Screening Request	ABP confirmed that the relevant parts of the development associated with the grid connection are not considered to be Strategic Infrastructure Development.

Any further specialist consultation carried out during the course of the development of the specialist chapters 7-16 is detailed in the specific chapters.

3.4.2 Dublin City Council

A meeting between ESB and Dublin City Council took place on 6 May 2020 to discuss current proposed planning applications. The following items were discussed:

- Proposed site layouts, project design and rationale for the swapping of the South Wall BESS and Ringsend FlexGen sites
- EIAR, NIS, and previous further information requests
- Engagements with key stakeholders
- ESB Poolbeg Land Use and Development Strategy
- Logistics around submitting applications / large volumes of material

Throughout the preparation of the EIAR and planning applications further communication has been undertaken with Dublin City Council, specifically the Cultural Heritage, Transport and Planning sections.

3.4.3 Community Consultation

Elected representatives in Dublin Bay South and Dun Laoghaire Rathdown constituencies were contacted by email on Thursday 28th May 2020. The email contained a description of the four proposed developments and their context in line with the ESB's Brighter Future Strategy of reducing the carbon intensity of the generation fleet.

3.5 Overview of the EIA Report

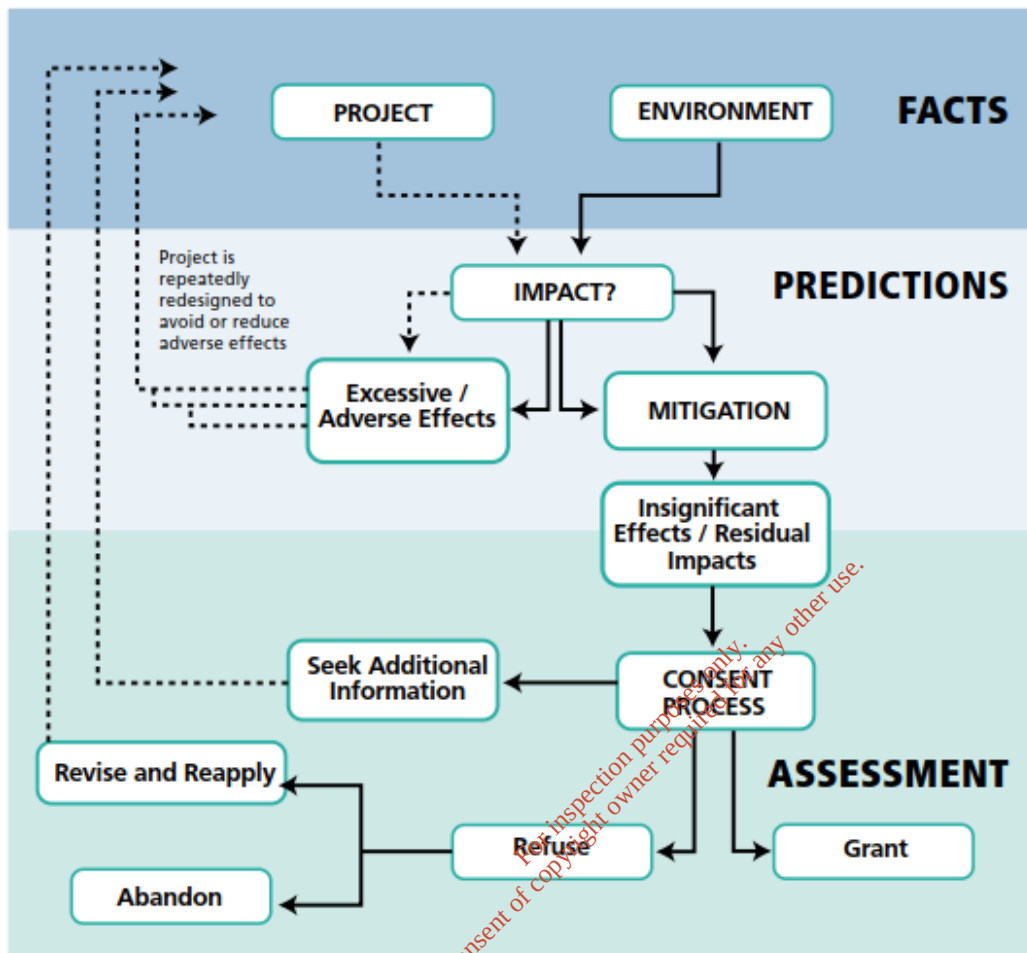
The methodology used in preparing an EIAR is comprised of the following steps in accordance with EIA Directive 2014/52/EU (the EIA Directive) and the EPA's Draft Guidelines on the Information to be contained in Environmental Impact Assessment Reports (2017)¹:

- A description of the proposed development, including in particular;
 - A description of the physical characteristics of the all of the works covered by the application and the land-use requirements during construction and operational phases;
 - A description of the main characteristics of the production processes, for instance, the nature and quantities of the materials used; and
 - An estimate by type and quantity, of expected residues and emissions resulting from operations of the Scheme (for example, water, air and soil pollution, noise, vibration, light, heat and radiation).
- An outline of the main alternatives considered and an indication of the main reasons for the choice made, taking into account environmental effects;
- A description of the aspects of the environment likely to be significantly affected by the proposed development, including, population, fauna, flora, soil, water, air climatic factors and material assets, including the architectural and archaeological heritage, landscape and the relationship between the above factors;
- A description of the likely significant effects of the project on the environment;
- A description of the measures proposed to be taken in order to prevent, reduce, and if possible, remedy any significant adverse effects on the environment;
- Data required to identify and assess the main effects which the proposed development is likely to have on the environment;
- A Non-Technical Summary of the information presented; and
- Any additional information specified in Annex IV relevant to the specific characteristics of a particular project or type of project and to the environmental features likely to be affected.

The methodology is broadly consistent across all chapters and has been adopted and adhered to as much as possible, in order to ensure that the assessment methodology is transparent and can be effectively communicated to, and understood by, all planning and environmental stakeholders, including the general public. Figure 3.1 below provides an overview of the steps undertaken in the preparation of this EIAR.

¹ Derived from Article 5(1) of the EIA Directive 2014/52/EU

Figure 3.1: Stages of EIAR Preparation



Source: EPA, Guidelines on the Information to be contained in Environmental Impact Assessment Reports (Draft, 2017)

3.5.1 Describing the Projects

This EIAR includes (to varying degrees of detail) a description of:

- The location of the project and the physical characteristics of the whole project, including, where relevant, demolition works, the land-use requirements during construction and operation as well as other works that are integral to the project;
- The main characteristics of the operational phase of the project (production and maintenance processes in particular), for example energy demand, energy used, nature and quantity of materials and natural resources (including water, land, soil, biodiversity) used;
- An estimate, by type and quantity, of the expected residues and emissions (such as water, air, soil and subsoil pollution, noise, vibration, etc and quantities and types of waste produced during the construction and operational phases; and
- The description of the site, design and scale of the project considers all relevant phases of the life of the project, e.g. from construction through to operation.

3.5.2 Baseline Environment

A 'study area' has been defined in each individual technical assessment. This study area encompasses all locations that may potentially be impacted upon by the proposals. Impacts may occur during the construction phase or the operation phase and may be temporary or permanent. They may also be positive or negative. All types of impact are considered when defining the study area. The study area for each specialist technical assessment is clearly described in each individual chapter of the EIAR.

In describing the temporal nature of the likely effects, the following terminology has been used (EPA Draft Guidelines on the Information to be contained in Environmental Impact Assessment Reports, 2017):

Table 3.3: Temporal Effects (EPA Draft Guidelines on the Information to be Contained in Environmental Impact Statements, 2017)

Duration/Frequency of Effect	Description
Momentary	Effects lasting from seconds to minutes
Brief	Effects lasting less than one day
Temporary	Effects lasting less than a year
Short Term	Effects lasting one to seven years
Medium-term	Effects lasting seven to 15 years
Long-Term	Effects lasting 15 to 60 years
Permanent	Effects lasting longer than 60 years

3.5.3 Technical Assessments

All of the data collected as part of the preparation of this EIAR is relevant to the specific study area defined for each individual chapter. The data requirements for each environmental topic have been determined by technical specialists and are driven by relevant legislation, guidelines and planning and environmental policy requirements. Desktop reviews of existing information have been carried out for all environmental topics. These desktop reviews have been supplemented by specialised field studies and consultation with Dublin City Council and, by association, with other planning stakeholders as indicated in Table 3.2. Where required, site surveys/inspections by technical specialists have been carried out.

3.5.4 Identification of Likely Significant Effects of the project on the Environment

All specialist technical contributors to this EIAR have reviewed the design of the proposed development (i.e. FlexGen and BESS) and the information contained in Chapter 5 Description of the Development and identified likely significant effects based on their experience and expertise. The source and type of all potential impacts is clearly identified for each individual environmental topic in the relevant chapters of the EIAR.

The proposed developments have the potential to impact on the environment during its construction, operational and decommissioning phases.

Construction impacts can be temporary or permanent whereas operational impacts will typically tend to be permanent only. Construction phase impacts will also apply to decommissioning.

It should also be noted that the Poolbeg FlexGen and BESS facilities are situated within the Poolbeg Generating Station (EPA registration no. P0577-03) and the ESB will be required to

submit an application to the EPA for review of this licence. An industrial emissions licence will be required for the Ringsend FlexGen facility. A Decommissioning Management Plan for each site will be required as part of the IE Licence condition compliance.

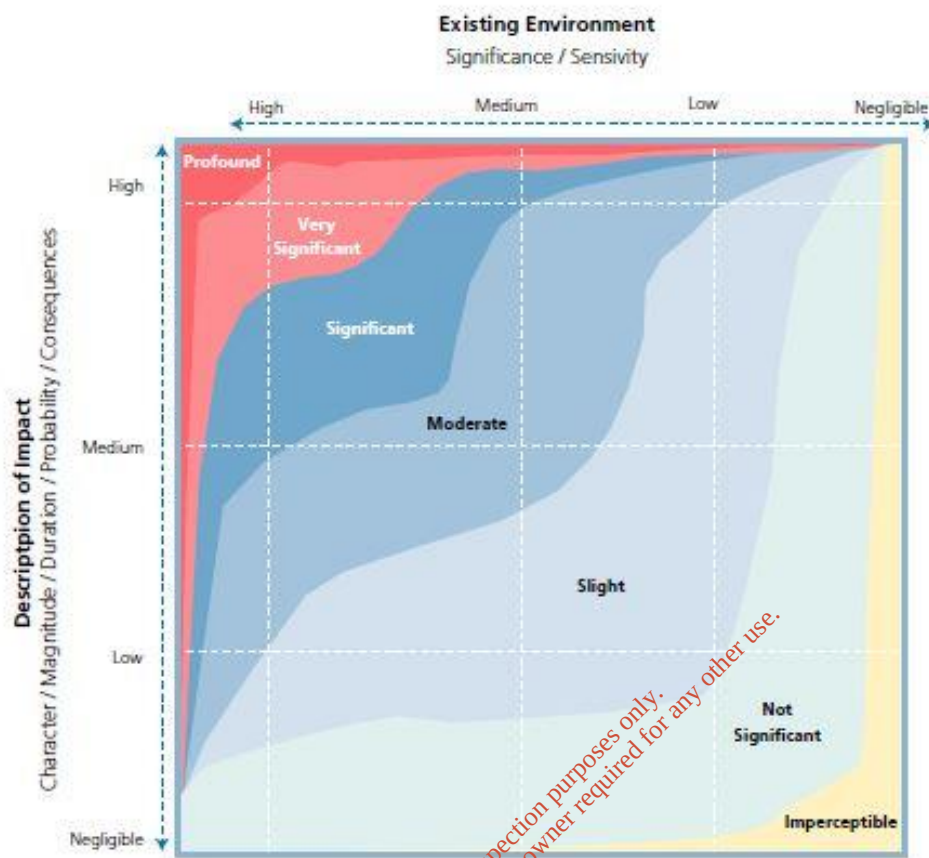
The description of the likely significant effects in this EIAR cover the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects of the project. In accordance with best EIA practice, the assessment of impacts is conservative, considering a 'reasonable worst case' where there is any degree of uncertainty'. The EIAR therefore constitutes a robust and transparent assessment of the 'likely significant environmental effects' associated with the 'worst case scenario'. The significance of potential impacts is assessed by evaluating the sensitivity of the baseline environment and the potential effects on the environmental resource affected. Each detailed assessment will define the type and characteristic of the potential impacts in relation to its topic having regard to criteria set out in Table 3.4 within the EPA Guidelines (Draft August 2017).

3.5.5 Determining Significance of Effects

The significance of a potential impact is defined by the sensitivity of the receiving environment and the description (i.e. magnitude/probability/duration) of the potential impact. The matrix that is used in this EIAR for evaluating the significance of environmental effects is set out in Figure 3.2. In some cases, magnitude or significance cannot be quantified with certainty, and in these cases professional judgement remains the most effective way to identify the significance of an impact. Where this is necessary, it will be highlighted within the text. A significant effect is generally accepted to be one which results in a at least a medium effect.

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Figure 3.2 Determining Significance of Effect



Source: EPA's Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (2017)

3.5.6 Mitigation and Monitoring Measures

There are four established strategies for the mitigation of effects - avoidance, prevention, reduction and offsetting. The efficacy of each is related to the stage in the design process at which environmental considerations are taken into account.

Mitigation measures that have been defined for each environmental topic are set out in the technical chapters comprising this EIAR. These mitigation measures relate to both the construction and operational phases of the projects. Mitigations, as proposed, are representative of best practice guidance in the respective specialist technical fields and given that these mitigations are not complex (in the context of standard design, engineering, construction and operational criteria) it is considered that alternative mitigations are required in this EIAR.

The mitigation measures and where appropriate proposed monitoring will be implemented by means of targeted management plans by the detailed design and construction phase project engineers and the associated construction contractors.

Monitoring provides assurance that proposed systems are operating as intended. This allows adjustments of operations to be made to ensure continued compliance with consent conditions such as emission limit values, conditions of operation, performance criteria/indicators and detection of unexpected mitigation failures. Post consent monitoring may include, for example, a

Construction Environmental Management Plan (CEMP) and a Construction Traffic Management Plan (CTMP). All agreed mitigation measures will be incorporated into these management plans. The content of these documents will be agreed with Dublin County Council and will be regularly reviewed and updated.

As part of the evolution of the design, mitigation measures have been incorporated into each individual project. These embedded mitigation measures are intended to 'design out' any potentially significant adverse environmental effects and are considered an integral component of the project.

Embedded mitigation measures relating to the construction phase for each of the four developments will be adopted by ESB and will be set out in the Construction Management Plan in Appendix 5A.

It should also be noted that the Poolbeg FlexGen and Poolbeg BESS facilities are situated within the Poolbeg Generating Station which has an existing Industrial Emissions Licence (P0577-03) from the Environmental Protection Agency. The Ringsend FlexGen facility will require an Industrial Emissions Licence from the EPA as its operations fall into the categories of industrial activity referred to the First Schedule of the *Environmental Protection Agency Act 1992*, as amended.

3.5.7 Residual effects

Any likely significant impacts that continue to exist when the mitigation and monitoring measures have been put in place are assessed for each individual environmental topic. These residual impacts are identified, and the relevant ones are described in detail and assessed (where appropriate) in terms of a combination of magnitude and significance.

3.5.8 Cumulative effects

Cumulative or in-combination effects takes account of the addition of many minor or significant effects, including effects of other projects, to create larger, more significant effects. While a single activity may itself result in a minor impact, it may, when combined with other impacts (minor or significant), result in a cumulative impact that is collectively significant.

The potential effects of each individual project are initially identified in isolation for each of the environmental topics. In addition, the cumulative effects of the four developments and other developments which are planned and have been granted planning permission within the relevant zone of influence for each environmental topic are described in each of the technical chapters of the EIAR.

4 Need for the Development

4.1 Introduction

The following chapter sets out the strategic energy market drivers for the proposed projects at EU, national and regional level. The key driver for the decarbonisation of the electricity network within Ireland are binding European targets to reduce greenhouse gas emissions. The strategies set out within this chapter detail how gas and energy storage developments will assist in facilitating increases in renewable energy generation to the national grid. A commentary on the demand for FlexGen and BESS facilities is provided which demonstrates the critical importance of these facilities to supporting increased renewables integration onto the transmission grid network and contributing towards achieving Ireland's renewable energy targets.

4.2 European Policy Context

The 'Climate Change and Energy Framework 2030' and energy directives 2012/27/E, 2009/28/EC, and 2018/2001/EU seek to make progress to achieve a low carbon economy.

4.2.1 European 2030 Climate and Energy Framework

The 2030 climate and energy framework was adopted by the European Commission on 22 January 2014. It is a communication setting out a framework for EU climate and energy policies in the 2020 to 2030 period. The 2030 framework aims to help the EU address issues such as:

- taking the next step towards the goal of reducing greenhouse gas emissions by 80% to 95% below 1990 level by 2050;
- high energy prices and the EU economy's vulnerability to future price rises, especially for oil and gas;
- the EU's dependence on energy imports, often from politically unstable areas;
- the need to replace and upgrade energy infrastructure and provide a stable regulatory framework for potential investors; and
- agree on a greenhouse gas reduction target for 2030.

4.2.2 Energy Roadmap 2050

The EU is committed to reducing greenhouse gas emissions to 80–95% below 1990 levels by 2050. Existing EU policies and measures created to achieve the 2020 goal of a 20% reduction in greenhouse gas emissions will continue to deliver beyond 2020 but would only achieve a 40% reduction by 2050. In order to achieve an 80% reduction, further reductions in emissions will be required. The roadmap sets out various scenarios for energy supply from different sources and estimates the effects on reducing carbon emissions.

The roadmap sets out various strategies for transforming the energy system. The prime focus remains on increased energy efficiency in new and existing buildings and providing incentives to adopt more carbon-efficient transport modes. The second major prerequisite for a more sustainable and secure energy system is a higher share of renewable energy beyond 2020. The scenarios developed in the roadmap suggest growing the renewable energy share to around 30%.

The energy supply systems currently in operation will need to change to help achieve the required reduction in carbon. Various initiatives are put forward such as moving away from nationally produced energy to EU-wide supply although this does raise issues in ensuring energy security. The roadmap identifies a need for a more flexible generation system as the contribution of intermittent renewable generation increases.

4.2.3 Renewable Energy Directive

The original renewable energy directive (2009/28/EC) established an overall policy for the production and promotion of energy from renewable sources in the EU. It requires the EU to fulfil at least 20% of its total energy needs with renewables by 2020 – to be achieved through the attainment of individual national targets.

In December 2018, the revised renewable energy directive 2018/2001/EU entered into force, as part of the Clean energy for all Europeans package, aimed at keeping the EU a global leader in renewables and, more broadly, helping the EU to meet its emissions reduction commitments under the Paris Agreement.

The new directive establishes a new binding renewable energy target for the EU for 2030 of at least 32%, with a clause for a possible upwards revision by 2023.

4.3 National Policy Context

The proposed FlexGen and BESS development satisfies the broad aims of the National Planning Framework (NPF) 2040 to secure a reliable, secure and cost competitive supply of energy to the power industry.

The approach, to raise the level of efficiency of power generation by the development of gas-fired power plants, is also emphasised in the Energy Policy Framework which requires the development of “immediate proposals for the development of new sites for additional flexible generation and to facilitate the competitive provision of additional mid-merit/flexible generating plant to address demand and capacity constraints”.

4.3.1 Project Ireland 2040 – Our Plan (National Planning Framework) [2018]

Project Ireland 2040 comprises the National Planning Framework to 2040 (hereafter referred to as the NPF) and the National Development Plan 2018-2027.

The NPF was published by the Government in February 2018 and is a 20-year planning framework designed to guide public and private investment, to create and promote opportunities for Irish citizens, and to protect and enhance Ireland’s built and natural environment. The NPF sets out five strategic actions required to achieve this vision:

- Developing a new region-focused strategy for managing growth;
- Linking this to a new 10-year investment plan, the Project Ireland 2040 National Development Plan 2018-2027;
- Using state lands for certain strategic purposes;
- Supporting this with strengthened, more environmentally focused planning at local level; and
- Backing the framework up in law with an Independent Office of the Planning Regulator.

The NPF notes that the population of Ireland is projected to increase by approximately 1 million people by 2040 which will result in a population of roughly 5.7 million. This growth will place

further demand on both the built and natural environment as well as the social and economic fabric of the country. In order to strengthen and facilitate more environmentally focused planning at the local level, the NPF states that future planning and development will need to;

“tackle Ireland’s higher than average carbon-intensity per capita and enable a national transition to a competitive low carbon, climate resilient and environmentally sustainable economy by 2050, through harnessing our country’s prodigious renewable energy potential.”

The NPF states that Ireland’s National Energy Policy is focused on three pillars: Sustainability; Security of Supply; and Competitiveness. In line with these principals, the **National Strategic Outcome 8** (Transition to Sustainable Energy), notes that in creating Ireland’s future energy landscape, new energy systems and transmission grids will be necessary to enable a more distributed energy generation which connects established and emerging energy sources, i.e. renewables, to the major sources of demand. ESB’s Brighter Future Strategy identifies new large energy consumers, such as data centres, as the key driver for electricity demand in Ireland for the immediate future. The growing energy demand within the Dublin region, is recognised within the NPF as it states that improving energy sustainability within Dublin and its surrounding Environs will be a key future growth enabler with regard to population and employment.

To facilitate this, the NPF acknowledges the need to:

‘Reinforce the distribution and transmission network to facilitate planned growth and distribution of a more renewables focused source of energy across the major demand centres.’

As such, some of the key National Policy Objectives identified in the NPF which the proposed FlexGen plant and BESS developments can assist in making a substantial contribution towards, include:

National Policy Objective 52: The planning system will be responsive to our national environmental challenges and ensure that development occurs within environmental limits, having regard to the requirements of all relevant environmental legislation and the sustainable management of our natural capital;

National Policy Objective 54: Reduce our carbon footprint by integrating climate action into the planning system in support of national targets for climate policy mitigation and adaptation objectives, as well as targets for greenhouse gas emission reduction; and

National Policy Objective 55: Promote renewable energy use and generation at appropriate locations within the built and natural environment to meet national objectives towards achieving a low carbon economy by 2050.

The reinforcement of Ireland’s renewable energy distribution network will subsequently facilitate planned growth and energy provision across major demand centres; however, the development of onshore and offshore renewable energy is critically dependent on the implementation of enabling infrastructure such as the proposed peaking plant and energy storage system. This is even more significant when considered in the context of EirGrid’s forecasting that there is currently inadequate generation capacity to meet median demand level from 2026 on an All-Island basis. The available support provided by the proposed FlexGen plant and complementary BESS development will therefore comply with both the strategic outcomes envisioned by the National Energy Policy and National Strategic Outcomes of the NPF.

4.3.2 Project Ireland 2040 – Our Plan - National Development Plan 2018-2027

The National Development Plan 2018-2027, hereafter referred to as the NDP, sets out the investment priorities at national, regional and local planning levels that will facilitate the implementation of the NPF. In the context of the energy sector, the principle objective of the NDP is to assist in ensuring a 'long-term, sustainable and competitive energy future for Ireland'. Targeted investment within regulated network infrastructure ensures that Ireland's power grid is:

- Maintained to the highest international safety standards;
- Fit for purpose in the medium to longer-term in order to meet projected demand levels; and
- Meets the challenge of integrating world-leading levels of renewable energy.

Similar to the precedent set out in the NPF, the NDP states that investments within grid infrastructure are an important enabler of economic growth, and as such, the energy sector will play critical role to play in meeting priority infrastructural needs. The proposed FlexGen and BESS developments represent the type and nature of investment described within the NDP required to achieve the NPF's strategic outcomes.

4.3.3 Government White Paper - Ireland's Transition to a Low Carbon Energy Future 2015-2030

The Government White Paper entitled *Ireland's Transition to a Low Carbon Energy Future 2015-2030* sets out a framework to guide Ireland's energy policy development. This White Paper is an update of the 2007 White Paper and sets out a framework to guide policy and actions that the Irish Government intends to take in the energy sector up to 2030 and also reaching out to 2050. The framework was developed in the context of the significant role played by European institutions in determining energy policy, markets and regulation. Similarly, it takes account of European and international climate change objectives, in particular the Renewable Energy Directive.

The Energy Vision 2050 established in the White Paper describes a 'radical transformation' of Ireland's energy system which it is hoped will result in GHG emissions from the energy sector reducing by between 80% and 95%, compared to 1990 levels. This means that the diversification of energy supply during the national transition to a renewable energy system will need to shift away from carbon-intensive fuels such as peat and coal in favour of lower carbon fuels like natural gas.

The White Paper notes that:

*"Renewable energy will also play a central role in the transition to low carbon energy. No single renewable energy technology – existing or emerging – will alone enable Ireland to overcome the low carbon challenge. Rather, **a diverse range of technologies** will be required along the supply chains for electricity, heat and transport".*

"Onshore wind continues to be the main contributor (18.2% of total generation and 81% of RES-E in 2014). It is a proven technology and Ireland's abundant wind resource means that a wind generator in Ireland generates more electricity than similar installations in other countries. This results in a lower cost of support. Due to the variability of wind conditions, wind generation poses challenges to the operation of electricity grids. In Ireland, these challenges are being addressed by the electricity system operators under their DS3 programme.

"Electricity storage is expected to play an important role in facilitating the deployment of intermittent renewable energy technologies like wind, solar PV and ocean energy".

In addition to this, of direct relevance to the proposed FlexGen plants, the White Paper acknowledges that an uninterrupted supply of energy is vital to the functioning of Irish society and economy. Thus, adequate infrastructure and the diversification of energy supply which avoids overdependency on any particular fuel, supplier, route or region is necessary. Natural gas will therefore remain a significant element of Ireland's energy supply. Grid connected battery storage would allow more efficient use of the network, maintain high standards of security of supply, and keep network operating costs lower than they would be without storage.

4.3.4 Climate Action Plan 2019

The Climate Action Plan 2019 sets out a 'roadmap' comprised of 183 no. actions to achieve net zero carbon energy system by 2050, and in the process, create a resilient, vibrant and sustainable country. This Plan builds on the policy framework, measures and actions set out in the National Mitigation Plan, Project Ireland 2040 and the draft 2030 National Energy and Climate Plan.

The targets and objectives established by the Europe 2030 Climate and Energy Framework and the Paris Agreement on climate change requires a transformational shift in the Irish economy and society in order facilitate climate resilience and sustainable development. As noted previously, Ireland will miss the target set for the period 2013 to 2020. Furthermore, EPA's Greenhouse Gas Emissions 2018-2040 projections (2019) indicate that Ireland faces significant challenges in meeting EU 2030 reduction targets in the non-ETS sector and national 2050 reduction targets, particularly in electricity generation. Specifically, it is estimated that emissions from the energy sector are projected to increase by 31% to 15.4 Mt CO₂eq between 2018 and 2030.

The Draft 2030 National Energy and Climate Plan envisages a target of at least 55% renewable energy in electricity by 2030. As of June 2019, the Irish government has confirmed that Ireland will now aim for at least 70% of Ireland's electricity supply to be generated from renewables by 2030 with no generation from peat and coal. This is considered an opportunity to create a sustainable electricity system, which the proposed FlexGen and BESS developments will support, that will meet the needs for the next generation.

To achieve Ireland's 2030 target and subsequent net zero carbon energy system by 2050, a detailed sectoral roadmap has been designed to deliver a cumulative reduction in emissions over the period 2021 to 2030 of 58.4 MtCO₂eq. The analysis presented in the Plan shows that it is technically feasible to meet the 2030 EU target, but that it is also economically achievable.

In the context of electricity, the Plan acknowledges that Ireland has to date been very successful in deploying renewable electricity with 30.1% of electricity produced from renewable sources in 2017. The Plan notes that demand for electricity is forecasted to increase by 50% above existing capacity in the next decade. Therefore, in order to achieve the target of 70% in the context of rising energy demand, significant progress in renewable electricity deployment will need to continue, with an increased deployment rate of all renewable electricity technologies.

- At least 3.5 GW of offshore renewable energy;
- Up to 1.5 GW of grid-scale solar energy; and
- Up to 8.2 GW total of increased onshore wind capacity.

The Plan states that increased levels of renewable generation will require new infrastructure, such as dispatchable capacity (e.g. natural gas peaking plants that can generate electricity at times where there is no wind) such as the proposed FlexGen plants. Storage development, such as the proposed BESS development, will be incentivised as they are also recognised as

critical infrastructure to absorb the high levels of renewable energy generation. Two actions which in part comprise the 'roadmap' are considered directly relevant to the proposed development:

- Action 17: Ensure that ESB Networks and EirGrid plan network and deliver on connecting renewable energy sources to meet the 2030 70% RES-E target; and
- Action 18: Facilitate additional hybrid connections (e.g. solar/wind/batteries) operating in the electricity market to increase RES-E penetration.

4.3.5 National Mitigation Plan 2017

The first National Mitigation Plan represents an initial step for Ireland on a pathway to achieve decarbonisation. The measures that will be implemented through this first Plan will lay the foundations for transitioning Ireland to a low carbon, climate resilient and environmentally sustainable economy by 2050. The Government recognises that this first Plan does not provide a complete roadmap to achieve the 2050 objective but begins the process of development of medium to long term mitigation choices for the next and future decades. The strategic aims of the National Mitigation Plan include:

- Policy will contribute to reductions in Ireland's greenhouse gas emissions and enhancement of sinks in a manner that achieves the optimum benefits at least cost;
- A stable and predictable policy and regulatory framework will be underpinned by rigorous analysis and appraisal, supported by strong research and analytical capacity; and
- The Government will pursue investment, innovation and enterprise opportunities towards building a competitive, low carbon, climate-resilient and environmentally sustainable economy.

Analysis by SEAI found that since 1990, there has been a positive correlation between the reduced share of high carbon content fuels in electricity generation, such as peat, coal and oil, in relation to the rise in the relatively lower carbon natural gas and zero carbon renewables. This trend of resource consumption supports the Plan's forecast that:

"Between now and 2050 we [Ireland] will move from a centralised fossil fuel-based electricity system to a low carbon power system. Smart operation of the power system at both transmission and distribution level and energy efficiency will enable maximisation of the existing grid. Increased levels of renewable generation will be accompanied by the development of large scale technology solutions, such as pumped storage and battery storage, together with demand response to complement the challenges posed".

In the context of the proposed FlexGen plants and BESS developments, the Plan states that fossil fuels are incompatible with a low carbon economy and as their use is be greatly diminished, the dispatchable natural gas fired peaking plants will be required in electricity generation. Specifically, as greater volumes of intermittent renewable electricity are connected to the grid, new measures and systems, including back up technologies such as energy storage, will be required to ensure grid stability is maintained.

4.3.6 Strategy for Renewable Energy 2012-2020

The Department of Communications, Energy and Natural Resources publication, Strategy for Renewable Energy 2012 – 2020, outlines the strategic goals which underpin the Government's energy and policy objectives. The Strategy articulates the key actions to be undertaken to support the development of each of the renewable energy sectors to deliver on Ireland's binding

2020 targets under the Renewable Energy Directive. These include the following strategic goals:

- Strategic Goal 1: Progressively more renewable electricity from onshore and offshore wind power for the domestic and export markets; and
- Strategic Goal 5: An intelligent, robust and cost-efficient energy networks system.

Under Strategic Goal 5, the Strategy acknowledges the overarching requirement for the modernisation and expansion of the electricity grid to accommodate the growth of renewable energy such as wind generation. In addition to investment in infrastructure, the Strategy notes that it will be equally necessary to adapt the grid to operate in a 'smarter' manner in order to overcome the challenges associated with large scale penetration of renewable technologies on the overall energy system. The proposed FlexGen and BESS developments are in accordance with Strategic Goal 5.

National Renewable Energy Action Plan

The Renewable Energy Directive 2009/28/EC requires that all member states adopt a national renewable energy action plan (NREAP). The Government set the target of 40% of electricity consumption from renewable sources by 2020. The sectoral target and trajectories of energy from renewable resources are set from the year 2005 to 2020. Within the NREAP the electricity sector baseline in 2005 was 6.9%, with a target of 42.5% for 2020 prescribed. The expected gross final consumption of electricity from renewable sources was stated as 180 ktoe in 2005, with a target of 1,196 ktoe for 2020.

Ireland submitted its fourth, and most recent progress report on the 2020 national targets in February 2018. The progress report outlines that Ireland met the interim target set by the Renewable Energy Directive for 2015-2016, reporting an average final energy consumption of 9.5% over that two-year period, against a target level of 8.92%. The electricity sector recorded an actual consumption of energy from renewable sources of 27.2% in 2016, which was below the estimated trajectory of 32.2% for that year. The gross final consumption of electricity from renewable resources was recorded as 687ktoe in 2016, which was below the original estimate within the NREAP of 862ktoe.

4.3.7 DS3 Programme

In response to the binding European and national total energy consumption targets EirGrid began a multi-year programme, "Delivering a Secure, Sustainable Electricity System" known as the DS3 Programme. To date the DS3 Programme has enabled increased instantaneous penetration levels of renewable generation on the system from 50% to 65%, with the aim to increase levels to 75% gradually over the coming years and ultimately achieve 95% instantaneous renewable generation penetration by 2030.

The DS3 Programme is designed to ensure that the increasing amount of renewable energy required on the Irish power system can operate in an efficient, secure and safe manner. The national power system operates as a synchronous system, whereby electricity is generated at a single synchronised AC frequency. Ireland and Northern Ireland form such a system – all of the conventional generators on the island run in synchronism, producing electricity at 50Hz. The growth of renewable energy generation, which is a non-synchronous form of power generation, presents a range of operational challenges for the power system as it displaces traditional synchronous generation on the system. This non-synchronous technology poses challenges in maintaining power system stability (maintaining system frequency within desired limits) and security due to both its non-synchronous characteristics and the inherent variability of

renewable energy which is dependent upon climatic conditions. This variability must be managed to ensure demand for electricity is met at all times.

A suite of system services has been developed as part of the DS3 Programme. These system services have been designed to aid the system operator in maintaining system stability and security as the level of renewable generation on the system increases. Under the DS3 System Services procurement programme required services vary from Fast Frequency Response (FFR) and Primary Operating Reserve (POR) with response times of 0.1 to 90 seconds and Tertiary Operating Reserve (TOR1 & TOR2) with response times between 90 seconds and 20 minutes. Plants are also remunerated for voltage control services and the provision of synchronous inertia.

The FlexGen plants will be able to meet the TOR2 response of 5 to 20 minutes, while the BESS plants can provide both FFR and POR when the system frequency deviates from the desired limits and TOR responses for where it identifies the need for short-term grid support. The BESS units can also control the local voltage profile in the Dublin region without producing or consuming any active power.

Also, recently the CRU has approved an additional allocation of DS3 revenue streams for the Dublin region only to cover supply shortages. This package focuses on incentivising the TOR2 ramping products and local voltage control support.

The provision of these capabilities from the proposed FlexGen and BESS development will mean that Ireland can continue to invest in renewable sources of power.

4.3.8 Strategy 2020-2025 Transform the power system for future generation

EirGrid Group published a five-year strategy in September 2019 outlining a strategic response to the transition of electricity generation to a sustainable low-carbon future. EirGrid Group has a leadership role in the transformation of the All-Ireland electricity system as the operator and developer of the transmission grid on an all-island basis.

The primary goal of the strategy is to support the continued decarbonisation of electricity generation within Ireland in response to the climate crisis. As coal, peat and oil-burning electricity generation is phased out during the period up to 2030 the generation of renewable energy will be pivotal in the significant transformation of the All-Ireland electricity system. The future operation of the electricity system will be required to be more dynamic and responsive, consequently, improvements to infrastructure are required to consolidate the strength and flexibility of the transmission grid to accommodate an additional 10,000 megawatts of renewable generation to the electricity system. EirGrid aim to achieve this through using both innovative and proven technologies to ensure the reliability of the electricity system. The primary goal of the Strategy 2020-25 is supplemented by supporting goals including the enhanced operation of the Single Electricity Market and strategic planning to take advantage of future interconnectors and infrastructure investment. It also identifies the requirement for a major collaborative programme with ESB networks, NIE networks and neighbouring transmission systems using interconnectors for successful and productive partnerships.

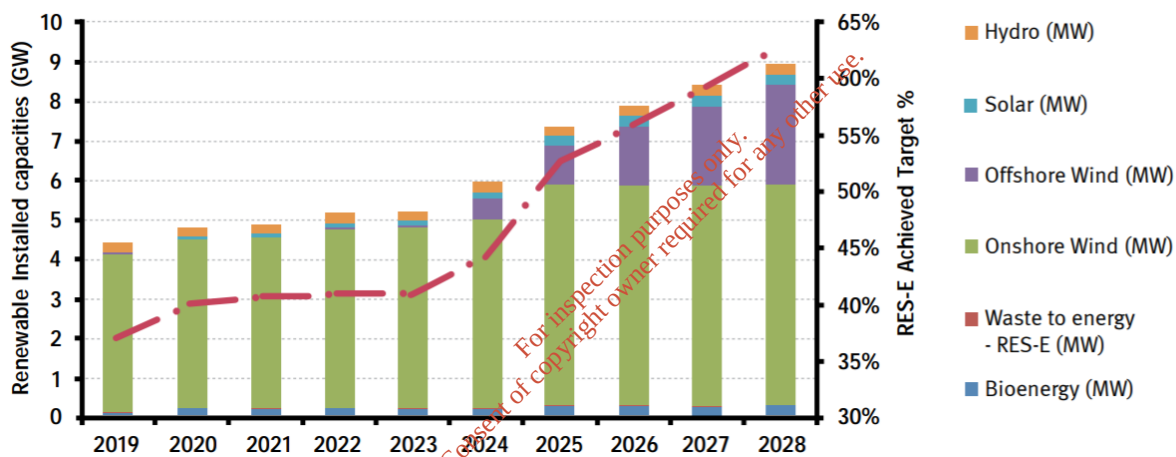
4.3.9 All-Island Generation Capacity Statement 2019-2028

This statement was published by EirGrid and SONI (System Operator for Northern Ireland) outlining the expected electricity demand and the level of generation capacity that will be required on the island over the next ten years. The scenarios generated within the statement

forecast that on an all-island basis the growth in energy demand over the period up to 2028 varies between 18% in the low demand scenario, to 41% in the high scenario. In the Ireland (Republic of Ireland) scenario the demand is greater, 23% in the low demand scenario and 47% in the high demand scenario. The significant increase in demand is largely due to the expected expansion of large energy users such as data centres.

As illustrated in Figure 4.1 below, wind energy will be the main generation source to assist in reaching the 2030 renewable energy targets as an export capacity deficit across all demand scenarios is predicted. The High Demand has the greatest predicted capacity deficit of 1130MW for the All-Island system, following the planned closure of high carbon generation plants.² The document states that increased intermittent renewable sources pose challenges related to the mismatch between energy generation and consumption and states that “*Sufficiently flexible energy storage systems, particularly those connected through fast-response electronic interfaces would ideally complement a varied and disperse generation portfolio*” It highlights that Battery Energy Storage will facilitate the integration of increased renewable generation.

Figure 4.1: Example of renewable energy generation portfolio which could achieve the 70% RES-E target



Source: EirGrid/SONI Strategy 2020-2025 Transform the power system for future generation (2019), Figure 19

The importance of gas generation is recognised within the statement. A total of 4.9 GW from the 8.3 GW of de-rated capacity which cleared in the T-1 2019/2020 All-Island capacity auction is from gas turbines. As illustrated within the statement gas turbine technology will continue to be an important technology in electricity generation on the journey to a low carbon future.

² Deficit has been predicted following the closure of Aghada (AT1), North Wall 5, Tarbert 1, 2, 3, 4, and Moneypoint

4.4 Regional Policy Context

4.4.1 East Coast Generation Opportunity Assessment (EirGrid, Feb 2019)

It is now likely that offshore wind generation will play a key part in meeting Ireland's 2030 climate change targets. It is expected that the initial phases of offshore wind generation development in Ireland will be focused on the East coast of the country.

In tandem with the development of offshore wind generation, EirGrid have also had numerous enquiries about the connection of large, conventional thermal generation projects in the Dublin area. Electricity demand is increasing rapidly in the greater Dublin region. It is likely that both offshore wind and new thermal generation will be required to meet the growing electricity demands in the eastern region.

The East Coast Generation Opportunity Assessment presents analysis that EirGrid has undertaken to identify the opportunities for connecting new power generation sources in the east coast region of Ireland from a grid capacity perspective. The analysis provides useful information for developers seeking to connect generation in the region.

The assessment considers a range of locations with strong 220 kV electrical connectivity to the Dublin region. The locations considered are strong points on the grid: Carrickmines and Arklow in the South Dublin/Wicklow area, Louth and Woodland in the Meath/Louth area and Poolbeg and Finglas in the Dublin City area.

The results indicated that locations close to the Dublin load centre and/or with multiple 220 kV connections into the Dublin area have the best opportunities for new generation capacity.

Poolbeg and Finglas were identified as having available capacity for up to 450 MW high-merit conventional thermal generation owing to the connections to the 220 kV transmission node in these areas. The assessment states that this capacity is specifically related to the assumption that the new generator would be very high in the merit order and therefore likely displace some existing conventional generation in these areas. This ensures that excessive power flows do not occur on certain critical circuits such as between Inchicore and Poolbeg and between Finglas and Corduff substations.

4.5 Conclusions

The proposed developments are consistent with the objectives of the Climate Action Plan 2019 and other national and European climate energy policies. The developments will provide an important component of the energy generation fleet required to meet Ireland's renewable energy targets by managing fluctuating electricity demands and compensating for intermittency associated with renewable energy generation from wind and solar.

The proposed FlexGens will provide quick response capabilities to EirGrid as part of the DS3 Programme to ensure that the electricity network can operate efficiently with the integration of additional renewable energy which, as set out in the Climate Action Plan 2019, is estimated at 13.2GW (13,200MW) in the period up to 2050. The proposed BESS developments will store surplus energy generated during low demand periods and release this when demand is greater. This provides security of supply during periods of high demand and means that Ireland can continue to invest in renewables into the future. In addition, the fast acting DS3 system services which the BESS can offer will help contribute to the stability of the system as the penetration of renewable generation on the system increases.

5 Description of the Proposed Developments

5.1 Overview of Proposed Developments

This EIAR relates to four distinct and independent proposed developments situated on the Poolbeg Peninsula, Dublin. Following consultation with DCC a single voluntary EIAR for the combined projects has been prepared.

ESB is proposing to develop two 75MWe (megawatts electrical) of flexible thermal generation (FlexGen) and two (one 75MW and one 30MW) battery energy storage systems (BESS). These facilities have been proposed as part of the wider move towards generating electricity using renewable energy sources.

The developments are referred to as follows:

- Poolbeg FlexGen
- Poolbeg BESS
- Ringsend FlexGen
- South Wall BESS.

The proposed Poolbeg FlexGen and Poolbeg BESS developments are situated in the eastern side of the Poolbeg Peninsula within the existing Poolbeg Generating station. The Ringsend FlexGen and South Wall BESS developments are located on the western side of the Poolbeg Peninsula, west of the existing Poolbeg Power Plant site.

5.2 What is FlexGen?

The purpose of the FlexGen units is to provide additional generating capacity during periods of high demand or when weather conditions mean renewable sources cannot meet demand. FlexGen refers to flexible thermal generation, and the operational nature of these plants is such that they do not operate in a traditional power generation sense on a continual basis but instead operate intermittently during peak electrical demand periods. This type of power plant is designed to operate when electricity demand is higher than average and will facilitate the increased use of renewable energy technologies, such as solar, and wind energy by providing energy to the national grid during periods when the energy available from the renewable technologies is insufficient.

Both proposed FlexGen developments will consist of 75MWe (electrical output) modular aero derivative dual fuel fired turbine referred to in this instance as a FlexGen/Thermal Peaker Plant due to their operational nature described above.

Natural gas, supplied from the Gas Networks Ireland national grid, will be the primary fuel for both FlexGen developments. However, in order to comply with Commission for Regulation of Utilities requirements, low sulphur diesel oil will be required as a backup fuel.

It should be noted that operation on the backup fuel is anticipated to occur for approximately 18 hours per year for testing purposes in accordance with the Transmission System Operator's

(EirGrid's) Grid Code which establishes the rules governing the electricity transmission systems and the procedures governing the actions of all transmission system users. The FlexGen plants will only operate on distillate in the event of a national electrical system emergency or an interruption to gas supply and for short duration testing.

Each electrical generator will be connected to transformers which will increase the voltage from 11.5 kV to 220 kV. Electrical energy will be conducted via underground cables from these transformers to the closest existing 220 kV indoor electrical substation from where it will be exported to the national electrical grid. This is described in more detail for each proposed FlexGen development in Sections 5.5 and 5.7.

Both FlexGens will be constructed on level sites. The larger items will be supported on foundations piled through the softer marine sediments underlying the site with smaller items founded on ground-bearing slabs.

Each FlexGen will comprise numerous components which are listed in Table 5.1. A more detailed description of these components is provided in the following sections of this chapter. A typical FlexGen unit is shown in Figure 5.1.

Table 5.1: FlexGen Development Key Components Dimensions

Building/Plant	Dimensions	Drawing Reference	
		Poolbeg	Ringsend
Turbine Module with Stack	L: 29m, W: 10.4m, H: 30m	QP-000026-04-D460-012	QP-000027-04-D460-012
Gas Reducing Building	L: 8m, W: 6m, H: 6m	QP-000027-04-D460-013	QP-000026-04-D460-025
Compressed Air and Fire Suppression Building	L: 6m, W: 6m, H: 3m	QP-000027-04-D460-014	QP-000026-04-D460-020
Control & Instrumentation (C&I) Communications Module	L: 17.8m, W: 5.7m, H: 4.7m	QP-000027-04-D460-039	QP-000026-04-D460-036
Welfare Facilities	L: 17.8m, W: 5.7m, H: 4.7m	QP-000027-04-D460-015	QP-000026-04-D460-024
Gas Compressor Building	L: 16m, W: 8m, H: 6m	QP-000027-04-D460-016	QP-000026-04-D460-014
Transformer Compounds	L: 59.5m, W: 22m, H: 5.6m	QP-000027-04-D460-017	QP-000026-04-D460-015
Demineralised Water Forwarding Pumps	L: 3m, W: 3m, H: 5m	Not included	QP-000027-04-D460-019
Water Treatment Plant & Pumps	L: 19.9m, W: 10.5m, H: 5.4m	QP-000027-04-D460-018	Not included
Fin Fan Coolers	L: 14.7m, W: 3.1m, H: 5m	QP-000027-04-D460-019	QP-000026-04-D460-016
Raw / Fire Water Tank	Diameter (tank): 14.63 m, H: 14 m	QP-000027-04-D460-020	Not included
Demineralised Water Tank	Diameter (tank): 14.2m, H: 12m	QP-000027-04-D460-021	
Demineralised Water Tank	Diameter (tank): 15.5m, H: 14.4m		QP-000026-04-D460-018
Liquid Fuel Tank	Diameter (tank): 6m, H: 9m	QP-000027-04-D460-022	
Liquid Fuel Tank	Diameter (tank): 10.06m, H: 9m		QP-000026-04-D460-033
Lube Oil Skid	L: 2.74m, W: 1.38m, H: 3.26m	QP-000027-04-D460-023	QP-000026-04-D460-022

Building/Plant	Dimensions	Drawing Reference	
		Poolbeg	Ringsend
Gas Compressor Cooler	L: 7m, W: 4m, H: 4m	QP-000027-04-D460-024	QP-000026-04-D460-021
Electrical Equipment Module	L: 17.8m, W: 5.7m, H: 4.7m	QP-000027-04-D460-025	QP-000026-04-D460-013
House Transformer	L: 3.3m, W: 3.3m, H: 2.5m	QP-000027-04-D460-026	QP-000026-04-D460-026
Fire Fighting Pumps	L: 10m, W: 8m, H: 5m	QP-000027-04-D460-027	Not included
Emergency Diesel Generator	L: 7.4m, W: 3m, H: 2.6m	QP-000027-04-D460-028	QP-000026-04-D460-023
Liquid Fuel Forwarding Building	L: 6m, W: 3m, H: 5m	QP-000027-04-D460-029	QP-000026-04-D460-027
Water Wash Cart	L: 4.78m, W: 2.24m, H: 1.84m	QP-000027-04-D460-030	QP-000026-04-D460-028
Water Injection Skid	L: 3.86m, W: 3m, H: 3.73m	QP-000027-04-D460-031	QP-000026-04-D460-029
Continuous Emissions Monitoring System (CEMS) Hut	L: 5.45m, W: 2.44m, H: 2.7m	QP-000027-04-D460-032	QP-000026-04-D460-030
Liquid Fuel Forwarding Skid	L: 2.4m, W: 1.3m, H: 2.5m	QP-000027-04-D460-033	QP-000026-04-D460-032
Gaseous Fire Suppression Cabinet	L: 4.27m, W: 2.59m, H: 2.24m	QP-000027-04-D460-034	QP-000026-04-D460-031
Generator Circuit Breaker	L: 7m, W: 3m, H: 6.55m	QP-000027-04-D460-035	QP-000026-04-D460-034
Power Control Module (PCM)	L: 17.8m, W: 5.7m, H: 4.7m	QP-000027-04-D460-036	QP-000026-04-D460-037
Spare Parts Storage Container	L: 12m, W: 3m, H: 2.59m	QP-000027-04-D460-037	Not included
Pipe Bridge	L: 10.2m, W: 2.95m, H: 7.5m	QP-000027-04-D460-038	QP-000026-04-D460-035

Source: ESB Planning drawings in Appendix 1

Figure 5.1: Typical FlexGen Unit



Source: ESB

5.3 What is BESS?

The purpose of the BESS developments is to store surplus energy generated during low demand periods and release this when demand is greater. Additionally, the stored energy is used to provide fast acting DS3 system services which contribute to the stability of the system as the penetration of renewable generation on the system increases.

The BESS units are modular and will be arrayed across each site along with associated transformers and inverters. An example of a typical BESS unit is shown in Figure 5.2. The dimensions of the BESS unit typically incorporating a concrete base, battery modules, associated plant and equipment including transformers and inverters are of the order of 21 to 24m by c. 5m wide by c. 4m high.

Figure 5.2: Typical BESS



Source: ESB

A BESS operates in either a charging mode or a discharging mode. During discharging mode power from the batteries is converted from direct current to alternating current by an inverter. Power from all the batteries is stepped up through a transformer to a 33 kV busbar which then connects to a main transformer and from there an underground cable connects the facility to the grid. During charging mode, the process is reversed and electricity from the grid is fed into the batteries and the energy is stored.

The design adopted allows for minimising on-site construction as each modular component is manufactured off-site and transported to site for final assembly. Each BESS unit will be transported to site already built, the site works will include installation, connection via cables and commissioning. Inverters and transformers will also be transported to site as complete functional units ready for installation and connection on site.

Where possible each substation/control building will be constructed using prefabricated building units to minimise on-site works. Cladding and insulation will be fixed and the buildings will be made weather tight. Internal walls will be installed where required. Prefabricated units will be divided into standard transportable sizes where possible and will be craned into position. If the use of prefabricated buildings is not possible a traditional masonry block, flat roof, single storey building may be constructed for use as a substation/control building.

5.4 Poolbeg Peninsula

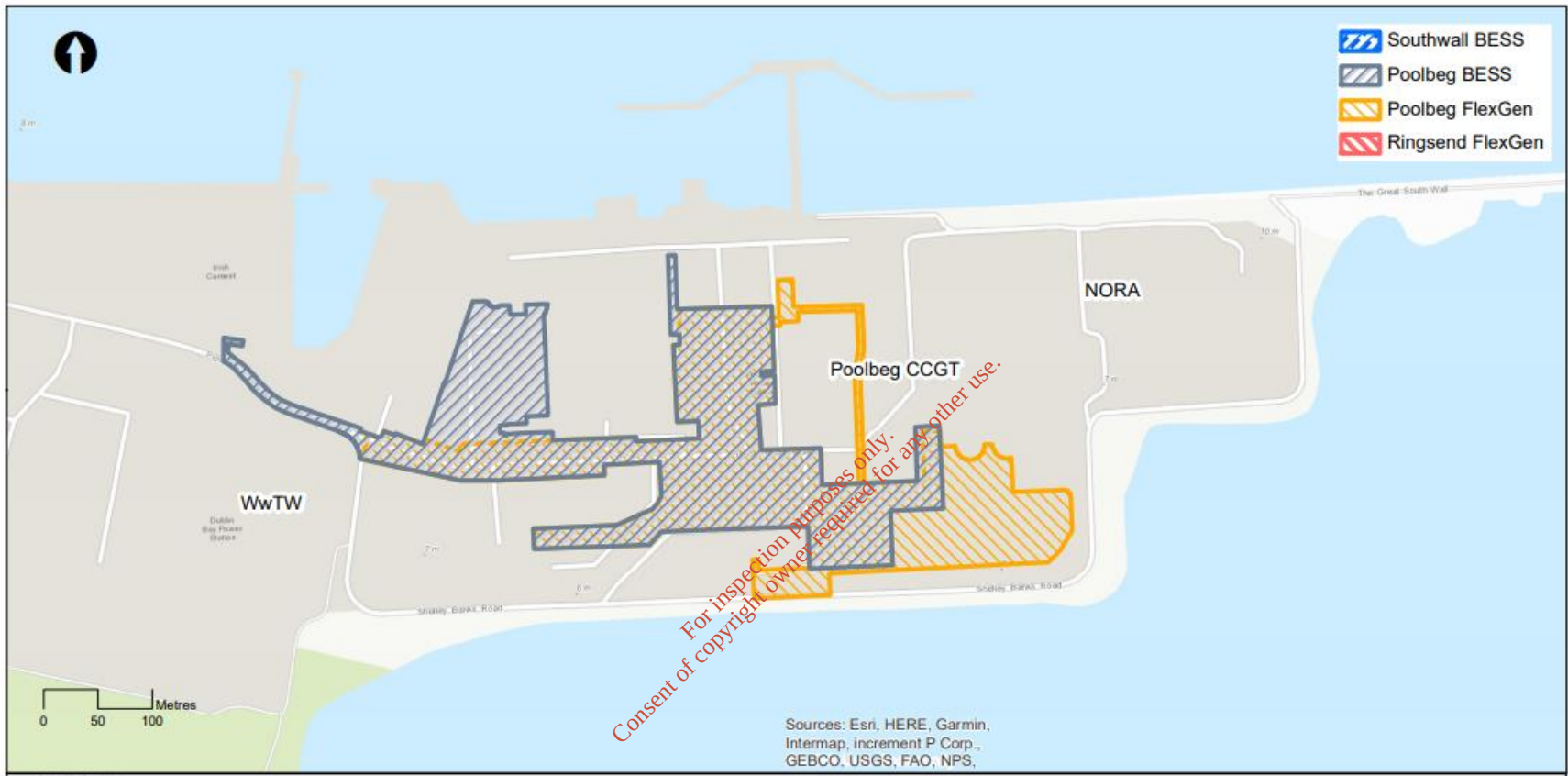
The four proposed developments are located on the Poolbeg Peninsula. Their locations and the temporary associated construction corridors, access routes and lay down areas are shown in Figure 5.3.

Figure 5.3: Proposed Development Sites on the Poolbeg Peninsula



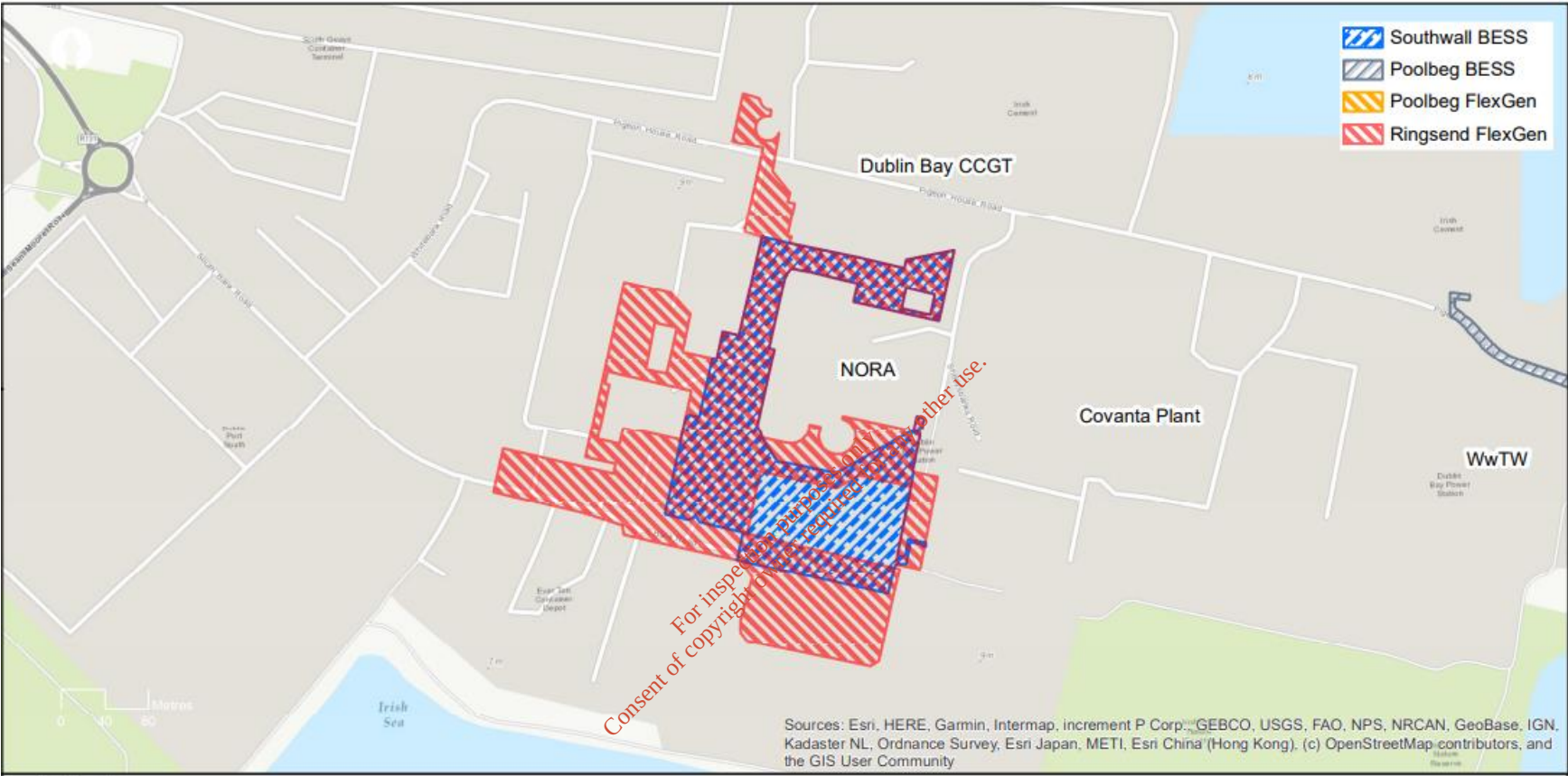
Source: Mott MacDonald Copyright © 1995-2018 Esri

Figure 5.4: Poolbeg FlexGen and Poolbeg BESS Locations



Source: Mott MacDonald Copyright © 1995-2018 Esri

Figure 5.5: Ringsend FlexGen and South Wall BESS Location



Source: Mott MacDonald Copyright © 1995-2018 Esri

The wider area is a heavily industrialised city port with a mixture of power generation, wastewater treatment and other commercial enterprises associated with the docks. The peninsula supports a number of large industrial/municipal installations which are listed in Table 5.2 below.

Table 5.2: Licensed Facilities on the Poolbeg Peninsula (source: www.epa.ie)

No.	Facility	Licence No.	Licence Type/Status
1	Former Irish Glass Bottle Factory Site (Beckbay Limited)	P0164-01	IPC Surrendered
2	Dublin Bay Power (Synergen Power Limited)	P0486-02	IE Licenced
3	The Hammond Lane Metal Company Limited	P1002	IE Licenced
4	ESB Poolbeg Generating Station	P0577-03	IE Licenced
6	Dublin Waste to Energy Limited (Covanta)	W0232	IE Licenced
7	Poolbeg/Irishtown Wastewater Treatment Works (Ringsend?)	LDW/001/93	Section 4 Discharge Licence

The existing ESB Poolbeg Generating Station occupies a significant portion of the eastern section of the peninsula, it was initially completed in 1971 and now covers an area of approximately 36ha. The existing ESB complex comprises the following;

- Existing combined cycle gas turbine (CCGT) station;
- National Oil Reserve Agency (NORA) oil tanks within the north eastern extent of the site, (this area has been leased to NORA);
- A significant portion of the western part of the site is occupied by buildings associated with the original power station which have been decommissioned.
- The brick and concrete stacks (Poolbeg Towers), associated with the decommissioned gas fired units, are located in the northern portion of the existing complex.
- Multiple existing office facilities, many of which are no longer occupied.
- A combination of hardstand and grassed areas.

The northern aspect of the existing ESB Generating station fronts the “South Wall” of Dublin Bay and the Liffey Estuary. The Irishtown Nature Park is located to the south of the station complex and a popular coastal walking route is located between Sandymount via the Irishtown Nature Park to the Great South Wall. Poolbeg Beach and Shellybanks Beach are located south of the station in Dublin Bay.

Each of the four proposed developments will utilise existing infrastructure on the Poolbeg Peninsula. This is described in Table 5.3 below:

Table 5.3: Use of Infrastructure on the Poolbeg Peninsula (Operational Phase)

Shared Infrastructure	Poolbeg FlexGen	Ringsend FlexGen	Poolbeg BESS	South Wall BESS
Access	Existing Poolbeg Generating Station Access	Accesses from South Bank Rd	Existing Poolbeg Generating Station Access	Access from South Bank Rd and Shellybanks Rd.
Gas	Connection to proposed upgraded GNI infrastructure. within the Poolbeg Generating Station.	Connection to proposed upgraded GNI infrastructure.	Not applicable	Not applicable
Liquid Fuel	On-site back-up fuel tank (c.182 m ³) with a metered supply from existing Poolbeg CCGT tanks	On-site back-up fuel tank (c.477 m ³) with a metered supply from existing DBP tanks or existing NORA tanks.	Not applicable.	Not applicable.
Demineralised Water	Water Treatment Plant on site taking its source from an Irish Water Townswater Mains supply. Demin Water Storage Tank on-site (c.1,540m ³). Alternatively, a supply may be taken from the existing Poolbeg CCGT Demin Water Storage Tanks.	On-site Demin Water Tank (c.1,923 m ³) fed by metered supply from existing water treatment plant facility at Dublin Bay Power Station.	Not applicable.	Not applicable.
Potable Water	New connection to Irish Water towns mains supply or alternatively may be supplied from the existing Poolbeg CCGT Raw Water Storage Tanks.	New connection to Irish Water towns mains supply.	Minor volumes of potable water for a small basic welfare facility taken from the mains supply for the Station.	Minor volumes of potable water for a small basic welfare facility via connection to public infrastructure.
Fire Protection	Fire Water tank on site (c.2,044 m ³). Alternatively, it may be a 'dry site' without a dedicated firewater system. There will be fire hydrants required on site for fire water supply. These will be supplied via connection to public infrastructure.	"dry site' without a dedicated firewater system. There will be fire hydrants required on site for fire water supply. These will be supplied via connection to public infrastructure or if determined to insufficient could connect to existing firewater system in DBP.	"dry site' without a dedicated firewater system. There may be fire hydrants required on site for fire water supply. If fire hydrants are to be installed they will be supplied via connection to public infrastructure.	'dry site' without a dedicated firewater system. There may be fire hydrants required on site for fire water supply. If fire hydrants are to be installed they will be supplied via connection to public infrastructure.
Surface Water	Connection to existing Station drainage system.	Connection to public drainage infrastructure.	Connection to existing Station drainage system.	Connection to public drainage infrastructure.

Shared Infrastructure	Poolbeg FlexGen	Ringsend FlexGen	Poolbeg BESS	South Wall BESS
Foul Water	Connection to the existing Station foul drainage network.	Minor volumes associated with small basic welfare facility discharging this flow via connection to public foul water drainage infrastructure.	Not Required.	Not Required.
Grid Connections	Electrical cable connection into Poolbeg 220 kV Substation	Electrical cable connection into Irishtown 220 kV Substation.	Electrical cable connection into Poolbeg 220 kV Substation via a ganged transformer arrangement located at the FlexGen site.	Electrical cable connection into Irishtown 220kV Substation via a ganged transformer arrangement located at the FlexGen site.
Electricity	A medium voltage (MV) power supply from the existing network. Houseload supplied by electricity generated by the gas turbine generator.	A medium voltage (MV) power supply from the existing network. Houseload supplied by electricity generated by the gas turbine generator.	A medium voltage (MV) power supply from the existing network will be provided.	A medium voltage (MV) power supply from the existing network will be provided.

5.5 Poolbeg FlexGen

5.5.1 Location

The proposed Poolbeg FlexGen development is located within the existing ESB Poolbeg Generating Station (Grid Reference. O 20940 33500) (refer to Figure 5.3). The proposed development area will occupy approximately 5.6 hectares.

Pigeon House Road approaches the site from the west and provides the main access to the ESB Generating station. The site is bounded by a vegetated earth bund along the eastern and southern boundaries. This bund will not be affected by the proposed FlexGen development. The site is bounded by an existing internal roadway on the northern and western sides.

Pigeon House Road and Dublin Bay bound the site to the south, Shellybanks car park and Shellybanks beach are located to the east, the NORA tank farm and the Poolbeg Power Station are located to the north of the site (both of these are within the Poolbeg Generating Station), and the Poolbeg 220 KV substation lies to the west of the site.

The site comprises a generally flat area of made ground covered in gravel. The existing ground profile of the development site slopes from approximately 5mOD Malin Head in the east to approximately 3.9m OD Malin Head in the west (topographical levels provided by ESB).

The site is elevated by up to approximately 1m compared to the adjacent areas. It is proposed to level the site such that the floor level in the development is at an elevation of approximately 4.0m OD Malin Head (topographical levels provided by ESB).

There is some existing vegetation across the site which has self-seeded. There are lighting columns and some underground services on the site.

There are no residential properties in close proximity to the proposed development. The nearest residential properties are in Sandymount approximately 1.7km from the site across Dublin Bay.

Prior to construction materials currently stored on site (for example construction materials and portacabins) will be removed.

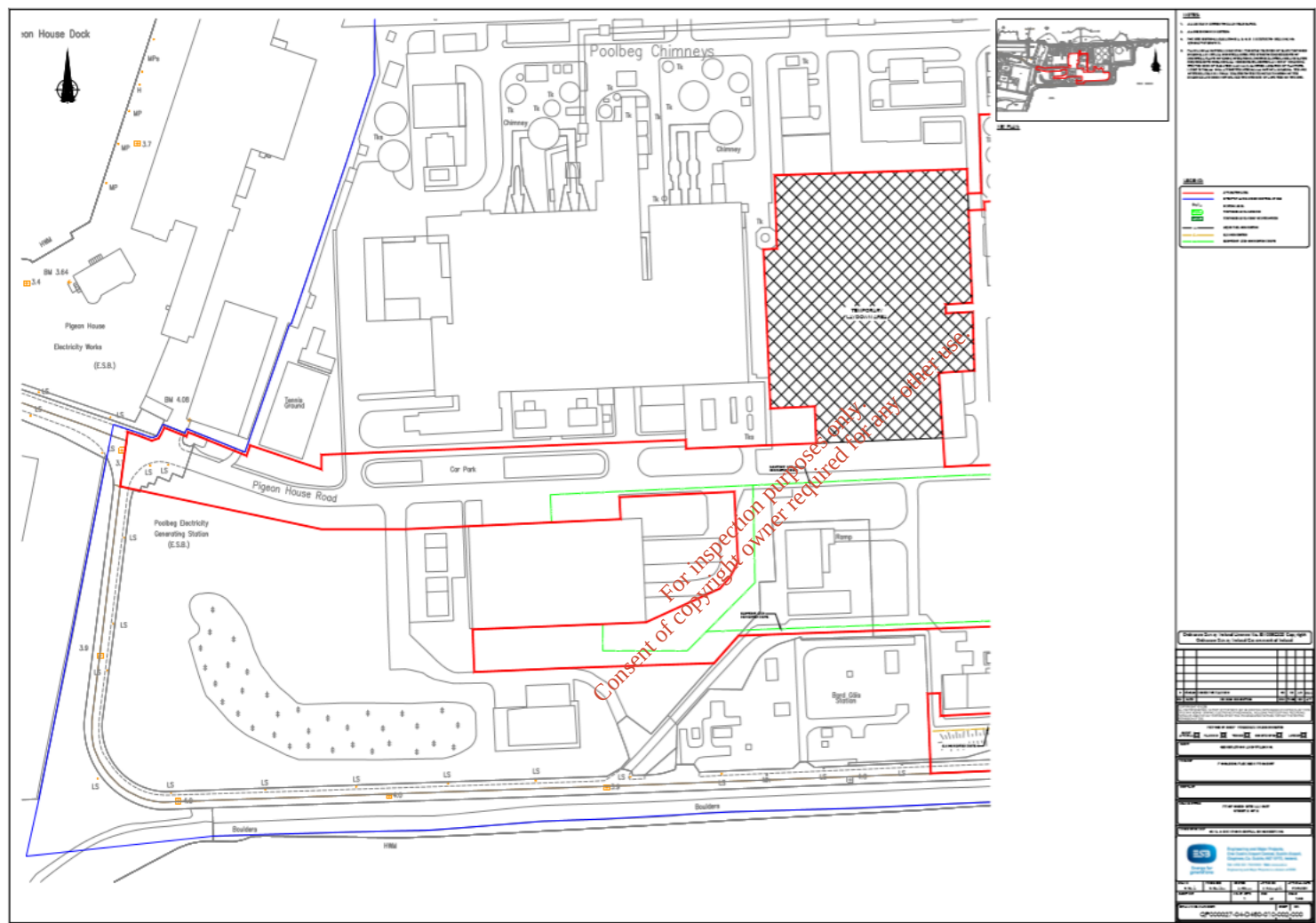
5.5.2 Site Layout and Processes

The proposed layout is shown in Figure 5.6 and 5.7 below (Drawing No: QP-000027-04-D460-010)

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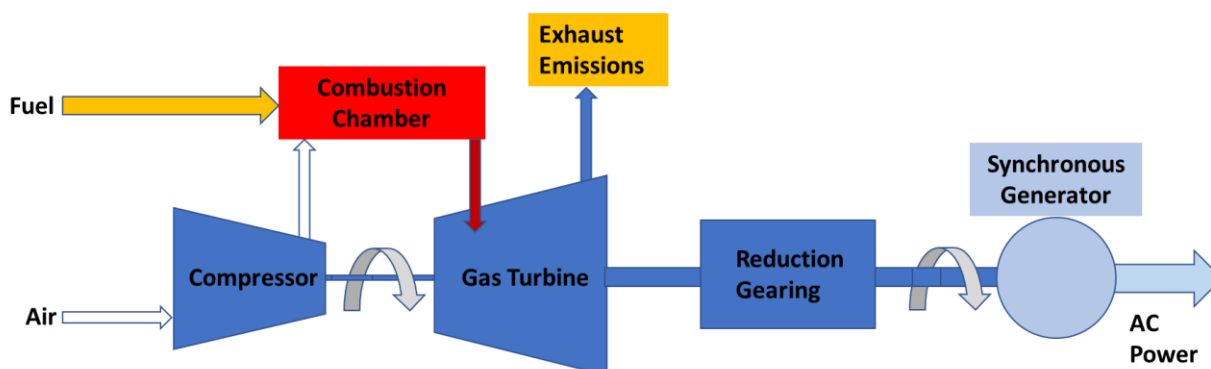


Figure 5.7: Proposed Layout for Poolbeg FlexGen (2) (Drawing No. QP-000027-04-D460-010)



A gas turbine generates electricity by using the combustion gases from burning a fuel in air to rotate a turbine fan. This rotational energy is converted to electrical energy using an electrical generator. This process is illustrated in Figure 5.8 below.

Figure 5.8: Gas Turbine Process



The proposed FlexGen developments can operate on two fuel sources, primarily natural gas and in the unlikely event of an interruption to the gas supply, fuel oil (diesel). The plant will operate in accordance with the Industrial Emission Licence Limits regulated by the EPA (refer to Section 1.3.1).

The proposed plant has been designed in accordance with Best Available Technique Reference Document (BREF) incorporating the following technologies:

- NOx suppression using water injection;
- The demineralised water will also be used in a Wet Compression System which will cool the inlet air temperature. The Wet Compression System will operate only when the ambient air temperature is greater than 7°C; and
- Additionally, CO Catalyst technology is utilised to reduce Carbon Monoxide (CO) emissions.

An aero derivative gas turbine is proposed for a variety of reasons including:

- To facilitate the increased generation of renewables on the national grid;
- Fast start up durations from cold to full power generation in approximately 5 minutes;
- Best Available Techniques (BAT) efficiency of 38% to 43%;
- Low emissions;
- Can operate on both gas and fuel oil(diesel) as a back-up fuel; and
- High reliability.

The proposed Poolbeg FlexGen development will consist of a 75 MWe (electrical output) aero derivative dual fuel fired turbine for the generation of electricity and will include the following elements:

- turbine module (typically comprising a gas turbine enclosure, generator, elevated air intake unit, vent air outlet, bleed valve plenum) and an exhaust stack (of 30m in height);

- ancillary buildings comprising:
 - single storey welfare facilities building
 - single storey compressed air and fire suppression building
 - single storey plant control module (PCM)
 - single storey electrical equipment module
 - single storey control & instrumentation communications module
 - gas compressor building and associated cooler
 - gas reducing building
 - water treatment plant & pumps building
 - single storey firefighting pumps building
 - single storey liquid fuel forwarding pumps building;
- industrial / electrical plant comprising:
 - transformer compound housing 2 transformers
 - house transformer
 - generator circuit breaker
 - lube oil skid
 - fin fan coolers
 - water injection skid
 - water wash cart
 - gaseous fire suppression cabinet
 - liquid fuel forwarding skid
 - continuous emissions monitoring system (CEMS) container
 - demineralised water tank
 - raw/fire water tank
 - bunded area containing a liquid fuel tank
 - emergency diesel generator
 - spare parts storage container
 - ancillary plant and equipment
- boundary palisade fencing, internal security mesh and chainlink fencing and gates
- ancillary site clearance and development works including provision of car parking, internal access roads, pipe bridges and connections to site services networks including:
 - telecommunications
 - gas
 - liquid fuel
 - electrical
 - water supply,
 - surface water drainage/attenuation
 - wastewater

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5.5.3 Fuel Supply

Natural gas, supplied from the Gas Networks Ireland national grid, will be the primary fuel for the plant. The gas supply for Poolbeg FlexGen will connect to the Bord Gáis facility via 212m of pipe running along the southern boundary of the site as shown on Figure 5.6 and 5.7. It is proposed that 50m of this will be aboveground between the Bord Gáis facility and the access road on the Poolbeg FlexGen site.

There is currently a Gas Networks Ireland (GNI) dedicated Above Ground Installation (AGI) gas compound within the Poolbeg Generating station complex. The AGI is where the incoming gas supply pressure will be reduced prior to its use in the gas turbine. There is no requirement for an AGI extension, however some modification works and additional equipment will be required to be installed within the footprint of the existing compound.

GNI will be responsible for the installation, operation, and maintenance of equipment within the AGI gas compound. All operations within the AGI will comply with standard GNI operational procedures and risk assessments and will be carried out by approved GNI contractors.

In order to comply with Commission for Regulation for Utilities requirements, low sulphur diesel oil will be required as a backup fuel.

Diesel will be supplied from existing Poolbeg CCGT tanks. There will be a diesel tank within the facility which will provide sufficient fuel to operate the FlexGen for 8 hours (c.182m³). This above ground fuel storage tank will be bunded.

5.5.4 Grid Connection

Connections to the existing Poolbeg 220 kV substation located within the Poolbeg Generating Station complex will be via underground cable. The proposed cable route is shown in Figure 5.10 and 5.11 and will run along the internal site road. The planning application includes the underground grid connection from the proposed development to the existing Poolbeg 220 kV substation connection point. Minor work required at the existing Poolbeg 220 kV substation will be located inside the existing building, and no extension to the building will be required. The potential impacts associated with the works to the substation have been assessed in this EIAR and the NIS.

5.5.5 Water Demand

Water supplies are required as follows:

- Potable water – for welfare facilities;
- Demineralised water – for injection into the turbines for control of nitrogen oxide emissions; and
- Raw/fire water – for emergency response.

The estimated total water demand which is made up primarily of process water (to be demineralised) and fire water (conservative estimate based on filling tank annually) is approximately 49,509,299 litres per year.

The service connections for these utilities are shown on Drawing QP-000027-04-D460-010 provided in the planning application drawings in Appendix 1.

5.5.5.1 Potable Water

There is currently no water connection within the site of the proposed development. There is a 300 mm diameter public watermain located approximately 200m to the west of the site on Pigeon House Road.

Potable water demand associated with the use of welfare facilities will be low and is estimated to be approximately 10,109 litres per annum.

It is proposed to make a new connection to the public watermain on the public road to the west of the site or alternatively may be supplied from the existing Poolbeg CCGT Raw Water Storage Tanks. The proposed water route is shown in Figure 5.9.

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5.5.5.2 Demineralised Water

The gas turbine will require injection of demineralised water for NOX control. It is proposed that this water will be produced in an on-site water treatment plant using industry-standard technology. Alternatively, a supply may be taken from the existing Poolbeg CCGT Demin Water Storage Tanks. It is expected that the turbine will require 26,000 litres per hour. It is anticipated that the equipment requiring the process water will be operational for 5 hours per day. This would amount to a daily demand across the turbine of 130,000 litres.

5.5.5.3 Firewater

The remaining water demand for the proposed station will be low and it is envisaged that the nearby public watermain has adequate supply and pressure to accommodate the addition of the proposed FlexGen plant. The connection will be metered and shut off valves will be provided on the connection. All connection works will be carried out in accordance with the requirements of Dublin City Council and / or Irish Water.

Potable water will also be required to fill the fire water tank. It is assumed as a conservative estimate that the tank may be filled once a year. The demand to fill the tank is estimated as 2,049,190 litres.

Alternatively, it may be a 'dry site' without a dedicated firewater system. There will be fire hydrants required on site for fire water supply. Fire hydrants will be supplied via connection to public infrastructure.

5.5.6 Drainage and Wastewater Management

The proposed surface drainage for the Poolbeg FlexGen plant is shown on Drawing QP-000027-04-D460-006 with typical details of drainage system components shown on Drawing QP-000027-04-D460-007 (provided in the planning application drawings in Appendix 1).

Surface water from the site will collect in the surface water drainage system before discharging into manholes and into an oil separator before reaching the proposed attenuation tank. The proposed attenuation tank has a volume of 418m³ based on limiting the discharge from the site to no more than 12 litres per second (the calculated greenfield runoff rate). The location of the attenuation tank is shown in drawing QP-000027-04-D460-006 of the planning application drawings in Appendix 1.

A number of oil interceptors are located at strategic points within the drainage system including the sump draining the fuel storage tank bunded area. These interceptors will be maintained by ESB throughout the operational life of the site.

The transformers and oil storage tank are considered to present the highest risk to the environment from accidental spillages or leaks and are bunded to prevent any such spillages escaping. Rainwater will be removed from the bunded areas using oil-sensitive pumps. The pumps will detect and separate oil ensuring that only clean water enters the site drainage network. The pumps shall be fitted with a high oil level alarm which will activate when a predetermined level of oil builds up on the surface of the water.

Should a fire occur in any bunded equipment the fire detection systems will also disable the bund pumping systems to prevent contaminated fire water being discharged into the drainage system.

The FlexGen uses demineralised water in the combustion chamber to reduce nitrogen oxide emissions. This water is produced on site from potable water and is consumed at a rate of

26,000 litres per hour of operation. The water treatment plant produces demineralised water by removing dissolved solids and chlorine from the potable water. This process produces a residual effluent. To produce 26,000 litres of demineralised water the plant will generate 9,000 litres of effluent. This will be discharged via the surface water attenuation system and in accordance with EPA Licence requirements.

During normal plant operation, the aero derivative gas turbine uses Wet-Low Emission (WLE) combustion technology to reduce Nitrogen Oxide (NOx) emissions. This is achieved by injecting demineralised water into the combustor to reduce the formation of NOx. Furthermore, in order to improve the efficiency of the unit, the turbine utilises Inlet Spray Intercooling (ISI) technology to cool inlet air to the gas turbine. Water injected during these processes will not enter the surface water drainage network because it will evaporate due to the high temperatures and discharge through the exhaust stack to the atmosphere as water vapour.

The surface water discharge will be monitored and regulated by the EPA under the revised IE licence for the Poolbeg Generating Station (EPA registration no. P0577-03).

Foul water arising from the welfare facilities will be disposed of by connecting to the existing foul drainage network in the Poolbeg Generating Station.

5.5.7 Resource Use and Waste Management

Management of waste from the Poolbeg FlexGen site is described in Chapter 14 Waste.

5.5.8 Utilisation of Existing Infrastructure

The primary access will be via the existing Poolbeg Generating Station entrance at Pigeon House Road with a temporary construction access via the existing entrance off the road immediately south of the site.

5.5.9 Proposed Demolition

There is no demolition proposed for Poolbeg FlexGen.

5.5.10 Lighting

The Poolbeg FlexGen will not be lit permanently as there is no requirement for the site to be permanently occupied. Lighting will be provided when personnel are on site to assist any night-time maintenance visits comprising lighting from the car park to the control room and other building entrances. The lighting will be for general purpose. External lighting will be automatic with motion detection and will be linked back to a security system if activated. There will be an option to override the control to turn on / off the system remotely or within the compound. No area of the compound will be less than 2 lux.

5.5.11 Security

The facility will be securely fenced, and access controlled. The site is within the Poolbeg Generating Station which is controlled by a security team.

5.6 Poolbeg BESS

5.6.1 Location

The Poolbeg BESS site lies within the existing ESB Generating station (Grid Reference. O 20460 33640). (Refer to Figure 5.5). The site is approximately 5.3ha in extent.

To the north is the 'South Wall' of Dublin Bay and the Liffey estuary; to the south is an internal site road with an existing transformer building and an area of open landscaped ground; to the east is the decommissioned Poolbeg Power Station and to the west is the disused Pigeon House Power Station. The site is currently occupied by disused buildings which will be demolished to ground floor to allow construction of the BESS facility. The existing ground profile varies from approximately 3.5m OD Malin to approximately 3.8m OD Malin Head sloping gently to the north (topographical levels supplied by ESB).

The existing access to the site is along the Pigeon House Road via the main Generating Station entrance.

There are no residential properties in close proximity to the proposed development. The nearest residential properties are approximately 1.5km from the site across Dublin Bay.

5.6.2 Site Layout and Processes

The proposed layout is shown in Figure 5.10.

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Figure 5.10: Poolbeg BESS proposed layout (1) (Drawing No: QP-000033-02-D460-033)

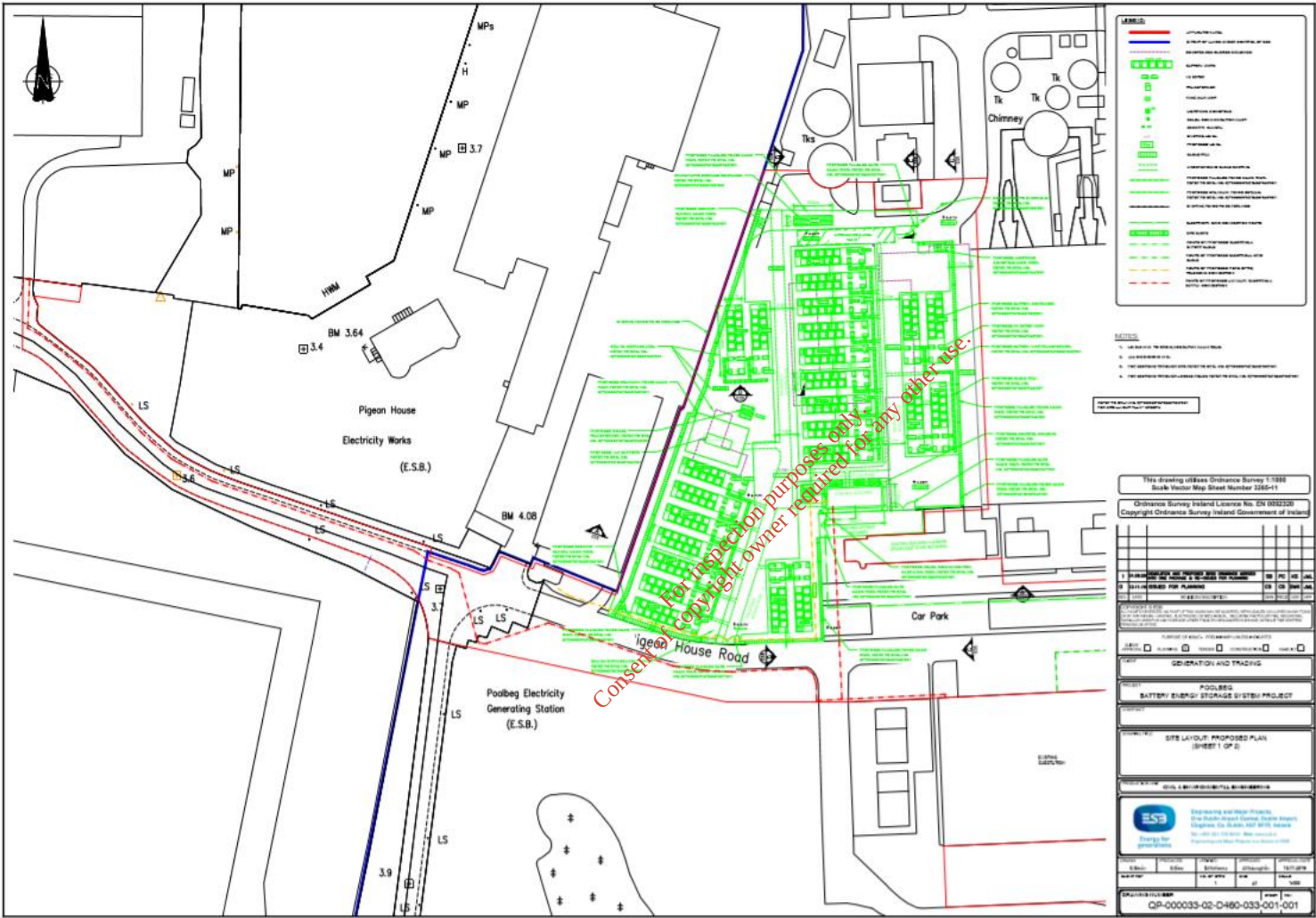
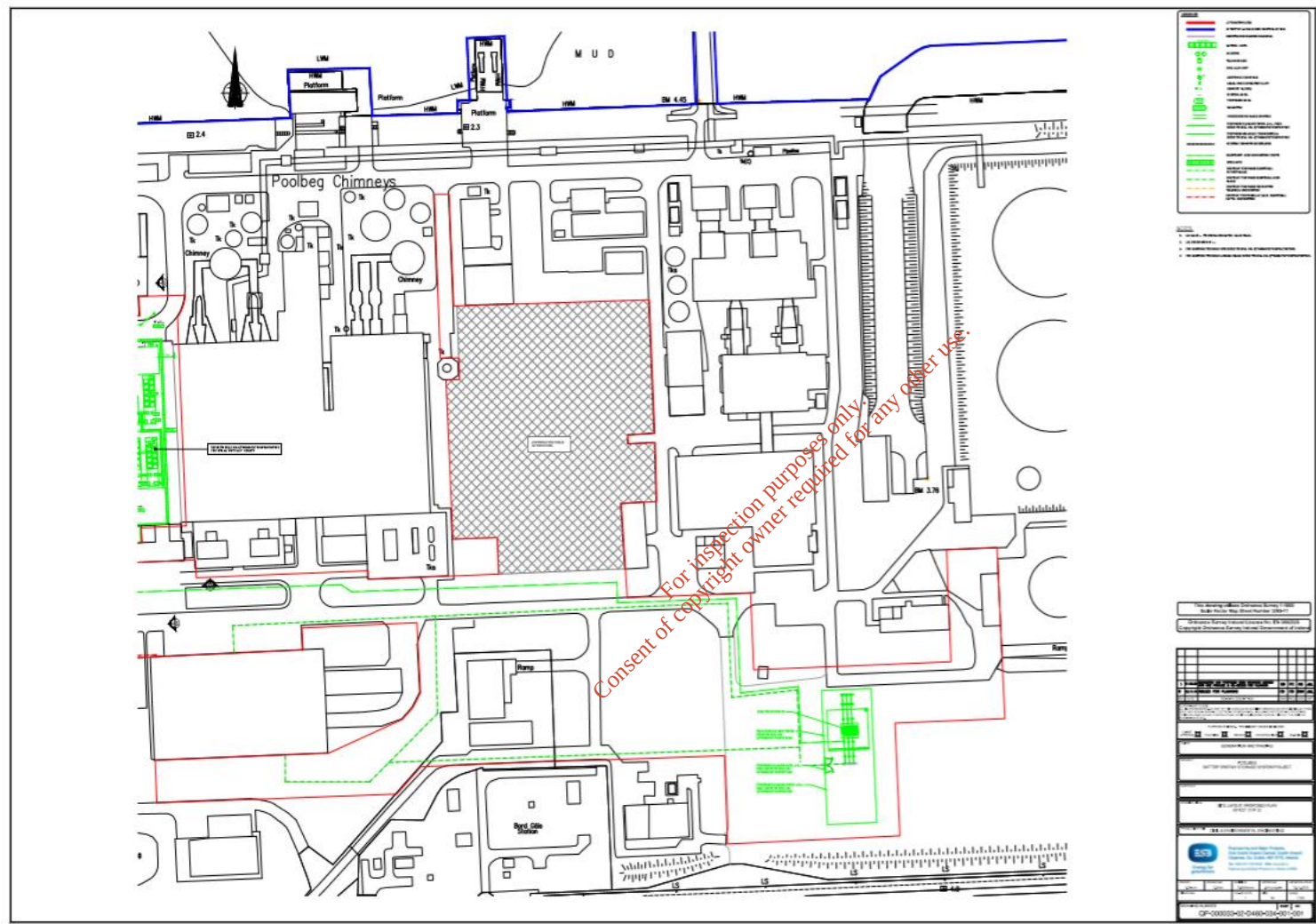


Figure 5.11: Poolbeg BESS proposed layout (2) (Drawing No: QP-000033-02-D460-034)



The facility will include up to 24 battery module assemblies, 24 inverter assemblies and 24 transformers. Electrical connections between the batteries and switchgear building will be contained in ducting which will be either underground or flush with the finished ground level.

Components of the BESS will be manufactured off site and brought to site ready for connection.

The facility will be securely fenced, and access controlled. The site is within the Poolbeg generation station which is controlled by a security team.

There is an existing potable water network flowing through the site. To facilitate the proposed development the site will be cleared and prepared. Existing underground potable water services and structures that cross the site are proposed to be rerouted internally within the site or removed if redundant.

5.6.3 Fuel Supply

No fuel is required for the proposed Poolbeg BESS facility.

5.6.4 Grid Connection

Connections to the existing Poolbeg 220 kV substation located within the Poolbeg Generating Station complex will be via underground cable. The proposed cable route is shown in Figure 5.10 and 5.11 and will run along the internal site road. The planning application includes the underground grid connection from the proposed development to the existing Poolbeg 220 kV substation connection point. Minor work required at the existing Poolbeg 220 kV substation will be located inside the existing building, and no extension to the building will be required. The potential impacts associated with the works to the substation have been assessed in this EIAR and the NIS.

5.6.5 Water Demand

A water supply is required to provide a potable water connection to the proposed services mini-pillar. The services mini-pillar will facilitate connection of a temporary welfare facilities unit during periods of maintenance of the development. It is proposed to make a new connection to the Poolbeg generating Station water supply to serve the proposed development.

The water demand for the development will be associated with the services mini-pillar which will facilitate a temporary welfare facility unit during periods of maintenance. These maintenance periods are expected to be of approximately three weeks duration per annum. The maintenance works will involve approximately 10 operatives on site daily during this period. The estimated potable water demand for the development is approximately 6,384 litres per annum.

5.6.6 Drainage and Wastewater Management

There is currently an existing surface water drainage system in place on the proposed site. To facilitate the proposed development of the site, the existing system that crosses the site is proposed to be rerouted internally or removed if redundant.

All surface water systems proposed for the BESS development will connect into an existing surface water system within the Poolbeg Station. The connection point is located to the north of the BESS site.

In order to prevent generation of runoff the extent of impermeable area on the site was minimised, and the proposed permeable area will remain finished in single size clean compound stone. This permeable compound stone will allow rainwater to infiltrate to ground as it would on a greenfield site.

The proposed surface water drainage system will collect surface water from the proposed new developments before discharging into manholes and into a Class 1 Full Retention oil separator before reaching the proposed attenuation tank. The site drainage proposals (see Appendix 5B) are shown the planning application drawings in Appendix 1 (Drawing No. QP - 000033-02-D460-036-001/002-001). As BESS is located within the boundaries of an existing IE licenced site the surface water discharge will be monitored and regulated by the EPA under any IE licence for the Poolbeg Generating Station (EPA registration no. P0577-03).

5.6.7 Resource Use and Waste Management

Management of waste from the Poolbeg BESS development is described in Chapter 14 Waste.

5.6.8 Utilisation of Existing Infrastructure

Operational access to the site will remain via the main entrance to the Poolbeg Generating Station along Pigeon House Road.

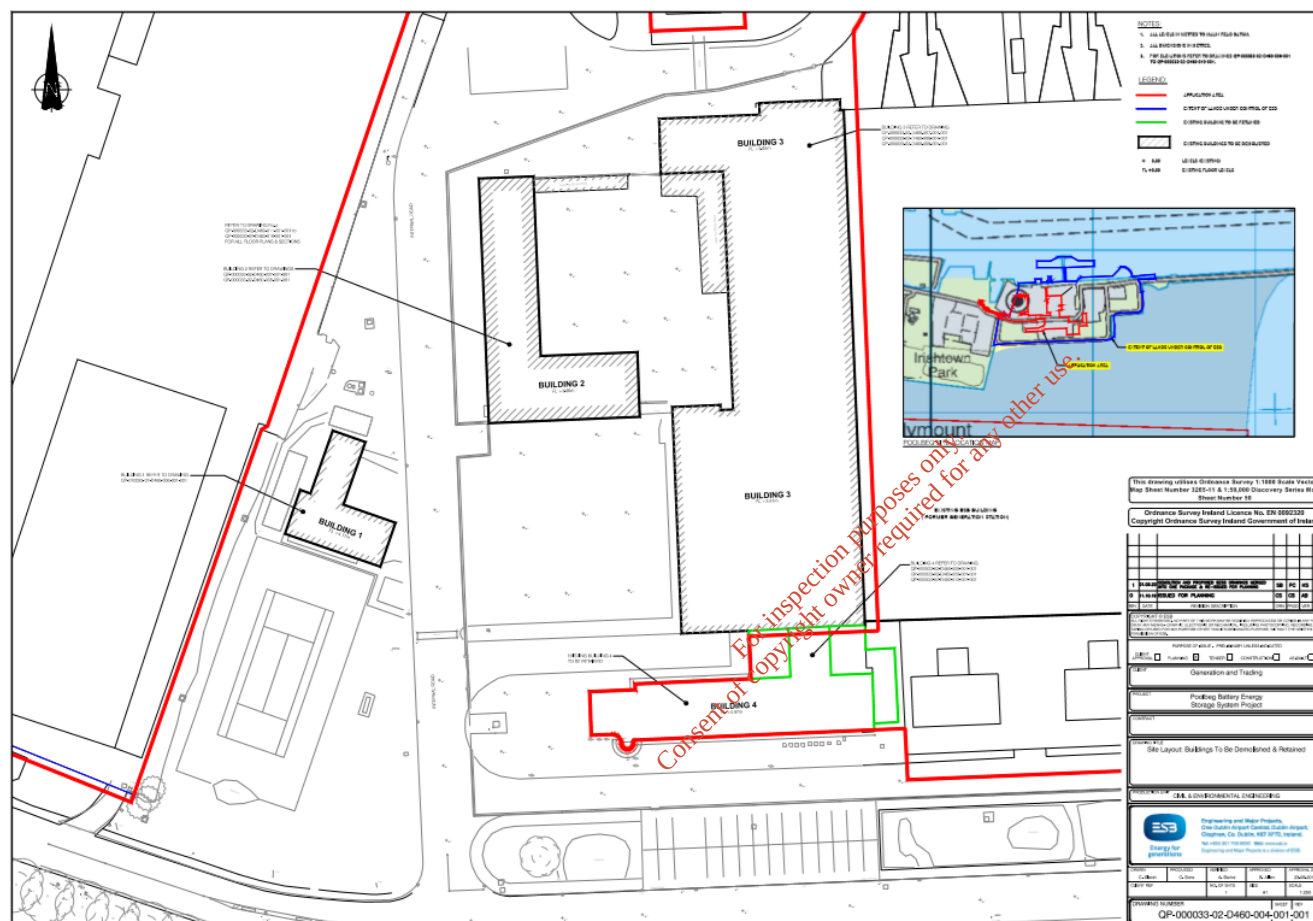
5.6.9 Proposed Demolition

A demolition and construction management plan has been prepared and is presented in Appendix 5A. The demolition will comprise the following stages:

- Site establishment, erection of security fences and gates around the site;
- The removal and disposal of all hazardous and non-hazardous materials within the buildings to be demolished;
- Dismantling, removal and disposal of mechanical and electrical equipment within the buildings to be demolished;
- Controlled demolition of the three buildings; (soft strip and demolition);
- Removal and disposal of all hard-standing surfaces within the site boundary line;
- Site clearance and removal of all material and debris resulting from the demolition works;
- Underground service removal and diversion;
- Temporary site drainage;
- Site raising, levelling and grading; and
- Site demobilisation.

The three existing buildings as labelled 'Building 1, 2 and 3' in Figure 5.12 will be demolished. The existing administration building (Building 4) is to be retained and protected during the construction works.

Figure 5.12: Buildings to be demolished & retained at Poolbeg BESS (Drawing No: QP-000033-02-P460-004)



Source: ESB

Structural surveys of these and adjoining buildings will be undertaken to determine the condition of these buildings.

A soft strip will be undertaken to remove all furniture and fittings including timber, partitions, glazing, electrical and plumbing equipment. Asbestos containing materials will be removed by specialist contractor. All materials removed from the buildings will be segregated, classified and disposed of off-site in line with the existing Industrial Emissions licence for Poolbeg Station, EPA Licence Reg. No. P0577-03.

Demolition will proceed from the top with removal of the roof and then wall cladding. Non-structural elements such as masonry infill and partition walls and steel access platforms will be removed. The structural frames will then be removed from roof level down to ground.

The Demolition/Enabling Works Contractor will also undertake a programme of ground clearance and levelling which will be undertaken across the proposed development site (or across the relevant part of the proposed development site as required) within the Demolition/Civil Enabling Works site boundary. It is anticipated that these works will take place directly after the completion of the Demolition Works. The existing ground level will be broken up and a new development platform prepared.

Where building 3 adjoins the Poolbeg power station building the existing openings in party walls will be closed with block work and the external surface clad with steel sheets as per the original finish.

Areas of minor vegetation on the site will be excavated and the soil retained for reuse elsewhere on site within landscaping.

Reinstatement of adjoining Poolbeg Generating Station buildings will involve the closing-up of existing openings in party walls between buildings to be demolished and the retained structures. This will include but is not limited to the construction of blockwork, weatherproofing and installation of steel cladding as required. It will also include securing and making good of all openings, holes and perforations to adjoining buildings and any other potential requirements.

5.6.10 Lighting

The Poolbeg BESS facility will not be lit permanently as there is no requirement for the site to be permanently occupied. Lighting will be provided to assist any night-time maintenance visits comprising lighting from the car park to the control room and other building entrances. External lighting will be automatic with motion sensors and timers to turn off.

5.6.11 Security

The facility will be securely fenced, and access controlled. The site is within the Poolbeg generating station which is controlled by a security team.

5.7 Ringsend FlexGen

5.7.1 Location

The site for the proposed Ringsend FlexGen site is located on the Poolbeg Peninsula and is shown on Figure 5.1 (Grid Reference O 19470 33450). The site is approximately 6.1 ha in extent.

. Prior to 2013 the western part of the site comprised electrical transmission equipment and prior to 2005 the western part of the site was used for container storage and there were two buildings on the eastern part. The site is bounded to the south by South Bank Road and then an area of open ground that lies to the north of South Dublin Bay. The Dublin Bay Power Station (IE licence no. P0486-02) lies to the north of the site. To the west is an open site which lies within the IE licence boundary of the Dublin Bay Power Station, and to the east is the proposed South Wall BESS site.

The nearest existing residential properties are located more than 550m east of the proposed works area, along Sean Moore Road in Ringsend.

5.7.2 Site Layout and Processes

The proposed layout is shown in Figure 5.13 (Drawing QP-000026-04-D460-004)

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Figure 5.13: Ringsend FlexGen Proposed Layout (1) (Drawing No: QP-000026-04-D460-004)





Access will be via the two accesses located on the southern boundary, from South Bank Road.

A gas turbine generates electricity by using the combustion gases from burning a fuel in air to rotate a turbine fan. This rotational energy is converted to electrical energy using an electrical generator. This process is illustrated in Figure 5.4.

The Ringsend FlexGen development will consist of a 75 MW (electrical output) aero derivative dual fuel fired turbine for the generation of electricity and will include the following elements:

- turbine module building (typically comprising a gas turbine enclosure, generator, elevated air intake unit, vent air outlet, bleed valve plenum) and an exhaust stack (30m in height) ;
- ancillary buildings comprising:
 - single storey welfare facilities building
 - single storey compressed air and fire suppression building
 - single storey plant control module (PCM)
 - single storey electrical equipment module
 - single storey control & instrumentation communications module
 - gas compressor building and associated cooler
 - gas reducing station
 - single storey demineralised water forwarding pumps building
 - single storey liquid fuel forwarding building;
- industrial / electrical plant comprising:
 - transformer compound housing 2 transformers
 - house transformer
 - generator circuit breaker
 - lube oil skid
 - fin fan coolers
 - water injection skid
 - water wash cart
 - fire suppression cabinet
 - liquid fuel forwarding skid
 - continuous emissions monitoring system (CEMS) container
 - demineralised water tank
 - bunded area containing a liquid fuel tank
 - emergency diesel generator
 - fire ring main
 - ancillary plant and equipment
- The palisade fencing on the southern boundary of the site will be replaced by a more aesthetic 2.6m-high system railing (i.e. 1.6m-high dark green railings on top of a 1m-high concrete wall).
- Internal palisade fencing, securi mesh and chainlink fencing and gates

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ancillary site clearance and development works including provision of car parking, internal access roads, pipe bridges, and connections to site services networks. These include connections into existing telecommunications, gas, electrical, water supply, surface water drainage / attenuation, and wastewater services. It also includes an ancillary connection to allow for the transfer of diesel between the existing Dublin Bay Power fuel oil storage tanks and the National Oil Reserves Agency Ltd (NORA) site, Shellybanks Road, Ringsend, Dublin 4.

5.7.3 Fuel Supply

Natural gas, supplied from the Gas Networks Ireland national grid, will be the primary fuel for the plant.

The gas supply for the Ringsend FlexGen will be provided from the existing gas infrastructure on the site adjacent to the Ringsend FlexGen site. The incoming gas will be supplied from the Bord Gais facility adjacent to the Ringsend FlexGen site. This is shown on Figure 5.6.

GNI will be responsible for the installation, operation, and maintenance of all equipment within the AGI gas compound. The AGI will be an asset owned wholly by GNI who own, operate, build, and maintain the natural gas network in Ireland and connect all customers through a 13,830 km pipeline network. All operations within the AGI will comply with standard GNI operational procedures and risk assessments and will be carried out by approved GNI contractors.

The current planning application includes the incoming gas supply connections. Minor works to the existing AGI will be required which are not included in this planning application, however the environmental impacts associated with these works are assessed in this EIAR.

In order to comply with Commission for Regulation of Utilities requirements, low sulphur diesel oil will be required as a backup fuel.

Diesel will be supplied from the existing Dublin Bay Power Station tanks or the existing NORA tanks situated adjacent to the site. There will be an on-site back up fuel tank (477m³).

5.7.4 Grid Connection

The Ringsend FlexGen plant will be connected via underground cable to the existing Irishtown 220 kV substation and from there onto the national grid. The current planning application for the Ringsend FlexGen plant includes the underground grid connection cable from the proposed development site to the existing Irishtown 220 kV substation connection point.

Works at the Irishtown 220 kV substation building will be required in order to accommodate the new connection.

5.7.5 Water Demand

Water supplies are required as follows:

- Potable water – for welfare facilities;
- Demineralised water – for injection into the turbines for control of nitrogen oxide emissions; and
- Raw/fire water – for emergency response.

The estimated total water demand which is made up primarily of process water and fire water (conservative estimate based on annual firewater demand) is approximately 48,027,309 litres per year.

(Drainage and Services Report, Document No. P000343-PM01-0009 provided in Appendix 5B).

5.7.5.1 Potable Water

A potable water supply will be required for the proposed welfare facilities. It is proposed that this supply will come from a new metered connection to the public watermain on either South Bank Road or Shellybanks Road. All works will be carried out according to the requirements of Irish Water. Volumes associated with use of welfare facilities will be insignificant by comparison and equivalent to the figures associated with foul water generation (10,109 litres per annum) (Drainage and Services Report (Document No.: P000343-PM01-0009) provided in Appendix 5B).

5.7.5.2 Demineralised Water

Demineralised water is required during the operation of the gas turbine. This will be sourced from the existing water treatment plant or demineralised water holding tank within Dublin Bay Power Station. This water will be brought into the site along a proposed route which can be viewed on Drawings QP-000026-04-D460-006-001-001 and QP-000026-04-D460-006-002-001 in the planning application drawings in Appendix 1.

According to ESB's Drainage and Services Report (Document No.: P000343-PM01-0009, provided in Appendix 5B) It is expected that the turbine will require up to 26,000 litres per hour of operation. It is anticipated that equipment requiring process water will be operating for 5 hours/day. This would amount to demand for the turbine of 130,000 litres/day.

5.7.5.3 Firewater

This site will be a 'dry site' without a dedicated firewater system. There will be fire hydrants required on site for fire water supply. Fire hydrants will be supplied via connection to public infrastructure. If it is determined that the public supply is insufficient a connection could be made to the existing firewater system in Dublin Bay Power Station.

According to ESB's Draft Drainage and Services Report (Document No.: P000343-PM01-0009) provided in Appendix 5B, firewater demand in the event of a fire is estimated as requiring a flow rate of 79 litres/second for a duration of 2 hours, which corresponds to a total of 567,200 litres. This calculation conservatively assumes a worst-case scenario that both a deluge system and hose stream demand are required.

5.7.6 Drainage and Wastewater Management

The proposed surface drainage connections are shown on Drawing QP-000026-04-D460-006-001-001 with typical details of drainage system components show on Drawing QP-000026-04-D460-007-001-001 in Appendix 1.

The proposed system will include a piped system which will collect runoff from the proposed turbine module platform, building roofs, impermeable bunds and access roads. Rainwater falling on the impermeable turbine module platform will drain to the site surface water network via an ACO channel drain. Rainwater falling on the proposed building roofs will be conveyed via rainwater downpipes to the site surface water drainage network. Surface water generated in the proposed impermeable transformer bunds will discharge via an oil sensitive bund dewatering system to the site drainage network. Surface water generated on the stoned access road will be drained to the roadside land drains before being conveyed to the proposed attenuation tank.

The water collected will pass through a BS EN 858 Class 1 Full Retention Oil Separator before reaching the proposed attenuation tank. Discharge from the site will be restricted to Greenfield runoff rates through the use of a flow control device in combination with attenuation storage.

It is proposed that the treated runoff will be discharged from the site to the existing public surface water network located on South Bank Road. The surface water network is shown on Drawings QP-000026-04-D460-006-001-001 and QP-000026-04-D460-006-002-001 the planning application drawings in Appendix 1. The proposed connection point, located approximately 75m to the south west of the site is indicated on the proposed site layout drawing in Annex A.

Following the granting of planning permission, an industrial emissions licence regulated by the EPA will be required. The surface water discharge will be monitored and regulated by the EPA under a IE licence for the Ringsend FlexGen facility.

Foul water arising from the welfare facilities will be disposed of by a new connecting to the existing public foul drainage network located on South Bank Road.

5.7.7 Resource Use and Waste Management

Management of waste from the Ringsend FlexGen site is described in Chapter 14 Waste.

5.7.8 Utilisation of Existing Infrastructure

Access will be via the two accesses located on the southern boundary, from South Bank Road.

5.7.9 Proposed Demolition

There is no demolition proposed for Ringsend FlexGen.

5.7.10 Lighting

The Ringsend FlexGen will not be lit permanently as there is no requirement for the site to be permanently occupied. Lighting will be provided when personnel are on site to assist any night-time maintenance visits comprising lighting from the car park to the control room and other building entrances. The lighting will be for general purpose. External lighting will be automatic with motion detection and will be linked back to a security system if activated. There will be an option to override the control to turn on / off the system remotely or within the compound. No area of the compound will be less than 2 lux.

5.7.11 Security

The facility will be securely fenced, and access will be controlled.

5.8 South Wall BESS

5.8.1 Location

The site for the proposed South Wall BESS development is located on the Poolbeg Peninsula and is shown on Figure 5.1. The site is approximately 3.5 ha in extent.

The site is bounded to the south by a vegetated boundary. The area to the south of the site is a hard-standing area (Grid Reference. O 19680 33400) which in turn is bounded by a vegetated earth bund situated just north of Dublin Bay. The Covanta facility lies adjacent to the site to the east, the site for the proposed Ringsend FlexGen facility to the west, and the NORA fuel storage tanks to the north.

The site is set at two generally flat levels with approximately 1.5m to 2.0m difference between the lower and upper levels, with the southern and western parts of the site being at the upper level. The part of the site with the lower elevation is bounded by a raised berm outside of the site to the east and to the north which will remain. It is proposed to construct the BESS within the northern part of the site with the southern area used as a laydown compound during construction.

Until 2018, the site was used as a pitch and putt golf course.

The site is comprised of unbound granular stoned surfacing with some vegetated areas.

There are multiple existing underground services crossing the site, mainly in the south.

Access to the site will be gained via South Bank Road or via Shellybanks Road to the east. There will be a connecting gate between this site and the adjacent Ringsend FlexGen to the west.

The nearest existing residential properties are approximately 710m from the site in Irishtown. In addition, there are residential receptors approximately 740m away in Sandymount, across Dublin Bay.

5.8.2 Site Layout and Processes

The site layout for the proposed South Wall BESS development is shown in Figure 5.8 below.

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Figure 5.15: Site Layout for South Wall BESS (Source: Drawing No. QR-000104-01-D460-004-001-000)



The development will consist of a 30 MW capacity battery storage facility within a secured compound and will include the following elements:

- control building
- plant and equipment comprising: up to 11 No. battery module assemblies;
- up to 11 No. battery unit transformers on concrete plinths;
- up to 11 No. inverter assemblies;
- a bunded house transformer surrounded on three sides by a 3 m high firewall;
- VAR support system on a concrete plinth on an adjacent site;
- cable trays and associated service connections;
- up to 4 No. lightning monopoles;
- SCADA communications mast;
- pole mounted security cameras;
- palisade fencing and gates;
- ancillary site clearance and development works including provision of areas of hardstanding, internal access roads, and connections to site services networks.
- a bunded Grid transformer with a fire wall on two sides, on an adjacent site
- outdoor electrical equipment including a transformer,
- chain link fence surrounding the transformer compound
- an underground cable between the control building and the Grid Transformer
- an underground cable running from the Grid Transformer to the existing 220 kV Irishtown Substation

Access will be via the proposed access on the Southbank Road and via the existing access on the Shellybanks Road.

5.8.3 Fuel Supply

No fuel is required for the proposed South Wall BESS facility.

5.8.4 Grid Connection

The South Wall BESS facility will have a cable connection into the existing Irishtown 220 kV substation via a shared transformer arrangement located at the proposed Ringsend FlexGen site. The proposed cable route is shown in Figure 5.8.

5.8.5 Water Demand

There is currently no water connection within the site of the proposed development. There is an existing 250 mm diameter public watermain on Shellybanks Road, which bounds the site to the east.

It is proposed to make a new connection to the public watermain on Shellybanks Road to the east of the site. The proposed route is shown on Drawing No. QR-000104-D460-006-001-000 the planning application drawings in Appendix 1.

A water supply is required to provide a potable water connection to the proposed services mini-pillar. The services mini-pillar will facilitate connection of a temporary welfare facilities unit during periods of maintenance of the development. The maintenance works will involve approximately 10 operatives on site daily during this period. The estimated potable water demand for the development is approximately 6,384 litres per annum.

5.8.6 Drainage and Wastewater Management

The surface water proposals include measures to attenuate surface water to greenfield runoff rates and to provide extensive treatment of surface water prior to discharge from the site.

The proposed system will include a piped system which will collect runoff from the control building roof and battery transformers. Surface water generated in the proposed impermeable transformer bund will discharge via an oil sensitive bund dewatering system to the site drainage network. Land drains are proposed around the battery units and access roads to collect runoff. Rainwater falling on the permeable stone surface of the remaining part of the site will infiltrate to ground as it would on an undeveloped site. Land drains are proposed in this area to collect any additional runoff which does not drain to ground. All collected surface runoff will pass through a BS EN 858 Class 1 Full Retention Oil Separator before being conveyed to the proposed attenuation tank. Discharge from the site will be restricted to Greenfield runoff rates through use of a flow control device in combination with the attenuation storage.

It is proposed that the treated runoff will be discharged from the BESS site to the existing stormwater drain on Shellybanks Road, at the eastern site boundary. This stormwater drain conveys runoff from the NORA site drainage network to an outfall at Sandymount Strand, to the south of the site. It is proposed to construct a new manhole on this drain to make the connection. The proposed location of the new manhole is indicated on the Proposed Site Drainage Layout drawing in Annex A. This connection will not impact on the drainage of the NORA site as the connection will be made downstream of the NORA site drainage network. NORA have indicated that these proposals are acceptable. The site drainage proposals are shown in Drawing No. QR-000104-D460-006-001-000 the planning application drawings in Appendix 1.

5.8.7 Resource Use and Waste Management

Following site clearance, ground level raising is to be undertaken at the site to reach required levels. Where required, material will be sourced from a licenced quarry or from a suitable 3rd party site. The material utilised for land raising will be geotechnically and chemically suitable for use on the site and will be imported to the site in accordance with best practice and all relevant waste legislation, including Article 27 regulations where applicable.

It is anticipated that a maximum volume of 6500 m³ of material will be required for land-raising purposes. The material will be imported to site for direct infilling with some short-term stockpiling undertaken to facilitate construction operations, where necessary.

Components of the BESS will be manufactured off site and brought to site ready for connection.

Management of waste from the South Wall BESS development is described in Chapter 14 Waste.

5.8.8 Utilisation of Existing Infrastructure

Access to the site will be gained via South Bank Road or via Shellybanks Road to the east. There will be a connecting gate between this site and the adjacent Ringsend FlexGen to the west.

The South Wall BESS facility will have a cable connection into the existing Irishtown 220 kV substation via a shared transformer arrangement located at the proposed Ringsend FlexGen site. The proposed cable route is shown in Figure 5.8.

5.8.9 Proposed Demolition

There is no demolition proposed for the South Wall BESS facility.

5.8.10 Lighting

The South Wall BESS facility will not be lit permanently as there is no requirement for the site to be permanently occupied. Lighting will be provided to assist any night-time maintenance visits comprising lighting from the car park to the control room and other building entrances. External lighting will be automatic with motion sensors and timers to turn off.

5.8.11 Security

The facility will be securely fenced, and access will be controlled.

5.9 Construction Phase

For the two proposed FlexGen plants, it is intended that the detailed design will be developed by a Design and Build Contractor. This Design and Build Contractor will be responsible for the following:

- Managing and executing the construction of the project in line with planning proposals.
- Updating and taking ownership the Construction Management Plan prior to commencement of construction activities on site.

There will be a combined connection for the FlexGen and BESS to Electrical Grid Network. The design and undertaking of construction works associated with the connection of the development to the Electrical Grid Network are included as part of the works.

The design and undertaking of construction works associated with the connection of the development to the National Gas network will be managed by Gas Networks Ireland.

For the two BESS facilities, it is intended that the second stage of the project will involve detailed design will be developed by a Design and Build EBOP Contractor. This appointment will be made as part of an Electrical Balance of Plant (EBOP) Contract. The EBOP Contractor will be required to coordinate with the BESS Contractor who will supply the battery equipment to ESB under a separate contract. The EBOP Contractor will be responsible for the following:

- Managing, coordinating and executing the detailed design and construction of the project in line with planning proposals.
- Updating and taking ownership the Construction Management Plan prior to commencement of construction activities on site.

A detailed Outline Construction Management Plan for each of the proposed developments has been prepared by ESB to inform this EIAR and is provided in Appendix 5A. The following sections identify the various temporary works and provisions required during the construction phase at each proposed development site.

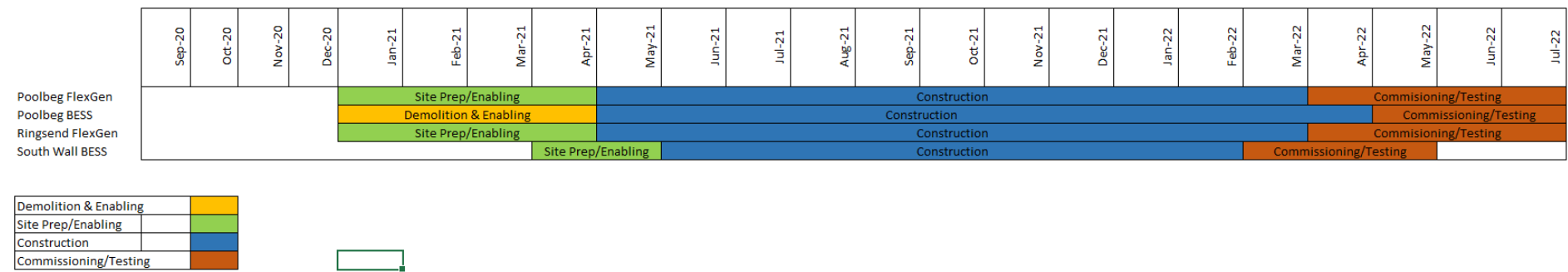
5.9.1 Construction Programme and Sequencing

A preliminary indicative construction schedule for each project relative to each other is outlined in the subsequent sections and summarised in Figure 5.9, subject to the granting of statutory consent for each development separately. As noted previously, contracts have not yet been appointed for the works, and the timing of phases and key activities are approximate based upon experience of similar projects and are indicative, rather than a definitive programme of events.

The proposed works at Poolbeg Generating Station complex will be undertaken within the boundary of an Industrial Emissions Licenced site (EPA Licence Reg. No. P0577-03) and will comply with all relevant requirements of this licence.

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Figure 5.16: Proposed Construction Timeline Cumulative



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5.9.2 Working Hours

The intended construction working hours for each of the four developments are presented in Table 5.4. These hours are applicable to normal construction activities, piling installations and heavy commercial vehicle movements.

Table 5.4: Construction Working Hours

Day	Working Hours
Monday to Friday	07:00 – 19:00
Saturday	08:00 – 14:00
Sunday or Bank Holiday	N/A

No construction works will take place outside these hours, unless such work:

- Is associated with exceptional circumstances; or,
- Is carried out with the prior written approval of the Local Authority.

5.9.3 FlexGen (Poolbeg and Ringsend)

5.9.3.1 Construction Activities

The following sections provide a summary of the proposed construction activities at the FlexGen Development. Regardless of the specific location (i.e. Ringsend or Poolbeg), the construction phase and activities for each of the FlexGen sites are similar. Based upon experience of the construction of similar power generating plants, a high-level programme for the development comprises:

- Provision of temporary construction facilities;
- Undertaking site preparation/enabling works;
- Installation of foundations and underground services;
- Buildings construction and Mechanical and Electrical Erection;
- Completion of construction; and
- Commissioning and handover.

Provision of temporary construction facilities

During the construction works, temporary construction facilities (comprising dedicated laydown and storage area) will be provided for construction plant / equipment.

Undertaking site preparation/enabling works

A programme of ground clearance and levelling will be undertaken across the proposed development site (or across the relevant part of the proposed development site as required). Existing foundations, obstructions, substructures and services which will affect the construction of the plant will be excavated and demolished where possible. Diversion of services will be undertaken where required. Minor vegetation / shrubs and tree clearance, and removal of any redundant on-site plant and buildings, will be undertaken where required.

Prior to the preparation of the programme of clearance, a site investigation will be carried out. During the detailed design and engineering studies, further surveys of the proposed site may be

undertaken to confirm the underlying ground conditions. The results of these surveys will be used to inform the final design and layout of the main plant / equipment items. The surveys will also be used to identify the locations of any existing underground electrical cables and other services, onsite access roads, other miscellaneous plant / equipment items, foundations and structures.

During site clearance, suitable material will be re-used on site where appropriate, or disposed of off-site by an approved and licensed contractor in accordance with applicable regulations for treatment and disposal at an appropriate facility.

Following site clearance, re-grading and levelling will be undertaken to raise the proposed development site to the design site levels. The material used for the surfacing of the site will be a compacted granular material in accordance with the TII publication "Specification for Road Works Series 600 – Earthworks". This imported engineered fill will be compacted where required.

Installation of Foundations and underground services

It is likely that piling will be required for the majority of the heavy equipment items including, but not limited to: the gas turbine; the generator; the transformers; the gas compressor; the gas receiving station; the water tanks; the liquid fuel tank; and the control/electrical room. This arises due to their high static or, for rotating plant, dynamic loading, and the tight tolerance requirements for settlement. The extent and type of piling will be determined, based upon the results of the site investigation, by a specialist piling contractor during detailed design. It is expected that a replacement piling technique, such as bored or CFA piling will be adopted, as these techniques are suitable in the expected ground conditions. Approved ground improvement techniques may be considered if judged necessary and feasible following the site investigation.

The piling works will be undertaken during / following the site preparation works. The primary foundations will comprise of a mix of reinforced concrete (RC) rafts, RC ground beams and / or RC pile caps, supported by the piling works. Minor foundations will comprise of ground bearing willow RC pads or RC strip footings, bearing upon engineered fill at a suitable founding level. The appropriate level will be determined during detailed design based upon the results of the site investigations.

Excavation for underground services will be required across the site. Trenches for services will be laid and backfilled with imported suitable engineered fill. Larger excavations will be required for the stormwater attenuation system, the oil/water separator, the liquid fuel bund, and for the foundations of primary plant. Temporary works may be installed to provide stable dry excavations, dependent upon the results of the site investigation and the contractor's proposed methods. Such temporary works may include the use of embedded retaining walls such as sheet piles, or other suitable methods and / or ground water management.

Arisings will be re-used on site where appropriate or disposed of off-site by an approved and licensed contractor in accordance with applicable regulations for treatment and disposal at an appropriate facility.

Equipment /Building Construction

The equipment / building construction works can be considered in terms of the following activities; plant / equipment / building manufacturing, off-site, and delivery, followed by equipment and building erection and construction onsite.

During the equipment / building construction works, factory finished painted building steelwork columns frames and roof trusses will be delivered and erected on to the foundations. Cladding and insulation will be fixed, and the buildings will be made weather tight. Where possible, prefabricated building units will be utilised to minimise on-site works. Prefabricated units will be divided into standard transportable sizes where possible and will be craned into position using approved safe techniques.

The buildings will then be fitted out with electrical systems, plumbing, drainage and final finishes.

The main pieces of equipment will be delivered to site and placed on their dedicated foundations or in the completed buildings or housings / modules. Heavy lifting with the use of cranes will be required for some items of plant. Auxiliary equipment, interconnections and acoustic panels will be installed to complete the build of the main plant.

Finally, ancillary site development works will be completed. Such works include, but are not limited to, completion of site fencing and gates, site lighting, site security system, roadways and site finishing. Refer to Proposed Development Planning Permission Drawings for details of the building requirements and of the ancillary site development works.

Commissioning/Handover

The commissioning works will be carried out as a progressive process from the final structural checks, pre-commissioning and operation of individual component parts, interconnecting pipework, cabling and signalling, through to the overall performance and compliance testing of the plant prior to its commercial operation.

5.9.3.2 Programme

An indicative timeline for construction phases and activities is shown in the Table 5.5 below. This timeline may vary depending upon the time of year, weather conditions and the availability of specialised equipment, in addition to the sequencing of construction activities with the proposed (BESS) project, positioned adjacent to the proposed Ringsend Flexible Generation (FlexGen) site. If possible, the Design and Build contractor may seek to improve upon the programme duration outlined within this report.

It is expected that the first 4 months will comprise site preparation and enabling works. Months 5 to 12 will include the installation of foundations and structures, transportation of major components to site and erection activities. Months 13 to 15 would see the completion of construction. The commissioning and testing of the facility will be carried out between months 16 and 19 with demobilisation of personnel from Site. Finally, the site will be handed over to the operations team. Details on the phasing of the works are summarised below under each of the project elements.

Table 5.5: Indicative timeline construction phases and activities for FlexGen Developments (Poolbeg and Ringsend)

Month	Construction Activities
Months 1 to 4	Project management planning. Mobilisation of contractors. Establishment of temporary construction facilities. Demolition, site clearance and service diversion. Preparation of temporary and permanent site roads. Preparation of laydown areas
Months 5 to 12	Ground improvement and piling. Trenching and installation of formwork and reinforcement for foundations. Foundation pour. Trenching and installation of underground utilities, Bund construction and drainage attenuation measures. Installation of structures. Erection of structural steel / prefabricated containers. General site works finishing.
Months 13 to 15	Completion of major structures. Installation of gas turbine package and transformer. Mechanical and Electrical installation. Testing of main systems. Restoration of laydown areas. Completion of construction.
Month 16 to 19	Start-up testing. Commissioning of plant. Performance and compliance testing Demobilisation. Hand over for commercial operation

5.9.3.3 Workforce

Workforce and traffic management calculations are based on the resumption of normal construction activities in 2021 following the Covid pandemic.

In order to optimise the construction activities on site, it is anticipated that construction at Poolbeg FlexGen and Ringsend FlexGen will be carried out concurrently.

Separately, a maximum daily workforce of approximately 60 people is expected during the peak period for construction works on site. Cumulatively between both FlexGen sites, it is anticipated that a maximum of 120 daily workforce. However, typical daily workforce requirements will be less than this.

A vehicle occupancy rate of 1.25 is assumed and in the worst-case scenario this would result in average daily personnel movements of 96 vehicles at each site (approximately 48 vehicles per day). This would mean a requirement for up to 48 car parking spaces at each site in the worst-case scenario.

A summary of construction personnel and personnel vehicle movements at each FlexGen site is provided in Table 5.6 and 5.7.

Table 5.6: Construction Personnel and Personnel Vehicle Movements at each FlexGen site

Description	Duration	Average Personnel on site per day	Average Personnel Vehicle Movements per day	Total per Construction Phase
Site Preparation	Months 1 to 4	20	32	2560
Heavy Civils & Building Erection	Months 5 to 12	30	48	7680
Mechanical and Electrical Erection	Months 13 to 15	60	96	5760
Commissioning	Months 16 to 19	60	96	7680
Total		39	63	23680

Source: Poolbeg FlexGen Construction Method Statement; Ringsend FlexGen Construction Method Statement

5.9.3.4 Vehicle Movements

In addition to construction personnel, construction traffic will consist of civil works traffic, mechanical works traffic and a small number of abnormal loads. The anticipated construction vehicle movement for each FlexGen plant type is summarised below. Further details are set out in the accompanying Construction Management Plans provided in Appendix 5A.

Tables 5.7 and 5.8 below show a summary of the envisaged traffic movements associated with deliveries to each of the proposed FlexGen sites, as well as the estimated volumes of waste to be removed off-site and import of materials such as concrete and stone (assumed 20 days per month).

Table 5.7: Summary of Envisaged Construction vehicle movements for Poolbeg FlexGen

Description	HGV Vehicles	Movements	Duration (months)	Frequency (Average No. HGV movements / day)
Site Preparation	1846	3692	4	46
Heavy Civils & Building Erection	1371	2742	8	17
Mechanical and Electrical Erection	66	132	3	2.2
Commissioning	8	16	4	0.3
Total	3291	6582	19	17

Source: ESB Poolbeg FlexGen Construction Management Plan Document No.: P000344-CE21-0008

Table 5.8: Summary of Envisaged Construction vehicle movements for Ringsend FlexGen

Description	HGV Vehicles	Movements	Duration (months)	Frequency (Average No. HGV movements / day)
Site Preparation	1432	2864	4	36
Heavy Civils & Building Erection	1094	2188	8	14
Mechanical and Electrical Erection	66	132	3	2.2
Commissioning	8	16	4	0.2
Total	2600	5200	19	14

Source: ESB Ringsend FlexGen Construction Management Plan Document No.: P000343-CE21-0011

Two-way heavy goods vehicle (HGV) movements are expected to peak during the early stages (Civil and mechanical works) of construction. During this time, it is estimated that there will be approximately 46 HGV two way traffic movements at the Poolbeg FlexGen site and 36 HGV two way traffic movements at the Ringsend FlexGen site. The majority of the deliveries will be during the construction of the groundworks and the foundations for the proposed development.

All civil construction materials are anticipated be delivered using standard rigid and articulated trucks, low-loaders and ready-mix concrete trucks etc.

It is estimated that there will be approximately 30 abnormal load movements over the course of each development. However, the final requirements will be established during detailed design and are dependent upon whether the proposed tanks, buildings will be delivered to site in modular format, prefabricated or constructed on site.

Appropriate permits will be sought in due course from DCC. As per the personnel vehicles and HGV's the final requirements and management of abnormal load vehicles will be detailed in the CEMP. A Construction Traffic Management Plan (CTMP) including an access route, will be prepared by the Contractor prior to commencement.

5.9.3.5 Temporary Construction Works Facilities

Each of the FlexGens will require a temporary construction and laydown compound for the duration of the construction works which will be used to store equipment and supplies and will include laydown areas and provide all the necessary temporary facilities such as offices, staff welfare facilities, car parking, etc. All areas under construction will be located within a secure perimeter.

Exact details of the temporary site compound and laydown area will be included in the Construction Environmental Management Plan (CEMP) agreed with the contractor prior to commencement of works. It is anticipated that the compound and laydown area are facilitated within the proposed project works boundary.

The laydown / storage areas will be available for any fabrication which may be necessary for construction and will include space for temporary car parking and office accommodation. Temporary fencing or hoarding will be erected where deemed required. Typical temporary site

services will be brought to the office accommodation. Existing station services will be utilised where possible.

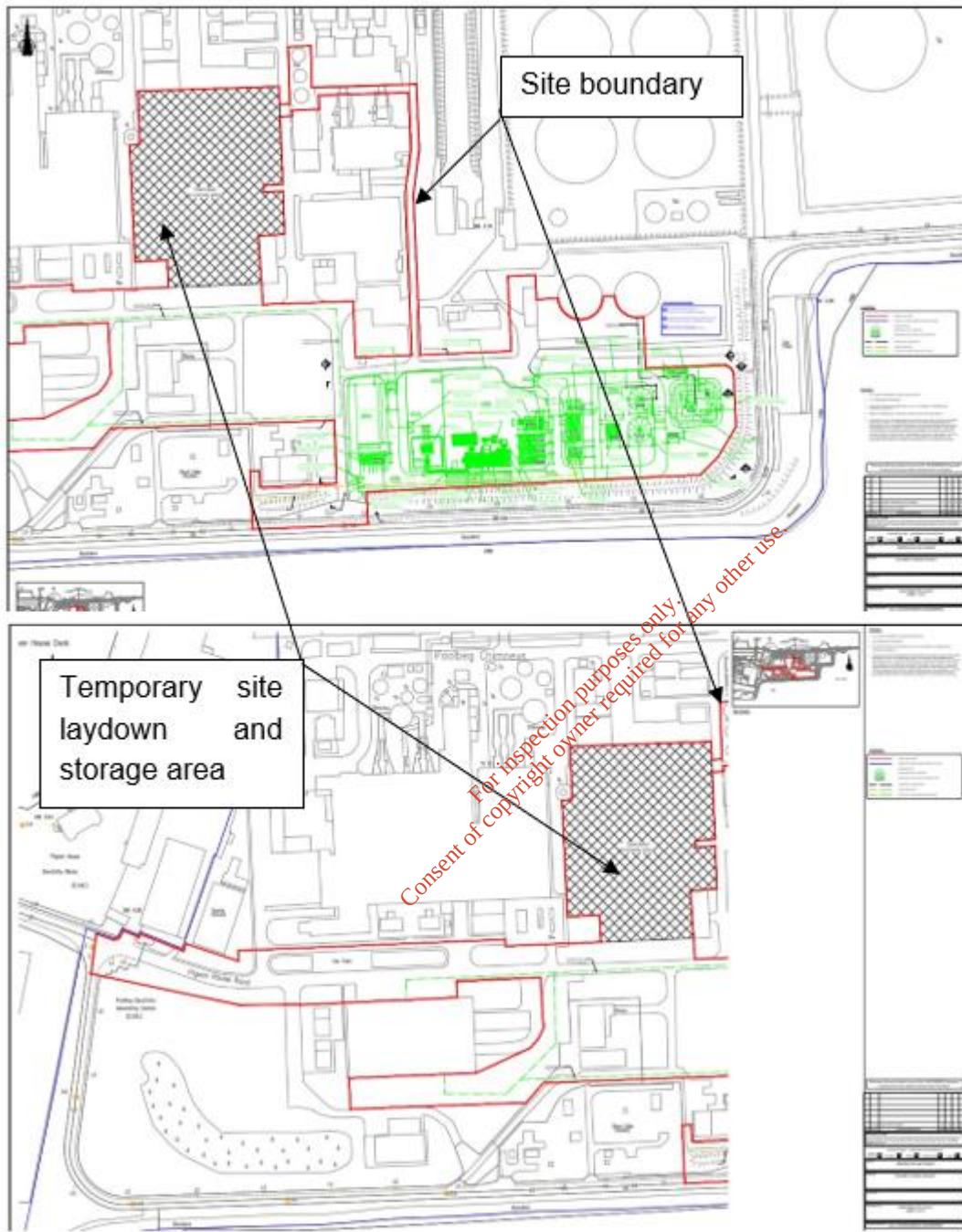
The temporary laydown and storage area will be covered with a suitable material where required and, as appropriate following construction, all required measures will be taken to return the area to its previous state.

The proposed location for the temporary laydown and storage area for the Poolbeg FlexGen development is indicated in Figure 5.10 below.

Primary access to the development site (Site Access 1) will be via the existing Poolbeg Generating Power Station entrance located on Pigeon House Road, and via the internal roadways within the Poolbeg Power Generating Station. This existing entrance is controlled by security control positioned at the entrance. During construction of the proposed development site, it is planned to use both this existing access off Pigeon House Road, and another existing access route (Site Access 2) from the ESB owned roadway to the south (unnamed), immediately adjacent to the proposed development site.

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Figure 5.17: Proposed temporary laydown/storage area and access at the Poolbeg FlexGen site

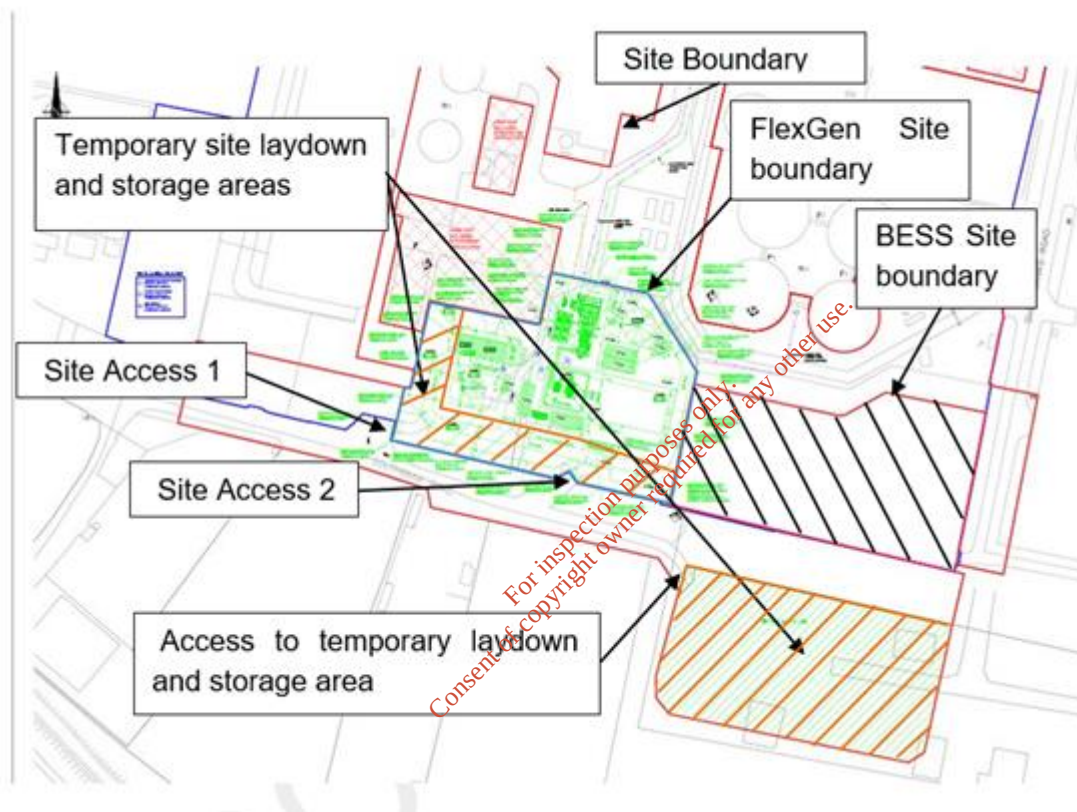


Source: ESB Poolbeg FlexGen Construction Management Plan Document No. P000344-CE21-0008

The proposed locations for the two temporary laydown and storage areas for the Ringsend FlexGen development are indicated in Figure 5.11 below. Figure 5.18: Proposed Site Compound and Laydown Area and accesses for Ringsend FlexGen

5.11 below shows the two accesses into the construction site. Both accesses (Site Access 1 & 2) utilise entrances located on Southbank Road. These accesses will also be utilised for emergency access and egress.

Figure 5.18: Proposed Site Compound and Laydown Area and accesses for Ringsend FlexGen



Source: ESB Ringsend FlexGen Construction Management Plan Document No.: P000343-CE21-0011

5.9.4 Poolbeg BESS

5.9.4.1 Construction Activities

The construction of the Poolbeg BESS facility will be broken down into the following main activities:

- Temporary construction facilities
- Demolition works
- Site enabling and preparation

- Infrastructure construction
- Buildings construction
- Equipment installation
- Commissioning and handover

Temporary construction facilities

The temporary laydown and storage area will be covered with a suitable material where required and, as appropriate following construction, all required measures will be taken to return the area to its previous state.

Secondary temporary laydown will be identified for construction plant and equipment. These areas will be available for any excess storage, heavy equipment storage or for daily goods deliveries. It is not anticipated that secondary temporary laydown outside the main construction works area will be required for the D&EW (Demolition and Enabling works) Contract.

Secondary temporary laydown may be required for construction plant and equipment. Land is available for use as a secondary temporary laydown area to the east of the existing disused generation station and within the grounds of main Poolbeg Generating Station. Laydown is also likely to be required at the proposed ganged transformer arrangement to the South East of the station.

The Contractor's primary site compound will be located on an elevated topographical area where feasible. Typical temporary site services such as power and potable water will be brought to the compound. Foul waste will be temporarily stored and regularly disposed of using appropriate facilities off-site. A suitably bundled generator may also be used for power if preferred.

Demolition/Civil Enabling Works

Three existing buildings within the existing site boundary will be demolished prior to the commencement of site enabling works and construction works. Prior to this, fully intrusive structural investigation of the buildings to be demolished and adjoining, potentially affected buildings will be carried out.

Pre and post demolition assessments of adjoining building(s) to be retained will be carried out, including a system for monitoring new and existing cracks in the building fabric. These buildings include the retained administration block along with the existing disused generating station.

Following site clearance, re-grading and levelling will be undertaken to raise the proposed development site to the design site levels. The material used for the surfacing of the site will be a compacted granular material in accordance with the TII publication "Specification for Road Works Series 600 – Earthworks

Infrastructure construction

The extent and type of foundations used for buildings and equipment will be determined during detailed design, based upon the results of site investigations. Foundation construction including piling works if necessary, will be undertaken following the site preparation works.

The applied bearing pressures arising due to the battery units and associated plant loads are relatively low. Typical foundation solutions may comprise of ground bearing shallow RC pads, rafts, strip footings or, in certain circumstances, piled foundations may be used. The use of pile foundations may arise in order to circumvent differential settlement issues or minimise

excavations and reduce below ground services diversions. The type of foundation will be determined, based upon the results of the geotechnical site investigation and services site investigation and subsequent detailed designs. Should pile foundations be deemed necessary, it is expected that a replacement piling technique, such as bored or CFA piling will be adopted, as these techniques are suitable in the expected ground conditions. Approved ground improvement techniques may be considered if judged necessary and feasible following the site investigation. Safe ground bearing levels and resulting excavation requirements, will be determined during detailed design.

It is not anticipated at this stage that major piling solutions will be required. However, if foundation settlement tolerances from battery suppliers are onerous at the detailed design stage, non-percussive mini piles systems may be used to ensure noise impacts are minimised. An assessment of surcharging of foundation loads onto existing below ground services will also be required at detailed design. This may also require sleeved piled foundations adjacent to or bridging over existing retained below ground services to distribute loads at greater depths. If piling is required, the duration of intermittent piling operations is likely to be limited to intermittent periods over the course of four to six weeks.

Large and/or deep excavations may be required for the stormwater attenuation system and for the foundations of primary plant. Some of these may require temporary ground support in the form of sheet piling. Where sheet piling is used, vibratory rather than percussive techniques will be employed.

Reinforced concrete plinth/slab foundations are expected to be required to support all BESS plant and ancillary equipment, in accordance with BESS Contractor's requirements.

Construction of the development infrastructure will involve excavation and installation of all below ground services including drainage systems connections to existing water supplies and power, along with the routing of all cable ducting throughout the site within the specified terminal points.

Services will be surrounded with imported suitable engineered fill and backfilled with either imported fill or with excavated material, if this proves suitable.

Temporary works may be installed to provide stable dry excavations, depending upon the results of the site investigation and the contractor's proposed construction methods. Such temporary works may include the use of embedded retaining walls such as sheet piles, or other suitable methods and/or ground water management.

Where works required to install grid cables to the 220kV Poolbeg substation and to install the 33kV export cable to the ganging transformer at the Poolbeg FlexGen site, coordination and permitting of the works will be required with Poolbeg Generating Station to ensure operation activities are not affected. Similar requirements will apply to the grid connection from the ganged transformer back to the substation.

Roads will be constructed to suit the final permanent layout of the proposed development with road finishes typically to be as shown on planning drawings in Appendix 1.

Building construction

Where possible, prefabricated building units will be utilised to minimise on-site building works. Prefabricated units will be divided into standard transportable units where possible and will be craned into position.

If the use of prefabricated buildings is not proposed by the Contractor, a suitably designed traditional masonry block, flat roof, single storey building may be constructed. Cladding and insulation will be fixed, and the buildings will be made weather tight. Internal walls will be erected where the building is to be divided. The buildings will then be fitted out with electrical systems, plumbing and drainage.

Ancillary works

Ancillary works will be required to be completed. Such works include, but are not limited to:

- Permanent site fencing and gates;
- Site lighting; and
- Site security systems.

Refer to the planning permission drawings for details of the building requirements and for all ancillary site development works.

Equipment installation

This construction phase is expected to include the following:

- Installation and commissioning of plant
- Electrical fit out and commissioning of buildings
- Installation and commissioning of transformers
- Installation and testing of all below ground cables

Factory acceptance testing will be carried out on equipment, at place of manufacture, prior to dispatch to the site.

Site acceptance testing will form part of the program of works. This will consist of inspection of equipment on delivery, pre-installation tests, testing of subsystems prior to commissioning. After the commissioning phase compliance testing will be undertaken to ensure adherence to national standards and regulations.

After the completion of the foundation works, plant and equipment will be installed. Transformers (within housings and modules) will be delivered and erected onto the foundations. Heavy lifting with the use of cranes will be required for some items of plant. Wind direction and data will be monitored using Met Éireann data will be to ensure safe crane operations.

The commissioning works will be carried out as a progressive process from the final structural checks, pre-commissioning and setting to work of individual component parts, interconnecting pipework, cabling and signalling, through to the overall performance and compliance testing of the plant prior to its commercial operation.

Completion and handover

This construction phase is expected to include the following:

- Energisation and start-up testing
- Commissioning and compliance testing
- Restoration of laydown areas
- Completion of construction and demobilisation
- Completion and handover of Health and Safety File, technical documentation, full discharge of planning and Building Regulation requirements etc.

- Formal handover of development for commercial operation

5.9.4.2 Programme

The commencement date is subject to the date of grant of planning permission, pre-commencement obligations, and progression of the design to construction stage. The key stages and activities within the construction programme along with construction hours are provided in the table below.

The timing of stages and activities are approximate based on experience of similar projects and this is meant as a guide, rather than a definitive programme of events. This timeline may vary depending on the time of year, weather conditions and the availability of specialised equipment. If possible, the Contractors may seek to improve upon the programme duration.

Demolition & Enabling Works Contract:

It is anticipated that for the first stage of the project, the Demolition and Enabling Works Contractor will:

- Begin intrusive demolition and site enabling works in early 2021.
- These site works are envisaged to be completed within approximately 6 months from mobilisation and the traffic volume intensity and movement around the site stated in this report are based upon this period.

Design & Build EBOP Contract:

- Begin mobilising for construction works towards the end of the Demolition and Enabling Works Contract in early Q2 of 2021.

These site works are envisaged to be completed within approximately 13 months and the traffic volume intensity and movement around the site stated in this EIAR are based upon this period.

Table 5.9: Indicative Timeline for Construction Phases and Activities for the Proposed Poolbeg BESS site

Month	Construction Activities
Demolition and Enabling Works	Temporary construction facilities
Months 1 to 6	• Primary laydown areas • Secondary laydown areas • Contractors site compound and services • Temporary fencing and site roads
	Demolition works
	• Building soft strip • Building demolition • Reinstatement of adjacent buildings
	Site Preparation
	• Existing services • Site clearance and enabling works • Removal and diversion of underground services • Site investigations • Site raising and grading
Design & Build EBOP Contract	Temporary construction facilities
Month 5 and/or 6	• Primary laydown areas • Secondary laydown areas • Contractors site compound and services

Month	Construction Activities
	Temporary fencing and site roads
Design & Build EBOP Contract	Infrastructure Construction
Month 7 to 16	- Foundation construction - Below ground services and utilities installation - Road networks construction
	Building Construction
	- Erection prefabricated units - Erection of structural steel, concrete, masonry and structures - Erection of ancillary structures
	Equipment installation
	- Installation and commissioning of plant - Electrical fit out and commissioning of buildings and enclosed units - Installation and commissioning of transformers - Installation and testing of all below ground cables
Design & Build EBOP Contract:	Commissioning and handover
Months 17 to 19	- Energisation and start-up testing - Commissioning and compliance testing - Restoration of laydown areas - Completion of construction and demobilisation - Completion and handover of Health and Safety File, technical documentation, full discharge of planning and Building Regulation requirements etc. - Formal handover of development for commercial operation
ESB Poolbeg Battery Energy Storage System (BESS) Construction Management Plan Document No.: QP-000033-02-R460-004	

5.9.4.3 Workforce

Workforce and traffic management calculations are based on the resumption of normal construction activities in 2021 following the Covid pandemic.

An average daily workforce of 20-24 is anticipated on each of the BESS sites, reaching a maximum daily workforce of approximately 30-35 people during the peak period for construction works on each site. However, typical daily workforce requirements will be less than this.

A vehicle occupancy rate of 1.25 is assumed and in the worst-case scenario this would result in average daily personnel movements of 52 vehicles (approximately 26 vehicles per day) per BESS site. This would mean a requirement for up to 26 temporary car parking spaces in the worst-case scenario at each of the BESS sites.

5.9.4.4 Vehicle Movements

Construction plant movements will consist of HGV civil and mechanical works traffic, and a smaller number of other deliveries and abnormal loads:

- Heavy Goods Vehicles (HGVs): during construction it is estimated that the maximum daily movements will be approximately 60 HGV movements (30 HGV vehicles) at the Poolbeg BESS site during peak construction stages which will take place during site preparation.

- Most of the vehicle movements for the project will be during the infrastructure and building construction works.
- Other deliveries: this will include the import of granular material, reinforcing steel, geo-textiles, electrical cable, switchgear and general building materials with the majority of those delivered to site during the initial construction stages. All civil construction materials are anticipated to be delivered using standard rigid and articulated trucks, low-loaders and ready-mix concrete trucks etc.
- Abnormal loads: these may include the delivery of battery units, transformers and prefabricated modular unit for the control building. During construction it is estimated that there will be maximum of 20 abnormal load movements over the course of the development (10 abnormal loads). However, the final requirements will be established during detailed design and are dependent upon whether the proposed equipment and infrastructure will be delivered to site in modular format, prefabricated or constructed on site.

Table 5.9 below shows a summary of the envisaged traffic movements associated with HGV vehicles to the proposed Poolbeg BESS development site. This includes approximated volumes of waste to be removed off-site and the import of concrete and stone.

Table 5.10: Summary of envisaged construction plant movements (approximate numbers only) for the proposed Poolbeg BESS site

Description	HGV/MGV Vehicles	Movements	Duration (months)	Frequent (Average No. day)
D&EW Works Contract				
Temporary Construction Facilities	200	400	2	5
Demolition Works				
- Building Soft Strip				
Demolition Works	2200	4400	4	30
Site Preparation				
D&B EBOP Contract				
Temporary Construction Facilities	2000	4000	11	8
Infrastructure Construction				
Building Construction				
Equipment Installation				
Commissioning and handover	150	300	2	3
Total	4550	9100	19	12

ESB Poolbeg Battery Energy Storage System (BESS) Construction Management Plan Document No.: QP-000033-02-R460-004

These are approximate numbers based on anticipated volumes for the construction of the current proposed layout. Exact figures will be determined by the specialist Contractor during detailed design prior to construction.

Appropriate permits will be sought in due course from Dublin City Council. As per the personnel vehicles and HGVs the final requirements and management of abnormal load vehicles will be detailed in the CEMP. A Construction Traffic Management Plan (CTMP) including an access route, will be prepared by the Contractor prior to commencement.

5.9.4.5 Temporary Construction Works Facilities

Dedicated primary temporary laydown and storage areas will be identified for construction plant and equipment. This area will be available for any fabrication which may be necessary.

The temporary laydown and storage area will be covered with a suitable material where required and, as appropriate following construction, all required measures will be taken to return the area to its previous state.

Secondary temporary laydown will be identified for construction plant and equipment. These areas will be available for any excess storage, heavy equipment storage or for daily goods deliveries.

It is not anticipated that secondary temporary laydown outside the main construction works area will be required.

Secondary temporary laydown may be required for the EBOP Contract. Land is available for use as a secondary temporary laydown area to the east of the existing disused generation station and within the grounds of main Poolbeg Generating Station. Laydown is also likely to be required at the proposed ganged transformer arrangement to the South East of the station.

The Contractor's primary site compound will be located on an elevated topographical area where feasible. Typical temporary site services such as power and potable water will be brought to the compound. Foul waste will be temporarily stored and regularly disposed of using appropriate facilities off-site. A suitably bunded generator may also be used for power if preferred.

It is expected that the area to the south of Building 4 would be a suitable location for the site compound for both D&EW and EBOP Contracts. To assist mobilisation works, the use of existing contractor cabins on the station site would need to be formally agreed with the station and would not be intended for use throughout all the construction works.

Temporary fencing or hoarding will be erected where delineation of works is deemed required.

Where works are required on the export cable, coordination and permitting of the works will be required with the Poolbeg Generating Station to ensure operational activities are not affected.

The main site access is available via the Pigeon House Road through the existing secured entrance to Poolbeg Generating Station. The existing entrance has wide gates and a clear approach along with being controlled by security control positioned at the entrance gate building. Direct access to the development will be via this gate and the existing internal roadways within Poolbeg Generating Station.

Secondary access is available to the southern boundary of Poolbeg Generating Station and it is expected that this may only be limited to heavy deliveries such as for the large transformer

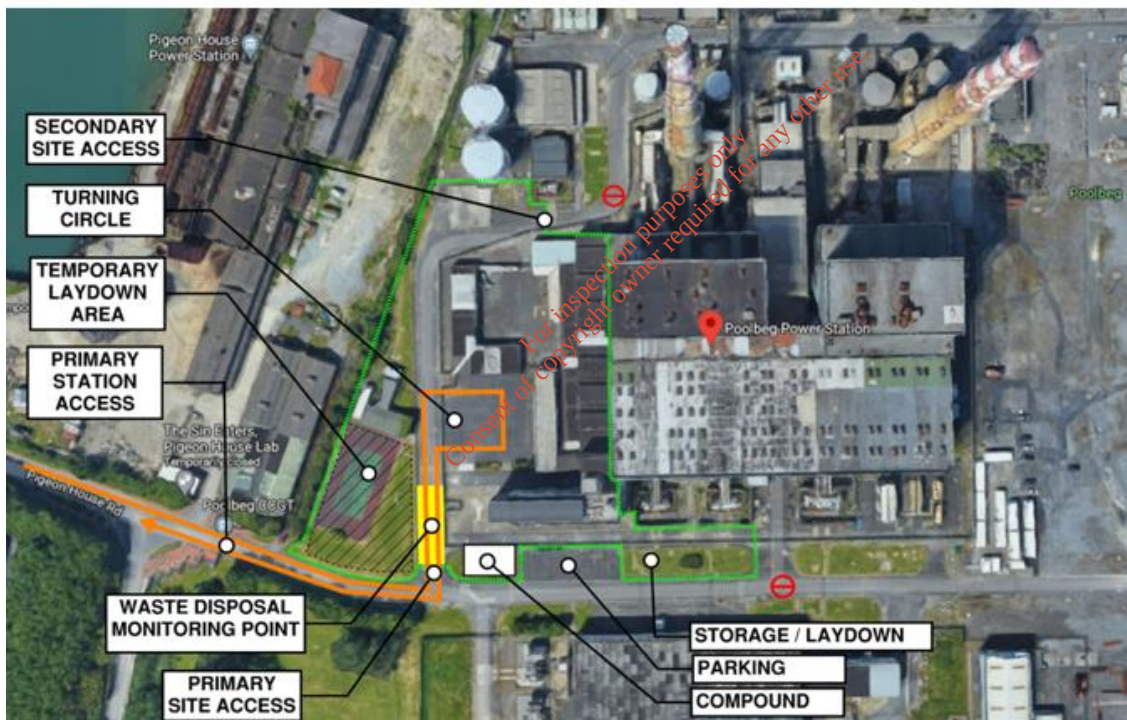
equipment at the ganged transformer arrangement to the South West. If required to be used, this shall be based on providing trained banksmen to ensure traffic and pedestrian management during these limited deliveries.

The primary entrance to the main development site for the demolition, construction and operational phases will be via the construction of a new access gate and entrance roadway onto the internal station road at the south of the proposed development. This entrance has clear lines of sight achievable in the East and West directions. Existing low speed limits for vehicles are enforced within the internal station roads.

It is anticipated that the construction works on the main site will be delineated with temporary fencing during the works, and permanent fencing when completed.

During the construction of the proposed development, it is expected that cranes or long vehicles could also obtain access/egress to north of the main development using internal station roads.

Figure 5.19: Proposed Site Compound and Laydown Area and access for Poolbeg BESS



Source: ESB

5.9.5 South Wall BESS

5.9.5.1 Construction Activities

The construction of the South Wall BESS facility will be broken down into the following main activities:

- Temporary construction facilities
- Site enabling and preparation
- Infrastructure construction
- Buildings construction
- Equipment installation
- Commissioning and handover

Temporary construction facilities

The temporary laydown and storage area will be covered with a suitable material where required and, as appropriate following construction, all required measures will be taken to return the area to its previous state.

Land for use as a secondary temporary laydown area may be available outside the property boundary subject to consented agreement with third party owners. This area would facilitate contractor personnel car parking and additional site laydown for heavy plant and equipment.

The Contractor's primary site compound will be located on an elevated topographical area where feasible. Typical temporary site services such as power and potable water will be brought to the compound. Foul waste will be temporarily stored and regularly disposed of using appropriate facilities off-site. A suitably banded generator may also be used for power if preferred.

Site preparation

Physical intrusive surveys using careful hand digging techniques may be used to physically verify desktop information and survey locations of any existing below ground services including electrical cables and other services.

There are several known existing electrical below ground services to the south of the site along with a deep sewer. These will be required to be maintained and the development layout has taken these into consideration. During the construction phase, existing services will need to be carefully identified and maintained.

A programme of ground clearance and levelling will be typically undertaken across the proposed development site. Vegetation, shrubs and tree clearance, and removal of any redundant on-site plant and buildings and fencing, will be undertaken where required.

During site clearance, suitable material will be re-used on site where appropriate, or disposed of off-site by an approved and licensed contractor in accordance with applicable regulations for treatment and disposal at an appropriate facility.

Demolition works

Existing foundations, obstructions, substructures and services which will affect the construction of the plant will be excavated and demolished where possible. Diversion of services will be undertaken where required.

Site Enabling and Preparation

During the Contractor's detailed design and engineering studies, surveys of the proposed site may be undertaken to confirm the underlying ground conditions. The results of these surveys will be used to inform the final design and layout of the main plant and equipment items, on site access roads, other miscellaneous plant and equipment items and foundations and structures.

Note that to date, detailed geo-environmental and geophysical site investigations have been undertaken and information obtained for advancing detailed designs by the Contractor.

Following site clearance, ground level raising is to be undertaken at the site. The land raising exercise is to be undertaken to reach required levels. Where required material will be sourced from a licenced quarry or from a suitable third-party site. The material utilised for land raising will be geotechnically and chemically suitable for use on the site and will be imported to the site in accordance with best practice and all relevant waste legislation, including Article 27 regulations where applicable.

It is anticipated that a maximum volume of 6,500 m³ of material will be required for land-raising purposes. The material will be imported to site for direct infilling with some short-term stockpiling undertaken to facilitate construction operations, where necessary.

Ground improvement and stabilization techniques may be considered by the Contractor if judged necessary to suit the site investigation.

Note that site raising requirements on the site to bring the proposed development to the required levels and is reflected in the HGV movements.

Infrastructure construction

The extent and type of foundations used for buildings and equipment will be determined during detailed design, based upon the results of site investigations. Foundation construction including piling works if necessary, will be undertaken following the site preparation works.

The applied bearing pressures arising due to the battery units and associated plant loads are relatively low. Typical foundation solutions may comprise of ground bearing shallow RC pads, rafts, strip footings or, in certain circumstances, piled foundations may be used. The use of pile foundations may arise in order to circumvent differential settlement issues or minimise excavations and reduce below ground services diversions. The type of foundation will be determined, based upon the results of the geotechnical site investigation and services site investigation and subsequent detailed designs. Should pile foundations be deemed necessary, it is expected that a replacement piling technique, such as bored or CFA piling will be adopted, as these techniques are suitable in the expected ground conditions. Approved ground improvement techniques may be considered if judged necessary and feasible following the site investigation. Safe ground bearing levels and resulting excavation requirements, will be determined during detailed design.

It is not anticipated at this stage that major piling solutions will be required. However, if foundation settlement tolerances from battery suppliers are onerous at the detailed design

stage, non-percussive mini piles systems may be used to ensure noise impacts are minimised. An assessment of surcharging of foundation loads onto existing below ground services will also be required at detailed design. This may also require sleeved piled foundations adjacent to or bridging over existing retained below ground services to distribute loads at greater depths. If piling is required, the duration of intermittent piling operations is likely to be limited to intermittent periods over the course of four to six weeks.

Large and/or deep excavations may be required for the stormwater attenuation system and for the foundations of primary plant. Some of these may require temporary ground support in the form of sheet piling. Where sheet piling is used, vibratory rather than percussive techniques will be employed.

Reinforced concrete plinth/slab foundations are expected to be required to support all BESS plant and ancillary equipment, in accordance with BESS Contractor's requirements.

Construction of the development infrastructure will involve excavation and installation of all below ground services including drainage systems, connections to existing water supplies and power, along with the routing of all cable ducting throughout the site within the specified terminal points.

Services will be surrounded with imported suitable engineered fill and backfilled with either imported fill or with excavated material, if this proves suitable.

Temporary works may be installed to provide stable dry excavations, depending upon the results of the site investigation and the contractor's proposed methods. Such temporary works may include the use of embedded retaining walls such as sheet piles, or other suitable methods and/or ground water management.

Where works are required to install grid cables to the 220kV Irishtown substation, coordination and permitting of the works will be required with the Dublin Bay Power Station to ensure operational activities are not affected.

Where works are required to water connections to Shellybanks Road, coordination and permitting of the works will be required with the Covanta Waste to Energy Plant to ensure operational activities are not affected.

Roads will be constructed to suit the final permanent layout of the proposed development with road finishes typically to be as shown on planning drawings in Appendix 1.

Building construction

Where possible, prefabricated building units will be utilised to minimise on-site building works. Prefabricated units will be divided into standard transportable units where possible and will be craned into position.

If the use of prefabricated buildings is not proposed by the Contractor, a traditional masonry block, flat roof, single storey building may be constructed. Cladding and insulation will be fixed, and the buildings will be made weather tight. Internal walls will be erected where the building is to be divided. The buildings will then be fitted out with electrical systems, plumbing and drainage.

Ancillary works will be required to be completed. Such works include, but are not limited to:

- Permanent site fencing and gates;
- Site lighting;

- Site security systems;

Refer to the planning permission drawings for details of the building requirements and for all ancillary site development works.

Equipment installation

This construction phase is expected to include the following:

- Installation and commissioning of plant
- Electrical fit out and commissioning of buildings
- Installation and commissioning of transformers
- Installation and testing of all below ground cables

Factory acceptance testing will be carried out on equipment prior to dispatch to the site. Site acceptance testing will form part of the program of works. This will consist of inspection of equipment on delivery, pre-installation tests, testing of subsystems prior to commissioning. After the commissioning phase compliance testing will be undertaken to ensure adherence to national standards and regulations.

After the completion of the foundation works, plant and equipment will be installed. Transformers (within housings and modules) will be delivered and erected onto the foundations. Heavy lifting with the use of cranes will be required for some items of plant. Wind direction and data will be monitored using Met Éireann data will be to ensure safe crange operations.

The commissioning works will be carried out as a progressive process from the final structural checks, pre-commissioning and setting to work of individual component parts, interconnecting pipework, cabling and signalling, through to the overall performance and compliance testing of the plant prior to its commercial operation.

Completion and handover

This construction phase is expected to include the following:

- Energisation and start-up testing
- Commissioning and compliance testing
- Restoration of laydown areas
- Completion of construction and demobilisation
- Completion and handover of Health and Safety File, technical documentation, full discharge of planning and Building Regulation requirements etc.
- Formal handover of development for commercial operation

5.9.5.2 Programme

The commencement date is subject to the date of grant of planning permission, pre-commencement obligations, and progression of the design to construction stage. The key stages and activities within the construction programme along with construction hours are tabulated below.

The timing of stages and activities are approximate based on experience of similar projects and this is meant as a guide, rather than a definitive programme of events. This timeline may vary depending on the time of year, weather conditions and the availability of specialised equipment. If possible, the Contractor may seek to improve upon the programme duration.

It is anticipated that the Contractor will:

- Begin site preparation works and setting up temporary construction facilities in January 2021 in order to meet the required Commercial Operation Date (COD) for the project.
- The site works are envisaged to be completed within approximately 14 months and the traffic volume intensity and movement around the site stated in this report are based upon this period.

Table 5.11: Indicative Timeline for Construction Phases and Activities for the Proposed South Wall BESS site

Month	Construction Activities
Months 1 and 2	Temporary construction facilities • Primary laydown areas • Secondary laydown areas • Contractors site compound and services • Temporary fencing and site roads Site Preparation • Existing services • Site clearance and enabling works • Removal and diversion of underground services • Site investigations • Site raising and grading
Months 3 to 11	Infrastructure Construction • Foundation construction • Below ground services and utilities installation • Road networks construction Building Construction • Erection prefabricated units • Erection of structural steel, concrete, masonry and structures • Erection of ancillary structures Equipment installation • Installation and commissioning of plant • Electrical fit out and commissioning of buildings and enclosed units • Installation and commissioning of transformers • Installation and testing of all below ground cables
Months 12 to 14	Commissioning and handover • Energisation and start-up testing • Commissioning and compliance testing • Restoration of laydown areas • Completion of construction and demobilisation • Completion and handover of Health and Safety File, technical documentation, full discharge of planning and Building Regulation requirements etc.

Month	Construction Activities
	Formal handover of development for commercial operation
Source: ESB South Wall Battery Energy Storage System (BESS) Construction Management Plan Document No. QR-000104-R460-001	

5.9.5.3 Workforce

Workforce and traffic management calculations are based on the resumption of normal construction activities in 2021 following the Covid pandemic.

An average daily workforce of 20-24 is anticipated on each of the BESS sites, reaching a maximum daily workforce of approximately 30 people during the peak period for construction works on each site. However, typical daily workforce requirements will be less than this.

A vehicle occupancy rate of 1.25 is assumed and in the worst-case scenario this would result in average daily personnel movements of 52 vehicles (approximately 26 vehicles per day) per BESS site. This would mean a requirement for up to 26 temporary car parking spaces in the worst-case scenario at each of the BESS sites.

5.9.5.4 Vehicle Movements

Construction plant movements will consist of HGV civil and mechanical works traffic, and a smaller number of other deliveries and abnormal loads:

- Heavy Goods Vehicles (HGVs): during construction it is estimated that the maximum daily movements will be approximately 48 HGV movements (24 HGV vehicles) at the South Wall BESS site during peak construction stages which will take place during site preparation.
- Other deliveries: this will include the import of granular material, reinforcing steel, geotextiles, electrical cable, switchgear and general building materials with the majority of those delivered to site during the initial construction stages. All civil construction materials are anticipated to be delivered using standard rigid and articulated trucks, low-loaders and ready-mix concrete trucks etc.
- Abnormal loads: these may include the delivery of battery units, transformers and prefabricated modular unit for the control building. During construction it is estimated that there will be maximum of 20 abnormal load movements over the course of the development (10 abnormal loads). However, the final requirements will be established during detailed design and are dependent upon whether the proposed equipment and infrastructure will be delivered to site in modular format, prefabricated or constructed on site.

Table 5.11 below shows a summary of the envisaged traffic movements associated with HGV vehicles to the proposed development site. This includes approximated volumes of waste to be removed off-site and the import of concrete and stone.

Table 5.12: Summary of envisaged construction plant movements (approximate numbers only) for the proposed South Wall BESS site

Construction Activities	HGV Vehicles	Movements	Duration (Months)	Frequency (Avg No. HGV /day)
Site preparation	950	1900	2	24
Infrastructure Construction	1350	2700	9	8
Building Construction				
Equipment Installation				
Commissioning and handover	50	100	3	1
Total	2350	4700	14	11

ESB South Wall Battery Energy Storage System (BESS) Construction Management Plan Document No. QR-000104-R460-001

These are approximate numbers based on anticipated volumes for the construction of the current proposed layout. Exact figures will be determined by the specialist Contractor to construction.

Appropriate permits will be sought in due course from Dublin City Council. As per the personnel vehicles and HGVs the final requirements and management of abnormal load vehicles will be detailed in the CEMP. A Construction Traffic Management Plan (CTMP) including an access route, will be prepared by the Contractor prior to commencement.

5.9.5.5 Temporary Construction Works Facilities

Primary temporary laydown areas

Dedicated primary temporary laydown and storage areas will be identified for construction plant and equipment. This area will be available for any fabrication which may be necessary.

The temporary laydown and storage area will be covered with a suitable material where required and, as appropriate following construction, all required measures will be taken to return the area to its previous state.

Secondary temporary laydown areas

Secondary temporary laydown will be identified for construction plant and equipment. This area will be available for any excess storage, heavy equipment storage or for daily goods deliveries.

Land for use as a secondary temporary laydown area may be available outside the property boundary. This area would facilitate contractor personnel car parking and additional site laydown for heavy plant and equipment.

Contractors site compound and services

The Contractor's primary site compound will be located on an elevated topographical area where feasible. Typical temporary site services such as power and potable water will be brought to the compound. Foul waste will be temporarily stored and regularly disposed of using appropriate facilities off-site. A suitably bunded generator may also be used for power if preferred. An example of a Contractor's site compound layout is shown below and is likely to include the following:

- Temporary site accommodation incorporating management and engineers cabins, WC facilities, canteen and drying room facilities;
- Primary materials storage including containerised units and lock ups for tools and equipment.
- COSHH Waste storage and recycling area either within or adjacent to compound
- Parking for key management and staff

Site mobilisation access

There is an existing gated site access point on the Southbank road to the south-west. This can be utilised if needed as an alternative mobilisation access point to the site for mobilisation of additional site investigations, establishment of services to the contractors site compound, fencing works to create the primary access gate.

South West access/ egress

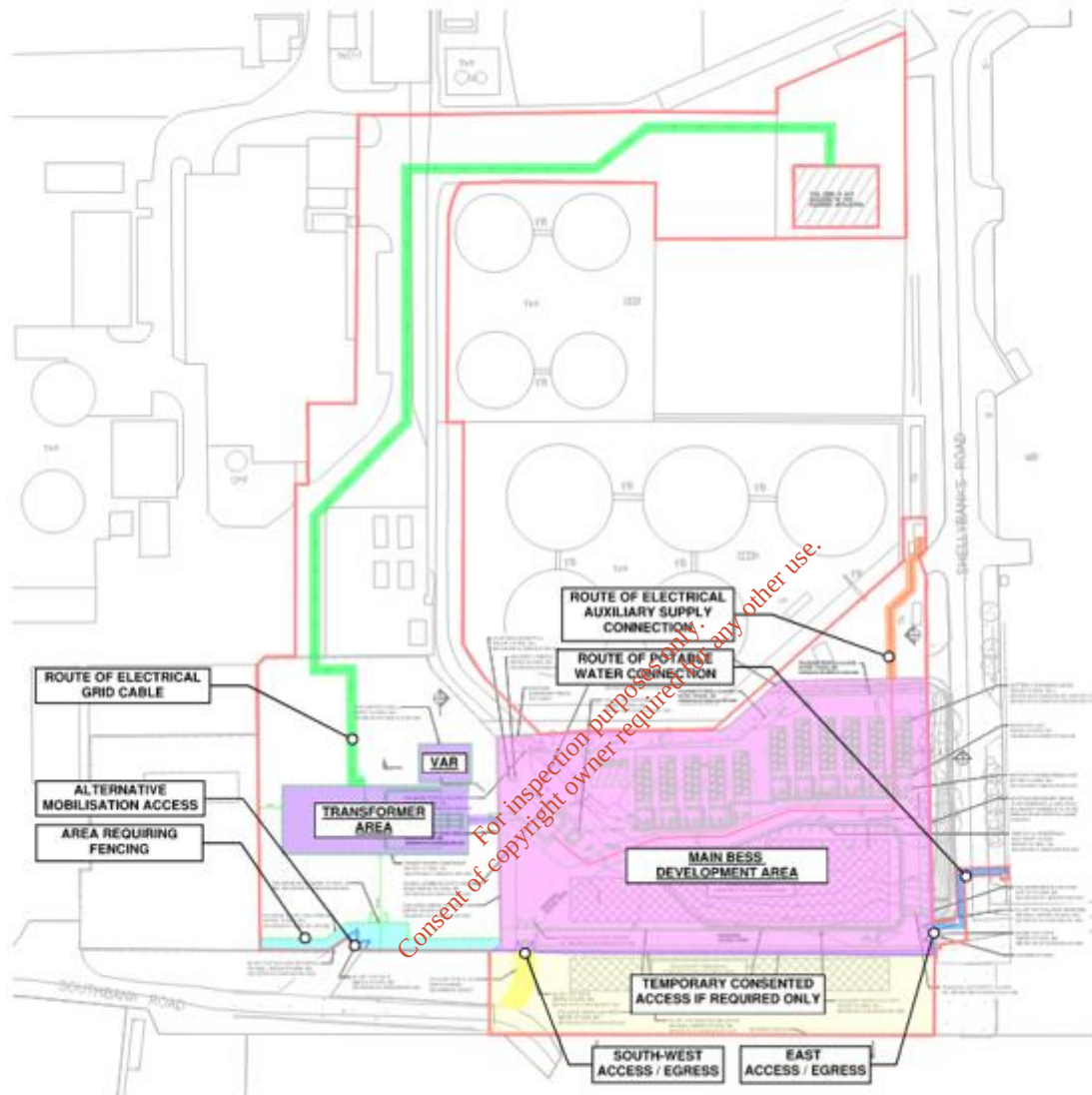
The entrance to the site for both the construction and operational phases will be via the construction of a new access gate and entrance roadway in the South-west corner of the site. This entrance will extend onto the existing Southbank Road with clear lines of sight achievable as indicated in the planning drawings in Appendix 1.

East access/ egress

During the construction phase it is anticipated that the existing gate at the East of the site onto the Shellybanks Road will be available. . This existing eastern entrance will also be available as an access/egress point during the operations phase of the project.

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Figure 5.20: Extract from drawing 'Site Layout: Proposed Plan (1:500)' which is highlighted to show development areas and available access and egress points



Source: ESB Construction Management Plan South Wall Battery Energy Storage System Document No. QR-000104-R460-001

5.10 Operational Phase Activities

5.10.1 Operational Management

5.10.1.1 Working Hours

The FlexGens will operate as required by the demands placed on the grid and the generating capacity available at any time. The plant will not have a permanent staff and will be operated remotely by ESB. There will be regular engineering checks on a weekly basis, security staff and periodic maintenance visits.

A BESS can operate at any time over a 24 hours period and does not require regular attendance, being operated remotely. There will be regular maintenance visits. When required a BESS would typically be used for periods of 30 to 60 minutes dependant on the amount of charge stored and the grid requirements at the time.

5.10.1.2 Operational Staff

During operation, all four proposed developments will operate unmanned, controlled remotely from another ESB site. There will be personnel on-site carrying out routine inspections and maintenance on each of the four proposed development sites.

5.10.2 Industrial Emission Licence

Both Poolbeg and Ringsend FlexGens will require an Industrial Emissions (IE) Licence from the Environmental Protection Agency as both operations fall into the categories of industrial activity referred to the First Schedule of the Environmental Protection Agency Act 199, as amended, i.e.;

'Combustion of fuels in installations with a total rated thermal input of 50 MW or more'.

The proposed Poolbeg FlexGen development is located within the boundary of an existing IE licenced facility; the Poolbeg Generating Station (EPA registration no. P0577-03). Should the application for planning consent be successful, an application to the EPA for a licence review of this existing licence will be progressed to incorporate Poolbeg FlexGen.

The proposed Ringsend FlexGen is not located within an existing IE licenced site. Should the application for planning consent be successful, an application to the EPA for an IE licence for Ringsend FlexGen will be progressed.

The proposed BESS is not a scheduled activity, as outlined in the EPA Acts 1992 to 2013.

5.10.3 Chemical Storage

All chemicals stored on the FlexGen sites will be regulated under the IE licences.

The generation process does not require chemicals to be stored on site.

The turbine requires lubricating oils which are stored within reservoirs in the turbine module. The lube oil will be stored in a reservoir tank incorporated into the turbine lube oil skid. The reservoir has a capacity of 646 litres for each development.

Coolant oils required for the transformers are typically synthetic or natural ester-based oils. Coolant oils are generally not replaced during the lifetime of the transformer; should any problems occur with the transformer the oil would generally be drained, the transformer repaired and then the oil replaced. As such, it is not expected that the facilities will consume significant volumes of coolant oil during their lifetime.

The transformers at both FlexGen and both BESS facilities will have secure coolant oil reservoirs and drainage from the transformers will be securely conveyed to oil interceptors prior to discharge to an attenuation tank and from there to the wider surface water drainage system.

The type of water treatment technology to be used in the water treatment plant at the Poolbeg FlexGen facility will be finalised after awarding the contract. It is envisaged that the water treatment plant will utilise either ion exchange or reverse osmosis and electro-deionisation. Those two systems have different chemical requirements which are described below. Volumes are estimated and are subject to change during detailed design. Chemical types and concentrations are typical and are subject to change during detailed design:

Ion Exchange

- Caustic NaOH 30%
- Caustic bulk tank 6m³
- Caustic Measuring Tank 0.2m³
- Sulphuric H₂SO₄ 96%
- Sulphuric Bulk Tank 5m³
- Sulphuric Measuring Tank 0.05m³

Reverse Osmosis and Electro-Deionisation

- Ferric Chloride 40% - 30m³
- Sodium Hypochlorite 15% - 30m³
- Scale Inhibitor – 0.1m³
- Sodium Bisulphite (NaHSO₃) – 0.14m³
- Caustic Soda (NaOH) 30% – 1.2m³
- Sulphuric Acid (H₂SO₄) 96% – 1.2m³
- Citric Acid HOC (COOH) (CH₂COOH)₂ – 0.14m³
- Sodium Hypochlorite (NaOCl) – 0.06m³

The chemical tanks specific to water treatment will be contained within the water treatment plant building at the Poolbeg FlexGen site.

All fuels and chemicals stored on site will be subject to a COSHH (Control of Substances Hazardous to Health) assessment and compliance with the requirements of REACH;

- All containers and bunds will be inspected regularly;
- Accidental spillages will be contained and cleaned immediately;
- Spill kit(s) will be stored on site; and
- All potentially polluting substances including waste will be stored in designated areas in appropriate containers within bunds, drip trays or spill pallets, as required.

All tanks containing liquids whose spillage could be harmful to the environment will be bunded. No tanks or pipework containing liquids such as fuel, oils or chemicals will be stored below ground.

The proposed water treatment plant at the Poolbeg FlexGen facility will result in demineralisation wastewater, the volume of which may be up to 25% of the volume of raw water supplied to the water treatment plant. This effluent will be managed by undergoing suitable treatment before it is discharged to the Poolbeg FlexGen development surface water drainage system. This discharge will be regulated under the IE Licence. Alternative arrangement for the

management of this wastewater will be made if advised by the Environmental Protection Agency and/or IE Licence requirements. In case of emergency, a shutdown valve will be provided at the discharge point from the treatment plant before entering the proposed drainage network.

5.11 Firefighting Systems and Controls

5.11.1 FlexGen (Poolbeg and Ringsend)

The Poolbeg facility has its own fire water tank, alternatively, it may be a 'dry site' without a dedicated firewater system. There will be fire hydrants required on site for fire water supply. It is anticipated that the Ringsend facility will be 'dry site' without a dedicated firewater system and will be connected to a fire main with hydrants located around the site. It is expected that this will fulfil fire requirements, however it will be connected to Dublin Bay Power if a deluge system is required.

There will be a comprehensive fire detection and fire-fighting system on each of the FlexGen sites. In each case, a fire protection design basis document containing a fire risk assessment will be developed by the Contractor and this will inform the design of the fire system.

Heat, fire and gas detection systems will be incorporated as appropriate to the fire risk. Where required, flame detection will also be installed.

For the gas turbine, fire and gas detection sensors will be incorporated. A gaseous suppression system will be used upon detection of a fire.

Additionally, monitoring of the concentration of hydrocarbon gas in the ventilation air discharge of the gas turbine enclosure will be included and will trip the turbine when the concentration exceeds a level deemed to be the limit of safe operation.

Portable extinguishers appropriate to the fire risk will be sited at readily accessible fire points throughout the site.

All switchgear rooms, relay rooms, communications rooms, cable basements, cable tunnels and the control room, will be provided with induced draught smoke/heat extraction fans as appropriate.

Fire hydrants will be included on site as required by the local fire authority. Fire safety evacuation drills & training to be provided as appropriate. NFPA guidance will be followed as appropriate.

5.11.2 BESS (Poolbeg and South Wall)

There are a number of levels of fire protection built into the BESS system. The BESS plants are comprised of a number of individual battery container units called 'cubes', each cube contains a number of battery modules and each module is comprised of a number of battery cells.

At a module and cell level the battery temperature and voltage are constantly monitored. If these parameters are measured outside the safe operating range, the module is automatically disconnected from the system in order to prevent any further issues.

Should the module level protections fail to prevent a fire each cube contains gas, temperature and smoke detection sensors. If smoke or oxidation gases are detected within the cube, all cubes linked in the same string are disconnected from the system and a solid aerosol fire suppressant is automatically released within the cube.

As a final layer of protection the battery modules are designed to ensure that in the event the first two layers of fire protection do not prevent a fire igniting, any fire will remain contained

within that module and will not spread to other modules within the cube and thereby will not spread to adjacent cubes. There are no sprinkler or deluge systems on site and the BESS manufacturer have advised that the use of water is not required in the case of a fire.

In the unlikely event that all fire prevention, suppression and containment measures fail and there is an uncontained fire which puts adjacent property at risk, the fire services may decide to use water to suppress the fire. The BESS manufacturer has advised that, should the integrity of the cube be compromised, and water is used to suppress the fire, the run off from the cube is equivalent to that of a plastic fire. As the sites are intended to be operated as dry sites, and there are multiple levels of safety systems to prevent, suppress and contain the breakout of fire, it is not intended to have any system to segregate the run off from the plant in the case of a fire in which water is used. In the extremely unlikely event that a major fire on site required water suppression the internal drainage system to the attenuation tank would provide a mechanism for intercepting contaminated fire water prior to its release into the environment.

5.12 COMAH

The European Communities, Control of Major-Accident Hazards involving Hazardous Substances (COMAH) Regulations under Directive 2012/18/EU were transposed into Irish legislation through S.I. No. 209 of 2015 Chemicals Act (Control of Major Accident Hazards Involving Dangerous Substances) Regulations 2015. The regulations require operators of establishments where dangerous substances are present, in quantities equal to or in excess of defined threshold, to take all measures necessary to prevent major accidents, limit their consequences and ensure a high level of protection for man and the environment. Establishments, which fall under the remit of the COMAH Regulations, are classified as either 'lower tier' or 'upper tier' sites depending on the quantities of dangerous substances held on site.

The categories of dangerous substances and preparations from Part 1 of Schedule 1 to the COMAH Regulations are as defined in the Classification, Labelling, and Packaging (CLP) Regulation 2008. Annex I of to the CLP Regulation describes the criteria that apply to each classification. The regulations specify lower and upper threshold quantities of 2,500 and 25,000 tonnes respectively for fuel oil.

The Poolbeg FlexGen is located within the 300m consultation distance of the National Oil Reserves Agency Ltd. (NORA) fuel storage establishment located to the north which is notified to the Health and Safety Authority (HSA) as an Upper Tier Seveso site and is subject to the provisions of the Chemical Act (Control of Major Accident Hazards Involving Dangerous Substances) Regulations 2015 (S.I 209 of 2015).

The Ringsend FlexGen is located within the 300m consultation distance of another NORA fuel storage site located to the northeast. This NORA site is also notified to the HSA as an Upper Tier Seveso site and as such the proposed development at Ringsend is subject to the provisions of the Chemical Act (Control of Major Accident Hazards Involving Dangerous Substances) Regulations 2015 (S.I 209 of 2015). The existing Dublin Bay Power Station is notified to the HSA as a Lower Tier Seveso site.

Each of the proposed developments has been subject to a Land Use Planning assessment in accordance with the HSA guidance. Copies of the COMAH assessment is provided in Appendix 5D of this EIAR.

There is currently no guidance available on the assessment of major accidents at BESS installations. The BESS developments do not form part of the proposed FlexGen developments assessed but have been referenced in the land use planning assessments in Appendix 5D. Health and Safety Considerations

The HSA land use planning department have been informed of the proposed planning applications.

5.13 Decommissioning

5.13.1 FlexGens (Poolbeg and Ringsend)

The proposed Poolbeg and Ringsend FlexGens are expected to be operational for at least 25 years or as long as is required by grid infrastructure. On cessation of activities the two plants will be decommissioned, and the sites remediated and restored in line with any requirements of the planning permissions and IE licences, unless otherwise authorised.

On decommissioning the following steps will be implemented:

- All plant and equipment will be dismantled and either sold, recycled or disposed of through licenced waste contractors.
- All waste will be removed to a licenced facility by licenced waste contractors.
- Services will be disconnected.
- The sites will be left level.

A Decommissioning Management Plan (DMP) for each site will be prepared in accordance with the IE licence applications. These will include details of decommissioning of all plant and equipment ensuring that there will be no environmental pollution. The modular nature of the FlexGen construction will assist any decommissioning in that modules can be disconnected and removed from site.

5.13.2 BESS (Poolbeg and South Wall)

The two proposed BESS developments (Poolbeg and South Wall) are both expected to be operational for at least 25 years or as long as is required by grid infrastructure. On cessation of activities the batteries will be decommissioned and the sites remediated and restored, unless otherwise authorised.

On decommissioning the following steps will be implemented:

- All plant equipment will be dismantled and either sold, recycled or disposed of through licenced waste contractors.
- All waste will be removed to a licenced facility by licenced waste contractors.
- Services will be disconnected.
- The sites will be reinstated.

Given the modular nature of the proposed developments, decommissioning will be straightforward, each unit will be disconnected from the grid and craned onto a lorry and removed. Service runs will be removed, and materials taken off site. The foundations will be broken down to ground level and any surplus material taken off site. The sites will be left as a flat development platform.

6 Planning Policy Considerations

6.1 Introduction

This chapter of the EIAR sets out the European, national regional and local planning policies and objectives that are relevant to the proposed FlexGen and BESS plants and demonstrates how the developments are consistent with and contribute towards the achievement of same.

6.2 European & National

It should be noted that the European and National policy framework which establishes the need and overall development context for the FlexGen and BESS plants is already provided in Section 4.2 and 4.3.

The relevant European policy context includes:

- Europe 2020 Climate and Energy Framework; Europe 2030 Climate and Energy Framework;
- Energy Roadmap 2050; and
- Renewable Energy Directive 2009/28/EC

The National policy context includes:

- Ireland 2040 - Our Plan (National Planning Framework) [2018];
- National Development Plan 2018-2027;
- Government White Paper - Irelands Transition to a Low Carbon Energy Future 2015-2030;
- Climate Action Plan 2019; and
- National Mitigation Plan 2017.

6.3 National Mitigation Plan 2017

The first National Mitigation Plan represents an initial step for Ireland on a pathway to achieve decarbonisation. The measures that will be implemented through this first Plan will lay the foundations for transitioning Ireland to a low carbon, climate resilient and environmentally sustainable economy by 2050. The Government recognises that this first Plan does not provide a complete roadmap to achieve the 2050 objective but begins the process of development of medium to long term mitigation choices for the next and future decades. The strategic aims of the National Mitigation Plan include:

- Policy will contribute to reductions in Ireland's greenhouse gas emissions and enhancement of sinks in a manner that achieves the optimum benefits at least cost;
- A stable and predictable policy and regulatory framework will be underpinned by rigorous analysis and appraisal, supported by strong research and analytical capacity; and
- The Government will pursue investment, innovation and enterprise opportunities towards building a competitive, low carbon, climate-resilient and environmentally sustainable economy.

Analysis by SEAI found that since 1990, there has been a positive correlation between the reduced share of high carbon content fuels in electricity generation, such as peat, coal and oil, in relation to the rise in the relatively lower carbon natural gas and zero carbon renewables. This trend of resource consumption supports the Plan's forecast that:

“Between now and 2050 we [Ireland] will move from a centralised fossil fuel-based electricity system to a low carbon power system. Smart operation of the power system at both transmission and distribution level and energy efficiency will enable maximisation of the existing grid. Increased levels of renewable generation will be accompanied by the development of large scale technology solutions, such as pumped storage and battery storage, together with demand response to complement the challenges posed”.

In the context of the proposed FlexGen plants and BESS developments, the Plan states that fossil fuels are incompatible with a low carbon economy and as their use is being greatly diminished, the dispatchable natural gas fired peaking plants will be required in electricity generation. Specifically, as greater volumes of intermittent renewable electricity are connected to the grid, new measures and systems, including back up technologies such as energy storage, will be required to ensure grid stability is maintained.

6.4 Regional

6.4.1 Regional Spatial and Economy Strategy 2019-2031

Ireland's Regional Authorities have a range of powers in relation to spatial planning and economic development and to promote coordinated public services and prioritise the delivery of key enabling infrastructure. The Eastern and Midland Regional Assembly (EMRA), in which Poolbeg Peninsula is located, agreed upon the adoption and publication of The Regional Spatial and Economic Strategy (RSES) on 28th June 2019. The RSES growth strategy is informed by the NPF and the National Development Plan 2018-2027 along with Ireland's National Enterprise Policy 2015-2025 – ‘Enterprise 2025’.

The RSES sets out a Vision Statement which is underpinned by three key cross-cutting principles which best reflect the challenges and opportunities of the Region: healthy placemaking; climate action; and economic opportunity.

The RSES contextualises the Eastern and Midland Region as the ‘*economic engine of the State*’ providing more than 1 million jobs. Specifically, Dublin and its Environs is a global hub for international investment and high value jobs in ICT, financial and business services with local enterprise and small and medium sized enterprises (SMEs) also providing vital employment opportunities. Consequently, the region contains some of the fastest growing communities in the country which has increased demand for housing, infrastructure and services in those areas. As such, the RSES states that a key growth enabler for the Dublin is to

‘Support the future success of Dublin as Ireland's leading global city of scale by better managing strategic assets to increase opportunity and sustain national economic growth and competitiveness’

According to the RSES, the Dublin and Eastern Regions are a major load centre on the Irish electricity transmission system; specifically, approximately one third of total electricity demand is located in these regions. Having regard to projected population and economic growth in the eastern region, the RSES notes that the increasing demand for electricity in the region must be addressed in a way which balances the need for a significant shift towards renewable energy and enabling resources to be harnessed in a manner consistent with the principles of proper planning and sustainable development. In regard to decarbonising the energy sector, it is stated within the RSES that the generation of electricity from indigenous renewable sources requires, inter alia:

- Facilitating the provision of appropriate renewable energy infrastructure and enabling technologies;
- Expansion and upgrading of the grid with the aim of increasing the share of variable renewable electricity;
- Moving from carbon intense fossil fuel generation to lower emissions fuels such as natural gas; and
- The need to ensure sufficient electricity to meet increased demand.

Developing the grid in the Region will enable the transmission system to safely accommodate more diverse power flows from renewable generation and also to facilitate future growth in electricity demand. These developments will strengthen the grid for all electricity users, and in doing so will improve the security and quality of supply. The RSES notes that this is particularly important if the Region is to attract high technology industries that depend on a reliable, high quality, electricity supply.

6.5 Local Policy Context

6.5.1 Dublin City Council Development Plan 2016-2022

6.5.1.1 Objectives and Policies

The proposed FlexGen and BESS plants will be located within the functional area of Dublin City Council and are therefore subject to the Dublin City Development Plan 2016-2022, hereafter referred to as the DCDP.

The overarching Strategic Vision of the DCDP is to establish Dublin as one of Europe's most sustainable, dynamic and resourceful regions.

The 30-year vision for the city is for a zero-carbon city with all energy provided by renewable sources, to achieve this the city must transition to a post-carbon economy to become a competitive, resilient, socially inclusive and sustainable city.

The DCDP notes that the Council will promote more sustainable energy technologies that are **clean sources of energy** and which have a **lower environmental impact** on the receiving environment. Sustainable energy sources can **reduce air emissions** as well as water consumption, waste, noise and adverse land-use impacts.

The objectives and policies of the DCDP recognise the importance of a reliable and secure energy network to support economic development and will support a wide range of energy supply developments required to meet demand. In addition, the DCDP notes that the Council will be open to the future requirements of major service providers, including ESB, for the provision of new infrastructure to strengthen energy supply to meet demand and meet climate reduction targets.

The following energy objectives and policies of the DCDP will contribute to the vision of a resilient city; **Objective CC09**: To encourage the production of energy from renewable sources, such as from bio-energy, solar energy, hydro energy, wave/tidal energy, geothermal, wind energy, combined heat and power (CHP), heat energy distribution such as district heating/cooling systems, and any other renewable energy sources, subject to normal planning considerations, including in particular, the potential impact on areas of environmental sensitivity including Natura 2000 sites.

Objective CC014: To support the government's target of having 40% of electricity consumption generated from renewable energy sources by the year 2020.

Policy SI31: To support and facilitate the development of enhanced electricity and gas supplies, and associated networks, to serve the existing and future needs of the city, and facilitate new transmission infrastructure projects that might be brought forward in the lifetime of this plan, subject to relevant Irish planning and European legislation including Article 6 of the Habitats Directive and/or environmental assessment.

At local level, Dublin City Sustainable Energy Action Plan 2010 – 2020³ remains active and seeks to reduce the energy consumption while making Dublin a more competitive and attractive destination for business through modern and efficient energy infrastructure and pricing. It also seeks to increase Dublin's share of renewable and sustainable energy systems.

Land Use Zoning

The DCDP sets out a range of land use zoning objectives in order to promote the orderly development of Dublin City by eliminating potential conflicts between incompatible land uses and to establish an efficient basis for investment in public infrastructure and facilities.

All proposed FlexGen and BESS plants are located in lands designated as Employment (Heavy) – Zone Z7, as illustrated within DCDP Map F. The objective of Z7 zoning is to provide for heavy industrial development, specifically:

“To provide for the protection and creation of industrial uses and facilitate opportunities for employment creation including Port Related Activities”.

Figure 6.1: Dublin City Development Plan – Land Use Zoning



Land Use Classes identified as 'Permitted in Principle' within Zone Z7 zones include, but are not limited to, general industrial uses, industry (light) and public service installations. The proposed land uses are consistent with the existing uses within Poolbeg Peninsula.

The Ringsend FlexGen and BESS and Poolbeg BESS are located adjoining Strategic Development and Regeneration Area - Zone Z14. The objective of Z14 zoning is stated with in the DCDP;

“To seek the social, economic and physical development and/or rejuvenation of an area with mixed use, of which residential and 'Z6' would be the predominant uses”.

³ <https://www.codema.ie/images/uploads/docs/SEAP-v2-14feb11-1-website.pdf>

The DCDP advises that where different adjoining land use zoning exists, it is necessary to avoid abrupt changes in these 'transition zones' in relation to scales, density and land use zones and ensure the avoidance of detrimental impact on amenities and more environmentally sensitive areas. The proposed Ringsend FlexGen and South Wall BESS plants are located adjacent to Poolbeg West Strategic Development Zone (SDZ) but will not directly overlook any residential zoned lands and is directly opposite mixed use (commercial, creative industries, industrial activities) and development infrastructure and open space zoning.

The precedence for the siting of the FlexGen and BESS plant within the Poolbeg Peninsula is well established given the existence of the existing Poolbeg CCGT plant, Dublin Waste to Energy Plant and historically the Pigeon House Power Station.

SEVESO Sites

The proposed FlexGen and BESS plants are not categorised as Upper or Lower Tier establishments under the S.I. No. 209 of 2015 - Chemicals Act (Control of Major Accident Hazards Involving Dangerous Substances) Regulations 2015 (hereafter referred to as the COMAH Regulations). Adjacent to the Poolbeg FlexGen site, National Oil Reserves Agency Ltd (NORA) is an Upper Tier SEVESO site. A second NORA Upper Tier SEVESO site is located along Shellybanks Road. The existing ESB Dublin Bay Power site is listed as a lower tier site. In accordance with the COMAH Regulations, both FlexGen plants and South Wall BESS plant are located within the 300m consultation distance around both NORA sites.

With regard to SEVESO sites the FDCP sets out the following relevant policy:

Policy SI28: To have regard to the provisions of the Major Accidents Directive (2012/18/EU), relating to the control of major accident hazards involving dangerous substances and its objectives are to prevent major accidents and limit the consequences of such accidents. Dublin City Council will have regard to the provisions of the directive and recommendations of the HSA in the assessment of all planning applications located on or impacted by such sites. All proposed plants within the 300m consultation distance have been subject to a Land Use Planning Assessment in accordance with Health and Safety Authority guidance and DCDP Policy SI28. Further discussion on the COMAH Assessments are provided in Chapter 5 of this EIAR and the land use planning reports in Appendix 5D.

6.6 ESB "Poolbeg Land Management and Development Strategy"

ESB are a prominent landowner within the Poolbeg peninsula as a result of their established history within the area. ESB have prepared the "Poolbeg Land Management and Development Strategy" in line with ESB's Corporate Policy and ESB's continued commitment to electricity generation within Poolbeg. The Strategy will support the continued use of existing sites within their ownership and help facilitate future operational needs for generation and network infrastructure while helping to manage the interactions between ESB operations and proposed new development in Poolbeg. The strategy relates to ESB owned lands at Poolbeg, illustrated as the Ringsend and Poolbeg land blocks in Figure 6.2.

The Strategy will be periodically reviewed in line with the diversifying energy sector and electricity demand for Dublin and the Region and has been prepared with regard to the objectives and policies of the Dublin City Development Plan 2016-2022. The purpose of the Strategy is to ensure that the strategic importance of Poolbeg for electrical power generation is preserved and the creation of an energy centre can be realised, utilising Poolbeg's central location, electricity grid connections, cooling water and gas connections.

The Strategy recognises that ESB infrastructure may have a limited design lifespan, however, this does not correlate with the cessation of those uses. Each development is dependent upon on securing appropriate statutory consents for continued operations and use of the land.

Figure 6.2: ESB land ownership within Poolbeg



Source: ESB

Within the Ringsend Land Block, the Strategy identifies that these lands are characterised by established industrial uses and the presence of a regionally significant electricity generation facility and significant grid infrastructure. The only undeveloped areas within that land block (referred to as Site D) are those proposed for the South Wall BESS and Ringsend FlexGen developments. In line with ESB's policy objectives this land block has been identified for strategic developments comprising battery storage and grid services, and expansion of electricity generation activity. Other likely future development proposals within the land block include the upgrading of the Ringsend 110kV substation including a new gas insulated substation building. The former ESB training centre (referred to as Site B) has the possibility of being utilised by Dublin Bus as part of the decarbonisation of public transport. The NORA facility, under long-term plans, may be developed in the future, however the site is subject to a long-term lease at present. There are no other development opportunities within this land block.

The Poolbeg Land Block is similarly characterised by the presence of regionally significant electricity generation and grid infrastructure. Site A is located adjoining the Conservation Area surrounding Pigeon House Hotel, and currently contains a number of disused buildings. Given the proximity of the Conservation Area, the Strategy deems that smaller scale development is suitable, such as battery storage. There are no fixed proposals for the Poolbeg Power Station (referred to as Site B). ESB is cognisant of the importance of the Poolbeg chimneys to the skyline of the city, but also the technical limitations and costs associated with their continued maintenance and management. The Poolbeg Power Station site would be able to facilitate the electricity generating infrastructure and/or supporting infrastructure, as such, this site has been earmarked for generation expansion. Similarly, the NORA site is subject to a long-term lease, beyond this ESB may develop this site to meet the Company's commitment to develop a strategic power generation location for Dublin and Ireland within Poolbeg. The only unused site within the Poolbeg Land Block is in the southwestern corner, the site of the proposed Poolbeg FlexGen. This site is identified as a strategic site for the expansion of electricity generation. This site choice is informed by the land availability within the overall land bank and the proximity to

the gas connection. There are no other identified development opportunities within this land block.

The Strategy notes that the existing uses of sites curtails possible future development within either land block, as does the proliferation of underground services such as Eir service cabling, ESB HV and MV cables, gas pipelines, unknown water main connections. These underground services will impose a constraint on the available footprint for future development.

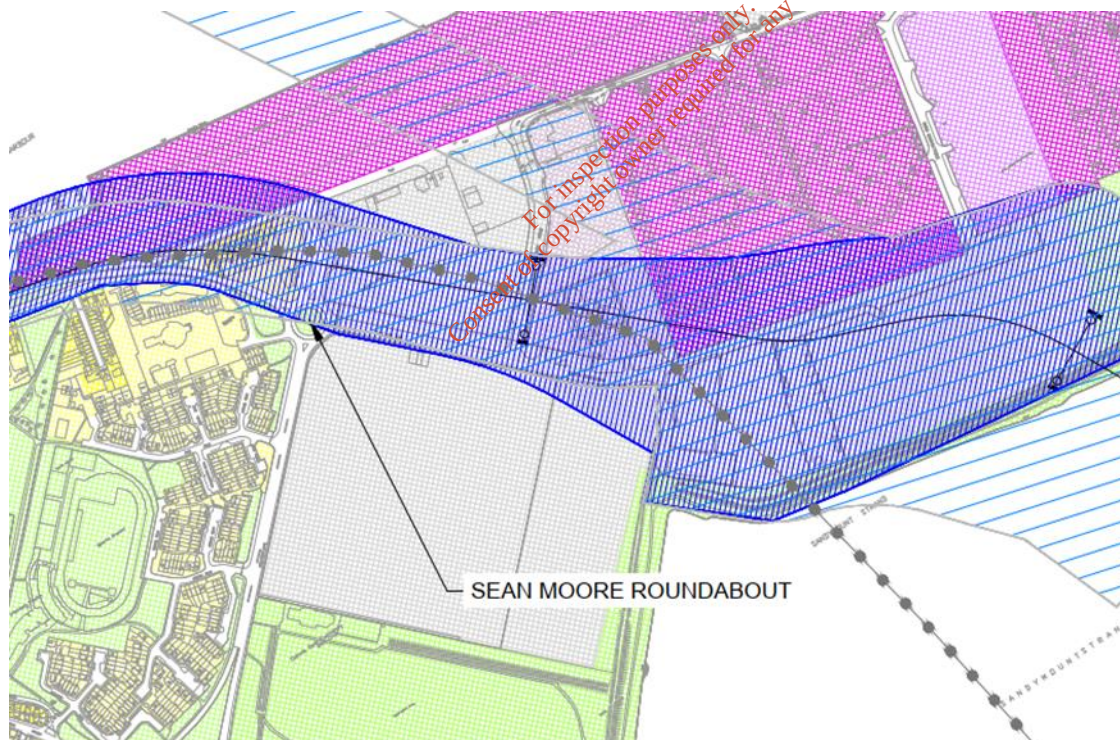
6.6.1 Notable Infrastructure

Within the Poolbeg Peninsula there are a number of strategic infrastructure developments which are proposed, and which will be potentially developed during the period to 2050. These proposals are discussed below.

Eastern Bypass Corridor

The National Roads Authority (now Transport Infrastructure Ireland) published the Corridor Protection Study for the Dublin Eastern Bypass, Sector A: Dublin Port Tunnel to Sandymount Strand in September 2014. The Study states that there is a strong economic case for retaining the Dublin Eastern Bypass motorway scheme as long term objective. The purpose of the Corridor Protection Study is to assist local authorities in the deliberations on planning applications. The Corridor is illustrated in Figure 6.3.

Figure 6.3: Dublin Eastern Bypass Corridor



Source: NRA, 2014

The Corridor was incorporated into the Dublin City Development Plan 2016-2022 (DCDP) as an indicative route within Map J - Strategic Transport and Parking Areas. The corridor route partially intersects with the proposed Ringsend FlexGen site. At present it is understood that the Eastern Bypass Corridor is being rationalised by Dublin City Council and Transport

Infrastructure Ireland to establish the exact spatial footprint required by the Bypass if progressed in the future.

Poolbeg West Strategic Development Zone

The Poolbeg West Planning Scheme was approved by An Bord Pleanála on April 9th 2019 (subject to modifications). The Poolbeg West Strategic Development Zone (SDZ) is illustrated in Figure 6.4

Figure 6.4: SDZ Boundary



Source: Poolbeg West Planning Scheme, April 2019 (Dublin City Council)

Poolbeg West SDZ consists of a spatial area of 34 hectares (HA) between Pigeon House Road, Sean Moore Road, Sean Moore Park and extends in an easterly direction along Sandymount Strand as far as Irishtown Nature Park.

The residential potential within the 34 HA of available land is up to 3,500 residential units. This estimated housing yield equates to a residential population of circa 8,000. Strategically, this provision would make a significant contribution to the city's housing needs (between 4,215 and 7,000 units per annum required under the Housing Strategy of the Dublin City Development Plan 2016-2022). The SDZ is also projected to accommodate up to one million sq. feet of commercial floorspace, providing employment for up to 8,000 workers. The Port lands at the north and east of the SDZ are necessary to provide additional port capacity as part of Dublin Port Company's anticipated growth from 30 million tonnes throughput to 77 million tonnes per annum by 2040.

The SDZ will require enabling works to be completed, this initial phase has been granted by Dublin City Council under Planning Ref: PWSDZ3270/19, comprising streets, transportation, water services and utilities infrastructure; public realm and public amenity spaces; and, temporary landscaping of a school site.

Dublin Port Masterplan

The Masterplan 2012-2040 was adopted by the Board of Dublin Port Company on 26th January 2012 and published in February 2012. The Masterplan 2040 seeks to provide the necessary framework to allow these essential projects to be brought forward for planning and other

consents and to be constructed in a timely manner. The 2018 Review was initiated in response to growth in Dublin Port's volumes of 30.1% in the five years to 2017.

Figure 6.5: Dublin Port Land Uses



Source: Dublin Port Company Masterplan 2040 Reviewed 2018

The 2018 Review led to a number of fundamental conclusions.

- The original Masterplan envisaged a return to an eastern expansion of Dublin Port into Dublin Bay, Dublin Port Company is no longer pursuing this as an option.
- To meet anticipated capacity requirements Dublin Port needs to be developed on the basis of an average annual volume growth of 3.3% over the 30 years from 2010 to 2040 rather than the 2.5% originally assumed in 2012.

As illustrated in Figure 6.5 the land use for southern Dublin Port lands as power predominately (orange) and the waste to energy facility (purple). The Masterplan has proposed a number of options for the lands annotated K to O, these are listed below. The Masterplan states that these options are not prescriptive and will need to be evaluated at the appropriate time (by reference to such issues as demand and capacity) and subjected to the completion of the relevant business case, environmental assessments, planning and other consent requirements.

- K: Current use as a container terminal. It is envisaged that the existing terminal will be redeveloped as Ro-Ro freight terminal and the existing Lo-Lo-container terminal will be relocated. Lands adjacent to South Bank Quay must be retained to achieve the objectives of the Masterplan.
- L: The existing South Bank Quay supports a range of bulk commodities including, petroleum coke imports; cement and cement raw materials; and scrap metal exports. These Are low growth potential businesses with a shorter future than the Masterplan duration. Dublin port will consider the redevelopment of these lands for more intensive cargo handling activities.
- M: A new deepwater multi-purpose berth is proposed as an eastwards extension of the existing South Bank Quay.
- N: If the existing MTL container terminal is redeveloped for Ro-Ro, then the Port will have a shortage of container terminal capacity for Lo-Lo. Proposed that a new deepwater Lo-Lo container terminal be developed by the creation of deepwater berths along the River Liffey in front of the ESB's Poolbeg Power Station.
- O: These lands will be redeveloped to support cargo handling activities at sites K, L, M and N. The primary planned use of these lands is to provide, in conjunction with Area N,

sufficient land capacity for the throughput of the new 600 metre long container terminal quay wall in Area N. Provision may also have to be made in this area for infrastructure (pipes and a peak boiler) required as a part of DCC's Dublin District Heating Scheme.

6.7 Planning History

Power generation has been a long-established land use within the Poolbeg Peninsula. The City of Dublin Electricity Works founded Pigeon House Power Station in 1903 and the site supplied most of Dublin's electricity until the 1950s. The existing Poolbeg CCGT plant commissioned in 1998 superseded the original Poolbeg oil fired station which was decommissioned in 2010.

A review of Dublin City Council online planning database system was conducted and granted planning permissions relevant to each site are included in Table 6.1 below.

Table 6.1: Planning History for FlexGen and BESS Plant sites

Planning Reference	Description of Development	Final Grant Date
Planning History for Ringsend FlexGen Plant Site		
3373/18	The development will consist of a c. 30 MW capacity battery storage facility within a secured compound on a 1.06 Ha site and will, subject to detailed design, commercial and technical considerations, include: (a) up to 12 No. battery storage units [each typically comprising: a containerised battery (c.12.2m x 2.5m x 3.2m), HVAC (c.2.7m x 2.7m), inverter (c.3m x 3m) and transformer (c.3.3m x 3.3m)] (b) a 279sq.m. single-storey control building; (c) ancillary electrical plant including 2 no. transformers, var support unit and cable sealing ends (d) a c.15.6m high lightning mast; (e) a 2.6m high palisade boundary fence and new access gates at the two existing vehicular entrances from South Bank Road, and on the northern boundary where access will be via the existing Dublin Bay Power Station; (f) ancillary site works including the installation of site services.	24 January 2019
1427/07	Removal of existing 600mm high steel railing and the erection of a new 1600mm high paladin fence on top of an existing 800mm high brickwork boundary wall to give an overall new boundary height of 2400mm to the north boundary of the site bordering Pigeon House Road.	03 May 2007
Planning History for South Wall BESS Plant Site		
3664/16	Permission for the retention and continuation of use of the following: (i) signage to the front of the premises; (ii) a single storey portable cabin structure with a floor area of 7.5 Sq metres in use as a security hut; (iii) two single storey prefab buildings in use as ancillary offices & staff welfare facilities with a floor area of 67 Sq metres & 160 sq metres respectively (iv) a two storey prefab building to be used as ancillary storage with a floor area of 76 Sq metres; all located at Gary Keville Transport.	12 Dec 2016
1427/07	Removal of existing 600mm high steel railing and the erection of a new 1600mm high paladin fence on top of an existing 800mm high brickwork boundary wall to give an overall new boundary height of 2400mm to the north boundary of the site bordering Pigeon House Road.	03 May 2007
2234/17	The development will consist of the creation of a new vehicular entrance to the southern boundary of ESB lands from South Bank Road including the erection of a new 4.5m wide 2.6m high entrance gate in the existing 2.6m high palisade boundary fence. The works shall also include the infilling of low lying areas within the development boundary of the site (1.13 ha) to a depth of up to c. 4 metres above Ordnance Datum and subsequent use for open storage within ESB Lands and all ancillary site and development works at ESB lands known as Area 'B', forming part of Dublin Bay Power Plant, bounding South Bank Road & Shellybanks Road, Ringsend, Dublin 4.	18 May 2017
Planning History for Poolbeg FlexGen Site		
2674/91	Erect and operate additional generating plant as an extension to the existing Poolbeg Generating Station. E.I.S. submitted.	Appeal decision date 24 May 1993
0588/97	Modifications to the previously approved Poolbeg Generating Station Extension (Planning Register No.2674/91). The modifications consist of the construction of a separate cooling water pumphouse (previously combined)	26-Jun-1997

Planning Reference	Description of Development	Final Grant Date
	and a separate cooling water chlorination building. Full planning permission and operating licences have been obtained for the new station extension. The modifications will not increase or alter licensed cooling water discharges. The proposed pumphouse will extend approx. 37m north from the Liffey side of the South Bull Wall with approx. 19m frontage. Pumpshafts will extend approx. 7m above the top of the South Bull Wall. The proposed chlorination building will be approx. 21m long, 13m wide and 6.5m high. Both structures will be located at Poolbeg Generating Station, Ringsend, Dublin 4.	
2309/99	The construction of housing to enclose ion exchange plant on its lands at Poolbeg Generating Station, Pigeon House Road, Ringsend, Dublin 4. This Work involves the installation of two ion exchange vessels, approximately 2.1m diameter and 4.5m high. The proposed housing comprises a clad steel frame structure, approximately 8.0m long, 6.5m wide and 7.3m high, on a concrete foundation. The Planning Application may be inspected during office hours at the Planning Department, Dublin Corporation, Block 4, Civic Offices, Wood Quay, Dublin 8.	26-Oct-1999
0655/00	To construct an extension to an existing above ground installation of Pigeon House Road, Dublin 4. The extension will consist of 2 no. fibreglass housing units 10m x 4.5m x 3.7m high, filters, heat exchangers and associated valves and pipework together with electrical and instrumentation equipment.	21-Jun-2000
3261/03	The Electricity Supply Board intends to apply to Dublin City Council for planning permission to extend the existing Control Building in Shellybanks 220kv Station, Pigeon House Road Dublin 4 to provide a single storey extension for a new battery room at the rear of the existing building.	14-Oct-2003
1088/05	Electricity Supply Board plans to apply to Dublin City Council for planning permission for development at Poolbeg Generating Station, Pigeon House Road, Ringsend, Dublin 4. the proposed development will consist of a prefabricated garage shed 2.8m tall with a concrete floor slab and an oil interceptor at a separate location on the site.	14-Apr-2005
3644/09	For an extension to the existing three storey Control Room Building. This development will consist of a three storey office extension to the south side of the existing three storey Control Building, including a new Chemical and Environmental Laboratory, internal modifications to existing building alteration to site roads, alterations to existing car parking for the Control Building, photovoltaic panels to existing and proposed roofs and associated site works. The chemical and environmental laboratory is subject to the existing integrated pollution prevention control licence for the station issued by the environmental protection agency.	11-Nov-2009
3282/12	The construction of 2 No. single storey enclosures with floor areas of 23msq. and 6msq. respectively to cover over existing equipment at the Poolbeg Above Ground Gas Installation. An Appropriate Assessment Screening Report has been prepared in respect of this application.	03-Jan-2013
2789/14	The proposed development will consist of the construction of 2 no. 50MVAR shunt reactance coil units within, and at the southern boundary of, the existing Poolbeg Generating station complex, which comprises the area of the existing Poolbeg 220 kV substation compound. The proposed equipment will connect to the existing Poolbeg 220kV substation by way of underground cabling, and the installation of 2 no. proposed cable/GIS switchgear interface units, of approximately 6m height and 2.4m width on the southern elevation of the existing GIS substation building. Ancillary works will include generally minor alterations to the existing internal road network, and drainage improvement works, including a new soakaway pit of approximately 25m ² . The removal of existing trees within the overall Generating Station complex, covering an area of approximately 1185m ² , is required to facilitate the proposed development. A section of an existing berm will be raised in height from approximately 2.6m to approximately 3.4m (approximately 40m in length).	10-Sep-2014
2650/16	The development consists of permission for 670 m of 2.6 m high palisade fencing and associated gates to secure an internal area within the Poolbeg Generating Station Compound.	29-Jun-2016
3794/16	The development will consist of the reinstatement of the recessed vehicular access, fencing and gates on the line of the original access to the ESB Station lands at Poolbeg. The works include the removal of 100m of existing 2.6m high palisade fence, 110m of chain link fence and 120m of 1.2m high pedestrian	11-Jan-2017

Planning Reference	Description of Development	Final Grant Date
	hand rail. This will be replaced with 4.5m wide 2.6m high palisade entrance gates and 100m of 2.6m high palisade fencing to create a splayed entrance along the original fence line. Development will also include works to the footpath with road markings at the entrance and all ancillary site and development works.	
2656/16	The development will consist of the construction of a new single storey operational control room, complete with electrical switch room to ESB specifications. A transformer will be sited adjacent to the North side of the new control room. The new control room is to be located adjacent to the existing terminal entrance/ exit gate onto Shelly Banks Road. The construction of a new pump-pad, truck loading gantry complete with a weather proof enclosure, above ground interceptor, horizontal marker dye tank with associated bund, impervious upgrade of existing bund areas and tank refurbishment. The installation of new pipe-work, pumps, fire protection system including firewater tank and other associated works. These development works will result in the site being upgraded to UPPER TIER under the SEVESO regulations.	03-Feb-2017
3669/19	The development will consist of 1.) Construction of a single storey ESB Substation & Switchroom located adjacent to the existing terminal entrance/exit gate onto Shelly Banks Road. 2.) All associated site works. These works are sought as an addition to the parent planning permission ref 2656/16 previously granted on the site. These development works will result in the site being upgraded to Upper Tier under the SEVESO regulations.	27-Feb-2020
Planning History for Poolbeg BESS Site		
3794/16	The development will consist of the reinstatement of the recessed vehicular access, fencing and gates on the line of the original access to the ESB Station lands at Poolbeg. The works include the removal of 100m of existing 2.6m high palisade fence, 110m of chain link fence and 120m of 1.2m high pedestrian hand rail. This will be replaced with 4.5m wide 2.6m high palisade entrance gates and 100m of 2.6m high palisade fencing to create a splayed entrance along the original fence line. Development will also include works to the footpath with road markings at the entrance and all ancillary site and development works.	11-Jan-2017
2650/16	The development consists of permission for 670 m of 2.6 m high palisade fencing and associated gates to secure an internal area within the Poolbeg Generating Station Compound.	29-Jun-2016

6.7.1 Previous Applications (withdrawn)

In addition to the above historic planning cases, planning applications with respect to the two FlexGen developments and for the demolition of existing buildings on the Poolbeg BESS site were made to Dublin City Council in 2019 (Poolbeg FlexGen Reg No. 3714/19, Poolbeg BESS site demolition only Reg No.4247/19, and Ringsend FlexGen Reg. No.4015/19). Prior to these applications being submitted, pre-application discussions and correspondence took place in early 2019.

Dublin City Council issued further information requests in relation to the two FlexGen applications, and two meetings (2 December and 16 December 2019) between the applicant and the Council were undertaken further to this.

Key discussion points at the meeting on 2 December were:

- The proposed project in terms of need / rationale for EIA – this also included the proposed BESS development on the Poolbeg demolition site (which had yet to be submitted at that point).
- The long-term future of ESB lands on the Poolbeg Peninsula.
- Location of the sites in the context of the European protected sites and the SDZ in close proximity.

- Statutory Consultees including Transport Infrastructure Ireland (TII), Irish Water, EPA and HSA.
- Noise and emissions.
- Transport and traffic.
- Project detail and specifically DCC requesting further detail on same.

Key discussion points at the meeting on 16 December were:

- ESB indicated a likelihood that two current FlexGen applications would be withdrawn and four separate planning applications would be submitted with one EIAR to cover all proposed BESS and FlexGen projects – this would encompass Ringsend FlexGen, Poolbeg FlexGen, Poolbeg BESS / demolition, and the relocation of the South Wall BESS facility (i.e. Ringsend FlexGen and South Wall BESS would be effectively swapped).
- Alternatives and cumulative impacts would be assessed in the EIAR.
- ESB advised that a Land Use and Development Strategy would be produced for the ESB lands on the Poolbeg Peninsula.
- Statutory Consultees including TII, Irish Water, EPA and HSA.

These applications were withdrawn and the current planning applications are advanced in their stead.

6.7.2 Planning History in the Vicinity of the ESB Lands

The planning history search was extended for a radius of 1km (covering the electoral divisions of Pembroke East A & B, Poolbeg, Irishtown, Sandymount) from the development sites, contemporaneous extant planning permissions are listed within Table 6.2. However, due to the prevalence of residential housing to the south of and southwest of Poolbeg Peninsula there are a vast number of planning applications relating to the alteration, partial demolition and extension of existing residential properties, due to the nature and scale of these developments they have not been included within the planning search.

Table 6.2: Planning History within 1km of development sites

Planning Reference	Description of Development	Final Grant Date
Planning History within Poolbeg Peninsula and Poolbeg SDZ		
PWSDZ327 0/19	Permission for development at a site forming part of the former Irish Glass Bottle and Fabrizia sites, Poolbeg West, Dublin 4. The application site is located within the Poolbeg West Strategic Development Zone (SDZ) Planning Scheme 2019 area. The proposed development will consist of: streets, transportation, water services and utilities infrastructure; public realm and public amenity spaces; and, temporary landscaping of a school site, to facilitate Phase 1 development as provided for under the approved Poolbeg West SDZ Planning Scheme.	28-Jan-2020 (Decision Notice issued)
2804/19	Planning permission for development at our existing molasses storage terminal at the corner of South Bank Road and Pigeon House Road, Ringsend, Dublin, D04 TC98. The development will consist of the construction of a new molasses storage tank within the existing bund at the existing molasses storage terminal.	18-Jul-2019
2130/18	Demolition of existing two-storey administration building (534 sq.m); construction of a new two-storey building (563 sq.m) containing an administration area, staff facilities and a non-ferrous metals recovery area; 2 no. 18 m long weighbridges; 1 no. dry wheelwash; car parking; all associated site development works all on a site of 1.79 Ha. This application relates to a development which comprises an activity for which an Industrial Emissions License under Part IV of the EPA 1992 (as amended) is required.	30-Apr-2018

Planning Reference	Description of Development	Final Grant Date
3711/18	Permission is sought for development that will consist of: construction of a bridge to span the existing cooling water outfall channel, adjacent to Pigeon House Road; construction of a new junction opposite the entrance to the Ecocem Ireland Plant; hard surfacing; site drainage and outfall; the use of lands for the storage of port-related maintenance and service equipment, construction project materials, contractor's site compound and project cargo; amendments to boundaries; and all associated services and site development works.	12-Aug-2019
3454/17	The development will consist of the construction of a new two storey permanent steel gantry structure to allow for safe inspection and repair of refrigeration engines on shipping containers & all associated site works.	23-Oct-2017
3493/12	Retention permission for the increase in capacity at its waste recovery facility for Construction and Demolition Waste from 5000 tonnes per annum (as permitted under condition no.1 (2) of An Bord Pleanála Planning Permission Ref. ABP PL 29S.109837) to a maximum of 20000 tonnes per annum and retention permission to expand the waste streams accepted at the facility to include non-hazardous waste. The proposed development is the subject of a Waste Facility Management Permit application. The development is located within the curtilage of a Protected Structure Ref.: No. 6793).	31-Jul-2013
Planning History within Irishtown and Sandymount (North)		
2401/19	Permission for development at Church of St. Matthews, Irishtown Road, Dublin 4, D04 C7F3. The development will consist of the construction of a columbarium wall along the east boundary wall for the purpose of storing cinerary urns and associated paths, landscaping and seating. This development is within the curtilage of a Protected Structure, RPS No. 4007	06-Aug-2019
2482/19	Permission for the continuation of use of an existing concrete batching plant and associated facilities (previously granted under File Ref. No. 1420/04 & ABP Ref. No. PL29S.207144 and File Ref. No. 2209/13 & ABP Ref. No. PL29S.241965), along with the retention permission for an existing concrete reclaimer all for a temporary period of five years.	13-Jun-2019
DSDZ2657/18	Temporary Planning Permission for 5 years for a development consisting of the erection of a new single storey prefabricated modular unit of 360m2 to replace the existing 4 single storey cabins and two 40ft double stacked containers at the rear of this site, totalling 228m2, currently used for community activities in order to replace and improve these existing community facilities. This application relates to a proposed development within the North Lotts & Grand Canal Dock SDZ Planning Scheme area.	04-Dec-2018
2001/18	Permission for development at a site of c. 0.385 ha. The site is bounded by Church Avenue to the north; existing education (St. Matthew's National School) and residential development to the south and west; the junction between Cranfield Place and Beach Road to the south; and Beach Road to the east. The development will consist of the demolition and removal of all existing buildings and associated structures above and below ground (total 1,311 sq m) and the construction of a 5-storey apartment building (with setbacks at Third and Fourth floor levels) (accommodating 90 no. apartments)	26-Nov-2018
2858/18	The development of the two-storey extension of the existing stadium will consist of indoor running track, gym, meeting rooms, changing rooms and associated facilities (927.4 Sq. M.); 2 No. external wall-mounted signs; also alterations to the existing building to form a new link corridor. The development will be served by the existing car and cycle parking provision.	22-Nov-2018
4023/17	Planning permission for development on a 0.28 ha site at Roslyn Park, Beach Road, Sandymount, Dublin 4. (Roslyn Park House is a Protected Structure - see RPS Ref. No. 496). The development will consist of the provision of a temporary one and two storey primary school (Shellybanks Educate Together National School: Roll No. 20441S), arranged in two separate blocks, comprising 12 no. classrooms in total, including all ancillary teacher and pupil facilities, located on the north-western part of the site (1,450 sq m gross floor area approximately).	31-Aug-2018
3265/17	Planning permission for an additional floor of accommodation and to make alterations to the existing clubhouse which is within the curtilage of a Protected Structure. It entails removal of the existing clubhouse roof, the addition of a new	03-Oct-2017

Planning Reference	Description of Development	Final Grant Date
	floor and roof, a new balcony viewing area and modifications to window and door locations at ground floor level.	
2268/14	Permission for provision of the phased development of a Sports Hall with associated changing facilities, demountable seating accommodation, reception, ancillary accommodation, first floor mezzanine gym all totalling 980m ² , 50 car parking spaces, 60 sheltered bicycle spaces with associated lighting and landscaping with additional phase 2 ancillary accommodation consisting of changing rooms and linkage circulation to existing Swimming Pool of 165m ² .	08-Oct-2014

6.8 Planning Policy Conclusions

The proposed FlexGen and BESS plants are considered consistent with the overarching planning framework set out in the above European, national, regional and local policies and plans. The rationale for this conclusion is based on the following sections.

6.8.1 European

Ireland will miss the target set for the period 2013 to 2020 for renewables by about 3% and for cumulative emissions by a little under 5%. Furthermore, EPA's Greenhouse Gas Emissions 2018-2040 projections indicate that Ireland faces significant challenges in meeting EU 2030 reduction targets in the non-ETS sector and national 2050 reduction targets, particularly in electricity generation. Ongoing review and refinement of the national transmission, including the implementation of support / enabling infrastructure such as the proposed OCGT power plants and BESS plants, will allow Ireland to continue to invest in renewable sources of power in order to meet future national and EU targets.

6.8.2 National

Due to the significant growth in demand for electricity, the national grid will require new solutions such as the proposed FlexGen and BESS plants to accommodate energy intensive industries in the Greater Dublin Area. The long-term renewal of the grid will need to be consistent with wider national, social, environmental, economic and energy policies, i.e. renewable energy targets and sustainability. Operation of the proposed plant will assist in regularising energy provision in the electricity grid; specifically, the FlexGen plants will operate as peaking plants will monitoring the grid frequency and reacting automatically during periods of high electricity demand. The BESS plants will be able to provide rapid response from stored electricity generated during peak generation periods. This will assist in delivering a secure and sustainable electricity system.

6.8.3 Regional

The RSES contextualises the Eastern and Midland Region as the '*economic engine of the State*', as such, this large employment and industry base is a large electricity consumer node on the Irish electricity system. Developing the electrical grid in the Region will enable the transmission system to safely accommodate more diverse and responsive power flows from renewable generation. Grid investment, and flexible power generation in the form of the proposed FlexGen and BESS plants, will solve immediate infrastructural deficiencies in addition to accommodating expected long-term growth in population and economic development. Greater integration of renewable energy will ensure grid capacity to meet growing commercial demand.

6.8.4 Local

The Dublin City Council's Strategic Vision and Aims are derived in part from the undercutting principles of sustainable development and climate change action.

The policies and objectives contained within the DCDP seek to promote and support energy technologies and the development of new energy infrastructure projects which assist in the achievement of the Government's electricity generation targets from renewable sources.

The OCGT and BESS plants will be located within land zoned for Employment (Heavy) which is designated to provide for industrial uses and facilitate opportunities for employment creation including Port Related Activities.

The precedence for the siting of the proposed FlexGen and BESS plants within Poolbeg Peninsula is well established land use given the historical and existing electricity power plants which have been operational since the early 1900's.

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7 Biodiversity

7.1 Introduction

This chapter of the EIAR will assess the potential for significant effects on biodiversity from the four proposed developments.

Biodiversity (or “biological diversity”), as defined at the United Nations Convention on Biological Diversity (CBD), is *‘the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes genetic diversity within species, between species and of ecosystems’*.

Along with the assessment of significance of any effects this chapter will also consider any mitigation which may be required to avoid or reduce any significant effects which arise from the construction or operation of the four proposed developments. This mitigation will take place as a priority over any compensation or offsetting measures.

7.2 Methodology

7.2.1 Legislation and Best Practice Guidelines

In order to assess the potential impacts on the prevailing biodiversity arising from the four proposed developments, due regard was given to the following relevant legislation and best practice guidelines;

- EIA Directive (2014/52/EU);
- Planning and Development Acts 2000 – 2018 and Planning and Development Regulations 2001-2019;
- Wildlife Act 1976 to 2018;
- Flora (Protection) Order 2015;
- Marine Institute Act 1991;
- EU Water Framework Directive 2000/60/EC; and
- European Communities (Birds and Natural Habitats) Regulations 2011 (as amended).
- Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Version 1.1. (Chartered Institute of Ecology and Environmental Management (CIEEM), 2018, updated 2019);
- DRAFT Guidelines on the information to be contained in Environmental Impact Assessment Reports (EIAR) (EPA, August 2017);
- Biodiversity Net Gain. Good practice principles for development. A practical guide. (CIRIA C776a, 2019);
- Guidelines for Assessment of Ecological Impacts of National Road Schemes (National Roads Authority, 2009);
- Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes (National Roads Authority, 2009);
- Guidelines for the Treatment of Otters prior to the Construction of National Road Schemes (National Roads Authority, 2008);
- Guidelines for the Treatment of Bats During the Construction of National Road Schemes (National Roads Authority, 2005);

- A Guide to Habitats in Ireland (Fossitt, 2000);
- Best Practice Guidance for Habitat Survey and Mapping (Smith *et al.*, 2011);
- Bat Surveys: Good Practice Guidelines, Third Edition (Bat Conservation Trust, 2016).

7.2.2 Zone of Influence

In order to assess what ecological features are inside the Zone of Influence (ZoI) of the four proposed developments a desktop study was carried out. The study reviewed current and relevant legislation and policy and collated information from relevant bodies in order to assess the impact on the receiving environment of the construction, operation and decommissioning of the proposed developments.

The current guidance on ecological assessments (CIEEM, 2018) states that:

“The ‘zone of influence’ for a project is the area over which ecological features may be affected by biophysical changes as a result of the proposed project and associated activities. This is likely to extend beyond the project site, for example where there are ecological or hydrological links beyond the site boundaries”. and that “The zone of influence will vary for different ecological features depending on their sensitivity to an environmental change.”

In order to establish the ZoI of the four proposed developments, the likely key biophysical changes associated with the developments were determined having regard to the project characteristics as set out in Chapter 5 of this report. In accordance with recommendations of the CIEEM ‘Guidelines for Ecological Impact Assessment in the UK and Ireland’ (2018), the spatial and temporal limits of the biophysical changes were determined on the basis of published studies and through modelling. The ZoI is further discussed throughout this chapter.

7.2.3 Desktop Study

A desktop assessment was carried out to identify features of ecological importance which have potential to be affected either directly or indirectly by the four proposed developments. The assessment included an interrogation of aerial imagery and available GIS datasets to investigate the potential for connectivity to designated and ecologically sensitive areas. Habitats which might be affected by the four developments were identified and their suitability to support protected species was also assessed (having regard to the typical ranges of species known to occur in the locality).

Principal sources of information utilised for the desktop assessment included:

- Existing relevant mapping and databases e.g. species and habitat distribution etc. (sourced from the Environmental Protection Agency (EPA), the National Biodiversity Data Centre (NBDC) and the National Parks and Wildlife Services (NPWS);
- Published and unpublished NPWS reports on protected habitats and species including Irish Wildlife Manual reports, Species Action Plans and Conservation Management Plans;
- Published data from Bat Conservation Ireland;
- Published data from BirdWatch Ireland;
- Published data from the Botanical Society of Britain & Ireland Database;
- Published documents from Inland Fisheries Ireland;
- The Dublin City Development Plan (2016-2022);
- Records of mammals and plants held by the National biodiversity Centre accessed online;
- Bat landscape suitability mapping held by the National Biodiversity Data Centre database, accessed online at <http://www.biodiversityireland.ie>.

A review of findings of previous ecological assessments/reports undertaken within proximity to the four proposed developments was also carried out. Information reviewed included:

- ESB (2019) Ringsend Flexible Generation Planning and Environmental Consideration Report;
- ESB (2018) South Wall Battery Energy Storage System (BESS) Planning and Environmental Consideration Report;
- ESB (2019) Poolbeg Flexible Generation Planning & Environmental Consideration Report;
- RPS (2018) Dublin Port Company Berth 47A Access Bridge & Storage Area Environmental Report; and
- Scott Cawley (2019) Natura Impact Statement. Provisions of information for Appropriate Assessment for Proposed Enabling Infrastructure at Former IGB and Fabrizia Sites, Poolbeg.

7.2.4 Consultations

As noted in Section 3.4 of this report, pre-application consultations were carried out with prescribed bodies. A summary of all consultation for the four proposed developments is provided in section 3.4.

In addition, data requests were issued to National Parks & Wildlife Services and to Bird Watch Ireland requesting any additional available information on nature conservation and biodiversity and bird count data within the receiving environment.

7.2.5 Field Study

In accordance with CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland, Mott MacDonald ecologists carried out a walkover survey of the Poolbeg Peninsula, including the sites of the four proposed developments, to ascertain whether there was potential for any impacts to biodiversity (habitats and species) as a result of the proposed developments. The habitats at the proposed development sites were classified in accordance with Fossitt (2000) and were assessed for their suitability to support features / species of ecological importance.

On the basis of the desktop assessment and site walkover, it was determined that there is potential for special conservation interests of the South Dublin Bay and River Tolka Estuary SPA to occur in the vicinity of the four proposed developments, which might be subjected to disturbance during the construction works. As such, MKO Consultants were appointed to undertake a targeted wintering bird survey within the South Dublin Bay and River Tolka Estuary SPA over five survey days between February and March 2020. The aim of the survey was to identify the presence of foraging or roosting Special Conservation Interests (SCI) within the adjacent SPA to inform the assessment of potential for adverse effects on site integrity.

In addition, due to the demolition of three existing buildings within the Poolbeg BESS site, bat surveys were carried out to assess the presence or absence of bat roosts within the buildings by MERC Consultants on behalf of ESB. A daytime presence/absence roost survey, emergence survey and a daytime swarm survey were carried out on the 30/10/2019 and 31/10/2019.

The findings of the surveys are discussed further in Section 7.3.5 of this chapter.

7.2.6 Ecological Valuation and Assessment of Impacts

The *Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA, 2009)* were adopted as part of this methodology for the purpose of evaluating the importance of

ecological features within the ZOI of the four proposed developments and is presented below in Table 7.1.

Table 7.1 Site Evaluation Criteria

Ecological Value	Description
Internationally Important	Sites designated (or qualifying for designation) as a SAC or SPA under the EU Habitats or Birds Directives Undesignated sites that fulfil criteria for designation as a European Site Features essential to maintaining the coherence of the Natura 2000 network Sites containing 'best examples' of the habitat types listed in Annex I of the Habitats Directive Resident or regularly occurring populations of birds listed in Annex I of the Birds Directive and species listed in Annex II and/or Annex IV of the Habitats Directive Ramsar Sites World Heritage Sites Biosphere Reserves Sites hosting significant species populations under the Bonn Convention Sites hosting significant populations under the Berne Convention Biogenetic Reserves European Diploma Sites Salmonid waters
Nationally Important	Sites or waters designated or proposed as an NHA Statutory Nature Reserves Refuge for fauna and flora protected under the Wildlife Acts National Parks Undesignated sites fulfilling criteria for designation as a NHA; Statutory Nature Reserves; Refuge for Fauna and Flora protected under the Wildlife Act and/or a National Park; Resident or regularly occurring populations (assessed to be important at the national level) of species protected under the Wildlife Acts and/or species listed on the relevant Red Data list) Sites containing viable areas of the habitat types listed in Annex I of the Habitats Directive
County Importance	Areas of Special Amenity Areas subject to a Tree Preservation Order Areas of High Amenity, or equivalent, designated under the County Development Plan Resident or regularly occurring populations (assessed to be important at the County level) of species of birds listed in Annex I of the Birds Directive, species listed in Annex II and/or IV of the Habitats Directive, species protected under the Wildlife Acts and/or species listed on the relevant Red Data list Site containing area(s) of the habitat types listed in Annex I of the Habitats Directive that do not fulfil criteria for valuation as of International or National Importance County important populations of species, or viable area of semi-natural habitats or natural heritage features identified in the National or local Biodiversity Action Plan Sites containing semi-natural habitat types with high biodiversity in a county context and a high degree of naturalness, or populations of species that are uncommon within the county Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level
Local Importance (higher value)	Locally important populations of priority species or habitats or natural heritage features identified in the Local Biodiversity Action Plan Resident or regularly occurring populations (assessed to be important at the Local level) of species of birds listed in Annex I of the Birds Directive, species listed in Annex II and/or IV of the Habitats Directive, species protected under the Wildlife Acts and/or species listed in the relevant Red Data list Sites containing semi-natural habitat types with high biodiversity in a local context and a high degree of naturalness, or populations of species that are uncommon in the locality Sites or features containing common or lower value habitats, including naturalised species that are nevertheless essential in maintaining links and ecological corridors between features of higher ecological value
Local Importance (lower value)	Sites containing small areas of semi-natural habitat that are of some local importance for wildlife

Sites of features containing non-native species that are of some importance in maintaining habitat links

7.2.7 Assessment of Impact

Impacts were assessed and characterised in accordance with the 'Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports' EPA (2017) as described in Table 7.2 below.

Table 7.2 Impact Magnitude and Duration Criteria

Impact magnitude	Definition
Quality of Effects	Positive Effects A change which improves the quality of the environment (for example, by increasing species diversity; or the improving reproductive capacity of an ecosystem, or by removing nuisances or improving amenities).
	Neutral Effects No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error
	Negative/adverse Effects A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem; or damaging health or property or by causing nuisance).
Significance of 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 Effects An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
	Moderate Effects An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
	Significant Effects An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment
	Very Significant An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.
	Profound Effects An effect which obliterates sensitive characteristics
Duration and Frequency 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
Frequency of Effects
Once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annually

7.3 Baseline Environment

7.3.1 Outputs of Desktop Assessment

The findings of the desktop assessment of the four proposed developments is presented hereunder.

7.3.1.1 Poolbeg Peninsula

As noted, the four proposed developments are located in the Poolbeg Peninsula. The peninsula is bordered by the River Liffey Estuary to the north and by Dublin Bay to the south.

The wider environment within the peninsula comprises a heavily industrialised city port with a mixture of power generation, wastewater treatment and other commercial enterprises associated with the docks. In addition, the peninsula supports a number of large industrial/municipal installations. Existing facilities within the wider environment include, but are not limited to the following; the ESB Poolbeg Generating Station which operates under the IE license P0577-03, Dublin Bay Power which operates under IE License P0486-02, Dublin Waste to Energy Limited (Covanta) which operates under IE License W0232 and Poolbeg/Irishtown Wastewater Treatment Works which operates under a Section 4 Discharge Licence LDW/001/93. All facilities operate and comply under the conditions set out within their licenses. It should be noted that the existing operational activities of the facilities have been considered within the baseline assessment.

There are a number of amenity grassland areas to the south of the peninsula, which include the Poolbeg compensatory grassland (hereafter referred to as the compensatory grassland) and the Irishtown Nature Park located at the southern boundary of the peninsula, as well as Sean Moore Park located to the south-west of the peninsula.

7.3.1.2 Designated Sites

Sites of International Importance

The Birds Directive (2009/147/EC) and the Habitats Directive (92/42/EEC) put an obligation on EU Member States to establish the Natura 2000 network. The Natura 2000 network comprises sites of the highest biodiversity importance for rare and threatened habitats and species across the EU. In Ireland, the Natura 2000 network of European sites comprises Special Areas of Conservation (SAC) and Special Protection Areas (SPA). SAC's are selected for the conservation of Annex I habitats (including priority types which are in danger of disappearance) and Annex II species (other than birds). SPA's are selected for the conservation of Annex I birds and other regularly occurring migratory birds and their habitats.

Mott MacDonald prepared a Natura Impact Statement (NIS) (which accompanies this EIAR) which investigated the potential for the four proposed developments to have significant effects on European Site(s), either alone or in combination, with other plans or projects. The site boundaries of the four proposed developments do not overlap with any European sites.

However, having determined the spatial and temporal limits of the key biophysical changes associated with the four proposed developments, the potential for key ecological features (in this case conservation interests of European Sites and their supporting environments) to be present / likely to be present within those limits was assessed. This is referred to as a source-pathway-receptor assessment. The European sites and their qualifying interests/special conservation interests are listed in Table 7.3 below. The potential for each of the four proposed developments to result in significant effects on the below listed European Sites is discussed further in section 7.6 of this chapter.

Table 7.3: European Sites with S-P-R Connectivity

Site Name and Code	Qualifying Interests / Special Conservation Interests (SCI) with S-P-R link (* denotes priority habitat)
South Dublin Bay SAC [000210]	Tidal Mudflats and Sandflats [1140] Salicornia Mud [1310]
North Dublin Bay SAC	Tidal Mudflats and Sandflats [1140] Annual Vegetation of Drift Lines [1210] Salicornia Mud [1310] Atlantic Salt Meadows [1330] Mediterranean Salt Meadows [1410]
Lambay Island SAC	Reefs [1170] Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] <i>Halichoerus grypus</i> (Grey Seal) [1364] <i>Phoca vitulina</i> (Harbour Seal) [1365]
Rockabill to Dalkey Island SAC	Reefs [1170] <i>Phocoena phocoena</i> (Harbour Porpoise) [1351]
South Dublin Bay and River Tolka Estuary SPA [004024]	Light-bellied Brent Goose (<i>Branta bernicla hrota</i>) [A046] Oystercatcher (<i>Haematopus ostralegus</i>) [A130] Ringed Plover (<i>Charadrius hiaticula</i>) [A137] Grey Plover (<i>Pluvialis squatarola</i>) [A141] Knot (<i>Calidris canutus</i>) [A143] Sanderling (<i>Calidris alba</i>) [A144] Dunlin (<i>Calidris alpina</i>) [A149] Bar-tailed Godwit (<i>Limosa lapponica</i>) [A157] Redshank (<i>Tringa totanus</i>) [A162] Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179] Roseate Tern (<i>Sterna dougallii</i>) [A192] Common Tern (<i>Sterna hirundo</i>) [A193] Arctic Tern (<i>Sterna paradisaea</i>) [A194] Wetland and Waterbirds [A999]
North Bull Island SPA [004006]	Light-bellied Brent Goose (<i>Branta bernicla hrota</i>) [A046] Shelduck (<i>Tadorna tadorna</i>) [A048] Teal (<i>Anas crecca</i>) [A052] Pintail (<i>Anas acuta</i>) [A054] Shoveler (<i>Anas clypeata</i>) [A056] Oystercatcher (<i>Haematopus ostralegus</i>) [A130] Golden Plover (<i>Pluvialis apricaria</i>) [A140] Grey Plover (<i>Pluvialis squatarola</i>) [A141] Knot (<i>Calidris canutus</i>) [A143] Sanderling (<i>Calidris alba</i>) [A144] Dunlin (<i>Calidris alpina</i>) [A149]

	Black-tailed Godwit (<i>Limosa limosa</i>) [A156] Bar-tailed Godwit (<i>Limosa lapponica</i>) [A157] Curlew (<i>Numenius arquata</i>) [A160] Redshank (<i>Tringa totanus</i>) [A162] Turnstone (<i>Arenaria interpres</i>) [A169] Black-headed Gull (<i>Chroicocephalus ridibundus</i>) [A179] Wetland and Waterbirds [A999]
Dalkey Island SPA [004172]	Roseate Tern (<i>Sterna dougallii</i>) [A192] Common Tern (<i>Sterna hirundo</i>) [A193] Arctic Tern (<i>Sterna paradisaea</i>) [A194]
Ireland's Eye SPA [004117]	Cormorant (<i>Phalacrocorax carbo</i>) [A017] Herring Gull (<i>Larus argentatus</i>) [A184] Kittiwake (<i>Rissa tridactyla</i>) [A188] Guillemot (<i>Uria aalge</i>) [A199] Razorbill (<i>Alca torda</i>) [A200]
Baldoyle Bay SPA [004016]	Light-bellied Brent Goose (<i>Branta bernicla hrota</i>) [A046] Shelduck (<i>Tadorna tadorna</i>) [A048] Ringed Plover (<i>Charadrius hiaticula</i>) [A137] Golden Plover (<i>Pluvialis apricaria</i>) [A140] Grey Plover (<i>Pluvialis squatarola</i>) [A141] Bar-tailed Godwit (<i>Limosa lapponica</i>) [A157] Wetland and Waterbirds [A999]

Sites of National Importance

Natural Heritage Areas (NHA) are the basic wildlife designation in Ireland. These areas are considered nationally important for the habitats present or which holds species of plants and animals whose habitats needs protection. Under the Wildlife Amendment Act (2000), NHAs are legally protected from damage from the date they are formally proposed for designation (source: www.npws.ie). Proposed Natural Heritage Areas (pNHA) were published on a non-statutory basis in 1995 and have not since been statutorily proposed or designated.

No NHAs occur within the ZOI of the four proposed developments. The closest NHA to the four proposed developments is Skerries Islands NHA (001218), which is situated ca. 26km to the north. No source-pathway-links were identified between the NHA and the four proposed developments.

The closest pNHA to the four proposed developments is the South Dublin Bay pNHA (000210), which is located approximately 25m south of the Poolbeg BESS and Poolbeg FlexGen developments, approximately 170m south of the Ringsend FlexGen and 240m south of the South Wall BESS. The pNHA has the same conservation interests as South Dublin Bay SAC (000210) and covers the same spatial extents.

The Dolphins Dublin Docks pNHA (000201), which covers the manmade structures utilised as nesting sites by tern species, is located at the closest point approximately 230m north of the Poolbeg BESS at the closest point. The Dolphin Dublin Docks pNHA is designated for breeding tern species. The easternmost structure (the ESB Dolphin) is also designated within the South Dublin Bay and River Tolka Estuary SPA.

North Dublin Bay pNHA (000206) is situated 1.2km north-east of all four proposed development sites. It covers the spatial extent of North Dublin Bay SAC, inclusive of the Tolka Estuary. No

site synopsis is currently available for the site; however, it is understood that the pNHA has the same conservation interests as North Dublin Bay SAC (*pers. comm.* with NPWS).

The potential for each of the four proposed developments to result in negative effects on the Nationally designated sites within the ZOI is discussed in section 7.6 of this Chapter.

Other Designated Sites

Other sites of nature conservation in relation to the proposed development are discussed hereunder.

- There are two Ramsar sites located within the ZOI of the four proposed developments which include; Sandymount Strand / Tolka Estuary (832) and North Bull Island (406). These sites cover the same extents as South Dublin Bay SAC and North Dublin Bay SAC respectively. There are no further Ramsar sites within the vicinity of the four proposed development sites.
- Dublin Bay is designated as a UNESCO Biosphere reserve due to the rare and internationally important habitats and species it supports
- Bull Island Nature Reserve is within North Dublin Bay SAC. The flora and fauna of interest in the reserve are the same as those of North Dublin bay SAC and North Dublin Bay pNHA. It is located 4km north-east of the Poolbeg FlexGen development.
- North Bull Island is preserved as a Wildfowl Sanctuary (WFS 19). It is excluded from the "Open Season Order". It is located 4.5km north east of Poolbeg FlexGen and is within North Bull Island SPA and North Dublin Bay SAC.

7.3.1.3 Records of rare and protected species and habitats

A review of published records of plants and animals protected under law, and invasive species listed in the Third Schedule of the Birds and Habitats Regulations was undertaken and is summarised hereunder.

There are no records of protected flora (included within the Flora Protection Order) or rare flora species within the grid Squares O13W and O23B which encompasses the four proposed development sites.

Records of protect fauna which have previously been recorded within the 2km grid squares which encompass the four proposed development sites (O13W & O23B) are included in Table 7.4 below.

Table 7.4 Records of rare/protected Fauna within 2km of the Proposed Development (O13W & O23B) from the National Biodiversity Data Centre

Name	Date of Record	Grid square	Title Dataset	Location in relation to the proposed development	Designation(s)
Common Frog (<i>Rana temporaria</i>)	07/03/2003	O13W	Irish National Frog Database	Recorded within 2km square	EU Habitats Directive: Annex V; Wildlife Acts.
European Otter (<i>Lutra lutra</i>)	04/05/1980	O13W	Otter Survey of Ireland 1982	Recorded within 2km square	EU Habitats Directive: Annex II & Annex IV; Wildlife Acts
Harbour Porpoise (<i>Phocoena phocoena</i>)	18/05/2012	O13W	IWDG Cetacean Strandings Database	Recorded stranded on Sandymount Strand, approx. 1km south.	EU Habitats Directive: Annex II & Annex IV; Wildlife Acts.

				Recorded stranded on Sandymount Strand, approx. 700m south.	
Grey Seal (<i>Halichoerus grypus</i>)	15/09/2013	O13W	Atlas of Mammals in Ireland 2010-2015	Live animal seen at Pigeon House Quay within Liffey Estuary, approx. 500m north.	EU Habitats Directive: Annex II & Annex IV; Wildlife Acts.
Common Seal (<i>Phoca vitulina</i>)	27/07/2018	O23B	Mammals of Ireland 2016-2025	Live animal seen north of the Great South Wall, approx. 1km east.	EU Habitats Directive: Annex II & Annex V; Wildlife Acts.
Common Dolphin (<i>Delphinus delphis</i>)	03/02/2012	O23B	IWDG Cetacean Strandings Database	Recorded stranded on Sandymount Strand, approx. 800m south.	EU Habitats Directive: Annex IV; Wildlife Acts.
Daubenton's Bat (<i>Myotis daubentonii</i>)	24/05/2011	O13W	National Bat Database of Ireland	Recorded in vicinity of Aviva Stadium, approx. 1.5km west, during EIS surveys.	EU Habitats Directive: Annex IV; Wildlife Acts.
Leisler's Bat (<i>Nyctalus leisleri</i>)	24/05/2011	O13W	National Bat Database of Ireland	Recorded in vicinity of Aviva Stadium, approx. 1.5km west, during EIS surveys.	EU Habitats Directive: Annex IV; Wildlife Acts.
Common Pipistrelle (<i>Pipistrellus pipistrellus</i>)	24/05/2011	O13W	National Bat Database of Ireland	Recorded in vicinity of Aviva Stadium, approx. 1.5km west, during EIS surveys.	EU Habitats Directive: Annex IV; Wildlife Acts.
	25/08/2011	O23B		Recorded at the Pigeon House site, adjacent to the proposed Poolbeg BESS.	
Soprano Pipistrelle (<i>Pipistrellus pygmaeus</i>)	24/05/2011	O13W	National Bat Database of Ireland	Recorded in vicinity of Aviva Stadium, approx. 1.5km west, during EIS surveys.	EU Habitats Directive: Annex IV; Wildlife Acts.
Lesser Noctule (<i>Nyctalus leisleri</i>)	24/05/2011	O13W	National Bat Database of Ireland	Recorded in vicinity of Aviva Stadium, approx. 1.5km west, during EIS surveys.	EU Habitats Directive: Annex IV; Wildlife Acts.

A number of protected bat species have been recorded within the 2km grid squares which encompass the four proposed developments. The habitats within the Poolbeg peninsula are predominately man-made and are dominated by existing industrial developments. A study undertaken in 2011 by Lundy *et al.*⁴ analysed data in the Irish National Bata Database. The outcome included GIS layers showing areas suitable for individual species of bats with the suitability index ranging from 0 to 100 with 0 being least favourable and 100 most favourable for bats. The national Bat Database habitat suitability tool⁵ indicates that the Poolbeg Peninsula has an overall suitability index of 17.44 which indicates that the habitats within the peninsula are unfavourable to bat species.

Invasive plant species listed in Part 1 of the Third Schedule recorded within the 2km grid squares O13W and O23B include: Himalayan balsam (*Impatiens glandulifera*), Japanese knotweed (*Fallopia japonica*), sea-buckthorn (*Hippophae rhamnoides*), three-cornered garlic (*Allium triquetrum*) and Spanish bluebell (*Hyacinthoides hispanica*).

⁴ Lundy, M.G., Aughney, T., Montgomery, W.I., & Roche, N., (2011) Landscape conservation for Irish bats & species specific roosting characteristics. Bat Conservation Ireland.

⁵ <https://maps.biodiversityireland.ie/Map/Terrestrial/Dataset/128> on the 26/05/2020

Invasive fauna species listed in Part 2 of the above legislation previously recorded include: American mink (*Neovison vison*), and grey squirrel (*Sciurus carolinensis*).

Numerous stands of Japanese knotweed have previously been recorded within the Poolbeg peninsula (NBDC, 2019). The locations of these previously recorded stands are outlined below;

- At the bend of the Pigeon House Road north of Poolbeg Beach;
- Numerous stands within Irishtown Nature Reserve south of the compensatory grassland;
- Along the coastal strip of the Irishtown Nature Reserve, south of the proposed Ringsend FlexGen site; and
- At the costal path east of Sean More Park, bordering Sandymount beach.

7.3.1.4 Review of previous ecological assessments

A review of previous ecological assessments undertaken for projects in the surrounding area of the four proposed development was carried out. An appraisal of results from relevant past ecological assessments associated with these projects is presented below and was used to inform the baseline for the proposed developments.

Poolbeg West SDZ Enabling Works (Planning ref. no. PWSZ3270/19)

The Poolbeg West Strategic Development Zone (SDZ) covers the former IGB and Fabrizia sites at Poolbeg, directly north of Sean More Park, approximately 60m west of the proposed Ringsend FlexGen development site. Scott Cawley undertook ecological surveys which included general walkovers and targeted bat and breeding/wintering bird surveys. The only mammal recorded within the survey area was red fox, and no signs of any protected mammal species were recorded.

Bat activity surveys recorded an overall low level of bat activity, with three species recorded; common pipistrelle, soprano pipistrelle and Leisler's bat. No roosts or suitable trees/buildings were identified.

Breeding bird surveys recorded a total of 21 species within the survey site including four amber-listed species (robin, linnet, greenfinch, house sparrow and swallow) and one red-listed species recorded as a flyover (herring gull). The majority of these species are associated with the scrub, hedgerow and grassland habitats present within the site. The proposed development does not contain extents of these habitats and is almost entirely composed of hardstanding with little to no vegetation. It is therefore not expected that species recorded at the former IGB and Fabrizia lands to the west would be present at the proposed development site.

Ringsend Wastewater Treatment Plant Upgrade Project (Planning ref. no.: 3669/19)

Irish Water are proposing the Ringsend Wastewater Treatment Plant Upgrade Project. An element of the project will include upgrade works at the existing Wastewater Treatment Plant at Ringsend which is located approximately 60m west of the Poolbeg BESS development.

Ecological field surveys to inform the project did not record any signs of protected flora/fauna. It concluded that the site does not contain suitable habitat for breeding birds, roosting bats or large mammals. Japanese knotweed was recorded along the internal road near the eastern boundary of the WWTP.

Dublin Port Company Berth 47A Access Bridge & Storage Area (Planning ref. no.: 3711/18)

Berth 47A is situated on the northern side of the Poolbeg peninsula, approximately 256m north west of the Poolbeg BESS site and 250m east of the Ringsend FlexGen site. It is the location of the tidal outlet from Covanta (Dublin's Waste-to-Energy Facility, also known as the Poolbeg Incinerator). The project involved the construction of an access bridge across the tidal outlet and some additional hardstanding area.

An ecological walkover survey was completed at the site on 18th July 2018 in order to inform the submitted Environmental Report. No evidence of any protected fauna was recorded and no features suitable for roosting bats were noted. Several stands of Japanese knotweed were recorded within the site.

Poolbeg 220kV Station – Shunt Reactance Coil Project (Planning ref. no.: 2789/14)

This project involved the construction of 2 no. 50MVar shunt reactance coil units within, and at the southern boundary of, the existing Poolbeg Generating station complex. This site is located directly south of the Poolbeg FlexGen site, on the opposite side of the internal road.

A Planning and Environmental Considerations Report was submitted as part of the planning application for this project. The report was informed by an ecological walkover survey at the site in February 2014. No rare / protected flora or fauna were recorded within the site during this walkover survey.

7.3.2 Outputs of Field Surveys

7.3.2.1 Habitats and Flora

A description of the habitats within the four proposed development site boundaries are presented hereunder. Habitats were described in accordance with Fossitt (2000)⁶. An assessment of the habitats was undertaken in accordance with the NRA Guidelines (2009)⁷.

7.3.2.2 Poolbeg FlexGen

The Poolbeg FlexGen site currently comprises a mix of gravelled tracks, areas of recolonising bare ground (ED3) and scrub (WS1) (refer to Figure 7.1 below). The site is bounded by a vegetated earth bund (BL2) along the eastern and southern boundaries. This bund will not be affected by the proposed FlexGen development. The site is bounded by an existing internal roadway on the northern and western sides. There are lighting columns, site cabins and some underground services on the site. There is also an existing roadway on the northern and western sides of the site (BL3).

Sandymount Strand is situated approximately 40m south of the site and is separated by an existing berm, planted treeline, security fencing and the Shellybanks Road.

The existing habitats within the site were assessed as having Local Importance (Lower Value) due to the low ecological value the habitats provide.

⁶ Fossitt (2000) A Guide to Habitats in Ireland, The Heritage Council

⁷ NRA (2009), Guidelines for Assessment of Ecological Impacts of National Roads Scheme.

Figure 7.1: Poolbeg FlexGen site



Source: ESB

7.3.2.3 Poolbeg BESS

The Poolbeg BESS site comprises buildings and artificial surfaces (BL3) (refer to Figure 7.2). There are some small areas of amenity grassland (Improved) (GA2). Three existing buildings within the site are proposed to be demolished as part of the works. A daytime presence/absence bat roost survey of the three buildings was carried out on the 30th and 31st October 2019 by MERC Consultants, on behalf of ESB. All three buildings were assessed as having negligible bat roost potential. Further details on the findings of the surveys are included in section 7.3.5.2.

The building/structures and artificial surfaces within the site are assessed as having Local Importance (Lower Value) due to the low ecological value the habitats provide.

Figure 7.2: Poolbeg BESS Site



Source: ESB

7.3.2.4 Ringsend FlexGen

The Ringsend FlexGen site currently consists of hard standing ground. (BL3). There are no existing permanent structures present within the site and no demolition works will therefore be required. There are existing vegetated earth banks (BL2) to the east and north of the site. There are also some small areas of amenity grassland (GA2).

The proposed FlexGen infrastructure will be built on the northern part of the site. Temporary site laydown and storage areas will be located to the south of the site. Access to the site will be made from South Bank Road. There will be a connecting gate between this site and the adjacent South Wall BESS to the east.

All habitats within the site were assessed as having Local Importance (Lower Value) due to the low ecological value the habitats provide.

7.3.2.5 South Wall BESS

The South Wall BESS site currently consists of hard standing ground (BL3) with some minor patches of recolonising bare ground (ED3) (refer to Figure 7.3 below). There are no permanent structures in this area to be demolished. The site is bounded by an earth bank (BL2) along the eastern and northern boundary of the site.

Access to the site will be gained via South Bank Road or via Shellybanks Road to the east. There will be a connecting gate between this site and the adjacent Ringsend FlexGen to the west.

Japanese knotweed (*Fallopia japonica*) occurs along the southern edge of South Bank Road immediately south of the South Wall BESS site.

All habitats within the site were assessed as having Local Importance (Lower Value) due to the low ecological value the habitats provide.

Figure 7.3: South Wall BESS Site



Source: ESB

7.3.2.6 Fauna

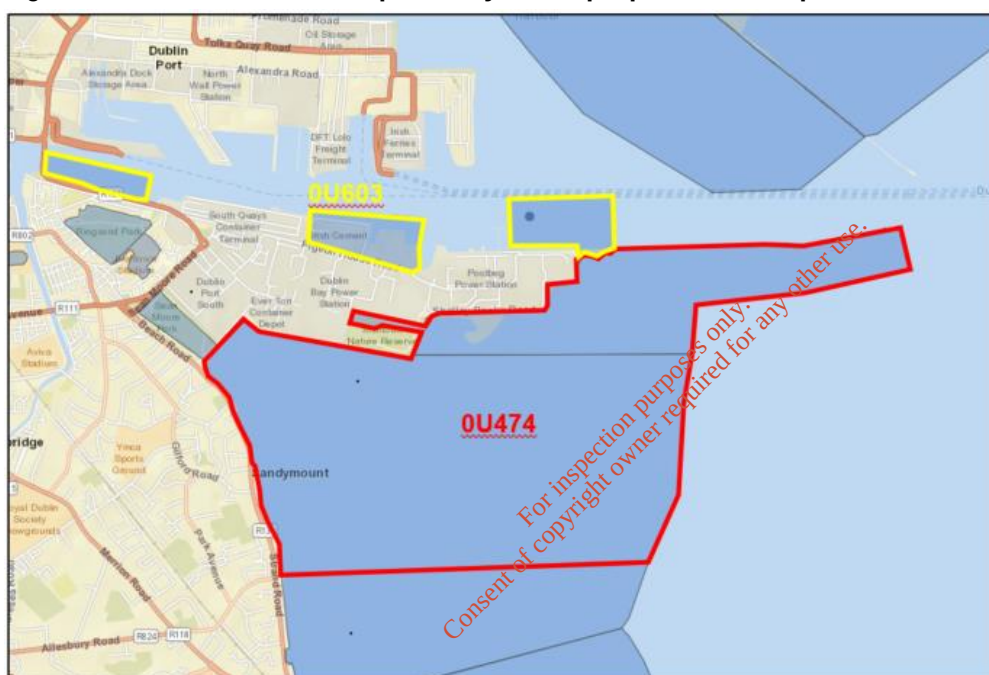
7.3.2.7 Birds

The findings of a robust desktop assessment and MKO's Winter Bird Surveys results are summarised and provided hereunder.

Irish Wetlands Bird Survey (I-WeBS)

The Irish Wetland Bird Survey (I-WeBS), a joint scheme of BirdWatch Ireland and the National Parks and Wildlife Service, monitors the numbers of wintering waterbirds in Ireland at a range of sites throughout the country. There are a number of sub-sites of Dublin Bay located within proximity to the four proposed developments (refer to Figure 7.4. below).

Figure 7.4 I-WeBS subsites in proximity to the proposed developments



Source: BirdWatch Ireland

The subsite of 'Poolbeg (Liffey)' (code: 0U603) covers sections of the Liffey Estuary north of the Poolbeg peninsula, approximately 57m from the proposed developments. The subsite 'Sydney Parade Ave – Poolbeg' (0U474) covers the tidal flats of North Sandymount Strand, approximately 40m from the proposed developments. Following a request for data, BirdWatch Ireland provided the annual peak counts for subsites 0U474 and 0U603 on the 24/03/2020. The annual peak counts recorded for subsite 0U474 are outlined in Table 7.5 below.

Table 7.5 6I-WeBS data for subsite OU474 (Sydney Parade Ave -Poolbeg)

Species	1% National	1% International	Mean 5-yr Peak Count (2013/14 – 2017/18)	Overall Peak Count (2013/14 – 2017/18)
Kittiwake			8	40
Mute Swan	90	100	1	2
Light-bellied Brent Goose	350	400	432	706
Shelduck	100	2500	8	14
Wigeon	560	14000	5	17
Teal	360	5000	26	128
Long-tailed Duck			0	1
Red-breasted Merganser	25	860	6	13
Little Grebe	20	4700	0	0
Great Crested Grebe	30	6300	10	30
Cormorant	110	1200	18	82
Shag			0	1
Little Egret	20	1100	6	9
Grey Heron	25	5000	1	2
Oystercatcher	610	8200	691	1031
Ringed Plover	120	540	84	223
Golden Plover	920	9300	80	350
Grey Plover	30	2000	3	8
Lapwing	850	72300	2	9
Knot	160	5300	782	1670
Sanderling	85	2000	167	440
Dunlin	460	13300	1947	4870
Snipe			0	1
Black-tailed Godwit	200	1100	5	15
Bar-tailed Godwit	170	1500	41	89
Curlew	350	7600	55	91
Greenshank	20	3300	3	6
Redshank	240	2400	151	261
Turnstone	95	1400	46	160
Black-headed Gull	-	20,000	763	1200
Common Gull	-	16,400	9	32
Lesser Black-backed Gull	-		1	2
Herring Gull	-	10,200	27	82
Great Black-backed Gull	-	4,200	3	5
Sandwich Tern	-	-	0	2
Common Tern	-	-	0	2

A total of 36 species have been recorded within the 'Sydney Parade Ave – Poolbeg' subsite over the most recent five-year data period. Of these species, seven have been recorded in numbers of national importance; Brent goose, oystercatcher, knot, ringed plover, sanderling, redshank and dunlin; and one in numbers of international importance; light bellied Brent goose.

The annual peak counts recorded for subsite OU603 are outlined in table 7.6 below.

Table 7.6: Annual peak Counts of wintering bird species recorded at subsite OU603

Species	1% National	1% International	Annual Peak Count (2016/17)
Light-bellied Brent Goose	360	400	290
Wigeon	560	14000	13
Teal	360	5000	55
Red-breasted Merganser	25	860	12
Red-throated Diver	20	3000	1
Great Crested Grebe	30	6300	6
Cormorant	110	1200	48
Grey Heron	25	5000	1
Oystercatcher	610	8200	139
Ringed Plover	120	540	1
Sanderling	85	2000	6
Dunlin	460	13300	250
Black-tailed Godwit	200	1100	285
Curlew	350	7600	16
Redshank	240	2400	45
Turnstone	95	1400	19
Black-headed Gull	n/a	20,000	750
Common Gull	n/a	16,400	120
Lesser Black-backed Gull	n/a	5500	1
Herring Gull	n/a	10,200	18
Great black backed gull	n/a	4,200	8

A total of 22 species have been recorded at the Poolbeg (Liffey) WeBS monitoring site. It is noted that this is a recently established monitoring subsite and as such only one year of data is currently available (2016/17). Of these 22 species, one has been recorded in numbers of national importance; black-tailed godwit.

Low tide roosting counts were carried out under the I-Webs monitoring programme in 2011/2012 which identified the location of roosting sites of the Special Conservation Interests within the SPA (NPWS, 2014⁸). The majority of roosting sites of the wintering species were recorded at the leeward side of Bull Island which included subsites; OU465 (Wooden Bridge-Causeway), OU466 (North of Causeway) and OUL47 (Kilbarrack), all located an excess of 2.5km north of the Poolbeg Peninsula. A large number of roosting sites were also recorded at the subsite OU460 (Dún Laoghaire - Seapoint) located approximately 3.3km south of the Poolbeg Peninsula.

Winter Bird Survey (2020)

MKO Consultants, on behalf of Mott MacDonald, undertook a winter bird survey within the South Dublin Bay and River Tolka Estuary SPA over five survey days between February and March 2020. The aim of the survey was to identify the presence of foraging and roosting SCIs within the adjacent SPA.

The study area was established as a 300m radius from each of the four proposed development site boundaries as per Cutts et al (2013)⁹. A list of the waterfowl species recorded during the surveys are listed in Table 7.7 below.

The locations where the highest numbers of SCIs were recorded included;

⁸ NPWS (2014). Conservation objectives supporting document – South Dublin Bay and River Tolka SPA & North Bull Island SPA. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

⁹ Cutts, N., Hemingway, K., Spencer, J., (2013). Waterbird Disturbance Mitigation Toolkit Informing Estuarine Planning and Construction Projects.

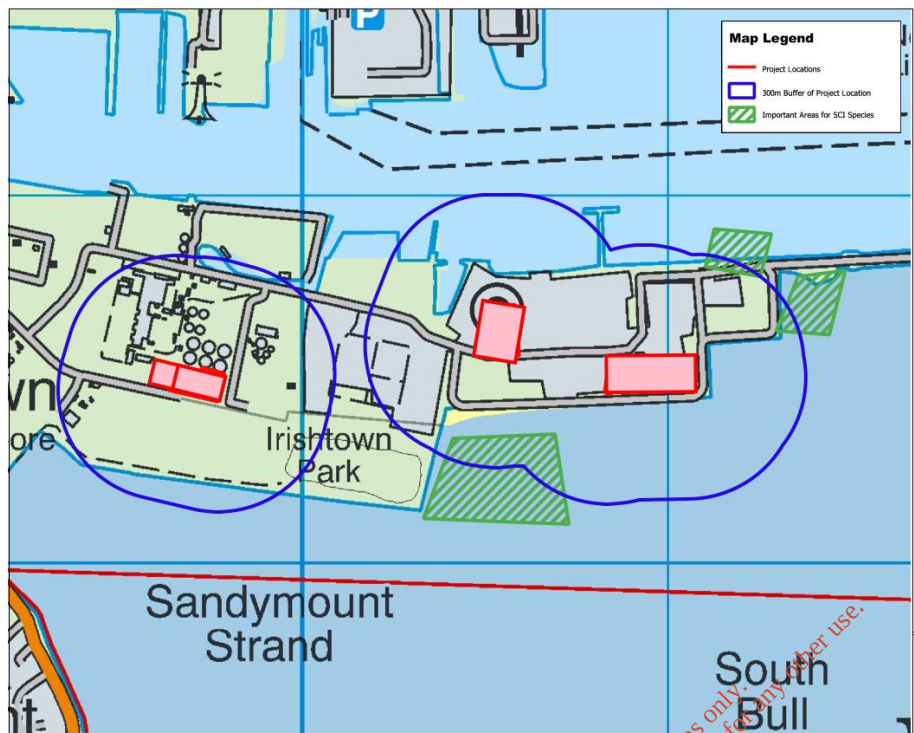
- Black headed gull: recorded in nationally important numbers on-site on four of the five visits undertaken with a peak count of 839 on the 1st of March 2020. The south-side of the South Wall, Shellybanks Beach and the water outfall at the northern-side base of the South Wall were the most important areas for this species.
- Bar-tailed godwit: 274 birds were recorded at the water outfall at the northern-side base of the South Wall on the 2nd of March 2020. This flock contained nationally important numbers.
- Herring gull: 169 birds were recorded at the water outflow at the north-side base of the South Wall on the 1st of March 2020.
- Dunlin: 116 birds were recorded at Shellybanks Beach on the 2nd of March 2020.
- Redshank: the peak total count recorded on-site included 178 birds, with the largest flock of 131 birds recorded at Shellybanks beach on the 5th of March 2020.
- Light-bellied Brent geese: 30 were recorded on the 25th of February 2020, feeding in on the compensatory grassland north of the Irishtown nature reserve. In addition, a total of 439 light-bellied Brent geese were recorded using Sandymount strand as a night-time roost on the 6th of March. This constitutes as nationally important flock.

In addition, significant numbers of SCIs were recorded outside of the 300m survey area from the proposed development site boundaries. Two high-tide communal roosts were identified 1km and 2.5km from the Poolbeg Peninsula. Nationally important numbers of dunlin (700) and sanderling (90) were recorded at the first roost area and nationally important numbers of bar-tailed godwits (400) and dunlin (700) were recorded at the second-high tide communal roost. Night-time roosting of light bellied Brent geese outside the 300m survey radius were also recorded before dawn. Figure 7.5 and 7.6 show the important areas for SCI species within the study area.

The most important habitat for the waterfowl species within the survey area were identified as Shellybanks Beach (located immediately east of the Poolbeg Peninsula), the water outfall at the north-side base of the south wall (located immediately north of the Poolbeg Peninsula), the compensatory grassland (located immediately north of Irishtown Nature Reserve) and the south side of the South Wall (located east of the Poolbeg Peninsula).

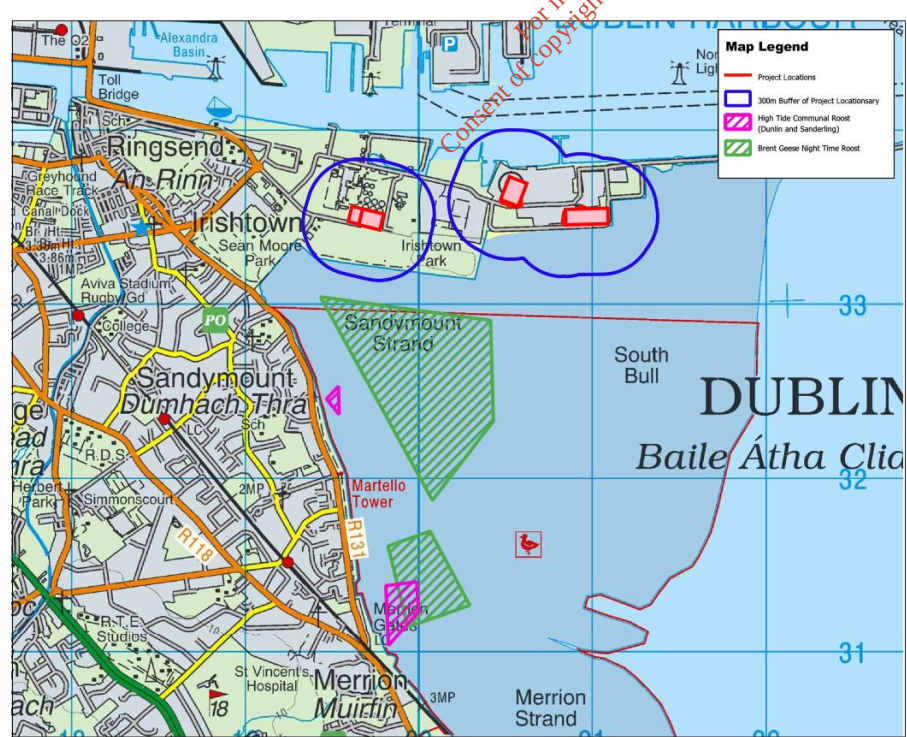
Any disturbance to the waterfowl species was recorded during the survey. Construction works (on one occasion), pedestrian activity (on one occasion) and loose dogs within the survey area (on two occasions) were recorded during the survey.

Figure 7.5: Important areas for SCI species



Source: Mott MacDonald based on MKOs findings

Figure 7.6: Significant SCI observation outside of 300m



Source: Mott MacDonald based on MKOs findings

Winter Bird Survey (2019)

Scott Cawley, as part of the Poolbeg West SDZ enabling works planning application¹⁰, undertook winter bird surveys at the north-western extent of North Sandymount Strand during the 2018/19 season (Scott Cawley, 2019¹¹). The winter bird survey covered the area of North Sandymount Strand between Poolbeg Beach and the Sandymount Martello Tower (the vantage point survey location was located approximately 140m south of the Ringsend FlexGen and South Wall BESS developments and approximately 1.2km south-west of the Poolbeg FlexGen and Poolbeg BESS developments). The surveys recorded the usage and distribution of wintering birds across North Sandymount Strand at low-tide, mid-tide and high-tide. A total of 15 SCI species were recorded at North Sandymount Strand during the surveys (species recorded are listed in **Error! Reference source not found.** below). The SCI species recorded in numbers of national importance included bar-tailed godwit, black-tailed godwit, dunlin, sanderling, ringed plover, knot and grey plover. No SCI species were recorded in numbers of international importance. Flocks were predominantly recorded within the extent of intertidal areas located south of the Irishtown Nature Reserve. Usage of Poolbeg Beach (west of Irishtown Nature Reserve) and associated intertidal areas was low, with observations primarily recorded at high tide. The results of these surveys show that SCI species utilise varying areas within North Sandymount Strand at differing tide conditions, often concentrating at topographical features, e.g. channels within the mudflats.

Scott Cawley (2019) recorded light bellied Brent geese throughout the study area during the surveys. Peak counts of the species were recorded foraging at Sean Moore Park (180) (located 450m south-west of the Poolbeg Peninsula) and at compensatory grasslands (190) (located 180m east of the Ringsend FlexGen development) which are known to be important foraging sites for the species. The survey found that the Brent geese used Sean Moore Park to take shelter from easterly wind conditions in the morning as birds came off roost sites along Sandymount strand or sandpit, and that the geese appeared to use compensatory grasslands, in numbers up to 200, at pre-roost times before moving to roost sites at Sandymount.

Scott Cawley (2019) also noted incidents of disturbance to the SCI species during the surveys. It was noted that recreational users using the coastal path adjacent to the SPA did not disturb the birds within Dublin Bay. Disturbance was only noted when users deviated from the coastal path onto the sandflats.

Note that the survey area of the 2019 Scott Cawley survey and the 2020 MKO survey only spatially overlap across the intertidal flats located to the south of peninsula and the compensatory grassland.

¹⁰ Planning reference number PWSDZ3270/19.

¹¹ Scott Cawley Ltd. (2019). Natura Impact Statement. Provision of information for Appropriate Assessment for proposed Enabling Infrastructure at Former IGB and Fabrizia Sites, Poolbeg West, Dublin 4. (Unpublished Report).

Table 7.7: Available data on the usage of North Sandymount Strand by SCI species.

SCI Species	1% National	1% Inter-national	I-WeBS		Scott Cawley Ltd. (2019)	MKO survey (2020)
			Mean 5-yr Peak Count (2013/14 – 2017/18)	Overall Peak Count (2013/14 – 2017/18)	Annual Peak Count (2018/19)	Peak Count (2020)
Light-bellied Brent Goose	350	400	432	706	210	30
Shelduck	100	2500	8	14	10	18
Teal	360	5000	26	128	0	112
Oystercatcher	610	8200	691	1031	677	132
Ringed Plover	120	540	84	223	175	0
Golden Plover	920	9300	80	350	0	0
Grey Plover	30	2000	3	8	2000	0
Knot	160	5300	782	1670	550	7
Sanderling	85	2000	167	440	600	0
Dunlin	460	13300	1947	4870	1392	116
Black-tailed Godwit	200	1100	5	15	225	37
Bar-tailed Godwit	170	1500	41	89	260	278
Curlew	350	7600	55	92	14	14
Redshank	240	2400	151	261	164	178
Turnstone	95	1400	46	160	28	41
Black-headed Gull	-	20,000	763	1200	498	839
Red-breasted Merganser	25	860	6	13	10	0
Great-crested Grebe	30	6,300	10	30	0	0

Orange = exceeds 1% national population estimate; Red = exceeds 1% international population estimate.

7.3.2.8 Breeding Birds

Given the nature of the habitats within the four proposed development sites, there is low potential for the sites to support breeding birds.

Tern Species

Three tern species: roseate tern (*Sterna dougalli*), common tern (*Sterna hirundo*), and Arctic tern (*Sterna paradisaea*), are listed as SCIs of the South Dublin Bay and River Tolka Estuary SPA (NPWS, 2015¹²). These species are designated for both breeding and staging populations. The main roosting sites for the tern species are the exposed sand banks in south Dublin Bay primarily between the Martello Towers at Sandymount (NPWS, 2015), which are located over 1km south of the Poolbeg Peninsula. In addition, the expansive sandflats on Sandymount Strand serve as a post-breeding staging site for the tern species (Tierney *et al.* 2016)¹³.

¹²NPWS (2015b). Conservation Objectives: South Dublin Bay and River Tolka Estuary SPA 004024. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht

¹³ Tierney, N., Whelan, R., Valentin, A., (2016). Post-breeding aggregations of roosting terns in south Dublin Bay in late summer

Sandymount Strand is located 1.7km south-west of the Poolbeg Peninsula. Both the breeding and staging sites are located outside the ZoI for noise effects (outside the 300m buffer).

It is noted however that both common tern and Arctic tern also breed in the Dublin Docks, on man-made mooring structures which include the ESB dolphin, the CDL dolphin and the two floating pontoons, which are located to the north of the Poolbeg Peninsula (NPWS, 2015¹²).

Peregrine Falcon

A Peregrine Falcon (*Falco peregrinus*) pair have been breeding for several years at the disused power station smokestacks at the Pigeon House. The stacks are located ca.120m from the Poolbeg BESS site and ca. 250m from the Poolbeg FlexGen site. Breeding peregrine falcon use a foraging core range of 2km¹⁴.

7.3.2.9 Bats

MERC Consultants, on behalf of ESB, undertook bat surveys of the three buildings proposed to be demolished within the Poolbeg BESS site on the 30th and 31st of October 2019.

It should be noted that internal areas of adjacent buildings to the proposed demolition sites could not be surveyed due to landowner access restriction, however, dusk and dawn surveys were carried out to establish bat activity in the locality.

A roost assessment survey of all three buildings due for demolition, both externally and internally, was undertaken. All buildings were checked for signs of bat use (e.g. droppings, urine stains, grease staining, physical wear scratches etc.) as well as definitive signs of bat absence (e.g. well-sealed joints, coating of old cobwebs etc). The aim of the survey was to determine the presence/absence of roosting bats and identify any suitable roost features within the buildings to be demolished.

A dusk emergence survey was carried out on the evening of the 30th and a dawn swarm survey was carried out on the morning of the 31st.

No active bat roosts were identified within the buildings surveyed. No evidence of bat activity was identified during the internal or external inspection of the buildings. In addition, no bats were seen during the emergence survey and none were seen returning or swarming during the dawn survey.

The site was considered to be unsuitable for bats. The site is within an exposed coastal area and is highly disturbed and industrialised. The report further states that there is very little optimal foraging habitat, and any existing habitat is highly fragmented. The report also noted a high level of existing lighting from the existing and surrounding buildings. The survey areas did not become fully dark due to the existing lighting.

7.3.2.10 Marine Mammals

Dublin Bay supports protected marine mammals which includes harbour porpoise (*Phocoena phocoena*), harbour seal (*Phoca vitulina*) and grey seal (*Halichoerus grypus*).

Surveys of harbour porpoise within Rockabill to Dalkey Island SAC have determined that the highest concentrations of the species occur in the northern extent of the site, in proximity to Lambay and Rockabill Islands (located approximately 20km and 30km northeast of the four proposed development sites respectively) while lower comparative concentrations have been

¹⁴ SNH (2017) Recommended bird survey methods to inform impacts assessment of onshore wind farms. Version 2.

recorded in the southern extent of the site, approximately 15km at its closest point to the proposed developments (Berrow et al., 2014¹⁵ and Berrow & O'Brien, 2013¹⁶). No harbour porpoises were recorded in the vicinity of the Liffey Estuary during the surveys. Considering the distance between the Poolbeg Peninsula and the areas of concentration no source-pathway-receptor link was identified between the designated marine species and the construction works associated with the four proposed developments.

Two harbour seal breeding colonies in Dublin Bay are located within the SAC at Lambay Island (NPWS, 2013¹⁷). There are three grey seal breeding sites within Dublin Bay (Ó Cadhla et al., 2013¹⁸). The largest of these is located at Lambay Island (ca. 20km north), with the other two sites located at Ireland's Eye (ca. 10.5km north-east) and Dalkey Island (10km south-east). A recent census of the seal population of Dublin Bay was carried out in September 2018 covered all coastal extents of Dublin Bay, from Ireland's Eye south to Dalkey Island (Lauder, 2018). The largest concentrations of grey seal were recorded in the vicinity of Ireland's Eye (>50% of all recordings) and the largest concentrations of harbour seal were recorded at Sutton Creek, at the western extent of North Bull Island (>50% of all recordings). No seals were recorded within the Liffey Estuary or Sandymount Strand during the census survey, with the closest recording to the Project being 4.5km north-east. The breeding and resting sites of harbour and grey seals are all located an excess of 10km from the four proposed development sites and thus outside the ZOI for noise disturbance. A review of available data has shown that the areas of open water within the surrounding environment of the proposed development sites (i.e. the Liffey Estuary and Sandymount Strand) are not significant *ex-situ* areas for these species. Thus, there is negligible S-P-R connectivity between the construction works associated with the four proposed developments and the designated marine species. There is no potential for impact.

7.3.3 Terrestrial Mammals

No evidence of protected mammal species or suitable habitat to support same was recorded during the ecological walkover of the four proposed development sites. The built and industrial nature of the for sites and surrounding habitat provides negligible value to protected species.

There is potential however that fox (*Vulpes Vulpes*) may occur within the four proposed sites and surrounding habitat. Foxes are not currently protected under National law, however there is an obligation to protect biodiversity within Ireland under the Convention on Biological Diversity.

7.4 Summary of Key Ecological Receptors

The key ecological receptors within the Zone of Influence of the four proposed developments are evaluated in accordance with the evaluation criteria set out in Table 7.2 (Impact Magnitude and Duration Criteria (EPA, 2017)) of this Chapter. The existing baseline condition / population stability, conservation status, rarity and legal protection of the key ecological receptors was considered as part of this evaluation. A summary of the ecological valuation and identification of Key Ecological Receptors is provided below in Table 7.8.

¹⁵ Berrow, S., Hickey, R., O'Connor, I. And McGrath, D. (2014) Density estimates of harbour porpoises *Phocoena* at eight coastal sites in Ireland. Biology and Environment: Proceedings of the Royal Irish Academy

¹⁶ Berrow, S.D. and O'Brien, J. (2013). Harbour porpoise SAC survey 2013. Report to the National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht. Irish Whale and Dolphin Group. pp. 37

¹⁷ NPWS (2013) Conservation Objectives: Lambay Island SAC 000204. Version 1. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht

¹⁸ Ó Cadhla, O., Keena, T., Strong, D., Duck, C. and Hiby, L. (2013) Monitoring of the breeding population of grey seals in Ireland, 2009 - 2012. Irish Wildlife Manuals, No. 74. National Parks and Wildlife Service, Department of the Arts, Heritage and the Gaeltacht, Dublin, Ireland.

Table 7.8 **Ecological valuation and identification of Key Ecological Receptors (KER)**

Habitats/Species	Ecological Value (as per NRA guideline)	Potential to occur within the Zol of Poolbeg FlexGen	Potential to occur within the Zol of Poolbeg BESS	Potential to occur within the Zol of Ringsend FlexGen	Potential to occur within the Zol of South Wall BESS	Key Ecological Receptors
A. Designated Sites						
South Dublin Bay and River Tolka Estuary SPA (004024)	International	Yes – due to the proximity of the SPA to the four proposed development sites there is potential for the disturbance of the SCI species and potential for indirect impacts due to a degradation of water quality impacts.	Yes – due to the proximity of the SPA to the four proposed development sites there is potential for the disturbance of the SCI species and potential for indirect impacts due to a degradation of water quality impacts.	Yes – due to the proximity of the SPA to the proposed development site there is potential for the disturbance of the SCI species and potential for indirect impacts due to a degradation of water quality impacts.	Yes – due to the proximity of the SPA to the proposed development site there is potential for the disturbance of the SCI species and potential for indirect impacts due to a degradation of water quality impacts.	Yes
North Bull Island SPA (004006)	International	Yes – due to the potential for the disturbance of ex-situ SCI species and potential for indirect impacts due to a degradation of water quality impacts.	Yes – due to the potential for the disturbance of ex-situ SCI species and potential for indirect impacts due to a degradation of water quality impacts.	Yes – due to the potential for the disturbance of ex-situ SCI species and potential for indirect impacts due to a degradation of water quality impacts.	Yes – due to the potential for the disturbance of ex-situ SCI species and potential for indirect impacts due to a degradation of water quality impacts.	Yes
North Dublin Bay SAC (000206)	International	Yes – due to the potential for indirect impacts due to a degradation of water quality impacts.	Yes – due to the potential for indirect impacts due to a degradation of water quality impacts.	Yes – due to the potential for indirect impacts due to a degradation of water quality impacts.	Yes – due to the potential for indirect impacts due to a degradation of water quality impacts.	Yes
South Dublin Bay SAC (000210)	International	Yes – due to the potential for indirect impacts due to a degradation of water quality impacts.	Yes – due to the potential for indirect impacts due to a degradation of water quality impacts.	Yes – due to the potential for indirect impacts due to a degradation of water quality impacts.	Yes – due to the potential for indirect impacts due to a degradation of water quality impacts.	Yes

Habitats/Species	Ecological Value (as per NRA guideline)	Potential to occur within the Zol of Poolbeg FlexGen	Potential to occur within the Zol of Poolbeg BESS	Potential to occur within the Zol of Ringsend FlexGen	Potential to occur within the Zol of South Wall BESS	Key Ecological Receptors
North Dublin Bay pNHA (000206)	National	Yes – due to the potential for indirect impacts due to a degradation of water quality impacts	Yes – due to the potential for indirect impacts due to a degradation of water quality impacts.	Yes – due to the potential for indirect impacts due to a degradation of water quality impacts	Yes – due to the potential for indirect impacts due to a degradation of water quality impacts	Yes
Dolphin, Dublin Docks pNHA (000201)	National	Yes – due to the proximity to the four proposed developments there is potential for the disturbance of the sites scientific interests.	Yes – due to the proximity to the four proposed developments there is potential for the disturbance of the sites scientific interests. .	Yes – due to the proximity to the four proposed developments there is potential for the disturbance of the sites scientific interests.	Yes – due to the proximity to the four proposed developments there is potential for the disturbance of the sites scientific interests.	Yes
South Dublin Bay pNHA (000210)	National	Yes – due to the potential for indirect impacts due to a degradation of water quality impacts.	Yes – due to the potential for indirect impacts due to a degradation of water quality impacts.	Yes – due to the potential for indirect impacts due to a degradation of water quality impacts.	Yes – due to the potential for indirect impacts due to a degradation of water quality impacts.	Yes
Habitats and Flora						
Buildings and artificial surfaces (BL3)	Local Importance (Lower Value)	Yes – All existing buildings (within the Poolbeg BESS site) and artificial surfaces will be removed to facilitate the proposed works.	Yes – All existing buildings (within the Poolbeg BESS site) and artificial surfaces will be removed to facilitate the proposed works.	Yes – All existing buildings (within the Poolbeg BESS site) and artificial surfaces will be removed to facilitate the proposed works.	Yes – All existing buildings (within the Poolbeg BESS site) and artificial surfaces will be to facilitate the proposed works	No

Habitats/Species	Ecological Value (as per NRA guideline)	Potential to occur within the Zol of Poolbeg FlexGen	Potential to occur within the Zol of Poolbeg BESS	Potential to occur within the Zol of Ringsend FlexGen	Potential to occur within the Zol of South Wall BESS	Key Ecological Receptors
Amenity grassland (GA2)	Local Importance (Lower Value)	No – There is no amenity grassland within the site.	Yes – There is potential that areas of amenity grassland will be cleared to facilitate the works.	Yes – There is potential that areas of amenity grassland will be cleared to facilitate the works.	No – There is no amenity grassland within the site.	No
Earth Bank (BL2)	Local Importance (Lower Value)	Yes – Earth Banks surround the site. These will be left in-situ.	No – There is no earth bank present within the site.	Yes – Earth Banks surround the site. These will be left in-situ.	Yes - Earth Banks surround the site. These will be left in-situ.	No
Fauna						
Bat species	Local Importance (High Value)	No - No suitable roosting or foraging habitat was identified within the footprint of the works.	No – No suitable roosting or foraging habitat was identified within the footprint of the works.	No – No suitable roosting or foraging habitat was identified within the footprint of the works	No - No suitable roosting or foraging habitat was identified within the footprint of the works	No
Wintering birds	International Importance	Yes – potential for disturbance of wintering species during construction and demolition works associated with the four proposed developments.	Yes – potential for disturbance of wintering species during construction and demolition works associated with the four proposed developments.	Yes – potential for disturbance of wintering species during construction and demolition works associated with the four proposed developments.	Yes – potential for disturbance of wintering species during construction and demolition works associated with the four proposed developments.	Yes
Breeding birds (tern population)	International Importance	Yes –potential for the disturbance of breeding terns.	Yes – potential for the disturbance of nesting breeding birds.	Yes – potential for the disturbance of nesting breeding birds.	Yes – potential for the disturbance of nesting breeding birds.	Yes

Habitats/Species	Ecological Value (as per NRA guideline)	Potential to occur within the Zol of Poolbeg FlexGen	Potential to occur within the Zol of Poolbeg BESS	Potential to occur within the Zol of Ringsend FlexGen	Potential to occur within the Zol of South Wall BESS	Key Ecological Receptors
Marine mammals	International Importance	No – concentrations of harbour porpoises, grey seal and harbour seal occur outside the Zol of the four proposed developments.	No – concentrations of harbour porpoises, grey seal and harbour seal occur outside the Zol of the four proposed developments.	No – concentrations of harbour porpoises, grey seal and harbour seal occur outside the Zol of the four proposed developments.	No – concentrations of harbour porpoises, grey seal and harbour seal occur outside the Zol of the four proposed developments.	No

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7.5 Do Nothing Scenario

In terms of the Do-Nothing scenario, there will be no changes to the existing site. The Poolbeg Generating Station will continue to operate under the existing IE Licence and will continue to comply with the conditions of the licence. Consequently, no impacts on biodiversity are assessed.

7.6 Impact Assessment

The assessment of impacts on biodiversity within the ZOI of the four proposed developments is discussed hereunder.

7.6.1 Poolbeg FlexGen Designated Sites

European sites

A Natura Impact Statement (NIS) prepared for the four proposed developments determined potential for adverse effects on site integrity on South Dublin Bay SAC, North Dublin Bay SAC, South Dublin Bay and River Tolka Estuary SPA and North Bull Island SPA, due to a degradation of water quality from the runoff of construction pollution and visual and noise disturbance to SCI species during the construction phases at the Poolbeg FlexGen site only. No effects from the other proposed development sites were determined. The NIS concluded that following the implementation of mitigation measures, the Poolbeg FlexGen development either alone or in combination with other plans and projects, would have no adverse effects on the integrity of the four European Sites, in view of the conservation objectives.

National Sites

North Dublin Bay pNHA, Dolphin Dublin Docks pNHA and South Dublin Bay pNHA occur within the same spatial extent as the above-mentioned European Sites and are designated for similar scientific interests. Due to the similar location of the pNHAs the same potential impacts identified for the European sites can be assumed for the pNHAs. Therefore, with the implementation of mitigation measures outlined in the NIS, no impacts to the pNHAs are anticipated.

7.6.2 Poolbeg FlexGen Construction Impacts

7.6.2.1 Flora

Habitat Damage/Loss

Habitats within the Poolbeg FlexGen site which will be removed to facilitate the construction works includes scrub, recolonising bare ground, and artificial surfaces. These habitats were identified as having local importance (lower value) and have negligible biodiversity value. As such, the loss of these habitats would not constitute a significant negative effect on biodiversity.

Habitat Degradation

Runoff of sediment and construction pollution

The construction works associated with the Poolbeg FlexGen development has the potential to result in accidental pollution events and the runoff of sediment if not appropriately managed, particularly in the event of heavy rainfall. There are no open drainage ditches or watercourses located within the Poolbeg FlexGen site. The Poolbeg FlexGen development is located approximately 20m north of Dublin Bay and 65m south of the River Liffey Estuary. There is no

existing surface water drainage system in place in the Poolbeg FlexGen site. There are some areas of vegetation around the boundaries of the site however vegetation does not surround the entirety of the site. Considering the proximity of the development site to the marine environment and the lack of impermeable boundaries surrounding the sites, the risk of the runoff of construction pollution and/or sediment cannot be ruled out.

A degradation of water quality would constitute a long-term, significant, negative effect on the receiving marine environment.

Dust

The Institute of Air Quality Management 'Guidance on the Assessment of dust from demolition and construction (Holman et al, 2014) prescribes potential dust emission risk classes to ecological receptors. The guidelines specify that receptor sensitivity is 'High' up to 20m from the source and reduces to 'Medium' at 50m from the source. Dust may also be generated from track-out due to heavy goods vehicle (HGV) movements from the site entrance. HGV movements are expected to peak during the early stages (civil and mechanical works) of the proposed construction works. For the FlexGen developments it is anticipated that at each FlexGen site up to approximately 46 HGV two-way traffic movement is expected. Referring to the guidelines, trackout at the Poolbeg FlexGen site was therefore established as 'Medium' 10-50 HDV (>3.5t) outward movements in any one day which equates to trackout occurring between 50-100m from the site boundaries. The spatial limit of dust impacts from the Poolbeg FlexGen developments is therefore determined as 100m from the site boundaries.

The only protected habitat which occurs within the spatial limits of dust effects is Mudflats and sandflats [1140] which is designated within the South Dublin Bay SAC. The mudflat/sandflat habitat comprises fine, muddy sediment, the deposition of dust within the habitat will not result in any change or impact to the habitat. There is no potential for dust to result in significant negative effects.

Protected and Invasive Plant Species

There are no previous records of protected or invasive plant species recorded within the boundary of the Poolbeg FlexGen proposed development site. There are, however, previous records of invasive plant species recorded in close proximity to the proposed development. There is potential for invasive species to be spread by construction traffic if not properly managed. The effects of introducing non-native invasive plant species during the construction works have the potential to negatively impact the receiving environment. However, considering the built nature of the proposed development site and lack of important ecological habitats within the site, the introduction of invasive species would result in a slight negative effect at a local geographic scale.

7.6.2.2 Fauna

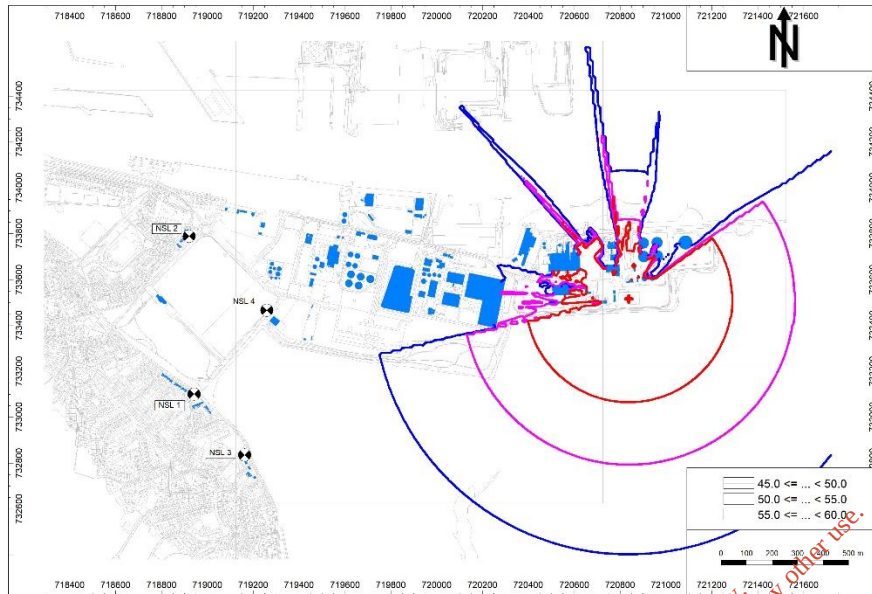
Wintering Birds

The construction works associated with the Poolbeg FlexGen development will result in an increase in noise. As noted in Chapter 11: Noise and Vibration, an assessment of the potential noise and vibration impacts and effects due to the construction, operation and decommissioning of the proposed Poolbeg FlexGen development was undertaken.

The worst-case construction phase noise levels of the development were predicted using a three-dimensional acoustic model and noise contour maps, depicting the spatial limits of noise were produced (refer to Figure 7.6 below). As shown in Figure 7.7, the noise contour map for the Poolbeg FlexGen development indicates that from the centre of the site to ca. 400m,

construction noise will range between 55-60 dB(A), at ca. 400-700m noise levels will range between 50-55 dB(A) and from ca. 700m - 1100m noise levels will range between 45-50 dB(A).

Figure 7.7: Construction Noise Contour Map - Poolbeg FlexGen



Source: Mott MacDonald

Cutts et al. (2013¹⁹) & Cutts et al. (2009²⁰) found that generally waterfowl species have been documented to habituate to regular noise levels below 70 dB(A). Wright et al. (2010²¹) investigated the effects of impulsive noise on shorebirds and reported that disturbance at levels above 65.5 dB(A) are more likely to result in behavioural response of some kind rather than no response. As a precautionary approach, a threshold figure of 60-70 dB(A) for disturbance of waterfowl species was used for this assessment.

Disturbance to Foraging Sites

Following a review of previous surveys and studies undertaken within Dublin Bay and results of the winter bird survey carried out by MKO, it was concluded that the most important foraging sites for protected waterfowl species within the study area include the compensatory grassland, the intertidal areas located to the south and east of Irishtown Nature Reserve, Shellybanks Beach, the water outflow at the north-side base of South Wall and the intertidal habitat located south-side of the South Wall.

Referring to the construction noise contour maps produced for the Poolbeg FlexGen site (refer to Figure 7.6 above), important foraging sites which occur within the noise level threshold range of 55-60 dB(A) include the intertidal habitat located to the east of the Irishtown Nature Reserve (ca. 80m south of the Poolbeg FlexGen development) and Shellybanks Beach (located ca. 90m

¹⁹ Cutts, N., Hemingway, K., Spencer, J., (2013). Waterbird Disturbance Mitigation Toolkit Informing Estuarine Planning and Construction Projects.

²⁰ Cutts, N., Phelps, A. & Burdon, D. (2009). Construction and waterfowl: defining sensitivity, response, impacts and guidance. Institute of Estuarine and Coastal Studies (IECS), University of Hull.

²¹ Wright, M., Goodman, P., Cameron, T., (2010). Exploring behavioural responses of shorebirds to impulsive noise.

east of the Poolbeg FlexGen development). Construction noise levels at all other important foraging sites are below 55 dB(A) and thus will not result in any disturbance.

The intertidal area located to the east of the Irishtown Nature Reserve and Shellybanks Beach are located within the ZOI of the Poolbeg FlexGen development. Both areas were identified as important sites for Special Conservation Interests (SCI) species by the survey undertaken by MKO. As outlined in section 7.3.2.7 nationally important numbers of black-headed gull and large flocks of redshank and dunlin were recorded using the Shellybanks Beach.

Numbers of birds using the intertidal sites within Dublin Bay were recorded to be highest at low tide when waders and water birds fed and roosted across the sandflats (Scott Cawley, 2019).

Thus, construction works undertaken at the site during winter, particularly at low tide, will result in a short-term disturbance of the wintering species from the important intertidal habitats. This would constitute a short-term negative effect on wintering bird species at an international geographical scale.

Disturbance to Roosting Sites

No important wintering bird roosting sites were recorded within 300m of the Poolbeg FlexGen development. There is no potential for disturbance, As noted, both common and Arctic tern breed on the ESB dolphin which is located approximately 300m north-west of the Poolbeg FlexGen development site. Referring to the noise contour map above, noise levels from the Poolbeg FlexGen development at the tern breeding site will range between 45- 50 dB(A). Considering the distance and low noise levels, there is no potential for the construction works to result in disturbance.

An active peregrine falcon nest is known to occur at the disused power station smokestacks at the Pigeon House. Breeding peregrine falcon use a foraging core range of 2km²². Considering the small area of habitat which will be lost and the availability of alternative hunting grounds, the loss of habitat is likely to have an imperceptible effect on the local peregrine population at local geographical scale. The nest occurs within the ZOI of noise disturbance of the proposed construction works. Studies indicate that peregrine falcon regularly nest within highly disturbed sites such as quarries and urban centres and become tolerant or habituate to human disturbance (Ruddock & Whitfield, 2007²³ and Kettle et al, 2019²⁴). Potential negative effects on the peregrine falcon nest are therefore considered unlikely.

Visual Disturbance

The use of construction lighting and the movement of machinery and site personnel across the site may result in visual disturbance to birds within proximity to the site, resulting in a short term significant negative effect on wintering and breeding bird species at local and international geographical scale.

²² SNH (2017) Recommended bird survey methods to inform impacts assessment of onshore wind farms. Version 2.

²³ Ruddock, M., Whitfield, D., A Review of Disturbance Distances in Selected Bird Species.

²⁴ Kettle, E.F., Gentle, L.K., Yarnell, R.W. Quinn, J., (2019). Breeding performance of an apex predator, the peregrine falcon, across urban and rural landscapes. Urban Ecosyst 22, 117–125 (2019).

7.6.3 Poolbeg FlexGen Operational Impacts

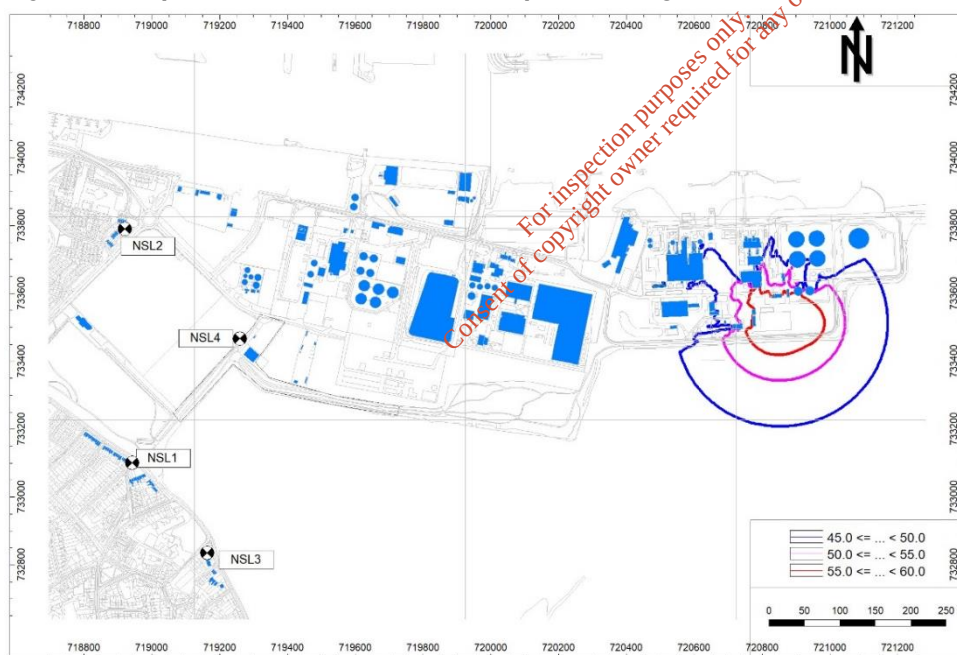
Noise and Visual Disturbance

The Poolbeg FlexGen development will operate as required by the demands placed on the grid and the generating capacity available at any time. During operation, the facility will generally be unmanned with weekly site inspections, meetings and maintenance works. Disturbance will be minor and will be limited to within the ESB facilities.

The Poolbeg FlexGen facilities will not be lit permanently as there is no requirement for the sites to be permanently occupied. Lighting will be provided to assist any night-time maintenance visits comprising lighting from the car park to the control room and other building entrances. External lighting will be automatic with motion sensors and timers to turn off.

The facility will generate noise during operation. The operational noise impacts of the facility were predicted using a three-dimensional acoustic model and noise contour mapping was produced and is shown in Figure 7.8 below. The noise contour map for the Poolbeg FlexGen indicates that that from the centre of the site to ca. 100m the construction noise will range between 55-60 dB(A), at ca. 100-200m from the site noise levels will range between 50-55 dB(A) and from ca. 200-350m noise levels will range between 45-50 dB(A). Thus, there is negligible potential for significance disturbance during the operation of the facility.

Figure 7.8: Operational Noise Contour Map – Poolbeg FlexGen



Source: Mott MacDonald

Pollution

Drainage

During the operational phase of the Poolbeg FlexGen site, surface water runoff will be generated from all surfaces within both facilities which are exposed to rainwater. This includes all hardstanding surfaces and other impermeable surfaces. The majority of site compound will be surfaced with permeable stone. Any surface water generated on permeable areas will

therefore infiltrate to ground and will be collected in an underground drainage network before passing through a Class 1 oil separator and into an attenuation tank where it will be discharged at calculated greenfield runoff rates. It will then connect to the existing ESB owned drainage network to the north of the site which ultimately discharges to Dublin Bay via the existing cooling water outfall. This emission will be regulated by the EPA under any revision of the existing IE licence (P0577-03 Poolbeg Generating Station).

The effects of drainage on biodiversity are considered to be negligible.

Air Quality

During the operation of the Poolbeg FlexGen facility combustion gases will be emitted through the flue stacks. The primary gases released will include; NO_x, SO₂ and CO. The proposed development will be licensed by the EPA under the industrial emissions licensing process. The licence will state the limits for atmospheric emissions that the proposed FlexGen facility will be required to comply with.

AWN Consulting undertook an air dispersion modelling of the proposed Poolbeg FlexGen facility using the United States Environmental Protection Agency's regulatory model AERMOD (Version 19191) and the findings of the assessment are outlined in Chapter 14 of this report. The dispersion model concluded that air quality impacts from the Poolbeg FlexGen on the designated sites and protected habitats within Dublin Bay are considered negligible.

The effects of released emissions during the operation of the facility on biodiversity is considered to be negligible.

Collision Risk

The design of the proposed turbine enclosure within the FlexGen development does not comprise any large windows or other reflective surfaces which may be associated with bird strikes on buildings. The proposed turbine also does not comprise any external moving parts or stabilising guy wires which could lead to any increased risk of collision. The elevation of the turbine module is not significantly higher than other buildings associated with the Poolbeg Generating Station which are located directly to the north of the FlexGen site; no regular commuting flyways between the foraging habitats on the intertidal area to the south of the Poolbeg peninsula and other roosting or foraging areas to the north of the site are expected to be impacted upon.

7.6.4 Poolbeg FlexGen Decommissioning

Should the Poolbeg FlexGen plant be decommissioned the equipment will be dismantled and removed from site and the site left as a level platform. A Decommissioning Management Plan (DMP) will be prepared in accordance with the IE licence (review).

Impacts during decommissioning are expected to be of a similar type and magnitude to those anticipated during construction but generally of a shorter duration.

7.6.5 Poolbeg FlexGen Mitigation

7.6.5.1 Construction Phase

Pollution Control

A suitably qualified Ecological Clerk of Works (ECoW) will be appointed by the appointed Contractor and will be required for the project on site during the construction works. The ECoW

will ensure that all mitigation measures outlined within this report are implemented correctly during the construction works.

All construction works will be carried out in accordance with the Outline Construction Environmental Management Plan (OCEMP) which will define measures to ensure that any contaminants resulting from the site preparation or construction will not enter the surface water.

All pollution control measures will be designed, installed, and maintained in accordance with CIRIA guidance for '*Environmental Good Practice on Site*' (C741) and '*Control of water pollution from linear construction projects. Technical guidance*' (C648).

Noise Disturbance

The appointed Contractors will be required to adhere to the codes of practice for construction work provided in British Standard BS 5228:2009+A1:2014 Part 1 and Part 2, and the guidance given therein, for minimising noise emissions from construction.

The appointed ECoW will liaise with the Contractor in relation to potential for significantly noisy works and will advise on when such works must be restricted.

To minimise disturbance, noise reducing hoarding should be erected around the southern and eastern perimeter of all four proposed development sites during the wintering season (September-April inclusive). Hoarding will also be erected along at the access points to reduce the visual disturbance of vehicles and machinery entering and leaving the site.

Vegetation Clearance

In accordance with Section 40 of the Wildlife Acts, the removal vegetation, which may be used as nesting sites by breeding birds, will be cleared outside of the birds nesting season (1st March to 31st August inclusive).

In the event that works within the bird nesting season cannot be avoided a derogation license will be sought from NPWS to facilitate the within the season, following a survey of the vegetation to establish the absence/presence of breeding nests. Where a nest is found, the clearance of vegetation can only occur once the chicks have fledged or where nesting has failed.

During the construction works, the appointed Contractor, in order to comply with Regulations 49 and 50 of the European Communities (Birds and Natural Habitat) Regulations (2011), will ensure biosecurity measures are implemented throughout the construction phase to ensure the introduction and translocation of invasive species is prevented.

7.6.5.2 Operation Phase

Operational impacts on Biodiversity were deemed Negligible. There is no requirement for mitigation measures.

7.6.6 Poolbeg BESS Designated Sites

European sites

The NIS identified source-pathway-receptor links between the Poolbeg BESS development and four European sites; South Dublin Bay SAC, North Dublin Bay SAC, South Dublin Bay and River Tolka Estuary SPA and North Bull Island SPA, due to the potential for construction pollution runoff and visual and noise disturbance during the construction phases. The NIS concludes that following the implementation of mitigation measures, the Poolbeg BESS development either alone or in combination with other plans and projects, would have no

adverse effects on the site's integrity of the four European Sites, in view of their site's conservation objectives.

National Sites

Source-pathway-receptor links were identified between the Poolbeg BESS development and North Dublin Bay pNHA, Dolphin Dublin Docks pNHA and South Dublin Bay pNHA. All pNHA sites occurs within the same spatial extent as the above-mentioned European Sites and are designated for similar scientific interests. Due to the similar location of the pNHA's the same potential impacts identified for the European sites can be assumed for the pNHA's. Therefore, with the implementation of mitigation measures outlined in the NIS, no impacts to the pNHAs's are anticipated.

7.6.7 Poolbeg BESS Construction Impacts

7.6.7.1 Flora

Habitat Damage/Loss

Habitats within the Poolbeg BESS site which will be removed to facilitate the construction works includes building, artificial surfaces and areas of amenity grassland. These habitats were identified as having local importance (lower value) and have negligible biodiversity value. As such, the loss of these habitats would not constitute a significant negative effect on biodiversity.

Habitat Degradation

Runoff of sediment and construction pollution

The construction works associated with the Poolbeg BESS development has the potential to result in accidental pollution events and the runoff of sediment if not appropriately managed, particularly in the event of heavy rainfall.

There are no open drainage ditches or watercourses located within the Poolbeg BESS site. The Poolbeg BESS development is located approximately 20m north of Dublin Bay and 40m south of the River Liffey Estuary. The Poolbeg BESS has an existing surface water drainage system located within the site. The drainage system is likely to have a treatment system in place such as oil separator etc. but will not be able to treat the runoff of sediment and/or concrete. There are some areas of vegetation around the boundaries of the site however vegetation does not surround the entirety of the site. Considering the proximity of the development site to the marine environment and the lack of impermeable boundaries surrounding the sites, the risk of the runoff of construction pollution and/or sediment cannot be ruled out.

A degradation of water quality would constitute a long-term, significant, negative effect on the receiving marine environment.

Dust

The Institute of Air Quality Management 'Guidance on the Assessment of dust from demolition and construction (Holman et al, 2014) prescribes potential dust emission risk classes to ecological receptors. The guidelines specify that receptor sensitivity is 'High' up to 20m from the source and reduces to 'Medium' at 50m from the source. Dust may also be generated from track-out due to heavy goods vehicle (HGV) movements from the site entrance. HGV movements are expected to peak during the early stages (civil and mechanical works) of the proposed construction works. For the BESS developments, during the construction works it is estimated that there will be up to approximately 30 HGV two-way traffic movements per day

during peak construction stages. Referring to the guidelines, trackout from the two sites was therefore established as 'Medium' 10-50 HDV (>3.5t) outward movements in any one day which equates to trackout occurring up to 50-100m from each of the four site boundaries. The spatial limit of dust impacts from the two BESS developments was therefore determined as 100m from the site boundaries.

The only protected habitat which occurs within the spatial limits of dust effects is Mudflats and sandflats [1140] which is designated within the South Dublin Bay SAC. The mudflat/sandflat habitat comprises fine, muddy sediment, the deposition of dust within the habitat will not result in any change or impact to the habitat. There is no potential for dust to result in significant negative effects.

Protected and Invasive Plant Species

There are no previous records of protected or invasive plant species recorded within the boundary of the Poolbeg BESS proposed development site. There are, however, previous records of invasive plant species recorded in close proximity to the proposed development. There is potential for invasive species to be spread by construction traffic if not properly managed. The effects of introducing non-native invasive plant species during the construction works have the potential to negatively impact the receiving environment. However, considering the built nature of the proposed development site and lack of important ecological habitats within the site, the introduction of invasive species would result in a slight negative effect at a local geographic scale.

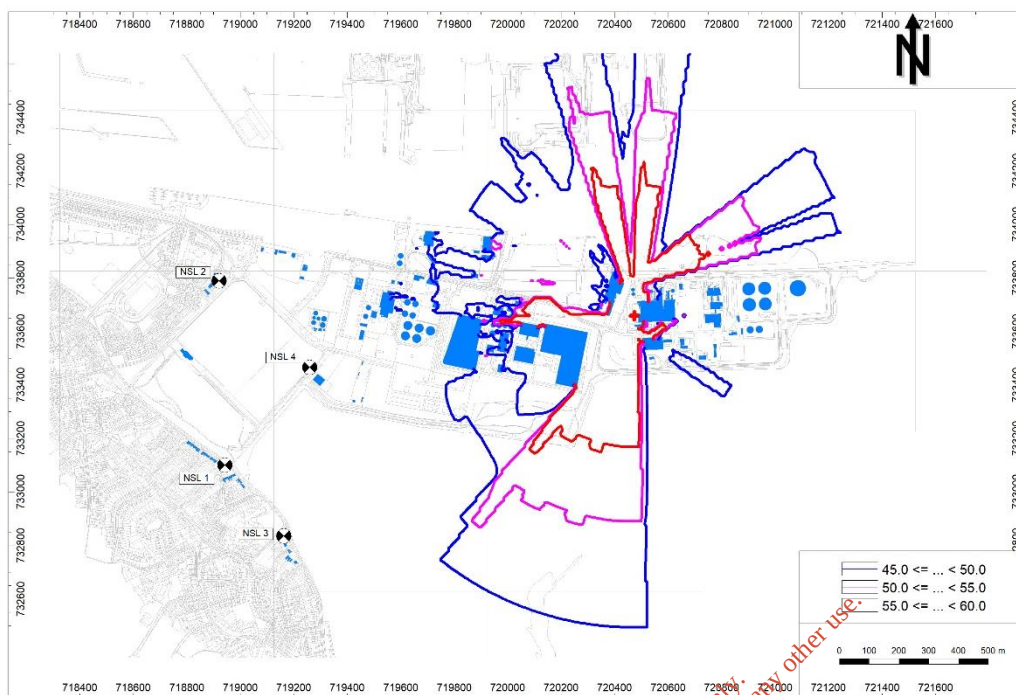
7.6.7.2 Fauna

Wintering Birds

The construction works associated with the Poolbeg BESS development will result in an increase in noise. As noted in Chapter 11: Noise and Vibration, an assessment of the potential noise and vibration impacts and effects due to the construction, operation and decommissioning of the proposed Poolbeg BESS development was undertaken.

The worst-case construction phase noise levels of the development were predicted using a three-dimensional acoustic model and noise contour maps, depicting the spatial limits of noise were produced (refer to Figure 7.9 below). As shown, the noise contour map for the Poolbeg BESS development indicates that from the centre of the site to ca. 400m, the construction noise will range between 55-60 dB(A), at ca. 400-800m from the site noise levels will range between 50-55 dB(A) and from ca. 800-1100m noise levels will range between 45-50 dB(A) as shown In Figure 7.9 below.

Figure 7.9: Construction Noise Contour Map – Poolbeg BESS



Source: Mott MacDonald

Cutts et al. (2013²⁵) & Cutts et al. (2009²⁶) found that generally waterfowl species have been documented to habituate to regular noise levels below 70 dB(A). Wright et al. (2010²⁷) investigated the effects of impulsive noise on shorebirds and reported that disturbance at levels above 65.5 dB(A) are more likely to result in behavioural response of some kind rather than no response. As a precautionary approach, a threshold figure of 60-70 dB(A) for disturbance of waterfowl species was used for this assessment.

Disturbance to Foraging Sites

A review of previous surveys and studies undertaken within Dublin Bay and results of the winter bird survey carried out by MKO, it was concluded that the most important foraging sites for protected waterfowl species within the study area include the compensatory grassland, the intertidal areas located to the south and east of Irishtown Nature Reserve, Shellybanks Beach, the water outflow at the north-side base of South Wall and the intertidal habitat located south-side of the South Wall.

Referring to the construction noise contour maps produced for the Poolbeg BESS site (refer to Figure 7.8 above), the only important foraging site which occurs within the noise level threshold range of 55-60 dB(A) is the intertidal area located to the east of the Irishtown Nature Reserve (ca. 80m south of the Poolbeg BESS development). Construction noise levels at all other important foraging sites are below 55 dB(A) and thus will not result in any disturbance.

²⁵ Cutts, N., Hemingway, K., Spencer, J., (2013). Waterbird Disturbance Mitigation Toolkit Informing Estuarine Planning and Construction Projects.

²⁶ Cutts, N., Phelps, A. & Burdon, D. (2009). Construction and waterfowl: defining sensitivity, response, impacts and guidance. Institute of Estuarine and Coastal Studies (IECS), University of Hull

²⁷ Wright, M., Goodman, P., Cameron, T., (2010). Exploring behavioural responses of shorebirds to impulsive noise.

The intertidal area located to the east of the Irishtown Nature Reserve are located within the ZoI of the Poolbeg BESS development. Numbers of birds using the intertidal sites within Dublin Bay were recorded to be highest at low tide when waders and waterbirds fed and roosted across the sandflats (Scott Cawley, 2019). Thus, construction works undertaken at the site during winter, particularly at low tide, will result in a short-term disturbance of the wintering species from the important intertidal habitats. Disturbance from the foraging sites would constitute a short term significant negative effect on wintering bird species at an international geographical scale.

Disturbance to Roosting Sites

No important wintering bird roosting sites were recorded within 300m of the Poolbeg BESS development. There is no potential for disturbance, As noted, both common and Artic tern breed on the ESB dolphin which is located approximately 140m north of the Poolbeg Peninsula (NPWS, 2015b). Referring to the construction noise contour maps, the Poolbeg BESS development will result in elevated noise levels within the range of 55-60 dB(A) in proximity to the ESB dolphin site.

Trial measurements carried out in June 2015 noted that the tern colony itself generates noise up to 70 to 80 dB(A) through the continuous calling of over 1,000 terns during the breeding season (Natura Environmental Consultants, 2018). The noise levels generated by the tern colonies exceeds the construction noise levels produced at the Poolbeg BESS development. Nisbet (2000) noted that there is no substantial evidence in the scientific literature that human disturbance affects reproductive success or colony site occupation among terns. Similarly, studies undertaken by Syrová et al (2020) noted terns breeding within human settlement returned to their nests more quickly than those breeding within a pristine environment due to habituation of disturbance, and that terns are able to adapt their incubation behaviour to different disturbance levels to meet the optimal incubation performance and to overcome disturbances that may affect the survival of the clutch.

Background noise levels within the Poolbeg Peninsula are already elevated due to the existing industrial sites. The roosting terns are likely to already be habituated to disturbance within the area. In addition, the construction works will be screened from the ESB Dolphin by existing buildings and structures located to the north of the Project. Considering the tolerance and habituation of the breeding tern species to disturbance and the low levels of noise from the Poolbeg BESS which are expected at the nesting site, the construction works proposed at the Poolbeg BESS development will not result in the disturbance of the designated species.

An active peregrine falcon nest is known to occur at the disused power station smokestacks at the Pigeon House. The stacks are located ca.120m from the Poolbeg BESS site. Breeding peregrine falcon use a foraging core range of 2km²⁸. Considering the small area of habitat which will be lost and the availability of alternative hunting grounds, the loss of habitat is likely to have an imperceptible effect on the local peregrine population at local geographical scale. The nest occurs within the ZoI of noise disturbance of the proposed construction works. Studies however indicate that peregrine falcon regularly nest within highly disturbed sites such as quarries and urban centres and become tolerant or habituate to human disturbance (Ruddock & Whitfield,

²⁸ SNH (2017) Recommended bird survey methods to inform impacts assessment of onshore wind farms. Version 2.

2007²⁹ and Kettle et al, 2019³⁰). Potential negative effects on the peregrine falcon nest are therefore considered unlikely.

Visual Disturbance

The use of construction lighting and the movement of machinery and site personnel across the site may result in visual disturbance to birds within proximity to the site, resulting in a short term significant negative effect on wintering and breeding bird species at local and international geographical scale.

7.6.8 Poolbeg BESS Operational Phase

Noise and Visual Disturbance

The Poolbeg BESS development will operate over a 24 hours period and can be operated remotely. The facilities will however require regular maintenance and site inspection visits. Disturbance will be minor and will be limited to within the ESB facilities.

The Poolbeg BESS facilities will not be lit permanently as there is no requirement for the site to be permanently occupied. Lighting will be provided to assist any night-time maintenance visits comprising lighting from the car park to the control room and other building entrances. External lighting will be automatic with motion sensors and timers to turn off.

The facility will generate noise during operation. The operational noise impacts of the facility were predicted using a three-dimensional acoustic model and noise contour mapping was produced and is shown in Figure 7.10 below. The noise contour map for the Poolbeg BESS indicates that that from the centre of the site to ca. 100m, the construction noise will range between 55-60 dB(A), at ca. 100-200m from the site noise levels will range between 50-55 dB(A) and from ca. 200-350m noise levels will range between 45-50 dB(A) as shown in Figure 4.8 below. Thus, there is no potential for disturbance during the operation of the facility.

²⁹ Ruddock, M., Whitfield, D., A Review of Disturbance Distances in Selected Bird Species.

³⁰ Kettel, E.F., Gentle, L.K., Yarnell, R.W. Quinn, J., (2019). Breeding performance of an apex predator, the peregrine falcon, across urban and rural landscapes. Urban Ecosyst 22, 117–125 (2019).

Figure 7.10: Operational Noise Contour Map – Poolbeg BESS



Source: Mott MacDonald

Pollution

Drainage

During the operational phase of the Poolbeg BESS site, surface water runoff will be generated from all surfaces within both facilities which are exposed to rainwater. This includes all hardstanding surfaces and other impermeable surfaces. The majority of site compound will be surfaced with permeable stone. Any surface water generated on permeable areas will therefore infiltrate to ground and will be collected in an underground drainage network before passing through a Class 1 oil separator and into an attenuation tank where it will be discharged at calculated greenfield runoff rates. It will then connect to the existing ESB owned drainage network to the north of the site which ultimately discharges to Dublin Bay via the existing cooling water outfall. The effects of drainage on biodiversity are considered to be negligible.

Air Quality

The BESS facilities will not result in any air emissions during operation. There is no potential for air quality impacts.

7.6.9 Poolbeg BESS Decommissioning

Should the Poolbeg BESS plant be decommissioned the equipment will be dismantled and removed from site and the site left as a level platform. Impacts during decommissioning are expected to be of a similar type and magnitude to those anticipated during construction but generally of a shorter duration.

7.6.10 Poolbeg BESS Mitigation

7.6.10.1 Construction Phase

Pollution Control

A suitably qualified Ecological Clerk of Works (ECoW) will be appointed by the Contractor and will be required for the project on site during the construction works. The ECoW will ensure that all mitigation measures outlined within this report are implemented correctly during the construction works.

All construction works will be carried out in accordance with the Outline Construction Environmental Management Plan (OCEMP) provided in Appendix 5C which will define measures to ensure that any contaminants resulting from the site preparation or construction will not enter the surface water. No Additional mitigation measures are required.

All pollution control measures will be designed, installed, and maintained in accordance with CIRIA guidance for '*Environmental Good Practice on Site*' (C741) and '*Control of water pollution from linear construction projects. Technical guidance*' (C648).

Noise Disturbance

The appointed Contractors will be required to adhere to the codes of practice for construction work provided in British Standard BS 5228:2009+A1:2014 Part 1 and Part 2, and the guidance given therein, for minimising noise emissions from construction.

The appointed ECoW will liaise with the Contractor in relation to potential for significantly noisy works and will advise on when such works must be restricted.

To minimise disturbance, noise reducing hoarding should be erected around the southern and eastern perimeter of all four proposed development sites during the wintering season (September-April inclusive). Hoarding will also be erected at the secondary access point to reduce visual disturbance of vehicles and machinery entering and leaving the site.

Vegetation Clearance

In accordance with Section 40 of the Wildlife Acts, the removal vegetation, which may be used as nesting sites by breeding birds, will be cleared outside of the birds nesting season (1st March to 31st August inclusive).

In the event that works within the bird nesting season cannot be avoided a derogation license will be sought from NPWS to facilitate the within the season, following a survey of the vegetation to establish the absence/presence of breeding nests. Where a nest is found, the clearance of vegetation can only occur once the chicks have fledged or where nesting has failed.

During the construction works, the appointed Contractor, in order to comply with Regulations 49 and 50 of the European Communities (Birds and Natural Habitat) Regulations (2011), will ensure biosecurity measures are implemented throughout the construction phase to ensure the introduction and translocation of invasive species is prevented.

7.6.10.2 Operation Phase

Operational impacts on Biodiversity were deemed Negligible. There is no requirement for mitigation measures.

7.6.11 Ringsend FlexGen Designated Sites

The NIS identified source-pathway-receptor links between the Ringsend FlexGen development and four European sites; South Dublin Bay SAC, North Dublin Bay SAC, South Dublin Bay and River Tolka Estuary SPA and North Bull Island SPA, due to the potential for construction pollution runoff and visual and noise disturbance during the construction phases. The NIS concludes that following implementation of mitigation measures, the Ringsend FlexGen development either alone or in combination with other plans and projects, would have no adverse effects on the site's integrity of the four European Sites, in view of their site's conservation objectives.

National Sites

Source-pathway-receptor links were identified between the Ringsend FlexGen development and North Dublin Bay pNHA, Dolphin Dublin Docks pNHA and South Dublin Bay pNHA. All pNHA sites occurs within the same spatial extent as the above-mentioned European Sites and are designated for similar scientific interests. Due to the similar location of the pNHAs the same potential impacts identified for the European sites can be assumed for the pNHAs. Therefore, with the implementation of mitigation measures outlined in the NIS, no impacts to the pNHAs are anticipated.

7.6.12 Ringsend FlexGen Construction Impacts

7.6.12.1 Flora

Habitat Damage/Loss

Habitats within the Poolbeg FlexGen site which will be removed to facilitate the construction works includes scrub, recolonising bare ground, and artificial surfaces. These habitats were identified as having local importance (low value) and have negligible biodiversity value. As such, the loss of these habitats would not constitute a significant negative effect on biodiversity.

Habitat Degradation

Runoff of sediment and construction pollution

The construction works associated with the Ringsend FlexGen development has the potential to result in accidental pollution events and the runoff of sediment if not appropriately managed, particularly in the event of heavy rainfall.

There are no open drainage ditches or watercourses located within the Ringsend FlexGen site. The Ringsend FlexGen development is located 120m north of Dublin Bay and 130m south of the River Liffey Estuary. There is no existing surface water drainage system in place in the Ringsend FlexGen sites. There are some areas of vegetation around the boundaries of the site however vegetation does not surround the entirety of the site. Considering the proximity of the development site to the marine environment and the lack of impermeable boundaries surrounding the sites, the risk of the runoff of construction pollution and/or sediment cannot be ruled out.

A degradation of water quality would constitute a long-term, significant, negative effect on the receiving marine environment.

Dust

The Institute of Air Quality Management 'Guidance on the Assessment of dust from demolition and construction (Holman et al, 2014) prescribes potential dust emission risk classes to

ecological receptors. The guidelines specify that receptor sensitivity is 'High' up to 20m from the source and reduces to 'Medium' at 50m from the source. Dust may also be generated from track-out due to heavy goods vehicle (HGV) movements from the site entrance. HGV movements are expected to peak during the early stages (civil and mechanical works) of the proposed construction works. For the FlexGen developments it is anticipated that at each FlexGen site up to approximately 46 HGV two-way traffic movement is expected. Referring to the guidelines, trackout at the Poolbeg FlexGen site was therefore established as 'Medium' 10-50 HDV (>3.5t) outward movements in any one day which equates to trackout occurring between 50-100m from the site boundaries. The spatial limit of dust impacts from the Poolbeg FlexGen developments is therefore determined as 100m from the site boundaries.

The only protected habitat which occurs within the spatial limits of dust effects is Mudflats and sandflats [1140] which is designated within the South Dublin Bay SAC. The mudflat/sandflat habitat comprises fine, muddy sediment, the deposition of dust within the habitat will not result in any change or impact to the habitat. There is no potential for dust to result in significant negative effects.

Protected and Invasive Plant Species

There are no previous records of protected or invasive plant species recorded within the boundary of the Ringsend FlexGen proposed development site. There are, however, previous records of invasive plant species recorded in close proximity to the proposed development. There is potential for invasive species to be spread by construction traffic if not properly managed. The effects of introducing non-native invasive plant species during the construction works have the potential to negatively impact the receiving environment. However, considering the built nature of the proposed development site and lack of important ecological habitats within the site, the introduction of invasive species would result in a slight negative effect at a local geographic scale.

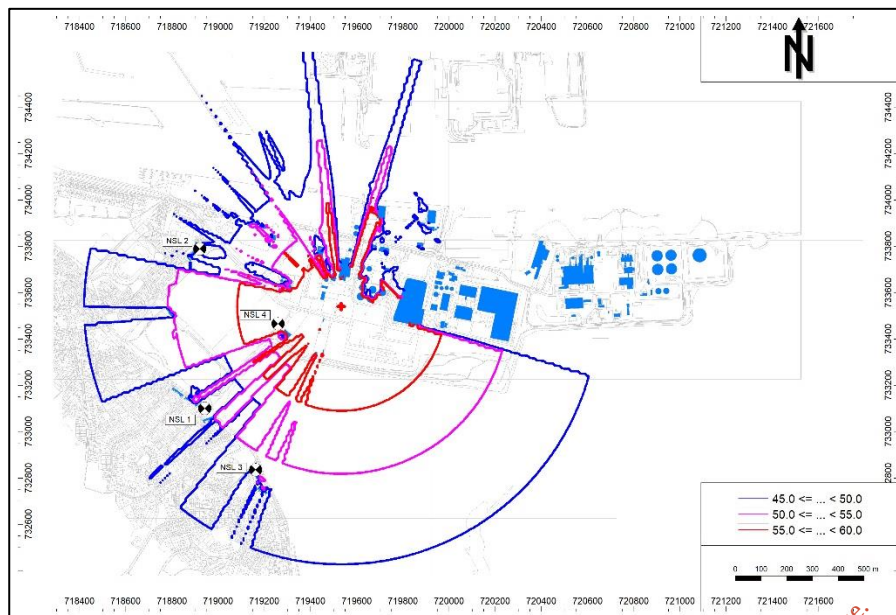
7.6.12.2 Fauna

Wintering Birds

The construction works associated with the Ringsend FlexGen development will result in an increase in noise. As noted in Chapter 11: Noise and Vibration, an assessment of the potential noise and vibration impacts and effects due to the construction, operation and decommissioning of the proposed Ringsend FlexGen development was undertaken.

The worst-case construction phase noise levels of the development were predicted using a three-dimensional acoustic model and noise contour maps, depicting the spatial limits of noise were produced (refer to Figure 7.11 below). As shown, the noise contour map for the Ringsend FlexGen indicates that from the centre of the site to ca. 400m, construction noise levels will range between 55-60 dB(A), at ca. 400-700m from the centre of the construction noise levels will range between 50-55 dB(A) and from ca. 700m - 1000m from the construction noise levels will range between 45-50 dB(A) as shown in Figure 7.11 below.

Figure 7.11: Construction Noise Contour Map - Ringsend FlexGen



Source: Mott MacDonald

Cutts et al. (2013³¹) & Cutts et al. (2009³²) found that generally waterfowl species have been documented to habituate to regular noise levels below 70 dB(A). Wright et al. (2010³³) investigated the effects of impulsive noise on shorebirds and reported that disturbance at levels above 65.5 dB(A) are more likely to result in behavioural response of some kind rather than no response. As a precautionary approach, a threshold figure of 60-70 dB(A) for disturbance of waterfowl species was used for this assessment.

Disturbance to Foraging Sites

A review of previous surveys and studies undertaken within Dublin Bay and results of the winter bird survey carried out by MKO, it was concluded that the most important foraging sites for protected waterfowl species within the study area include the compensatory grassland, the intertidal areas located to the south and east of Irishtown Nature Reserve, Shellybanks Beach, the water outflow at the north-side base of South Wall and the intertidal habitat located south-side of the South Wall.

Referring to the construction noise contour maps produced for the Ringsend FlexGen site, the important foraging sites which occur within the noise level threshold range of 55-60 dB(A) include the intertidal habitat located to the south of the Irishtown Nature Reserve (ca.160m south of the Ringsend FlexGen development) and the compensatory grassland. Construction noise levels at all other identified important foraging sites are below 55 dB(A) and thus will not result in any disturbance. The intertidal areas located to the south of the Irishtown Nature

³² Cutts, N., Phelps, A. & Burdon, D. (2009). Construction and waterfowl: defining sensitivity, response, impacts and guidance. Institute of Estuarine and Coastal Studies (IECS), University of Hull

³³ Wright, M., Goodman, P., Cameron, T., (2010). Exploring behavioural responses of shorebirds to impulsive noise.

Reserve is located within the ZoI of the Poolbeg FlexGen development. 7.3.2.7, a flock of light-bellied Brent geese were recorded using the compensatory grassland during the survey.

The compensatory grassland is one of a number of important foraging sites for Light-bellied Brent geese in Dublin Bay. Past surveys (Tierney et al, 2017 & Mayes, 2015) found that Brent geese, on arrival to Dublin Bay, feed exclusively on sea grass *Zostera spp.* in intertidal areas (an important area of *Zostera spp.* occurs at Merrion Gate located outside the ZoI of disturbance) only moving to terrestrial grassland habitats as winter progress (late November – December) once sea grass levels have depleted. Scott Cawley (2019) found that the Brent geese tended to use Sean Moore Park (located outside the ZoI of disturbance) in the morning as the geese came off roost sites, and then appeared to use the compensatory grasslands at pre-roost times before moving to roost sites at Sandymount.

Background noise levels within the Poolbeg Peninsula are already elevated due to the existing industrial sites, however Brent geese are highly sensitive to noise disturbance (Cutts et al., 2013), excessively noisy works and impulsive noises are likely to result in disturbance to the species. Very noisy works undertaken at the Ringsend FlexGen site, in mid-winter and during pre-roosts times will result in short-term disturbance of the Brent geese from one of their important foraging sites. Other wintering species have also been recorded using the compensatory grassland including; oystercatcher, black-tailed godwit, curlew, redshank and black-headed gull, albeit in numbers significantly below any national or international importance thresholds (Maye, 2015). There is also potential for the disturbance of these species.

The intertidal areas located south of the Irishtown Nature Reserve is located within the ZoI of noise of the Ringsend FlexGen development. Numbers of birds using the intertidal sites within Dublin Bay were recorded to be highest at low tide when waders and waterbirds fed and roosted across the sandflats (Scott Cawley, 2019). Thus, construction works undertaken at the site during winter, particularly at low tide, will result in a short-term disturbance of the wintering species from the important intertidal habitats. Disturbance from the foraging sites would constitute a short term significant negative effect on wintering bird species at an international geographical scale.

Disturbance to Roosting Sites

No important wintering bird roosting sites were recorded within 300m of the Ringsend FlexGen development. There is no potential for disturbance, As noted, both common and Artic tern breed on the ESB dolphin which is located approximately 700m north-west of the Ringsend FlexGen development site. Referring to the noise contour map above, noise levels from the Ringsend FlexGen development will not result in an increase to existing noise levels at the nesting site.

An active peregrine falcon nest is known to occur within a radius of 3km from the proposed development. The nest occurs within the ZoI of noise disturbance of the proposed construction works. Studies indicate that peregrine falcon regularly nest within highly disturbed sites such as quarries and urban centres and become tolerant or habituate to human disturbance (Ruddock & Whitfield, 2007³⁴ and Kettle et al, 2019³⁵). Potential negative effects on the peregrine falcon nest are therefore considered unlikely.

Visual Disturbance

³⁴ Ruddock, M., Whitfield, D., A Review of Disturbance Distances in Selected Bird Species.

³⁵ Kettel, E.F., Gentle, L.K., Yarnell, R.W. Quinn, J., (2019). Breeding performance of an apex predator, the peregrine falcon, across urban and rural landscapes. Urban Ecosyst 22, 117–125 (2019).

The use of construction lighting and the movement of machinery and site personnel across the site may result in visual disturbance to birds within proximity to the site, resulting in a short term significant negative effect on wintering and breeding bird species at local and international geographical scale.

7.6.13 Ringsend FlexGen Operational Impacts

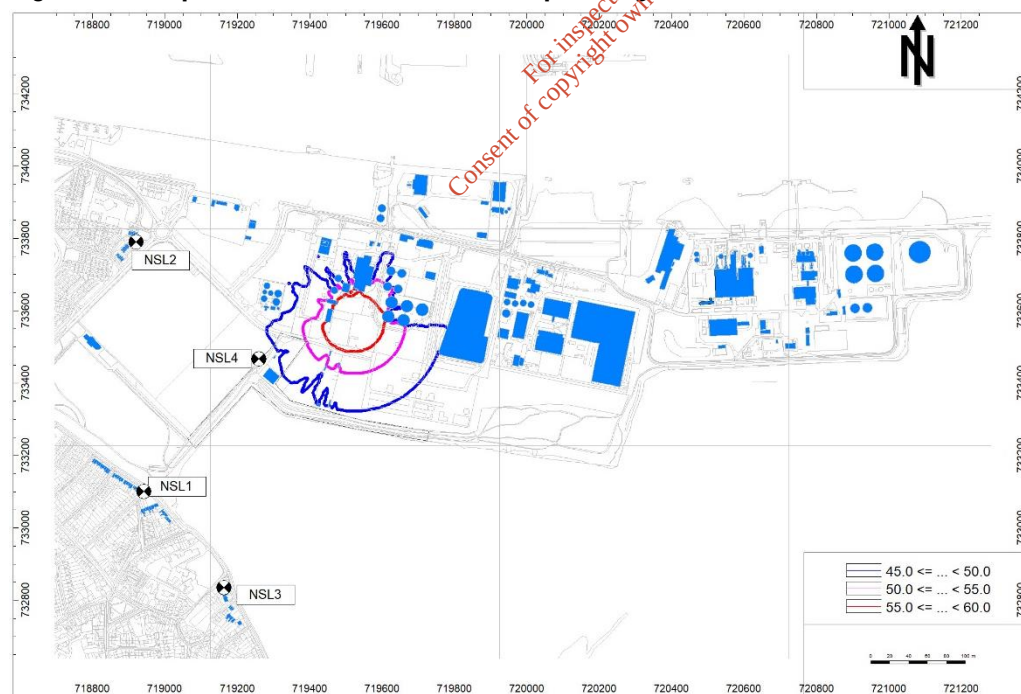
Noise and Visual Disturbance

The Ringsend FlexGen development will operate as required by the demands placed on the grid and the generating capacity available at any time. During operation, the facility will generally be unmanned with weekly site inspections, meetings and maintenance works. Disturbance will be minor and will be limited to within the ESB facilities.

The Ringsend FlexGen facility will not be lit permanently as there is no requirement for the sites to be permanently occupied. Lighting will be provided to assist any night-time maintenance visits comprising lighting from the car park to the control room and other building entrances. External lighting will be automatic with motion sensors and timers to turn off.

The facility will generate noise during operation. The operational noise impacts of the facility were predicted using a three-dimensional acoustic model and noise contour mapping was produced and is shown in Figure 7.12 below. The noise contour map for the Ringsend FlexGen indicates that that from the centre of the site to ca. 100m the construction noise will range between 55-60 dB(A), at ca. 100-150m from the site noise levels will range between 50-55 dB(A) and from ca. 150-250m noise levels will range between 45-50 dB(A) as shown in Figure 7.12 below. Thus, there is no potential for disturbance during the operation of the facility.

Figure 7.12: Operational Noise Contour Map – Ringsend FlexGen



Source: Mott MacDonald

Pollution

Drainage

During the operational phase of the Ringsend FlexGen site, surface water runoff will be generated from all surfaces within both facilities which are exposed to rainwater. This includes all hardstanding surfaces and other impermeable surfaces. The majority of site compound will be surfaced with permeable stone. Any surface water generated on permeable areas will therefore infiltrate to ground and will be collected in an underground drainage network before passing through a Class 1 oil separator and into an attenuation tank where it will be discharged at calculated greenfield runoff rates. It will then connect to the existing public drainage network to the north of the site which ultimately discharges to Dublin Bay.

The effects of drainage on biodiversity are considered to be negligible.

Air Quality

During the operation of the Ringsend FlexGen facility combustion gases will be emitted through the flue stacks. The primary gases released will include; NO_x, SO₂ and CO. The proposed development will be licensed by the EPA under the industrial emissions licensing process. The licence will state the limits for atmospheric emissions that the proposed FlexGen facility will be required to comply with.

AWN Consulting undertook an air dispersion modelling of the proposed Ringsend FlexGen facility using the United States Environmental Protection Agency's regulatory model AERMOD (Version 19191) and the findings of the assessment are outlined in Chapter 14 of this report. The dispersion model concluded that air quality impacts from the Ringsend FlexGen on the designated sites and protected habitats within Dublin Bay are considered negligible.

The effects of released emissions during the operation of the facility on biodiversity is considered to be negligible.

Collision Risk

The design of the proposed turbine enclosure within the FlexGen development does not comprise any large windows or other reflective surfaces which may be associated with bird strikes on buildings. The proposed turbine also does not comprise any external moving parts or stabilising guy wires which could lead to any increased risk of collision. The elevation of the turbine module is not significantly higher than other buildings associated with the Poolbeg Generating Station which are located approximately 750m north-east of the site; no regular commuting flyways between the foraging habitats on the intertidal area to the south of the Poolbeg peninsula and other roosting or foraging areas to the north of the site are expected to be impacted upon.

7.6.14 Ringsend FlexGen Decommissioning

Should the Ringsend FlexGen plant be decommissioned the equipment will be dismantled and removed from site and the site left as a level platform. A Decommissioning Management Plan (DMP) will be prepared in accordance with the IE licence. Impacts during decommissioning are expected to be of a similar type and magnitude to those anticipated during construction but generally of a shorter duration.

7.6.15 Ringsend FlexGen Mitigation

7.6.15.1 Construction Phase

Pollution Control

A suitably qualified Ecological Clerk of Works (ECoW) will be appointed by the Contractor and will be required on site during the construction works. The ECoW will ensure that all mitigation measures outlined within this report are implemented correctly during the construction works.

All construction works will be carried out in accordance with the Outline Construction Environmental Management Plan (OCEMP) provided in Appendix 5C which will define measures to ensure that any contaminants resulting from the site preparation or construction will not enter the surface water. No Additional mitigation measures are required.

All pollution control measures will be designed, installed, and maintained in accordance with CIRIA guidance for '*Environmental Good Practice on Site*' (C741) and '*Control of water pollution from linear construction projects. Technical guidance*' (C648).

Noise Disturbance

The appointed Contractors will be required to adhere to the codes of practice for construction work provided in British Standard BS 5228:2009+A1:2014 Part 1 and Part 2, and the guidance given therein, for minimising noise emissions from construction.

The appointed ECoW will liaise with the Contractor in relation to potential for significantly noisy works and will advise on when such works must be restricted, particularly (but not limited to), in relation to the light-bellied Brent geese which utilise the Compensatory Grassland.

To minimise disturbance, noise reducing hoarding should be erected around the southern and eastern perimeter of all four proposed development sites during the wintering season (September-April inclusive). Hoarding will also be erected at the site access point located on Southbank Road to reduce the visual disturbance of vehicles and machinery entering and leaving the site.

Vegetation Clearance

In accordance with Section 40 of the Wildlife Acts, the removal vegetation, which may be used as nesting sites by breeding birds, will be cleared outside of the birds nesting season (1st March to 31st August inclusive).

In the event that works within the bird nesting season cannot be avoided a derogation license will be sought from NPWS to facilitate the within the season, following a survey of the vegetation to establish the absence/presence of breeding nests. Where a nest is found, the clearance of vegetation can only occur once the chicks have fledged or where nesting has failed.

During the construction works, the appointed Contractor, in order to comply with Regulations 49 and 50 of the European Communities (Birds and Natural Habitat) Regulations (2011), will ensure biosecurity measures are implemented throughout the construction phase to ensure the introduction and translocation of invasive species is prevented.

7.6.15.2 Operation Phase

Operational impacts on Biodiversity were deemed Negligible. There is no requirement for mitigation measures.

7.6.16 South Wall BESS Designated Sites

European sites

The NIS identified source-pathway-receptor links between the South Wall BESS development and four European sites; South Dublin Bay SAC, North Dublin Bay SAC, South Dublin Bay and River Tolka Estuary SPA and North Bull Island SPA, due to the potential for construction pollution runoff and visual and noise disturbance during the construction phases. The NIS concludes that following implementation of the mitigation measures, the South Wall BESS development either alone or in combination with other plans and projects, would have no adverse effects on the site's integrity of the four European Sites, in view of their site's conservation objectives.

National Sites

Source-pathway-receptor links were identified between the South Wall BESS development and North Dublin Bay pNHA, Dolphin Dublin Docks pNHA and South Dublin Bay pNHA. All pNHA sites occurs within the same spatial extent as the above-mentioned European Sites and are designated for similar scientific interests. Due to the similar location of the pNHA's the same potential impacts identified for the European sites can be assumed for the pNHA's. Therefore, with the implementation of mitigation measures outlined in the NIS, no impacts to the pNHAs are anticipated.

7.6.17 South Wall BESS Construction Impacts

7.6.17.1 Flora

Habitat Damage/Loss

Habitats within the South Wall BESS site which will be removed to facilitate the construction works include hardstanding ground and recolonising bare ground. These habitats were identified as having local importance (low value) and have negligible biodiversity value. As such, the loss of these habitats would not constitute a significant negative effect on biodiversity.

Habitat Degradation

Runoff of sediment and construction pollution

The construction works associated with the South Wall BESS development has the potential to result in accidental pollution events and the runoff of sediment if not appropriately managed, particularly in the event of heavy rainfall. There are no open drainage ditches or watercourses located within the South Wall BESS site. The development is located 180m north of Dublin Bay and 270m south of the River Liffey Estuary. There is currently no existing surface water drainage system in place within the South Wall BESS site. There are some areas of vegetation around the boundaries of the site however vegetation does not surround the entirety of the site. Considering the proximity of the development site to the marine environment and the lack of impermeable boundaries surrounding the sites, the risk of the runoff of construction pollution and/or sediment cannot be ruled out.

A degradation of water quality would constitute a long-term, significant, negative effect on the receiving marine environment.

Dust

The Institute of Air Quality Management 'Guidance on the Assessment of dust from demolition and construction (Holman et al, 2014) prescribes potential dust emission risk classes to

ecological receptors. The guidelines specify that receptor sensitivity is 'High' up to 20m from the source and reduces to 'Medium' at 50m from the source. Dust may also be generated from track-out due to heavy goods vehicle (HGV) movements from the site entrance. HGV movements are expected to peak during the early stages (civil and mechanical works) of the proposed construction works. For the BESS developments, during the construction works it is estimated that there will be up to approximately 30 HGV two-way traffic movements per day during peak construction stages. Referring to the guidelines, trackout from the two sites was therefore established as 'Medium' 10-50 HDV (>3.5t) outward movements in any one day which equates to trackout occurring up to 50-100m from each of the four site boundaries. The spatial limit of dust impacts from the two BESS developments was therefore determined as 100m from the site boundaries.

The only protected habitat which occurs within the spatial limits of dust effects is Mudflats and sandflats [1140] which is designated within the South Dublin Bay SAC. The mudflat/sandflat habitat comprises fine, muddy sediment, the deposition of dust within the habitat will not result in any change or impact to the habitat. There is no potential for dust to result in significant negative effects.

Protected and Invasive Plant Species

There are no previous records of protected plant species recorded within the boundary of the South Wall BESS proposed development site.

Japanese knotweed occurs along the southern edge of South Bank Road immediately south of the South Wall BESS site. Considering the proximity of the invasive species to the site there is potential for the movement of construction machinery/vehicles to and from the South Wall BESS site to result in the translocation and spread of the invasive species to the surrounding environment if not appropriately managed, the introduction of invasive species would result in a slight negative effect at a local geographic scale.

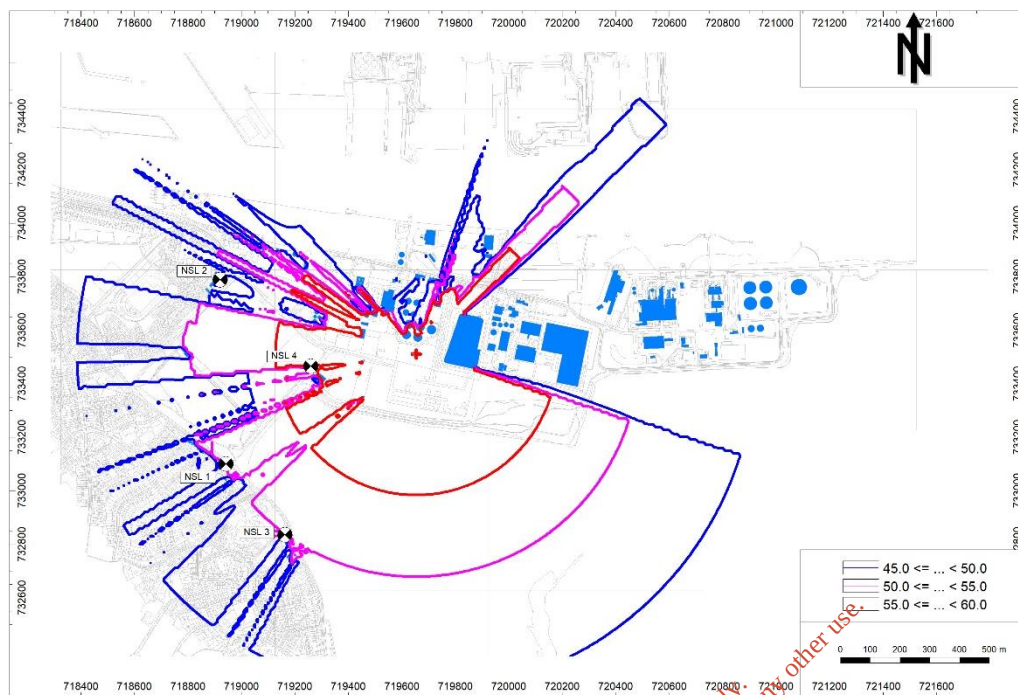
7.6.17.2 Fauna

Wintering Birds

The construction works associated with the South Wall BESS development will result in an increase in noise. As noted in Chapter 11: Noise and Vibration, an assessment of the potential noise and vibration impacts and effects due to the construction, operation and decommissioning of the proposed South Wall BESS development was undertaken.

The worst-case construction phase noise levels of the development were predicted using a three-dimensional acoustic model and noise contour maps, depicting the spatial limits of noise were produced (refer to Figure 7.13 below). As shown, the noise contour map for the South Wall BESS development indicates that from the centre of the site to ca. 500m, construction noise will range between 55-60 dB(A), at ca. 500-800m from the site noise levels will range between 50-55 dB(A) and from ca. 800m - 1200m noise levels will range between 45-50 dB(A).

Figure 7.13: Construction Noise Contour Map - South Wall BESS



Source: Mott MacDonald

Cutts et al. (2013⁹) & Cutts et al. (2009³⁶) found that generally waterfowl species have been documented to habituate to regular noise levels below 70 dB(A). Wright et al. (2010³⁷) investigated the effects of impulsive noise on shorebirds and reported that disturbance at levels above 65.5 dB(A) are more likely to result in behavioural response of some kind rather than no response. As a precautionary approach, a threshold figure of 60-70 dB(A) for disturbance of waterfowl species was used for this assessment.

Disturbance to Foraging Sites

A review of previous surveys and studies undertaken within Dublin Bay indicates that the most important foraging sites for protected waterfowl species within the study area include the compensatory grassland, the intertidal areas located to the south and east of Irishtown Nature Reserve, Shellybanks Beach, the water outflow at the north-side base of South Wall and the intertidal habitat located south-side of the South Wall.

Referring to the construction noise contour maps produced for the South Wall BESS site (refer to Figure 7.13 above), important foraging sites which occur within the noise level threshold range of 55-60 dB(A) include the compensatory grasslands (ca. 190m east of the South Wall BESS development) and the intertidal area located to the south of the Irishtown Nature Reserve (ca. 290m south-east of the South Wall BESS). Construction noise levels at all other important foraging sites are below 55 dB(A) and thus will not result in any disturbance.

³⁶ Cutts, N., Phelps, A. & Burdon, D. (2009). Construction and waterfowl: defining sensitivity, response, impacts and guidance. Institute of Estuarine and Coastal Studies (IECS), University of Hull

³⁷ Wright, M., Goodman, P., Cameron, T., (2010). Exploring behavioural responses of shorebirds to impulsive noise.

The compensatory grassland is one of a number of important foraging sites for Light-bellied Brent geese in Dublin Bay. Past surveys (Tierney et al, 2017 & Mayes, 2015) found that Brent geese, on arrival to Dublin Bay, feed exclusively on sea grass *Zostera spp.* in intertidal areas (an important area of *Zostera spp.* occurs at Merrion Gate located outside the ZoI of disturbance) only moving to terrestrial grassland habitats as winter progress (late November – December) once sea grass levels have depleted. Scott Cawley (2019) found that the Brent geese tended to use Sean Moore Park (located outside the ZoI of disturbance) in the morning as the geese came off roost sites, and then appeared to use the compensatory grasslands at pre-roost times before moving to roost sites at Sandymount.

Background noise levels within the Poolbeg Peninsula are already elevated due to the existing industrial sites, however Brent geese are highly sensitive to noise disturbance (Cutts et al., 2013), excessively noisy works and impulsive noises are likely to result in disturbance to the species. Only the South Wall BESS development would result in disturbance of the compensatory grassland area. Very noisy works undertaken at the South Wall BESS site, in mid-winter and during pre-roosts times will result in short-term disturbance of the Brent geese from one of their important foraging sites. Other wintering species have also been recorded using the compensatory grassland including; oystercatcher, black-tailed godwit, curlew, redshank and black-headed gull, albeit in numbers significantly below any national or international importance thresholds (Maye, 2015). There is also potential for the disturbance of these species.

The intertidal areas located south of the Irishtown Nature Reserve is located within the ZoI of noise of the South Wall BESS development. Numbers of birds using the intertidal sites within Dublin Bay were recorded to be highest at low tide when waders and waterbirds fed and roosted across the sandflats (Scott Cawley, 2019). Thus, construction works undertaken at all four sites during winter, particularly at low tide, will result in a short-term disturbance of the wintering species from the important intertidal habitats. Disturbance from the foraging sites would constitute a short term significant negative effect on wintering bird species at an international geographical scale.

Disturbance to Roosting Sites

No important wintering bird roosting sites were recorded within 300m of the South Wall BESS development. There is no potential for disturbance, As noted, both common and Artic tern breed on the ESB dolphin which is located approximately 840m north-west of the South Wall development site. Referring to the noise contour map above, noise levels from the South Wall BESS development will not result in an increase to existing noise levels at the nesting site.

An active peregrine falcon nest is known to occur at the disused power station smokestacks at the Pigeon House. Breeding peregrine falcon use a foraging core range of 2km³⁸. Considering the small area of habitat which will be lost and the availability of alternative hunting grounds, the loss of habitat is likely to have an imperceptible effect on the local peregrine population at local geographical scale.

The nest site occurs within the ZoI of noise disturbance of the proposed construction works, However, studies indicate that peregrine falcon regularly nest within highly disturbed sites such as quarries and urban centres and become tolerant or habituate to human disturbance

³⁸ SNH (2017) Recommended bird survey methods to inform impacts assessment of onshore wind farms. Version 2.

(Ruddock & Whitfield, 2007³⁹ and Kettle et al, 2019⁴⁰). Potential negative effects on the peregrine falcon nest are therefore considered unlikely.

Visual Disturbance

The use of construction lighting and the movement of machinery and site personnel across the site may result in visual disturbance to birds within proximity to the site, resulting in a short term significant negative effect on wintering and breeding bird species at local and international geographical scale.

7.6.18 South Wall BESS Operational Impacts

Noise and Visual Disturbance

The South Wall BESS development will operate over a 24 hours period and can be operated remotely. The facilities will however require regular maintenance and site inspection visits. Disturbance will be minor and will be limited to within the ESB facilities.

The South Wall BESS facilities will not be lit permanently as there is no requirement for the site to be permanently occupied. Lighting will be provided to assist any night-time maintenance visits comprising lighting from the car park to the control room and other building entrances. External lighting will be automatic with motion sensors and timers to turn off.

The facility will generate noise during operation. The operational noise impacts of the facility were predicted using a three-dimensional acoustic model and noise contour mapping was produced and is shown in Figure 7.14 below. The noise contour map for the South Wall BESS indicates that that from the centre of the site to ca. 100m the construction noise will range between 55-60 dB(A), at ca. 100-150m from the site noise levels will range between 50-55 dB(A) and from ca. 150-300m noise levels will range between 45-50 dB(A) as shown in Figure 7.14. Thus, there is no potential for disturbance during the operation of the facility.

³⁹ Ruddock, M., Whitfield, D., A Review of Disturbance Distances in Selected Bird Species.

⁴⁰ Kettel, E.F., Gentle, L.K., Yarnell, R.W. Quinn, J., (2019). Breeding performance of an apex predator, the peregrine falcon, across urban and rural landscapes. Urban Ecosyst 22, 117–125 (2019).

Figure 7.14: Operational Noise Contour Map – South Wall BESS



Source: Mott MacDonald

Pollution

Drainage

During the operational phase of the South Wall BESS site, surface water runoff will be generated from all surfaces within both facilities which are exposed to rainwater. This includes all hardstanding surfaces and other impermeable surfaces. The majority of site compound will be surfaced with permeable stone. Any surface water generated on permeable areas will therefore infiltrate to ground and will be collected in an underground drainage network before passing through a Class 1 oil separator and into an attenuation tank where it will be discharged at calculated greenfield runoff rates. It will then connect to the existing ESB owned drainage network to the north of the site which ultimately discharges to Dublin Bay via the existing cooling water outfall. The effects of drainage on biodiversity are considered to be negligible.

Air Quality

The BESS facilities will not result in any air emissions during operation. There is no potential for impact.

7.6.19 South Wall BESS Decommissioning Impacts

Should the South Wall BESS plant be decommissioned the equipment will be dismantled and removed from site and the site left as a level platform. Impacts during decommissioning are expected to be of a similar type and magnitude to those anticipated during construction but generally of a shorter duration.

7.6.20 South Wall BESS Mitigation

7.6.20.1 Construction Phase

Pollution Control

A suitably qualified Ecological Clerk of Works (ECoW) will be appointed by the Contractor and will be required on site during the construction works. The ECoW will ensure that all mitigation measures outlined within this report are implemented correctly during the construction works.

All construction works will be carried out in accordance with the Outline Construction Environmental Management Plan (OCEMP) provided in Appendix 5C which will define measures to ensure that any contaminants resulting from the site preparation or construction will not enter the surface water. No Additional mitigation measures are required.

All pollution control measures will be designed, installed, and maintained in accordance with CIRIA guidance for '*Environmental Good Practice on Site*' (C741) and '*Control of water pollution from linear construction projects. Technical guidance*' (C648).

Noise Disturbance

The appointed Contractors will be required to adhere to the codes of practice for construction work provided in British Standard BS 5228:2009+A1:2014 Part 1 and Part 2, and the guidance given therein, for minimising noise emissions from construction.

The appointed ECoW will liaise with the Contractor in relation to potential for noisy works and will advise on when such works must be restricted, particularly (but not limited to), in relation to Brent geese which utilise the compensatory grassland.

In addition to avoid disturbance of the wintering species within the intertidal habitats, significantly noisy works will be avoided at low tide when usage of the intertidal flats is at its highest. The requirement for same will be dictated by the ECoW.

To minimise disturbance, noise reducing hoarding should be erected around the southern and eastern perimeter of the South Wall BESS development site during the wintering season (September-April inclusive). Hoarding will also be erected at the site access points on Southbank Road and at the existing entrance on the Shellybanks Road to the east to reduce the visual disturbance of vehicles and machinery entering and leaving the site.

Vegetation Clearance

In accordance with Section 40 of the Wildlife Acts, the removal vegetation, which may be used as nesting sites by breeding birds, will be cleared outside of the birds nesting season (1st March to 31st August inclusive).

In the event that works within the bird nesting season cannot be avoided a derogation license will be sought from NPWS to facilitate the within the season, following a survey of the vegetation to establish the absence/presence of breeding nests. Where a nest is found, the clearance of vegetation can only occur once the chicks have fledged or where nesting has failed.

During the construction works, the appointed Contractor, in order to comply with Regulations 49 and 50 of the European Communities (Birds and Natural Habitat) Regulations (2011), will ensure biosecurity measures are implemented throughout the construction phase to ensure the introduction and translocation of invasive species is prevented.

Japanese Knotweed

Japanese knotweed was identified along an access track located immediately south of the South Wall BESS. There is a risk that the invasive species could be translocated during the proposed construction works.

A suitably qualified Ecologist will be appointed by the Contractor to carry out a pre-construction survey to determine the full extent of the Japanese knotweed infestation located adjacent to the South Wall BESS prior to the construction works commencing. If the area of infestation can be safely isolated from the proposed construction site at this point, then this shall be done. A site-specific Japanese Knotweed management plan will be prepared by the Ecologist which will be in accordance with Irish Water's *Information and Guidance Document on Japanese knotweed Asset Strategy and Sustainability IW-AMT-SOP-009*. All works will be carried out in accordance with the management plan. All Contractors carrying out works will be appropriately trained (e.g. through toolbox talks) on the identification of invasive plant and animal species, which are known to occur within or adjacent to the proposed works area, and actions to be taken if such species are observed on site.

7.6.20.2 Operation Phase

Operational impacts on Biodiversity were deemed Negligible. There is no requirement for mitigation measures.

7.7 Cumulative Effects

Each of the four developments have been assessed individually within this chapter however due to the proximity of the four developments to one another and the potential for the developments to be constructed and operate simultaneously there is potential for the four developments to result in cumulative effects.

The main potential impacts identified from the four proposed developments include water quality impacts and an increase in noise levels and visual disturbances. The magnitude of the impact associated with an individual project would likely be increased if the same effects were to occur in parallel. Thus, there is potential for a combined effect from the four developments on the biodiversity.

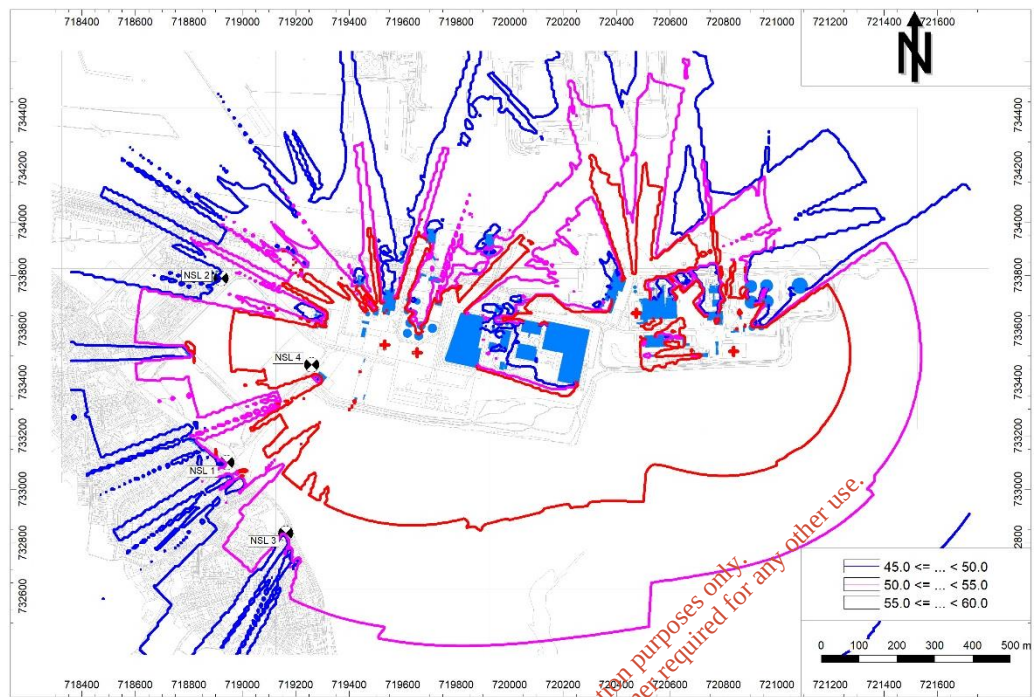
All four proposed development will be subject to stringent surface water control mitigation measures which will ensure the runoff of construction pollution/sediment is managed. There is therefore, no potential for the in-combination of water quality effects from the four developments if constructed simultaneously.

A noise contour map of the cumulative construction noise impacts of the four proposed developments (which includes the existing baseline noise conditions) was prepared and is shown in Figure 7.15 below. The noise contour map for all four developments indicates that from the centre of the sites to ca. 500m, construction noise will range between 55-60 dB(A). The important foraging sites located within the 55-60 dB(A) noise threshold range includes the compensatory grassland, the intertidal areas located to the south and east of Irishtown Nature Reserve and Shellybanks Beach. Considering the cumulative construction noise levels will not exceed 70 dB(A) and very noisy works at all four construction sites will be subject to timing restrictions following the appointed ECoWs decision, there is no potential for cumulative effects on biodiversity.

All four facilities will generate noise during operation. A noise contour map of the cumulative operational noise from all four facilities (which includes the exiting baseline condition which includes Poolbeg CCGT and DBP) was prepared and is shown in Figure 7.16 below. As shown, in the immediate surrounding area of the facilities, noise levels will range between 55 – 60

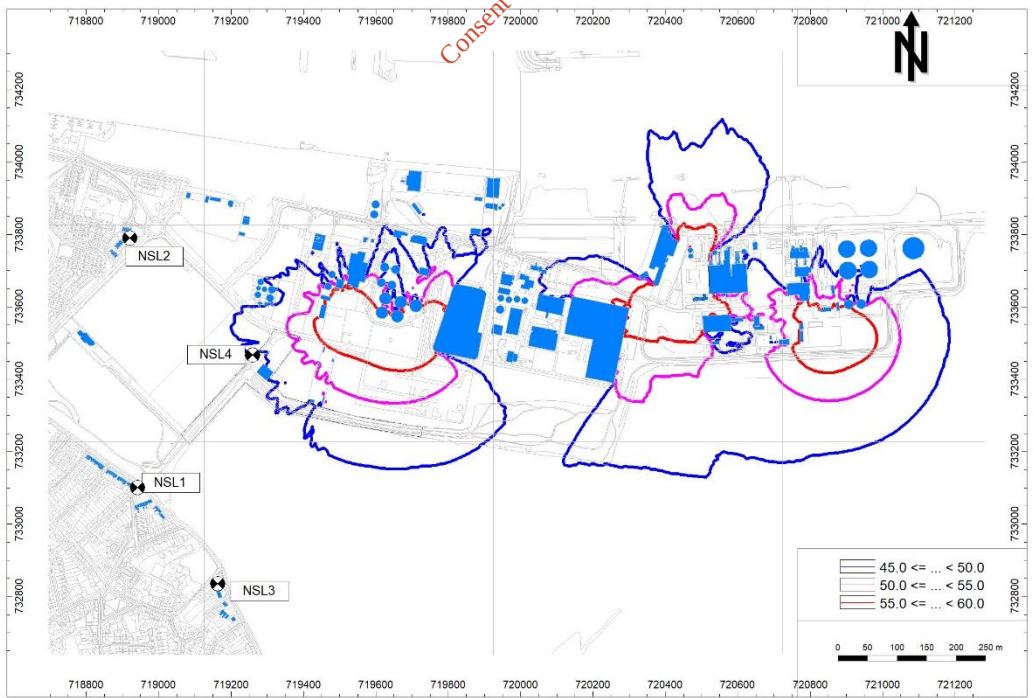
dB(A). The noise level threshold of 55-60 dB(A) does not extend into any of the important SCI foraging sites. There is no potential for the combined operational noise of the four developments to result in cumulative effects on the biodiversity.

Figure 7.15: Construction Noise contour Map of all Four Developments



Source: Mott MacDonald

Figure 7.16: Operational Noise contour Map of all Four Developments



Source: Mott MacDonald

7.8 Summary of Mitigation and Monitoring

The summary of mitigation and monitoring measures for the four proposed developments are outline in Chapter 18.

7.9 Summary of Significant Residual Effects

It is anticipated that with the implementation of mitigation measures (as detailed above), the development and operation of the four proposed development is unlikely to impact significantly on the biodiversity of the study area and surroundings.

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8 Land, Soils and Ground Conditions

8.1 Introduction

This chapter summarises the findings of the geology, soils and contaminated land technical assessment that has been undertaken for the four proposed developments and presents the potential significant effects likely to be associated with the proposed FlexGen and BESS developments related to these topics. It provides an overview of the baseline geological and soil conditions across the study areas, the potential presence of land and groundwater contamination and assessment of potential significant effects relating to geology, soils, and contaminated land.

8.2 Assessment Methodology

Ground conditions considers geology, soils and contamination of land and groundwater.

The underlying ground conditions are assessed in terms of the geology and soil resources present based on desk studies and site-specific investigations. A site walkover survey was undertaken in February 2020. The potential for contamination to be present has been assessed through studying the development history of the sites.

8.2.1 Sources of Information

The nature of the underlying geology, hydrogeology and soils are determined from published mapping and ground investigations undertaken by ESB. The following reports have been used:

- AECOM 2020 ESB Proposed BESS and FlexGen Sites, Poolbeg Baseline Assessment, Report Reference PR-446384-ACM-EN-RP-PB-001;
- AECOM 2020 ESB Poolbeg BESS and FlexGen SI and GQRA, Report Reference PR-446384-ACM-EN-RP-PB-006;
- AECOM 2020 Proposed BESS Site, South Wall BESS & Ringsend FlexGen – SI and GQRA Final Report. Report Reference PR-44384-ACM-EN-RP-RG-007;
- AECOM 2020 ESB Poolbeg FlexGen Hotspot Remedial Excavation and Validation Report Reference PR-44384-EN-RP-PB-010.

These reports are available in Appendix 8.

Geological maps are published by Geological Survey Ireland and available to view online⁴¹. Soils have been mapped by the EPA and information presented online in the Irish Soil Information System which can be viewed online⁴².

Potential impacts are assessed with regard to construction, operation and decommissioning of each project. Mitigation and monitoring measures are proposed, where appropriate, in order to minimise any significant adverse impacts.

⁴¹ <https://dcenr.maps.arcgis.com/apps/MapSeries/index.html?appid=a30af518e87a4c0ab2fbde2aaac3c228>

⁴² <http://gis.teagasc.ie/soils/about.php>

8.2.2 Legislation and Guidance

Geology is recognised as an important component of natural heritage in three separate pieces of national legislation which include the following:

- Planning and Development Act 2000 (as amended);
- Planning and Development Regulations 2001(as amended); and
- Wildlife (Amendment) Act 2000

This legislation requires various branches of Government and statutory agencies to consult and take due regard for the conservation of geological heritage features. Geological features which are considered valuable and worthy of protection are classified as Geological Heritage Sites and County Geological Sites and can be viewed online⁴³.

Land contamination is assessed in terms of developing a conceptual model of the site which identifies sources, pathways and receptors that are reasonably anticipated to be present which together create contaminant linkages. Where a linkage is present an environmental risk is considered to exist. This approach is in accordance with published guidance⁴⁴.

8.2.3 Study Area

The study area comprises the land required to construct each of the four proposed projects including any construction compounds and temporary access routes. The potential effects on ground conditions will be limited to the development footprint for each of the four projects. The immediately surrounding land is also considered in terms of any potential for contamination to migrate onto or off site via groundwater. The development sites are close to the coast and shallow groundwater will be influenced by seawater ingress during high tides. The zone of influence for consideration of contaminant migration via groundwater is considered to extend from each site to Dublin Bay/River Liffey estuary.

8.2.4 Sensitivity

The value or sensitivity of a receptor is determined in accordance with the criteria presented in Table 8.1.

Table 8.1: Environmental Value

Receptor Value (Sensitivity)	Description	Example
Very High	Geology	Attribute has a high quality, significance or value on a regional or national scale Geological feature rare on a regional or national scale (NHA) Groundwater supports river, wetland or surface water body ecosystem protected by EU or national legislation
	Soil	Volume of peat and/or soft organic soil underlying route is significant on a national or regional scale Regionally Important aquifer with multiple wellfields or supplying >2500 homes
	Contamination	Degree or extent of soil contamination is significant on a national or regional scale Inner source protection area for regionally important water source Large existing quarry or pit Proven economically extractable mineral resource
High	Geology	Attribute has a high quality, significance or value on a local scale Geological feature of high value on a local scale (County Geological Site)

⁴³ <https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=b245c2bd11a64162a1632ad6bccf8e34&scale=0>

⁴⁴ EPA 2013. Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites.

Receptor Value (Sensitivity)	Description	Example
	Soils	Volume of peat and/or soft organic soil underlying route is significant on a local scale
	Contamination	Degree or extent of soil contamination is significant on a local scale
		Regionally Important Aquifer. Groundwater provides large proportion of baseflow to local rivers Locally important potable water source supplying >1000 homes Outer source protection area for regionally important water source Inner source protection area for locally important water source Large recent landfill site for mixed wastes. Well drained and/or high fertility soils. Moderately sized existing quarry or pit Marginally economic extractable mineral resource Contaminated soil on site with previous heavy industrial usage
Medium	Geology	Attribute has a medium quality, significance or value on a local scale
	Soils	Volume of peat and/or soft organic soil underlying route is moderate on a local scale
	Contamination	Degree or extent of soil contamination is moderate on a local scale
Low	Geology	Attribute has a low quality, significance or value on a local scale
	Soils	Volume of peat and/or soft organic soil underlying route is small on a local scale
	Contamination	Degree or extent of soil contamination is minor on a local scale
Negligible	Geology	No geological exposures, little / no local interest
	Soils	Previously developed land formerly in 'hard uses' with little potential to return to agriculture.
	Contamination	Human health: undeveloped surplus land / no sensitive land use proposed. Surface water: No surface water receptors Groundwater: Poor aquifer, unproductive.

Source: Adapted from Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements.

Where a change in the baseline condition is considered possible the magnitude of that change is assessed using criteria presented in Table 8.2. The descriptions of impact consider factors such as the duration or frequency of any effects, the reversibility of that effect and the consequences. Effects can also be positive, negative or imperceptible.

Table 8.2: Description of Impact

Description of Impact (Change)		Typical Description
High	Geology	Loss of geological feature/designation and/or quality and integrity, severe damage to key characteristics, features or elements.
	Soil	Physical removal or permanent sealing of soil resource or agricultural land.
	Contamination	Significant contamination identified. Contamination levels significantly exceed background levels and relevant screening criteria with potential for significant harm to human health or controlled waters. Contamination heavily restricts future use of land.
Medium	Geology	Partial loss of geological feature / designation, potentially adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements.
	Soils	Permanent loss / reduction of one or more soil function(s) and restriction to current or approved future use (e.g. through degradation, compaction, erosion of soil resource).
	Contamination	Contaminant concentrations exceed background levels and are in line with limits of relevant screening criteria. Significant contamination can be present. Control / remediation measures are required to reduce risks to human health or controlled waters / make land suitable for intended use.
Low	Geology	Minor measurable change in geological feature / designation attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements.
	Soils	Temporary loss / reduction of one or more soil function(s) and restriction to current or approved future use (e.g. through degradation, compaction, erosion of soil resource).
	Contamination	Contaminant concentrations are below relevant screening criteria. Significant contamination is unlikely with a low risk to human health or controlled waters.
Negligible	Geology	Very minor loss or detrimental alteration to one or more characteristics, features or elements of geological feature / designation. Overall integrity of resource not affected.
	Soils	No discernible loss / reduction of soil function(s) that restrict current or approved future use.
	Contamination	Contaminant concentrations substantially below levels outlined in relevant screening criteria. No requirement for control measures to reduce risks to receptors.
No change	Geology	No temporary or permanent loss / disturbance of characteristic features or elements.
	Soils	No loss / reduction of soil function(s) that restrict current or approved future use.
	Contamination	Reported contaminant concentrations at or below background levels;

Source: Adapted from National Roads Authority Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes

8.2.5 Significance of Impact

The significance of any impact is determined from the receptor value (Table 8.3) and the magnitude of predicted impact (Table 8.2). Table 8.3 uses these descriptors to assign a significance category.

Table 8.3: Significance Matrix

		Magnitude of Impact				
		No change	Negligible	Low	Medium	High
	Very High	Imperceptible	Slight	Moderate	Large	Very Large
		Not Significant	Not Significant	Significant	Significant	Significant
	High	Imperceptible	Slight	Moderate	Moderate	Large
		Not Significant	Not Significant	Significant	Significant	Significant
	Medium	Imperceptible	Slight	Slight	Moderate	Moderate
		Not Significant	Not Significant	Not Significant	Significant	Significant
Environmental Value	Low	Imperceptible	Slight	Slight	Slight	Moderate
		Not Significant	Not Significant	Not Significant	Not Significant	Significant
	Negligible	Imperceptible	Slight	Slight	Slight	Slight
		Not Significant	Not Significant	Not Significant	Not Significant	Not Significant

8.3 Baseline Environment

8.3.1 Geology

The Geological Survey Ireland mapping indicates the site is underlain by limestone and calcareous mudstone of the Lucan Formation. The solid geology is overlain by inter tidal sands. The peninsula has been developed through raising the level of the land which was originally inter tidal through placement of granular waste materials from the 1960s onwards.

The Geological Survey Ireland Spatial Resources website⁴⁵ shows that the Poolbeg peninsula is not located in or near to a designated County Geological Site. The nearest Geological Site is North Bull Island. The Scheme will have no effect on this designation.

The Geological Survey Ireland Spatial Resources website shows that the Poolbeg peninsula is not located within an area where aggregates could potential be extracted. The northern strip of the peninsula is designated as having low potential for aggregate resources with the remainder not classified.

ESB have undertaken ground investigations within the Peninsula^{46,47}, summarised in **Table 8.44**

Table 8.4: Summary of Geology

Stratum	Typical Depth Range (m below ground level)
Made ground	0-6
Upper and Lower Gravels (comprising medium dense to dense sand, gravel with some cobbles and boulders. The upper and lower gravels are separated by occasional silt horizons)	6-14
Port Clay (comprising firm to stiff silty clay with thin laminations of fine sand or silt)	14-33
GLACIAL DRIFT (comprising very dense sand and gravel with some cobbles and traces of clay)	33-40
BEDROCK (hard argillaceous Limestone)	40+

Source: AECOM Reports

⁴⁵ <https://dcenr.maps.arcgis.com/apps/MapSeries/index.html?appid=a30af518e87a4c0ab2fbde2aaac3c228>

⁴⁶ AECOM 2020 ESB Proposed BESS and FlexGen Sites ESB Poolbeg BESS and FlexGen SI and GQRA

⁴⁷ AECOM 2020 ESB Proposed BESS Site Ringsend SI and GQRA Final Report

The ground conditions encountered during the AECOM 2020 ground investigation are summarised in Table 8.5.

Table 8.5: Summary of Ground Conditions

	Poolbeg Flex Gen	Poolbeg BESS	South Wall BESS and FlexGen
Topsoil	Parts of the site were covered with topsoil extending to depths between 0.1m and 0.2m bgl. The topsoil was soft, brown, slightly sandy, silty clay with plant rootlets and other organic plant matter	Generally present in the south comprising between 0.1m and 0.2m soft, brown, slightly sandy, silty clay with plant rootlets and other organic plant matter	Absent
Made Ground (Hardstanding)	Compacted gravel sub-base extending to depths of between 0.2m and 0.4m bgl. Very dense, grey, sandy, of fine to coarse grained gravel. Buried gravel material was occasionally found beneath the topsoil and other made ground soils to depths up to 0.7m bgl	The majority of the site is covered in hardstanding / tarmac. The hardstanding / tarmac sub-base extended to a depth of 0.1m bgl. A secondary layer of hardstanding or hardcore was observed in five of the eight trial pits and one of the four slit trenches at depths ranging from 0.3m to 1.5m bgl	Absent
Made Ground (Soil)	Occurring beneath the topsoil and gravel sub-base to depths between 0.3m and 5.0m bgl. Consisted of greyish brown, sandy, gravelly clays with occasional low to high cobble content and low boulder content or as greyish brown sandy, silty, clayey gravel with occasional low to high cobble content and low boulder content. Made ground material included fragments of wood, glass, ceramics, red brick, yellow brick, plastic, concrete and metal	Made ground soils consisted of greyish brown, slightly clayey, slightly gravelly sands with occasional low to high cobble content or as greyish brown sandy, silty, clayey gravel with occasional low to high cobble content and low boulder content. Made ground material included fragments of wood, yellow brick, plastic, concrete, roof slate, shells and metal	Up to 3.5m in thickness. Gravel soil typically occurred as grey sandy, silty gravel with low cobble content. The gravel was typically subangular in nature but contained various degrees of angularity and roundedness. Gravel grain size ranged from fine to coarse. Colour variations included grey, blueish grey, and brownish grey. Silt soil typically occurred as brown and grey sandy gravelly clayey silt with low cobble content. Soil included organic material of roots and tree trunks. Colour variations included greenish grey, brownish grey and blueish grey. Clay soil typically occurred as brown sandy gravelly clay. Soil included organic matter of roots and twigs. Colour variations included greyish brown and reddish brown
Gravelly Sand / Sandy Gravel	Reclaimed soils typically occurring beneath made ground soils at depths of between 0.3m and 3.8m bgl. Natural soils consisted of brown rounded to sub-rounded gravelly sand or sandy gravels with shells and occasional low to medium cobble content	Not encountered	Not encountered
Silt	Soft, grey, fine, sandy silt occurring beneath the natural sand and gravels		

Source: AECOM

8.3.2 Groundwater

Groundwater was recorded at shallow depths within the Made Ground during the recent AECOM ground investigations and is tidally influenced, indicating a connection with seawater in Dublin Bay. Given the coastal location and interaction with seawater, groundwater is likely to be brackish and not suitable for abstraction.

AECOM report⁴⁸ that the Lucan Formation is classified as LI – locally important aquifer, which is moderately productive in local zones. However, the bedrock beneath the Poolbeg site is not mapped as an aquifer, given the depth to bedrock and coastal setting it is expected that groundwater in the bedrock would be brackish. Neither are the reclaimed sediments classified as a gravel aquifer; groundwater in the reclaimed sediments is also expected to be brackish. In previous groundwater monitoring rounds electrical conductivity readings indicate brackish groundwater conditions. Groundwater beneath the sites is not considered to be a sensitive receptor, however it is considered as a potential pathway for contaminant migration to Dublin Bay.

AECOM report that groundwater flow across the Poolbeg site is expected to be tidally driven given that it is surrounded on three side by Dublin Bay and the Liffey Estuary. Previous groundwater monitoring has indicated that groundwater elevations can vary by 0.7m between high and low tides which indicates limited connectivity between groundwater and Dublin Bay, the tidal Range in Dublin Bay is much larger at approximately 3m.

8.3.3 Radon

According to the EPA Radon Map accessed via the EPA website, the site is located within a 10 km grid square where less than one percent of the homes are estimated to be above the Reference Level of 200 becquerel per cubic metre and is, therefore, not classified as a high radon area.

8.3.4 Soils

There are limited areas of soils present across the four projects:

- Poolbeg FlexGen – there are limited soils present in the area to be developed. The bund around the perimeter will remain;
- Poolbeg BESS - there are limited soils present in the area to be developed. Minor vegetation and fence clearance around the building envelopes will be undertaken where required to facilitate access ahead of the main demolition works.
- Ringsend FlexGen – no soils present in the area to be developed; and
- South Wall BESS – no soils present in the area to be developed.

Soil removed from the Poolbeg BESS site will be retained for reuse on the site where possible.

8.3.5 Contaminated land

The recent AECOM 2020 ground investigations undertaken to inform foundation design at the four project sites have determined that contamination was present within the underlying ground at the following sites:

⁴⁸ AECOM 2020 ESB Proposed BESS and FlexGen Sites ESB Poolbeg Baseline Assessment

- Poolbeg FlexGen - During the ground investigations hydrocarbon contamination was noted within the Made Ground comprising tarry residues. The affected Made Ground has been excavated and the material appropriately disposed of in accordance with national legislation.
- Poolbeg BESS - Ground investigations at this site have not indicated that contamination is present.
- Ringsend FlexGen - During the ground investigations hydrocarbon contamination was noted within the Made Ground comprising tarry residues, odours and sheens on groundwater.
- South Wall BESS - Ground investigations at this site have indicated hydrocarbon contamination is present within a buried mat of plant matter between 1.4m and 1.8m depth in two trial pits.

Conceptual Site Model

Given the similarities between all four proposed projects a single conceptual site model is considered appropriate to adequately describe each project.

The underlying ground conditions comprise made ground over inter tidal sands. Residual contamination was found and subsequently remediated in the Poolbeg FlexGen site. However, the possibility remains that residual contamination will be encountered during construction in all sites.

Risks to construction workers from soil bound contamination are easily mitigated through adoption of standard good practice in minimising exposure to soils and provision of measures such as hygiene facilities and prohibitions on eating and smoking on site outside welfare areas. With these standard practice measures in place there are considered to be no significant risks to construction workers. Operational staff will only visit each site on occasions, there will be no permanent occupation. The completed developments will all isolate any residual contamination present in the underlying made ground preventing exposure pathways from being created. With these measures in place there are considered to be no significant risks to operational workers.

Risks to groundwater quality are not considered significant; groundwater within the underlying strata is not considered to be a resource; water quality is poor with influence from the adjacent seawater creating brackish conditions. There are no abstractions of groundwater.

Groundwater beneath the sites is considered to be a pathway for migration of residual contaminants within each site to Dublin Bay, a sensitive receptor. Residual contamination that has been discovered during recent and detailed ground investigations has been removed and it is intended that in the event more residual contamination being discovered during construction this will also be removed; reducing the potential for a source of contamination to migrate towards Dublin Bay. The construction of the projects will divert incident rainfall into secure drainage systems which will further reduce the potential for mobilisation of contaminants. The facilities themselves will store potentially contaminative substances in secure bunded areas which are further secured by the site drainage system. Construction and operation of these sites will reduce the potential for contamination of Dublin Bay.

8.4 Poolbeg FlexGen Impact Assessment

8.4.1 Do Nothing

In terms of the Do Nothing scenario, there will be no changes in the existing ground conditions. Consequently, no impacts are assessed.

8.4.2 Poolbeg FlexGen Construction Effects

Geology

The geology at the site is considered to be of negligible environmental value; there are no geological exposures and the proposed development will not create any new exposures. There will be no change in the nature of the geological resource.

There will be no changes to the underlying geology following development. The underlying made ground and inter tidal deposits are granular in nature and no new pollutant pathways will be created.

A not significant effect is assessed.

Soils

There are limited areas of soils on site considered to be of negligible environmental value. There will be small loss of soil from the site which will be reused in landscaping and so there will be no change.

A not significant effect is assessed.

Contamination

There is a potential to encounter residual contaminated soils whilst excavating the Made Ground for foundations and service runs. Ground investigations have been undertaken on the site to inform foundation designs, during which some contamination was noted comprising hydrocarbons. These contaminated soils were appropriately excavated and removed from site in June/July 2020⁴⁹. This material has been removed from site and so the probability of mobilising existing contamination during construction is reduced.

Any further contamination discovered during the construction will be assessed and if found to pose a significant risk to human health or controlled waters, removed from site.

The potential for construction activities to contaminate the underlying ground will be managed through adopting safe working practices such as storing fuels and other hazardous substances in self-contained storage vessels or bunded areas. Any spillages will be cleared immediately by excavating and disposing of affected soils.

The proposed use of the site is considered to be of Medium sensitivity in terms of human health but Very High in terms of controlled waters through the potential for groundwater migration from the site to the adjacent Dublin Bay. Adopting standard best practice in pollution control will result in no measurable impact to groundwater and so a negligible magnitude of impact is considered appropriate.

A slight adverse not significant effect is assessed for receiving surface waters (Dublin Bay) and not significant effect for site workers.

8.4.3 Poolbeg FlexGen Operational Effects

The site is located within the curtilage of the existing Poolbeg power station and is subject to the controls required under that facility's operating licence.

Geology

⁴⁹ AECOM 2020. Poolbeg BESS and FlexGen SI and GQRA

The geology at the site is considered to be of negligible environmental value; there are no geological exposures and the proposed development will not create any new exposures. There will be no change in the nature of the geological resource.

There will be no changes to the underlying geology following development. The underlying made ground and inter tidal deposits are granular in nature and no new pollutant pathways will be created.

A not significant effect is assessed.

Soils

There will be no changes in the soil resources on the site during operation. Operating the site in accordance with its IE licence and adherence to existing regulations and standards will not cause any pollution of the underlying ground.

A not significant effect is assessed.

Contamination

The proposed use of the site is considered to be of Medium sensitivity in terms of human health but Very High in terms of controlled waters through the potential for groundwater migration from the site to the adjacent Dublin Bay. The development will create a barrier between any residual contamination within the underlying ground and site workers and so the magnitude of impact on site workers is assessed to be negligible. The removal of residual contamination during the recent ground investigations has reduced the potential for contamination to migrate towards Dublin Bay⁵⁰. Any further residual contamination discovered during construction will also be removed, which will further reduce the pollution potential. The potential for the facility to produce significant contamination is considered low with all potentially hazardous materials stored in self-contained or bunded areas (emergency fuel supply, transformers).

No new contaminant pathways will be created during construction. The proposed drainage system will divert some incident rainfall into the new drainage system, reducing infiltration into the underlying ground and further reducing the potential for mobilising residual contaminants. It is considered there will be no measurable effect on surface water receptors (Dublin Bay) and so the magnitude of impact is determined to be negligible.

A slight adverse not significant effect is assessed for receiving surface waters (Dublin Bay) and not significant effect for site workers.

8.4.4 Poolbeg FlexGen Decommissioning

Decommissioning the facility will have no effect on geology or soils. Should the plant be decommissioned the equipment will be dismantled and removed from site and the site left as a level platform. A Decommissioning Management Plan (DMP) will be prepared in accordance with the IE licence.

Decommissioning the plant will require the removal of the diesel fuel tank and transformers. Once these sources of potential contamination have been removed there will be no effect arising from contamination sources. Any decommissioning required will be subject to the conditions set out in the operating licence issued by the EPA.

⁵⁰ AECOM 2020. Poolbeg BESS and FlexGen SI and GQRA

A not significant effect is assessed.

8.4.5 Poolbeg FlexGen Mitigation and Monitoring

Operational risk mitigation measures have been designed into the initial design of the FlexGen, such as bunded fuel tank, bunded transformers and impermeable surfacing reducing infiltration. No further mitigation is considered necessary.

The Environmental Clerk of Works will be responsible for identifying any ground contamination during the construction phase. Any contaminated soils, sediment or groundwater that is encountered will be managed in accordance with best practice guidelines and all relevant legislation in consultation with EPA and any other relevant authorities as outlined in the OCEMP in Appendix 5D.

Storage of contaminated material if encountered on-site will be avoided where possible. If storage on site is necessary, contaminated material, if present, will be strictly segregated into designated bunded areas where contaminants cannot leach into the underlying ground. If spoil is to be stored on site, consultation with the EPA will be undertaken, prior to commencing storage, to ensure that any relevant authorisations are obtained and that spoil is managed, at all times, in accordance with all relevant legislation.

As no significant impacts are assessed as likely, no monitoring to required.

Table 8.6: Summary of Poolbeg FlexGen Impact Assessment

Issue	Value	Impact	Significance	Mitigation	Residual Impact
Construction					
Geology	Negligible	No change	Not Significant	None required	No residual impact
Soils	Negligible	No change	Not Significant	Any soils will be reused on site	No residual effects
Contamination (Human Health)	Medium	Negligible	Not Significant	Ground will be suitable for use following development in accordance with regulatory requirements	No residual impact
Contamination (Water)	Very High	Negligible	Not significant	Best practice during construction will minimise risk pf pollution migrating	No residual impact
Operation					
Geology	Negligible	No change	Not Significant	None required	No residual impact
Soils	Negligible	No change	Not Significant	None required	No residual effects
Contamination (Human Health)	Medium	Negligible	Not Significant	Ground will be suitable for use following development in accordance with regulatory requirements	No residual impact
Contamination (Water)	Very High	Negligible	Not significant	Best practice during construction will minimise risk pf pollution migrating	No residual impact

Issue	Value	Impact	Significance	Mitigation	Residual Impact
Construction					
Decommissioning					
Geology	Negligible	No change	Not Significant	None required	No residual impact
Soils	Negligible	No change	Not Significant	None required	No residual effects
Contamination (Human Health)	Medium	Negligible	Not Significant	Any residual contamination arising to be cleaned up	No residual impact
Contamination (Water)	Very High	Negligible	Not significant	Best practice in pollution control during demolition of infrastructure	No residual impact

8.5 Poolbeg BESS Impact Assessment

8.5.1 Do Nothing

In terms of the Do Nothing scenario, there will be no changes in the existing ground conditions. Consequently, no impacts are assessed.

8.5.2 Poolbeg BESS Construction Effects

The construction effects are based on the activities outlined in Chapter 5 of this EIAR.

Geology

The geology at the site is considered to be of negligible environmental value; there are no geological exposures and the proposed development will not create any new exposures. There will be no change in the nature of the geological resource.

There will be no changes to the underlying geology following development. The underlying made ground and inter tidal deposits are granular in nature and no new pollutant pathways will be created.

A not significant effect is assessed.

Soils

There are limited areas of soils on site considered to be of negligible environmental value. There will be small loss of soil from the site which will be reused in landscaping (where possible) and so there will be no change.

A not significant effect is assessed.

Contamination

There is a potential to encounter contaminated soils whilst excavating the Made Ground for foundations and service runs. Ground investigations have been undertaken on the site to inform foundation designs. No contamination was noted during these investigations. Should contamination discovered during the construction it will be assessed and if found to pose a significant risk to human health or controlled waters, removed from site.

The potential for construction activities to contaminate the underlying ground will be managed through adopting safe working practices such as storing fuels and other hazardous substances in self-contained storage vessels or bunded areas. Any spillages will be cleared immediately by excavating and disposing of affected soils.

The proposed use of the site is considered to be of Medium sensitivity in terms of human health but Very High in terms of controlled waters through the potential for groundwater migration from the site to the adjacent Dublin Bay. Adopting standard best practice in pollution control will result on no measurable impact to water resources and so a negligible magnitude of impact is considered appropriate.

A slight adverse not significant effect is assessed for receiving surface waters (Dublin Bay) and not significant effect for site workers.

8.5.3 Poolbeg BESS Operational Effects

Geology

The geology at the site is considered to be of negligible environmental value; there are no geological exposures and the proposed development will not create any new exposures. There will be no change in the nature of the geological resource.

There will be no changes to the underlying geology following development. The underlying made ground and inter tidal deposits are granular in nature and no new pollutant pathways will be created.

A not significant effect is assessed.

Soils

There will be no changes in the soil resources on the site during operation. Operating the site in accordance with its licence and adherence to existing regulations and standards will not cause any pollution of the underlying ground.

A not significant effect is assessed

Contamination

The proposed use of the site is considered to be of Medium sensitivity in terms of human health but Very High in terms of controlled waters through the potential for groundwater migration from the site to the adjacent Dublin Bay. The development will create a barrier between any residual contamination within the underlying ground, if present, and site workers and so the magnitude of impact on site workers is assessed to be negligible. The removal of any residual contamination encountered during construction will reduce the potential for contamination to migrate towards Dublin Bay. The potential for the facility to produce significant contamination is considered low. Potentially hazardous materials such as transformer coolant oil are stored in self-contained and bunded areas.

No new contaminant pathways will be created during construction. The proposed drainage system will divert some incident rainfall into the new drainage system, reducing infiltration into the underlying ground and further reducing the potential for mobilising residual; contaminants. It is considered there will be no measurable effect on surface water receptors (Dublin Bay) and so the magnitude of impact is determined to be negligible.

A slight adverse not significant effect is assessed for surface waters (Dublin Bay) and not significant effect for site workers.

8.5.4 Poolbeg BESS Decommissioning

Decommissioning the facility will have no effect on geology or soils. On decommissioning the plant will be dismantled and removed leaving a level platform.

Decommissioning the plant will require the removal of the transformers. Once these sources of potential contamination have been removed there will be no effect arising from contamination sources. As the BESS site is proposed to be located within an existing IE licenced site any decommissioning required will be subject to any relevant conditions set out in the IE licence.

A not significant effect is assessed.

8.5.5 Poolbeg BESS Mitigation and Monitoring

Operational risk mitigation measures have been designed into the initial design of the BESS, such as bunded transformers and impermeable surfacing reducing infiltration. No further mitigation is considered necessary.

The Environmental Clerk of Works will be responsible for identifying any ground contamination during the construction phase. Any contaminated soils, sediment or groundwater that is encountered will be managed in accordance with best practice guidelines and all relevant legislation in consultation with EPA and any other relevant authorities as outlined in the OCEMP in Appendix 5D.

Storage of contaminated material if encountered on-site will be avoided where possible. If storage on site is necessary, contaminated material, if present, will be strictly segregated into designated bunded areas where contaminants cannot leach into the underlying ground. If spoil is to be stored on site, consultation with the EPA will be undertaken, prior to commencing storage, to ensure that any relevant authorisations are obtained and that spoil is managed, at all times, in accordance with all relevant legislation.

As no significant impacts are assessed as likely, no monitoring is required.

Table 8.7: Summary of Poolbeg BESS Impact Assessment

Issue	Value	Impact	Significance	Mitigation	Residual Impact
Construction					
Geology	Negligible	No change	Not Significant	None required	No residual impact
Soils	Negligible	No change	Not Significant	Any soils will be reused on site	No residual effects
Contamination (Human Health)	Medium	Negligible	Not Significant	Ground will be suitable for use following development in accordance with regulatory requirements	No residual impact
Contamination (Water)	Very High	Negligible	Not significant	Best practice during construction will minimise risk of pollution migrating	No residual impact
Operation					

Issue	Value	Impact	Significance	Mitigation	Residual Impact
Geology	Negligible	No change	Not Significant	None required	No residual impact
Soils	Negligible	No change	Not Significant	None required	No residual effects
Contamination (Human Health)	Medium	Negligible	Not Significant	Ground will be suitable for use following development in accordance with regulatory requirements	No residual impact
Contamination (Water)	Very High	Negligible	Not significant	Best practice during construction will minimise risk of pollution migrating	No residual impact
Decommissioning					
Geology	Negligible	No change	Not Significant	None required	No residual impact
Soils	Negligible	No change	Not Significant	None required	No residual effects
Contamination (Human Health)	Medium	Negligible	Not Significant	Any residual contamination arising to be cleaned up	No residual impact
Contamination (Water)	Very High	Negligible	Not significant	Best practice in pollution control during demolition of infrastructure	No residual impact

8.6 Ringsend FlexGen Impact Assessment

8.6.1 Do Nothing

In terms of the Do Nothing scenario, there will be no changes in the existing ground conditions. Consequently, no impacts are assessed.

8.6.2 Ringsend FlexGen Construction Effects

Geology

The geology at the site is considered to be of negligible environmental value; there are no geological exposures and the proposed development will not create any new exposures. There will be no change in the nature of the geological resource.

A not significant effect is assessed.

Soils

There are no soils on site, a negligible environmental value is determined.

A not significant effect is assessed.

Contamination

There is a potential to encounter contaminated soils whilst excavating the Made Ground for foundations and service runs. Detailed ground investigations have been undertaken on the site to inform foundation designs. Contamination comprising hydrocarbon odours and sheens was

noted during these investigations. This contamination and any other areas discovered during the construction will be assessed and if found to pose a significant risk to human health or controlled waters, removed from site in accordance with relevant legislation and guidance.

The potential for construction activities to contaminate the underlying ground will be managed through adopting safe working practices such as storing fuels and other hazardous substances in self-contained storage vessels or bunded areas. Any spillages will be cleared immediately by excavating and disposing of affected soils.

The proposed use of the site is considered to be of Medium sensitivity in terms of human health but Very High in terms of controlled waters through the potential for groundwater migration from the site to the adjacent Dublin Bay. Adopting standard best practice in pollution control will result in no measurable impact to water resources and so a negligible magnitude of impact is considered appropriate.

A not significant adverse effect is assessed.

8.6.3 Ringsend FlexGen Operational Effects

Geology

The geology at the site is considered to be of negligible environmental value; there are no geological exposures and the proposed development will not create any new exposures. There will be no change in the nature of the geological resource.

There will be no changes to the underlying geology following development. The underlying made ground and inter tidal deposits are granular in nature and no new pollutant pathways will be created.

A not significant effect is assessed.

Soils

There are no soils on site, a negligible environmental value is determined.

A not significant effect is assessed

Contamination

The proposed use of the site is considered to be of Medium sensitivity in terms of human health but Very High in terms of controlled waters through the potential for groundwater migration from the site to the adjacent Dublin Bay. Ground investigations have not indicated the presence of any residual contamination and any significant contamination found during construction will be removed. The magnitude of impact on site workers is therefore assessed as negligible. The removal of any residual contamination during construction will further reduce the potential for contamination to migrate towards Dublin Bay. The potential for the facility to produce significant contamination is considered low with all potentially hazardous materials stored in self-contained or bunded areas (emergency fuel supply, transformers).

No new contaminant pathways will be created during construction. The proposed drainage system will divert some incident rainfall into the new drainage system, reducing infiltration into the underlying ground and further reducing the potential for mobilising residual contaminants. It is considered there will be no measurable effect on surface water receptors (Dublin Bay) and so the magnitude of impact is determined to be negligible.

A slight adverse effect is assessed for surface water and neutral effect for site workers.

8.6.4 Ringsend FlexGen Decommissioning

Decommissioning the facility will have no effect on geology or soils. On decommissioning the plant will be dismantled and removed leaving a level platform. Should the Ringsend FlexGen plant be decommissioned the equipment will be dismantled and removed from site and the site left as a level platform. A Decommissioning Management Plan (DMP) will be prepared in accordance with the IE licence.

Decommissioning the plant will require the removal of the diesel fuel tank and transformers. Once these sources of potential contamination have been removed there will be no effect arising from contamination sources. Any decommissioning required will be subject to the conditions set out in any future IE licence issued by the EPA.

A neutral effect is assessed.

Table 8.8: Summary of Ringsend FlexGen Impact Assessment

Issue	Value	Impact	Significance	Mitigation	Residual Impact
Construction					
Geology	Negligible	No change	Not Significant	None required	No residual impact
Soils	Negligible	No change	Not Significant	There are no soils on site	No residual effects
Contamination (Human Health)	Medium	Negligible	Not Significant	Ground will be suitable for use following development in accordance with regulatory requirements	No residual impact
Contamination (Water)	Very High	Negligible	Not significant	Best practice during construction will minimise risk of pollution migrating	No residual impact
Operation					
Geology	Negligible	No change	Not Significant	None required	No residual impact
Soils	Negligible	No change	Not Significant	None required	No residual effects
Contamination (Human Health)	Medium	Negligible	Not Significant	Ground will be suitable for use following development in accordance with regulatory requirements	No residual impact
Contamination (Water)	Very High	Negligible	Not significant	Best practice during construction will minimise risk of pollution migrating	No residual impact
Decommissioning					
Geology	Negligible	No change	Not Significant	None required	No residual impact
Soils	Negligible	No change	Not Significant	None required	No residual effects

Issue	Value	Impact	Significance	Mitigation	Residual Impact
Construction					
Contamination (Human Health)	Medium	Negligible	Not Significant	Any residual contamination arising to be cleaned up	No residual impact
Contamination (Water)	Very High	Negligible	Not significant	Best practice in pollution control during demolition of infrastructure	No residual impact

8.6.5 Ringsend FlexGen Mitigation and Monitoring

Operational risk mitigation measures have been designed into the initial design of the FlexGen, such as bunded fuel tank, bunded transformers and impermeable surfacing reducing infiltration. No further mitigation is considered necessary.

The Environmental Clerk of Works will be responsible for identifying any ground contamination during the construction phase. Any contaminated soils, sediment or groundwater that is encountered will be managed in accordance with best practice guidelines and all relevant legislation in consultation with EPA and any other relevant authorities as outlined in the OCEMP in Appendix 5D.

Storage of contaminated material if encountered on-site will be avoided where possible. If storage on site is necessary, contaminated material, if present, will be strictly segregated into designated bunded areas where contaminants cannot leach into the underlying ground. If spoil is to be stored on site, consultation with the relevant authorities will be undertaken, prior to commencing storage, to ensure that any relevant authorisations are obtained and that spoil is managed, at all times, in accordance with all relevant legislation.

As no significant impacts are assessed as likely, no monitoring to required.

8.7 South Wall BESS Impact Assessment

8.7.1 Do Nothing

In terms of the Do Nothing scenario, there will be no changes in the existing ground conditions. Consequently, no impacts are assessed.

8.7.2 South Wall BESS Construction Effects

Geology

The geology at the site is considered to be of negligible environmental value; there are no geological exposures and the proposed development will not create any new exposures. There will be no change in the nature of the geological resource.

There will be no changes to the underlying geology following development. The underlying made ground and inter tidal deposits are granular in nature and no new pollutant pathways will be created.

A not significant effect is assessed.

Soils

There are limited areas of soils on site considered to be of negligible environmental value. A not significant effect is assessed.

Contamination

There is a potential to encounter contaminated soils whilst excavating the Made Ground for foundations and service runs. Ground investigations have been undertaken on the site to inform foundation designs, during which some minor soil contamination was noted comprising hydrocarbons associated with a layer of vegetation. Laboratory testing determined that this material posed no significant risk to human health⁵¹. Risks to controlled waters will be more fully assessed when further ground investigation is undertaken. Should further contamination be discovered during the construction it will be assessed and if found to pose a significant risk to human health or controlled waters, removed from site.

The potential for construction activities to contaminate the underlying ground will be managed through adopting safe working practices such as storing fuels and other hazardous substances in self-contained storage vessels or bunded areas. Any spillages will be cleared immediately by excavating and disposing of affected soils.

The proposed use of the site is considered to be of Medium sensitivity in terms of human health but Very High in terms of controlled waters through the potential for groundwater migration from the site to the adjacent Dublin Bay. Adopting standard best practice in pollution control will result in no measurable impact to water resources and so a negligible magnitude of impact is considered appropriate.

A slight adverse not significant effect is assessed for receiving surface waters (Dublin Bay) and not significant effect for site workers.

8.7.3 South Wall BESS Operational Effects

Geology

The geology at the site is considered to be of negligible environmental value; there are no geological exposures and the proposed development will not create any new exposures. There will be no change in the nature of the geological resource.

There will be no changes to the underlying geology following development. The underlying made ground and inter tidal deposits are granular in nature and no new pollutant pathways will be created.

A not significant effect is assessed.

Soils

There are limited areas of soils on site considered to be of negligible environmental value. There will be small loss of soil from the site which will be reused in landscaping and so a neutral effect is assessed. Adherence to existing regulations and standards will not cause any pollution of the underlying ground.

A not significant effect is assessed.

⁵¹ AECOM 2020. Proposed BESS Site, Ringsend – SI and GQRA Final Report

Contamination

The proposed use of the site is considered to be of Medium sensitivity in terms of human health but Very High in terms of controlled waters through the potential for groundwater migration from the site to the adjacent Dublin Bay. The development will create a barrier between any previously undetected residual contamination within the underlying ground and site workers and so the magnitude of impact on site workers is assessed to be negligible. The removal of any residual contamination encountered during construction will reduce the potential for contamination to migrate towards Dublin Bay. The potential for the facility to produce significant contamination is considered low with all potentially hazardous materials stored in self-contained or bunded areas (transformers).

No new contaminant pathways will be created during construction. The proposed drainage system will divert some incident rainfall into the new drainage system, reducing infiltration into the underlying ground and further reducing the potential for mobilising residual contaminants. It is considered there will be no measurable effect on surface water receptors (Dublin Bay) and so the magnitude of impact is determined to be negligible.

A slight adverse not significant effect is assessed for receiving surface waters (Dublin Bay) and not significant effect for site workers.

8.7.4 South Wall BESS Decommissioning

Decommissioning the facility will have no effect on geology or soils. On decommissioning the plant will be dismantled and removed leaving a level platform.

Decommissioning the plant will require the removal of the transformers and other electrical equipment. Once these sources of potential contamination have been removed there will be no effect arising from contamination sources.

A not significant effect is assessed.

Table 8.9: Summary of South Wall Impact Assessment

Issue	Value	Impact	Significance	Mitigation	Residual Impact
Construction					
Geology	Negligible	No change	Not Significant	None required	No residual impact
Soils	Negligible	No change	Not Significant	There are no soils on site	No residual effects
Contamination (Human Health)	Medium	Negligible	Not Significant	Ground will be suitable for use following development in accordance with regulatory requirements	No residual impact
Contamination (Water)	Very High	Negligible	Not significant	Best practice during construction will minimise risk of pollution migrating	No residual impact
Operation					
Geology	Negligible	No change	Not Significant	None required	No residual impact

Issue	Value	Impact	Significance	Mitigation	Residual Impact
Soils	Negligible	No change	Not Significant	None required	No residual effects
Contamination (Human Health)	Medium	Negligible	Not Significant	Ground will be suitable for use following development in accordance with regulatory requirements	No residual impact
Contamination (Water)	Very High	Negligible	Not significant	Best practice during construction will minimise risk of pollution migrating	No residual impact
Decommissioning					
Geology	Negligible	No change	Not Significant	None required	No residual impact
Soils	Negligible	No change	Not Significant	None required	No residual effects
Contamination (Human Health)	Medium	Negligible	Not Significant	Any residual contamination arising to be cleaned up	No residual impact
Contamination (Water)	Very High	Negligible	Not significant	Best practice in pollution control during demolition of infrastructure	No residual impact

8.7.5 South Wall BESS Mitigation and Monitoring

Operational risk mitigation measures have been designed into the initial design of the BESS, such as bunded transformers and impermeable surfacing reducing infiltration. No further mitigation relating to the operation of the site is considered necessary.

The Environmental Clerk of Works will be responsible for identifying any ground contamination during the construction phase.

Any contaminated soils, sediment or groundwater that is encountered will be managed in accordance with best practice guidelines and all relevant legislation in consultation with EPA and any other relevant authorities as outlined in the OCEMP in Appendix 5D.

Storage of contaminated material if encountered on-site will be avoided where possible. If storage on site is necessary, contaminated material, if present, will be strictly segregated into designated bunded areas where contaminants cannot leach into the underlying ground. If spoil is to be stored on site, consultation with the relevant authorities will be undertaken, prior to commencing storage, to ensure that any relevant authorisations are obtained and that spoil is managed, at all times, in accordance with all relevant legislation.

8.8 Cumulative Effects

8.8.1 Geology and Soils

Effects on geology and soils have been assessed as neutral, consequently there are considered to be no cumulative effects.

8.8.2 Contamination

The potential for impact arising from contaminated land is considered to be slight adverse for all four projects. Any potential for contamination effects arising on one site will have no effect on the other sites. Should contamination arise on a combination of sites the effects on surface water (Dublin Bay) are considered to be of negligible impact given that any such contamination will be remediated.

8.9 Summary of Mitigation and Monitoring

The summary of mitigation and monitoring measures for the four proposed developments are outline in Chapter 18.

8.10 Summary of Significant Residual Effects

There are not considered to be any significant residual effects.

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9 Water Environment

9.1 Introduction

This chapter provides an assessment of the baseline conditions of the water environment (both natural and artificial surface water features) within the study area. Surface water features include natural waterbodies such as rivers, streams and lakes, and artificial ones such as canals and reservoirs. The chapter considers the potential effects the construction of the four projects may have on water features and also considers flood risk.

Existing water quality in the vicinity of the four sites is established from desktop sources. The assessment is based on the development as described in Chapter 5 of this EIAR. Where potential adverse impacts are identified, mitigation measures are defined to prevent, reduce or offset potential adverse effects, or enhance potential beneficial effects where possible.

9.2 Assessment Methodology

The assessment has considered the resources and receptors identified in Table 9.1. A flood risk assessment for each project has been undertaken in accordance with The Planning System and Flood Risk Management - Guidelines for Planning Authorities' issued by the Department of Environment, Heritage and Local Government in November 2009 relating to flood risk, which are included in The Flood Risk Assessment (see Appendix 9).

Table 9.1: Resources and Receptors

Resource/Receptor	Description
Surface waterbodies	Any controlled waters or other surface water features that may be affected by the proposed development. The site is located within Dublin Bay with the River Liffey flowing into the Bay to the north.
Landform and drainage patterns	The topography/morphology of the land. Key receptors include any areas that may be affected by changes in the surface water flow regime on the site.

9.2.1 Legislation and Guidance

In assessing the potential impacts on surface water features and flood risk arising from the proposed project including construction, operation and decommissioning, an assessment methodology has been developed having due regard to relevant legislation and guidance;

- EU Water Framework Directive (Directive 2000/60/EC);
- EU 'Floods' Directive (Directive 2007/60/EC);
- The Planning System and Flood Risk Management: Guidelines for Planning Authorities (Department of Environment, Heritage and Local Government/Office of Public Works, 2009);
- Greater Dublin Strategic Drainage Study, Regional Drainage Policies - Technical Documents (2005);
- European Commission's Guidance on the preparation of the Environmental Impact Assessment Report (European Commission, 2017);
- EPA Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports (EPA, 2017); and

- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (August 2018) prepared by the Department of Housing, Planning and Local Government.

Directive 2000/60/EC (the Water Framework Directive) was adopted by the European Parliament and Council in 2000. The Water Framework Directive (WFD) establishes a legal framework for the protection, improvement and sustainable management of inland surface waters, transitional waters, coastal waters and groundwater. Article 5 of the WFD states that characterisation is to be carried out for each river basin district, or for the portion of an international river basin district falling within its territory. There are three separate objectives that are of particular relevance to the characterisation of water quality and hydrology (Article 4.1):

- To prevent deterioration of the status of all water bodies;
- To protect, enhance and restore all water bodies with the aim of achieving Good Status by 2015, with some limited exceptions, or by the dates set out in the river basin management plans; and
- To reverse any significant and sustained upward trend in the concentration of any pollutant resulting from the impact of human activity on groundwater.

The European Communities (Water Policy) Regulations 2003 (S.I. No. 722 of 2003), as amended by the European Communities (Water Policy) (Amendment) Regulations, 2005, transposed the WFD into Irish law establishing seven River Basin Districts (RBDs) on the island of Ireland for the co-ordinated management of water resources. Water bodies were delineated into groundwater, river, lake, transitional and coastal water bodies and, in accordance with the requirements of the WFD, an analysis of the characteristics and impact of human activity on each RBD was undertaken. This analysis provided an assessment of the likely condition of all water bodies and established a baseline for identifying future priority actions for subsequent stages in the river basin planning approach.

The European Communities Environmental Objectives (Surface Water) Regulations 2009 (S.I. 272 of 2009) and the European Communities Environmental Objectives (Groundwater) Regulations 2010 (S.I. 9 of 2010) establish the legal framework needed to implement the environmental objectives of the WFD. The European Communities Environmental Objectives (Surface Waters) Regulations, 2009 give effect to the criteria and standards to be used for classifying surface waters in accordance with the ecological objectives approach of the WFD. In accordance with the Regulations, waters classified as 'High' or 'Good' must not be allowed to deteriorate. Waters classified as less than good must be restored to at least good status within a prescribed timeframe. In addition, the Regulations address certain shortcomings identified by the European Court of Justice in relation to Ireland's implementation of the Dangerous Substances Directive (76/464/EEC, as amended). The Regulations set standards for biological quality elements and physico-chemical conditions, supporting biological elements, which must be complied with. These parameters establish the "ecological status" of a water body.

9.2.2 Desktop Study

A desktop study was undertaken to identify the baseline characteristics relating to the surface water environment and local flood risk of proximate surface waterbodies.

The following is a list of sources of information consulted for use in this chapter:

- EPA (Water Framework Ireland Map viewer) databases for information on surface water features within proximity to the proposed development;
- Ireland's Water Catchments (www.catchments.ie);

- Water Quality in Ireland 2010-2015 (EPA, 2017);
- Office of Public Works Catchment Flood Risk Assessment and Management Maps (www.floodinfo.ie)
- River Basin Management Plan for Ireland 2018 - 2021 (Department of Housing, Planning and Local Government, 2018);
- Geological Survey Ireland (information on groundwater bodies); and
- National Parks and Wildlife Service (information on protected sites); and
- Ordnance Survey of Ireland, current and historic mapping.

9.2.3 Study Area

The extent of the study area reflects the distance over which significant changes to the water environment are likely to occur. This distance is influenced by the physical extent of the works, the nature of the baseline environment and the way the effects may be propagated. It takes account of the land required permanently for the operation of the four projects and the additional land required temporarily for construction.

The study area has been confined to the land required for the four projects and the immediate receiving surface waterbodies.

9.2.4 Sensitivity

Table 9.2: Receptor Sensitivity 9.2 provides an indication of how levels of sensitivity were assigned to the identified receptors.

Table 9.2: Receptor Sensitivity

Sensitivity	Criteria	Examples
Negligible	Lower quality	Surface water sewer Poorly permeable aquifer not used for potable water or river baseflow
Low	Low quality or value on a local scale	Locally important amenity site for a small range of activities Locally important potable water supply (<50 homes) Quality Class D (Biotic Index Q2, Q1),
Medium	Locally significant attribute of high value	Coarse fishery Locally important potable water supply (>50 homes) Quality Class C (Biotic Index Q3, Q2-3),
High	Internationally, Nationally or Locally significant attribute of high value	Designated European Site Salmonid fishery Regionally or locally important potable water supply (>1000 homes) Local amenity site for a wide range of leisure activities Quality Class A, B (Biotic Index Q3, Q4, Q5),

Source: Adapted from Guidelines and Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes

9.2.5 Magnitude of Impact

Table 9.3 provides examples of the potential impacts and their magnitude, which can be reported as either 'beneficial' or 'adverse'. This list is intended as a guide and is not exhaustive. The magnitude of impact has been formulated based on descriptions of effects presented in Table 3.3 of Draft Guidelines on the Information to be Contained in EIARs. EPA 2017.

Table 9.3: Magnitude of Impacts

Magnitude	Criteria	Example
Negligible	No change to integrity of attribute. An effect capable of measurement but without significant consequences.	Discharges to watercourse with no change in the attribute's integrity.
Low	Adverse: measurable change to the integrity of an attribute	Adverse: measurable decrease in surface water ecological or chemical quality, or flow; not affecting existing users or changing any WFD status.
	Beneficial: measurable increase, or reduced risk of negative effect to an attribute	Beneficial: measurable increase in surface water ecological or chemical quality; not changing any WFD status.
Medium	Adverse: loss of part of an attribute or decrease in integrity of an attribute	Adverse: measurable decrease in surface water ecological or chemical quality, or flow, such that existing users are affected but not changing any WFD status.
	Beneficial: moderate improvement in quality of an attribute	Beneficial: measurable increase in surface water quality but not changing any WFD status.
High	Adverse: loss of an attribute and / or quality and integrity of an attribute	Adverse: decrease in surface water ecological or chemical WFD status.
	Beneficial: creation of new attribute or major improvement in quality of an attribute	Beneficial: increase in surface water ecological or chemical WFD status.

Source: Adapted from Draft Guidelines on the Information to be Contained in EIARs. EPA 2017

9.2.6 Significance Criteria

The significance of an effect is defined by the magnitude of the impact and the overall sensitivity of the receiving receptor. Significant effects on the water environment are those that have a 'moderate' significance of effect or greater (Table 9.4).

Table 9.4: Significance Matrix

Description of Impact	Sensitivity of Resources/Receptors			
	Negligible	Low	Medium	High
High	Imperceptible	Slight	Moderate	Large
	Not Significant	Not Significant	Significant	Significant
Medium	Imperceptible	Slight	Moderate	Moderate
	Not Significant	Not Significant	Significant	Significant
Low	Imperceptible	Slight	Slight	Moderate
	Not Significant	Not Significant	Not Significant	Significant
Negligible	Imperceptible	Slight	Slight	Slight
	Not Significant	Not Significant	Not Significant	Not Significant

Source: Draft Guidelines on the Information to be Contained in EIARs. EPA 2017

9.3 Baseline Environment

9.3.1 Potable Water Supply

Council Directive 98/83/EC of 3rd November 1998 on the quality of water intended for human consumption was transposed into Irish law by the European Communities (Drinking Water) (No. 2) Regulations 2007 (S.I. 278 / 2007). The EPA reports annually on the quality of drinking water in Ireland based on the monitoring data provided by Irish Water. There are no licenced surface water abstraction points within the vicinity of the sites, and potable water is not sourced within the vicinity of the sites (www.epa.ie accessed on 4th September 2020).

9.3.2 Surface Water

Poolbeg Peninsula is located within the Liffey and Dublin Bay catchment (WFD Catchment 09) which includes the area drained by the River Liffey and by all streams entering tidal water between Sea Mount and Sorrento Point, County Dublin, draining a total area of 1,616km². The largest urban centre in the catchment is Dublin City. To the south is the Dodder sub-catchment (WFD 09-010) and to the north is the Tolka sub-catchment (WFD 09-020)

The area of Dublin Bay immediately to the south of the peninsula is the South Dublin Bay Special Area of Conservation [Sitecode: 000210]. Immediately to the north is the River Liffey and beyond that the South Dublin Bay and River Tolka Estuary Special Protection Area [Sitecode: 004024]. Further to the north east is the North Bull Island Special Protection Area [Sitecode 004006]⁵². These areas are designated under the EU Habitats or Birds Directive.

The *Urban Waste Water Treatment Regulations 2001*, as amended (which transpose the *Urban Wastewater Treatment Directive (91/271/EEC)* into Irish law and update the Environmental Protection Agency Act, 1992 (*Urban Waste Water Treatment Regulations 1994*, as amended) list nutrient sensitive waters in the Third Schedule. The Liffey Estuary from Island bridge weir to Poolbeg Lighthouse, including the River Tolka basin and South Bull Lagoon has been designated as a nutrient sensitive area. Poolbeg CCGT, Dublin Bay Power Plant, Covanta and Ringsend WWTP all currently discharge to the Lower Liffey Estuary.

The *Water Framework Directive (2000/60/EC)* provides a system for monitoring and classifying the quality of surface and groundwater which involves establishing the existing ecological and chemical status of each water body, setting environmental objectives and devising programmes of measures designed to meet those objectives. The Directive sets a target of aiming to achieve at least “good status” in all natural waterbodies and maintaining that status once achieved. Ecological status is measured on the scale: high, good, moderate, poor and bad. Chemical status is recorded as “good” or “fail”. The WFD also requires that ecological status or potential does not decline over time.

The Liffey Estuary Lower to the north of the peninsula is a transitional water body classified as being of Good Status. Dublin Bay is a coastal water body classified as being of Good Status. The Tolka Estuary transitional water body further north is classified as being of Moderate Quality.

There are no other surface water features within the study area.

The key surface water receptor is Dublin Bay which is determined to have High sensitivity given the various international designations applicable.

⁵² <https://www.npws.ie/>

9.3.3 Groundwater

The GSI spatial resources viewer shows that the Lucan Formation is classified as LI – locally important aquifer, which is moderately productive in local zones. However, the bedrock beneath the Poolbeg peninsula is not mapped as an aquifer, given the depth to bedrock and coastal setting it is expected that groundwater in the bedrock would be brackish. Neither are the reclaimed sediments classified as a gravel aquifer; groundwater in the reclaimed sediments is also expected to be brackish. In previous groundwater monitoring rounds electrical conductivity readings above 3,999 μ S/cm were frequently recorded, indicative of brackish groundwater conditions⁵³.

Groundwater vulnerability is classified as Low in the Ringsend/South Wall and Poolbeg BESS areas of the peninsula and not classified further east towards Poolbeg FlexGen as the reclaimed sediments and bedrock are not classified as aquifers in this area.

The site is mapped as being within the Dublin Groundwater Body (IE_EA_G_008) whose status under the Water Framework Directive (WFD, 2013 to 2018) is classified as Good and Not at Risk. There are no groundwater protection areas within a 2km radius of the four sites for either public water supplies or group water schemes and there are no groundwater Drinking Water Protection Areas for potable supply. A search of the GSI well database identified no groundwater wells within the immediate vicinity of the four sites. The nearest is 1.6km north of the Ringsend FlexGen site, on the northern side of Dublin Port by the Tolka Estuary. There will be no hydraulic connectivity between this well and the four development sites.

Groundwater flow across the Poolbeg peninsula is expected to be tidally driven given that it is surrounded on three sides by Dublin Bay and the Liffey Estuary. Previous groundwater monitoring has indicated that groundwater elevations can vary by 0.7m between high and low tides (depth to groundwater measurements provided in the OCM baseline report). It is considered that the direction of groundwater flow across the Peninsula varies with potentially influent conditions occurring at times of high tide and effluent conditions at low tide with groundwater discharging to Dublin Bay to the east and south and the Liffey Estuary to the north.

Groundwater quality has been monitored from boreholes installed in the Poolbeg FlexGen and BESS sites in March 2020. Groundwater was generally encountered at depths of 3.5m and 4.5m bgl. Conductivity measurements of between 522 μ S/cm and >70900 μ S/cm confirm previous evidence for brackish water quality. Generally, there was no evidence of contamination during groundwater purging for well development. In well BSA01 in the proposed Poolbeg BESS site, there was a slight hydrocarbon sheen visible during well development (19 March 2020), reducing to a trace sheen during sampling (23 March 2020). There was also a trace sheen observed on groundwater from BH102 in the proposed Poolbeg FlexGen site during sampling. No hydrocarbon odour was observed during sampling.

Some hydrocarbons were recorded within groundwater samples from the Poolbeg BESS site at concentrations in excess of the adopted thresholds which were interpreted as possible PAH compounds, lubricating oil or diesel. Concentrations of cyanide were also detected in excess of its threshold value. Soil leachate testing also recorded concentrations of PAH compounds. These concentrations are assessed as not posing a significant risk to nearby controlled waters receptors⁵⁴.

Groundwater quality has been monitored from boreholes installed in the Ringsend/South Wall sites in June 2020. Groundwater was generally encountered at depths of 2.0m and 4.2m bgl.

⁵³ AECOM 2020 Poolbeg Baseline Assessment

⁵⁴ AECOM 2020 Poolbeg Baseline Assessment

Conductivity measurements of between 820µS/cm and 2150µS/cm confirm previous evidence for brackish water quality. Field evidence of soil contamination was noted in two trial pits (BTP040 and BTP05) in the central portion of the South Wall BESS site and in three trial pits in the Ringsend FlexGen site comprising hydrocarbon odours and sheens on groundwater (FTP05, FTP08 and FSA07). A thin tar layer was noted in FTP009. Leachate analysis of soil samples indicates a potential source of contamination is present from hydrocarbons, antimony, arsenic, copper, nickel, molybdenum and sulphate. Groundwater samples recorded concentrations of petroleum hydrocarbons and PAH compounds above thresholds protective of groundwater and surface water quality. Concentrations of metals were generally below thresholds protective of surface water except for nickel which was elevated in a single borehole (FSA01). AECOM conclude that risks to controlled waters are likely to be very low⁵⁵ citing the likelihood for dilution and general elevated concentrations of hydrocarbons within groundwater across the Peninsula.

9.3.4 Hydrogeological Conceptual Site Model

Given the similarities between all four proposed projects a single conceptual site model is considered appropriate to adequately describe each project.

The underlying ground conditions comprise made ground over inter tidal sands. Residual contamination was found and subsequently remediated in the Poolbeg FlexGen site and there is evidence of hydrocarbon contamination within the South Wall/Ringsend sites. The possibility remains that residual contamination will be encountered during construction in all sites.

Groundwater is present within the underlying Made Ground and is likely to be in hydraulic continuity with the surrounding Dublin Bay and Liffey estuary as evidenced by tidally influenced groundwater fluctuations. Groundwater gradients across the Peninsula are relatively flat indicating little potential for contaminant migration. Groundwater is expected to flow towards the Liffey Estuary in the north and towards Dublin Bay in the south and east, with a watershed running along the centre of the Peninsula, although this is likely to be influenced by underground structures modifying groundwater migration pathways and surface developments intercepting rainfall and diverting this into drainage systems.

Risks to groundwater quality are not considered significant; groundwater within the underlying strata is not considered to be a resource; water quality is poor with influence from the adjacent seawater creating brackish conditions. There are no abstractions of groundwater and the underlying strata are not classified as aquifers.

Groundwater beneath the sites is considered to be a pathway for migration of residual soil bound contaminants within each site to Dublin Bay, a sensitive receptor. Residual contamination that has been discovered during recent ground investigations in the Poolbeg FlexGen site has been removed and it is intended that in the event more residual contamination being discovered during construction this will also be removed; reducing the potential for a source of contamination to migrate towards Dublin Bay. Contamination in the South Wall / Ringsend site will be similarly excavated to remove the potential source of contamination from this area; reducing the risk of residual contamination migrating off site.

The construction of each project will divert incident rainfall into secure drainage systems which will further reduce the potential for mobilisation of contaminants. The facilities themselves will store potentially contaminative substances in secure bunded areas which are further secured by

⁵⁵ AECOM 2020 South Wall BESS and Ringsend FlexGen – SI and GQRA Report

the site drainage system. Construction and operation of these sites will reduce the potential for contamination of Dublin Bay.

9.3.5 Flood Risk

Flood risk has been considered in accordance with 'The Planning System and Flood Risk Management - Guidelines for Planning Authorities' issued by the Department of Environment, Heritage and Local Government in November 2009. These Guidelines set out the policy on development and flood risk in Ireland and provide a framework for the integration of flood risk assessment into the planning process. The objective is to ensure that flood risk is taken into account at all stages in the planning process and as a result to:

- Avoid inappropriate development in areas at risk of flooding,
- Avoid new developments increasing flood risk elsewhere,
- Ensure effective management of residual risks for development permitted in floodplains.

The Guidelines set out a staged approach for the consideration of flood risk in relation to developments as follows;

Stage 1: Flood risk identification – to identify whether there may be any flooding or surface water management issues related to either the area of regional planning guidelines, development plans and LAP's or a proposed development site that may warrant further investigation at the appropriate lower level plan or planning application levels;

Stage 2: Initial flood risk assessment – to confirm sources of flooding that may affect a plan area or proposed development site, to appraise the adequacy of existing information and to scope the extent of the risk of flooding which may involve preparing indicative flood zone maps. Where hydraulic models exist the potential impact of a development on flooding elsewhere and of the scope of possible mitigation measures can be assessed. In addition, the requirements of the detailed assessment should be scoped; and

Stage 3: Detailed flood risk assessment – to assess flood risk issues in sufficient detail and to provide a quantitative appraisal of potential flood risk to a proposed or existing development or land to be zoned, of its potential impact on flood risk elsewhere and of the effectiveness of any proposed mitigation measures.

The Guidelines classify developments into three vulnerability classes based on the effects of flooding;

- Highly vulnerable development,
- Less vulnerable development and,
- Water compatible development.

Essential infrastructure such as energy generation and storage systems are classed as highly vulnerable development.

The Guidelines classify land areas within three flood zones based on the probability of flooding. Flood zones are defined as follows in the Guidelines:

Zone A is at highest risk. In any one year, Zone A has a 1 in 100 year (1%) chance of flooding from rivers and a 1 in 200 year (0.5%) chance of flooding from the sea.

Zone B is at moderate risk. The outer limit of Zone B is defined by the 1 in 1,000 year (or 0.1%) flood from rivers and the sea.

Zone C is at low risk. In any one year, Zone C has less than 1 in 1,000 year (<0.1%) chance of flooding from rivers, estuaries or the sea.

In the identification of flood zones, no account should be taken of any flood relief walls or embankments. Development within Zones A and B may be permissible as long as a justification test is passed, Table 9.5.

Table 9.5: Development within Flood Risk Zones

	Flood Zone A	Flood Zone B	Flood Zone C
Highly Vulnerable	Justification Test	Justification Test	Appropriate
Less vulnerable	Justification Test	Appropriate	Appropriate
Water-compatible Development	Appropriate	Appropriate	Appropriate

From Table 9.5 it is apparent that highly vulnerable development such as power generation and energy storage infrastructure should ideally be located in Flood Zone C but where development is proposed in areas at greater flood risk a justification test is needed.

9.3.6 Poolbeg FlexGen

9.3.6.1 Drainage

The proposed FlexGen site is located on a vacant site within the boundary of the existing Poolbeg generating station. The site is bounded by an earth bund along the eastern and southern boundaries. The ground surface is currently permeable rubble and so incident rainfall will soak into the ground. Groundwater from the site will migrate towards Dublin Bay, the nearest receiving waterbody is the South Dublin Bay Special Area of Conservation [Sitecode: 004024].

9.3.6.2 Flood Risk

The proposed site is located approximately 75m from the sea in Dublin Bay at its outermost boundaries. There are currently no existing drainage services or watercourses located on the site and consequently it is not expected that fluvial flooding will pose a risk at this location.

A flood risk assessment has been prepared which shows the site is located in Flood Risk Zone C⁵⁶. The proposed site is not located within an area considered to be at risk of flooding from river or sea. It should be noted that a short section of internal road within the wider Poolbeg generating site is lower than the predicted 0.1% annual exceedance probability tidal flood level allowing for climate change; however, there is no critical infrastructure proposed for this location and an alternative route to the site is available which is not within a flood risk zone.

Taking climate change into account the Office of Public Works recommends an allowance of 500mm mean sea level rise which would result in a predicted tidal flood level of 3.84mOD Malin at 0.1% annual exceedance probability, which is higher than the lowest levels at the site, 3.63mOD Malin.

⁵⁶ ESB, 2020. Poolbeg Flexible Generation Flood Risk Assessment Report Reference P000344-PM01-0003

9.3.7 Poolbeg BESS

9.3.7.1 Drainage

The proposed BESS site is located within the boundaries of the existing Poolbeg Generating station, on existing development largely comprising buildings and impermeable paving with some minor vegetated areas. Incident rainfall is collected within the existing Poolbeg Generating Station drainage system which discharges via the station cooling water outfall to Dublin Bay to the north. Details of the existing control measures are in the Drainage report in Appendix 5B.Flood Risk

The proposed site is located approximately 100m from the sea in Dublin Bay at its outermost boundaries. There are currently no watercourses located on the site for the proposed BESS development and consequently it is not expected that fluvial flooding will pose a risk at this location.

The proposed site is not located within an area considered to be at risk of flooding from river or sea. A flood risk assessment has been prepared which shows the site is located in Flood Risk Zone C⁵⁷. Taking climate change into account the Office of Public Works recommends an allowance of 500mm mean sea level rise which would result in a predicted tidal flood level of 3.84mOD Malin at 0.1% annual exceedance probability, which is higher than the lowest levels at the site, 3.56mOD Malin.

9.3.8 Ringsend FlexGen

9.3.8.1 Drainage

The site of the proposed FlexGen is previously developed land comprising areas of impermeable ground and rubble. Incident rainfall will infiltrate through the areas of rubble.

9.3.8.2 Flood Risk

The proposed site is located approximately 200m from the sea in Dublin Bay at its outermost boundary. There are currently no existing drainage services or watercourses located on the existing site and consequently it is not expected that fluvial flooding will pose a risk at this location.

A flood risk assessment has been prepared which shows the site is located in Flood Risk Zone C⁵⁸. The proposed site is not located within an area considered to be at risk of flooding from river or sea. Taking climate change into account the Office of Public Works recommends an allowance of 500mm mean sea level rise which would result in a predicted tidal flood level of 3.84mOD Malin at 0.1% annual exceedance probability. The site is currently at an elevation of 4.3mOD to 4.8mOD Malin, and so is outside the floodplain.

9.3.9 South Wall BESS

9.3.9.1 Drainage

The proposed BESS site is located on a vacant site. The site is bounded by an earth bund along the eastern and northern boundaries. The ground surface comprises rubble and so incident rainfall will soak into the ground.

⁵⁷ ESB, 2020. Poolbeg BESS Flood Risk Assessment Report Reference P000033-02-R460-002

⁵⁸ ESB, 2020. Ringsend Flexible Generation Flood Risk Assessment Report Reference P000343-PM01-0008

9.3.9.2 Flood Risk

The proposed site is located approximately 200m from the sea in Dublin Bay at its outermost boundary. There are currently no existing drainage services or watercourses located on the existing site and consequently it is not expected that fluvial flooding will pose a risk at this location.

A flood risk assessment has been prepared which shows the site is located in Flood Risk Zone C⁵⁹. Taking climate change into account the Office of Public Works recommends an allowance of 500mm mean sea level rise which would result in a predicted tidal flood level of 3.84mOD Malin at 0.1% annual exceedance probability, which is higher than the lowest levels at the site, 1.75mOD Malin. The parts of the site where the development will be located will be raised to a minimum level of 4.0mOD. A portion of the site which will not be developed will be left at its existing level in order to maintain access to ESB Networks underground cables which run diagonally from the southeast to northwest through the site. The majority of the area which will not be developed is located in the southern part of the site. The levels here vary from approximately 2.45mOD to 4.87mOD.

9.4 Poolbeg FlexGen Impact Assessment

9.4.1 Do Nothing

In terms of the Do Nothing scenario, there will be no changes in the existing drainage and no change in flood risk. Consequently, no impacts are assessed.

9.4.2 Poolbeg FlexGen Construction Effects

Drainage

During construction the principal risk arises from heavy rainfall causing surface flooding which then flows into nearby drains transporting sediment and subsequently may affect nearby surface water bodies. During construction the elevation of the site will be regraded to provide a finished floor level of at least 4.0mOD Malin using granular fill. Incident rainfall will continue to soak into the ground. The new surface water drainage system will be progressively constructed and connected to the existing site-wide drainage network. As elements of the construction that will intercept rainfall (hard surfaces and roofs) are constructed these will be connected to the site drainage system which flows into the attenuation tank⁶⁰.

The receiving waterbody is considered to be of high sensitivity given its designation as a Special Area of Conservation. Pollutants mobilised by incident rainfall and migrating with groundwater could enter Dublin Bay. Potentially polluting activities will however be controlled to prevent spillages of polluting materials.

During construction there is a potential for silt to run-off exposed surfaces. High risk activities such as pouring concrete and refuelling vehicles will also have the potential to cause polluted run off which may enter unprotected drains. Polluting matter entering drains has the potential to discharge to Dublin Bay, a highly sensitive receptor. The magnitude of any such pollution incidents is likely to be high to medium, presenting a moderate to large adverse impact (significant) on Dublin Bay. Construction activities with a potential to cause polluting run off will be managed; concrete wash water will be retained on site and prevented from entering drains; and refuelling will be undertaken using purpose designed equipment bunded to prevent leaks. Should any fuels or other liquids spill or leak from any vehicles these will be cleaned

⁵⁹ ESB, 2020 South Wall BESS Flood Risk Assessment Report Reference QS-000266-01-R460-005

⁶⁰ ESB 2020 Poolbeg Flexible Generation Drainage and Services Report P000344-PM01-0004

immediately, and any affected soils excavated and removed. Excavations for service runs will be managed using control measures such as bunding areas to prevent surface run-off and protecting drains. With these control measures in place the effect on Dublin Bay the magnitude of impact from polluting run off is expected to be negligible with a slight adverse impact (not significant).

Some elements of the proposed development will require piled foundations. The underlying granular geology is already permeable and so any piling is not anticipated to create new pollution pathways. A negligible magnitude of impact is assessed resulting in a slight adverse effect (not significant).

It is not anticipated that any excavations will require dewatering; groundwater is generally deeper than service trenches. Should dewatering be required this will be managed under a method statement to prevent silty water discharging to drains or surface water receptors. A negligible magnitude of impact is assessed resulting in a slight adverse effect (not significant).

During ground investigations undertaken in 2020 and reported in Chapter 8 some residual contamination was found within the underlying made ground comprising tarry hydrocarbons. This material has been removed from site and so the probability of mobilising existing contamination during construction is reduced. Should any further areas of contamination be noted during the works, these will also be removed. A negligible magnitude of impact is assessed resulting in a slight adverse effect (not significant).

Considering the control measures to prevent polluting substances entering the ground and subsequently migrating to Dublin Bay to the south, the effects on drainage are considered to be negligible and so a not significant impact is assessed in accordance with Table 9.4.

Flood Risk

The internal access road to the site is below the level of the 0.1% annual exceedance probability with climate change factored indicating that there is a possibility that during severe weather this road could be at risk of flooding. In the unlikely event that this occurs there is an alternative access route to the site which is not at risk. The development site is in Flood Risk Zone C and will be raised to the required level to account climate change as recommended in the Greater Dublin Strategic Drainage Study⁶¹. The development is considered to be appropriate in accordance with Table 9.5. The development will not cause increased risk of flooding in other areas.

The effects on flood risk are considered to be negligible and so a not significant impact is assessed in accordance with Table 9.4.

9.4.3 Poolbeg FlexGen Operational Effects

9.4.3.1 Drainage

The proposed site will comprise of a number of new buildings and plant to facilitate the operation of the FlexGen development. The majority of the proposed site compound will be surfaced with permeable stone. Surface water generated on permeable areas will infiltrate to ground. Surface water generated on the impermeable elements of the proposed development will be collected in an underground drainage network before passing through a Class 1 oil separator and into an attenuation tank where it will be discharged at the calculated greenfield

⁶¹ Dublin Drainage Consultancy 2005. Greater Dublin Strategic Drainage Study, Final Strategy Report

runoff rate. It will then connect to the existing ESB owned drainage network to the north of the site which ultimately discharges to Dublin Bay via the existing cooling water outfall.

The proposed drainage design is presented in the Drainage Report⁶² and on Drawing QP-000027-04-D460-006. Accounting for a 1 in a 100 year rainfall event with 20% climate change the attenuation tank requires a capacity of 418m³. The hydrobrake flow control system will limit discharge to 12 litres per second. A number of oil interceptors are located at strategic points within the drainage system including the sump draining the fuel storage tank bunded area. Typical details are shown on Drawing QP-000027-04-D460-007. These interceptors will be maintained by ESB throughout the operational life of the site. The secure drainage system will prevent contamination migrating downwards to impact groundwater and will reduce infiltration from rainwater, reducing any potential for residual contamination to be mobilised.

The transformers and oil storage tank are considered to present the highest risk to the environment from accidental spillages or leaks and are bunded to prevent any such spillages escaping. The bunded areas are kept free of standing water using permanent pumps which drain incident rainfall. These pump systems are fitted with oil indicators which would prevent the pumps from operating and sound an alarm in the Distributed Control System (DCS). Should a fire occur in any bunded equipment the fire detection systems will also disable the bund pumping systems to prevent contaminated fire water being discharged into the drainage system.

The FlexGen uses demineralised water in the combustion chamber to reduce nitrogen oxide emissions. Demineralised water required for the turbine operation will be produced in the proposed onsite water treatment plant or sourced from a new connection to the existing Poolbeg Generating Station water treatment plant. This water is consumed at a rate of 26,000 litres per hour of operation. The treatment plant removes dissolved solids and chlorine from the potable water with a residual effluent. To produce 26,000 litres of demineralised water the plant will generate 9,000 litres of effluent. This will be discharged via the surface water drainage system in accordance with EPA Licence requirements.

There will be a foul water connection for the welfare facilities to existing sewers which connect to Irish Water's treatment facility. The site is not occupied permanently and so these facilities will be used infrequently.

The effects on drainage are considered to be negligible and so a not significant impact is assessed in accordance with Table 9.4.

9.4.3.2 Flood Risk

The development site is in Flood Risk Zone C and will be raised to the required level to account climate change as recommended in the Greater Dublin Strategic Drainage Study⁶³. The development will not cause increased risk of flooding in other areas.

The effects on flood risk are considered to be negligible and so a not significant impact is assessed in accordance with Table 9.4.

9.4.4 Poolbeg FlexGen Decommissioning

Should the Poolbeg FlexGen plant be decommissioned the equipment will be dismantled and removed from site and the site left as a level platform. A Decommissioning Management Plan (DMP) will be prepared in accordance with the IE licence. Any spills or leaks that may have

⁶² Poolbeg Flexible Generation Drainage and Services Report P000344-PM01-0004

⁶³ Dublin Drainage Consultancy 2005. Greater Dublin Strategic Drainage Study, Final Strategy Report

occurred will be cleaned. The existing drainage system will be maintained. Any decommissioning required will be subject to the conditions set out in the IE licence issued by the EPA. Consequently, there will be no environmental effects relating to drainage from decommissioning. The site will remain outside the flood risk zone.

Table 9.6: Summary of Poolbeg FlexGen Impact Assessment

Issue	Value	Impact	Significance	Mitigation	Residual Impact
Construction					
Pollution from run-off reaching Dublin Bay	High	High to Medium	Significant	Best practice measures to control pollution	Slight Adverse Not Significant
Piling	High	Negligible	Not Significant	Piling to be undertaken following detailed risk assessments. Low chance of residual contamination and piling will not introduce new pathways.	No residual effects
Dewatering	High	Negligible	Not Significant	If required, will be undertaken under method statements and pollution control measures.	No residual impact
Mobilisation of residual contamination	High	Negligible	Not significant	Best practice during construction will minimise risk pf pollution migrating	No residual impact
Flood Risk	The site will be developed to be outside the flood risk zone. There is an access road that will remain within the flood risk zone			An alternative access road is available	No residual impact
Operation					
Pollution from site drainage reaching Dublin Bay	High	Negligible	Not Significant	Drainage design has measures to control pollution.	No residual impact
Mobilisation of residual contamination	High	Negligible	Not significant	Site drainage will minimise potential for infiltration	No residual impact
Flood Risk	The site is not within a flood risk zone				
Decommissioning					
Pollution from site drainage reaching Dublin Bay	High	Negligible	Not Significant	Drainage design has measures to control pollution. Site drainage will continue to be managed following decommissioning	No residual impact
Mobilisation of residual contamination	High	Negligible	Not significant	Decommissioning will follow best practice under pollution prevention and control measures.	No residual impact

Issue	Value	Impact	Significance	Mitigation	Residual Impact
Flood Risk	The site is not within a flood risk zone				

9.4.5 Poolbeg FlexGen Mitigation and Monitoring

During construction the contractor will implement an environmental management plan which will set out control measures and procedures to ensure potentially polluting activities are controlled and managed. These measures will include the following:

- Fuel storage – bunded tanks to prevent spillages and designated fuelling areas with spillage control;
- Chemical storage – all potentially polluting chemicals will be stored in secure weatherproof enclosures with spill kits;
- Concrete wash water will be collected;
- Should dewatering be required any discharges will be treated to remove contaminants and silt and disposed of in accordance with EPA requirements; and
- The site will be kept secure to prevent vandalism which can lead to pollution from stored liquids escaping and entering drains.

The CEMP will include emergency procedures in the event of a pollution event and routine monitoring of the site to ensure potentially contaminating activities remain under control. Monitoring will include daily visual monitoring of any surface water outfalls.

Operational risk mitigation measures have been designed into the FlexGen design.

The drainage system has been designed to mitigate the effects of severe rainfall. Incident rainwater will collect in an attenuation tank which will slowly empty, reducing the surge of water entering the drainage system and reducing flood risk.

The development platform will be raised outside the 0.1% annual exceedance probability with climate change factored flood risk level.

The safety systems designed into the plant will monitor rainfall levels in bunded areas and maintain these free of rainwater. These systems are designed to prevent contaminated water being discharged into the drainage system.

No other mitigation is required.

As no significant impacts are assessed as likely, no monitoring is required.

9.5 Poolbeg BESS Impact Assessment

9.5.1 Do Nothing

In terms of the Do Nothing scenario, there will be no changes in the existing drainage and no change in flood risk. Consequently, no impacts are assessed.

9.5.2 Poolbeg BESS Construction Effects

Drainage

The receiving waterbody is considered to be of high sensitivity given its designation as a Special Protection Area. Pollutants mobilised by incident rainfall and migrating with groundwater could

enter Dublin Bay. Potentially polluting activities will however be controlled by standard construction practices to prevent spillages of polluting materials.

Demolition of the existing buildings will create various waste streams. Materials will be segregated into types and stored either in skips or as stockpiles awaiting off-site disposal. Materials stored in skips will not present any risk to drainage. Masonry and concrete which may be crushed on site and reused will be stockpiled. Drainage of the stockpile areas will be managed by standard construction practices to prevent surface water washing through and mobilising fine sediment.

During construction the principal risk arises from heavy rainfall causing surface flooding which then flows into drains transporting sediment and subsequently may affect nearby surface water bodies. During construction the site will be regraded to provide a finished floor level of at least 4.0mOD Malin using granular fill. Incident rainfall will enter the existing drainage system for as long as these systems remain. As demolition and land raising progresses the old drainage system will become redundant and incident water will soak into the ground. The new surface water drainage system will be progressively constructed and connected to the existing site-wide drainage network. As elements of the construction that will intercept rainfall (hard surfaces and roofs) are constructed these will be connected to the site drainage system which flows into the attenuation tank⁶⁴.

During construction there is a potential for silt to run-off exposed surfaces. High risk activities such as pouring concrete and refuelling vehicles will also have the potential to cause polluted run off which may enter unprotected drains. Polluting matter entering drains has the potential to discharge to Dublin Bay, a highly sensitive receptor. The magnitude of any such pollution incidents is likely to be high to medium, presenting a moderate to large adverse impact (Significant) on Dublin Bay. Construction activities with a potential to cause polluting run off will be managed as outlined in the OCEMP in Appendix 5C. With these control measures in place the effect on Dublin Bay the magnitude of impact from polluting run off is expected to be negligible with a slight adverse impact (not significant).

Some elements of the proposed development will require piled foundations. The underlying granular geology is already permeable and so any piling is not anticipated to create new pollution pathways. A negligible magnitude of impact is assessed resulting in a slight adverse effect (not significant).

It is not anticipated that any excavations will require dewatering; groundwater is generally deeper than service trenches. Should dewatering be required this will be managed under a method statement to prevent silty water discharging to drains or surface water receptors. A negligible magnitude of impact is assessed resulting in a slight adverse effect (not significant).

Whilst no significant contamination was found during ground investigations undertaken in 2020 and reported in Chapter 8 there remains the possibility that residual contamination will be present. Any such material will be assessed and if found to present a risk to controlled waters will be removed from site. Should any further areas of contamination be noted during the works, these will also be removed. A negligible magnitude of impact is assessed resulting in a slight adverse effect (not significant).

Considering the control measures to prevent polluting substances entering the ground and subsequently migrating to Dublin Bay, the effects on drainage are considered to be negligible and so a not significant impact is assessed in accordance with Table 9.4.

⁶⁴ ESB 2020. Poolbeg BESS Drainage and Services Report QP-000033-02-R460-002

Flood Risk

The development site is in Flood Risk Zone C and will be built to the required level to account climate change as recommended in the Greater Dublin Strategic Drainage Study⁶⁵. The development is considered to be appropriate in accordance with Table 9.5. The development will not cause increased risk of flooding in other areas.

The effects on flood risk are considered to be negligible and so a not significant impact is assessed in accordance with Table 9.4.

9.5.3 Poolbeg BESS Operational Effects

Drainage

The proposed site will comprise of a number of new buildings and plant housing batteries and other electrical equipment. The majority of the proposed site compound will be surfaced with permeable stone. Surface water generated on permeable areas will infiltrate to ground. Surface water generated on the impermeable elements will be collected in an underground drainage network before passing through a Class 1 oil separator and into an attenuation tank where it will be discharged at the calculated greenfield runoff rate. It will then connect to the existing ESB owned drainage network which discharges to Dublin Bay via the cooling water outfall.

The proposed drainage design is presented in the Drainage Report⁶⁶ and on Drawing QP-000027-04-D460-006-001 and QP-000027-04-D460-006-002. which shows a 129m³ attenuation tank with a hydrobrake flow control system to limit discharge to greenfield rates. The drainage network passes through an oil interceptor prior to entering the attenuation tank. Typical details are shown on Drawing QP-000033-02-D460-037. The secure drainage system will prevent contamination migrating downwards to impact groundwater and will reduce infiltration from rainwater, reducing any potential for residual contamination to be mobilised.

The effects on drainage are considered to be negligible and so a not significant impact is assessed in accordance with Table 9.4.

Flood Risk

A flood risk assessment⁶⁷ has been undertaken and is presented in Appendix 9. The site will be built to achieve a final finished ground level of 4.0mOD Malin which will maintain all critical infrastructure outside the flood risk zone and so the development is considered to be appropriate in accordance with Table 9.5. This elevation has been recommended in the Greater Dublin Strategic Drainage Study to account for climate change.

The effects on flood risk are considered to be negligible and so a not significant impact is assessed in accordance with Table 9.4.

9.5.4 Poolbeg BESS Decommissioning

Should the BESS plant be decommissioned the equipment will be dismantled and removed from site and the site left as a level platform. Any spills or leaks that may have occurred will be cleaned. The existing drainage system will be maintained. As the BESS is proposed to be located within an existing IE licenced site any decommissioning required will be in line with an IE licence. Consequently, there will be no environmental effects relating to drainage from decommissioning. The site will remain outside the flood risk zone.

⁶⁵ Dublin Drainage Consultancy 2005. Greater Dublin Strategic Drainage Study, Final Strategy Report

⁶⁶ Poolbeg Battery Energy Storage System Drainage and Services Report QP-000033-02-R460-002

⁶⁷ Poolbeg Battery Energy Storage System Flood Risk Assessment QP-000033-02-R460-002

Table 9.7: Summary of Poolbeg BESS Impact Assessment

Issue	Value	Impact	Significance	Mitigation	Residual Impact
Construction					
Pollution from run-off reaching Dublin Bay	High	High to Medium	Significant	Best practice measures to control pollution	Slight Adverse Not Significant
Piling	High	Negligible	Not Significant	Piling to be undertaken following detailed risk assessments. Low chance of residual contamination and piling will not introduce new pathways.	No residual effects
Dewatering	High	Negligible	Not Significant	If required, will be undertaken under method statements and pollution control measures.	No residual impact
Mobilisation of residual contamination	High	Negligible	Not significant	Best practice during construction will minimise risk of pollution migrating	No residual impact
Flood Risk	The site will be developed to be outside the flood risk zone				No residual impact
Operation					
Pollution from site drainage reaching Dublin Bay	High	Negligible	Not Significant	Drainage design has measures to control pollution.	No residual impact
Mobilisation of residual contamination	High	Negligible	Not significant	Site drainage will minimise potential for infiltration	No residual impact
Flood Risk	The site is not within a flood risk zone				
Decommissioning					
Pollution from site drainage reaching Dublin Bay	High	Negligible	Not Significant	Drainage design has measures to control pollution. Site drainage will continue to be managed following decommissioning	No residual impact
Mobilisation of residual contamination	High	Negligible	Not significant	Decommissioning will follow best practice under pollution prevention and control measures.	No residual impact
Flood Risk	The site is not within a flood risk zone				

9.5.5 Poolbeg BESS Mitigation and Monitoring

During construction the contractor will implement an environmental management plan which will set out control measures and procedures to ensure potentially polluting activities are controlled and managed. These measures will include the following:

- Fuel storage – bunded tanks to prevent spillages and designated fuelling areas with spillage control;
- Chemical storage – all potentially polluting chemicals will be stored in secure weatherproof enclosures with spill kits;
- Concrete wash water will be collected;
- Should dewatering be required any discharges will be treated to remove contaminants and silt and disposed of in accordance with EPA requirements; and
- The site will be kept secure to prevent vandalism which can lead to pollution from stored liquids escaping and entering drains.

The CEMP plan will include emergency procedures in the event of a pollution event and routine monitoring of the site to ensure potentially contaminating activities remain under control. Monitoring will include daily visual monitoring of any surface water outfalls.

Operational risk mitigation measures have been designed into the BESS design.

The drainage system has been designed to mitigate the effects of severe rainfall. Incident rainwater will collect in an attenuation tank which will slowly empty, reducing the surge of water entering the drainage system and reducing flood risk.

The development platform will be raised outside the 0.1% annual exceedance probability with climate change factored flood risk level.

The safety systems designed into the plant will monitor rainfall levels in bunded areas and maintain these free of rainwater.

No other mitigation is required.

As no significant impacts are assessed as likely, no monitoring is required.

9.6 Ringsend FlexGen Impact Assessment

9.6.1 Do Nothing

In terms of the Do Nothing scenario, there will be no changes in the existing drainage and no change in flood risk. Consequently, no impacts are assessed.

9.6.2 Ringsend FlexGen Construction Effects

Drainage

The receiving waterbody is considered to be of high sensitivity given its designation as a Special Area of Conservation. Pollutants mobilised by incident rainfall and migrating with groundwater could enter Dublin Bay. Potentially polluting activities will however be controlled to prevent spillages of polluting materials.

During construction the principal risk arises from heavy rainfall causing surface flooding which then flows into drains transporting sediment and subsequently may affect nearby surface water bodies. Incident rainfall will infiltrate the site as per its current condition. The surface water drainage system will be constructed and connected to the existing public surface water drainage network located on South Bank Road, to the south west of the site. As elements of the

construction that will intercept rainfall (hard surfaces and roofs) are constructed these will be connected to the site drainage system which flows into the attenuation tank⁶⁸.

During construction there is a potential for silt to run-off exposed surfaces. High risk activities such as pouring concrete and refuelling vehicles will also have the potential to cause polluted run off which may enter unprotected drains. Polluting matter entering drains has the potential to discharge to Dublin Bay, a highly sensitive receptor. The magnitude of any such pollution incidents is likely to be high to medium, presenting a moderate to large adverse impact (significant) on Dublin Bay. Construction activities with a potential to cause polluting run off will be managed; concrete wash water will be retained on site and prevented from entering drains; and refuelling will be undertaken using purpose designed equipment bunded to prevent leaks. Should any fuels or other liquids spill or leak from any vehicles these will be cleaned immediately, and any affected soils excavated and removed. Excavations for service runs will be managed using control measures such as bunding areas to prevent surface run-off and protecting drains. With these control measures in place the effect on Dublin Bay the magnitude of impact from polluting run off is expected to be negligible with a slight adverse impact (not significant).

Some elements of the proposed development will require piled foundations. The underlying granular geology is already permeable and so any piling is not anticipated to create new pollution pathways. A negligible magnitude of impact is assessed resulting in a slight adverse effect (not significant).

It is not anticipated that any excavations will require dewatering; groundwater is generally deeper than service trenches. Should dewatering be required this will be managed under a method statement to prevent silty water discharging to drains or surface water receptors. A negligible magnitude of impact is assessed resulting in a slight adverse effect (not significant).

Ground investigations will be completed to inform foundation design. Should these investigations discover significant residual contamination this material will be removed from site and so the probability of mobilising existing contamination during construction is reduced. Should any further areas of contamination be noted during the construction works, these will also be removed. A negligible magnitude of impact is assessed resulting in a slight adverse effect (not significant).

Considering the control measures to prevent polluting substances entering the ground and subsequently migrating to the Dublin Bay to the south, the effects on drainage are considered to be negligible and so a not significant impact is assessed in accordance with Table 9.4.

Flood Risk

The development site is in Flood Risk Zone C and will be built to the required level to account climate change as recommended in the Greater Dublin Strategic Drainage Study⁶⁹. The development is considered to be appropriate in accordance with Table 9.5. The development will not cause increased risk of flooding in other areas. The effects on flood risk are considered to be negligible and so a not significant impact is assessed in accordance with Table 9.4.

⁶⁸ ESB 2020. Ringsend Flexible Generation Drainage Report

⁶⁹ Dublin Drainage Consultancy 2005. Greater Dublin Strategic Drainage Study, Final Strategy Report

9.6.3 Ringsend FlexGen Operational Effects

Drainage

The proposed site will comprise of a number of new buildings and plant to facilitate the operation of the FlexGen development. The majority of the proposed site compound will be surfaced with permeable stone. Surface water generated on permeable areas will infiltrate to ground. Surface water generated on the impermeable elements of the proposed development will be collected in an underground drainage network before passing through a Class 1 oil separator and into an attenuation tank where it will be discharged at the calculated greenfield runoff rate. It will then connect to the existing public drainage network to the south west of the site which ultimately discharges to Dublin Bay.

The proposed drainage design is presented in the Drainage Report⁷⁰ and on Drawings QP-000026-04-D460-006-001-001 and QP-000026-04-D460-006-002-000. Accounting for a 1 in a 100 year rainfall event with 20% climate change the attenuation tank requires a capacity of 224m³. The hydrobrake flow control system will limit discharge to 20 litres per second. A number of oil interceptors are located at strategic points within the drainage system including the sump draining the fuel storage tank bunded area (Drawing QP-000027-04-D460-007). These interceptors will be maintained by ESB throughout the operational life of the site. The secure drainage system will prevent contamination migrating downwards to impact groundwater and will reduce infiltration from rainwater, reducing any potential for residual contamination to be mobilised.

The transformers and oil storage tank are considered to present the highest risk to the environment from accidental spillages or leaks and are bunded to prevent any such spillages escaping. The bunded areas are kept free of standing water using permanent pumps which drain incident rainfall. These pump systems are fitted with oil indicators which would prevent the pumps from operating and sound an alarm in the DCS. Should a fire occur in any bunded equipment the fire detection systems will also disable the bund pumping systems to prevent contaminated fire water being discharged into the drainage system.

The FlexGen uses demineralised water in the combustion chamber to reduce nitrogen oxide emissions. This water is produced on the adjacent Dublin Bay site from potable water and is consumed at a rate of 26,000 litres per hour of operation. The treatment plant removes dissolved solids and chlorine from the potable water with a residual effluent. To produce 26,000 litres of demineralised water the plant will generate 9,000 litres of effluent. This is discharged via an EPA Licenced discharge from Dublin Bay power station. There is capacity within the Dublin Bay plant to cope with the increased demand from the Ringsend site.

There will be a foul water connection for the welfare facilities to existing sewers which connect to Irish Water's treatment facility. The site is not occupied permanently and so these facilities will be used infrequently.

The effects on drainage are considered to be negligible and so a not significant impact is assessed in accordance with Table 9.4.

Flood Risk

A flood risk assessment has been prepared and is presented in Appendix 9. The site is outside the flood risk zone and so the development is considered to be appropriate in accordance with Table 9.5. The final finished ground level will be at least 4.0mOD Malin which will maintain all

⁷⁰ Ringsend Flexible Generation Drainage and Services Report P000343-PM01-0009

vulnerable infrastructure outside the flood risk zone. This elevation has been recommended in the Greater Dublin Strategic Drainage Study to account for climate change.

The effects on flood risk are considered to be negligible and so a not significant impact is assessed in accordance with Table 9.4.

9.6.4 Ringsend FlexGen Decommissioning

Should the Ringsend FlexGen plant be decommissioned the equipment will be dismantled and removed from site and the site left as a level platform. A Decommissioning Management Plan (DMP) will be prepared in accordance with the IE licence. Any spills or leaks that may have occurred will be cleaned. The existing drainage system will be maintained.. Any decommissioning required will be subject to the conditions set out in any IE licence issued by the EPA. Consequently, there will be no environmental effects relating to drainage from decommissioning. The site will remain outside the flood risk zone.

9.6.5 Ringsend FlexGen Mitigation and Monitoring

During construction the contractor will implement an environmental management plan which will set out control measures and procedures to ensure potentially polluting activities are controlled and managed. These measures will include the following:

- Fuel storage – bunded tanks to prevent spillages and designated fuelling areas with spillage control;
- Chemical storage – all potentially polluting chemicals will be stored in secure weatherproof enclosures with spill kits;
- Concrete wash water will be collected;
- Should dewatering be required any discharges will be treated to remove contaminants and silt and disposed of in accordance with EPA requirements; and
- The site will be kept secure to prevent vandalism which can lead to pollution from stored liquids escaping and entering drains.

The CEMP will include emergency procedures in the event of a pollution event and routine monitoring of the site to ensure potentially contaminating activities remain under control. Monitoring will include daily visual monitoring of any surface water outfalls.

Operational risk mitigation measures have been designed into the FlexGen design.

The drainage system has been designed to mitigate the effects of severe rainfall. Incident rainwater will collect in an attenuation tank which will slowly empty, reducing the surge of water entering the drainage system and reducing flood risk.

The development platform is outside the 0.1% annual exceedance probability with climate change factored flood risk level.

The safety systems designed into the plant will monitor rainfall levels in bunded areas and maintain these free of rainwater. These systems are designed to cut out should contamination of the rainwater occur so as to prevent contaminated water being discharged into the drainage system.

No other mitigation is required.

As no significant impacts are assessed as likely, no monitoring is required.

Table 9.8: Summary of Ringsend FlexGen Impact Assessment

Issue	Value	Impact	Significance	Mitigation	Residual Impact
Construction					
Pollution from run-off reaching Dublin Bay	High	High to Medium	Significant	Best practice measures to control pollution	Slight Adverse Not Significant
Piling	High	Negligible	Not Significant	Piling to be undertaken following detailed risk assessments. Low chance of residual contamination and piling will not introduce new pathways.	No residual effects
Dewatering	High	Negligible	Not Significant	If required, will be undertaken under method statements and pollution control measures.	No residual impact
Mobilisation of residual contamination	High	Negligible	Not significant	Best practice during construction will minimise risk pf pollution migrating	No residual impact
Flood Risk	The site will be developed to be outside the flood risk zone.				No residual impact
Operation					
Pollution from site drainage reaching Dublin Bay	High	Negligible	Not Significant	Drainage design has measures to control pollution.	No residual impact
Mobilisation of residual contamination	High	Negligible	Not significant	Site drainage will minimise potential for infiltration	No residual impact
Flood Risk	The site is not within a flood risk zone				
Decommissioning					
Pollution from site drainage reaching Dublin Bay	High	Negligible	Not Significant	Drainage design has measures to control pollution. Site drainage will continue to be managed following decommissioning	No residual impact
Mobilisation of residual contamination	High	Negligible	Not significant	Decommissioning will follow best practice under pollution prevention and control measures.	No residual impact
Flood Risk	The site is not within a flood risk zone				

9.7 South Wall BESS Impact Assessment

9.7.1 Do Nothing

In terms of the Do Nothing scenario, there will be no changes in the existing drainage and no change in flood risk. Consequently, no impacts are assessed.

9.7.2 South Wall BESS Construction Effects

Drainage

During construction the principal risk arises from heavy rainfall causing surface flooding which then flows into nearby drains transporting sediment and subsequently may affect nearby surface water bodies. During construction the elevation of the site will be regraded to provide a finished floor level of at least 4.0mOD Malin using granular fill. Incident rainfall will continue to soak into the ground. The new surface water drainage system will be progressively constructed and connected to the existing site-wide drainage network. As elements of the construction that will intercept rainfall (hard surfaces and roofs) are constructed these will be connected to the site drainage system which flows into the attenuation tank⁷¹.

The receiving waterbody is considered to be of high sensitivity given its designation as a Special Area of Conservation. Pollutants mobilised by incident rainfall and migrating with groundwater could enter Dublin Bay. Potentially polluting activities will however be controlled to prevent spillages of polluting materials.

During construction there is a potential for silt to run-off exposed surfaces. High risk activities such as pouring concrete and refuelling vehicles will also have the potential to cause polluted run off which may enter unprotected drains. Polluting matter entering drains has the potential to discharge to Dublin Bay, a highly sensitive receptor. The magnitude of any such pollution incidents is likely to be high to medium, presenting a moderate to large adverse impact (significant) on Dublin Bay. Construction activities with a potential to cause polluting run off will be managed; concrete wash water will be retained on site and prevented from entering drains; and refuelling will be undertaken using purpose designed equipment bunded to prevent leaks. Should any fuels or other liquids spill or leak from any vehicles these will be cleaned immediately, and any affected soils excavated and removed. Excavations for service runs will be managed using control measures such as bunding areas to prevent surface run-off and protecting drains. With these control measures in place the effect on Dublin Bay the magnitude of impact from polluting run off is expected to be negligible with a slight adverse impact (not significant).

Some elements of the proposed development will require piled foundations. The underlying granular geology is already permeable and so any piling is not anticipated to create new pollution pathways. A negligible magnitude of impact is assessed resulting in a slight adverse effect (not significant).

It is not anticipated that any excavations will require dewatering; groundwater is generally deeper than service trenches. Should dewatering be required this will be managed under a method statement to prevent silty water discharging to drains or surface water receptors. A negligible magnitude of impact is assessed resulting in a slight adverse effect (not significant).

During ground investigations undertaken in 2020 and reported in Chapter 8 some residual contamination was found within the underlying made ground comprising tarry hydrocarbons. This material has been removed from site and so the probability of mobilising existing contamination during construction is reduced. Should any further areas of contamination be noted during the works, these will also be removed. A negligible magnitude of impact is assessed resulting in a slight adverse effect (not significant).

⁷¹ ESB 2020. South Wall BESS Drainage and Services Report QS-000266-01-R460-006

Considering the control measures to prevent polluting substances entering the ground and subsequently migrating to Dublin Bay, the effects on drainage are considered to be negligible and so a not significant impact is assessed in accordance with Table 9.4.

Flood Risk

The development site is in Flood Risk Zone C and will be built to the required level to account climate change as recommended in the Greater Dublin Strategic Drainage Study⁷². The development is considered to be appropriate in accordance with Table 9.5. The development will not cause increased risk of flooding in other areas.

The effects on flood risk are considered to be negligible and so a not significant impact is assessed in accordance with Table 9.4.

9.7.3 South Wall BESS Operational Effects

Drainage

The proposed site will comprise of a number of new buildings and plant housing batteries and other electrical equipment. The majority of the proposed site compound will be surfaced with permeable stone. Surface water generated on permeable areas will infiltrate to ground. Surface water generated on the impermeable elements will be collected in an underground drainage network before passing through a Class 1 oil separator and into an attenuation tank where it will be discharged at the calculated greenfield runoff rate. It will then connect to an existing surface water drain which discharges to Dublin Bay at Sandymount Strand to the south.

The proposed drainage design is presented in the Drainage Report⁷³ on Drawing QR-000104-01-D460-001-006 which shows a 218m³ attenuation tank with a hydrobrake flow control system to limit discharge to greenfield rates. The drainage network passes through an oil interceptor prior to entering the attenuation tank. Typical details are shown on Drawing QR-000104-01-D460-001-019. The secure drainage system will prevent contamination migrating downwards to impact groundwater and will reduce infiltration from rainwater, reducing any potential for residual contamination to be mobilised.

The effects on drainage are considered to be negligible and so a not significant impact is assessed in accordance with Table 10.4.

Flood Risk

A flood risk assessment⁷⁴ has been prepared and is presented in Appendix 9. The part of the site where the development will be located will be raised to achieve a final finished ground level of 4.0mOD Malin which will maintain all vulnerable infrastructure outside the flood risk zone and so the development is considered to be appropriate in accordance with Table 9.5. This elevation has been recommended in the Greater Dublin Strategic Drainage Study to account for climate change.

The effects on flood risk are considered to be negligible and so a not significant impact is assessed in accordance with Table 9.4.

9.7.4 South Wall BESS Decommissioning

Should the BESS plant be decommissioned the equipment will be dismantled and removed from site and the site left as a level platform. Any spills or leaks that may have occurred will be

⁷² Dublin Drainage Consultancy 2005. Greater Dublin Strategic Drainage Study, Final Strategy Report

⁷³ South Wall Battery Energy Storage System Drainage and Services Report QS-000266-01-R460-006

⁷⁴ South Wall Battery Energy Storage System Flood Risk Assessment QS-000266-01-R460-005

cleaned. The existing drainage system will be maintained. Any decommissioning required may be subject to planning conditions determined by Dublin City Council. Consequently, there will be no environmental effects relating to drainage from decommissioning. The site will remain outside the flood risk zone.

Table 9.9: Summary of South Wall BESS Impact Assessment

Issue	Value	Impact	Significance	Mitigation	Residual Impact
Construction					
Pollution from run-off reaching Dublin Bay	High	High to Medium	Significant	Best practice measures to control pollution	Slight Adverse Not Significant
Piling	High	Negligible	Not Significant	Piling to be undertaken following detailed risk assessments. Low chance of residual contamination and piling will not introduce new pathways.	No residual effects
Dewatering	High	Negligible	Not Significant	If required, will be undertaken under method statements and pollution control measures.	No residual impact
Mobilisation of residual contamination	High	Negligible	Not significant	Best practice during construction will minimise risk pf pollution migrating	No residual impact
Flood Risk	The site will be developed to be outside the flood risk zone.				No residual impact
Operation					
Pollution from site drainage reaching Dublin Bay	High	Negligible	Not Significant	Drainage design has measures to control pollution.	No residual impact
Mobilisation of residual contamination	High	Negligible	Not significant	Site drainage will minimise potential for infiltration	No residual impact
Flood Risk	The site is not within a flood risk zone				
Decommissioning					
Pollution from site drainage reaching Dublin Bay	High	Negligible	Not Significant	Drainage design has measures to control pollution. Site drainage will continue to be managed following decommissioning	No residual impact
Mobilisation of residual contamination	High	Negligible	Not significant	Decommissioning will follow best practice under pollution prevention and control measures.	No residual impact
Flood Risk	The site is not within a flood risk zone				

9.7.5 South Wall BESS Mitigation and Monitoring

During construction the contractor will implement an environmental management plan which will set out control measures and procedures to ensure potentially polluting activities are controlled and managed. These measures will include the following:

- Fuel storage – bunded tanks to prevent spillages and designated fuelling areas with spillage control;
- Chemical storage – all potentially polluting chemicals will be stored in secure weatherproof enclosures with spill kits;
- Concrete wash water will be collected;
- Should dewatering be required any discharges will be treated to remove contaminants and silt and disposed of in accordance with EPA requirements; and
- The site will be kept secure to prevent vandalism which can lead to pollution from stored liquids escaping and entering drains.

The CEMP will include emergency procedures in the event of a pollution event and routine monitoring of the site to ensure potentially contaminating activities remain under control. Monitoring will include daily visual monitoring of any surface water outfalls.

Operational risk mitigation measures have been designed into the BESS design.

The drainage system has been designed to mitigate the effects of severe rainfall. Incident rainwater will collect in an attenuation tank which will slowly empty, reducing the surge of water entering the drainage system and reducing flood risk.

The development platform will be raised outside the 0.1% annual exceedance probability with climate change factored flood risk level.

The safety systems designed into the plant will monitor rainfall levels in bunded areas and maintain these free of rainwater.

No other mitigation is required.

As no significant impacts are assessed as likely, no monitoring is required.

9.8 Cumulative Effects

The drainage designs for each project will operate individually and replicate greenfield conditions for managing run-off. Consequently, it is considered there are no cumulative effects from drainage for the four sites and the existing infrastructure in the area.

Each project will be outside the flood plain and so it is considered there are no cumulative effects on flood risk.

9.9 Summary of Mitigation and Monitoring

The summary of mitigation and monitoring measures for the four proposed developments are outline in Chapter 18.

9.10 Summary of Significant Residual Effects

There are not considered to be any residual effects.

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10 Landscape and Visual

10.1 Introduction

This Landscape and Visual Impact Assessment (LVIA) has been prepared in respect of the four planning applications on the Poolbeg Peninsula, Ringsend, Dublin 4. This LVIA report describes the landscape context of each of the proposed developments and assesses the likely landscape and visual impacts of each on the receiving environment. Although closely linked, landscape and visual impacts are assessed separately for each proposed development.

Landscape Impact Assessment (LIA) relates to assessing effects of a development on the landscape as a resource in its own right and is concerned with how the proposal will affect the elements that make up the landscape, the aesthetic and perceptual aspects of the landscape and its distinctive character.

Visual Impact Assessment (VIA) relates to assessing effects of a development on specific views and on the general visual amenity experienced by people. This deals with how the surroundings of individuals or groups of people may be specifically affected by changes in the content and character of views as a result of the change or loss of existing elements of the landscape and/or introduction of new elements. Visual impacts may occur from; Visual Obstruction (blocking of a view, be it full, partial or intermittent) or; Visual Intrusion (interruption of a view without blocking).

This LVIA uses methodology as prescribed in the following guidance documents:

- Environmental Protection Agency (EPA) publication 'Guidelines on the Information to be contained in Environmental Impact Assessment Reports' (updated draft 2017) and the accompanying Advice Notes on Current Practice in the Preparation of Environmental Impact Statements (updated draft 2017);
- [Landscape Institute and the Institute of Environmental Management and Assessment](#) publication entitled Guidelines for Landscape and Visual Impact Assessment (2013).

10.2 Assessment Methodology

Production of this LVIA involved:

- A desktop study to establish an appropriate study area, relevant landscape and visual designations in the Dublin City Development Plan (CDP) 2016-2022, as well as other sensitive visual receptors. This stage culminates in the selection of a set of potential viewpoints from which to study the effects of each proposed development;
- Fieldwork to establish the landscape character of the receiving environment and to confirm and refine the set of viewpoints to be used for the visual assessment stage;
- Assessment of the significance of the landscape impact of each development as a function of landscape sensitivity weighed against the magnitude of the landscape impact;
- Assessment of the significance of the visual impact of each development as a function of visual receptor sensitivity weighed against the magnitude of the visual impact. This aspect of the assessment is supported by photomontages prepared in respect of the selected viewpoints, presented in Appendix 10F.

For more detailed information on the Landscape and Visual Impact Assessment Criteria, as well as assessment methodology, please see Appendix 10A.

10.3 Definition of Study Area

Given the highly industrialised land use to all sides of the four sites, which entails multiple large, capacious buildings and structures associated with Dublin Port and electricity generation a 2.5km radius study area is used in this LVIA.

Four viewpoints located outside the study area have also been included, solely for Visual Impact Assessment purposes, in order to include certain sensitive designations within the wider Dublin Bay; as stipulated by Dublin City Council, in its RFI to ESB in late 2019, in relation to the proposed Poolbeg FlexGen development (ref. 3714/19).

Figure 10.1: Study Area – Landscape and Visual Impact Assessment



Source: Macro Works

10.4 Baseline Environment

10.4.1 Landscape Baseline of Study Area

The landscape baseline represents the existing landscape context and is the scenario against which any changes to the landscape brought about by the developments will be assessed. It is worth noting, however, that many of the landscape elements identified in the landscape baseline also relate to visual receptors i.e. places and transport routes from which viewers can potentially see the proposed developments.

Poolbeg Peninsula

The evolution of Dublin Port is what has chiefly generated the landform of the site; that is, flat, low-lying land reclaimed from Dublin Bay over the last two centuries. The peninsula now contains some of the tallest industrial structures and largest industrial buildings in the country (see Figure 10.2 below). The four developments (i.e. Poolbeg FlexGen; Poolbeg BESS; Ringsend FlexGen; and South Wall BESS) are located in four locations within the Poolbeg Peninsula, to the south of Dublin docks (see Chapter 1, Figure 1.1). The sites of the four proposed projects are all *de facto* (i.e. manmade) landscapes, located over approx. 1.5km of the peninsula. Being an entirely anthropocentric creation, the only “natural” watercourses within the vicinity of the site is the River Liffey estuary, as well as Dublin Bay.

Figure 10.2: Landform and land use of the Poolbeg Peninsula, when viewed from the south/Sandymount



Source: Macro Works

Figure 10.3: View of the Poolbeg peninsula from the Great South Wall/South Bull Wall



Source: Macro Works

In all four locations, the site is surrounded by mostly industrial/post-industrial use and/or energy generation / infrastructure, which is reflective of the wider Poolbeg Peninsula. Towards the western end of the peninsula, notable developments include the ESB Networks Ringsend substation / Dublin Bay Power Station, the DWTE Covanta incinerator; the Kilsaran Concrete plant, as well as numerous industrial-scale fuel/liquid tanks. Adjoining the south-eastern end of the peninsula is the Poolbeg West SDZ (see Figure 10.4, below). Located within and around the site of the former Irish Glass Bottle Factory, this 43ha Strategic Development Zone has recently been approved permission for the development of streets, parks and utilities infrastructure in a substantial mixed-use development.

Towards the eastern (i.e. the seaward) half of the peninsula, notable developments include similarly highly visible infrastructure reflective of its industrial zoning. This includes the high brick and concrete chimneystacks (Poolbeg towers), which are protected structures; the Poolbeg Generating Station, a Combined Cycle Gas Turbine (CCGT) Station and the National Oil Reserve Agency (NORA) oil tanks. Closer to the River Liffey is a large and ostensibly intact stone building that was built in 1760 as a “blockhouse” (i.e. a detached fort occupied by a garrison) and is a protected structure.

Figure 10.4: Location of Poolbeg West SDZ (photo courtesy of Poolbeg West SDZ Planning Scheme 2017, produced by Dublin City Council)



Source: Macro Works

While there are limited recreational / amenity facilities within this industrial peninsula, there is a well-used walkway that aligns the southern coast of the peninsula, linking Ringsend / Irishtown / Sandymount to the Irishtown Nature Park and, eventually, to Poolbeg Lighthouse. At the eastern end of the peninsula, Poolbeg Beach is present, as is Great South Wall/ South Bull Wall. This is a public, 18th Century stone sea wall extending into Dublin Bay for almost 2km, terminating at the Poolbeg Lighthouse, and is very popular with walkers, runners and fisher folk. Though technically not on the peninsula, Clan na Gael GAA Club and Sean Moore Park are located south of the aforementioned Poolbeg West SDZ. Aside from within Irishtown Nature Park, which was only established in the 1980s, there is no notable vegetation on the peninsula. In terms of transport routes, busy roads mostly transporting large and plentiful HGVs are primarily found in the western half of the Poolbeg peninsula. Otherwise, the mouth of the River Liffey is a busy transport route, primarily owing to the Irish Ferries port, in the north of the study area.

Wider Study Area

It should be noted that there are several localities outside the Poolbeg Peninsula that are within the study area, although these tend to share very few of the defining characteristics of the peninsula. These localities include sections of Ballsbridge, Sandymount, Irishtown and Ringsend on the southside of the city, and East Wall, Clontarf and Bull Island on the northside; in addition to the extensive Dublin Port, north of the Liffey Estuary.

Those localities nearest the Poolbeg Peninsula are Dublin Port, Irishtown and Ringsend. Dublin Port consists of a substantial and highly-industrialised, brownfield area of land, north of the Liffey and east of East Wall. Like Poolbeg peninsula, it is a *de facto* peninsula, surrounded by water on

three sides; only it is almost exclusively made up of private property, with no waterside walks or reserves, like Poolbeg Peninsula. There are no known residents and/or amenities within the port, and like most modern ports, it is an area of primarily low landscape and visual sensitivity. In several regards, its landscape character is very similar to that of the peninsula. Along the western edge of the Port is the Dublin Port tunnel entrance (i.e. one official start/end of the M50), the R101 and the Eastlink Toll bridge. Further west is East Wall, which is characterised by residential and industrial land uses, with some commercial properties too (e.g. East Point Business Park).

Irishtown and Ringsend are within 2-3km east of the city centre and within 1km west of the Poolbeg peninsula. Land use is overwhelmingly and intensively residential, with some open space and key transport corridors. Both Sandymount and Clontarf have strong crossovers, in the context of the study area, in that both are separated from the peninsula by large tracts of Dublin Bay; albeit considerably further for Clontarf. Both suburbs are prized for their coastal views and coastal amenities, and being highly residential, have a distinctively different sense of place and purpose from the peninsula, and settlement there predates the peninsula by centuries. However, the industrial nature of their respective seawards views - Dublin Port primarily for Clontarf; Poolbeg Peninsula primarily for Sandymount - means that such an industrialised skyline has been part of these communities' view for several decades, with the "iconic" Poolbeg Towers frequently viewed as being emblematic of Dublin.

Lastly, Bull Island is located more than 1.5km northeast of the Poolbeg Peninsula and is one of three National Special Amenity Areas in the country. However, only the most southern 300-400m of the island enters within the study area, which most entail all of the North Bull Wall, and small parts of the Royal Dublin Golf Club and Dollymount Strand.

Summary

In summary, the study area is characterised by its dynamic, bay-side setting; a locale perched between the Irish Sea and the eastern edge of a bustling and rapidly evolving European capital and which successfully balances a vibrant, contemporary and ever-changing mix of residential, recreational, industrial, commercial, transport and ecological identities and demands.

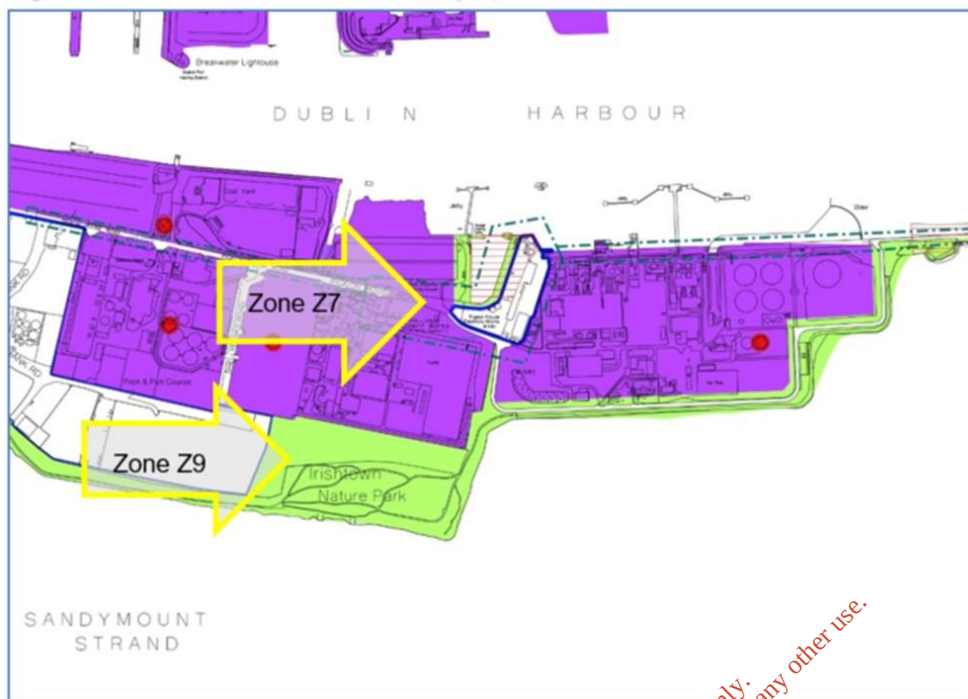
10.4.2 Policy Context of Study Area

Dublin City Development Plan (CDP) 2016-2022

According to the CDP, and representative of much of the Dublin Port locale, all four proposed development sites are located within Zone Z7 (see Figure 10.4a, below), whose zoning objective is, "To provide for the protection and creation of industrial uses and facilitate opportunities for employment creation." In addition, all four sites are designated as being of "low" sensitivity.

However, a recreational 'corridor' runs along the southern side and eastern end of the peninsula, which includes Irishtown Nature Park. Most of this corridor takes the form of a public pathway and green network that also facilitates walkers and runners accessing not just the nature park but also the Great South Wall/South Bull Wall and Poolbeg Lighthouse. Unlike most of the peninsula, this 'corridor' is designated as Zone Z9, whose objective is, "*To preserve, provide and improve recreational open space lands, and entails: public open space; private open space and sports facilities in private amenity and open space and green networks.*" According to the CDP, the Z9 zoning includes all amenity ownership.

Figure 10.4a: Extract of Dublin CDP Map F, which shows the site within 'Zone Z7'



Source: Macro Works

With regards to Chapter 10 ('Green Infrastructure, Open Space and Recreation') and Chapter 11 ('Built Heritage and Culture') of the Dublin CDP 2016-2022, there are no policies or objectives that are relevant to the applicant sites, nor the proposed developments. Furthermore, there are no designated/protected routes, views or prospects within the study area.

National Parks & Wildlife Service (NPWS)

In terms of NPWS sensitive designations, the only land-based designation on the peninsula is part of the South Dublin Bay and River Tolka Estuary Special Protection Area (SPA) (site code 004024). This entails an approx. 70m-wide strip between Irishtown Nature Park and the Celtic Anglian city wastewater plant. South of the Liffey, the South Dublin Bay and River Tolka Estuary SPA (site code 004024) and the South Dublin Bay Special Area of Conservation (SAC) and Proposed Natural Heritage Area (pNHA) (site code 000210) align the southern and eastern perimeter of the peninsula. These are exclusively marine/riverine designations that are adjacent to, rather than within, the Poolbeg peninsula. North of the River Liffey, Bull Island is a SPA, while the North Dublin Bay (i.e. north of North Bull Wall) is a designated SAC, with the north inner bay being a pNHA.

Outside such NPWS designations, it should be noted that there are two National Special Amenity Areas within North Dublin Bay, being Bull Island and Howth Head; the former of which enters the study area. In addition, the proposed Special Amenity Area for South Dublin Bay and the 'core zone' of the Dublin Bay UNESCO Biosphere is also present within the study; a designation that aligns the southern and eastern perimeter of the peninsula.

10.4.3 Poolbeg FlexGen baseline

As the landscape baseline of the Poolbeg Peninsula has been previously described above in Section 10.4.1, the emphasis of this section is on the baseline of the site and its vicinity.

Figure 10.5: Aerial view of land use within the site and its vicinity Note: red line denotes site boundary



Source: Macro Works

The Poolbeg FlexGen site is located within the wider Poolbeg Generating Station, which includes:

- The existing combined cycle gas turbine (CCGT) station;
- National Oil Reserve Agency (NORA) oil tanks in the north-east of the station site;
- Buildings associated with 1970s conventional thermal units, which have been decommissioned, occupy a significant portion of the western part of the station site;
- The brick and concrete chimneystacks (i.e. the Poolbeg 'chimney towers') are located within the northern portion of the station site, and are protected structures;
- Multiple existing office facilities, many of which are no longer occupied;
- A combination of hardstand and green areas, generally unused.

The Poolbeg Generating Station is accessed via a manned security barrier at the end of Pigeon House road (see it Figure 10.9 below).

To the southwest of the site is Poolbeg Beach, which includes a recreational walking/running trail that follows the southern and eastern site boundaries. Pigeon House Road approaches the site from the west and provides the main access to the site. An unnamed road owned by ESB runs close to the site's southern and eastern boundaries. An internal roadway bounds the FlexGen development area on the northern and western sides. The approximately 5.6ha Poolbeg FlexGen site is under ESB ownership and is within the overall ESB Poolbeg Generating Station site that dominates the Poolbeg peninsula. Existing access to the site is through a large, security-manned, palisade gateway off Pigeon House Road; a gateway that also serves Poolbeg Generating Station. In terms of land use upon the site at present, it includes a combination of unused

hardstand and green areas that are indicative of the site's former industrial use, and this is understood to be the case for at least the last 20 years. The existing ground profile of the development site marginally slopes from 5m AOD in the east to 3.9m AOD in the west.

There is some existing, self-seeded vegetation across the site, as well as some existing lighting and underground services. Rubble, general construction materials, plant operation materials and site cabins have also been observed within the site. Palisade fencing secures the overall Poolbeg Generating Station (see Figure 10.6, below), while a vegetated berm aligns its southern and eastern boundaries (see Figure 10.7, below), along which relatively young trees and native scrub have established. The site is bound by an existing internal roadway on its northern and western sides.

A public road and footpath wrap around the southern and eastern boundary, which is mostly used by members of the public accessing the Great South Wall/South Bull Wall. The road terminates soon after passing the site, where motorists typically park and then walk, fish or swim. Land to the north and west of the site is of an industrial nature, with its highly visible infrastructure reflective of the industrial zoning of similar ESB sites nationwide. This includes a NORA facility to the north of the FlexGen site. Consistent with such an industrial zone, there are no protected structures or cultural heritage features on the site. The nearest residential properties are in Sandymount approximately 1.7km from the site across Dublin Bay.

Figure 10.6: Vehicular entrance to the southwest of the site



Source: Macro Works

Figure 10.7: Palisade fencing outside the vegetated berm along the southern and eastern boundaries of site



Source: Macro Works

10.4.4 Poolbeg BESS baseline

Figure 10.8: Aerial view of land use within the site and its vicinity. Note: red line denotes site boundary



Source: Macro Works

As the landscape baseline of the Poolbeg Peninsula has been previously described above in Section 10.4.1, the emphasis of this section is on the baseline of the site and its vicinity.

The nearest “natural” watercourse is the River Liffey estuary, which is located within 100m to the north of the site, with Dublin Bay located approx. 40m to the south. The approximately 5.3ha site is ostensibly flat and is set within the existing Poolbeg Generating Station. The area within the overall site proposed specifically for the BESS development can be described as being:

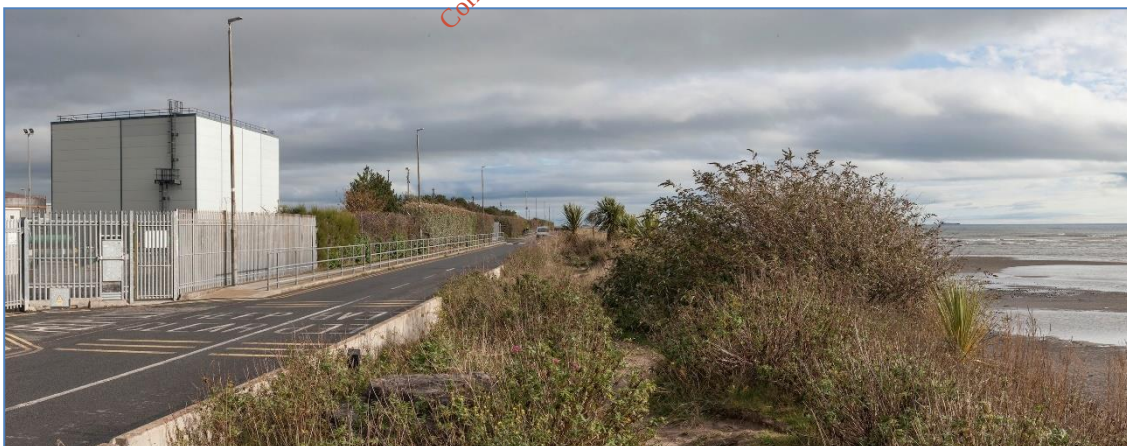
- Within the western part of the overall Power Generating Station site, to the north of the main access road through the site, running from Pigeon House Road at its western end;
- Comprising of existing unused office, administration and general purposes facilities that are proposed to be demolished under a separate planning application; an existing tennis court and a small-scale pavilion building (both of which are also proposed to be demolished) and some existing hardstand areas.

Figure 10.9: View of manned, barrier security access to the Poolbeg Generating Station



Source: Macro Works

Figure 10.10: View of walkway that aligns the southern coast of the peninsula, linking Irishtown/Sandymount to the Poolbeg Lighthouse



Source: Macro Works

Consistent with such an industrial zone and similar to the sites of all four projects, there are no protected structures or cultural heritage features on the Poolbeg BESS site and neither is there any notable vegetation. While there are no recreational/amenity facilities within the site, there is the well-used, aforementioned walkway approx. 30m south of the site, while Irishtown Nature

Park is located approx. 330m southwest of the site. The nearest residential properties are approx. 1.5km southwest from the site across Dublin Bay at Sandymount.

10.4.5 Ringsend FlexGen

The Ringsend FlexGen site is relatively square in shape and is located at the western end of the peninsula (i.e. more than 1km west of the Poolbeg FlexGen site, for example). It is under ESB ownership and is within the outer compound of the wider ESB Networks Ringsend substation and Dublin Bay Power Station, which is a SEVESO site utilised for electricity generation. In terms of land use upon the site at present, the site comprises of a flat area of hard standing, while its previous history alternated between electrical transmission equipment and container storage. The site is enclosed by palisade fencing, with two large vehicular entrances to the southwest and south centre. Consistent with such an industrial zone and similar to the sites of all four proposed projects, there are no protected structures or cultural heritage features on the site, and neither is there any notable vegetation.

Figure 10.11: Palisade fencing encloses the Ringsend FlexGen site



Source: Macro Works

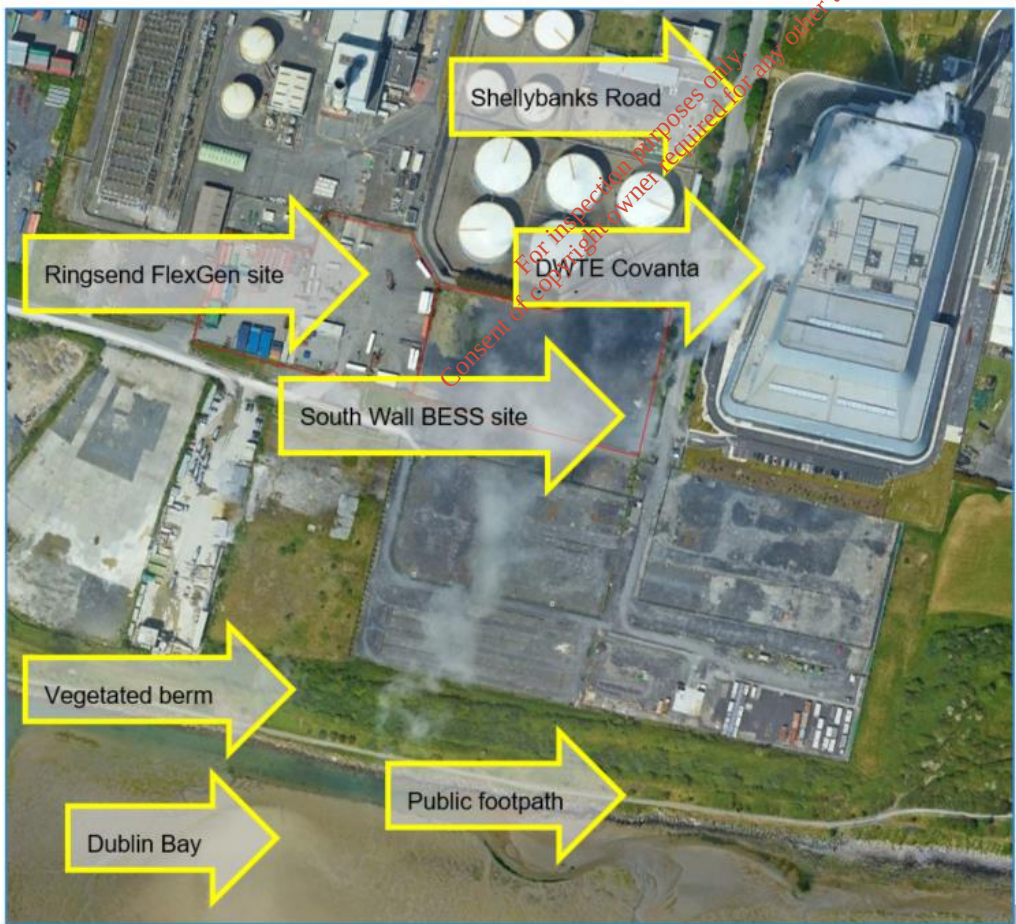
The wider ESB substation lands adjoin the site to the north and west, while the southern boundary adjoins the Poolbeg West SDZ (i.e. earmarked for mixed use development). The western portion of the wider site is used for ESB electricity generation purposes, with its infrastructure reflective of the industrial zoning of similar ESB sites nationwide. Approx. 150m east of the site is the Shellybanks Road, with the DWTE Covanta incinerator east of that road (see Figure 10.13, below). In terms of transport routes, busy roads transporting large and plentiful HGVs are found throughout this area of the Poolbeg peninsula, including along the southern boundary of the site, where trucks accessing the Kilsaran Concrete site repeatedly pass the site.

Figure 10.12: Palisade fencing encloses the Ringsend FlexGen site



Source: Macro Works

Figure 10.13: Location of Ringsend FlexGen site & South Wall BESS site



Source: Macro Works

While there are no recreational/amenity facilities within the site, the aforementioned well-used walkway (i.e. linking Irishtown/Sandymount to Poolbeg Lighthouse in Dublin Bay) is located approx. 200m south of the site - and separated from it by a large berm. Irishtown Nature Park is located approx. 350m southeast of the site, while Clan na Gael GAA club/Sean Moore Park is approx. 600m southwest of the site. The nearest residential properties are located more than 550m east, along Sean Moore Road in Ringsend.

10.4.6 South Wall BESS

Adjacent to the Ringsend FlexGen site (see Figure 10.13, above), the approximately 3.5ha South Wall BESS site is surrounded also by mostly industrial/post-industrial use and/or energy generation/ infrastructure. To the immediate east of the site are Shellybanks Road and the DWTE Covanta incinerator; while to the north there are numerous industrial-scale fuel/liquid tanks. South, southeast and southwest of the site are large areas of secured, hardscape storage yards that are of an industrial nature, most of which is within the Poolbeg West SDZ (i.e. earmarked for mixed use development). Along the site's western boundary is the site of the aforementioned, proposed Ringsend FlexGen site.

The site is enclosed by palisade fencing, with a palisade vehicular entrance to Shellybanks Road near the southeast corner of the site and an additional entrance on to South Bank road. It is characterised by a hardscape expanse (i.e. unbound granular stoned surfacing). There is a low level of scrub vegetation in the western end of the site, while a tall, tight line of evergreen trees is located outside the northwest corner of the site, while a small amount of mid-height, self-sown trees are located just outside the eastern site boundary, on the western edge of Shellybanks Road.

According to myplan.ie, the site was granted planning permission in 2017 (Ref. No. 2234/17) for:

"The creation of a new vehicular entrance to the southern boundary of ESB lands from South Bank Road including the erection of a new 4.5m wide 2.6m high entrance gate in the existing 2.6m high palisade boundary fence. The works shall also include the infilling of low lying areas within the development boundary of the site (1.13 ha) to a depth of up to c. 4 metre..."

Until 2018, the site was used as a pitch and putt golf course. It is set at two generally flat levels with approx. 1.5m to 2.0m difference, with the southern and western parts of the site being at the upper level. A self-seeded berm runs outside of the site to the east and to the north. While the southern end of Shellybanks Road aligns the eastern boundary of the site, it is not a public road, but is the approach to the DWTE Covanta incinerator, and is secured/manned at its northern end. Nestled within secured/fenced-off land deep within ESB ownership, there is no public access to the site. Consistent with such an industrial zone, there are no protected structures or cultural heritage features on the site, and neither is there any notable vegetation. The nearest residential properties are located more than 700m east, along Sean Moore Road in Ringsend.

10.5 Poolbeg FlexGen Impact Assessment

For a description of the proposed Poolbeg FlexGen development, please refer to Chapter 5 of this report.

10.5.1 Landscape Value and Sensitivity

Landscape value and sensitivity are considered in relation to a number of factors highlighted in the Guidelines for Landscape and Visual Impact Assessment 2013 and in accordance with the criteria set out in Appendix 10A.

The landscape quality/condition of the site is indicative of a former industrialised, now derelict nature. It is a brownfield site that is less than a century old and has always been of an industrial or post-industrial nature. Unlike most terrain elsewhere in the city, county and country, the site is on land reclaimed from Dublin Bay specifically for such industrial and/or port-related purposes. As a result, it is of low quality, condition and integrity. As with most industrialised, brownfield sites, there is minimal or absent scenic quality, conservation value or recreation value associated with the site, though these qualities, for reasons set out in Section 10.4.1, do exist immediately south and east of the site. Similarly, in the context of an industrialised, brownfield site set within a port peninsula, there is little, if any, rarity with the site. In summary, and in accordance with the site's location as designated in the Dublin CDP, the site and its vicinity are of Low sensitivity.

10.5.2 Poolbeg FlexGen Construction Effects

Magnitude of Landscape Effects

The initial proposed work will involve site clearance and preparation, with existing concrete slabs and fence lines demolished and cleared. The subsequent construction work will include the laying of foundations for plant and buildings, installation of plant and equipment, concrete works/hard surfacing and paving, as well as external lighting, landscaping and fencing. The existing, aforementioned, security-manned site access to the Poolbeg Generating Station will be used for construction access, with an internal access created at the FlexGen development site, in addition to taking access from the existing road to the south of site, if permitted, during construction. For more information on the construction phase activities relating to the Poolbeg FlexGen site, please refer to Chapter 5.

There will be a higher intensity of site activity during the construction phase of the proposed development than there is at present on site, with an average daily workforce of approx. 60 people expected during the construction phase. Construction activity will include the movement of construction machinery on-site, as well as an estimated 23 HGV deliveries (46 HGV traffic movements) to the site per working day during peak stages. It may also include temporary site lighting and the temporary storage of some stripped earth, or excavated hardcore, and construction materials. The construction phase is likely to take in the order of 19 months to complete. Construction-related impacts will only result in 'short term' landscape and visual effects (i.e. effects lasting one to seven years, according to aforementioned EPA Guidelines).

On the basis of the factors discussed above it is considered that the magnitude of landscape impact during construction is High.

10.5.3 Poolbeg FlexGen Operational Effects

Magnitude of Landscape Effects

In terms of physical landscape effects, the proposed development will require a relatively minor degree of excavation, which would continue to evolve the entirely anthropocentric landform of the site. In addition, the aforementioned vegetated berm aligning the site's southern and eastern boundaries, along which relatively young trees and native scrub have established, will not be modified or disturbed, and the vegetation will be allowed to further prosper and mature. No extensive modifications will be made to the terrain of the site, and the proposed development will introduce a form of contemporary industrial construction upon a pre-existing hardcore base. In

addition, the site boundaries will be broadly similar to the existing site, in their location, alignment and treatment (i.e. palisade fencing). In this regard, the proposed development is consistent with the nature and scale of prevailing land use on the peninsula.

While the use of the site will change once the construction stage is completed, any perceived change to landscape character is one that entails the intensification of a brownfield site of industrial character to that of a relatively large mechanised development representing a notable increase in built intensity. Thus, while the existing landscape character of the site will be somewhat evolved from its present state, it will become more consistent and compatible with that of the broader Poolbeg peninsula.

To put it another way, the former industrial use of the site, in tandem with the established character and built form of this industrial area, mitigates against perceived or real incongruities or incompatibilities between the proposed and existing land-uses. This point is particularly salient within the framework of the highly transitional character of the Poolbeg Peninsula. As the site is within the wider ESB Poolbeg Generating Station, a near-identical and compatible land use and character is in the immediate vicinity of the site. In that regard, the proposed development is a moderate expansion of the electricity generation/storage land use and landscape character adjacent to the site.

On the basis of the factors discussed above it is considered that the magnitude of landscape impact is Low.

With reference to the significance matrix (Table 3 in the Appendix 10A), the Low landscape sensitivity judgement attributed to the study area coupled with a Low magnitude of landscape impact is considered to result in a slight-imperceptible operational/residual significance of landscape impact.

Summary of Visual Effects

The following summary is to be read in conjunction with: Appendix 10B - Poolbeg FlexGen Visual Impact Assessment.

Table 10.1 (below) summarises the full textual assessment of visual effects for each View Point (VP) contained in Appendix 10B. Whilst the 'receptor sensitivity analysis table' and full textual assessment for each VP is normally contained within the landscape and visual chapter, in this instance, given the considerable scale of this project and the number of VPs, it is considered more prudent to place this material in a separate appendix and focus herein on the significance of the findings.

Table 10.1: **Summary of Visual Effects at Viewshed Reference Points (VRP's)**

VRP No.	Distance to site boundary	Visual receptor Sensitivity (from Appendix 10B)	Visual Impact Magnitude	Significance of Visual effect
VP10	602m	Medium	Low-negligible	Slight-imperceptible
VP11	31m	Medium-low	Low-negligible	Slight-imperceptible
VP12	44m	Medium-low	Low	Slight-imperceptible
VP13	667m	High-medium	Low-negligible	Slight
VP14	1.962km	High-medium	Negligible	Slight-imperceptible
VP19	6.8km	High-medium	Negligible	Imperceptible

VRP No.	Distance to site boundary	Visual receptor Sensitivity (from Appendix 10B)	Visual Impact Magnitude	Significance of Visual effect
VP20	2.2km	High-medium	Negligible	Imperceptible
VP21	1.8km	High-medium	Low-negligible	Slight
VP22	4.6km	High-medium	Negligible	Imperceptible

Visual impacts were assessed at nine viewpoints representing a variety of distances, angles and viewing contexts. These viewpoints are considered to range in sensitivity from Medium-low to High-medium. In all nine viewpoints, the Significance of Visual Impact is considered to be no higher than 'Slight,' which occurred at two viewpoints. At four of the nine viewpoints the Significance of Visual Impact is considered to be 'Slight-imperceptible,' while at the remaining three viewpoints, it is deemed to be 'Imperceptible.'

Such low visual impact significance is primarily as a result of the proposed development having no material consequence for the nature of the already industrial visual setting or the visual amenity of the viewer, despite the proposed development being a noticeable addition to the industrial profile of the Poolbeg peninsula in each instance.

Statement of Significance

Based on the landscape and visual impact judgements provided throughout this LVIA, the proposed FlexGen development that is located on Poolbeg peninsula, Ringsend, Dublin 4 is not considered to give rise to any significant landscape or visual impacts.

10.5.4 Poolbeg FlexGen Decommissioning

The Poolbeg FlexGen plant is expected to be operational for at least 25 years or as long as is required by grid infrastructure. On cessation of activities, the plant will be decommissioned, and the site remediated and restored and left level, in line with any requirements of a planning permission and IE licence, unless otherwise authorised. A Decommissioning Management Plan (DMP) will be prepared, which will include details of decommissioning of all plant and equipment ensuring that there will be no environmental pollution. Please refer to Chapter 5 of this EIAR.

10.6 Poolbeg FlexGen Mitigation and Monitoring

There are no additional mitigation measures proposed in relation to the proposed Poolbeg FlexGen development. The siting and design of the proposed development are the main mitigation measures associated with this project (i.e. the mitigation measures are already embedded). In addition, any proposed screening is not considered necessary or effective in this overtly industrial context. Owing to this, monitoring of these measures is neither necessary nor applicable.

10.7 Poolbeg BESS Impact Assessment

For a description of the proposed Poolbeg FlexGen development, please refer to Chapter 5.

Landscape Value and Sensitivity

As with Section 10.4, and for very similar reasons, the site and its vicinity are deemed to be of Low sensitivity.

10.7.1 Poolbeg BESS Construction Effects

Magnitude of Landscape Effects

The demolition and construction phases include: the controlled demolition of three existing buildings; the cladding of the existing/remaining administration building and other remaining buildings; construction of BESS civil infrastructure; installation and commissioning of plant and equipment. For more information on the construction phase activities relating to the Poolbeg BESS site, please refer to Chapter 5.

There will be a much higher intensity of site activity during the construction phase of the proposed development than there is at present on site. Such activity will include the movement of demolition and construction machinery on-site, as well as HGVs travelling to and from the site. It may also include temporary site lighting and the temporary storage of some stripped earth, or excavated hardcore, and construction materials. The construction phase is likely to take in the order of 19 months to complete. Construction-related impacts will only result in short-term landscape and visual effects (i.e. effects lasting one to seven years, according to the aforementioned Environmental Protection Agency publication 'Guidelines on the Information to be contained in Environmental Impact Assessment Reports').

On the basis of the factors discussed above it is considered that the magnitude of landscape impact during construction is High.

10.7.2 Poolbeg BESS Operational Effects

Magnitude of Landscape Effects

The application site will contain two distinct areas. Contained within a secured, fenced off compound, the smaller area (in the north-west of the site application area) will accommodate, among other items, the BESS containers, a house transformer and access to the control building containing switchgear and the BESS control equipment. The larger area (in the central and southern section of the site application area) is to facilitate grid connections, where no visible or 'above ground' development is proposed and is accessible to anyone entering the Poolbeg Generating Station site.

In terms of physical landscape effects, the proposed development will require a relatively low amount of excavation that would continue to evolve the entirely anthropocentric, much-modified landform of the site. No considerable alterations will be made to the terrain of the site. Furthermore, numerous derelict/unused buildings of up to four or five storeys-high on the site will be demolished, as will a tennis court and small-scale pavilion building; buildings and a recreational facility that are not consistent with the broader land use on, or landscape character of, the highly-industrialised Poolbeg peninsula.

Following the demolition of these buildings and tennis court, the proposed development will entail a form of low-lying construction upon a pre-existing, primarily hardcore base. In this regard, the proposed development is broadly consistent with the nature of prevailing land use on the peninsula. However, the site boundaries will be largely different to the existing site, in their location and alignment, while a new entrance will be created to access the BESS compound from within the ESB-owned Poolbeg Generating Station site.

While the use of the site will change once the construction stage is completed, any perceived change to landscape character is one that entails exchanging one form of industrial character for another, thereby effectively maintaining the existing landscape character of the site. In other words, the established use of the site for electricity generation-related activities, combined with the established character and built form of this industrial area assimilate the proposed

development, especially within the framework of the transitional character of the Poolbeg Peninsula. Furthermore, the site is within the overall Power Generating Station site, where a near-identical and compatible land use and character adjoins the site's boundaries. In that regard, the proposed development is a "natural" extension of the electricity generation/storage land use and landscape character engulfing the site.

On the basis of the factors discussed above it is considered that the magnitude of landscape impact is negligible.

With reference to the significance matrix (Table 3 in the Appendix 10A), the Low landscape sensitivity judgement attributed to the study area coupled with a negligible magnitude of landscape impact is considered to result in an Imperceptible operational/residual significance of landscape impact.

Summary of Visual Effects

The following summary is to be read in conjunction with: Appendix 10C - Poolbeg BESS Visual Impact Assessment.

Table 10.2 (below) summarises the full textual assessment of visual effects for each View Point (VP) contained in Appendix 10C. Whilst the 'receptor sensitivity analysis table' and full textual assessment for each VP is normally contained within the landscape and visual chapter, in this instance, given the considerable scale of this project and the number of VPs, it is considered more prudent to place this material in a separate appendix and focus herein on the significance of the findings.

Table 10.2: **Summary of Visual Effects at Viewshed Reference Points (VRP's)**

VRP No.	Distance to site boundary	Visual receptor Sensitivity (from Appendix 10C)	Visual Impact Magnitude	Significance of Visual effect
VP15	206m	Low	Negligible	Imperceptible
VP16	45m	Low	Low-negligible	Slight-imperceptible
VP17	25m	Medium-low	Negligible	Imperceptible
VP18	631m	Medium-low	Negligible	Imperceptible
VP19	6.9km	High-medium	Negligible	Imperceptible
VP20	2.2km	High-medium	Negligible	Imperceptible
VP21	1.7km	High-medium	Negligible	Imperceptible
VP22	4.7km	High-medium	Negligible	Imperceptible

Visual impacts were assessed at eight viewpoints representing a variety of distances, angles and viewing contexts. These viewpoints are considered to range in sensitivity from Low to High-medium. The highest Significance of visual impact was considered to be 'Slight-imperceptible' at just one viewpoints (i.e. VP16). All other viewpoints, including all with a sensitivity of 'High-medium', were deemed to have an 'Imperceptible' impact on visual amenity. Such a starkly low visual impact significance is mostly as a result of this low-lying proposed development having no material consequence for the nature of the already industrial visual setting or the visual amenity of the viewer, despite the proposed development being a noticeable addition to the industrial profile of the Poolbeg peninsula in each instance.

Statement of Significance

Based on the landscape and visual impact judgements provided throughout this LVIA, the proposed BESS development that is located on Poolbeg peninsula, Ringsend, Dublin 4 is not considered to give rise to any significant landscape or visual impacts.

10.7.3 Poolbeg BESS Decommissioning

The Poolbeg BESS is expected to be operational for at least 25 years or as long as is required by grid infrastructure. On cessation of activities, the facility will be decommissioned, and the site remediated and restored and left level, in line with any requirements of a planning permission ensuring that there will be no environmental pollution. Please refer to Chapter 5 of this EIAR.

10.8 Poolbeg BESS Mitigation and Monitoring

There are no additional mitigation measures proposed in relation to the proposed Poolbeg BESS development. The siting and design of the proposed development are the main mitigation measures associated with this project (i.e. the mitigation measures are already embedded). In addition, any proposed screening is not considered necessary or effective in this overtly industrial context. Owing to this, monitoring of these measures is neither necessary nor applicable.

10.9 Ringsend FlexGen Impact Assessment

For a description of the proposed Ringsend FlexGen development, please refer to Chapter 5.

Landscape Value and Sensitivity

As with Section 10.4 and 10.6, and for very similar reasons, the site and its vicinity are deemed to be of Low sensitivity.

10.9.1 Ringsend FlexGen Construction Effects

Magnitude of Landscape Effects

The initial proposed work will involve site clearance and preparation, while the subsequent construction work will include the import of fill material, laying of foundations for plant and buildings, installation of plant and equipment, concrete works/hard surfacing and paving, as well as external lighting and fencing. Access to the site is proposed via two existing entrances at the southwest and south of the site, onto South Bank Road. For more information on the construction phase activities relating to the Ringsend FlexGen site, please refer to Chapter 5.

There will be a higher intensity of site activity during the construction phase of the proposed development than there is at present on site, with a maximum daily workforce of approx. 60 people expected during the construction phase. Construction activity will include the movement of construction machinery on-site, as well as an estimated 36 HGV deliveries to the site per working day during peak stages. It may also include temporary site lighting and the temporary storage of some stripped earth, or excavated hardcore, and construction materials. The construction phase is likely to take in the order of 19 months to complete. Construction-related impacts will only result in 'short term' landscape and visual effects (i.e. effects lasting one to seven years, according to aforementioned EPA Guidelines).

On the basis of the factors discussed above it is considered that the magnitude of landscape impact during construction is High.

10.9.2 Ringsend FlexGen Operational Effects

Magnitude of Landscape Effects

In terms of physical landscape effects, the proposed development will require a slim degree of excavation, which would continue to evolve the wholly manmade landform of the site. No modifications will be made to the terrain of the site, and the proposed development will introduce a form of contemporary industrial construction upon a pre-existing hardcore base. In addition, the site boundaries will be similar to the existing site, in their location, alignment and approx. height. However, the palisade fencing that previously occupied the southern boundary of the site will be replaced by a more aesthetic 2.6m-high system railing (i.e. 1.6m-high dark green railings on top of a 1m-high concrete wall). In this regard, the proposed development is consistent with the nature and scale of prevailing land use on the peninsula.

While the use of the site will be altered once the construction stage is completed, any perceived change to landscape character is one that entails the intensification of a hardcore site of industrial character to that of a relatively large mechanised development representing a notable increase in built intensity. Thus, while the existing landscape character of the site will be somewhat evolved from its present state, it will become more consistent and compatible with that of the broader Poolbeg peninsula. To put it another way, the established character and built form of this industrial area will mitigate against perceived or real incongruities or incompatibilities between the proposed and existing land-uses. This point is even more prominent within the context of the highly transitional character of the Poolbeg Peninsula. As the site is in close proximity to the ESB Dublin Bay Power Station, a near-identical and compatible land use and character is in the immediate vicinity of the site. In that regard, the proposed development is a moderate expansion of the electricity generation/storage land use and landscape character adjacent to the site.

On the basis of the factors discussed above it is considered that the magnitude of landscape impact is Low.

With reference to the significance matrix (Table 3 in the Appendix 10A), the Low landscape sensitivity judgement attributed to the study area coupled with a Low magnitude of landscape impact is considered to result in a Slight-imperceptible operational/residual significance of landscape impact.

Summary of Visual Effects

The following summary is to be read in conjunction with: Appendix 10D - Ringsend FlexGen Visual Impact Assessment.

Table 10.3 (below) summarises the full textual assessment of visual effects for each View Point (VP) contained in Appendix 10D. Whilst the 'receptor sensitivity analysis table' and full textual assessment for each VP is normally contained within the landscape and visual chapter, in this instance, given the considerable scale of this project and the number of VPs, it is considered more prudent to place this material in a separate appendix and focus herein on the significance of the findings

Table 10.3: **Summary of Visual Effects at Viewshed Reference Points (VRP's)**

VRP No.	Distance to site boundary	Visual receptor Sensitivity (from Appendix 10D)	Visual Impact Magnitude	Significance of Visual effect
VP1	17m	Low	Medium-low	Slight
VP2	14m	Low	Medium-low	Slight
VP3	258m	Low	Low-negligible	Slight-imperceptible
VP4	302m	Medium-low	Negligible	Imperceptible
VP5	228m	Medium-low	Negligible	Imperceptible
VP6	631m	High-medium	Negligible	Slight-imperceptible
VP7	325m	Low	Negligible	Imperceptible
VP8	403m	Medium	Low-negligible	Slight-imperceptible
VP9	2.3km	High-medium	Negligible	Imperceptible
VP19	8.0km	High-medium	Negligible	Imperceptible
VP20	2.8km	High-medium	Negligible	Imperceptible
VP21	1.6km	High-medium	Low-negligible	Slight
VP22	5.3km	High-medium	Negligible	Imperceptible

Visual impacts were assessed at 13 no. viewpoints representing a variety of distances, angles and viewing contexts. These viewpoints are considered to range in sensitivity from Low to High-medium. The highest level of Significance of Visual Impact was deemed to be 'Slight,' which occurred at three viewpoints, two of which are located less than 20m from the site boundary. A 'Slight-imperceptible' Significance of Visual Impact was deemed to occur at three viewpoints. However, in the majority of viewpoints (i.e. seven of the 13 no. viewpoints), the proposed development was deemed to have an 'Imperceptible' impact upon the inherent visual amenity. Such a notably low visual impact significance is primarily as a result of the proposed development having no material consequence for the nature of the already industrial visual setting or the visual amenity of the viewer, despite the proposed development being a noticeable addition to the industrial profile of the Poolbeg peninsula in each instance.

Statement of Significance

Based on the landscape and visual impact judgements provided throughout this LVIA, the proposed Ringsend FlexGen development that is located on Poolbeg peninsula, Ringsend, Dublin 4 is not considered to give rise to any significant landscape or visual impacts.

10.9.3 Ringsend FlexGen Decommissioning

The Ringsend FlexGen plant is expected to be operational for at least 25 years or as long as is required by grid infrastructure. On cessation of activities, the plant will be decommissioned, and the site remediated and restored and left level, in line with any requirements of a planning permission and IE licence, unless otherwise authorised. A Decommissioning Management Plan (DMP) will be prepared, which will include details of decommissioning of all plant and equipment ensuring that there will be no environmental pollution. Please refer to Chapter 5 of this EIAR.

10.10 Ringsend FlexGen Mitigation and Monitoring

There are no additional mitigation measures proposed in relation to the proposed Ringsend FlexGen development. The potential for enhancements to the southern boundary of the site

have been considered and therefore the design of the facility incorporates a more aesthetic 2.6m-high system railing (i.e. 1.6m-high dark green railings on top of a 1m-high wall). **Noting the alignment of underground services along that southern boundary, planted or green edges are not proposed in this location.**

The siting and design of the proposed development are the main mitigation measures associated with this project (i.e. the mitigation measures are already embedded), including the proposed systems railing as an alternative, more aesthetic boundary treatment along the southward/public facing side of the site. Owing to this, monitoring of these measures is neither necessary nor applicable.

10.11 South Wall BESS Impact Assessment

For a description of the proposed South Wall BESS development, please refer to Chapter 5.

10.11.1 South Wall BESS Construction Effects

Magnitude of Landscape Effects

The construction phases will include civil enabling works; the construction of BESS infrastructure; the installation, commissioning and testing of plant and equipment. For more information on the construction phase activities relating to the South Wall BESS site, please refer to Chapter 5.

Aside from a low amount of fill required to be imported in order to raise the site level to avert the threat of future flooding, works may also include temporary site lighting and the temporary storage of some stripped earth, or excavated hardcore, and construction materials. The construction phase is likely to take in the order of 14 months to complete. Construction-related impacts will only result in short-term landscape and visual effects (i.e. effects lasting one to seven years, according to the aforementioned Environmental Protection Agency publication 'Guidelines on the Information to be contained in Environmental Impact Assessment Reports').

On the basis of the factors discussed above it is considered that the magnitude of landscape impact during construction is High.

10.11.2 South Wall BESS Operational Effects

Magnitude of Landscape Effects

The compound will contain two distinct areas, with proposed mounding aligning the change of level between the two areas. The higher area of land (on the north of the site) will accommodate the BESS, a dedicated IPP Transformer and access to a dedicated portion of the control building containing switchgear and the BESS control equipment. The lower area (to the south) will primarily contain a temporary laydown area. In terms of proposed entrances, there will be a secure dedicated entrance on its southern and eastern boundary, as well as an "internal" entrance from the proposed Ringsend FlexGen site (i.e. to its west).

In terms of physical landscape effects, an alteration of up to approx. 1.6m will be made to the terrain of the site (i.e. between the northern area and southern area, with an embankment defining that change of level), and the proposed development will essentially introduce a form of low-lying construction upon a pre-existing, brownfield base. In addition, the site boundaries will be broadly similar to the existing site, in their location, alignment and treatment (i.e. palisade fencing). In this regard, the proposed development is wholly consistent with the nature and scale of prevailing land use on the peninsula.

In terms of any potential loss of vegetation on the site as a result of the proposed development, the small amount of scrub vegetation present on the site is of negligible intrinsic and/or naturalistic value, while the only mature trees located in the direct vicinity of the site (i.e. the aforementioned line of evergreen trees outside the northwest corner of the site, and the mid-height, self-sown trees just outside the eastern site boundary) will not be affected by the proposed development.

While the use of the site will change once the construction stage is completed, any perceived change to landscape character is one that entails exchanging one form of relatively low-lying brownfield character for another, thereby effectively maintaining the existing landscape character of the site. In other words, the established character and built form of this industrial area mitigates against perceived or real incompatibilities between the proposed and existing land-uses, especially within the framework of the transitional character of the Poolbeg Peninsula. Furthermore, the site is within the outer compound of the wider ESB Networks Ringsend substation/Dublin Bay Power Station, where a highly compatible land use and character adjoins the site's boundaries. In that regard, the proposed development is a "natural" extension of the electricity generation/storage land use and landscape character engulfing the site.

On the basis of the factors discussed above it is considered that the magnitude of landscape impact is Low.

With reference to the significance matrix (Table 3 in the Appendix 10A), the Low landscape sensitivity judgement attributed to the study area coupled with a Low magnitude of landscape impact is considered to result in a Slight-imperceptible significance of landscape impact.

Summary of Visual Effects

The following summary is to be read in conjunction with Appendix 10E – South Wall BESS Visual Impact Assessment.

Table 10.4 (below) summarises the full textual assessment of visual effects for each View Point (VP) contained in Appendix 10E. Whilst the 'receptor sensitivity analysis table' and full textual assessment for each VP is normally contained within the landscape and visual chapter, in this instance, given the considerable scale of this project and the number of VPs, it is considered more prudent to place this material in a separate appendix and focus herein on the significance of the findings.

Table 10.4: **Summary of Visual Effects at Viewshed Reference Points (VRP's)**

VRP No.	Distance to site boundary	Visual receptor Sensitivity (from Appendix 10E)	Visual Impact Magnitude	Significance of Visual effect
VP1	146m	Low	Negligible	Imperceptible
VP2	70m	Low	Negligible	Imperceptible
VP3	282m	Low	Negligible	Imperceptible
VP4	407m	Medium-low	Negligible	Imperceptible
VP5	299m	Medium-low	Negligible	Imperceptible
VP6	696m	High-medium	Negligible	Slight-imperceptible
VP7	262m	Low	Negligible	Imperceptible
VP8	272m	Medium	Low-negligible	Slight-imperceptible
VP9	3.0km	High-medium	Negligible	Imperceptible

VRP No.	Distance to site boundary	Visual receptor Sensitivity (from Appendix 10E)	Visual Impact Magnitude	Significance of Visual effect
VP19	7.9km	High-medium	Negligible	Imperceptible
VP20	2.7km	High-medium	Negligible	Imperceptible
VP21	1.5km	High-medium	Negligible	Imperceptible
VP22	5.1km	High-medium	Negligible	Imperceptible

Visual impacts were assessed at 13 No. viewpoints representing a variety of distances, angles and viewing contexts. These viewpoints are considered to range in sensitivity from Low to High-medium. The highest level of Significance of Visual Impact is considered to be 'Slight-imperceptible,' which occurred at two viewpoints. All other viewpoints (i.e. 11 out of 13 viewpoints) were deemed to have an 'Imperceptible' impact upon visual amenity. This markedly low visual impact significance is primarily as a result of the proposed development having no material consequence for the nature of the already industrial visual setting or the visual amenity of the viewer, despite the proposed development being a noticeable addition to the industrial profile of the Poolbeg peninsula in each instance.

10.11.3 South Wall BESS Decommissioning

The South Wall BESS is expected to be operational for at least 25 years or as long as is required by grid infrastructure. On cessation of activities, the facility will be decommissioned, and the site remediated and restored and left level, in line with any requirements of a planning permission ensuring that there will be no environmental pollution. Please refer to Chapter 5 of this EIAR.

10.12 South Wall BESS Mitigation and Monitoring

There are no additional mitigation measures proposed in relation to the proposed South Wall BESS development. The potential for enhancements to the southern boundary of the site have been considered and therefore the design of the facility incorporates a more aesthetic 2.6m-high system railing (i.e. 1.6m-high dark green railings on top of a 1m-high wall). **Noting the alignment of underground services along that southern boundary, planted or green edges are not proposed in this location.**

The siting and design of the proposed development are the main mitigation measures associated with this project (i.e. the mitigation measures are already embedded), including the proposed systems railing as an alternative, more aesthetic boundary treatment along the southward/public facing side of the site. Owing to this, monitoring of these measures is neither necessary nor applicable.

10.13 Cumulative Effects

10.13.1 Poolbeg FlexGen Cumulative

In relation to the potential cumulative impacts arising from the proposed development in conjunction with existing developments, the context of the site's location, within a port peninsula, is crucial. As is detailed in Section 10.4.1, the Poolbeg peninsula contains some of the tallest industrial structures and largest industrial buildings in the country. Indeed, the peninsula was reclaimed from Dublin Bay specifically for such industrial and/or port-related purposes, and it is reflective of this fact that there are no residential dwellings upon the peninsula to this day. For

well over a century, and consistent with its current zoning, the peninsula has been subject to further and consistent intensification of industrial development. The most visible and well-known example of this intensification in the last decade has been the construction and operation of the Covanta Waste to Energy facility, though there are several existing voluminous industrial developments even closer to the site, which are also commensurately larger and more visible than the proposed development.

In that context, it is not considered that the proposed development will have any material landscape or visual impacts in-combination with other existing developments in the vicinity of the site.

In relation to the potential cumulative impacts arising from the proposed development in conjunction with other proposed or permitted developments in the vicinity of the site, there are three such developments that are of potential relevance, owing to their relative scale and proximity, within the broader vicinity of the site.

The first instance (planning reference 2130/18) refers to the *“Demolition of existing two-storey administration building (534 sq.m); construction of a new two-storey building (563 sq.m) containing an administration area, staff facilities and a non-ferrous metals recovery area; 2 no. 18 m long weighbridges; 1 no. dry wheelwash; car parking; all associated site development works all on a site of 1.79 Ha.”* This proposed development will be located on the north side of Pigeon House Road and granted planning permission in 2018.

The second instance (planning reference 3669/19), was granted planning permission in January 2020, and refers to:

(1.) Construction of a single storey ESB Substation & Switchroom located adjacent to the existing terminal entrance/exit gate onto Shelly Banks Road.

(2.) All associated site works. These works are sought as an addition to the parent planning permission ref 2656/16 previously granted on the site. These development works will result in the site being upgraded to Upper Tier under the SEVESO regulations.

The third instance (planning reference 2804/19) refers to a proposed Molasses Storage tank at the corner of South Bank Road and Pigeon House Road, which was granted planning permission earlier this year.

In that context, it is not considered that the proposed development will have any material landscape or visual impacts in-combination with other proposed/permitted developments in the vicinity of the site.

In summary, the likely cumulative effects of the proposed development are deemed to be negligible.

10.13.2 Poolbeg BESS Cumulative

In relation to the potential cumulative impacts arising from the proposed development in conjunction with existing developments, please refer to Section 10.4.1 (i.e. all four proposed developments relating to this EIAR are on the same port peninsula, and share the same highly industrialised context of numerous voluminous and highly-visible structures and developments).

In relation to the potential cumulative impacts arising from the proposed development in conjunction with other proposed or permitted developments within or in the vicinity of the site, there are no known proposed or permitted developments that are of potential relevance.

In summary, it is not considered that the proposed development will have any material landscape or visual impacts in-combination with other existing or permitted developments in the vicinity. This is partly due to the relatively low-lying nature of the proposed development, and partly due to the inherent screening from the public realm, provided by existing buildings, structures and vegetation.

Consequently, the likely cumulative effects of the proposed development are deemed to be negligible.

10.13.3 Ringsend FlexGen Cumulative

In relation to the potential cumulative impacts arising from the proposed development in conjunction with existing developments, please refer to Section 10.4.1 (i.e. all four proposed developments relating to this EIAR are on the same port peninsula, and share the same highly industrialised context of numerous voluminous and highly-visible structures and developments).

In relation to the potential cumulative impacts arising from the proposed development in conjunction with other proposed or permitted developments in the vicinity of the site, according to myplan.ie (an initiative of the Department of Housing, Planning and Local Government, in conjunction with Irish Local Authorities), there are four such developments that are of potential relevance, owing to their relative scale and/or proximity, within the broader vicinity of the site (i.e. less than 500m away).

The

The first instance refers to a proposed development located approx. 300m west/southwest of the site and is located within the Poolbeg West Strategic Development Zone (SDZ) Planning Scheme 2019 area, at the site of the former Irish Glass Bottle and Fabrizia sites. The proposed development (file no. 14/6/2019) will consist of *“streets, transportation, water services and utilities infrastructure; public realm and public amenity spaces; and, temporary landscaping of a school site, to facilitate Phase 1 development, as provided for under the approved Poolbeg West SDZ Planning Scheme.”* As part of the SDZ, this land is planned to be a new “city quarter” catering for up to 16,000 people living/working there. This 43ha Strategic Development Zone has recently been approved permission for the development of streets, parks and utilities infrastructure.

The second instance is located approx. 280m west/northwest of the site, and entails planning permission granted, on 18/07/2019 (file no. 2804/19), for a molasses storage tank at the corner of South Bank Road and Pigeon House Road.

Approx. 250m northwest of the site, the third instance refers to planning permission granted in 2017 for a development that will consist of *“the construction of a new two storey permanent steel gantry structure to allow for safe inspection and repair of refrigeration engines on shipping containers & all associated site works.”*

The fourth site granted planning permission (file no. 2130/18) refers to the *“Demolition of existing two-storey administration building (534 sq. m); construction of a new two-storey building (563 sq.m) containing an administration area, staff facilities and a non-ferrous metals recovery area; 2 no. 18m long weighbridges; 1 no. dry wheelwash; car parking; all associated site development works all on a site of 1.79 Ha.”* This is located approx. 290m north of the site.

Overall, it is not considered that the proposed development, which has only result in very minor landscape and visual impacts in this industrial context in its own right, will have any material landscape or visual impacts in-combination with other proposed/permitted developments in the

vicinity of the site. In summary, the likely cumulative effects of the proposed development are deemed to be negligible.

10.13.4 South Wall BESS cumulative

In relation to the potential cumulative impacts arising from the proposed development in conjunction with existing developments, please refer to Section 10.4.1 (i.e. all four proposed developments relating to this EIAR are on the same port peninsula, and share the same highly industrialised context of numerous voluminous and highly-visible structures and developments).

In relation to the potential cumulative impacts arising from the proposed development in conjunction with other proposed or permitted developments in the vicinity of the site, according to myplan.ie, there are four such developments that are of potential relevance, owing to their relative scale and/or proximity, within the broader vicinity of the site (i.e. less than 500m away).

The first instance refers to a proposed development located west/southwest of the site, and is located within the Poolbeg West Strategic Development Zone (SDZ) Planning Scheme 2019 area, at the site of the former Irish Glass Bottle and Fabrizia sites. The proposed development (file no. 14/6/2019) will consist of *“streets, transportation, water services and utilities infrastructure; public realm and public amenity spaces; and, temporary landscaping of a school site, to facilitate Phase 1 development, as provided for under the approved Poolbeg West SDZ Planning Scheme.”* As part of the SDZ, this land is planned to be a new “city quarter” catering for up to 16,000 people living/working there. this 43ha Strategic Development Zone has recently been approved permission for the development of streets, parks and utilities infrastructure .

The second instance is located west/northwest of the site, and entails planning permission granted, on 18/07/2019 (file no. 2804/19), for a molasses storage tank at the corner of South Bank Road and Pigeon House Road.

Northwest of the site, the third instance refers to planning permission granted in 2017 for a development that will consist of *“the construction of a new two storey permanent steel gantry structure to allow for safe inspection and repair of refrigeration engines on shipping containers & all associated site works.”*

The fourth site granted planning permission (file no. 2130/18) refers to the *“Demolition of existing two-storey administration building (534 sq.m); construction of a new two-storey building (563 sq.m) containing an administration area, staff facilities and a non-ferrous metals recovery area; 2 no. 18 m long weighbridges; 1 no. dry wheelwash; car parking; all associated site development works all on a site of 1.79 Ha.”* This is located north of the site.

Overall, it is not considered that the proposed development, which has only results in very minor landscape and visual impacts in this industrial context in its own right, will have any material landscape or visual impacts in-combination with other proposed/permitted developments in the vicinity of the site. In summary, the likely cumulative effects of the proposed development are deemed to be negligible.

10.13.5 Cumulative summary

Table 10.5: Summary of Potential Cumulative Effects

	Poolbeg FlexGen	Poolbeg BESS	Ringsend FlexGen	South Wall BESS
Poolbeg FlexGen		Negligible	Negligible	Negligible
Poolbeg BESS	Negligible		Negligible	Negligible
Ringsend FlexGen	Negligible	Negligible		Negligible
South Wall BESS	Negligible	Negligible	Negligible	

In summary, and consistent with Sections 10.13.1 to 10.13.4, in all cases the likely cumulative effects of the proposed development are deemed to be negligible.

10.14 Summary of Mitigation and Monitoring

The summary of mitigation and monitoring measures for the four proposed developments are outlined in Chapter 18.

10.15 Summary of Significant Residual Effects

Based on the landscape and visual impact judgements provided throughout this LVIA, all four of the proposed developments located on the Poolbeg peninsula are not considered to give rise to any significant residual landscape or visual impacts.

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11 Noise and Vibration

11.1 Introduction

This chapter presents an assessment of the potential noise and vibration impacts and effects due to the construction, operation and decommissioning of the proposed FlexGen and BESS plants. Impacts of the four projects are considered separately and in combination. The assessment of cumulative noise impacts includes the contribution of other industrial development nearby: Dublin Bay Power Station, Poolbeg CCGT, the Covanta Dublin Waste-to-Energy facility and Ringsend Wastewater Treatment Plant.

Each of the proposed developments is expected to generate:

- Temporary noise and vibration impacts due to activities during the construction and decommissioning phases; and
- Permanent noise and vibration impacts due to fixed plant and processes on site during operation.

The closest existing sensitive receptors to the proposed developments are residential properties at a minimum distance of 580m. Potential residential development on the former Irish Glass Bottle Factory as part of the Poolbeg West Strategic Development Zone is also considered. The approximate area of potential residential development associated within the SDZ is at a minimum of 220m to the proposed Ringsend FlexGen facility, which is the closest of the four projects.

The proposed developments are not predicted to result in significant adverse effects due to construction or operational noise or vibration and therefore no specific mitigation measures are proposed. However, noise emissions should be minimised at source, in accordance with best practice, to minimise the exposure site personnel to noise from the emission of noise during construction and operation.

11.2 Assessment Methodology

This section describes the approach to the assessment based on the various relevant requirements and criteria. Cumulative impacts due to the contributions of noise from other nearby licenced sites are also assessed.

11.2.1 Regulatory Controls

The Environmental Noise Regulations (ENR)⁷⁵ transposes the EU Directive 2002/49/EC⁷⁶ (commonly referred to as the Environmental Noise Directive (END)) for the strategic control of environmental noise within the Republic of Ireland. The project sites fall within the Dublin agglomeration⁷⁷ and therefore it is within the scope of the ENR. However, this is mainly concerned with the strategic management of noise within the agglomeration whereas the IE Licence regulations give powers to the Environmental Protection Agency, as the competent authority, to place controls on noise from industrial sites. Nuisance due to noise is dealt with by the Environmental Protection Agency Act and the Protection of the Environment Act 2003

⁷⁵ Environmental Noise Regulations, 2006 (S.I. No. 140 of 2006).

⁷⁶ The European Parliament and the Council of the European Union, 2002. Directive 2002/49/EC of 25 June 2002 relating to the assessment and management of environmental noise.

⁷⁷ <https://gis.epa.ie/EPAMaps/>

require Best Available Techniques in controlling noise as a result of human activity “*which may be harmful to human health or the quality of the environment, result in damage to material property, or impair or interfere with amenities and other legitimate uses of the environment*”. It clarifies that noise includes vibration.

11.2.2 Construction Noise

In lieu of Irish construction noise methodology or statutory guidelines, British Standard 5228-1 (BS 5228)⁷⁸ has been adopted for the assessment of effects at noise sensitive receptors. This standard provides comprehensive guidance including details of typical noise levels associated with items of plant and activities, prediction methods, and options for mitigation measures, and therefore has been considered appropriate for use in this assessment.

Based on the BS 5228 Part 1 ‘Example method 1 – ABC Method’ in BS 5228 Part 1 2009+A1:2014, noise levels generated by site activities are deemed to be potentially significant if the predicted construction noise level at the receptor exceeds the applicable threshold value. The threshold value is assigned based on the representative baseline ambient noise level for the receptor. BS 5228 states: “*The assessor then needs to consider other project-specific factors, such as the number of receptors affected and the duration and character of the impact, to determine if there is a significant effect*”.

11.2.3 Construction Vibration

Vibration during the construction of the proposed development is assumed to be negligible at residential distances given the long separation distance to the nearest receptor and is not considered further. However, the assessment considers the potential impact of construction vibration on nearby built heritage assets in terms of cosmetic and structural damage.

BS 5228 ‘Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 2: Vibration’ (2009+A1:2014)⁷⁹ provides comprehensive guidance on the assessment of vibration due to construction activity. The Standard considers levels of vibration from construction in terms of peak particle velocity (ppv) defined as the instantaneous maximum velocity reached by a vibrating element as it oscillates about its rest position and is expressed in millimetres per second (mm/s).

BS 5228–2:2009 includes guidance on the levels of vibration that would be necessary to cause structural damage to different types of buildings. It states that low frequency vibration at a ppv of 15 mm/s may cause cosmetic damage in un-reinforced or light framed structures e.g. for residential/light commercial use, and 50 mm/s in heavy commercial buildings. These values apply to transient vibration which does not induce a resonant response in structures and low-rise buildings. A source of continuous low frequency vibration may induce a vibration response in buildings or structures at their resonant frequencies. The building would then be subject to additional dynamic forces arising from its own motion. Therefore, BS 5228–2:2009+A1:2014 recommends that the values given should be reduced by 50% to take into account for dynamic magnification due to resonances. Applying a reduction of 50% to the lowest values in BS 5228–2:2009+A1:2014 gives:

- 7.5 mm/s for residential and light commercial buildings
- 25 mm/s for industrial and commercial buildings

⁷⁸ British Standard 5228-1:2009+A1:2014 ‘Code of practice for noise and vibration control on construction and open sites – Part 1: Noise’.

⁷⁹ British Standard 5228-1:2009+A1:2014 ‘Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration’.

The Standard also states: “Important buildings which are difficult to repair might require special consideration on a case-by-case basis. A building of historical value should not (unless it is structurally unsound) be assumed to be more sensitive.”

The German Standard DIN 4150 ‘Structural Vibration – Part 3: Effect of Vibration on Structures’ (1999)⁸⁰ includes guideline values for the evaluation of short-term vibration on buildings with regards to potential damage. The values are presented as a function of frequency and apply at the building foundation. The short-term levels of vibration in the frequency bands having the most stringent levels are as follows:

- 3 mm/s for particularly sensitive buildings;
- 5 mm/s for residential buildings; and
- 20 mm/s for industrial and commercial buildings.

The Association of Noise Consultants Guidelines ‘Measurement and Assessment of Groundborne Noise and Vibration’ (2012)⁸¹ reviews the various criteria for building damage which concludes: “To be below damage criteria, vibration in any direction should not exceed 3 mm/s ppv for transient vibration and 2.5 mm/s (below 2 mm/s at 1 Hz) for continuous vibration (anywhere in the structure). Higher vibration may not necessarily cause damage.”

With respect to the above discussion, it is considered that an appropriate value for the onset of significance for occupied receptors would be 1 mm/s. The onset of significance for non-residential receptors i.e. the potential for cosmetic damage is considered to commence at:

- 3 mm/s for sensitive/susceptible buildings; and
- for other non-residential receptors e.g. commercial and industrial buildings, a continuous ppv of more than about 7 mm/s would be required to cause cosmetic damage.

11.2.4 Operational Noise

The Environmental Protection Agency ‘Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4)’ (2016)⁸² describes a methodology to assess and control the predicted and actual noise impacts associated with licenced sites. It specifically considers operational noise impacts only. For construction-related noise, the Guidance states this is not a licensable aspect of site noise and is generally covered by conditions attached planning permission. The British Standard 5228 ‘Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 1: Noise’⁸³ and ‘Part 2: Vibration’⁸⁴ (2009+A1:2014) are referenced as relevant guidance.

The NG4 Guidance sets out a methodology for setting appropriate noise criteria on operational noise emissions with the potential to affect Noise Sensitive Locations (NSLs). NSLs are defined as “Any dwelling house, hotel or hostel, health building, educational establishment, place of worship or entertainment, or any other installation or area of high amenity which for its proper enjoyment requires the absence of noise at nuisance levels.”

⁸⁰ Das Deutsche Institut für Normung e.V. (DIN), 1999. Standard 4150 ‘Structural Vibration – Part 3: Effect of Vibration on Structures’.

⁸¹ Association of Noise Consultants, 2012. ‘Measurement and Assessment of Groundborne Noise and Vibration’.

⁸² Environmental Protection Agency Office of Environmental Enforcement Guidance Note for Noise Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4). January 2016.

⁸³ British Standards Institution Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 1: Noise 2009+A1:2014.

⁸⁴ British Standards Institution Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 2: Vibration 2009+A1:2014.

Firstly, sites are screened to determine whether they are Quiet Areas based on the proximity of the proposed development to urban areas and other major sources of environmental noise. The Quiet Area Noise Criteria for applicable sites is a limit defined as 10 dB below the average background noise level for the day (07:00 to 19:00), evening (19:00 to 23:00) and night-time (23:00 to 07:00) periods obtained by long-term noise monitoring.

For NSLs that are not identified as being within Quiet Areas, the NSLs are first screened for low background noise defined as those where the average background noise levels (L_{AF90}) are less than or equal to:

- Daytime: 40 dB L_{AF90} ;
- Evening: 35 dB L_{AF90} ; and
- Night-time: 30 dB L_{AF90} .

The noise criteria for NSLs with low background noise are:

- Daytime (07:00 to 19:00) 45 dB $L_{Ar,T}$;
- Evening (19:00 to 23:00) 40 dB $L_{Ar,T}$; and
- Night-time (23:00 to 07:00) 35 dB $L_{Aeq,T}$.

where $L_{Ar,T}$ is the rated noise level, which is equal to the L_{Aeq} plus any correction for tonal or impulsive acoustic features.

Where low background noise criteria are not met, then the general criteria apply as follows:

- Daytime (07:00 to 19:00) 55 dB $L_{Ar,T}$;
- Evening (19:00 to 23:00) 50 dB $L_{Ar,T}$; and
- Night-time (23:00 to 07:00) 45 dB $L_{Aeq,T}$.

NG4 makes reference to other guidance which may apply to facilities that do not fall under the licensing functions of the EPA. In terms of operational noise, the British Standard 4142 'Methods for Rating and Assessing Industrial and Commercial Sound' is referenced. Using this methodology, adverse and significant adverse impact is identified by calculating the difference between the rating level due to the facility with background sound level. BS 4142 states:

- Typically, the greater this difference, the greater the magnitude of impact;
- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact depending on context;
- A difference of around +5 dB is likely to be an indication of an adverse impact depending on context; and
- Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact depending on context.

11.2.5 Operational Vibration

Operational vibration due to the proposed development is assumed to be negligible given the long separation distance to the nearest sensitive receptor and is not considered further.

11.2.6 Receptor Sensitivity

The effects of environmental noise take various forms including but not limited to annoyance, sleep disturbance, disturbance of tranquillity, ability to communicate or concentrate, or participate in social and community activities.

Noise-sensitive locations are defined within the NG4 guidance as “Any dwelling house, hotel or hostel, health building, educational establishment, place of worship or entertainment, or any other installation or area of high amenity which for its proper enjoyment requires the absence of noise at nuisance levels.” Table 11.1 sets out typical classes of sensitive receptors and classification of noise sensitivity respectively. However, the assessment criteria for noise account for sensitivity receptor by using different magnitudes of impact to identify significant effects, rather than using a significance matrix.

Table 11.1: Criteria of sensitivity

Sensitivity	Criteria
High	Receptors where occupants or activities are particularly susceptible to noise. Examples include: Residences, quiet outdoor areas used for recreation, conference facilities, auditoria/studios, schools in daytime, hospitals/residential care homes and religious institutions e.g. churches or mosques.
Medium	Receptors moderately sensitive to noise, where it may cause some distraction or disturbance. Examples include offices, restaurants and sports grounds where spectator noise is not a normal part of the event and where quiet conditions are necessary (e.g. golf or tennis).
Low	Receptors where distraction or disturbance from noise is minimal. Examples include residences and other buildings not occupied during working hours, factories and working environments with existing high noise levels and sports grounds where spectator noise is a normal part of the event.

11.2.6.1 Significance of Effect - Construction

‘Example method 1 – The ABC Method’ of BS 5228 describes a methodology for determining significance of effect. Table F.1 of the standard is replicated in Table 11.2 and the levels at which a significant effect is indicated. For this assessment all noise sensitive receptors are considered to be Category A and therefore the lowest threshold values apply.

Table 11.2: Threshold of potential significant effects due to construction noise at sensitive receptors

Assessment category and threshold value period	Threshold value $L_{Aeq,T}$ dB		
	Category A	Category B	Category C
Night-time (any day 23.00-07.00)	45	50	55
Evenings and Weekends (weekdays 19.00-23.00, Saturdays 13.00-23.00, and Sundays 07.00-23.00)	55	60	65
Standard working hours (weekdays 07.00-19.00 and Saturdays 07.00-13.00)	65	70	75

11.2.6.2 Significance of Effect - Operation

A significant adverse effect due to the operation of the project is deemed to arise when the proposed development results in noise impacts at noise-sensitive receptors that exceed:

- 55 dB(A) L_{eq} during the daytime (07:00 to 19:00);

- 50 dB(A) L_{eq} during the evening (19:00 to 23:00); or
- 45 dB(A) L_{eq} during the night-time (23:00 to 07:00) for any thirty-minute period.

These correspond with the 'Typical limit values for noise for licenced sites' as given in the NG4 Guidance. This is applicable to operational noise but is also applied in the case of construction-related noise on a precautionary basis. It is assumed that these would also apply in the case of the all four proposed projects (licenced and non-licenced) for consistency.

Where the predicted noise impacts exceed these values, the final significance of effect shall be considered with regard to:

- Sensitivity of receptor;
- Whether the impact is temporary/short term (construction-related) or permanent (operational);
- The magnitude by which the limit value is exceeded; and
- The change in ambient noise levels as a result of the contribution of the proposed development.

It is assumed that operational noise includes no significant tonal or impulsive features and therefore correction of daytime and evening noise levels to represent rating levels.

11.3 Baseline Environment

11.3.1 Site location

The location of the proposed development is within the major section of Poolbeg peninsula. The closest noise-sensitive receptors are dwellings in the area of Dublin Bay. Though not currently consented the approximate location of a potential residential development has been included and is approximately 220m from the closest proposed development, Ringsend FlexGen. This is a *potential residential development associated with the SDZ*. The approximate area of potential residential development associated with the SDZ is indicated above in Figure 11.1. A location, NSL4 as shown on Figure 11.1, was added as representative of the potential closest residential location which would be part of the proposed SDZ.

Surrounding industrial receptors are considered to have low sensitivity and due to the nature of their use are not expected to result in significant effects.

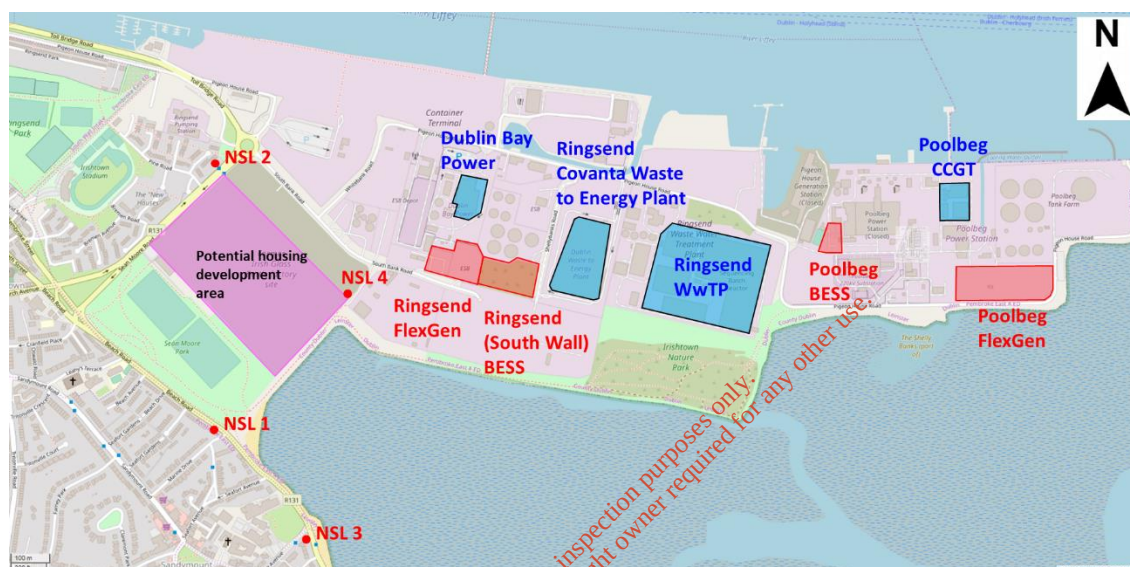
Operational and construction noise levels due to the proposed developments would be calculated at four locations that are representative of the closest noise sensitive locations in Dublin Bay area as shown in Figure 11.1:

Table 11.3: Noise Sensitive Locations

ID	Description (Grid Reference)	Distance to the closest part of the plant in metres			
		Poolbeg FlexGen	Poolbeg BESS	Ringsend FlexGen	South Wall BESS
NSL 1	Existing residential, 26 Beach Road (O 18998 33081)	1,900	1,540	670	770
NSL 2	Existing residential, 13 Leukos Road (O 18982 33761)	1,900	1500	580	720

ID	Description (Grid Reference)	Distance to the closest part of the plant in metres			
		Poolbeg FlexGen	Poolbeg BESS	Ringsend FlexGen	South Wall BESS
NSL 3	Existing residential, 27 Newgrove Ave (O 19219 32815)	1,770	1,460	730	770
NSL 4	Potential residential, South Bank Road (O 19280 33442)	1,540	1,160	220	320

Figure 11.1: Site Layout Plan



Source: © OpenStreetMap contributors. Data is available under the Open Database Licence, and cartography is licenced as CC BY-SA.

11.3.2 Noise monitoring

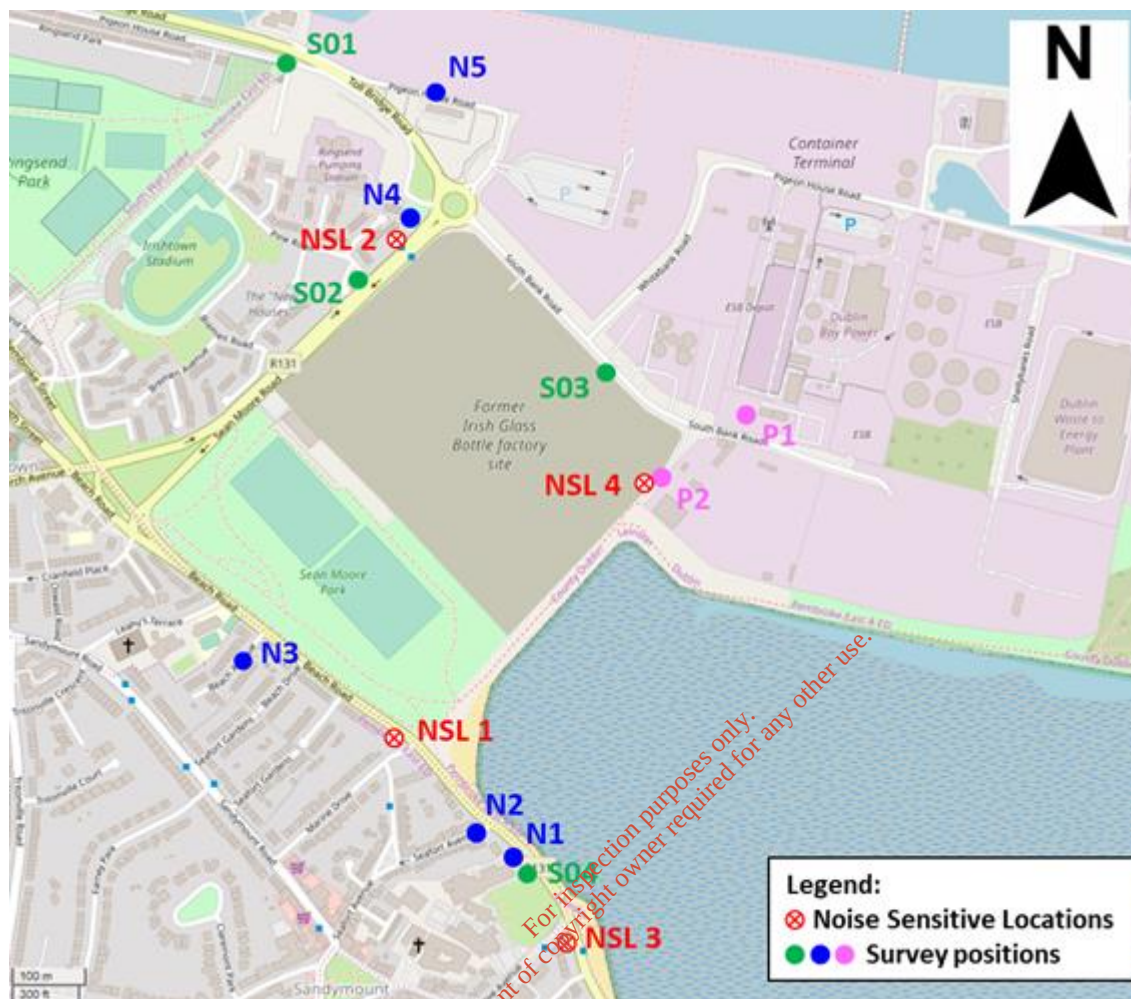
Three baseline noise surveys were undertaken in 2016⁸⁵, 2018⁸⁶ and 2019⁸⁷, which acquired instantaneous noise levels at receptors in Dublin Bay area. The measurements were carried out over intervals of minimum durations of fifteen minutes. The measurement locations are indicated on the mapping in Figure 11.2

⁸⁵ Ringsend Wastewater Treatment Plant Upgrade Project, Environmental Impact Assessment Report, Volume 3, Part A, June 2018

⁸⁶ ESBI South Wall BESS., Noise Impact Assessment - Rev.4, Hoare Lea, 8 June 2018

⁸⁷ Dublin Waste-to-Energy Compliance Environmental Noise Monitoring Report – Quarter 2, 2019

Figure 11.2: Locations of baseline noise surveys



Source: © OpenStreetMap contributors. Data is available under the Open Database Licence, and cartography is licenced as CC BY-SA.

Table 11.4 Summary of baseline noise survey results

Measurement Date	ID	Daytime [a]		Night-time [b]	
		L _{Aeq,T} dB	L _{A90,T} dB	L _{Aeq,T} dB	L _{A90,T} dB
June 2016	S01	65	58-60	53-57	41-43
	S02	71-72	60-61	56-57	38-47
	S03	64-67	51-57	39-51	37-38
	S04	65-67	50-56	62-63	38
May 2018	P1	54	47	50	47
	P2	53	51	50	44
May 2019	N1	74	57-59	70	44-45
	N2	59-61	46-47	46-49	32-35
	N3	51	45-46	40-41	31-32
	N4	65-69	61	47-48	44-45
	N5	56-57	50-53	44	42

[a] S01 to S04 – L_{Aeq,15min}, L_{A90,15min}; P1 to P2 – L_{Aeq,16hr}, Typical L_{A90,5min}; N1 to N5 – L_{Aeq,30min}, L_{A90,30min}

[b] S01 to S04 – $L_{Aeq,15min}$, $L_{A90,15min}$; P1 to P2 – $L_{Aeq,8hr}$, Typical $L_{A90,5min}$; N1 to N5 – $L_{Aeq,30min}$, $L_{A90,30min}$

The area surrounding the proposed project site is industrial in nature and is a characteristic of the baseline conditions of the NSLs. The dominant sources of noise affecting the baseline noise climate associated with the NSLs 1 to 4 are given in Table 11.5.

Table 11.5: Baseline noise levels associated with NSLs

NSLs	Represent Survey ID	Baseline noise climate	Daytime		Night-time	
			$L_{Aeq,T}$ dB	$L_{A90,T}$ dB	$L_{Aeq,T}$ dB	$L_{A90,T}$ dB
NSL1	N2 and N3 [#]	Local road traffic on Beach Road	51	45	40	31
NSL2	S02 and N4 [#]	Heavy traffic on the nearby roundabout, Sean Moore Road and Eastlink; ship engine and operational noise from South Bank Marine Terminal during night-time	65	61	47	44
NSL3	S04 [#] , N1 and N2	Local road traffic on Beach Road	65	50	62	38
NSL4	S03, P1 and P2 [#]	Heavy vehicles accessing to the Kilsaran Concrete site on Southbank Road; site operational noise; activities from the dock (container handling, rumble from ship engines)	53	51	50	44

Remark: # The selected survey IDs are used to represent the baseline noise levels.

The background noise levels expressed as L_{A90} dB given in Table 11.4 exceed the daytime and night-time screening criteria for Areas of Low Background Noise given in the NG4 Guidance. This confirms that the NSLs are within areas that would not be identified as Quiet Areas. Consequently, this also confirms that the General Noise Criteria defined in the NG4 Guidance are applicable rather than the Quiet Area Noise Criteria.

11.4 Poolbeg FlexGen Impact Assessment

11.4.1 Poolbeg FlexGen Construction Effects

An indicative list of construction plant is presented in **Error! Reference source not found.** and has been derived from the Poolbeg FlexGen Construction Management Plan (see Appendix 5A). Reference Sound Pressure Levels (SPL) for continuous operation are presented. The level of noise emission is corrected for utilisation based on the estimated percentage of time the plant is expected to be in use over a working day.

Table 11.6a: List of noise sources considered for the construction of the proposed development

Description	SPL at 10m dB(A)	On time	Specification data source
Air Compressors	62	50%	BS 5228 Table C.5 ref. no. 5
Articulating Boom	74	50%	BS 5228 Table C.4 ref. no. 53
Bulldozers	78	50%	BS 5228 Table C.2 ref. no. 12
Compactors	75	50%	BS 5228 Table C.2 ref. no. 42
Concrete pumps	79	75%	BS 5228 Table C.4 ref. no. 29
Cranes – 100 – 200 tonnes	68	50%	BS 5228 Table C.4 ref. no. 41
Cranes– mobile, 22 – 35 tonnes	67	50%	BS 5228 Table C.4 ref. no. 43
Cranes, mobile, 45 – 65 tonnes	78	50%	BS 5228 Table C.4 ref. no. 45
Crusher	80	50%	BS 5228 Table C.1 ref. no. 15

Description	SPL at 10m dB(A)	On time	Specification data source
Cutters, drills and small tools	78	50%	BS 5228 Table C.4 ref. no. 93
Diesel generators	64	75%	BS 5228 Table C.4 ref. no. 87
Excavator – backhoe	86	25%	BS 5228 Table C.1 ref. no. 1
Excavator – loader	74	25%	BS 5228 Table C.2 ref. no. 27
Excavator – motor grader	73	25%	BS 5228 Table C.1 ref. no. 14
Excavator – jackhammer	73	25%	BS 5228 Table C.1 ref. no. 14
Excavator – Sheet piling machine	60	50%	BS 5228 Table C.3 ref. no. 9
Fork lift truck	75	50%	BS 5228 Table C.4 ref. no. 54
Miscellaneous pumps	76	50%	BS 5228 Table C.3 ref. no. 25
HGV rigs	83	25%	BS 5228 Table C.3 ref. no. 1
Portable compaction equipment	75	50%	BS 5228 Table C.2 ref. no. 42
Scaffolding and mobile hydraulic access platforms	64	50%	BS 5228 Table C.4 ref. no. 57
Telescopic handler	67	50%	BS 5228 Table C.2 ref. no. 35
Truck – boom	70	10%	BS 5228 Table C.4 ref. no. 29
Trucks – fuel/lube	66	10%	BS 5228 Table C.4 ref. no. 15
Trucks – large	75	10%	BS 5228 Table C.1 ref. no. 10
Trucks – pickup	75	10%	BS 5228 Table C.1 ref. no. 10
Trucks – water	66	10%	BS 5228 Table C.4 ref. no. 15
Trucks - Ready-mix concrete	67	10%	BS 5228 Table C.4 ref. no. 21
Welders	63	50%	BS 5228 Table C.4 ref. no. 85

The source of noise is assumed to be evenly distributed across the site at locations adjacent to site components scheduled for demolition or construction. The calculation of construction noise has accounted for buildings providing screening. It is assumed that there will be no construction activity during the night-time. Normal working hours during the construction period are expected to be Monday to Friday 07:00 to 19:00 hours and Saturday 08:00 to 14:00. During certain stages of the construction phase, it is expected that some work will have to be carried out outside of normal working hours however this will be kept to a minimum.

Noise impacts due to construction traffic is considered negligible within the context of the site locations.

Error! Reference source not found. includes noise levels at representative noise sensitive receptors due to the construction of the proposed developments.

Table 11.7: Construction noise levels at sensitive receptors due to the proposed development

Receptor	Noise Level dB(A) L _{eq}				Significant Adverse Effect
	NSL 1	NSL 2	NSL 3	NSL 4	
Poolbeg FlexGen Site Preparation	38	30	39	33	None
Poolbeg FlexGen Heavy Civils	37	29	38	32	None
Poolbeg FlexGen Mechanical and Electrical	36	28	37	30	None

Receptor	Noise Level dB(A) L_{eq}				Significant Adverse Effect
	NSL 1	NSL 2	NSL 3	NSL 4	
Poolbeg FlexGen Commissioning and Testing	34	25	34	28	None

The predicted noise levels at the noise sensitive receptors due to the construction of the proposed developments are below the daytime criterion of 65 dB(A). It is assumed that this limit applies to activities within the working hours on Saturdays up to 14:00. It is concluded that there are no potential significant adverse effects due to construction noise.

On a precautionary basis, the methodology described in Table E.1 in BS 5228-2:2009+A1:2014 is used to predict worst-case vibration due to percussive piling at five heritage assets. The results are summarised in Table 11.7 and show the predicted vibration levels fall below the criteria significant effects associated with cosmetic or structural damage.

Table 11.8: Predicted vibration levels at heritage assets during percussive piling

Receptor	Shortest plan distance to Poolbeg FlexGen (m)	Worst case vibration level due to percussive piling ppv mm/s
Pigeon House Power Station	400	0.02
Pigeon House Hotel	430	0.02
Poolbeg Power Station Chimney 1	295	0.03
Poolbeg Power Station Chimney 2	240	0.04
The Great South Wall	240	0.04

11.4.2 Poolbeg FlexGen Operational Effects

The operational noise impacts are predicted using a three-dimensional acoustic model within DataKustik CadnaA software, which implements the procedures of ISO 9613-2⁸⁸. The model includes:

- noise source elements which represent operational activities;
- screening elements such as buildings and plant enclosures; and
- sensitive receptor elements at first floor level.

A list of operational noise sources is presented in Table 11.8 and the steady state sound power levels (SWL) that have been applied within the acoustic model. The item numbers correspond to the equipment layout in Figure 11.3. At this stage, the noise emission data of plant items for the proposed development is based on a representative information for similar plant specifications for similar projects. Manufacturer data will not be confirmed until procurement. It is assumed that all plant will operate continuously and simultaneously.

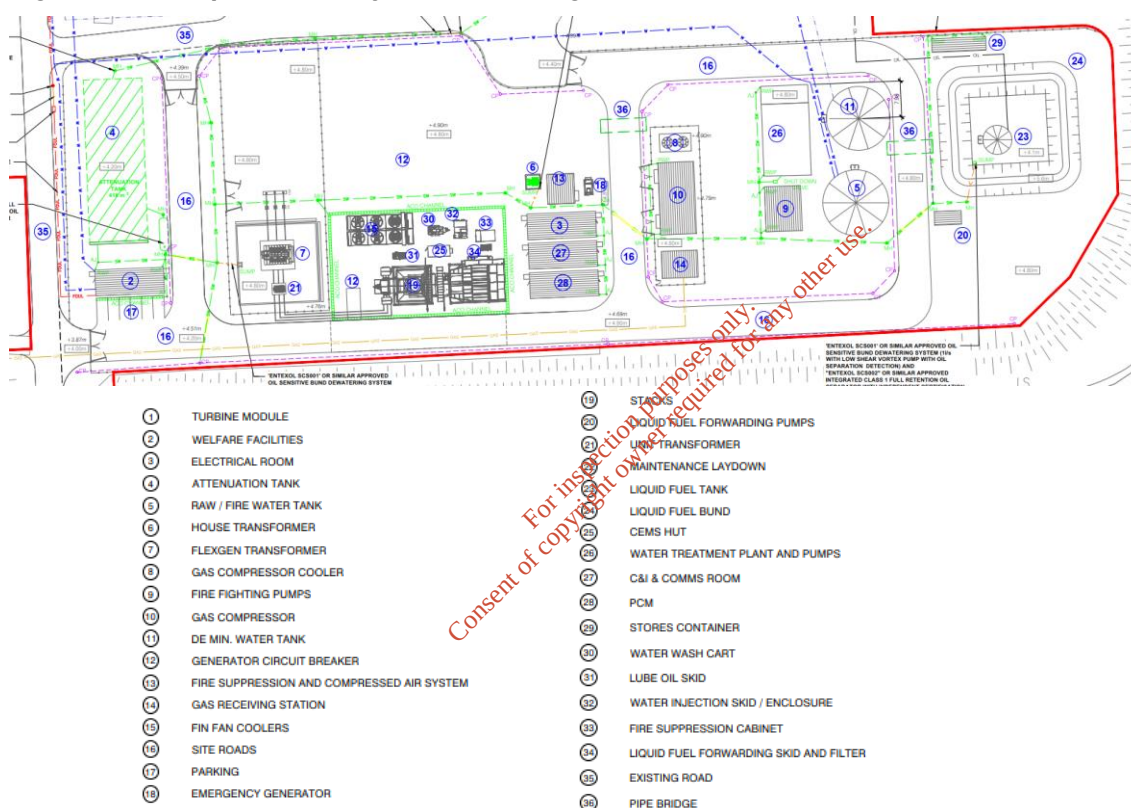
Table 11.9: List of noise sources considered within the acoustic model for the operation of Poolbeg FlexGen

Description	Quantity	Source height	SWL dB(A)
Stack exit	1	30m	97
Inlet chamber breakout	1	15m	94

⁸⁸ ISO 9613 (1996) Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation.

Description	Quantity	Source height	SWL dB(A)
Chamber breakout	1	5m	88
Stack breakout	1	5m	89
Cooling fans inlet (two fans included)	2	4m	98
Cooling fans breakout	1	4m	83
Injection fans breakout	1	2m	72
Gas Compressor unit	1	6m	90
Main step-up transformer	1	8.5m	85
Station service transformer	1	2.5m	73

Figure 11.3: Proposed site layout for Poolbeg FlexGen



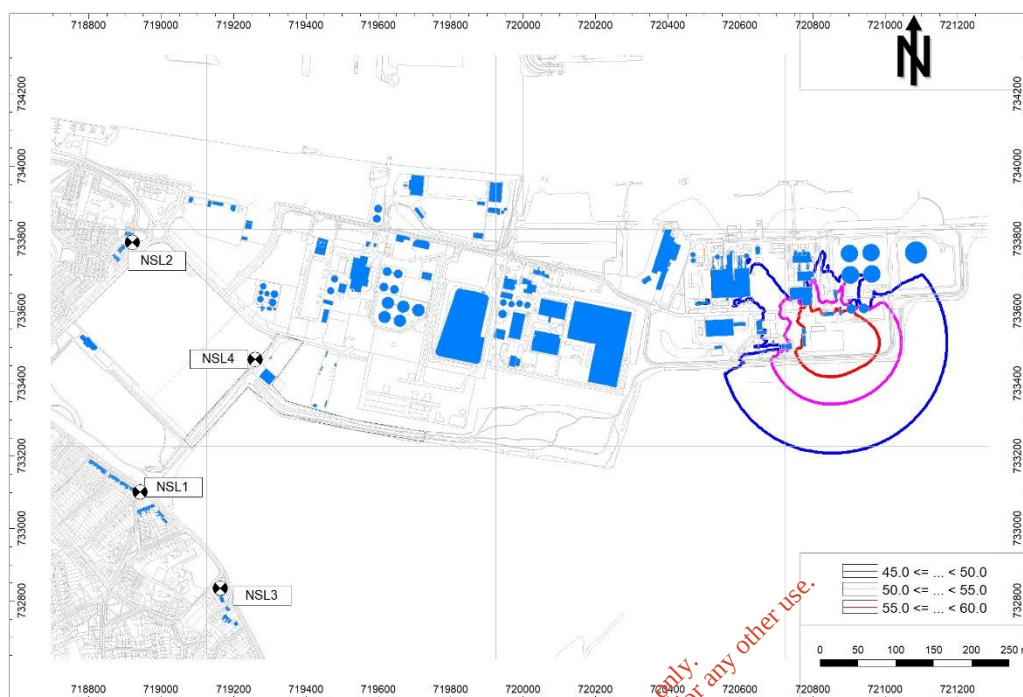
Source: ESB

Error! Reference source not found. presents predicted noise levels at representative noise-sensitive receptors (high sensitivity) in Dublin Bay area due to the operation of the proposed development. Figure 11.4 presents the predicted noise levels graphically as contours of operational noise.

Table 11.10: Predicted operational noise levels at sensitive receptors due to Poolbeg FlexGen

Receptor	Predicted Leq dB(A)	Significant Adverse Effect
NSL 1	27	None
NSL 2	19	None
NSL 3	29	None
NSL 4	22	None

Figure 11.4: Contour plot of operational noise levels due to Poolbeg FlexGen



Source: Mott MacDonald

The predicted noise levels at the representative receptors in Dublin Bay area due to the proposed development are below the lowest criterion given in the NG4 guidance of 45 dB(A) L_{eq} for the night-time. The noise levels are therefore also below the criteria for daytime and evening of 55 dB(A) L_{eq} and 50 dB(A) L_{eq} respectively. The predicted noise levels are also more than 10 dB below the baseline noise levels measured in 2016, 2018 and 2019. This indicates that the predicted operational noise levels in Table 11.9 will not contribute to an increase in prevailing noise as they are sufficiently below the baseline. Therefore, there is no potential significant adverse effect due to operational noise.

11.4.3 Poolbeg FlexGen Decommissioning

A Decommissioning Management Plan (DMP) will be prepared in accordance with the IE licence (review) requirements. Furthermore, it is expected that the proximity of sensitive receptors may change over the operational lifetime of the Project. However, impacts during decommissioning are expected to be of a similar magnitude to those during construction but generally of shorter duration. Temporary impacts due to general site activities and road traffic in decommissioning the Project site are also expected to be as insignificant with a low risk of adverse effects due to noise based on the proximity of existing sensitive receptors.

11.5 Poolbeg FlexGen Mitigation and Monitoring

11.5.1 Construction Phase

The majority of construction activity that generates noise is expected to be undertaken within daytime working hours. Predicted noise impacts due to daytime construction works do not

indicate potential significant effects. Where works are required to be undertaken outside daytime working hours the predicted noise impacts should be assessed to identify any requirement for mitigation.

11.5.2 Operational Phase.

No specific mitigation measures are proposed for the mitigation of operational noise impacts at off-site sensitive receptors. However, noise emissions should be minimised at source, in accordance with best practice, to minimise the exposure site personnel to noise from operational plant.

The siting and design of the development is the main mitigation measure associated with this project (i.e. the mitigation measures are already embedded). Noise emissions will be minimised at source, in accordance with best practice, to minimise noise from operational plant. It is expected that the noise limits will be in line with those specified in NG4 against which this development has been assessed.

11.6 Poolbeg BESS Impact Assessment

11.6.1 Poolbeg BESS Construction Effects

An indicative list of construction plant is presented in **Error! Reference source not found.** and has been derived from the Poolbeg BESS Demolition and Construction Management Plan (see Appendix 5A). Reference Sound Pressure Levels (SPL) for continuous operation are presented. The level of noise emission is corrected for utilisation based on the estimated percentage of time the plant is expected to be in use over a working day.

Table 11.11: List of noise sources considered for the construction of the proposed development

Description	SPL at 10m dB(A)	On time	Specification data source
Air Compressors	62	50%	BS 5228 Table C.5 ref. no. 5
Articulating Boom	74	50%	BS 5228 Table C.4 ref. no. 53
Bulldozers	78	50%	BS 5228 Table C.2 ref. no. 12
Compactors	75	50%	BS 5228 Table C.2 ref. no. 42
Concrete pumps	79	75%	BS 5228 Table C.4 ref. no. 29
Concrete Saw	88	50%	BS 5228 Table C.4 ref. no. 70
Cranes – 100 – 200 tonnes	68	50%	BS 5228 Table C.4 ref. no. 41
Cranes– mobile, 22 – 35 tonnes	67	50%	BS 5228 Table C.4 ref. no. 43
Cranes, mobile, 45 – 65 tonnes	78	50%	BS 5228 Table C.4 ref. no. 45
Crusher	80	50%	BS 5228 Table C.1 ref. no. 15
Cutters, drills and small tools	78	50%	BS 5228 Table C.4 ref. no. 93
Diesel generators	64	75%	BS 5228 Table C.4 ref. no. 87
Excavator – backhoe	86	25%	BS 5228 Table C.1 ref. no. 1
Excavator – High reach with hydraulic concrete breakers	84	25%	BS 5228 Table C.1 ref. no. 9
Excavator – jackhammer	73	25%	BS 5228 Table C.1 ref. no. 14
Excavator – loader	74	25%	BS 5228 Table C.2 ref. no. 27

Description	SPL at 10m dB(A)	On time	Specification data source
Excavator – motor grader	73	25%	BS 5228 Table C.1 ref. no. 14
Excavator – Sheet piling machine	60	50%	BS 5228 Table C.3 ref. no. 9
Fork lift truck	75	50%	BS 5228 Table C.4 ref. no. 54
Miscellaneous pumps	76	50%	BS 5228 Table C.3 ref. no. 25
Mobile Elevated Work Platform (MEWP)	64	50%	BS 5228 Table C.4 ref. no. 57
Piling rigs	83	25%	BS 5228 Table C.3 ref. no. 1
Portable compaction equipment	75	50%	BS 5228 Table C.2 ref. no. 42
Remote Controlled Brokk	86	50%	BS 5228 Table C.5 ref. no. 1
Scaffolding and mobile hydraulic access platforms	64	50%	BS 5228 Table C.4 ref. no. 57
Telescopic handler	67	50%	BS 5228 Table C.2 ref. no. 35
Truck – boom	70	10%	BS 5228 Table C.4 ref. no. 29
Trucks – fuel/lube	66	10%	BS 5228 Table C.4 ref. no. 15
Trucks – large	75	10%	BS 5228 Table C.1 ref. no. 10
Trucks – pickup	75	10%	BS 5228 Table C.1 ref. no. 10
Trucks - Ready-mix concrete	67	10%	BS 5228 Table C.4 ref. no. 21
Trucks – water	66	10%	BS 5228 Table C.4 ref. no. 15
Welders	63	50%	BS 5228 Table C.4 ref. no. 85

The same assumptions and significance criteria have been applied as Poolbeg FlexGen, which are specified for Poolbeg FlexGen Construction Effects. **Error! Reference source not found.** includes noise levels at representative noise sensitive receptors due to the construction of the proposed developments.

Table 11.12: Construction noise levels at sensitive receptors due to the proposed development

Receptor	Noise Level dB(A) L_{eq}				Significant Adverse Effect
	NSL 1	NSL 2	NSL 3	NSL 4	
Poolbeg BESS Demolition	33	33	33	36	None
Poolbeg BESS Site Clearance / Civil Enabling Works	18	18	19	21	None
Poolbeg BESS Construction of BESS Infrastructure	32	32	33	36	None
Poolbeg BESS Installation, Commissioning, and Testing	28	28	28	31	None

The predicted noise levels at the noise sensitive receptors due to the construction of the proposed developments are below the daytime criterion of 65 dB(A). It is assumed that this limit applies to activities within the working hours on Saturdays up to 14:00. It is concluded that there are no potential significant adverse effects due to construction noise.

On a precautionary basis, the methodology described in Table E.1 in BS 5228-2:2009+A1:2014 is used to predict worst-case vibration due to percussive piling at five heritage assets. The results are summarised in **Error! Reference source not found.** and show the predicted

vibration levels fall below the criteria significant effects associated with cosmetic or structural damage.

Table 11.13: Predicted vibration levels at heritage assets during percussive piling

Receptor	Shortest plan distance to Poolbeg BESS (m)	Worst case vibration level due to percussive piling ppv mm/s
Pigeon House Power Station	40	0.4
Pigeon House Hotel	75	0.2
Poolbeg Power Station Chimney 1	40	0.4
Poolbeg Power Station Chimney 2	100	0.1
The Great South Wall	55	0.3

11.6.2 Poolbeg BESS Operational Effects

The operational noise impacts are predicted using a three-dimensional acoustic model within DataKustik CadnaA software, which implements the procedures of ISO 9613-2⁸⁹. The model includes:

- noise source elements which represent operational activities;
- screening elements such as buildings and plant enclosures; and
- sensitive receptor elements at first floor level.

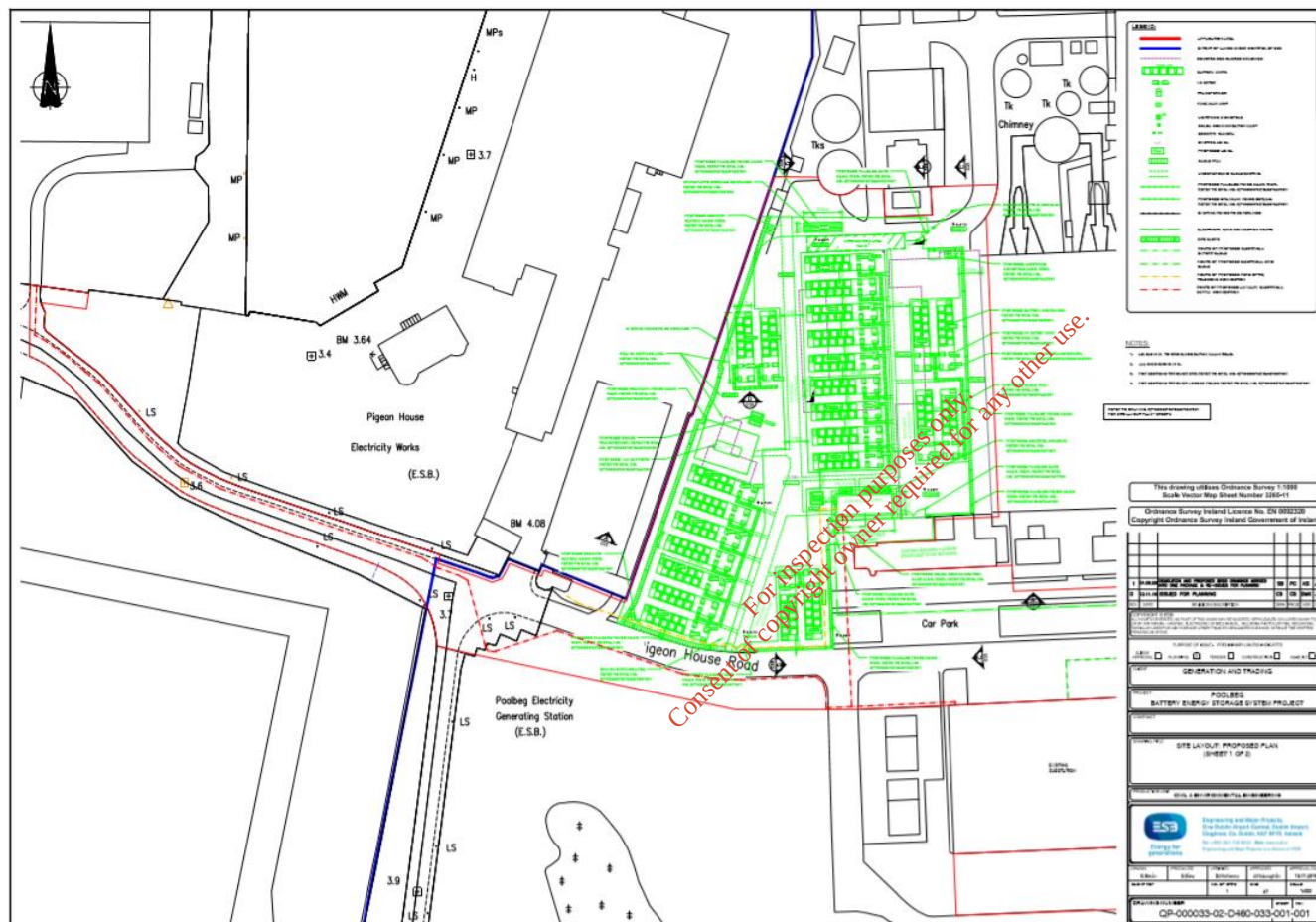
A list of operational noise sources is presented in Table 11.14 and the steady state sound power levels (SWL) that have been applied within the acoustic model. The item numbers correspond to the equipment layout in Figure 11.5. The noise emission data of plant items for the proposed development will not be certain until procurement. Therefore, the levels presented below have been obtained for plant items specified within other similar projects and with similar specifications. It is assumed that all plant will operate continuously.

Table 11.14: List of noise sources considered within the acoustic model for the operation of Poolbeg BESS

Description	Quantity	Source height	SWL dB(A)
2.5kW Water Cooler	308	4m	82.5
WS Tech APS Inverter	24	4m	80.5
5MVA Transformer	24	4m	65.5
House Transformer	2	4m	79
VAR unit	1	4m	78.6
BESS Transformer (on the Poolbeg FlexGen site)	1	8.5m	79

⁸⁹ ISO 9613 (1996) Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation’.

Figure 11.5: Proposed site layout for Poolbeg BESS (Source: QP-000033-02-D460-033)



Source: ESB

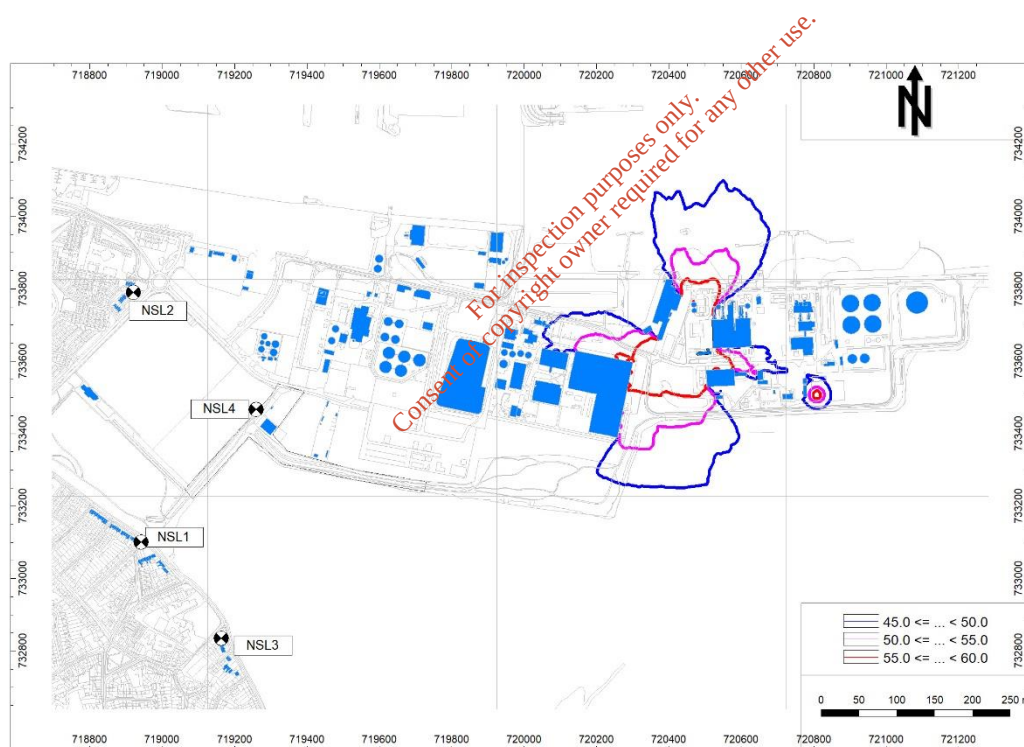
Error! Reference source not found. presents predicted noise levels at representative noise-sensitive receptors (high sensitivity) in Dublin Bay area due to the operation of the proposed development.

Error! Reference source not found. presents the predicted noise levels graphically as contours of operational noise.

Table 11.15: Predicted operational noise levels at sensitive receptors due to Poolbeg BESS

Receptor	Predicted L_{eq} dB(A)	Significant Adverse Effect
NSL 1	22	None
NSL 2	23	None
NSL 3	23	None
NSL 4	25	None

Figure 11.6: Contour plot of operational noise levels due to Poolbeg BESS



Source: Mott MacDonald

The predicted noise levels at the representative receptors in Dublin Bay area due to the proposed development are below the lowest criterion given in the NG4 guidance of 45 dB(A) L_{eq} for the night-time. The noise levels are therefore also below the criteria for daytime and evening of 55 dB(A) L_{eq} and 50 dB(A) L_{eq} respectively. The predicted noise levels are also more than 10 dB below the baseline noise levels measured in 2016, 2018 and 2019. This indicates that the

predicted operational noise levels in Table 11.4 will not contribute to an increase in prevailing noise as they are sufficiently below the baseline. Therefore, there is no potential significant adverse effect due to operational noise.

11.6.3 Poolbeg BESS Decommissioning

As the proposed BESS is located within the boundary of an existing IE licenced site a Decommissioning Management Plan (DMP) will be prepared in accordance with IE licence requirements. Furthermore, it is expected that the proximity of sensitive receptors may change over the operational lifetime of the Project. However, impacts during decommissioning are expected to be of a similar magnitude to those during construction but generally of shorter duration. Temporary impacts due to general site activities and road traffic in decommissioning the Project site are also expected to be as insignificant with a low risk of adverse effects due to noise based on the proximity of existing sensitive receptors.

11.7 Poolbeg BESS Mitigation and Monitoring

11.7.1 Construction Phase

The assessment indicates that worst case from vibration during percussive piling may result in feelable ground-borne vibration at the closest part of Pigeon House Power Station and Poolbeg Power Station Chimney 1 to the works. Vibration monitoring will be undertaken when the works are close to these heritage assets. More detail is provided in the OCEMP provided in Appendix 5A.

The majority of construction activity that generates noise is expected to be undertaken within daytime working hours. Predicted noise impacts due to daytime construction works do not indicate potential significant effects. Where works are required to be undertaken outside daytime working hours the predicted noise impacts should be assessed to identify any requirement for mitigation.

11.7.2 Operational Phase.

No specific mitigation measures are proposed for the mitigation of operational noise impacts at off-site sensitive receptors. However, noise emissions should be minimised at source, in accordance with best practice, to minimise the exposure site personnel to noise from operational plant.

The siting and design of the development is the main mitigation measure associated with this project (i.e. the mitigation measures are already embedded). Noise emissions will be minimised at source, in accordance with best practice, to minimise noise from operational plant. It is expected that the noise limits will be in line with those specified in NG4 against which this development has been assessed.

11.8 Ringsend FlexGen Impact Assessment

11.8.1 Ringsend FlexGen Construction Effects

An indicative list of construction plant is presented in Table: 11.15 and has been derived from the Ringsend FlexGen Construction Management Plan in Appendix 5A. Reference Sound Pressure Levels (SPL) for continuous operation are presented. The level of noise emission is

corrected for utilisation based on the estimated percentage of time the plant is expected to be in use over a working day.

Table 11.16: List of noise sources considered for the construction of the proposed development

Description	SPL at 10m dB(A)	On time	Specification data source
Air Compressors	62	50%	BS 5228 Table C.5 ref. no. 5
Articulating Boom	74	50%	BS 5228 Table C.4 ref. no. 53
Bulldozers	78	50%	BS 5228 Table C.2 ref. no. 12
Compactors	75	50%	BS 5228 Table C.2 ref. no. 42
Concrete pumps	79	75%	BS 5228 Table C.4 ref. no. 29
Cranes – 100 – 200 tonnes	68	50%	BS 5228 Table C.4 ref. no. 41
Cranes– mobile, 22 – 35 tonnes	67	50%	BS 5228 Table C.4 ref. no. 43
Cranes, mobile, 45 – 65 tonnes	78	50%	BS 5228 Table C.4 ref. no. 45
Crusher	80	50%	BS 5228 Table C.1 ref. no. 15
Cutters, drills and small tools	78	50%	BS 5228 Table C.4 ref. no. 93
Diesel generators	64	75%	BS 5228 Table C.4 ref. no. 87
Excavator – backhoe	86	25%	BS 5228 Table C.1 ref. no. 1
Excavator – loader	74	25%	BS 5228 Table C.2 ref. no. 27
Excavator – motor grader	73	25%	BS 5228 Table C.1 ref. no. 14
Excavator – jackhammer	73	25%	BS 5228 Table C.1 ref. no. 14
Excavator – Sheet piling machine	60	50%	BS 5228 Table C.3 ref. no. 9
Fork lift truck	75	50%	BS 5228 Table C.4 ref. no. 54
Miscellaneous pumps	76	50%	BS 5228 Table C.3 ref. no. 25
Piling rigs	83	25%	BS 5228 Table C.3 ref. no. 1
Portable compaction equipment	75	50%	BS 5228 Table C.2 ref. no. 42
Scaffolding and mobile hydraulic access platforms	64	50%	BS 5228 Table C.4 ref. no. 57
Telescopic handler	67	50%	BS 5228 Table C.2 ref. no. 35
Truck – boom	70	10%	BS 5228 Table C.4 ref. no. 29
Trucks – fuel/lube	66	10%	BS 5228 Table C.4 ref. no. 15
Trucks – large	75	10%	BS 5228 Table C.1 ref. no. 10
Trucks – pickup	75	10%	BS 5228 Table C.1 ref. no. 10
Trucks – water	66	10%	BS 5228 Table C.4 ref. no. 15
Trucks - Ready-mix concrete	67	10%	BS 5228 Table C.4 ref. no. 21
Welders	63	50%	BS 5228 Table C.4 ref. no. 85

The same assumptions and significance criteria have been applied as Poolbeg FlexGen, which are specified in Poolbeg FlexGen Construction Effects. **Error! Reference source not found.** includes noise levels at representative noise sensitive receptors due to the construction of the proposed developments.

Table 11.17: Construction noise levels at sensitive receptors due to the proposed development

Receptor	Noise Level dB(A) L_{eq}				Significant Adverse Effect
	NSL 1	NSL 2	NSL 3	NSL 4	
Ringsend FlexGen Site Preparation	45	44	45	59	None
Ringsend FlexGen Heavy Civils	44	43	45	59	None
Ringsend FlexGen Mechanical and Electrical	43	42	43	58	None
Ringsend FlexGen Commissioning and Testing	40	39	41	55	None

The predicted noise levels at the noise sensitive receptors due to the construction of the proposed developments are below the daytime criterion of 65 dB(A). It is assumed that this limit applies to activities within the working hours on Saturdays up to 14:00. It is concluded that there are no potential significant adverse effects due to construction noise.

On a precautionary basis, the methodology described in Table E.1 in BS 5228-2:2009+A1:2014 is used to predict worst-case vibration due to percussive piling at five heritage assets. The results are summarised in Table 11.17 and show the predicted vibration levels fall below the criteria significant effects associated with cosmetic or structural damage.

Table 11.18: Predicted vibration levels at heritage assets during percussive piling

Receptor	Shortest plan distance to Ringsend FlexGen (m)	Worst case vibration level due to percussive piling ppv mm/s
Pigeon House Power Station	780	<0.01
Pigeon House Hotel	750	<0.01
Poolbeg Power Station Chimney 1	960	<0.01
Poolbeg Power Station Chimney 2	1,035	<0.01
The Great South Wall	885	<0.01

11.8.2 Ringsend FlexGen Operational Effects

The operational noise impacts are predicted using a three-dimensional acoustic model within DataKustik CadnaA software, which implements the procedures of ISO 9613-2⁹⁰. The model includes:

- noise source elements which represent operational activities;
- screening elements such as buildings and plant enclosures; and
- sensitive receptor elements at first floor level.

A list of operational noise sources is presented in **Error! Reference source not found.** and the steady state sound power levels (SWL) that have been applied within the acoustic model. The item numbers correspond to the equipment layout in **Error! Reference source not found.**. The noise emission data of plant items for the proposed development will not be certain until procurement. Therefore, the levels presented below have been obtained for plant items

⁹⁰ ISO 9613 (1996) Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation’.

specified within other similar projects and with similar specifications. It is assumed that all plant will operate continuously.

Table 11.19: List of noise sources considered within the acoustic model for the operation of Ringsend FlexGen

Description	Quantity	Source height	SWL dB(A)
Inlet chamber breakout	1	15m	94
Chamber breakout	1	5m	88
Stack exit	1	30m	97
Stack breakout	1	5m	89
Cooling fans inlet (two fans included)	2	4m	83
Cooling fans breakout	1	4m	72
FlexGen transformer	1	8.5m	85
House transformer	1	2.5m	85
Unit transformer	1	2.5m	85
Gas compressor	1	6m	90

Figure 11.7: Proposed site layout for Ringsend FlexGen



Source: ESB

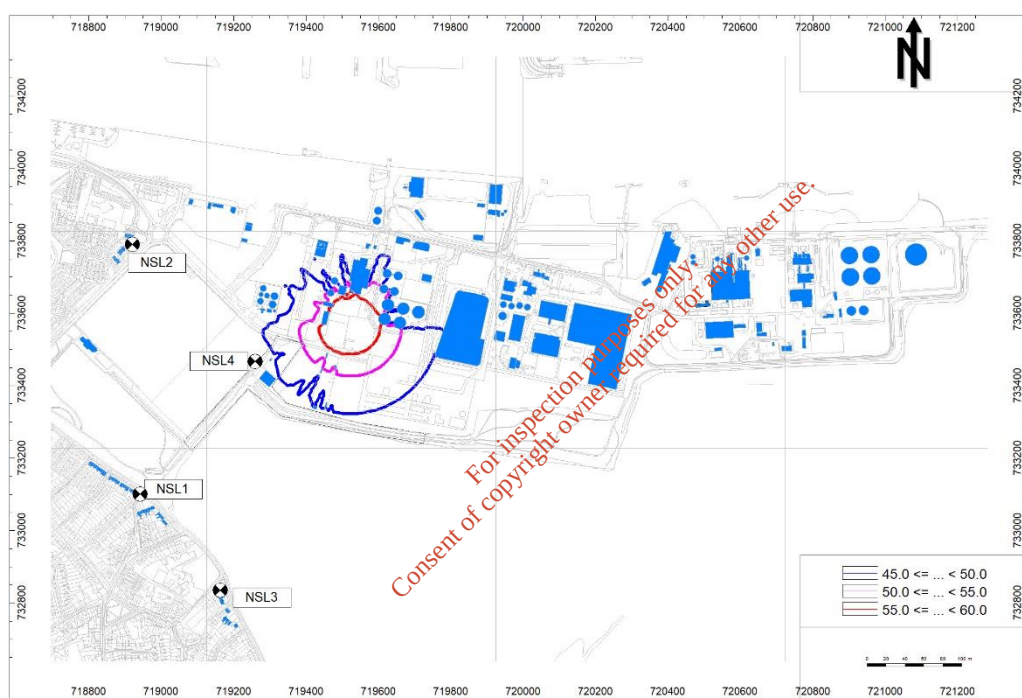
Error! Reference source not found. presents predicted noise levels at representative noise-sensitive receptors (high sensitivity) in Dublin Bay area due to the operation of the proposed

development. **Error! Reference source not found.** presents the predicted noise levels graphically as contours of operational noise.

Table 11.20: Predicted operational noise levels at sensitive receptors due to Ringsend FlexGen

Receptor	Predicted Leq dB(A)	Significant Adverse Effect
NSL 1	36	None
NSL 2	31	None
NSL 3	31	None
NSL 4	42	None

Figure 11.8: Contour plot of operational noise levels due to Ringsend FlexGen



Source: Mott MacDonald

The predicted noise levels at the representative receptors in Dublin Bay area due to the proposed development are below the lowest criterion given in the NG4 guidance of 45 dB(A) L_{eq} for the night-time. The noise levels are therefore also below the criteria for daytime and evening of 55 dB(A) L_{eq} and 50 dB(A) L_{eq} respectively. Therefore, there is no potential significant adverse effect due to operational noise.

11.8.3 Ringsend FlexGen Decommissioning

A Decommissioning Management Plan (DMP) will be prepared in accordance with any future E licence. Furthermore, it is expected that the proximity of sensitive receptors may change over the operational lifetime of the Project. However, impacts during decommissioning are expected to be of a similar magnitude to those during construction but generally of shorter duration.

Temporary impacts due to general site activities and road traffic in decommissioning the Project site are also expected to be as insignificant with a low risk of adverse effects due to noise based on the proximity of existing sensitive receptors.

11.9 Ringsend FlexGen Mitigation and Monitoring

11.9.1 Construction Phase

The majority of construction activity that generates noise is expected to be undertaken within daytime working hours. Predicted noise impacts due to daytime construction works do not indicate potential significant effects. Where works are required to be undertaken outside daytime working hours the predicted noise impacts should be assessed to identify any requirement for mitigation.

11.9.2 Operational Phase.

No specific mitigation measures are proposed for the mitigation of operational noise impacts at off-site sensitive receptors. However, noise emissions should be minimised at source, in accordance with best practice, to minimise the exposure site personnel to noise from operational plant.

The siting and design of the development is the main mitigation measure associated with this project (i.e. the mitigation measures are already embedded). Noise emissions will be minimised at source, in accordance with best practice, to minimise noise from operational plant. It is expected that the noise limits will be in line with those specified in NG4 against which this development has been assessed.

11.10 South Wall BESS Impact Assessment

11.10.1 South Wall BESS Construction Effects

An indicative list of construction plant is presented in **Error! Reference source not found.** and has been derived from the South Wall BESS Construction Management Plan in Appendix 5A. Reference Sound Pressure Levels (SPL) for continuous operation are presented. The level of noise emission is corrected for utilisation based on the estimated percentage of time the plant is expected to be in use over a working day.

Table 11.21: List of noise sources considered for the construction of the proposed development

Description	SPL at 10m dB(A)	On time	Specification data source
Air Compressors	62	50%	BS 5228 Table C.5 ref. no. 5
Articulating Boom	74	50%	BS 5228 Table C.4 ref. no. 53
Bulldozers	78	50%	BS 5228 Table C.2 ref. no. 12
Compactors	75	50%	BS 5228 Table C.2 ref. no. 42
Concrete Saw	88	50%	BS 5228 Table C.4 ref. no. 70
Concrete pumps	79	75%	BS 5228 Table C.4 ref. no. 29
Cranes – 100 – 200 tonnes	68	50%	BS 5228 Table C.4 ref. no. 41
Cranes– mobile, 22 – 35 tonnes	67	50%	BS 5228 Table C.4 ref. no. 43
Cranes, mobile, 45 – 65 tonnes	78	50%	BS 5228 Table C.4 ref. no. 45
Crusher	80	50%	BS 5228 Table C.1 ref. no. 15
Cutters, drills and small tools	78	50%	BS 5228 Table C.4 ref. no. 93

Description	SPL at 10m dB(A)	On time	Specification data source
Diesel generators	64	75%	BS 5228 Table C.4 ref. no. 87
Excavator – backhoe	86	25%	BS 5228 Table C.1 ref. no. 1
Excavator – loader	74	25%	BS 5228 Table C.2 ref. no. 27
Excavator – motor grader	73	25%	BS 5228 Table C.1 ref. no. 14
Excavator – High reach with hydraulic concrete breakers	84	25%	BS 5228 Table C.1 ref. no. 9
Excavator – jackhammer	73	25%	BS 5228 Table C.1 ref. no. 14
Excavator – Sheet piling machine	60	50%	BS 5228 Table C.3 ref. no. 9
Fork lift truck	75	50%	BS 5228 Table C.4 ref. no. 54
Miscellaneous pumps	76	50%	BS 5228 Table C.3 ref. no. 25
Piling rigs	83	25%	BS 5228 Table C.3 ref. no. 1
Portable compaction equipment	75	50%	BS 5228 Table C.2 ref. no. 42
Scaffolding and mobile hydraulic access platforms	64	50%	BS 5228 Table C.4 ref. no. 57
Telescopic handler	67	50%	BS 5228 Table C.2 ref. no. 35
Truck – boom	70	10%	BS 5228 Table C.4 ref. no. 29
Trucks – fuel/lube	66	10%	BS 5228 Table C.4 ref. no. 15
Trucks – large	75	10%	BS 5228 Table C.1 ref. no. 10
Trucks – pickup	75	10%	BS 5228 Table C.1 ref. no. 10
Trucks – water	66	10%	BS 5228 Table C.4 ref. no. 15
Trucks - Ready-mix concrete	67	10%	BS 5228 Table C.4 ref. no. 21
Welders	63	50%	BS 5228 Table C.4 ref. no. 85

Error! Reference source not found. presents noise levels at the NSLs due to the construction of the proposed developments.

Table 11.22: Construction noise levels at sensitive receptors due to the proposed development

Receptor	Noise Level dB(A) L_{eq}				Significant Adverse Effect
	NSL 1	NSL 2	NSL 3	NSL 4	
South Wall BESS Site Clearance / Civil Enabling Works	50	43	50	54	None
South Wall BESS Construction of BESS Infrastructure	49	42	49	53	None
South Wall BESS Installation, Commissioning, and Testing	44	37	44	48	None

The predicted noise levels at the noise sensitive receptors due to the construction of the proposed developments are below the daytime criterion of 65 dB(A). It is assumed that this limit applies to activities within the working hours on Saturdays up to 14:00. It is concluded that there are no potential significant adverse effects due to construction noise.

On a precautionary basis, the methodology described in Table E.1 in BS 5228-2:2009+A1:2014 is used to predict worst-case vibration due to percussive piling at five heritage assets. The results are summarised in **Error! Reference source not found.** and show the predicted

vibration levels fall below the criteria significant effects associated with cosmetic or structural damage.

Table 11.23: Predicted vibration levels at heritage assets during percussive piling

Receptor	Shortest plan distance to South Wall BESS (m)	Worst case vibration levels from percussive piling ppv mm/s
Pigeon House Power Station	650	0.01
Pigeon House Hotel	615	0.01
Poolbeg Power Station Chimney 1	825	<0.01
Poolbeg Power Station Chimney 2	905	<0.01
The Great South Wall	760	<0.01

11.10.2 South Wall BESS Operational Effects

The operational noise impacts are predicted using a three-dimensional acoustic model within DataKustik CadnaA software, which implements the procedures of ISO 9613-2⁹¹. The model includes:

- noise source elements which represent operational activities;
- screening elements such as buildings and plant enclosures; and
- sensitive receptor elements at first floor level.

A list of operational noise sources is presented in Table 11.24 and the steady state sound power levels (SWL) that have been applied within the acoustic model. The item numbers correspond to the equipment layout in **Error! Reference source not found.** The noise emission data of plant items for the proposed development will not be certain until procurement. Therefore, the levels presented below have been obtained for plant items specified within other similar projects and with similar specifications. It is assumed that all plant will operate continuously.

Table 11.24: List of noise sources considered within the acoustic model for the operation of South Wall BESS

Description	Quantity	Source height	SWL dB(A)
2.5kW Water Cooler	142	4m	82.5
WS Tech APS Inverter	11	4m	80.5
5 MVA Transformer	11	4m	65.5
House Transformer	1	4m	79
VAR unit	1	4m	78.6
BESS transformer (on the Ringsend FlexGen site)	1	8.5m	79

⁹¹ ISO 9613 (1996) Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation’.

Figure 11.10: Contour plot of operational noise levels due to South Wall BESS



Source: Mott MacDonald

The predicted noise levels at the representative receptors in Dublin Bay area due to the proposed development are below the lowest criterion given in the NG4 guidance of 45 dB(A) L_{eq} for the night-time. The noise levels are therefore also below the criteria for daytime and evening of 55 dB(A) L_{eq} and 50 dB(A) L_{eq} respectively.

If the noise is assessed in accordance with the BS 4142 methodology, then given the context of the noise impact, no adverse impact is identified. If the application of an acoustic penalty is found to be required (e.g. 3 dB due to tonal features) then the worst case impact would not be indicated as a significant adverse impact.

Therefore, there is no potential significant adverse effect due to operational noise.

11.10.3 South Wall BESS Decommissioning

Specific details on decommissioning are not available at this stage of the Project. Furthermore, it is expected that the proximity of sensitive receptors may change over the operational lifetime of the Project. However, impacts during decommissioning are expected to be of a similar magnitude to those during construction but generally of shorter duration. Temporary impacts due to general site activities and road traffic in decommissioning the Project site are also expected to be as insignificant with a low risk of adverse effects due to noise based on the proximity of existing sensitive receptors.

11.10.4 South Wall BESS Mitigation and Monitoring

11.10.4.1 Construction Phase

The majority of construction activity that generates noise is expected to be undertaken within daytime working hours. Predicted noise impacts due to daytime construction works do not indicate potential significant effects. Where works are required to be undertaken outside daytime working hours the predicted noise impacts should be assessed to identify any requirement for mitigation.

11.10.4.2 Operational Phase

No specific mitigation measures are proposed for the mitigation of operational noise impacts at off-site sensitive receptors. However, noise emissions should be minimised at source, in accordance with best practice, to minimise the exposure site personnel to noise from operational plant. The siting and design of the development is the main mitigation measure associated with this project (i.e. the mitigation measures are already embedded). Noise emissions will be minimised at source, in accordance with best practice, to minimise noise from operational plant. It is expected that the noise limits will be in line with those specified in NG4 against which this development has been assessed.

11.11 Cumulative Effects

11.11.1 Construction Noise

Each of the four project has an individual construction programme and whilst the sequence and durations of the main stages of work has been estimated, the start times are subject to consent and uncertain at this stage. Therefore, it is not possible to be precise about what stages of the individual projects may occur simultaneously. However, in order to consider a reasonably worst case, it is assumed work on each project site begins at about the same time.

Error! Reference source not found. presents the construction programmes of the four projects that has been used to calculate combined noise impacts.

Table 11.26: Construction programme assumed for the calculation of cumulative noise impacts

Stages of construction	Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22	Apr-22	May-22	Jun-22	July-22
Ringsend FlexGen Site preparation																			
Ringsend FlexGen Heavy Civils																			
Ringsend FlexGen Commissioning and Testing																			
Poolbeg FlexGen Site Preparation																			
Poolbeg FlexGen Heavy Civils																			
Poolbeg FlexGen Commissioning and Testing																			
South Wall BESS Site Clearance / Civil Enabling Works																			
South Wall BESS Construction of BESS Infrastructure																			
South Wall BESS Installation, Commissioning, and Testing																			
Poolbeg BESS Demolition																			
Poolbeg BESS Construction of BESS Infrastructure																			
Poolbeg BESS Installation, Commissioning, and Testing																			

Error! Reference source not found. presents the predicted construction noise levels due to the combined contributions of the works from all four project elements. This is based on the plant inventories and reference noise levels for the project elements given above. The sources of noise are assumed to be evenly distributed across the site at locations adjacent to site components scheduled for demolition or construction. The calculation of construction noise has accounted for buildings providing screening. It is assumed that there will be no construction activity during the night-time. Noise impacts due to construction traffic is considered negligible within the context of the site locations.

Table 11.27: Predicted construction noise impacts at NSRs

Receptor	Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22	Apr-22	May-22	Jun-22	Jul-22
NSR1	46	46	46	51	51	50	50	50	50	50	50	50	50	50	48	46	46	41	41
NSR2	44	44	44	47	46	46	46	46	46	46	46	46	46	46	45	42	42	40	40
NSR3	46	46	46	52	51	50	50	50	50	50	50	50	50	50	48	46	46	42	42
NSR4	59	59	59	61	60	60	60	60	60	60	60	60	60	60	59	56	56	55	55

The predicted noise levels at the noise sensitive receptors due to the construction of the proposed developments are below the daytime criterion of 65 dB(A). It is assumed that this limit applies to activities within the standard working hours on Saturdays up to 14:00. It is concluded that there are no potential significant adverse effects due to construction noise.

11.11.2 Operational Noise

The cumulative effects of operational noise comprise:

- The proposed development of two FlexGen and two BESS plants;
- Dublin Bay Power Station (DBPS);
- Covanta Dublin Waste-to-Energy facility (Covanta);
- Poolbeg CCGT; and
- Ringsend Wastewater Treatment Plant (WwTP).

The proposed plants (in red) as well as the existing plants (in blue) are shown in **Error! Reference source not found.** shows the cumulative operational noise impacts at the receptors. General descriptions of operational noise impact of each existing site are given as follows:

- Dublin Bay Power Station (DBPS): The baseline noise survey was carried out by Hoare Lea in May 2018 (refer to Section 11.3). An unattended measurement undertaken at position (P1) and was used to represent the operational noise of DBPS. However, the measurement position was approximately 165 metres away from the main plant and the measured noise level were likely to have been affected by other noise sources, e.g. road traffic and other industrial plant. Therefore, the estimated contribution of operational noise levels from DBPS is likely to be lower than predicted.
- Covanta Waste-to-Energy facility: The baseline noise survey was carried out by Altum Scientific in May 2019 (refer to Section 11.3). An unattended measurement position (N9), which is approximately 15m away at the eastern boundary the plant, was used to represent the operational noise for the plants of Covanta. It was noted that the noise content at this measurement point was mainly continuous hum and intermittent operational noise inside of the plant buildings. Therefore, the night-time measurement result at N9 was used to represent the noise sources in the noise model to estimate the operational noise impact.
- Poolbeg CCGT: The operational noise impacts of Poolbeg CCGT are derived from the results of operational phase monitoring undertaken by Resonate Acoustics in March and May 2018. Measurements were made at three positions and the dominant noise sources affecting the noise climate were the generator and the 220kV substation.
- Ringsend Wastewater Treatment Plant (WwTP): The results of the operational noise impacts from WwTP are based on the Ringsend Wastewater Treatment Plant Upgrade Project, Environmental Impact Assessment Report Volume 3 Part A, June 2018. The major noise sources of the plant comprised blower fans, centrifuges, chillers, pumps and compressors. The operational noise levels used to represent the WwTP are referenced from Table 11.27 of the report.

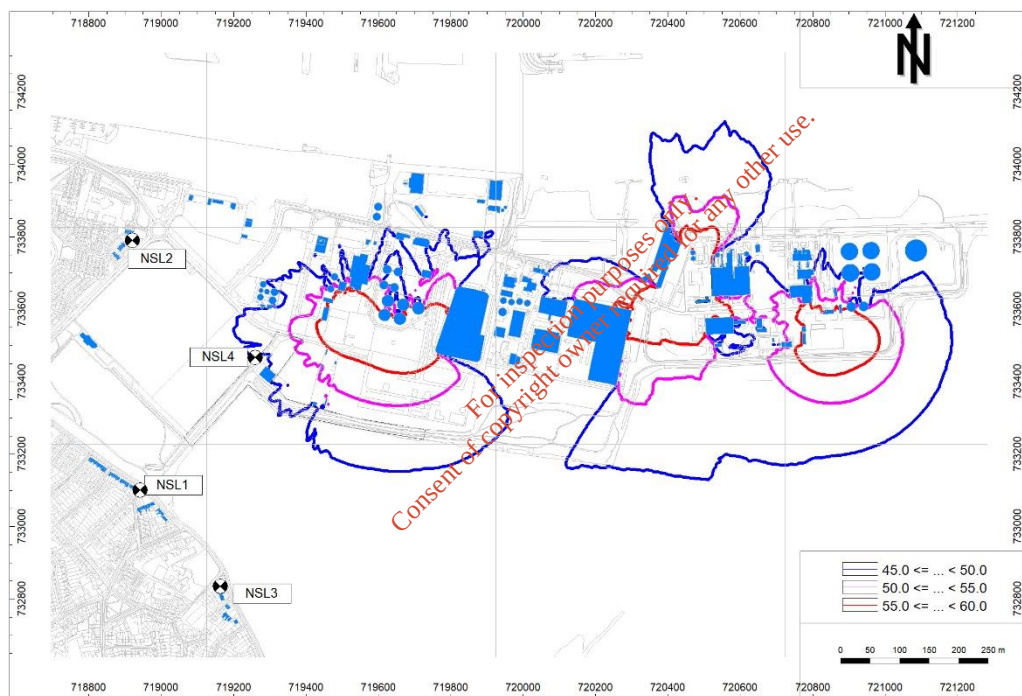
Error! Reference source not found. presents the predicted operational noise levels at each NSL due to the four project elements and the combined level. This shows that the combined level does not exceed the night-time criterion of 45 dB(A).

Table 11.28a: Summary of the operational noise impacts for the proposed development

Receptor	Operational Noise Impacts, dB(A)				Combined dB(A)
	Poolbeg FlexGen	Poolbeg BESS	Ringsend FlexGen	South Wall BESS	
NSL 1	27	22	36	35	39
NSL 2	19	23	31	30	34
NSL 3	29	23	31	35	37
NSL 4	22	25	42	35	43

Figure 11.11 presents a noise contour plot of the combined operational noise impact of four project elements.

Figure 11.11: Noise contours of combined operational noise impacts from all four project elements



Source: Mott MacDonald

Error! Reference source not found. presents the combined predicted operational noise impacts of the four projects given in **Error! Reference source not found.**, those of the three individual operating licensed sites in the area and the combined operational noise the proposed and existing developments.

Table 11.29: Cumulative impacts of operational noise

Receptor	Operational Noise Impacts, dB(A)					Total dB(A)	Baseline night-time noise level	Below the night-time baseline level
	ESB ^[1]	DBPS ^[2]	Covanta ^[2]	WwTP ^[3]	Poolbeg CCGT ^[4]			
NSL 1	39	40	37	30	22	44	40 dB(A) L _{eq}	N
NSL 2	34	41	33	19	22	42	47 dB(A) L _{eq}	Y
NSL 3	37	37	38	27	22	42	62 dB(A) L _{eq}	Y
NSL 4	43	45	39	34	24	48	50 dB(A) L _{eq}	Y

[1] ESB – The proposed development, results are given in Table 11.29

[2] Results are estimated by the noise model. The noise emissions are based on the baseline measurement results with the closest measurement point to the plant.

[3] Results are obtained from the noise model in “Ringsend Wastewater Treatment Plant Upgrade Project, Environmental Impact Assessment Report”, Volume 3 Part A, June 2018.

[4] Results are estimated by the noise model. The noise emissions are based on the baseline measurement results with the closest measurement points to the plant.

Error! Reference source not found. summarises the potential cumulative effects due to operational noise. In all cases, the predicted noise levels do not exceed the criteria for significant operational noise impacts which correspond with typical limit values for noise for licenced sites as given in the NG4 Guidance.

Table 11.30: Summary of potential Cumulative Effects

	Poolbeg FlexGen	Poolbeg BESS	Ringsend FlexGen	South Wall BESS
Poolbeg FlexGen	-	NSL 1 - 28 dB(A) NSL 2 - 24 dB(A) NSL 3 - 30 dB(A) NSL 4 - 27 dB(A)	NSL 1 - 37 dB(A) NSL 2 - 31 dB(A) NSL 3 - 33 dB(A) NSL 4 - 42 dB(A)	NSL 1 - 36 dB(A) NSL 2 - 30 dB(A) NSL 3 - 36 dB(A) NSL 4 - 35 dB(A)
Poolbeg BESS	NSL 1 - 28 dB(A) NSL 2 - 24 dB(A) NSL 3 - 30 dB(A) NSL 4 - 27 dB(A)		NSL 1 - 36 dB(A) NSL 2 - 32 dB(A) NSL 3 - 32 dB(A) NSL 4 - 42 dB(A)	NSL 1 - 35 dB(A) NSL 2 - 31 dB(A) NSL 3 - 35 dB(A) NSL 4 - 35 dB(A)
Ringsend FlexGen	NSL 1 - 37 dB(A) NSL 2 - 31 dB(A) NSL 3 - 33 dB(A) NSL 4 - 42 dB(A)	NSL 1 - 36 dB(A) NSL 2 - 32 dB(A) NSL 3 - 32 dB(A) NSL 4 - 42 dB(A)	-	NSL 1 - 39 dB(A) NSL 2 - 34 dB(A) NSL 3 - 36 dB(A) NSL 4 - 43 dB(A)
South Wall BESS	NSL 1 - 36 dB(A) NSL 2 - 30 dB(A) NSL 3 - 36 dB(A) NSL 4 - 35 dB(A)	NSL 1 - 35 dB(A) NSL 2 - 31 dB(A) NSL 3 - 35 dB(A) NSL 4 - 35 dB(A)	NSL 1 - 39 dB(A) NSL 2 - 34 dB(A) NSL 3 - 36 dB(A) NSL 4 - 43 dB(A)	-

11.12 Summary of Mitigation and Monitoring

The summary of mitigation and monitoring measures for the four proposed developments are outlined in Chapter 18.

11.13 Summary of Significant Residual Effects

The assessment indicates there are no significant residual effects.

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12 Architecture, Archaeology and Cultural Heritage

12.1 Introduction

This section of the EIAR assesses the potential impacts and resulting effects that are likely to occur as a result of each of the proposed developments on the archaeological and architectural heritage. It has been produced to be read in conjunction with the Cultural Heritage Baseline Assessment.

Full details for each of the developments can be found in Chapter 5 of the EIAR.

This section and assessment have been completed following the guidance outlined in the Environment Protection Agency documents *Guidelines on the information to be contained in Environmental Impact Assessment Reports* (Draft, August 2017) and *Advice Notes for Preparing Environmental Impact Statements* (Draft, September 2015).

12.2 Assessment Methodology

This study is an assessment of the known or potential cultural heritage within the study areas for each the developments. It includes the information that may reasonably be required for reaching a conclusion on the significant effects of the developments upon the architecture, archaeology and cultural heritage, taking into account current knowledge and methods of assessment. It consists of a collation of existing written information and cultural heritage data in order to identify the likely context, character, significance and sensitivity of the known or potential architectural, archaeological and cultural heritage resource using the methodology defined in detail below.

The historic environment assessment will assess the potential effects on the following;

- Designated assets including sites identified on the Record of Monuments and Places (RMP) and assets identified in the Record of Protected Structures (RPS);
- Non-designated assets including assets recorded in the National Inventory of Architectural Heritage (NIAH), locally listed buildings, buildings and structures of recognisable heritage value and archaeological remains of national, regional and local value; and
- Unknown archaeological remains.

The assessment methodology is contained in the Cultural Heritage Baseline Assessment (Appendix 12A) which is based on the following studies undertaken to date:

- Poolbeg FlexGen Project Poolbeg Peninsula, Ringsend, Dublin 4 (Byrne 2019a);
- Poolbeg BESS Project Poolbeg Peninsula, Ringsend, Dublin 4 (Byrne 2019b);
- Ringsend FlexGen Project Poolbeg Peninsula, Ringsend, Dublin 4 (Byrne 2019c); and
- Proposed Demolition of Ancillary Structures at Poolbeg Generating Station Pigeon House Road, Dublin 4 (Historic Building Consultants 2020 – Revised July 2020, Appendix 12B).

12.2.1 Study area

The Study Area for the assessment of cultural heritage has been defined as the area enclosed by each of the red-line boundary for each of the developments and to a distance of 1km

surrounding each of the development areas, in order to consider potential impacts due to intervisibility, connecting views or historic relationships. The extent of the study area is considered an appropriate context for the development, beyond which the developments would have no direct or indirect impacts.

12.3 Baseline research

12.3.1 Sources of information

Information relating to cultural heritage has been obtained from the following organisations:

- Department of Culture, Heritage and the Gaeltacht (DCHG)
- Dublin City Council; and
- Dublin City Library (Archives and Local Studies)

The information sources consulted includes:

- Record of Monuments and Places (RMP);
- Sites and Monuments Record (SMR) – www.archaeology.ie;
- National Museum of Ireland (NMI) Topographical Files;
- Record of Protected Structure (RPS) (Defined by Dublin City Development Plan 2016-2022);
- The National Inventory of Architectural Heritage (NIAH) – www.buildingsofireland.ie;
- Dublin City Industrial Heritage Record (DCIHR);
- Annual Archaeological Excavations Bulletin – www.excavations.ie;
- Dublin Archaeological Data Viewer – www.heritage.maps.ie;
- Dublin City Conservation Area Appraisals and Management Plans;
- Cartographic and Aerial Photographic Archive of the Ordnance Survey of Ireland – www.osi.ie;
- National Monuments Service's Wreck Inventory of Ireland Database (WIID) - www.archaeology.ie/underwater-archaeology/wreck-viewer;
- Vertical and oblique aerial photographs;
- Published and unpublished sources (documentary material, archaeological studies, fieldwork reports, local histories);
- Cartographic information; and
- Relevant borehole and geotechnical data, where available.

12.4 Assigning Value and Magnitude of Impact

A full assessment of the impact of the development on all heritage receptors (including heritage assets, historic landscapes and unknown archaeology) has been undertaken based upon guidance and terminology laid out in:

- National Road Authorities (NRA) Environmental Impact Assessment of National Road Schemes – A Practical Guide (NRA 2008);
- Guidelines for the Assessment of Architectural Heritage Impacts of National Road Schemes; and (NRA 2006a); and

- Guidelines for the Assessment of Archaeological Heritage Impacts of National Road Schemes (NRA 2006b).

Although the NRA guidelines are designed for road schemes, the guidance in assessing significance can be applied to schemes of any nature. The guidance has been adapted to be effective for cultural heritage assessment.

According to NRA guidelines, significance of effect upon the cultural heritage resource is assessed according to the value of the heritage asset and the magnitude of change. The impacts may be positive, neutral or negative. The impacts are assessed after mitigation.

The proposed assessment criteria are set out in Tables 12.1 to 12.3.

Table 12.1: Value of the receptor (heritage asset)

Sensitivity/Value	Criteria
Very High	Sites of international significance: World Heritage Sites National Monuments Protected Structures of international and national importance Designed landscapes and gardens of national importance Assets of acknowledged international importance or that can contribute significantly to international and national research objectives
High	RMP / SMR sites Designated assets that contribute to regional research objectives Protected Structures of regional importance Architectural Conservation Areas
Medium	Recently / newly identified archaeological sites (not yet included on the SMR / RMP; the importance of the resource has yet to be fully ascertained) Undesignated assets that contribute to regional research objectives NIAH Building Survey and Garden Survey Sites
Low	Undesignated Sites of local importance (e.g. townland / field boundaries) Assets compromised by poor preservation and/or poor survival of contextual associations Assets of limited value but with the potential to contribute to local research objectives (e.g. potential buried foundations associated with features / structures shown the 1st edition OS six-inch mapping) Historic townscapes or built up areas of limited historic integrity in their building or their settings
Negligible	Assets with very little or no surviving archaeological interest. Buildings of no architectural or historic note
Unknown	The nature of the resource has yet to be fully ascertained, e.g. sites or areas of specific archaeological potential, greenfield areas or riverine / stream / coastal environs with inherent archaeological potential. Structures with potential historic significance (possibly hidden or inaccessible).

Table 12.2: Magnitude of impact

Magnitude	Criteria
Very High	Applies where mitigation would be unlikely to remove adverse effects. Reserved for adverse, negative effects only. These effects arise where a cultural heritage asset is completely and irreversibly destroyed by a proposed development.
High	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 cultural heritage asset would be permanently impacted upon leading to a loss of character, integrity and data about the archaeological/cultural heritage feature/site.

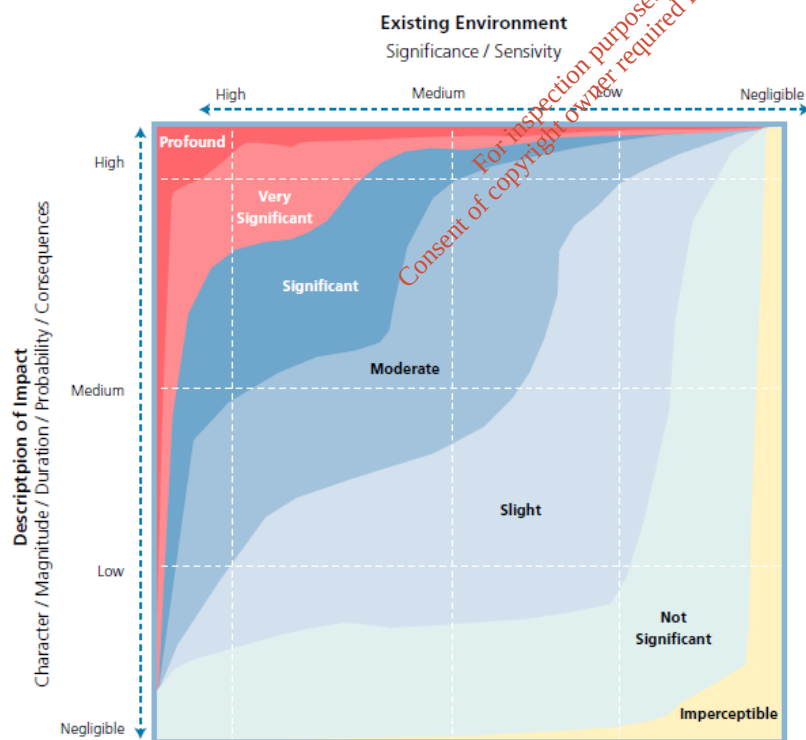
Medium	A moderate direct impact arises where a change to the site is proposed which though noticeable is not such that the archaeological / cultural heritage integrity of the site is compromised, and which is reversible. This arises where an archaeological / cultural heritage feature can be incorporated into a modern-day development without damage and that all procedures used to facilitate this are reversible.
Low	An impact which causes changes in the character of the environment which are not significant or profound and do not directly impact or affect an archaeological / cultural heritage feature, site or monument.
Negligible	An impact capable of measurement but without noticeable consequences.
No Change	No change to the asset or setting

12.4.1 Assigning Significance

The overall significance of effect, taking into account mitigation, is determined by cross-referencing the value of the asset (Table 12.1) and the magnitude of impact (Table 12.2) as shown in Figure 12.1. Where there is potential for two levels of effects professional judgement is used to select the one relevant to the impact on the asset.

The significance of effect is determined according to the criteria outlined below in Table 12.3. Profound, Very Significant, Significant and Moderate effects are considered significant. These have the potential to be material in the decision-making process.

Figure 12.1: Significance of effect matrix



Source: EPA 2017

Table 12.3: Significance categories and typical descriptions (Following EPA 2017)

Value	Asset
Profound	An effect which obliterates sensitive characteristics
Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.
Significant	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
Moderate	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
Imperceptible	An effect capable of measurement but without significant consequences.
Neutral	No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

12.4.2 Relevant legislation, policy and guidance

12.4.2.1 Legislation

The over-arching legislation in relation to heritage management in Ireland is provided by:

- National Monuments Acts 1930-2004;
- The Planning and Development Act 2000, as amended;
- Heritage Act, 1995;
- Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act, 1999
- The UNESCO World Heritage Convention, 1972.

12.4.2.2 National Planning Policy

- Project Ireland 2040 - National Planning Framework
- National Landscape Strategy for Ireland 2015-2025
- National Planning Framework (NPF)
- National Development Plan (NDP) 2018-2027

12.4.2.3 Local Planning Policy

Within Dublin, the following policies apply:

- Dublin City Council Development Plan 2016-2022
- Dublin Port Masterplan 2040

12.4.2.4 Guidance

The baseline for assessment will be established using guidance contained within the following:

- Chartered Institute for Archaeologists (CIfA) (2015) Standards and guidance for historic environment desk-based assessments
- Code of Practice between the National Roads Authority (NRA) and the Minister for Arts, Heritage and the Gaeltacht, June 2000
- Council of Europe (1985) Convention for the Protection of the Architectural Heritage of Europe (Granada) (Ratified by Ireland in 1991)
- Council of Europe (1992) European Convention on the Protection of the Archaeological Heritage (Valletta) (Ratified by Ireland in 1997)
- Department of Arts, Heritage and the Gaeltacht (2015) National Landscape Strategy for Ireland 2015-2025
- Department of Arts, Heritage, Gaeltacht and Islands (1999) Frameworks and Principles for the Protection of the Archaeological Heritage
- EPA (2002) Guidelines on the information to be contained in Environmental Impact Statements
- EPA (2003) Advice Notes on Current Practice (in preparation of Environmental Impact Statements)
- EPA (2015) Draft Advice Notes for Preparing Environmental Impact Statements
- EPA (2017) Draft Revised Guidelines on The Information to be Contained in Environmental Impact Assessment Reports
- Historic England (2008) Conservation Principles: policies and guidance for the sustainable management of the historic environment
- Historic England (2015) Managing Significance in Decision-Taking in the Historic Environment (Historic Environment Good Practice Advice in Planning: 2)
- Historic England (2017) The Setting of Heritage Assets (Historic Environment Good Practice Advice in Planning Aine that was the appendix
- So nvm that (Second Edition))
- Historic England (2019) Statements of Heritage Significance: Analysing Significance in Heritage Assets (Historic England Advice Note 12)
- Historic Scotland (2010) Managing Change in the Historic Environment
- ICOMOS (2005) Xi'an Declaration on the Conservation of the Setting of Heritage Structures, Sites and Areas
- ICOMOS (2011) Guidance on Heritage Impact Assessments for Cultural World Heritage Properties
- ICOMOS (2011) Guidance on Heritage Impact Assessments for Cultural World Heritage Properties
- The European Landscape Convention (ELC), ratified by Ireland 2002 European Landscapes Convention 2010. (The Department of the Environment, Heritage and Local Government 'Landscape and Landscape Assessment Guidelines' have been in draft form since 2000, however the Draft National Landscape Strategy (NLS) was launched in July 2014)
- The Heritage Council (2010) Proposals for Irelands Landscapes

12.5 Baseline Environment

A full cultural heritage baseline has been compiled in the Cultural Heritage Baseline Assessment that can be found in Appendix 12A. A summary of this baseline is provided here.

Due to the close proximity of the developments, and the large overlap of the Study Areas, the cultural heritage baseline environment will be virtually identical for all of the developments. The baseline has therefore been compiled collectively. Where any aspect of the baseline is of specific relevance to a particular development, this will be noted in the text.

12.5.1 Archaeological and Historical Development

A full narrative of the archaeological and historical development of the Poolbeg and Ringsend Sites has been compiled in the Cultural Heritage Baseline Assessment that can be found in Appendix 12A. The following is a summary of the key heritage assets identified in the narrative.

12.5.2 Heritage Assets

12.5.2.1 Designated assets

World Heritage Sites

There are no World Heritage Sites included either within the proposed development area or within the study area.

Record of Monuments and Places

The Record of Monuments and Places (RMP) is a statutory list of all recorded archaeological monuments known to the National Monuments Service. Sites recorded on the Record of Monuments and Places are referred to as 'Recorded Monuments' and receive statutory protection under the National Monuments Act 1994. Any works that will impact upon these monuments will require a written application for ministerial consent two months prior to commencement of the work.

No Recorded Monuments are located within the proposed development area for each of the four development sites. However, the western edge of the Poolbeg BESS Site overlaps the notification zone for Pigeon House Fort (SMR: DU019-027, RPS: 6794) by approximately 25m.

Five Recorded Monuments and Archaeological Zones have been identified in the wider landscape, beyond the proposed areas of the Developments, as having the potential for intervisibility and connecting views or having a historic relationship with the four developments. The distances from the four developments vary and are recorded in detail below in Table 12.11. The intervisibility, connecting views or relationships considered here are for their architectural, archaeological and/ or cultural heritage significance. These may also have landscape and visual significance but are considered in the landscape and visual chapter.

The five Recorded Monuments and Archaeological Zones are:

Table 12.4: RMP Sites within Study Areas

UID	Name	Asset Type	Description of Value
SMR: DU018-054	Irishtown – Archaeological Zone	Settlement	Irishtown is a medieval settlement, first recorded in the mid-15th century. The archaeological zone of Irishtown includes several sites of archaeological interest: St. Mathew's Church (DU018:05401), Graveyard located to the immediate south of St. Matthews Church (DU018:05402), Site of House (DU018:05403). The zone has a high historical value as the area outside the walled city of Dublin in which people of Irish blood settled after expulsion from the city in the 15th century.

SMR: DU018-066	The Great South Wall	Sea Wall	The Great South Wall, or South Bull Wall, is registered on the RMP and the RPS, and is considered to be an asset of national importance. The value of the site derives from its maritime significance as a substantial, intact, in-situ construction that has been one of the defining characteristics of Dublin bay from the 18th century into the present day. The wall represents a major achievement in 18th century maritime engineering of national significance. The wall extends from Pigeon House to Poolbeg Lighthouse along a course that has remained unaltered since its construction and retains its original purpose. The wall's sea front setting has remained mostly unchanged, although the Pigeon House district has been considerably altered by 20th century industrialisation, the reclamation work of the 1960s and the construction of Poolbeg Generating Station.
SMR: DU019-029	The South Wall (Ballast Office Wall)	Sea Wall	The South Wall, or Ballast Office Wall, is registered on the RMP and is considered to be an asset of national importance. The asset is a substantial, intact and in-situ construction that represents a major achievement in 18th century maritime engineering, and which contributed to the transformation of Dublin harbour and the prosperity of the city. The course of the wall remains unaltered but is now incorporated into the present Pigeon House Road and York Road. The setting of the wall has altered considerably since its construction and makes no contribution to its value.
SMR: DU019-027 RPS: 6794	Pigeon House Fort	Fort	Pigeon House Fort survives as the extant remains of walls and structures to the north and south of Pigeon House Road, with the additional possibility of surviving sub-surface archaeological remains. The remains of the fort are registered on the RMP and RPS, and it is considered to be an asset of national importance. The significance of the fort primarily derives from its military historical value as a substantial military installation and once prominent element of the city's defences. The Pigeon House Hotel (RPS 6795) and the fort have a group value as the hotel building formed part of the military fort complex. The setting of the fort has altered substantially since its construction. The seafront location of the northern fort walls is largely unaltered since the 18th century, although the views will have substantially altered.
SMR: DU019-029002 RPS: 6798	The Piles	Sea Wall	The piles are the remains of the original breakwater, constructed in the early 18th century, that was replaced by the South Wall and Great South Wall by the end of the 18th century. Lines of the timbers were exposed on the south side of the Great South Wall following severe storms in 1981. These remains have since been protected by a layer of rock armour. There are likely to be other limited remains of the original Piles, either embedded within the current South Wall or surviving in the sea or silt adjacent to the existing wall. The remains are registered on the RMP and RPS and are considered of national importance. The remains are of considerable historical value as they are remnants of a major 18th century engineering achievement and represent the first stage in the formation of Dublin Bay from the 18 th century onwards. The setting of the asset has altered considerably due to the construction of the later walls, and from alteration in the formation of the harbour, although the setting of any surviving

remnants of the stretch between Poolbeg
Generating Station and the lighthouse will be less
affected.

None of the Recorded Monuments are in state ownership or guardianship.

Record of Protected Structures (RPS)

Section 51 of the Planning and Development Act, 2000 (as amended) requires the Development Plan to include a record of structures of architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest. These structures form part of the architectural heritage of the County and are to be protected. This list, referred to as the Record of Protected Structures (RPS), is included within the Dublin City Development Plan 2016-2022.

There are four structures listed in the RPS as being located within the subject study area associated with the four developments.

Table 12.5: RPS Sites within Study Areas

UID	Name	Asset Type	Description of Value
SMR: DU019-027 RPS: 6794	Pigeon House Fort	Fort	See Table 12.4
SMR: DU019-029002 RPS: 6798	The Piles	Sea Wall	See Table 12.4
DCIHR: 19-09-006 RPS: 6796	Pigeon House Power Station	Electricity Works	Early 20th century power station, decommissioned in 1976. The Pigeon House Power Station is registered on the RPS and the DCIHR and is considered to be of national value. The main building was constructed in 1902, with multiple extensions in the mid-20th century. The shell of the building remains intact and generally in good condition, although some cracks are visible at the northern end of the structure. The roof is mostly missing, and the interior has been partially gutted and exposed to the elements. The power station was Ireland's earliest major power production facility and the world's first three-phase generating station. It is thus considered to be of value for its industrial heritage interest. The structure of the building, including extension, is of architectural significance as a distinctive piece of early 20th century industrial architecture. The harbour, Pigeon House Fort (SMR DU019-027, RPS 6794) and the Pigeon House Hotel (RPS 6795) form part of the setting of the original site. With the exception of Poolbeg Generating Station to the east and the modernisation of the outfall beds to the west (DCIHR 19-09-004) the setting of the site has remained largely unaltered since its construction.
RPS: 6795	Pigeon House Hotel	Hotel (former)	The Pigeon House Hotel building is registered on the RPS and is considered to be an asset of high value. The hotel was constructed in c. 1793 to a design of Robert Pool, close to the site of the original pigeon house blockhouse from which the pigeon house area derived its name. The building has historical value relating to its original purpose as a hotel to accommodate travellers, continuing the tradition of hospitality at the location started by Mr Pidgeon in the earlier building, and as part of the military complex of Pigeon House Fort. The house and the fort (SMR DU019-027, RPS 6794) have a

group value due to the building's incorporation into the fort's military complex. The building is also of architectural value due to the involvement of Robert Pool, a celebrated 18th century architect, in the design of the building. The building's setting has altered substantially since its construction and the building is now set within a modern industrial landscape that does not contribute to the asset's significance. The proximity to the 18th century Pigeon House harbour remains, although the harbour itself has been considerably modified by the construction of the late 19th century outfall works (DCIHR 19-09-004).

Conservation areas

No part of the proposed development scheme falls within an architectural conservation area.

Within the immediate landscape of the Poolbeg Site, there are two conservation areas.

- Pigeon House Conservation area, incorporating the Pigeon House Power Station (MM008) and the remaining open section of Pigeon House Harbour.
- Great South Wall Conservation area, incorporating the section of the Great South Wall (MM002) stretching from the end of the reclaimed land to Poolbeg Lighthouse.

Wreck Sites

Wrecks and underwater archaeological objects over 100 years old are afforded protection under Section 3 of the National Monuments (Amendment) Act 1987, irrespective of age. The act also allows for more recent wrecks and archaeological objects to be afforded protection by an underwater heritage order, if they are considered to be of sufficient historical, archaeological or artistic importance.

The files of the Underwater Archaeological Unit, National Monuments Service include a number of wrecks in the general area of the subject site. The exact locations of such wrecks are, for the most part, unknown and in most instances the place of loss was only generally recorded – e.g. 'Dublin Bay', Dublin Harbour', 'Dublin Bay', or simply 'near Dublin'.

Four known wrecks are recorded as located within the defined Study Area.

Table 12.6: Wreck Sites within Study Areas

UID	Name	Asset Type	Description of Value
Wreck: W11568	Unknown	Wreck site	Redeposited ship timbers. Wreck details unknown, but all wrecks and underwater archaeological remains over 100 years old are afforded protection under the National Monument Act.
Wreck: W11569	Unknown	Wreck site	Redeposited ship timbers. Wreck details unknown, but all wrecks and underwater archaeological remains over 100 years old are afforded protection under the National Monument Act.
Wreck: W11571	Ringsend Wreck	Wreck site	Wreck of timber and metal, probably of mid-19 th century. All wrecks and underwater archaeological remains over 100 years old are afforded protection under the National Monument Act. Several structural pieces of wood and iron

			revealed during excavation. Musket balls and bullets also retrieved in area of wreck.
Wreck: W01734	Unknown	Wreck site	Redeposited ship timbers. Wreck details unknown, but all wrecks and underwater archaeological remains over 100 years old are afforded protection under the National Monument Act.

In addition, 48 wrecks have been recorded with a place of loss within the vicinity of Pigeon House, Poolbeg, Ringsend and the Great South Wall. The exact locations and nature of these wrecks is unknown.

Table 12.7: Wrecks with Place of Loss in Proximity to the Developments

Name	Date of Loss	Place of Loss	Description
Alderborough	April 1725	Poolbeg Harbour	British 'man of war' sank during a storm
Antelope	27 September 1852	Ringsend Point	Vessel was en-route from New York
Apollo	30 January 1799	Poolbeg	Brig had its cables cut
Argo	10 December 1892	Opposite old coast guard station at Ringsend	46 ton Fishing smack moored in River Liffey
Ashbourne	1832	Pigeon House	Last seen at the Pigeon House and not seen since
Belle Kate	17 December 1851	Pigeon House	Barque ran aground but recorded as having got off again
Dorset	26 March 1804	Pigeon House Dock	Yacht damaged by a brig but expected to continue journey
Duke of Leinster	22 October 1883	c. ½ mile north of Pigeon House Fort	Steamer struck a sunken dredge and sank; subsequently raised and beached on south bank of River Liffey, near Pigeon House
Dunbar	20/22 February 1756	Poolbeg	Brig
Emerald	2 July 1898	Pigeon House Fort	51 ton ketch collided with a steamship and sunk
Flyde of Preston	11 October 1824	Neat Lighthouse-White Bank	Vessel Lost
Friendship	22 November 1798	Poolbeg	Sloop lost after cables cut
Glory	26 September 1805	White Bank	Went ashore
Governor Picton	26 August 1799	Opposite Pigeon House	Ran aground and sank
Henrietta Louisa	23 September 1799	Opposite Pigeon House	Brig had cables cut
Henry	12 January 1767	Back of piles – Dublin Port	Wrecked
Henry	23 November 1798	South Wall	Brig was wrecked
Hero	11 October 1824	Pigeon House	Hit a sand bar and sunk
Isabella	28 July 1811	Poolbeg	Stranded
James and Ann	7 February 1812	Pigeon Hole, Dublin River	Hit by a collier brig and sank
Jealous of Me	5 December 1934	Poolbeg Lighthouse	Sank
London Packet	8 February 1798	Poolbeg	Stranded and sank

Naomi	22 December 1909	Poolbeg Lighthouse	46 ton fishing cutter
Pelican	8 April 1889	Ringsend, River Liffey	37 ton wooden smack was at anchor and burnt
Poseidon	Around 1907	Shell Banks south of Poolbeg Generating Station	Barque went ashore and remains protruded from the sands
Polly	25 April 1775	Poolbeg	Sank
Princess Augusta	6 December 1819	White bank	Ran ashore
Prosperous	21 July/August 1854	Near Pigeon House	Sank after collision
Providence	5 February 1771	Behind Piles at Dublin	Sank
Providence	16 November 1779	Poolbeg	Sank
Rainbow	16 January 1874	Poolbeg Lighthouse	Smack ran aground after collision with a steamship
Seaflower	24 January 1856	Off Ringsend	Broke from moorings and collided with a steamer
Smyrna/Smyra	29 September 1852	Rocks near Poolbeg Lighthouse	90 ton brig last seen 'bottom up' in White Bank
Speculation	12 October 1799	Poolbeg	Cables cut
Times	13 Sept/29 Nov 1851	Off Pigeon House	Went ashore in dense fog but was got off again
Wellington	1 December 1825	Near Pigeon House	Schooner sank
William	January 1609	Poolbeg	At anchor and lost in storm
Wilmington	4 February 1791	Poolbeg Harbour	Wrecked
Young Christian	17 April 1799	Poolbeg	Cables cut
Unknown	1524-1561	Poolbeg	Mayor took charge and returned goods from wrecked ship to merchant concerned
Unknown	January 1608	Poolbeg	Ship was 'riding at anchor' and wrecked in storm
Unknown	17/20 February 1770	Poolbeg	Stoop sank
Unknown	5 February 1771	Behind Piles at Dublin	Two unnamed ships were lost
Unknown	16 December 1787	Dublin Bay	Five vessels driven ashore south of piles
Unknown	22 October 1883	c. ½ mile north of Poolbeg Lighthouse	Dredger collided with collier and sank
Unknown	20 June 1895	200 yards inside Poolbeg Lighthouse	Wooden sailing boat was lost
Unknown	February 1900	Ringsend Basin	Trawler collided with steamship and sank
Unknown	Unknown	Poolbeg	6 boat timbers exposed in a sewage trench by a dredger

12.5.2.2 Non-designated assets

Non-designated buildings

National Inventory of Architectural Heritage (NIAH)

The National Inventory of Architectural Heritage (NIAH) was established in 1990 in order to fulfil Ireland's obligations under the Granada Convention which states that 'for the purpose of precise identification of the monuments, groups of buildings and sites to be protected, each Party undertakes to maintain inventories of that architectural heritage'. 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. It is intended that the NIAH will provide the basis for the recommendations of the Minister for Culture, Heritage and the Gaeltacht to the planning authorities. The building survey highlights a representative sample and raises awareness of the wealth of architectural heritage in the county. The NIAH surveys can be reviewed at www.buildingsofireland.ie.

There are no structures recorded on the NIAH within the Development Area or the Study Area.

Dublin City Industrial Heritage Record (DCIHR)

The Dublin City Industrial Heritage Record represents a full survey of the industrial architectural heritage of Dublin City. The purpose of the record is to highlight structures requiring statutory protection, to make recommendations on conservation of streetscapes and to raise awareness of the industrial heritage of the city. Although these sites are not necessarily included within the RPS, they represent Industrial assets that are considered to be of value and may be recommended for inclusion within the RPS.

Five sites within the study area are recorded on the DCIHR as being of industrial archaeological interest.

Table 12.8: DCIHR Sites within Study Areas

UID	Name	Asset Type	Description of Value
DCIHR: 19-09-004	Outfall Works (Dublin Corporation)	Drainage Outfall Works	Early 20th century outfall works, replaced by concrete outfall works in c. 2003. Registered in the DCIHR, the site is considered of local importance. These works are at the site of sludge beds completed in 1906 that formed part of Dublin's main drainage system. Although the original works have been replaced, the site retains significant historical value as the sewage works were among the earliest such developments in Ireland, representative of a major engineering achievement and form part of Dublin's social and industrial history. The harbour, Pigeon House Fort (SMR DU019-027, RPS 6794) and the Pigeon House Hotel (RPS 6795) from part of the setting of the original site.
DCIHR: 19-09-005	Lifeboat House	Lightboat House	Site of lifeboat house to north east of outfall works and last visible in OS mapping of 1910. Although recorded as of interest in the DCIHR, there are no extant remains visible relating to the lifeboat house.
DCIHR: 19-09-006 RPS: 6795	Pigeon House Power Station	Electricity Works	See Table 12.5

DCIHR: 19-09-012	Landing Slip	Landing Slip	Late 18th century landing strip that forms part of the Great South Wall. The slip is registered on the DCIHR and is considered of local importance. The slip provided access to Pigeon House via pigeon house Fort's east gate, which has now been completely modernised. The landing strip construction reflects the high level of construction of the wall, and remains in good, functional condition. The value of the asset derives from its historical association with the Great South Wall, with Pigeon House fort and for its relationship to Dublin's maritime history. The slip has group value with several other assets due to its functional relationships: The Great South Wall (SMR: DU018-066), Pigeon House Fort (SMR DU019-027, RPS 6794), Pigeon House Hotel (RPS 6795) and Pigeon House Power Station (DCIHR: 19-09-006, RPS: 6795). The waterfront setting of the asset remains largely unaltered, although the views will have changed substantially. The east gate access to the fort has been almost entirely modified.
DCIHR: 19-09-015	Poolbeg Generating Station Chimneys	Chimneys	The tall twin chimneys of the 20th century Poolbeg Generating Station are registered on the DCIHR and are considered to be of local value. Within the Dublin setting, the chimneys are a prominent feature of the urban landscape and have significant local value as a well-known landmark. At just over 207m in height, the chimneys are also among the tallest structures in Ireland. The chimneys formed the back drop to a U2 video, giving them a place in popular culture. The chimneys are still within the original setting of the power station but, while the power station represents an element of Dublin's modern industrial history, the primary local value of the chimneys derives from their height and visual impact in the skyline.

Other buildings

As part of the demolition assessment for the Poolbeg BESS development, four ancillary buildings within the Poolbeg Generating Station have been assessed for their heritage value (Historic Building Consultants 2020). The report concluded that the buildings were not of architectural historical significance. The redundant administration block is not included within the planning application for Poolbeg BESS/demolition with the exception of the remedial / cladding works proposed to the newly exposed northern façade.

Table 12.9: Other Buildings within Study Areas

UID	Name	Asset Type	Description of Value
N/A	Poolbeg Generating Station ancillary buildings	Administrati on Building, Storage Building, Pavilion	The buildings are later 20th century buildings with negligible architectural historical significance. Their setting is within the original context as part of the Poolbeg Generating Station complex.

12.5.2.3 Archaeological sites and monuments

Topographical Files of the National Museum of Ireland (NMI)

The topographical files of the National Museum of Ireland (NMI) identify recorded stray finds held in the museum's archive.

Table 12.10: NMI Sites within Study Areas

UID	Name	Asset Type	Description of Value
NMI Reg. No: RIA 1918:368	Glass bead recovered from water at Pigeonhouse Fort	Find Spot	Glass bead with blue and white ridges and while and blue spiral knobs with yellow insets, a good bit broken; recovered from water at Pigeonhouse Fort. Negligible value. Stray find that has been removed. Find not necessarily in situ.
NMI Reg. No: 1954:4	Portion of medieval jug discovered at Pigeonhouse	Find Spot	Portion of medieval jug discovered at Pigeonhouse. Negligible value. Stray find that has been removed. Indicative of medieval activity within the landscape, but not necessarily at the location.

12.5.3 Proximity of Heritage Assets to Developments

The shortest distance between the red line boundary for each development and each recorded heritage asset, excluding findspots, has been calculated and is presented in Table 12.11.

Table 12.11: Minimum Distance between Heritage Assets and Sites

UID	Asset Name	Minimum Distance from Development (m)			
		Poolbeg BESS	Poolbeg FlexGen	Ringsend FlexGen	South Wall BESS
SMR DU018-054	Irishtown (Archaeological Zone)	1877	1912	918	831
SMR DU019-029	The Great South Wall	50	59	886	722
SMR DU018-066	The South Wall (Ballast Office Wall)	368	401	228	55
SMR DU019-027 RPS 6794	Pigeon House Fort	44	101	512	364
SMR DU019-029002 RPS 6798	The Piles (Archaeological zone)	50	59	886	722
DCIHR 19-09-004	Outfall Works (Dublin Corporation)	187	231	443	259
DCIHR 19-09-005	Lifeboat House	200	278	744	563
DCIHR 19-09-006 RPS 6796	Pigeon House Power Station	27	77	779	628
DCIHR 19-09-012	Landing Slip, Pigeon House Road	84	202	898	729
DCIHR 19-09-015	Poolbeg Power Station Chimneys	20	96	960	804
RPS 6795	Pigeon House Hotel	72	114	749	603

Wreck W11568	Unknown	408	225	1612	1473
Wreck W11569	Unknown	393	212	1597	1458
Wreck W11571	Ringsend Wreck	567	386	1765	1627
Wreck W01734	Unknown	546	372	1741	1603
N/A	Poolbeg power station ancillary buildings	Within	7	843	706

12.5.4 Archaeological Potential

12.5.4.1 Geoarchaeological Potential

Poolbeg FlexGen and Poolbeg BESS Sites

The surface level across the Poolbeg Generating Station is composed entirely of made ground, with a variation in thickness from 0.3m to 3.8m bgl. Below the made ground, the naturally occurring sands and gravels of the intertidal zone have been preserved.

The potentially waterlogged nature of deposits below 0.6m AOD is very likely to result in the survival of organic archaeological remains, if present, and provides good conditions for the survival of paleo-environmental evidence.

Ringsend FlexGen and South Wall BESS Sites

The surface level across the Ringsend Generating Station is composed entirely of made ground. At present, there is insufficient GI data to estimate the depth of the made ground. It is expected that there will be variation in the thickness of the made ground layer.

The potentially waterlogged nature of deposits below 0.6m AOD is very likely to result in the survival of organic archaeological remains, if present, and provides good conditions for the survival of environmental remains.

12.5.4.2 Archaeological Potential

Poolbeg FlexGen Site

There are no known archaeological features within the proposed area of the Poolbeg FlexGen development. Archaeological monitoring of site investigations has been undertaken and did not reveal archaeological remains.

The ground surface of the development area consists entirely of made ground to depths of approximately 0.3m to 3.8m bgl, within which no significant archaeological deposits will be present. Any archaeological evidence within the made ground will be displaced finds of unknown context and therefore of negligible significance.

Below the made ground, the intertidal sands are anticipated to have a moderate potential for remains from the prehistoric, early medieval, medieval and post medieval periods.

For the prehistoric periods, these finds may include the remains of coastal exploitation, such as fish traps, as well as wrecks or wreck material. These remains would be considered of potentially high significance.

For the early medieval to medieval period, any material would be anticipated to relate to wrecks and wreck material, as well as stray finds or refuse relating to activity within the Pigeon House

area. These remains would generally be considered of slight significance, but wrecks could be of potentially high significance.

For the post medieval period, any material would be anticipated to relate to wrecks, flotsam and jetsam, as well as stray finds or refuse relating to activity within the Pigeon House area. These remains would generally be considered of slight significance, but wrecks and wreck material could be of potentially high significance.

Poolbeg BESS Site

There are no known archaeological features within the proposed area of the Poolbeg BESS development. However, the western boundary of the development does overlap the Zone of Archaeological Interest associated with Pigeon House Fort (SMR DU019-027 RPS 6794). Archaeological monitoring of site investigations has been undertaken and did not reveal archaeological remains.

The ground surface of the development area consists entirely of made ground to depths of approximately 0.9m to 3.5m bgl, within which no significant archaeological deposits will be present. Any archaeological evidence within the made ground will be displaced finds of unknown context and therefore of negligible significance.

Below the made ground, the intertidal sands are anticipated to have a moderate potential for remains from the prehistoric, early medieval, medieval and post medieval periods. There is also anticipated to be a high potential for remains from the modern period.

For the prehistoric periods, these finds may include the remains of coastal exploitation, such as fish traps, as well as wrecks or wreck material. These remains would be considered of potentially high significance.

For the early medieval to medieval period, any material would be anticipated to relate to wrecks and wreck material, as well as stray finds or refuse relating to activity within the Pigeon House area. These remains would generally be considered of slight significance, but wrecks could be of potentially high significance.

For the post medieval period, any material would be anticipated to relate to wrecks and wreck material, as well as stray finds or refuse relating to activity within the Pigeon House area. These remains would generally be considered of slight significance, but wrecks could be of potentially high significance.

For the modern period, it is anticipated that there may be some surviving remains of ancillary structures from the coal storage yard of the Pigeon House Power Station. Although related to the power station, these structures are likely to be minor elements such as walls and small outbuildings that will be of low significance.

Ringsend FlexGen Site

There are no known archaeological features within the proposed area of the Ringsend FlexGen development.

The ground surface of the development area consists entirely of made ground of unestablished depths, within which no significant archaeological deposits will be present. Any archaeological evidence within the made ground will be displaced finds of unknown context and therefore of negligible significance.

Below the made ground, deposits are expected to comprise entirely of inter-tidal sands. Within these sands, it is anticipated that there is a moderate potential for remains from the prehistoric, early medieval, medieval and post medieval periods.

For the prehistoric periods, these finds may include the remains of coastal exploitation, such as fish traps, as well as wrecks or wreck material. These remains would be considered of potentially high significance.

For the early medieval to medieval period, any material would be anticipated to relate to wrecks and wreck material, as well as stray finds or refuse relating to coastal occupation and activity. These remains would generally be considered of slight significance, but wrecks could be of potentially high significance.

For the post medieval period, any material would be anticipated to relate to wrecks, flotsam and jetsam, as well as stray finds or refuse from occupation in the Pigeon House area. These remains would generally be considered of slight significance, but wrecks and wreck material could be of potentially high significance.

South Wall BESS Site

There are no known archaeological features within the proposed area of the South Wall BESS development.

The ground surface of the development area consists entirely of made ground of unestablished depths, within which no significant archaeological deposits will be present. Any archaeological evidence within the made ground will be displaced finds of unknown context and therefore of negligible significance.

Below the made ground, deposits are expected to comprise entirely of intertidal sands. Within these sands, it is anticipated that there is a moderate potential for remains from the prehistoric, early medieval, medieval and post medieval periods.

For the prehistoric periods, these finds may include the remains of coastal exploitation, such as fish traps, as well as wrecks or wreck material. These remains would be considered of potentially high significance.

For the early medieval to medieval period, any material would be anticipated to relate to wrecks and wreck material, as well as stray finds or. These remains would generally be considered of slight significance, but wrecks could be of potentially high significance.

For the post medieval period, any material would be anticipated to relate to wrecks and wreck material, as well as stray finds or refuse. These remains would generally be considered of slight significance, but wrecks and wreck material could be of potentially high significance.

12.6 Impact Assessment

Of the heritage assets identified, only such assets that are likely to be affected by the Developments, whether this impact is physical or by way of effect to the setting, will be considered. Heritage assets that have been excluded from further assessment, and the reasons for that exclusion, are shown in Table 12.12 below.

Table 12.12: Assets excluded from further assessment

Asset No.	Name	Designation	Value/ sensitivity	Reason for exclusion
MM001	Irishtown	Archaeological Zone. Including buildings within RMP.	HIGH	The archaeological zone of Irishtown is located over 830m from the proposed developments. It is considered that no aspect of the zone or its setting will be impacted by the development due to distance and screening by the intervening built environment.
MM012	Unknown	NMA	HIGH	The proposed Developments are entirely terrestrial in nature and sufficiently distant that neither the wreck nor its setting will be impacted in any way by the development. There is not anticipated to be any discharge from the development that will alter the marine environment or impact survival of maritime remains.
MM013	Unknown	NMA	HIGH	The proposed developments are entirely terrestrial in nature and sufficiently distant that neither the wreck nor its setting will be impacted in any way by the development. There is not anticipated to be any discharge from the development that will alter the marine environment or impact survival of maritime remains.
MM014	Ringsend Wreck	NMA	HIGH	The proposed Developments are entirely terrestrial in nature and sufficiently distant that neither the wreck nor its setting will be impacted in any way by the development. There is not anticipated to be any discharge from the development that will alter the marine environment or impact survival of maritime remains.
MM015	Unknown	NMA	HIGH	The proposed Developments are entirely terrestrial in nature and sufficiently distant that neither the wreck nor its setting will be impacted in any way by the development. There is not anticipated to be any discharge from the development that will alter the marine environment or impact survival of maritime remains.

12.7 Poolbeg FlexGen Impact Assessment

12.7.1 Do-Nothing Impacts

Were the proposed development not to go ahead, there would be no foreseeable impact to heritage assets or archaeology.

12.7.2 Poolbeg FlexGen Construction Effects

The known receptors with potential to be impacted during the construction phase comprise the Pigeon House Power Station, Pigeon House Hotel, Pigeon House Fort and the Poolbeg Power Station Chimneys. These are built structures with a low sensitivity to construction impacts. The magnitude of potential impacts is negligible, and of low significance. Potential impacts will be short term, lasting only for the duration of the construction.

There is also the potential for impact to unknown archaeology by any excavation that penetrates below the depth of the made ground layer at the site.

12.7.2.1 Piles

The proposed development falls entirely within an area of reclaimed land. The ground surface is entirely made ground with known depths ranging from a minimum of c. 0.3m to a maximum of c. 3.8m below the current surface. Parts of the development will involve piles that will be bored through the made ground layer and may impact potential archaeology within the ground beneath.

There is also the potential that vibrations generated from pile boring will have the potential to impact built heritage. Five nearby structures of architectural heritage value are potentially vulnerable to vibrations from the works: The Great South Wall, Pigeon House Fort, Pigeon House Hotel, Pigeon House Generating Station and the Poolbeg Power Station Chimneys. Particular vulnerability is recognised in the Poolbeg Power Station Chimneys, due both to their close proximity to the site and due to the height of the structures, and the Pigeon House Power Station, due to the presence of cracking apparent in some parts of the structure. The assessment of the vibrations is detailed in the Noise and Vibration chapter.

These assessments indicate that the worst-case vibration impact is expected to be 0.037 mm/s at Poolbeg Power Station Chimney 1 and the closest point of the Great South Wall. This level of vibration is significantly below the 3mm/s threshold potential for cosmetic or structural damage. However, the estimate is based upon modelling. Monitoring of sensitive structures will be undertaken in line with the CEMP during the closest phases of piling to ensure that real world vibrations remain within safe levels.

12.7.2.2 Temporary Construction Compounds

The proposed location for the construction compound is sited upon made ground and will have no archaeological impact where it is placed upon the ground surface. It is unlikely that any additional groundworks will be required. However, should any excavation be required, such as for hard-standing, excavation may penetrate through the made ground to impact potential archaeology beneath.

12.7.2.3 Services

Excavations will be required for the installation of services. Although these excavations will be shallow, the variation in depth of the made ground presents the potential for the disturbance of archaeological deposits where excavations penetrate below the made ground layer.

The installation of a new water connection along Pigeon House Road to the west of the Site carries a low risk of disturbance to archaeological deposits, particularly relating to Pigeon House Fort.

12.7.2.4 Cranes

Where cranes are placed within the footprint of the proposed development, they will be entirely upon made ground and are not anticipated to have any impact. If any additional groundworks are required for the installation of hard standing, it is possible that the excavation may penetrate through the made ground to impact potential archaeology beneath.

The proposed siting of cranes is not yet established. If the cranes are sited near the Poolbeg Power Station Chimneys and the retained administration building, crane operation may present the risk of accidental damage to the structures.

12.7.3 Poolbeg FlexGen Operational Effects

The operation of the proposed FlexGen development will not give rise to emissions or impacts that have the potential to cause direct or indirect effects upon cultural heritage. Noise generation will not be sufficient to cause any significant impact upon the setting of heritage assets. Therefore, there are no anticipated impacts upon cultural heritage from the operational effects of the development.

12.7.4 Poolbeg FlexGen Decommissioning

12.7.4.1 Cranes

Where cranes are placed within the footprint of the proposed development, they will be entirely upon made ground and are not anticipated to have any impact. If any additional groundworks are required for the installation of hard standing, it is possible that the excavation may penetrate through the made ground to impact potential archaeology beneath.

The proposed siting of cranes is not yet established. If the cranes are sited near the Poolbeg power Station Chimneys and the retained administration building, crane operation may present the risk of accidental damage to the structures.

12.8 Poolbeg FlexGen Mitigation and Monitoring

12.8.1 Construction Phase

12.8.1.1 Archaeology

The principal risk of impact upon archaeology by the development is from any works that penetrate below the made ground layer. The variation in depth of the made ground layer makes it difficult to predict where excavations might have an impact. It is proposed that a programme of archaeological investigation will be implemented in accordance with an archaeological excavation strategy and methodology. This will be in line with guidance set out by the

Department of Arts, Heritage, Gaeltacht and the Islands and agreed with the Dublin City Archaeologist. This will be detailed in the CEMP. Where works take place for the installation of utilities within the Zone of Archaeological Interest associated with Pigeon House Fort, the works will be archaeologically monitored.

12.8.1.2 Piles

Although the predicted impact of vibration is below harmful levels, care will need to be taken to ensure that real world vibrations remain at safe levels. During the phases of piling that are closest to the Poolbeg Power Station towers, monitoring of sensitive structures will be undertaken in line with the CEMP to ensure that real world vibrations remain within safe levels.

12.8.1.3 Temporary Construction Compounds

Where construction compounds require any sub-surface works that will penetrate to a depth below that of the made ground, any excavation work will be monitored by a suitably qualified archaeologist.

12.8.1.4 Cranes

Where construction of hard standing for cranes will require sub-surface works to a depth that will penetrate the made ground layer, any excavation work will be monitored by a suitably qualified archaeologist.

Cranes should preferably be sited where their operation will avoid the possibility of accidental damage to the Poolbeg Power Station Chimneys or the retained administration building within the Poolbeg power Station. Operations will be planned and monitored accordingly to avoid any risk of impact to the buildings.

12.8.2 Operational Phase

As no cultural heritage impacts have been identified for the operational phase, no mitigation measures are required.

12.8.3 Decommissioning Phase

12.8.3.1 Cranes

Where construction of hard standing for cranes will require sub-surface works to a depth that will penetrate the made ground layer, any excavation work will be monitored by a suitably qualified archaeologist.

Cranes should preferably be sited where their operation will avoid the possibility of accidental damage to the Poolbeg Power Station Chimneys or the retained administration building within the Poolbeg power Station. Operations will be planned and monitored accordingly to avoid any risk of impact to the buildings.

12.8.4 Monitoring

Where piles are to be bored through the made ground, they will be archaeologically monitored.

Where construction compounds require sub-surface works to a depth that will penetrate the made ground layer, the excavation work will be archaeologically monitored.

Where construction of hard standing for cranes will require sub-surface works to a depth that will penetrate the made ground layer, the excavation work will be archaeologically monitored.

Where works take place for the installation of utilities within the Zone of Archaeological Interest associated with Pigeon House Fort, the works will be archaeologically monitored.

12.9 Poolbeg BESS Impact Assessment

12.9.1 Do-Nothing Impacts

Were the proposed development not to go ahead, there would be no foreseeable impact to heritage assets or archaeology.

12.9.2 Poolbeg BESS Construction Effects

The known receptors with potential to be impacted during the construction phase comprise the Pigeon House Power Station, Pigeon House Hotel, Pigeon House Fort and the Poolbeg Power Station Chimneys. These are built structures with a low sensitivity to construction impacts. The magnitude of potential impacts is negligible, and of low significance. Potential impacts will be short term, lasting only for the duration of the construction.

There is also the potential for impact to unknown archaeology by any excavation that penetrates below the depth of the made ground layer at the site.

12.9.3 Demolition

Three late 20th century buildings will be demolished as part of the development: The Safety Centre (Pavilion), The Store and The Main Store/Workshop. These buildings have been assessed as being of no architectural historical significance (refer to 'Proposed Demolition of Ancillary Structures at Poolbeg Generating Station Pigeon House Road, Dublin 4 prepared by Historic Building Consultants, July 2020. This report is provided in Appendix 12B).

12.9.3.1 Piles

The proposed development falls entirely within an area of reclaimed land. The ground surface is entirely made ground with known depths ranging from a minimum of c. 0.9m to a known maximum of c. 3.5m below the current surface. Parts of the development will involve piles that will be bored through the made ground layer and may impact potential archaeology within the ground beneath.

There is also the potential that vibrations generated from pile boring will have the potential to impact built heritage. Five nearby structures of architectural heritage value are potentially vulnerable to vibrations from the works: The Great South Wall, Pigeon House Fort, Pigeon House Hotel, Pigeon House Generating Station and the Poolbeg Power Station Chimneys. Particular vulnerability is recognised in the Poolbeg Power Station Chimneys, due both to their close proximity to the site and due to the height of the structures, and the Pigeon House Power Station, due to the presence of cracking apparent in some parts of the structure. The assessment of the vibrations is detailed in the Noise and Vibration chapter.

These assessments indicate that the worst-case vibration impact is expected to be 0.381 mm/s at Poolbeg Power Station Chimney 1 and the Pigeon House Power Station. This level of vibration is significantly below the 3mm/s threshold potential for cosmetic or structural damage. However, the estimate is based upon modelling. Monitoring of sensitive structures will be undertaken in line with the CEMP during the closest phases of piling to ensure that real world vibrations remain within safe levels.

12.9.3.2 Temporary Construction Compounds

The proposed location for the construction compound is sited upon made ground and will have no archaeological impact where it is placed upon the ground surface. It is unlikely that any additional groundworks will be required. However, should any excavation be required, such as for hard-standing, excavation may penetrate through the made ground to impact potential archaeology beneath.

12.9.3.3 Services

Excavations will be required for the installation of services. Although these excavations will be shallow, the variation in depth of the made ground presents the potential for the disturbance of archaeological deposits where excavations penetrate below the made ground layer.

The installation of a power supply connection along Pigeon House Road to the west of the Site carries a low risk of disturbance to archaeological deposits, particularly relating to Pigeon House Fort.

12.9.3.4 Cranes

Where cranes are placed within the footprint of the proposed development, they will be entirely upon made ground and are not anticipated to have any impact. If any additional groundworks are required for the installation of hard standing, it is possible that the excavation may penetrate through the made ground to impact potential archaeology beneath.

The proposed siting of cranes is not yet established. If the cranes are sited near the Poolbeg power Station Chimneys and the retained administration building, crane operation may present the risk of accidental damage to the structures.

12.9.4 Poolbeg BESS Operational Effects

The operation of the proposed BESS development will not give rise to emissions or impacts that have the potential to cause direct, indirect or cumulative effects on cultural heritage. Noise generation will not be sufficient to cause any significant impact upon the setting of heritage assets. Therefore, there are no anticipated impacts upon cultural heritage from the operational effects of the development.

12.9.5 Poolbeg BESS Decommissioning

12.9.5.1 Cranes

Where cranes are placed within the footprint of the proposed development, they will be entirely upon made ground and are not anticipated to have any impact. If any additional groundworks are required for the installation of hard standing, it is possible that the excavation may penetrate through the made ground to impact potential archaeology beneath.

The proposed siting of cranes is not yet established. If the cranes are sited near the Poolbeg power Station Chimneys and the retained administration building, crane operation may present the risk of accidental damage to the structures.

12.10 Poolbeg BESS Mitigation and Monitoring

12.10.1 Construction Phase

12.10.1.1 Archaeology

The principal risk of impact upon archaeology by the development is from any works that penetrate below the made ground layer. The variation in depth of the made ground layer makes it difficult to predict where excavations might have an impact. It is proposed that a programme of archaeological investigation will be implemented in accordance with an archaeological excavation strategy and methodology. This will be in line with guidance set out by the Department of Arts, Heritage, Gaeltacht and the Islands and agreed with the Dublin City Archaeologist. This will be detailed in the CEMP. Where works take place for the installation of utilities within the Zone of Archaeological Interest associated with Pigeon House Fort, the works will be archaeologically monitored.

12.10.1.2 Demolition

Each of the three buildings will be recorded through photographs and a written description prior to demolition. The resulting reports will be lodged in the Dublin City Library and Archive and in the Irish Architectural Archive. This will be detailed in the CEMP.

12.10.1.3 Piles

Although the predicted impact of vibration is below harmful levels, care will need to be taken to ensure that real world vibrations remain at safe levels. During the phases of piling that are closest to the Poolbeg Power Station towers, monitoring of sensitive structures will be undertaken in line with the CEMP.

12.10.1.4 Temporary Construction Compounds

Where construction compounds require any sub-surface works that will penetrate to a depth below that of the made ground, any excavation work will be monitored by a suitably qualified archaeologist.

12.10.1.5 Cranes

Where construction of hard standing for cranes will require sub-surface works to a depth that will penetrate the made ground layer, any excavation work will be monitored by a suitably qualified archaeologist.

Cranes should preferably be sited where their operation will avoid the possibility of accidental damage to the Poolbeg Power Station Chimneys or the retained administration building within the Poolbeg power Station. . Operations will be planned and monitored accordingly to avoid any risk of impact to the buildings.

12.10.2 Operational Phase

As no cultural heritage impacts have been identified for the operational phase, no mitigation measures are required.

12.10.3 Decommissioning Phase

12.10.3.1 Cranes

Where construction of hard standing for cranes will require sub-surface works to a depth that will penetrate the made ground layer, any excavation work will be monitored by a suitably qualified archaeologist.

Cranes should preferably be sited where their operation will avoid the possibility of accidental damage to the Poolbeg Power Station Chimneys or the retained administration building within the Poolbeg power Station.. Operations will be planned and monitored accordingly to avoid any risk of impact to the buildings.

12.10.4 Monitoring

Where piles are to be bored through the made ground, they will be archaeologically monitored.

Where construction compounds require sub-surface works to a depth that will penetrate the made ground layer, the excavation work will be archaeologically monitored.

Where construction of hard standing for cranes will require sub-surface works to a depth that will penetrate the made ground layer, the excavation work will be archaeologically monitored.

Where works take place for the installation of utilities within the Zone of Archaeological Interest associated with Pigeon House Fort, the works will be archaeologically monitored.

12.11 Ringsend FlexGen Impact Assessment

12.11.1 Do-Nothing Impacts

Were the proposed development not to go ahead, there would be no foreseeable impact to heritage assets or archaeology.

12.11.2 Ringsend FlexGen Construction Effects

The connection of a liquid fuel line for the Ringsend FlexGen scheme will require works that cross the Zone of Archaeological Interest of the Ballast Office Wall (MM003). Full details of the works have not yet been specified.

However, this work is expected to be confined entirely within the constraints of modern disturbance by the existing Pigeon House Road and therefore the potential impact on any archaeological deposits or remains is reduced.

No heritage receptors are identified as having the potential to be impacted by the development.

There is the potential for impact to unknown archaeology by any excavation that penetrates below the depth of the made ground layer at the site.

12.11.2.1 Piles

The proposed development falls entirely within an area of reclaimed land. The ground surface is entirely made ground with unestablished depths. Parts of the development will involve piles that

will be bored through the made ground layer and may impact potential archaeology within the ground beneath.

12.11.2.2 Temporary Construction Compounds

The proposed location for the construction compound is sited upon made ground and will have no archaeological impact where it is placed upon the ground surface. It is unlikely that any additional groundworks will be required. However, should any excavation be required, such as for hard-standing, excavation may penetrate through the made ground to impact potential archaeology beneath.

12.11.2.3 Services

Excavations will be required for the installation of services. Although these excavations will be shallow, the variation in depth of the made ground presents the potential for the disturbance of archaeological deposits where excavations penetrate below the made ground layer.

The installation of a liquid fuel line across Pigeon House Road to the north of the Site carries a low risk of disturbance to archaeological deposits, particularly relating to the Ballast Office Wall.

12.11.2.4 Cranes

Where cranes are placed within the footprint of the proposed development, they will be entirely upon made ground and are not anticipated to have any impact. If any additional groundworks are required for the installation of hard standing, it is possible that the excavation may penetrate through the made ground to impact potential archaeology beneath.

12.11.3 Ringsend FlexGen Operational Effects

The operation of the proposed FlexGen development will not give rise to emissions or impacts that have the potential to cause direct, indirect or cumulative effects on cultural heritage. Noise generation will not be sufficient to cause any significant impact upon the setting of heritage assets. Therefore, there are no anticipated impacts upon cultural heritage from the operational effects of the development.

12.11.4 Ringsend FlexGen Decommissioning

12.11.4.1 Cranes

Where cranes are placed within the footprint of the proposed development, they will be entirely upon made ground and are not anticipated to have any impact. If any additional groundworks are required for the installation of hard standing, it is possible that the excavation may penetrate through the made ground to impact potential archaeology beneath.

12.12 Ringsend FlexGen Mitigation and Monitoring

12.12.1 Construction Phase

12.12.1.1 Archaeology

The principal risk of impact upon archaeology by the development is from any works that penetrate below the made ground layer. The variation in depth of the made ground layer makes it difficult to predict where excavations might have an impact. It is proposed that a programme of archaeological investigation will be implemented in accordance with an archaeological excavation strategy and methodology. This will be in line with guidance set out by the Department of Arts, Heritage, Gaeltacht and the Islands and agreed with the Dublin City Archaeologist. This will be set out in the CEMP. Where works take place for the installation of utilities within the Zone of Archaeological Interest associated with The South Wall (Ballast Office Wall), the works will be archaeologically monitored.

12.12.1.2 Temporary Construction Compounds

Where construction compounds require any sub-surface works that will penetrate to a depth below that of the made ground, any excavation work will be monitored by a suitably qualified archaeologist.

12.12.1.3 Cranes

Where construction of hard standing for cranes will require sub-surface works to a depth that will penetrate the made ground layer, any excavation work will be monitored by a suitably qualified archaeologist.

12.12.2 Operational Phase

As no cultural heritage impacts have been identified for the operational phase, no mitigation measures are required.

12.12.3 Decommissioning Phase

12.12.3.1 Cranes

Where construction of hard standing for cranes will require sub-surface works to a depth that will penetrate the made ground layer, any excavation work will be monitored by a suitably qualified archaeologist.

12.12.4 Monitoring

Where piles are to be bored through the made ground, they will be archaeologically monitored.

Where construction compounds require sub-surface works to a depth that will penetrate the made ground layer, the excavation work will be archaeologically monitored.

Where construction of hard standing for cranes will require sub-surface works to a depth that will penetrate the made ground layer, the excavation work will be archaeologically monitored.

Where works take place for the installation of utilities within the Zone of Archaeological Interest associated with The South Wall (Ballast Office Wall), the works will be archaeologically monitored.

12.13 South Wall BESS Impact Assessment

12.13.1 Do-Nothing Impacts

Were the proposed development not to go ahead, there would be no foreseeable impact to heritage assets or archaeology.

12.13.2 South Wall BESS Construction Effects

No heritage receptors are identified as having the potential to be impacted by the development.

There is the potential for impact to unknown archaeology by any excavation that penetrates below the depth of the made ground layer at the site.

12.13.2.1 Piles

The proposed development falls entirely within an area of reclaimed land. The ground surface is entirely made ground with unestablished depths. Parts of the development will involve piles that will be bored through the made ground layer and may impact potential archaeology within the ground beneath.

12.13.2.2 Temporary Construction Compounds

The proposed location for the construction compound is sited upon made ground and will have no archaeological impact where it is placed upon the ground surface. It is unlikely that any additional groundworks will be required. However, should any excavation be required, such as for hard-standing, excavation may penetrate through the made ground to impact potential archaeology beneath.

12.13.2.3 Services

Excavations will be required for the installation of services. Although these excavations will be shallow, the variation in depth of the made ground presents the potential for the disturbance of archaeological deposits where excavations penetrate below the made ground layer.

12.13.2.4 Cranes

Where cranes are placed within the footprint of the proposed development, they will be entirely upon made ground and are not anticipated to have any impact. If any additional groundworks are required for the installation of hard standing, it is possible that the excavation may penetrate through the made ground to impact potential archaeology beneath.

12.13.3 South Wall BESS Operational Effects

The operation of the proposed FlexGen development will not give rise to emissions or impacts that have the potential to cause direct, indirect or cumulative effects on cultural heritage. Noise generation will not be sufficient to cause any significant impact upon the setting of heritage assets. Therefore, there are no anticipated impacts upon cultural heritage from the operational effects of the development.

12.13.4 South Wall BESS Decommissioning

12.13.4.1 Cranes

Where cranes are placed within the footprint of the proposed development, they will be entirely upon made ground and are not anticipated to have any impact. If any additional groundworks are required for the installation of hard standing, it is possible that the excavation may penetrate through the made ground to impact potential archaeology beneath.

12.14 South Wall BESS Mitigation and Monitoring

12.14.1 Construction Phase

12.14.1.1 Archaeology

The principal risk of impact upon archaeology by the development is from any works that penetrate below the made ground layer. The variation in depth of the made ground layer makes it difficult to predict where excavations might have an impact. It is proposed that a programme of archaeological investigation will be implemented in accordance with an archaeological excavation strategy and methodology. This will be in line with guidance set out by the Department of Arts, Heritage, Gaeltacht and the Islands and agreed with the Dublin City Archaeologist. This will be set out in the CEMP.

12.14.1.2 Temporary Construction Compounds

Where construction compounds require any sub-surface works that will penetrate to a depth below that of the made ground, any excavation work will be monitored by a suitably qualified archaeologist.

12.14.1.3 Cranes

Where construction of hard standing for cranes will require sub-surface works to a depth that will penetrate the made ground layer, any excavation work will be monitored by a suitably qualified archaeologist.

12.14.2 Operational Phase

As no cultural heritage impacts have been identified for the operational phase, no mitigation measures are required.

12.14.3 Decommissioning Phase

12.14.3.1 Cranes

Where construction of hard standing for cranes will require sub-surface works to a depth that will penetrate the made ground layer, any excavation work will be monitored by a suitably qualified archaeologist.

12.14.4 Monitoring

Where piles are to be bored through the made ground, they will be archaeologically monitored.

Where construction compounds require sub-surface works to a depth that will penetrate the made ground layer, the excavation work will be archaeologically monitored.

Where construction of hard standing for cranes will require sub-surface works to a depth that will penetrate the made ground layer, the excavation work will be archaeologically monitored.

12.15 Cumulative Effects

12.15.1 Poolbeg FlexGen and Poolbeg BESS

Potential cumulative effects from the developments will be entirely within simultaneous construction phases within the Poolbeg FlexGen and Poolbeg BESS developments. It is anticipated that the construction phases will result in an increase in noise and vibration. The increased impact of noise is not anticipated to be sufficient to cause any change in the overall impact to the setting of heritage assets, which will remain not significant. There will also be a potential increase in vibration but, given the low predicted levels, this is not anticipated to be sufficient to change the overall impact. The proposed monitoring should remain sufficient to ensure that vibration levels do not cause any impacts.

12.15.2 Ringsend FlexGen and South Wall BESS

There are no anticipated changes to impacts from the Ringsend FlexGen and South Wall BESS developments resulting from cumulative effects of the schemes, either through direct impacts from noise and vibrations or changes to the setting of heritage assets.

Table 12.13: Summary of potential Cumulative Effects

	Poolbeg FlexGen	Poolbeg BESS	Ringsend FlexGen	South Wall BESS
Poolbeg FlexGen		Increase in noise and vibration during construction phase. No change in overall impact.	No change	No change
Poolbeg BESS	Increase in noise and vibration during construction phase. No change in overall impact.		No change	No change
Ringsend FlexGen	No change	No change		No change
South wall BESS	No change	No change	No change	

12.16 Summary of Mitigation and Monitoring

The summary of mitigation and monitoring measures for the four proposed developments are outlined in Chapter 18.

12.17 Summary of Significant Residual Effects

Based on the assessment provided within this chapter, all four of the Proposed Developments located on the Poolbeg Peninsula are not considered to give rise to any significant effects on Architecture, Archaeology or Cultural Heritage.

13 Air Quality and Climate

13.1 Introduction

13.2 Assessment Methodology

13.2.1 Criteria for Rating of Impacts

13.2.1.1 Description of Impacts

The significance criteria used throughout this assessment to describe the impacts to air quality and climate are based on the general terminology outlined within the EPA Guidance document *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* (EPA, 2017). The sections below discuss the relevant standards and guidelines relating to air quality and climate which were applied for the purpose of this assessment when rating the significance of predicted impacts.

13.2.1.2 Ambient Air Quality Standards

In order to reduce the risk to health from poor air quality, 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 13.1).

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 the pollutants NO₂, CO, PM₁₀, and PM_{2.5} 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) and also includes ambient limit values relating to PM_{2.5}.

Table 13.1 Air Quality Standards Regulations 2011 (based on EU Council Directive 2008/50/EC)

Pollutant	Regulation	Limit Type	Value
Nitrogen Dioxide (NO ₂)	2008/50/EC	Hourly limit for protection of human health - not to be exceeded more than 18 times/year	200 µg/m ³ NO ₂
		Annual limit for protection of human health	40 µg/m ³ NO ₂
		Critical annual limit for protection of vegetation	30 µg/m ³ NO + NO ₂
Sulphur Dioxide (SO ₂)	2008/50/EC	Hourly limit for protection of human health - not to be exceeded more than 24 times/year	350 µg/m ³ SO ₂
		Daily limit for protection of human health - not to be exceeded more than 3 times/year	125 µg/m ³ SO ₂
		Critical annual and winter limit for protection of vegetation	20 µg/m ³ SO ₂
Carbon Monoxide (CO)	2008/50/EC	8-hour limit (on a rolling basis) for protection of human health	10 mg/m ³ (8.6 ppm)
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}

13.2.1.3 Gothenburg Protocol

In 1999, Ireland signed the Gothenburg Protocol to the 1979 UN Convention on Long Range Transboundary Air Pollution. In 2012, the Gothenburg Protocol was revised to include national emission reduction commitments for the main air pollutants to be achieved in 2020 and beyond and to include emission reduction commitments for PM_{2.5}. In relation to Ireland, 2020 emission targets are 25 kt for SO₂ (65% below 2005 levels), 65 kt for NO_x (49% reduction), 43 kt for VOCs (25% reduction), 108 kt for NH₃ (1% reduction) and 10 kt for PM_{2.5} (18% reduction).

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 EU in 2010 indicated that Ireland complied with the emissions ceilings for SO₂, VOCs and NH₃ but failed to comply with the ceiling for NO_x. 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}.

13.2.1.4 Climate Agreements

Ireland ratified the United Nations Framework Convention on Climate Change in April 1994 (UNFCCC, 1992) 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 December 2019 and focussed on advancing the implementation of the Paris Agreement. The Paris Agreement (UNFCCC, 2015) 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 has also been made on elevating adaption onto the same level as action to cut and curb emissions.

The EU, on the 23rd/24th of October 2014, agreed the "2030 Climate and Energy Policy Framework" (European Commission, 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 Emission Trading Development (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.

In March 2020 the European Commission unveiled its proposal for a legally binding commitment to reach net-zero greenhouse gas emissions by 2050. While the European Climate Law contains no concrete proposals for an enhanced mid-term target, the proposal suggests the European Commission is looking at a September deadline for finalising its "impact assessed plan" to raise the 2030 target to 50-55% (European Commission, 2020).

The "National Energy and Climate Plan (NECP) 2021-2030" (Government of Ireland, 2020) was published in August 2020. The plan outlines the roadmap for meeting the legal energy and climate obligations including a 30% reduction target in greenhouse gas emissions from the non-ETS sectors including transport, buildings, agriculture and waste management.

13.2.2 Methodology for Assessing Construction Phase Impacts

13.2.2.1 Air Quality

The current assessment focused firstly on identifying the existing baseline levels of NO₂, CO, and SO₂ in the region of the proposed development by an assessment of EPA monitoring data.

Thereafter, the impact of the construction phase of the development on air quality was determined by a qualitative assessment of the nature, scale and duration of dust generating construction activities associated with the proposed development and determining the sensitivity of the surrounding area to potential dust impacts.

13.2.2.2 Climate

The impact of the construction phase of the development on climate was determined by a qualitative assessment of the nature, scale and duration of greenhouse gas generating construction activities associated with the proposed development.

13.2.3 Methodology for Assessing Operational Phase Impacts

13.2.3.1 Climate Methodology

The existing and proposed facilities, as electricity providers, form part of the EU-wide Emission Trading Scheme (ETS) and thus greenhouse gas emission from these electricity generators are not included when determining compliance with the targeted 20% reduction in the non-ETS sector i.e. electricity associated greenhouse gas emissions will not count towards the Effort Sharing Decision (406/2009/EC) target (European Parliament and Council of Europe, 2009).

Thus, the electricity generation will have no impact on Ireland's obligation to meet the EU Effort Sharing Decision, which is set at a 20% reduction in non-Emission Trading Scheme (non-ETS) greenhouse gas emissions by 2020 relative to the 2005 levels.

In terms of future obligations (after 2020) under the "2030 Climate and Energy Policy Framework", the European Council (EC, 2014) 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 sector amounting to 43% by 2030 compared to 2005. Thus, the EU policy of operating the ETS (on an EU-wide basis) for large industrial emitters including electricity generators will continue up to 2030 as a minimum and thus electricity generation will have no impact on the non-ETS targets up to 2030.

13.2.3.2 Air Quality Methodology

Air dispersion modelling was carried out using the United States Environmental Protection Agency's regulated model AERMOD (USEPA, 2017, 2019). The AERMOD model has USEPA regulatory status and is one of the advanced models recommended within the air modelling guidance document 'Air Dispersion Modelling from Industrial Installations Guidance Note (AG4)' published by the EPA in Ireland (EPA, 2020a). Further information on the background of the AERMOD modelling assessment can be found in Appendix 13. The modelling of air emissions from the site was carried out to assess concentrations of nitrogen dioxide (NO₂) and carbon monoxide (CO) at a variety of locations beyond the site boundary. In addition to assessing the process emissions from the proposed development, a cumulative scenario has also been assessed based on the proposed development and the permitted neighbouring facilities being operational at the same time.

The dispersion modelling study consisted of the following components:

- Review of emissions data and other relevant information needed for the modelling study;
- Review of background ambient air quality in the vicinity of the facility;
- Air dispersion modelling of significant substances released from the facility;
- Identification of predicted concentrations of released substances beyond the site boundary;

- Evaluation of the environmental significance of these predicted concentrations, including consideration of whether these concentrations are likely to exceed relevant ambient air quality standards and guidelines.

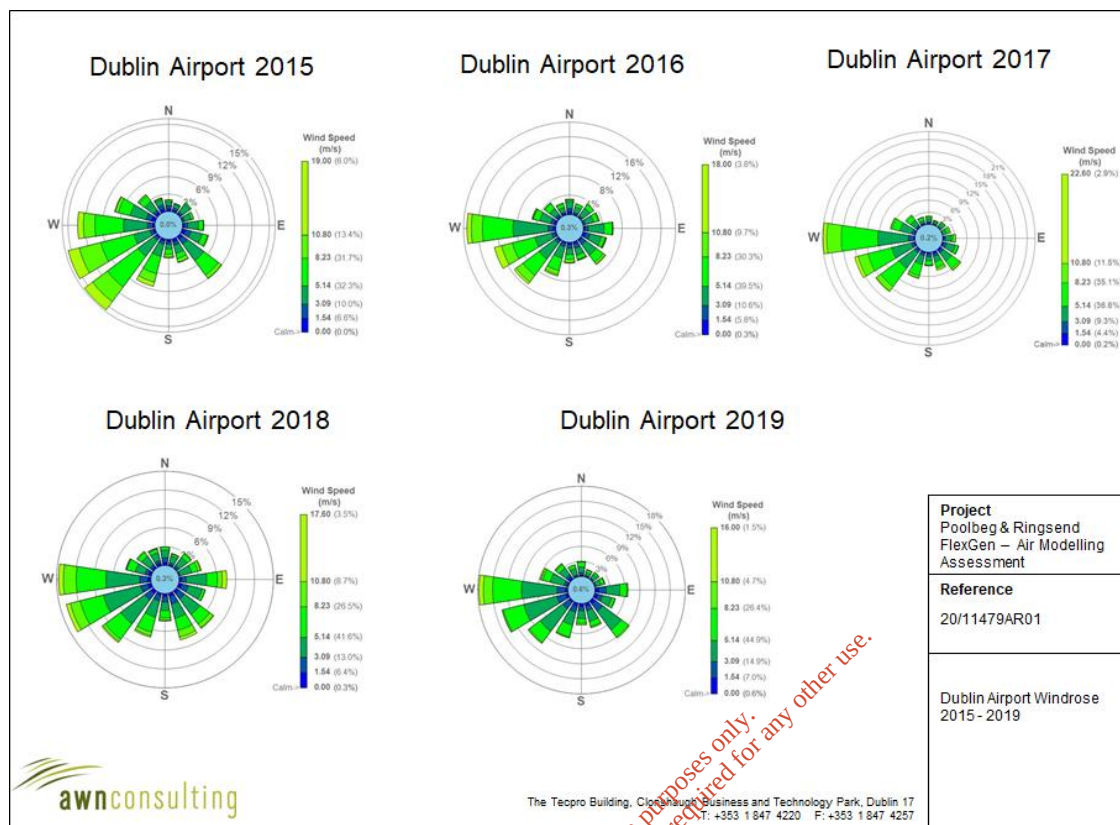
The air dispersion modelling input data consisted of information on the physical environment, design details for all relevant emission points and five full years of meteorological data. Using this input data, the model predicted ambient air pollutant concentrations beyond the site boundary for each hour of the modelled meteorological years. This study adopted a conservative approach which will lead to an over-estimation of the actual levels that will arise.

The AERMOD model incorporated the following features:

- Receptor grids were created at which concentrations would be modelled. Receptors were mapped with sufficient resolution to ensure all localised “hot-spots” were identified without adding unduly to processing time. The receptor grids were based on a Cartesian grid with the site at the centre.
- All on-site buildings and significant process structures were mapped into the model to create a three-dimensional visualisation of the site and its emission points. The buildings and structures from the adjacent Dublin Waste-To-Energy facility were also included. Buildings and process structures can influence the passage of airflow over the emission stacks and draw plumes down towards the ground (termed building downwash). The stacks themselves can influence airflow in the same way as buildings by causing low pressure regions behind them (termed stack-tip downwash). Both building and stack-tip downwash were incorporated into the modelling. Due to the proximity of the proposed emission points to the proposed buildings and structures, the Plume Rise Model Enhancements (PRIME) Building Downwash Program (BPIP Prime) (USEPA, 1999) has been incorporated into the model to determine the influence (wake effects) of these buildings and structures on dispersion in each wind direction considered.
- Hourly-sequenced meteorological information has been used in the model covering the years 2015 - 2019 from Dublin Airport Meteorological Station as shown in Figure 13.1. The data is publicly available from Met Eireann (www.met.ie). A primary requirement for the meteorological data used for air dispersion modelling is that the data used should have a data capture of greater than 90% for all parameters. Dublin Airport meteorological station collects data in the correct format and has a data collection of greater than 90% and thus, was selected as the most appropriate station for use in the model. AERMOD incorporates a meteorological pre-processor AERMET (USEPA, 2018a) which allows AERMOD to account for changes in the plume behaviour with height using information on the surface characteristics of the site.
- Terrain has been mapped out in the model as using SRTM (Shuttle Radar Topography Mission) data with 30m resolution. All terrain features have been mapped in detail into the model using the terrain pre-processor AERMAP (USEPA, 2018b).

The contour patterns shown in the figures in this report which are a representation of the variation in ambient ground level pollutant concentrations beyond the site boundary, is a function of several interacting parameters. Wind speed and direction are important in determining offsite ambient concentrations. However, building downwash is also an important consideration and for each emission point the relative position of the stack to the dominant building will be important and will lead to variations in the

Figure 13.1: Dublin Airport Windrose 2015 – 2019



13.3 Baseline Environment

13.3.1 General Baseline Air Quality

Air quality monitoring programs have been undertaken in recent years by the EPA and Local Authorities (EPA, 2019, 2020b). The most recent annual report on air quality “Air Quality Monitoring Annual Report 2018” (EPA, 2019), details the range and scope of monitoring undertaken throughout Ireland. As part of the implementation of the Framework Directive on Air Quality (1996/62/EC), four air quality zones have been defined in Ireland for air quality management and assessment purposes (EPA, 2019). 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, Poolbeg is categorised as Zone A (EPA, 2019).

With regard to NO₂, continuous monitoring data from the EPA (EPA, 2019), at suburban (non-road) Zone A locations in Rathmines, Ringsend, Dun Laoghaire, 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 16 – 24 µg/m³ in 2018 (see Table 13.2). Sufficient data is available for the stations in Rathmines, Ballyfermot, Dun Laoghaire and Swords to observe the long-term trend since 2014 (EPA, 2019) (see Table 13.2), with results ranging from 15 – 20 µg/m³ and few exceedances of the one-hour limit value and with an average annual mean for Rathmines for this period (2014 - 2018) of 18 µg/m³.

The EIAR for the proposed development at the Former IGB & Fabrizia Sites, Poolbeg West, Dublin 4, published in June 2019, has been reviewed. The EIAR Air Quality & Climate Chapter (Chapter 9) has modelled the impact of the proposed scheme on ambient levels of NO₂ for both 2021 and 2036 based on the full build-out of the development. The results of this assessment found that the maximum predicted increase in ambient NO₂ levels at the nearest residential receptor was 0.24 µg/m³. Thus, the proposed increase was deemed to be negligible. Based on these results, a conservative estimate of the background NO₂ concentration in the region of the proposed development in 2020 is 24 µg/m³.

Table 13.2 Annual Mean NO₂ Concentrations In Representative Zone A Locations 2014 - 2018 (µg/m³)

Year	Rathmines	Ballyfermot	Ringsend	Swords	Dun Laoghaire
2014	17	16	-	14	15
2015	18	16	-	13	16
2016	20	17	-	16	19
2017	17	17	22	14	17
2018	20	17	27	16	19
Average	18	17	24	15	17

Continuous SO₂ monitoring carried out at the suburban background locations of Rathmines, Tallaght and Ringsend showed annual mean concentrations ranging from 2 – 3 µg/m³ in 2018 (see Table 13.3), with no exceedances of the daily or hourly limit values of 125 µg/m³ (3 daily exceedances are permitted per year) and 350 µg/m³ (24 hourly exceedances are permitted per year) (EPA, 2019). Based on this information, the estimated background SO₂ concentration in the region of the proposed development in 2020 is 4 µg/m³.

Table 13.3 Annual Mean SO₂ Concentrations In Representative Zone A Locations 2014 - 2018 (µg/m³)

Year	Rathmines	Tallaght	Ringsend
2014	3	6	-
2015	2	3	-
2016	2	2	-
2017	2	2	4
2018	2	2	3
Average	2	3	4

CO concentrations for the urban Zone A monitoring stations of Winetavern Street and Coleraine Street between 2014 and 2018, averaged 2.3 mg/m³ for the 8-hour maximum value (EPA, 2019) (as outlined in Table 13.4). This is significantly below the 10 mg/m³ limit value. Based on this information, a conservative background CO concentration in the region of the proposed development in 2020 is 3 mg/m³.

Table 13.4 Maximum 8-Hour CO Concentrations In Representative Zone A Locations 2014 - 2018 (mg/m³)

Year	Winetavern Street	Coleraine Street

2014	2.4	2.5
2015	2.0	3.0
2016	1.9	2.3
2017	2.3	2.9
2018	1.8	-
Average	2.1	2.7

In summary, existing baseline levels of the pollutants based on extensive long-term data from the EPA are expected to be below ambient air quality limit values in the vicinity of the proposed development.

13.3.2 Poolbeg FlexGen

As the Poolbeg FlexGen is located in the Poolbeg Peninsula, the general baseline environment is as described in 13.3.1.

Modelling of the *Existing Scenario* is detailed in Table 13.5. The existing environment for the Poolbeg FlexGen is the typical operation of the Poolbeg Generating Plant. Full details of the modelled operational scenario are outlined in Appendix 13.

The results indicate that the ambient ground level concentrations are below the relevant air quality limit values for NO₂. Emissions from the facility including background lead to an ambient NO₂ concentration which is 61% of the maximum 1-hour limit value (measured as a 99.8thile) and 36% of the annual limit value at the worst-case off-site receptor for the worst-case year modelled (2018).

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Table 13.5 Modelled NO₂ Concentrations for the *Existing Scenario* – Poolbeg Generating Plant (µg/m³)

Pollutant/ Scenario / Year	Averaging Period	Process Contribution NO ₂ (µg/m ³)	Backgrou nd Concentr ation (µg/m ³)	Predicted Emission Concentrat ion - PEC NO ₂ (µg/Nm ³)	Limit Values (µg/Nm ³)	PEC as a % of Limit Value
NO ₂ / Existing / 2015	Annual Mean	0.43	24	24.43	40	61%
	99.8th%ile of 1-hr means	24.70	48	72.70	200	36%
NO ₂ / Existing / 2016	Annual Mean	0.39	24	24.39	40	61%
	99.8th%ile of 1-hr means	24.00	48	72.00	200	36%
NO ₂ / Existing / 2017	Annual Mean	0.36	24	24.36	40	61%
	99.8th%ile of 1-hr means	23.90	48	71.90	200	36%
NO ₂ / Existing / 2018	Annual Mean	0.52	24	24.52	40	61%
	99.8th%ile of 1-hr means	24.70	48	72.70	200	36%
NO ₂ / Existing / 2019	Annual Mean	0.39	24	24.39	40	61%
	99.8th%ile of 1-hr means	23.10	48	71.10	200	36%

Note 1 The short-term peaks are assumed to have an ambient background concentration of twice the annual mean background concentration

13.3.3 Poolbeg BESS

As the Poolbeg BESS is located in the same general vicinity as the Poolbeg FlexGen, the baseline environment is as described in 13.3.1.

13.3.4 Ringsend FlexGen

As the Ringsend FlexGen is located in the Poolbeg Peninsula, the general baseline environment is as described in 13.3.1.

Modelling of the *Existing Scenario* is detailed in Table 13.6. The existing environment for the Ringsend FlexGen is the typical operation of the Dublin Bay Power Plant. Full details of the modelled operational scenario are outlined in Appendix 13.

The results indicate that the ambient ground level concentrations are below the relevant air quality limit values for NO₂. Emissions from the facility including background lead to an ambient NO₂ concentration which is 36% of the maximum 1-hour limit value (measured as a 99.8th%ile) and 61% of the annual limit value at the worst-case off-site receptor for the worst-case year modelled (2018).

Table 13.6 Modelled NO₂ Concentrations for the *Existing Scenario* – Dublin Bay Power Plant (µg/m³)

Pollutant/ Scenario / Year	Averaging Period	Process Contribution on NO ₂ (µg/m ³)	Background Concentration (µg/m ³)	Predicted Emission Concentration - PEC NO ₂ (µg/Nm ³)	Limit Values (µg/Nm ³)	PEC as a % of Limit Value
NO ₂ / Existing / 2015	Annual Mean	0.28	24	24.28	40	61%
	99.8th%ile of 1-hr means	17.20	48	65.20	200	33%
NO ₂ / Existing / 2016	Annual Mean	0.41	24	24.41	40	61%
	99.8th%ile of 1-hr means	20.20	48	68.20	200	34%
NO ₂ / Existing / 2017	Annual Mean	0.32	24	24.32	40	61%
	99.8th%ile of 1-hr means	22.80	48	70.80	200	35%
NO ₂ / Existing / 2018	Annual Mean	0.58	24	24.58	40	61%
	99.8th%ile of 1-hr means	23.90	48	71.90	200	36%
NO ₂ / Existing / 2019	Annual Mean	0.31	24	24.31	40	61%
	99.8th%ile of 1-hr means	20.70	48	68.70	200	34%

Note 1 The short-term peaks are assumed to have an ambient background concentration of twice the annual mean background concentration

13.3.5 South Wall BESS

As the South Wall BESS is located in the same general vicinity as the Poolbeg FlexGen, the baseline environment is as described in 13.3.1.

13.4 Poolbeg FlexGen Impact Assessment

13.4.1 Poolbeg FlexGen Construction Effects

13.4.1.1 Climate

Impacts to climate during the construction phase are deemed short-term and imperceptible.

13.4.1.2 Air Quality

Provided the dust mitigation measures outlined in Section 13.5 are adhered to, the impact on air quality and dust in particular during construction will not be significant.

13.4.2 Poolbeg FlexGen Operational Effects

13.4.2.1 Conservative Operational Scenario – NO₂

Modelling of the *Conservative Operational Scenario* is detailed in Table 13.7 for NO₂ emissions. The proposed environment for the Poolbeg FlexGen is the typical operation of the Poolbeg Generating Plant and the concurrent operation of the Poolbeg FlexGen. Full details of the modelled operational scenario are outlined in Appendix 13.

The Poolbeg FlexGen NO₂ modelling results for the Conservative Operational Scenario are detailed in Table 13.7. The results indicate that the ambient ground level concentrations are below the relevant air quality limit values for NO₂. Emissions from the facility including background lead to an ambient NO₂ concentration which is 36% of the maximum 1 hour limit value (measured as a 99.8th%ile) and 61% of the annual limit value at the worst-case off-site receptor for the worst-case year modelled (2018).

The geographical variations in ground level NO₂ concentrations (without background) beyond the facility boundary for the worst-case year modelled are illustrated as concentration contours in Figures 13.2 and 13.3. The contents of each figure are described below:

Figure 13.2: Conservative Operational Scenario: Predicted NO₂ 99.8th Percentile of Hourly Concentrations (2018)



Figure 13.3: Conservative Operational Scenario: Predicted Annual Mean NO₂ Concentrations (2018)



Table 13.7 Modelled NO₂ Concentrations for the *Conservative Operational Scenario* – Poolbeg FlexGen (µg/m³)

Pollutant/ Scenario / Year	Averaging Period	Process Contribution NO ₂ (µg/m ³)	Background Concentration (µg/m ³)	Predicted Emission Concentration - PEC NO ₂ (µg/Nm ³)	Limit Values (µg/Nm ³)	PEC as a % of Limit Value
NO ₂ / Cons. Operation/ 2015	Annual Mean	0.43	24	24.43	40	61%
	99.8th%ile of 1-hr means	24.80	48	72.80	200	36%
NO ₂ / Cons. Operation/ 2016	Annual Mean	0.40	24	24.40	40	61%
	99.8th%ile of 1-hr means	24.00	48	72.00	200	36%
NO ₂ / Cons. Operation/ 2017	Annual Mean	0.37	24	24.37	40	61%
	99.8th%ile of 1-hr means	23.90	48	71.90	200	36%
NO ₂ / Cons. Operation/ 2018	Annual Mean	0.53	24	24.53	40	61%
	99.8th%ile of 1-hr means	24.70	48	72.70	200	36%
NO ₂ / Cons. Operation/ 2019	Annual Mean	0.40	24	24.40	40	61%
	99.8th%ile of 1-hr means	23.10	48	71.10	200	36%

Note 1 The short-term peaks are assumed to have an ambient background concentration of twice the annual mean background concentration

Figure 13.4 Poolbeg FlexGen Conservative Operational Scenario: Predicted NO₂ 99.8th Percentile of Hourly Concentrations (2018)



Figure 13.5 Poolbeg FlexGen Conservative Operational Scenario: Predicted NO₂ Annual Mean Concentrations (2018)



13.4.2.2 Worst-case Scenario – NO₂

The Poolbeg FlexGen NO₂ modelling results for the *Worst-case Gas Scenario* are detailed in Table 13.8 for NO₂ emissions. The results indicate that the ambient ground level concentrations are below the relevant air quality limit values for NO₂. Emissions from the facility including background lead to an ambient NO₂ concentration which is 36% of the maximum 1-hour limit value (measured as a 99.8th percentile) and 62% of the annual limit value at the worst-case off-site receptor for the worst-case year modelled (2018).

Table 13.8 Modelled NO₂ Concentrations for the Worst-case Scenario – Poolbeg FlexGen (µg/m³)

Pollutant/ Scenario / Year	Averaging Period	Process Contribution NO ₂ (µg/m ³)	Background Concentration (µg/m ³)	Predicted Emission Concentration - PEC NO ₂ (µg/Nm ³)	Limit Values (µg/Nm ³)	PEC as a % of Limit Value
NO ₂ / WC Gas / 2015	Annual Mean	0.45	24	24.45	40	61%
	99.8th%ile of 1-hr means	24.80	48	72.80	200	36%
NO ₂ / WC Gas / 2016	Annual Mean	0.47	24	24.47	40	61%
	99.8th%ile of 1-hr means	24.00	48	72.00	200	36%
NO ₂ / WC Gas / 2017	Annual Mean	0.40	24	24.40	40	61%
	99.8th%ile of 1-hr means	23.90	48	71.90	200	36%
NO ₂ / WC Gas / 2018	Annual Mean	0.65	24	24.65	40	62%
	99.8th%ile of 1-hr means	24.70	48	72.70	200	36%
NO ₂ / WC Gas / 2019	Annual Mean	0.43	24	24.43	40	61%
	99.8th%ile of 1-hr means	23.10	48	71.10	200	36%
Note 1	The short-term peaks are assumed to have an ambient background concentration of twice the annual mean background concentration					

13.4.2.3 Conservative Operational Scenario – Carbon Monoxide

Modelling of the *Conservative Operational Scenario* is detailed in Table 13.9 for CO emissions. The proposed environment for the Poolbeg FlexGen is the typical operation of the Poolbeg Generating Plant and the concurrent operation of the Poolbeg FlexGen. Full details of the modelled operational scenario are outlined in Appendix 13.

The Poolbeg FlexGen CO modelling results for the Conservative Operational Scenario are detailed in Table 13.9. The results indicate that the ambient ground level concentrations are below the relevant air quality limit value for CO. Emissions from the facility including background lead to an ambient CO concentration which is 31% of the maximum 8 hour limit value at the worst-case off-site receptor for the worst-case year modelled (2018).

Table 13.9 Modelled CO Concentrations for the *Conservative Operational Scenario* – Poolbeg FlexGen ($\mu\text{g}/\text{m}^3$)

Pollutant/ Scenario / Year	Averaging Period	Process Contribution NO_2 ($\mu\text{g}/\text{m}^3$)	Background Concentration ($\mu\text{g}/\text{m}^3$)	Predicted Emission Concentration - PEC NO_2 ($\mu\text{g}/\text{Nm}^3$)	Limit Values ($\mu\text{g}/\text{Nm}^3$)	PEC as a % of Limit Value
CO / Cons. Operation/ 2015	Maximum 8 Hour Mean	0.05	3	3.05	10	30.5%
CO/ Cons. Operation/ 2016	Maximum 8 Hour Mean	0.08	3	3.08	10	30.8%
CO / Cons. Operation/ 2017	Maximum 8 Hour Mean	0.09	3	3.09	10	30.9%
CO / Cons. Operation/ 2018	Maximum 8 Hour Mean	0.10	3	3.10	10	31.0%
CO / Cons. Operation/ 2019	Maximum 8 Hour Mean	0.07	3	3.07	10	30.7%

13.4.2.4 Worst-case Scenario – CO

The Poolbeg FlexGen CO modelling results for the *Worst-case Gas Scenario* are detailed in Table 13.10 for CO emissions. The results indicate that the ambient ground level concentrations are below the relevant air quality limit value for CO. Emissions from the facility including background lead to an ambient CO concentration which is 31% of the maximum 8-hour limit value at the worst-case off-site receptor for the worst-case year modelled (2018).

Table 13.10 Modelled CO Concentrations for the *Worst-case Scenario* – Poolbeg FlexGen ($\mu\text{g}/\text{m}^3$)

Pollutant/ Scenario / Year	Averaging Period	Process Contribution NO_2 ($\mu\text{g}/\text{m}^3$)	Background Concentration ($\mu\text{g}/\text{m}^3$)	Predicted Emission Concentration - PEC NO_2 ($\mu\text{g}/\text{Nm}^3$)	Limit Values ($\mu\text{g}/\text{Nm}^3$)	PEC as a % of Limit Value
CO / WC Gas / 2015	Maximum 8 Hour Mean	0.04	3	3.04	10	30.4%
CO / WC Gas / 2016	Maximum 8 Hour Mean	0.06	3	3.06	10	30.6%
CO / WC Gas / 2017	Maximum 8 Hour Mean	0.06	3	3.06	10	30.6%
CO / WC Gas / 2018	Maximum 8 Hour Mean	0.06	3	3.06	10	30.6%
CO / WC Gas / 2019	Maximum 8 Hour Mean	0.05	3	3.05	10	30.5%

13.4.3 Poolbeg FlexGen Decommissioning

Should the Poolbeg FlexGen plant be decommissioned the equipment will be dismantled and removed from site and the site left as a level platform. A Decommissioning Management Plan (DMP) will be prepared in accordance with the IE licence.

13.4.3.1 Climate

Impacts to climate during the decommissioning phase are deemed short-term and imperceptible.

13.4.3.2 Air Quality

Impacts to air quality during the decommissioning phase are deemed short-term and imperceptible.

13.5 Poolbeg FlexGen Mitigation and Monitoring

The objective of dust control at the site is to ensure that no significant nuisance occurs at nearby sensitive receptors. In order to develop a workable and transparent dust control strategy, the following management plan has been formulated by drawing on best practice guidance from Ireland, the UK and the USA based on the following publications:

- 'Guidance on the Assessment of Dust from Demolition and Construction' (IAQM, 2014);
- 'Planning Advice Note PAN50 Annex B: Controlling The Environmental Effects Of Surface Mineral Workings Annex B: The Control of Dust at Surface Mineral Workings' (The Scottish Office, 1996);
- 'Controlling the Environmental Effects of Recycled and Secondary Aggregates Production Good Practice Guidance' (UK Office of Deputy Prime Minister, 2002);
- 'Controlling Particles, Vapours & Noise Pollution From Construction Sites' (BRE, 2003);
- Fugitive Dust Technical Information Document for the Best Available Control Measures' (USEPA, 1997); and
- 'Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition' (periodically updated) (USEPA, 1986).

13.5.1 Site Management

The aim is to ensure good site management by avoiding dust becoming airborne at source. This will be done through good design and effective control strategies.

At the construction planning stage, the siting of activities and storage piles will take note of the location of sensitive receptors and prevailing wind directions in order to minimise the potential for significant dust nuisance (see **Error! Reference source not found.** for the windrose for Dublin Airport). As the prevailing wind is predominantly westerly to south-westerly, locating construction compounds and storage piles downwind (to the east or north-east) of sensitive receptors will minimise the potential for dust nuisance to occur at sensitive receptors.

Good site management will include the ability to respond to adverse weather conditions by either restricting operations on-site or quickly implementing effective control measures before the potential for nuisance occurs. When rainfall is greater than 0.2mm/day, dust generation is generally suppressed (UK Office of Deputy Prime Minister (2002), BRE (2003)). The potential for significant dust generation is also reliant on threshold wind speeds of greater than 10 m/s (19.4 knots) (at 7m above ground) to release loose material from storage piles and other exposed materials (USEPA, 1986). Particular care should be taken during periods of high winds (gales) as these are periods where the potential for significant dust emissions are highest. The prevailing meteorological conditions in the vicinity of the site are favourable in general for the suppression of dust for a significant period of the year. Nevertheless, there will be infrequent periods where care will be needed to ensure that dust nuisance does not occur. The following

measures shall be taken in order to avoid dust nuisance occurring under unfavourable meteorological conditions:

- The Principal Contractor or equivalent will monitor the contractors' performance to ensure that the proposed mitigation measures are implemented, and that dust impacts and nuisance are minimised;
- During working hours, dust control methods will be monitored as appropriate, depending on the prevailing meteorological conditions;
- The name and contact details of a person to contact regarding air quality and dust issues shall be displayed on the site boundary, this notice board will also include head/regional office contact details;
- A complaints register will be kept on site detailing all telephone calls and letters of complaint received in connection with dust nuisance or air quality concerns, together with details of any remedial actions carried out;
- It is the responsibility of the contractor at all times to demonstrate full compliance with the dust control conditions herein;
- The procedures put in place will be reviewed at regular intervals and monitoring conducted and recorded by the principal contractor. It is recommended that reviews are conducted on a monthly basis as a minimum.

The dust minimisation measures shall be reviewed at regular intervals during the works to ensure the effectiveness of the procedures in place and to maintain the goal of minimisation of dust through the use of best practice and procedures. In the event of dust nuisance occurring outside the site boundary, site activities will be reviewed and satisfactory procedures implemented to rectify the problem. Specific dust control measures to be employed are described below.

13.5.2 Site Roads / Haulage Routes

Movement of construction trucks along site roads (particularly unpaved roads) can be a significant source of fugitive dust if control measures are not in place. The most effective means of suppressing dust emissions from unpaved roads is to apply speed restrictions. Studies show that these measures can have a control efficiency ranging from 25 to 80% (UK Office of Deputy Prime Minister, 2002).

- A speed restriction of 20 km/hr will be applied as an effective control measure for dust for on-site vehicles using unpaved site roads;
- Access gates to the site shall be located at least 10m from sensitive receptors where possible;
- 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 shall be conducted during sustained dry periods to ensure that unpaved areas are kept moist. The required application frequency will vary according to soil type, weather conditions and vehicular use; and
- Any hard surface roads will be swept to remove mud and aggregate materials from their surface while any unsurfaced roads shall be restricted to essential site traffic only.

13.5.3 Land Clearing / Earth Moving

Land clearing / earth-moving works during periods of high winds and dry weather conditions can be a significant source of dust.

- During dry and windy periods, and when there is a likelihood of dust nuisance, watering shall be conducted to ensure moisture content of materials being moved is high enough to increase the stability of the soil and thus suppress dust; and
- During periods of very high winds (gales), activities likely to generate significant dust emissions shall be postponed until the gale has subsided.

13.5.4 Storage Piles

- The location and moisture content of storage piles are important factors which determine their potential for dust emissions;
- Overburden material will be protected from exposure to wind by storing the material in sheltered regions of the site. Where possible storage piles should be located downwind of sensitive receptors;
- Regular watering will take place to ensure the moisture content is high enough to increase the stability of the soil and thus suppress dust. The regular watering of stockpiles has been found to have an 80% control efficiency (UK Office of Deputy Prime Minister, 2002); and
- Where feasible, hoarding will be erected around site boundaries to reduce visual impact. This will also have an added benefit of preventing larger particles from impacting on nearby sensitive receptors.

13.5.5 Site Traffic on Public Roads

Spillage and blow-off of debris, aggregates and fine material onto public roads will be reduced to a minimum by employing the following measures:

- Vehicles delivering or collecting material with potential for dust emissions shall be enclosed or covered with tarpaulin at all times to restrict the escape of dust;
- At the main site traffic exits, a wheel wash facility shall be installed. All trucks leaving the site must pass through the wheel wash.
- Public roads outside the site shall be regularly inspected for cleanliness, as a minimum on a daily basis, and cleaned as necessary.

13.5.6 Summary of Dust Mitigation Measures

The pro-active control of fugitive dust will ensure that the prevention of significant emissions, rather than an inefficient attempt to control them once they have been released, will contribute towards the satisfactory performance of the contractor. The key features with respect to control of dust will be:

- The specification of a site policy on dust and the identification of the site management responsibilities for dust issues;
- The development of a documented system for managing site practices with regard to dust control;
- The development of a means by which the performance of the dust minimisation plan can be regularly monitored and assessed; and
- The specification of effective measures to deal with any complaints received.

13.6 Poolbeg BESS Impact Assessment

13.6.1 Poolbeg BESS Construction Effects

13.6.1.1 Climate

Impacts to climate during the construction phase are deemed short-term and imperceptible.

13.6.1.2 Air Quality

Provided the dust mitigation measures outlined in Section 13.5 are adhered to, the impact on air quality and dust in particular during construction will not be significant.

13.6.2 Poolbeg BESS Operational Effects

13.6.2.1 Climate

Impacts to climate during the operational phase are deemed long-term and imperceptible.

13.6.2.2 Air Quality

Impacts to air quality during the operational phase are deemed long-term and imperceptible.

13.6.3 Poolbeg BESS Decommissioning

13.6.3.1 Climate

Impacts to climate during the decommissioning phase are deemed short-term and imperceptible.

13.6.3.2 Air Quality

Impacts to air quality during the decommissioning phase are deemed short-term and imperceptible.

13.7 Poolbeg BESS Mitigation and Monitoring

The dust mitigation measures outlined in Section 13.5 are also appropriate to the Poolbeg BESS construction phase.

13.8 Ringsend FlexGen Impact Assessment

13.8.1 Ringsend FlexGen Construction Effects

13.8.1.1 Climate

Impacts to climate during the construction phase are deemed short-term and imperceptible.

13.8.1.2 Air Quality

Provided the dust mitigation measures outlined in Section 13.5 are adhered to, the impact on air quality and dust in particular during construction will not be significant.

13.8.2 Ringsend FlexGen Operational Effects

13.8.2.1 Conservative Operational Scenario – NO₂

Modelling of the *Conservative Operational Scenario* is detailed in Table 13.11 for NO₂ emissions. The proposed environment for the Ringsend FlexGen is the typical operation of the Dublin Bay Power Plant and the concurrent operation of the Ringsend FlexGen. Full details of the modelled operational scenario are outlined in Appendix 13.1.

The Ringsend FlexGen NO₂ modelling results for the Conservative Operational Scenario are detailed in Table 13.11. The results indicate that the ambient ground level concentrations are below the relevant air quality limit values for NO₂. Emissions from the facility including background lead to an ambient NO₂ concentration which is 61% of the maximum 1 hour limit value (measured as a 99.8th%ile) and 36% of the annual limit value at the worst-case off-site receptor for the worst-case year modelled (2018).

The geographical variations in ground level NO₂ concentrations (without background) beyond the facility boundary for the worst-case year modelled are illustrated as concentration contours in Figures 13.4 and 13.5. The contents of each figure are described below:

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Table 13.11 Modelled NO₂ Concentrations for the Conservative Operational Scenario – Ringsend FlexGen (µg/m³)

Pollutant/ Scenario / Year	Averaging Period	Process Contribution NO ₂ (µg/m ³)	Background Concentration (µg/m ³)	Predicted Emission Concentration - PEC NO ₂ (µg/Nm ³)	Limit Values (µg/Nm ³)	PEC as a % of Limit Value
NO ₂ / Cons. Operation/ 2015	Annual Mean	0.28	24	24.28	40	61%
	99.8th%ile of 1-hr means	17.40	48	65.40	200	33%
NO ₂ / Cons. Operation/ 2016	Annual Mean	0.42	24	24.42	40	61%
	99.8th%ile of 1-hr means	20.70	48	68.70	200	34%
NO ₂ / Cons. Operation/ 2017	Annual Mean	0.33	24	24.33	40	61%
	99.8th%ile of 1-hr means	23.10	48	71.10	200	36%
NO ₂ / Cons. Operation/ 2018	Annual Mean	0.59	24	24.59	40	61%
	99.8th%ile of 1-hr means	24.60	48	72.60	200	36%
NO ₂ / Cons. Operation/ 2019	Annual Mean	0.31	24	24.31	40	61%
	99.8th%ile of 1-hr means	20.70	48	68.70	200	34%

Note 1 The short-term peaks are assumed to have an ambient background concentration of twice the annual mean background concentration

Figure 13.6 Ringsend FlexGen Conservative Operational Scenario: Predicted NO₂ 99.8th Percentile of Hourly Concentrations (2018)



Figure 13.7 Ringsend FlexGen Conservative Operational Scenario: Predicted NO₂ Annual Mean Concentrations (2018)



13.8.2.2 Worst-case Scenario – NO₂

The Ringsend FlexGen NO₂ modelling results for the *Worst-case Gas Scenario* are detailed in Table 13.12 for NO₂ emissions. The results indicate that the ambient ground level concentrations are below the relevant air quality limit values for NO₂. Emissions from the facility including background lead to an ambient NO₂ concentration which is 62% of the maximum 1-hour limit value (measured as a 99.8thile) and 38% of the annual limit value at the worst-case off-site receptor for the worst-case year modelled (2018).

Table 13.12 Modelled NO₂ Concentrations for the Worst-case Scenario – Ringsend FlexGen (µg/m³)

Pollutant/ Scenario / Year	Averaging Period	Process Contribution NO ₂ (µg/m ³)	Background Concentration (µg/m ³)	Predicted Emission Concentration - PEC NO ₂ (µg/Nm ³)	Limit Values (µg/Nm ³)	PEC as a % of Limit Value
NO ₂ / WC Gas / 2015	Annual Mean	0.32	24	24.32	40	61%
	99.8th%ile of 1-hr means	20.10	48	68.10	200	34%
NO ₂ / WC Gas / 2016	Annual Mean	0.48	24	24.48	40	61%
	99.8th%ile of 1-hr means	23.10	48	71.10	200	36%
NO ₂ / WC Gas / 2017	Annual Mean	0.37	24	24.37	40	61%
	99.8th%ile of 1-hr means	26.20	48	74.20	200	37%
NO ₂ / WC Gas / 2018	Annual Mean	0.67	24	24.67	40	62%
	99.8th%ile of 1-hr means	27.40	48	75.40	200	38%
NO ₂ / WC Gas / 2019	Annual Mean	0.35	24	24.35	40	61%
	99.8th%ile of 1-hr means	23.40	48	71.40	200	36%

Note 1 The short-term peaks are assumed to have an ambient background concentration of twice the annual mean background concentration

13.8.2.3 Conservative Operational Scenario – Carbon Monoxide

Modelling of the *Conservative Operational Scenario* is detailed in Table 13.13 for CO emissions. The proposed environment for the Ringsend FlexGen is the typical operation of the Dublin Bay Power Plant and the concurrent operation of the Ringsend FlexGen. Full details of the modelled operational scenario are outlined in Appendix 13.1.

The Ringsend FlexGen CO modelling results for the Conservative Operational Scenario are detailed in Table 13.13. The results indicate that the ambient ground level concentrations are below the relevant air quality limit value for CO. Emissions from the facility including background lead to an ambient CO concentration which is 30% of the maximum 8 hour limit value at the worst-case off-site receptor for the worst-case year modelled (2018).

Table 13.13 Modelled CO Concentrations for the *Conservative Operational Scenario* – Ringsend FlexGen ($\mu\text{g}/\text{m}^3$)

Pollutant/ Scenario / Year	Averaging Period	Process Contribution NO_2 ($\mu\text{g}/\text{m}^3$)	Background Concentration ($\mu\text{g}/\text{m}^3$)	Predicted Emission Concentration - PEC NO_2 ($\mu\text{g}/\text{Nm}^3$)	Limit Values ($\mu\text{g}/\text{Nm}^3$)	PEC as a % of Limit Value
CO / Cons. Operation/ 2015	Maximum 8 Hour Mean	0.02	3	3.02	10	30.2%
CO/ Cons. Operation/ 2016	Maximum 8 Hour Mean	0.03	3	3.03	10	30.3%
CO / Cons. Operation/ 2017	Maximum 8 Hour Mean	0.03	3	3.03	10	30.3%
CO / Cons. Operation/ 2018	Maximum 8 Hour Mean	0.04	3	3.04	10	30.4%
CO / Cons. Operation/ 2019	Maximum 8 Hour Mean	0.03	3	3.03	10	30.3%

13.8.2.4 Worst-case Scenario – CO

The Ringsend FlexGen CO modelling results for the *Worst-case Gas Scenario* are detailed in Table 13.14 for CO emissions. The results indicate that the ambient ground level concentrations are below the relevant air quality limit value for CO. Emissions from the facility including background lead to an ambient CO concentration which is 30% of the maximum 8-hour limit value at the worst-case off-site receptor for the worst-case year modelled (2018).

Table 13.14 Modelled CO Concentrations for the *Worst-case Scenario* – Ringsend FlexGen ($\mu\text{g}/\text{m}^3$)

Pollutant/ Scenario / Year	Averaging Period	Process Contribution NO_2 ($\mu\text{g}/\text{m}^3$)	Background Concentration ($\mu\text{g}/\text{m}^3$)	Predicted Emission Concentration - PEC NO_2 ($\mu\text{g}/\text{Nm}^3$)	Limit Values ($\mu\text{g}/\text{Nm}^3$)	PEC as a % of Limit Value
CO / WC Gas / 2015	Maximum 8 Hour Mean	0.03	3	3.03	10	30.3%
CO / WC Gas / 2016	Maximum 8 Hour Mean	0.04	3	3.04	10	30.4%
CO / WC Gas / 2017	Maximum 8 Hour Mean	0.04	3	3.04	10	30.4%
CO / WC Gas / 2018	Maximum 8 Hour Mean	0.04	3	3.04	10	30.4%
CO / WC Gas / 2019	Maximum 8 Hour Mean	0.04	3	3.04	10	30.4%

13.8.3 Ringsend FlexGen Decommissioning

Should the Ringsend FlexGen plant be decommissioned the equipment will be dismantled and removed from site and the site left as a level platform. A Decommissioning Management Plan (DMP) will be prepared in accordance with the IE licence.

13.8.3.1 Climate

Impacts to climate during the decommissioning phase are deemed short-term and imperceptible.

13.8.3.2 Air Quality

Impacts to air quality during the decommissioning phase are deemed short-term and imperceptible.

13.9 Ringsend FlexGen Mitigation and Monitoring

The dust mitigation measures outlined in Section 13.5 are also appropriate to the Ringsend FlexGen construction phase.

13.10 South Wall BESS Impact Assessment

13.10.1 South Wall BESS Construction Effects

13.10.1.1 Climate

Impacts to climate during the construction phase are deemed short-term and imperceptible.

13.10.1.2 Air Quality

Provided the dust mitigation measures outlined in Section 13.5 are adhered to, the impact on air quality and dust in particular during construction will not be significant.

13.10.2 South Wall BESS Operational Effects

13.10.2.1 Climate

Impacts to climate during the operational phase are deemed long-term and imperceptible.

13.10.2.2 Air Quality

Impacts to air quality during the operational phase are deemed long-term and imperceptible.

13.10.3 South Wall BESS Decommissioning

13.10.3.1 Climate

Impacts to climate during the decommissioning phase are deemed short-term and imperceptible.

13.10.3.2 Air Quality

Impacts to air quality during the decommissioning phase are deemed short-term and imperceptible.

13.11 South Wall BESS Mitigation and Monitoring

The dust mitigation measures outlined in Section 13.5 are also appropriate to the South Wall BESS construction phase.

13.12 Cumulative Effects

13.12.1 NO₂ Cumulative Impacts

Modelling of the *Cumulative Impact Scenario* is detailed in Table 13.15 for NO₂ emissions. The proposed environment for the cumulative impact is the operation of the proposed Ringsend and Poolbeg FlexGens in addition to the typical operation of the Poolbeg Generating Plant, the Dublin Bay Power Plant and the Dublin WTE facility. Full details of the modelled operational scenario are outlined in Appendix 13.1.

In addition, the EIAR for the proposed development at the Former IGB & Fabrizia Sites, Poolbeg West, Dublin 4, published in June 2019, has been reviewed. The EIAR Air Quality & Climate Chapter (Chapter 9) has modelled the impact of the proposed scheme on ambient levels of NO₂ for both 2021 and 2036 based on the full build-out of the development. The results of this assessment found that the maximum predicted increase in ambient NO₂ levels at the nearest residential receptor was 0.24 µg/m³. Thus, the proposed increase was deemed to be negligible.

The cumulative NO₂ modelling results are detailed in Table 13.15. The results indicate that the ambient ground level concentrations are below the relevant air quality limit values for NO₂. Emissions from all existing and proposed facilities including background lead to an ambient NO₂ concentration which is 54% of the maximum 1 hour limit value (measured as a 99.8th%ile) for the worst-case year modelled (2016) and 66% of the annual limit value at the worst-case off-site receptor for the worst-case year modelled (2017).

The geographical variations in ground level NO₂ concentrations (without background) beyond the facility boundary for the worst-case year modelled are illustrated as concentration contours in Figures 13.6 and 13.7.

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Table 13.15 Modelled NO₂ Concentrations for the Cumulative Operational Scenario (µg/m³)

Pollutant/ Scenario / Year	Averaging Period	Process Contribution NO ₂ (µg/m ³)	Background Concentration (µg/m ³)	Predicted Emission Concentration - PEC NO ₂ (µg/Nm ³)	Limit Values (µg/Nm ³)	PEC as a % of Limit Value
NO ₂ / Cum. Operation/ 2015	Annual Mean	2.10	24	26.10	40	65%
	99.8th%ile of 1-hr means	50.9	48	98.9	200	49%
NO ₂ / Cum. Operation/ 2016	Annual Mean	2.00	24	26.00	40	65%
	99.8th%ile of 1-hr means	59.3	48	107.3	200	54%
NO ₂ / Cum. Operation/ 2017	Annual Mean	2.40	24	26.40	40	66%
	99.8th%ile of 1-hr means	55.3	48	103.0	200	52%
NO ₂ / Cum. Operation/ 2018	Annual Mean	2.00	24	26.00	40	65%
	99.8th%ile of 1-hr means	56.0	48	104.0	200	52%
NO ₂ / Cum. Operation/ 2019	Annual Mean	2.10	24	26.10	40	65%
	99.8th%ile of 1-hr means	52.9	48	100.9	200	50%
Note 1	The short-term peaks are assumed to have an ambient background concentration of twice the annual mean background concentration					

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Figure 13.8 Cumulative Operational Scenario: Predicted NO₂ 99.8th Percentile of Hourly Concentrations (2016)



Figure 13.9 Cumulative Operational Scenario: Predicted NO₂ Annual Mean Concentrations (2017)

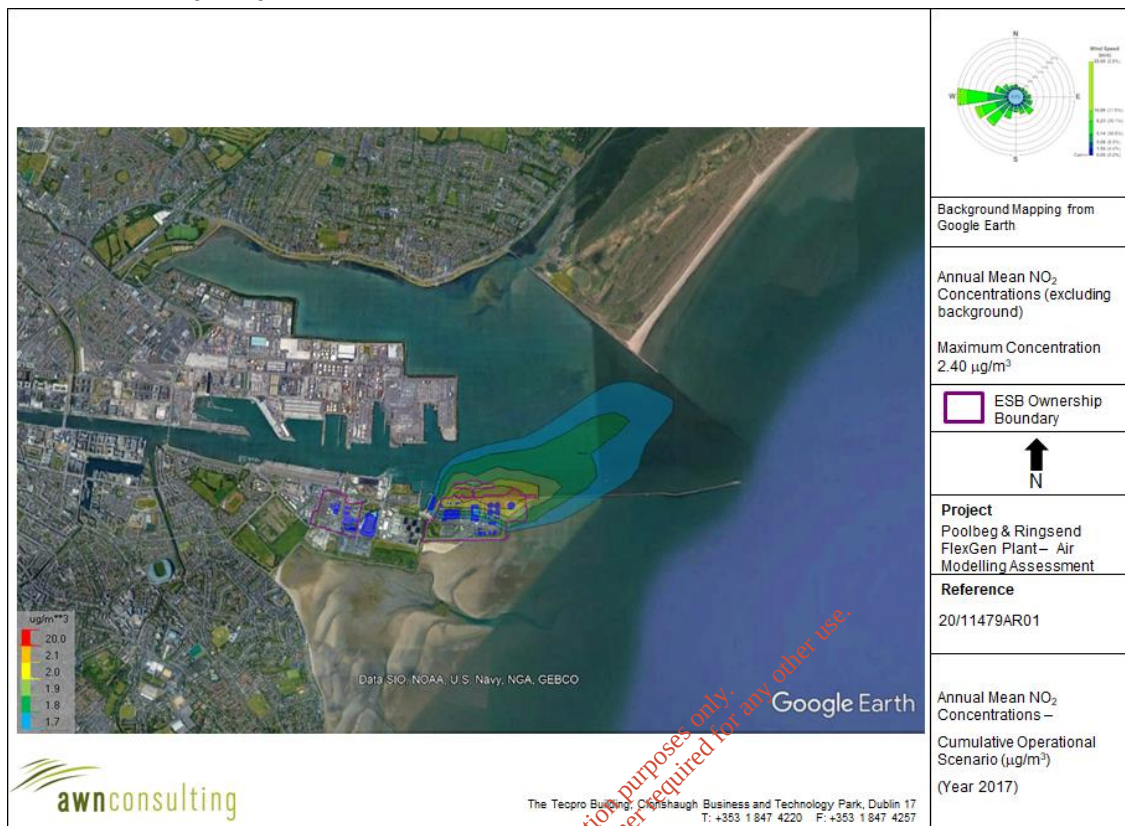


Table 13.16: Summary of Potential Cumulative Effects

	Poolbeg FlexGen	Poolbeg BESS	Ringsend FlexGen	South Wall BESS
Poolbeg FlexGen	n/a	No impact	Cumulative air impact	No impact
Poolbeg BESS	No impact	n/a	No impact	No impact
Ringsend FlexGen	Cumulative air impact	No impact	n/a	No impact
South Wall BESS	No impact	No impact	No impact	n/a

13.13 Summary of Mitigation and Monitoring

The summary of mitigation and monitoring measures for the four proposed developments are outlined in Chapter 18.

13.14 Summary of Significant Residual Effects

Impacts to climate during the construction phase are considered short-term and imperceptible. In terms of air quality, provided the dust mitigation measures outlined in Section 13.5 are adhered to, the impact on air quality and dust in particular during construction will not be significant.

The assessment has shown that the operational phase will not cause a significant impact on climate. Emissions will be regulated under the EU-wide ETS scheme and thus is not considered to be significant in the context of aggregated national emission sources.

Based on the efficient technology and minimum stack heights proposed for the associated with the operation of the proposed development, the residual impacts on air quality and climate from the operational phase of the proposed development will be long-term, negative and imperceptible.

13.15 References

- BRE (2003) Controlling Particles, Vapours & Noise Pollution From Construction Sites
Climate Action and Low Carbon Development Act (Act. No. 46 of 2015)
DCCAE (2019). Climate Action Plan 2019
Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe
Directive (EU) 2016/2284 of the European Parliament and of the Council of 14 December 2016 on the reduction of national emissions of certain atmospheric pollutants, amending Directive 2003/35/EC and repealing Directive 2001/81/EC
Draft General Scheme of the Climate Action (Amendment) Bill 2019 (January 2020)
EPA (2015) Advice Notes for Preparing Environmental Impact Statements – Draft
EPA (2017) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (Draft)
EPA (2019) Air Quality in Ireland 2018 – Indicators of Air Quality (and previous annual reports 1997-2017)
EPA (2020a) Air Dispersion Modelling from Industrial Installations Guidance Note (AG4)
EPA (2020b). EPA Website [Online] Available from <http://www.epa.ie/whatwedo/monitoring/air/>
European Parliament and Council of Europe (2009). Effort Sharing Decision (ESD) 406/2009/EC
European Parliament and Council of Europe (2018). Regulation (EU) 2018/842 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement and amending Regulation (EU) No. 525/2013
European Commission (2020) Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL establishing the framework for achieving climate neutrality and amending Regulation (EU) 2018/1999 (European Climate Law)
IAQM (2014) Guidance on the Assessment of Dust from Demolition and Construction
Government Of Ireland (2020) National Energy and Climate Plan (NECP) 2021-2030
S.I. No. 180 of 2011 Air Quality Standards Regulations 2011
TII (2011) Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes
The Scottish Office (1996) Planning Advice Note PAN50 Annex B: Controlling The Environmental Effects Of Surface Mineral Workings Annex B: The Control of Dust at Surface Mineral Workings
UK Office of Deputy Prime Minister (2002) Controlling the Environmental Effects of Recycled and Secondary Aggregates Production Good Practice Guidance
UNFCCC (1992) United Nations Framework Convention on Climate Change, New York, 9 May 1992
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Change adopted at COP3 in Kyoto, Japan, on 11 December 1997

UNFCCC (2012) Doha Amendment to the Kyoto Agreement United Nations Framework Convention on Climate Change Conference of the Parties December 2012,

UNFCCC (2015) The Paris Agreement United Nations Framework Convention on Climate Change Conference of the Parties 30 November – 13 December 2015,

USEPA (1986) Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition' (periodically updated)

USEPA (1997) Fugitive Dust Technical Information Document for the Best Available Control Measures

USEPA (1999) Comparison of Regulatory Design Concentrations: AERMOD vs. ISCST3 vs. CTDM PLUS

USEPA (2017) Guidelines on Air Quality Models, Appendix W to Part 51, 40 CFR Ch.1

USEPA (2018a) User's Guide to the AERMOD Meteorological Preprocessor (AERMET)

USEPA (2018b) AERMAP Users Guide

USEPA (2019) AERMOD Description of Model Formulation

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14 Waste

14.1 Introduction

The construction, improvement and maintenance of any infrastructure can result in environmental effects associated with the consumption and use of materials, and the disposal / recovery of waste. Environmental assessment provides a framework for assessing and managing the effects associated with the use of materials and disposal / recovery of waste by promoting:

- reduction in overall impacts and improvements in the efficiency of resource use; and
- prevention and / or reduction of the adverse effects associated with the generation and management of waste.

14.2 Assessment Methodology

Environmental assessments must, in line with the EIA Directive, identify, describe and assess the likely significant effects of proposed projects on the environment resulting from:

- the expected residues and emissions and the production of waste.

The assessment of materials and waste shall include:

- the consumption of materials and products (from primary, recycled or secondary, and renewable sources, the use of materials offering sustainability benefits, and the use of excavated and other arisings that fall within the scope of waste exemption criteria; and
- the production and disposal of waste.

The environmental assessment and subsequent management of waste shall apply the following waste management hierarchy from the Waste Directive, in descending order of preference:

1. prevention (no waste produced);
2. preparing for re-use;
3. recycling;
4. other recovery, e.g. energy recovery; and
5. disposal.

14.2.1 Study Area

The study area is defined as the construction footprint for the four projects. This is the area in which any wastes will be generated during construction, operation and decommissioning. In addition, the regional capacity to accept waste materials must be considered taking account of the ability of regional infrastructure to cope with the demands placed on it by the projects.

For the construction footprint the assessment shall describe the current and likely future state (in the absence of the project) of the following:

- the types and quantity of material use associated with operation of the existing power generation capacity which the FlexGen and BESS will replace;
- the types and quantities of waste produced associated with operation of the existing power generation capacity which the FlexGen and BESS will replace;

- information on availability of key construction materials required for the project; and
- information on likely waste generation.

For consideration of the wider regional waste disposal capacity the baseline will describe the current and likely future state (in the absence of the project) of the following:

- regional (or other relevant geographic scale) presence and capacity of landfill facilities to be utilised by the project;
- regional (or other relevant geographic scale) presence and capacity of material recovery / recycling facilities to be utilised by the project; and
- location of mineral resources in relation to the project.

14.2.2 Legislation

All waste materials will be handled in accordance with the Waste Management Act 1996, as amended which enacts the requirements of the Waste Framework Directive. Waste management planning in Ireland is managed regionally and Poolbeg is within the Eastern-Midlands Region. The Eastern Midlands Region Waste Management Plan⁹² is a statutory document prepared by the local authorities within the region. It covers the period from 2015 to 2021, after which time it will be revised or replaced. It is underpinned by National and European waste legislation and the work carried out will ensure the continued management of waste in a safe and sustainable manner. The vision for the plan is to reconsider our approach and attitudes towards managing waste. The primary focus will be to view waste as a valuable resource in conjunction with making better use of current resources along with the reduction of leakage of material, to include energy, as we make the transition from a linear to a circular economy. While there will be many areas to cover and many crossovers within the implementation of the plan the eight Strategic Objectives within the plan will see an overall achievement of the outlined goals.

14.2.3 Data Collection

In the context of this chapter the following shall be defined as materials

- types of materials required to construct the project;
- Materials required during the operational phase;
- information on materials that contain secondary / recycled content;
- information on any known sustainability credentials of materials to be consumed;
- materials that will be recovered from off-site sources for use on the project;
- the cut and fill balance;
- details of on-site storage and stockpiling arrangements, and any supporting logistical details.

For waste, the assessment shall identify the following;

- waste that will be recovered and diverted from landfill either on site or off-site (i.e. for use on other projects);
- waste arising from the project (demolition, excavation arisings and remediation) requiring disposal to landfill;
- details of on-site storage and segregation arrangements for waste and any supporting logistical arrangements; and

⁹² Eastern - Midlands Region Waste Management Plan 2015 – 2021. Eastern-Midlands Region Waste Management Office, Environment and Transportation Department <http://emwr.ie/emwr-plan/>

- potential for generation of hazardous waste (type and quantity).

14.2.4 Significance Criteria

The assessment of effects on material use and waste shall adopt the significance categories in Table 14.1 which have been selected to reflect waste minimisation targets set out in the Eastern Midlands Region Waste Management Plan⁹³.

Table 14.1: Significance Category Descriptions

Significance Category	Description
Very High	Material Use 1) no criteria: use criteria for high categories. Waste 1) >1% reduction or alteration in national capacity of landfill, as a result of accommodating waste from a project; or 2) construction of new (permanent) waste infrastructure is required to accommodate waste from a project.
High	Material Use 1) project achieves <70% overall material recovery / recycling (by weight) of non-hazardous Construction and Demolition Waste (C&D waste) to substitute use of primary materials; and 2) aggregates required to be imported to site comprise <1% re-used / recycled content; and 3) project sterilises a mineral safeguarding site. Waste 1) >1% reduction in the regional capacity of landfill as a result of accommodating waste from a project; and 2) >50% of project waste for disposal outside of the region.
Medium	Material Use 1) project achieves less than 70% overall material recovery / recycling (by weight) of non-hazardous C&D waste to substitute use of primary materials; and 2) aggregates required to be imported to site comprise re-used/recycled content below the national percentage target (70%). Waste 1) >1% reduction or alteration in the regional capacity of landfill as a result of accommodating waste from a project; and 2) Up to 50% of project waste disposed of outside of the region.
Low	Material Use 1) project achieves 70% to 99% overall material recovery / recycling (by weight) of non-hazardous C&D waste to substitute use of primary materials; and 2) aggregates required to be imported to site comprise re-used/recycled content in line with the national percentage target (70%). Waste 1) ≤1% reduction or alteration in the regional capacity of landfill; and 2) waste infrastructure has sufficient capacity to accommodate waste from a project, without compromising integrity of the receiving infrastructure (design life or capacity) within the region.
Negligible	Material Use 1) project achieves >99% overall material recovery / recycling (by weight) of non-hazardous C&D waste to substitute use of primary materials; and 2) aggregates required to be imported to site comprise >99% re-used / recycled content. Waste 1) no reduction or alteration in the capacity of waste infrastructure within the region.

Source: Mott MacDonald

⁹³ <http://emwr.ie/>

The significance of effects on material use and waste shall be reported in accordance with Table 14.2.

Table 14.2: Significance Criteria

Significance	Description
Significant (one or more criteria met)	Material Use and Waste Category description met for medium or higher effect.
Not significant	Material Use and Waste Category description met for low or negligible effect.

Source: Mott MacDonald

The environmental assessment shall describe any likely significant effects of the project on the environment from the use of materials and recovery / disposal of waste.

14.2.5 Design and Mitigation

The environmental assessment shall evidence how project design has adopted the waste management hierarchy, in accordance with the Waste Directive. At least 70% (by weight) of CDW shall be subjected to material recovery in accordance with the Waste Directive. The environmental assessment shall evidence the adoption of design and mitigation measures for waste. The evidence should include (list not exhaustive);

- design for reuse and recovery: identifying, securing and using materials that already exist on site, or can be sourced from other projects;
- design for materials optimisation: simplifying layout and form to minimise material use, using standard design parameters, balancing cut and fill, maximising the use of renewable materials and materials with recycled content;
- design for off-site construction: maximising the use of prefabricated structure and components, encouraging a process of assembly rather than construction;
- design for the future (deconstruction and flexibility): identify how materials can be designed to be more easily adapted over an asset lifetime and how deconstructability and demountability of elements can be maximised at end of first life;
- design for waste efficient procurement: identify and specify materials that can be acquired responsibly, in accordance with a recognised industry standard; and
- engineering plan configurations and layouts that show how the most effective use of materials and arisings can be achieved.

The environmental assessment shall evidence the adoption of design and mitigation measures for waste. The evidence should include (list not exhaustive);

- engage early with contractors during design to identify possible mitigation and enhancement measures, and to identify opportunities to reduce waste;
- ensuring arisings generated are handled, stored, managed and re-used or recycled as close as possible to the point of origin;
- identify areas for stockpiling and storing arisings that will minimise degradation, damage and loss;
- capture information and data on site arisings recovered / diverted from landfill and waste sent to landfill as part of a 'live' Environmental Management Plan (EMP); and
- specify management requirements for construction materials, site arisings and waste in a 'live' EMP.

14.3 Baseline Environment

As discussed in Chapter 5 the sites for the four proposed developments are not currently in use and do not produce waste..

14.3.1 Regional Waste Management

Construction Wastes

The principal waste stream produced during construction will be construction and demolition waste (C&D waste), generated through site levelling to produce the development platforms at the required elevations and from demolition of the redundant office buildings on the Poolbeg BESS site.

ESB have estimated the following volumes of C&D waste arising from each project:

- Poolbeg FlexGen; 13,000m³ (approx. 29,000t)
- Poolbeg BESS; 18,000m³ (approx. 40,000t)
- Ringsend FlexGen; 10,000m³ (approx. 22,000t)
- South Wall BESS 2,000m³ (approx. 4,500t)

In total approximately 100,000t of C&D waste is anticipated to be generated.

EPA record the composition of C&D waste arising in Ireland. The EPA waste data release published in October 2019⁹⁴ shows that for 2017 C&D waste comprised the following proportions:

• Soil and stones	81%
• Mixed	8%
• Metals	4%
• Concrete, bricks, tiles	7%
• Bituminous mixtures	1%
• Wood, glass plastic (segregated)	1%

The Waste Framework Directive requires each member state to achieve 70% material recovery of non-hazardous C&D waste (excluding soil and stones) by 2020. EPA have determined that in Ireland 71% of such wastes are recovered.

C&D waste is recovered at EPA licensed landfills and Local Authority permitted sites. The latest available progress report for the Dublin Waste Management Plan (2011) indicates that 98% of C&D waste is recovered which indicates that there is infrastructure locally to process C&D waste.

The EPA Waste Data Release shows an estimated 4,749,700 tonnes of C&D waste were collected by authorised waste collectors in 2017 in Ireland:

• Soil and stone	3,827,100t
• Mixed C&D waste	368,500t
• Concrete, bricks, tiles and similar	312,500t
• Metals	182,000t
• Bituminous mixtures	40,700t

⁹⁴ <http://www.epa.ie/nationalwastestatistics/constructiondemolition/>

- Segregated wood, glass and plastic 18,900t

The anticipated tonnage of C&D waste to be generated by all four projects is 2% of the total soil and stone C&D waste generated in Ireland.

All waste classification, reuse and off-site disposal will be undertaken in accordance with a CEMP & WMP with approval from DCC.

Hazardous Wastes

The Poolbeg BESS site is currently occupied by several buildings which were used as office accommodation and recreation. These redundant buildings will be demolished. An asbestos survey⁹⁵ has identified a wide range of building materials which contain asbestos and which will need to be stripped out of the building prior to general demolition. Asbestos containing material will be disposed of as hazardous waste. The nearest suitable facility is operated by Rilta Environmental Limited based in Rathcoole, Co. Dublin. Waste Licence Register Number: W0192-03. Waste containing asbestos cannot be reused or recovered in any way and this material will require landfilling to control the risks posed from asbestos fibres.

Municipal Wastes

During operation there will be minor amounts of domestic type waste arising from infrequent use of the welfare facilities at each site which will not have any noticeable effect on the waste management capacity within Dublin.

14.3.2 Mineral Resources

As discussed in Chapter 8, Land Soil and Ground Conditions there are no strategic mineral resources beneath the sites.

Whereas the ideal solution for sourcing the required aggregates to construct the four projects is to use recycled C&D waste it is likely that some virgin mineral resources will be used. Ireland currently produces 35Mt of aggregates a year.⁹⁶ It is considered that there are sufficient mineral resources available to allow construction of the four projects.

Following site clearance, ground level raising is to be undertaken at the sites. The land raising exercise is to be undertaken to reach required levels to ensure the development is outside the flood risk zone. Where required material will be sourced from a licenced quarry or from a suitable 3rd party site. The material utilised for land raising will be geotechnically and chemically suitable for use on the site and will be imported to the site in accordance with best practice and all relevant waste legislation, including Article 27 Regulations where applicable.

It is anticipated that a maximum volume of 6500m³ of material will be required for land-raising purposes. The material will be imported to site for direct infilling with some short-term stockpiling undertaken to facilitate construction operations, where necessary.

14.3.3 Poolbeg FlexGen

An Outline Waste Management Plan (OWMP) has been prepared in accordance with waste management guidance and principles as outlined in *Design Out Waste: A design team guide to waste reduction in construction and demolition projects* (EPA, 2015) and *Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects*,

⁹⁵ OHSS Safety Consultants 2020. Asbestos Demolition Survey Report of Poolbeg Ancillary Demolition Project Buildings 1 to 4 Poolbeg.

⁹⁶ Irish Concrete Federation Essential Aggregates Providing for Ireland's needs to 2040

Department of the Environment, Heritage and Local Government (DoEHLG), June 2006. This is provided in Appendix 14.

The aim of the OWMP is to provide a framework for the development of a detailed Construction Waste Management Plan and to ensure that optimum levels of waste reduction, re-use, recycling, and recovery are achieved throughout the duration of the project. It is preliminary in nature as it has been prepared at a stage when exact quantities and volumes of waste material cannot be determined. Any quantities and/or volumes presented in this report should be considered indicative only.

The requirement to develop, maintain and operate this OCMP to a detailed Construction Waste Management Plan will form part of the contract documents for the project.

On commencement of the project, the Contractor(s) appointed to undertake the works will be responsible for the development of this OCMP and the implementation of all necessary protocols and measures to ensure regulatory compliance, including the provision of data to ESB to enable fulfilment of reporting obligations.

A final WMP will be agreed with Dublin City Council prior to the commencement of construction on site. The final WMP will be available for inspection at the site of the proposed development at all reasonable times for examination by Dublin City Council.

Types and quantities of materials required to construct the project

A variety of materials will be used in the construction of the Flex Gen. Foundations will be concrete with ground levels made up with aggregates and floors cast from concrete. The plant itself comprises prefabricated modules. Service connections will be made using pipe and cabling manufactured off site. The modular design with components assembled off site minimises the amount of waste created as manufacture is under controlled conditions by specialist companies who will be able to maximise resource efficiency. Materials such as water and gas pipes and cabling will be brought to site as bulk lengths and the required lengths cut on site, further reducing waste.

Information on materials that contain secondary / recycled content

Many of the components making up the FlexGen will have recycled materials which are used as the feedstock in manufacturing. An obvious example would be steel used to build storage tanks which is routinely recycled.

Materials to be consumed during operation

FlexGen do not consume materials other than gas fuel and water. Periodic replacement of lubricating oils will be required, this oil is routinely recycled within the industry.

The combustion process uses de-mineralised water which is sprayed into the combustion chamber to reduce nitrogen oxide emissions. The de-mineralised water will be produced on site using potable water as a feed stock. The process removes dissolved solids such as calcium carbonate from the water leaving an effluent with slightly higher concentrations of dissolved solids which is discharged via the surface water drainage system under an IE licence.

The cut and fill balance

The development platform will require 10,000m³ of fill to be imported to achieve the required levels.

Details of on-site storage and stockpiling arrangements, and any supporting logistical details

Any surplus materials created during the creation of the development platform will be stockpiled prior to offsite recycling. Lay down areas have been defined which will be used for storing materials temporarily during construction.

Waste that will be recovered and diverted from landfill either on site or off-site (i.e. for use on other projects)

It is envisaged that all C&D wastes will be taken for recovery to a licenced facility. Wastes generated during construction have been minimised by adopting a modular construction system with most construction occurring offsite. Wastes generated during construction will be segregated by the contractor and disposed at recycling facilities.

Waste arising from the project (excavation arisings and remediation) requiring disposal to landfill

Some oil contamination has been discovered during the ground investigation and this material has been sent for disposal. It is anticipated that only small volumes of residual waste generated during construction will require disposal to landfill. During operation volumes of waste will be insignificant, comprising domestic type waste generated in the welfare facilities.

Details of on-site storage and segregation arrangements for waste and any supporting logistical arrangements

It is unlikely there will be a need for stockpiling surplus aggregates for any length of time. Any surplus generated will be stored locally to the construction site before being appropriately sampled, classified and sent off-site for recovery in accordance with best practice and waste legislation.

Potential for generation of hazardous waste

It is not anticipated the any hazardous wastes will be produced during construction.

Operation of the FlexGen will require replenishment of lubricating oils periodically. These will be classified as hazardous waste if they are disposed of, however it is industry practice to recycle such materials.

Should the facility be decommissioned there may be minor quantities of hazardous waste produced, however it is anticipated that most materials will be recycled.

14.3.4 Poolbeg BESS

An Outline Waste Management Plan (OWMP) has been prepared in accordance with waste management guidance and principles as outlined in *Design Out Waste: A design team guide to waste reduction in construction and demolition projects* (EPA, 2015) and *Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects*, Department of the Environment, Heritage and Local Government (DoEHLG), June 2006. This is provided in Appendix 14.

The aim of the OWMP is to provide a framework for the development of a detailed Construction Waste Management Plan and to ensure that optimum levels of waste reduction, re-use, recycling, and recovery are achieved throughout the duration of the project. It is preliminary in nature as it has been prepared at a stage when exact quantities and volumes of waste material cannot be determined. Any quantities and/or volumes presented in this report should be considered indicative only.

The requirement to develop, maintain and operate this OCMP to a detailed Construction Waste Management Plan will form part of the contract documents for the project.

On commencement of the project, the Contractor(s) appointed to undertake the works will be responsible for the development of this OCMP and the implementation of all necessary protocols and measures to ensure regulatory compliance, including the provision of data to ESB to enable fulfilment of reporting obligations.

A final WMP will be agreed with Dublin City Council prior to the commencement of construction on site. The final WMP will be available for inspection at the site of the proposed development at all reasonable times for examination by Dublin City Council.

Types and quantities of materials required to construct the project

A variety of materials will be used in the construction of the BESS. Foundations will be concrete with ground levels made up with aggregates. The plant itself comprises prefabricated modules. Service connections will be made using pipe and cabling manufactured off site. The modular design with components assembled off site minimises the amount of waste created as manufacture is under controlled conditions by specialist companies who will be able to maximise resource efficiency. Materials to connect services will be brought to site as bulk lengths on reels and the required lengths cut on site, reducing waste.

Information on materials that contain secondary / recycled content

Many of the components making up the BESS will have recycled materials which have been used as the feedstock in manufacturing. An obvious example would be steel used to build the containers which is routinely recycled.

Information on any known sustainability credentials of materials to be consumed

BESS do not consume materials. The lithium batteries used have a life expectancy beyond the design life of the facility. At the end of their useful life these batteries are recycled.

The cut and fill balance

The development platform will require 5500m³ of fill to be imported to achieve the required levels⁹⁷.

Details of on-site storage and stockpiling arrangements, and any supporting logistical details

Any surplus materials generated during the creation of the development platform will be stockpiled prior to offsite recycling. Lay down areas have been defined which will be used for storing materials temporarily during construction.

The soil present in the small area of landscaping will be excavated and stored for reuse on site. Storage of soils will be controlled to maintain the functionality of the soil.

Waste that will be recovered and diverted from landfill either on site or off-site (i.e. for use on other projects)

It is envisaged that all C&D wastes will be appropriately sampled, classified and taken for recovery to a licenced facility in accordance with best practice and waste legislation. Wastes generated during construction have been minimised by adopting a modular construction system with most construction occurring offsite. Wastes generated during construction will be segregated by the contractor and disposed at recycling facilities.

⁹⁷ ESB 2020 Poolbeg Battery Energy Storage System Demolition and Construction Management Plan QP-000033-02-R460-004-000

Waste arising from the project (demolition, excavation arisings and remediation) requiring disposal to landfill;

It is anticipated that only small volumes of residual waste generated during construction will require disposal to landfill. During operation volumes of waste will be insignificant, comprising domestic type waste generated in the welfare facilities.

Details of on-site storage and segregation arrangements for waste and any supporting logistical arrangements

During the demolition of the redundant offices various wastes streams will be produced, such as timber, plasterboard, masonry, concrete and glass. These materials will be segregated on site and stored temporarily before being shipped to offsite recovery facilities.

Potential for generation of hazardous waste

Demolition of the redundant offices will generate hazardous waste from asbestos containing materials which will be stripped out of the building prior to demolition. An asbestos demolition survey report has identified asbestos containing materials in a variety of materials within the buildings to be demolished. This waste will be stored securely in covered skips prior to disposal as hazardous waste.

It is not anticipated that the BESS will generate any hazardous wastes during operation.

Should the facility be decommissioned there may be minor quantities of hazardous waste produced, however it is anticipated that most materials will be recycled.

14.3.5 Ringsend FlexGen

An Outline Waste Management Plan (OWMP) has been prepared in accordance with waste management guidance and principles as outlined in *Design Out Waste: A design team guide to waste reduction in construction and demolition projects* (EPA, 2015) and *Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects*, Department of the Environment, Heritage and Local Government (DoEHLG), June 2006. This is provided in Appendix 14.

The aim of the OWMP is to provide a framework for the development of a detailed Construction Waste Management Plan and to ensure that optimum levels of waste reduction, re-use, recycling, and recovery are achieved throughout the duration of the project. It is preliminary in nature as it has been prepared at a stage when exact quantities and volumes of waste material cannot be determined. Any quantities and/or volumes presented in this report should be considered indicative only.

The requirement to develop, maintain and operate this OCMP to a detailed Construction Waste Management Plan will form part of the contract documents for the project.

On commencement of the project, the Contractor(s) appointed to undertake the works will be responsible for the development of this OCMP and the implementation of all necessary protocols and measures to ensure regulatory compliance, including the provision of data to ESB to enable fulfilment of reporting obligations.

A final WMP will be agreed with Dublin City Council prior to the commencement of construction on site. The final WMP will be available for inspection at the site of the proposed development at all reasonable times for examination by Dublin City Council.

The following shall be identified;

Types and quantities of materials required to construct the project

A variety of materials will be used in the construction of the Flex Gen. Foundations will be concrete with ground levels made up with aggregates and floors cast from concrete. The plant itself comprises prefabricated modules. Service connections will be made using pipe and cabling manufactured off site. The modular design with components assembled off site minimises the amount of waste created as manufacture is under controlled conditions by specialist companies who will be able to maximise resource efficiency. Materials such as water and gas pipes and cabling will be brought to site as bulk lengths and the required lengths cut on site, further reducing waste.

Information on materials that contain secondary / recycled content

Many of the components making up the FlexGen will have recycled materials which are used as the feedstock in manufacturing. An obvious example would be steel used to build storage tanks which is routinely recycled.

Materials to be consumed during operation

FlexGen do not consume materials other than gas fuel and water. Periodic replacement of lubricating oils will be required, this oil is routinely recycled within the industry.

The combustion process uses de-mineralised water which is sprayed into the combustion chamber to reduce nitrogen oxide emissions. The de-mineralised water will be produced on the adjacent Dublin Bay Power Station site using potable water as a feed stock. The process removes dissolved solids such as calcium carbonate from the water leaving an effluent with slightly higher concentrations of dissolved solids which is discharged via the surface water drainage system. The Dublin Bay plant produces between 3m³ and 5m³ of effluent a day which is generally discharged on a weekly basis. This treatment process is licenced by EPA and has a maximum discharge limit of 200m³ per day.

The cut and fill balance

The development platform will require 7,500m³ of fill to be imported to achieve the required levels.

Details of on-site storage and stockpiling arrangements, and any supporting logistical details

Any surplus materials created during the creation of the development platform will be stockpiled before being appropriately sampled, classified and sent off-site for recovery in accordance with best practice and waste legislation. Lay down areas have been defined which will be used for storing materials temporarily during construction.

Waste that will be recovered and diverted from landfill either on site or off-site (i.e. for use on other projects)

It is envisaged that all C&D wastes will be taken for recovery to a licenced facility. Wastes generated during construction have been minimised by adopting a modular construction system with most construction occurring offsite. Wastes generated during construction will be segregated by the contractor and disposed of at recycling facilities.

Waste arising from the project (excavation arisings and remediation) requiring disposal to landfill;

It is anticipated that only small volumes of waste will be disposed of to landfill. It is anticipated that only small volumes of residual waste generated during construction will require disposal to

landfill. During operation volumes of waste will be insignificant, comprising of domestic type waste generated in the welfare facilities.

Details of on-site storage and segregation arrangements for waste and any supporting logistical arrangements

It is unlikely there will be a need for stockpiling surplus aggregates for any length of time. Any surplus generated will be stored locally to the construction site before being sent off site for recovery.

Potential for generation of hazardous waste

It is not anticipated the any hazardous wastes will be produced during construction.

Operation of the FlexGen will require replenishment of lubricating oils periodically. These will be classified as hazardous waste if they are disposed of, however it is industry practice to recycle such materials.

Should the facility be decommissioned there may be minor quantities of hazardous waste produced, however it is anticipated that most materials will be recycled.

14.3.6 South Wall BESS

An Outline Waste Management Plan (OWMP) has been prepared in accordance with waste management guidance and principles as outlined in *Design Out Waste: A design team guide to waste reduction in construction and demolition projects* (EPA, 2015) and *Best Practice Guidelines on the Preparation of Waste Management Plans for Construction and Demolition Projects*, Department of the Environment, Heritage and Local Government (DoEHLG), June 2006. This is provided in Appendix 14.

The aim of the OWMP is to provide a framework for the development of a detailed Construction Waste Management Plan and to ensure that optimum levels of waste reduction, re-use, recycling, and recovery are achieved throughout the duration of the project. It is preliminary in nature as it has been prepared at a stage when exact quantities and volumes of waste material cannot be determined. Any quantities and/or volumes presented in this report should be considered indicative only.

The requirement to develop, maintain and operate this OCMP to a detailed Construction Waste Management Plan will form part of the contract documents for the project.

On commencement of the project, the Contractor(s) appointed to undertake the works will be responsible for the development of this OCMP and the implementation of all necessary protocols and measures to ensure regulatory compliance, including the provision of data to ESB to enable fulfilment of reporting obligations.

A final WMP will be agreed with Dublin City Council prior to the commencement of construction on site. The final WMP will be available for inspection at the site of the proposed development at all reasonable times for examination by Dublin City Council.

Types and quantities of materials required to construct the project

A variety of materials will be used in the construction of the BESS. Foundations will be concrete with ground levels made up with aggregates. The plant itself comprises prefabricated modules. Service connections will be made using pipe and cabling manufactured off site. The modular design with components assembled off site minimises the amount of waste created as manufacture is under controlled conditions by specialist companies who will be able to

maximise resource efficiency. Materials to connect services will be brought to site as bulk lengths on reels and the required lengths cut on site, reducing waste.

Information on materials that contain secondary / recycled content

Many of the components making up the BESS will have recycled materials which are used as the feedstock in manufacturing. An obvious example would be steel used to build the containers which is routinely recycled.

Information on any known sustainability credentials of materials to be consumed

BESS do not consume materials. Periodic replacement of transformer coolant oil will be required, this oil is routinely recycled within the industry.

The cut and fill balance

Following site clearance, ground level raising is to be undertaken at the site. The land raising exercise is to be undertaken to reach required levels. Where required material will be sourced from a licenced quarry or from a suitable 3rd party site. The material utilised for land raising will be geotechnically and chemically suitable for use on the site and will be imported to the site in accordance with best practice and all relevant waste legislation, including Article 27 regulations where applicable.

It is anticipated that a maximum volume of 6500m³ of material will be required for land-raising purposes. The material will be imported to site for direct infilling with some short-term stockpiling undertaken to facilitate construction operations, where necessary.

Details of on-site storage and stockpiling arrangements, and any supporting logistical details

Any surplus materials generated during the creation of the development platform will be stockpiled before being appropriately sampled, classified and sent off-site for recovery in accordance with best practice and waste legislation. Lay down areas have been defined which will be used for storing materials temporarily during construction.

Waste that will be recovered and diverted from landfill either on site or off-site (i.e. for use on other projects);

It is envisaged that all C&D wastes will be taken for recovery to a licenced facility. Wastes generated during construction have been minimised by adopting a modular construction system with most construction occurring offsite. Wastes generated during construction will be segregated by the contractor and disposed of to recycling facilities.

Waste arising from the project (excavation arisings and remediation) requiring disposal to landfill;

It is anticipated that only small volumes of residual waste generated during construction will require disposal to landfill. During operation volumes of waste will be insignificant, comprising domestic type waste generated in the welfare facilities.

Details of on-site storage and segregation arrangements for waste and any supporting logistical arrangements

Any surplus materials created during the creation of the development platform will be stockpiled prior to off-site recycling.

Potential for generation of hazardous waste (type and quantity).

Demolition of the redundant offices will generate hazardous waste from asbestos containing materials which will be stripped out of the building prior to demolition. This waste will be stored securely in covered skips prior to disposal as hazardous waste.

It is not anticipated that the BESS will generate any hazardous wastes during operation.

Should the facility be decommissioned there may be minor quantities of hazardous waste produced, however it is anticipated that most materials will be recycled.

14.4 Poolbeg FlexGen Impact Assessment

14.4.1 Do Nothing

In terms of the Do Nothing scenario, there will be no changes to the existing site. Consequently, no impacts are assessed.

14.4.2 Poolbeg FlexGen Construction Effects

It is expected that existing suitable granular material will be reused within the construction of the development platform. Any surplus materials will be recycled off site in accordance with the environmental management plan, waste management plan and regulatory requirements.

In terms of waste a low significance is considered appropriate in accordance with Table 14.1. The FlexGen plant is largely built off site as modules which reduces waste generation. Construction wastes are expected to place an insignificant burden on regional waste management facilities; all wastes will be segregated into type and disposed of to appropriate recycling facilities.

In accordance with Table 14.1 a low significance is placed on the generation of surplus C&D waste; there is no reason why any surplus will not be capable of beneficial reuse either on the project or elsewhere.

Construction effects on Materials and Waste are assessed as not significant in accordance with Table 14.2.

14.4.3 Poolbeg FlexGen Operational Effects

Operation of the FlexGen will not generate significant amounts of waste nor use significant amounts of materials.

In terms of material use the turbine will use lubricating oils. These oils are not replaced frequently, and all waste oil will be recycled through established processes.

The FlexGen uses demineralised water in the combustion chamber to reduce nitrogen oxide emissions. This water is produced on site from potable water. The treatment plant removes dissolved solids and chlorine from the potable water with a residual effluent. The volume of effluent generated is 9000 litres for every hour of operation. The amount of water used is not significant and will have no noticeable effect on water supplies. Waste effluent from the demineralisation process will be discharged via the surface water drainage system in accordance with EPA Licence requirements.

In terms of waste the welfare facilities will generate a small volume of domestic type waste; however, this will be limited as the facility is not occupied permanently. Any such waste will be disposed of in line with requirements of the IE Licence.

A negligible significance is assessed. Operational effects on Materials and Waste are assessed as not significant in accordance with Table 14.2.

14.4.4 Poolbeg FlexGen Decommissioning

Should the FlexGen plant ever be decommissioned there will be waste generated through dismantling of the plant. The plant itself is modular and will be dismantled as a reversal of the construction process. It is expected that a large proportion of the plant would be capable of either reuse elsewhere or recycling. There are established recycling markets in Ireland to process these materials. It is more likely that the facility will continue to operate and worn out components will be replaced as required which will reduce the burden placed on waste management infrastructure at any one time.

A Decommissioning Management Plan (DMP) will be prepared in accordance with the IE licence.

A low significance is assessed. Decommissioning effects on Materials and Waste are assessed as not significant in accordance with Table 14.2.

14.5 Poolbeg FlexGen Mitigation

The facility is small and will not generate process wastes during its operation and so no further mitigation is considered to be required. There will be a small amount of domestic type waste produced in the welfare facilities which will be managed in accordance with the requirements of an IE licence. This will have no significant effect on waste management resources.

Mitigation has been built into the design and procurement of the FlexGen. The modular nature of the construction has been selected to increase resource efficiency by reducing waste generated during the construction process.

An OWMP has been prepared and is included in Appendix 14. A final WMP will be agreed with Dublin City Council prior to the commencement of construction on site. The final WMP will be available for inspection at the site of the proposed development at all reasonable times for examination by Dublin City Council.

All waste arising will be managed and disposed of in a way that ensures the provisions of the Waste Management Act 1996 and associated amendments and regulations are applied and fully complied with.

Table 14.3: Summary of Poolbeg FlexGen Impact Assessment

Issue	Significance	Effect	Mitigation	Residual Impact
Surplus C&D Waste	Low	Not Significant	All surplus to be recycled	No residual impact
Construction materials	Low	Not Significant	Requirements easily met by regional construction materials capacity	No residual effects
Construction wastes	Negligible	Not Significant	Modular design reduces waste generation at source. Utilities connections to minimise waste generation	No residual impact

Issue	Significance	Effect	Mitigation	Residual Impact
Water consumption	Negligible	Not significant	None required	No residual impact
Wastewater	Negligible	Not significant	Discharged under IE licence	No residual impact
Office waste/welfare waste	Negligible	Not significant	Small volume managed in line with requirements of an IE Licence	No residual impact

14.6 Poolbeg BESS Impact Assessment

14.6.1 Do Nothing

In terms of the Do Nothing scenario, there will be no changes to the existing site. Consequently, no impacts are assessed.

14.6.2 Poolbeg BESS Construction Effects

Demolition of the existing offices will generate C&D waste. The various waste streams will be segregated and disposed of off-site to appropriate recycling facilities. The C&D waste processing infrastructure in Dublin is well established already has the capacity to recycle 98% of C&D wastes. The volume of C&D waste anticipated to be generated is less than 2% of the total C&D waste currently produced in Ireland and so it is considered reasonable to assume waste arising from the demolition of the offices will be able to be absorbed into the existing recycling industry and consequently is assessed as having a low significance. All materials recycled off site will be managed in accordance with the environmental management plan, waste management plan and regulatory requirements.

The BESS plant is largely built off site as modules which maximises the efficiency in materials consumption and reduces waste generation. Each component will be placed and connected using cables cut to the required length further reducing wastage. A low significance is assessed.

The amounts of construction wastes generated are expected to place an insignificant burden on regional waste management facilities; all wastes will be segregated into type and disposed of to appropriate recycling facilities. A low significance is assessed.

In accordance with Table 14.1 a low significance is placed on the generation of surplus C&D waste; there is no reason why any surplus will not be capable of beneficial reuse elsewhere.

Construction effects on Materials and Waste are assessed as not significant in accordance with Table 14.2.

14.6.3 Poolbeg BESS Operational Effects

Whilst operational the BESS is not expected to use significant quantities of materials. The lithium batteries installed have a design life in excess of the design life of the facility and are readily recyclable within the industry.

A negligible significance is assessed. Operational effects on Materials and Waste are assessed as not significant in accordance with Table 14.2.

14.6.4 Poolbeg BESS Decommissioning

Should the BESS plant ever be decommissioned there will be waste generated through dismantling of the plant. The plant itself is modular and will be dismantled as a reversal of the construction process. It is expected that a large proportion of the plant would be capable of either reuse elsewhere or recycling. There are established recycling markets in Ireland to process these materials. It is more likely that the facility will continue to operate and worn out components will be replaced as required which will reduce the burden placed on waste management infrastructure at any one time.

A low significance is assessed. Decommissioning effects on Materials and Waste are assessed as not significant in accordance with Table 14.2.

14.7 Poolbeg BESS Mitigation

The facility is small and will not generate process waste during its operation and so no further mitigation is considered to be required. There will be a small amount of domestic type waste produced in the welfare facilities which will be managed in accordance with ESB's existing waste disposal procedures. This will have no significant effect on waste management resources.

Mitigation has been built into the design and procurement of the BESS. The modular nature of the construction has been selected to increase resource efficiency by reducing waste generated during the construction process.

An OWMP has been prepared and is included in Appendix 14. A final WMP will be agreed with Dublin City Council prior to the commencement of construction on site. The final WMP will be available for inspection at the site of the proposed development at all reasonable times for examination by Dublin City Council.

All waste arising will be managed and disposed of in a way that ensures the provisions of the Waste Management Act 1996 and associated amendments and regulations are applied and fully complied with.

Table 14.4: Summary of Poolbeg BESS Impact Assessment

Issue	Significance	Effect	Mitigation	Residual Impact
Surplus C&D Waste	Low	Not Significant	All surplus to be recycled	No residual impact
Construction materials	Low	Not Significant	Requirements easily met by regional construction materials capacity	No residual effects
Construction wastes	Low	Not Significant	Modular design reduces waste generation at source. Utilities connections to minimise waste generation	No residual impact
Office waste/welfare waste	Negligible	Not significant	Small volume readily incorporated into existing management system	No residual impact

14.8 Ringsend FlexGen Impact Assessment

14.8.1 Do Nothing

In terms of the Do Nothing scenario, there will be no changes to the existing site. Consequently, no impacts are assessed.

14.8.2 Ringsend FlexGen Construction Effects

It is expected that existing suitable granular material will be reused within the construction of the development platform. Any surplus materials will be recycled off site in accordance with the environmental management plan, waste management plan and regulatory requirements.

In terms of waste a low significance is considered appropriate in accordance with Table 14.1. The Flex Gen plant is largely built off site as modules which reduces waste generation. Construction wastes are expected to place an insignificant burden on regional waste management facilities; all wastes will be segregated into type and disposed of to appropriate recycling facilities in accordance with the environmental management plan, waste management plan and regulatory requirements.

In accordance with Table 14.1 a low significance is placed on the generation of surplus C&D waste; there is no reason why any surplus will not be capable of beneficial reuse either on the project or elsewhere.

Construction effects on Materials and Waste are assessed as not significant in accordance with Table 14.2.

14.8.3 Ringsend FlexGen Operational Effects

Operation of the FlexGen will not generate significant amounts of waste nor use significant amounts of materials.

In terms of material use the turbine will use lubricating oils. These oils are not replaced frequently, and all waste oil will be recycled through established processes.

The FlexGen uses demineralised water in the combustion chamber to reduce nitrogen oxide emissions. This water is produced on the adjacent Dublin Bay power station site from potable water and is consumed at a rate of 26m³ per hour of operation. The volume of effluent generated is 9m³ for every hour of operation. The demineralised water is stored on the Dublin Bay site in a storage tank which also supplies the Dublin Bay plant. As the FlexGen operates water will be drawn from the storage tank which will trigger the treatment plant to treat water to top up the tank. The amount of water used is not significant and will have no noticeable effect on water supplies. Waste effluent from the de-mineralisation process is discharged under an EPA licence to surface water. The current licence allows up to 200m³ per day to be discharged which will not be exceeded by the additional loading from Ringsend. There are no significant impacts relating to waste from this operation.

The FlexGen also uses demineralised water in the combustion chamber as a means of reducing nitrogen oxide emissions. The amount of water used is not significant and will have no noticeable effect on water supplies. Waste effluent from the de-mineralisation process is discharged under an EPA licence to surface water, there are no significant impacts relating to waste from this operation.

In terms of waste the welfare facilities will generate a small volume of domestic type waste; however, this will be limited as the facility is not occupied.

A neutral significance is assessed. Operational effects on Materials and Waste are assessed as not significant in accordance with Table 14.2.

14.8.4 Ringsend FlexGen Decommissioning

Should the FlexGen plant ever be decommissioned there will be waste generated through dismantling of the plant. The plant itself is modular and will be dismantled as a reversal of the construction process. It is expected that a large proportion of the plant would be capable of either reuse elsewhere or recycling. There are established recycling markets in Ireland to process these materials. It is more likely that the facility will continue to operate and worn out components will be replaced as required which will reduce the burden placed on waste management infrastructure at any one time.

A Decommissioning Management Plan (DMP) will be prepared in accordance with the IE licence.

A low significance is assessed. Decommissioning effects on Materials and Waste are assessed as not significant in accordance with Table 14.2.

14.9 Ringsend FlexGen Mitigation

The facility is small and will not generate process waste during its operation and so no further mitigation is considered to be required. There will be a small amount of domestic type waste produced in the welfare facilities which will be managed in accordance with ESB's existing waste disposal procedures. IE Licence requirements. This will have no significant effect on waste management resources.

Mitigation has been built into the design and procurement of the FlexGen. The modular nature of the construction has been selected to increase resource efficiency by reducing waste generated during the construction process.

An OWMP has been prepared and is included in Appendix 14. A final WMP will be agreed with Dublin City Council prior to the commencement of construction on site. The final WMP will be available for inspection at the site of the proposed development at all reasonable times for examination by Dublin City Council.

All waste arising will be managed and disposed of in a way that ensures the provisions of the Waste Management Act 1996 and associated amendments and regulations are applied and fully complied with.

Table 14.5: Summary of Ringsend FlexGen Impact Assessment

Issue	Significance	Effect	Mitigation	Residual Impact
Surplus C&D Waste	Low	Not Significant	All surplus to be recycled	No residual impact
Construction materials	Low	Not Significant	Requirements easily met by regional construction materials capacity	No residual effects
Construction wastes	Negligible	Not Significant	Modular design reduces waste generation at source. Utilities connections to minimise waste generation	No residual impact
Water consumption	Negligible	Not significant	None required	No residual impact

Issue	Significance	Effect	Mitigation	Residual Impact
Wastewater	Negligible	Not significant	Discharged under IE licence	No residual impact
Office waste/welfare waste	Negligible	Not significant	Small volume managed in line with requirements of an IE Licence	No residual impact

14.10 South Wall BESS Impact Assessment

14.10.1 Do Nothing

In terms of the Do Nothing scenario, there will be no changes to the existing site. Consequently, no impacts are assessed.

14.10.2 South Wall BESS Construction Effects

The BESS plant is largely built off site as modules which maximises the efficiency in materials consumption and reduces waste generation. Each component will be placed and connected using cables cut to the required length further reducing wastage. A low significance is assessed.

The amounts of construction wastes generated are expected to place an insignificant burden on regional waste management facilities; all wastes will be segregated into type and disposed of to appropriate recycling facilities in accordance with the environmental management plan, waste management plan and regulatory requirements. A low significance is assessed.

In accordance with Table 14.1 a low significance is placed on the generation of surplus C&D waste; there is no reason why any surplus will not be capable of beneficial reuse elsewhere.

Construction effects on Materials and Waste are assessed as not significant in accordance with Table 14.2.

14.10.3 South Wall BESS Operational Effects

Whilst operational the BESS is not expected to use materials. The lithium batteries installed have a design life in excess of the design life of the facility.

A negligible significance is assessed. Operational effects on Materials and Waste are assessed as not significant in accordance with Table 14.2.

14.10.4 South Wall BESS Decommissioning

Should the BESS plant ever be decommissioned there will be waste generated through dismantling of the plant. The plant itself is modular and will be dismantled as a reversal of the construction process. It is expected that a large proportion of the plant would be capable of either reuse elsewhere or recycling. There are established recycling markets in Ireland to process these materials. It is more likely that the facility will continue to operate and worn out components will be replaced as required which will reduce the burden placed on waste management infrastructure at any one time.

A low significance is assessed. Decommissioning effects on Materials and Waste are assessed as not significant in accordance with Table 14.2.

14.10.5 South Wall BESS Mitigation

The facility is small and will not generate process waste during its operation and so no further mitigation is considered to be required. There will be a small amount of domestic type waste produced in the welfare facilities which will be managed in accordance with ESB's existing waste disposal procedures. This will have no significant effect on waste management resources.

Mitigation has been built into the design and procurement of the BESS. The modular nature of the construction has been selected to increase resource efficiency by reducing waste generated during the construction process.

An OWMP has been prepared and is included in Appendix 14. A final WMP will be agreed with Dublin City Council prior to the commencement of construction on site. The final WMP will be available for inspection at the site of the proposed development at all reasonable times for examination by Dublin City Council.

All waste arising will be managed and disposed of in a way that ensures the provisions of the Waste Management Act 1996 and associated amendments and regulations are applied and fully complied with.

Table 14.6: Summary of South Wall BESS Impact Assessment

Issue	Significance	Effect	Mitigation	Residual Impact
Surplus C&D Waste	Negligible	Not Significant	All surplus to be recycled	No residual impact
Construction materials	Low	Not Significant	Requirements easily met by regional construction materials capacity	No residual effects
Construction wastes	Low	Not Significant	Modular design reduces waste generation at source. Utilities connections to minimise waste generation	No residual impact
Office waste/welfare waste	Negligible	Not Significant	Small volume readily incorporated into existing management system	No residual impact

14.11 Cumulative Effects

All four projects will produce C&D waste during the creation of the development platforms. Estimates of the volumes of waste arising amount to some 2.5% of the total annual production of C&D waste in Ireland. There is a well-established recycling industry for these waste streams within Dublin and so it is considered that there are no significant cumulative effects on waste.

The two FlexGens will use demineralised water produced from potable water supplies. There is sufficient capacity within the established water supply network to provide this water and current EPA licensing of the discharge from Dublin Bay Power Station provides sufficient capacity to accommodate the additional discharges associated with Ringsend. A revision of the existing licence for Poolbeg will be required which will set discharge limits which will have no significant effect on the environment. No cumulative effect is anticipated from the use of de-mineralised water.

14.12 Summary of Mitigation and Monitoring

The summary of mitigation and monitoring measures for the four proposed developments are outlined in Chapter 18.

14.13 Summary of Significant Residual Effects

With the mitigation measures that have been identified as being incorporated into the design of this scheme it is considered there will be no significant effects on consequently no significant residual effects.

Through the adoption of these technologies to support renewable power generation it will be possible to reduce the reliance on burning peat, coal and oil for power generation which will have a beneficial effect, reducing mineral extraction.

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15 Traffic, Transportation and Material Assets

15.1 Introduction

This chapter provides an assessment of the potential effects and significance of the proposal of the two 75MW of flexible thermal generation (FlexGen) and two battery energy storage systems (BESS, one 75MW and one 30MW) on the Poolbeg Peninsula, on the local material assets. For the purpose of this assessment material assets can be taken to mean built services and infrastructure. Traffic is included because in effect traffic consumes roads infrastructure.

The proposed developments are in an area with existing power stations and other significant industry and the majority of the required infrastructure such as connection to the electric and gas networks is in place. No changes to this infrastructure are anticipated outside the redlines of the developments, therefore, impacts to these are not assessed in detail in this chapter. The water infrastructure is dealt with in detail in the Water (Chapter 9). Therefore, the focus of this assessment is on local roads and traffic. This assessment addresses predicted changes in traffic movements during the, construction and operational phases of development.

This assessment has been carried out in accordance to TII Guidelines and addresses predicted changes in traffic movements during the construction and operational phases of development.

The development is proposed in four locations within the Poolbeg Peninsula to the south of Dublin docks. The peninsula is generally developed with a variety of industrial activities such as power generation, oil storage, wastewater treatment and various businesses associated with the docks to the north. The peninsula is accessed by Pigeon House Road.

The assessment considers the effects of the proposed development on the local and regional traffic and transportation network. This traffic and transportation assessment include:

- Examination and description of the existing road network;
- Assessment of existing traffic flows;
- Estimated trip generation of proposed developments;
- Construction traffic impact assessment;
- Traffic impacts for operational years; and
- Impact on the wider transport network.

Mitigation measures are proposed, where relevant, to address any significant impacts which may occur.

15.2 Assessment Methodology

A Junction Turning Count Survey, commissioned by ESB, was undertaken by Irish Traffic Surveys Ltd in May 2019 to assess the volumes of vehicles passing through the junctions every 15 minutes. The classifications for vehicles recorded during the junction turning count survey includes:

- Car;

- LGV (Light Goods Vehicle);
- OGV1 (Other Goods Vehicle – 2 axle and 3 axle rigid commercial vehicles);
- OGV2 (Other Goods Vehicle – 4 axle and 3 axle rigid or more articulated vehicles);
- PSV (Public Service Vehicles);
- MCL (Motorcycle);
- PCL (Pedal Cycles); and
- PEDS (Pedestrian).

In addition to the Junction Turning Count Survey, a desktop study reviewing and analysing the relevant documents such as the previous assessments carried out for the purposes of the previous planning applications for the operational traffic, construction traffic and the impact on the existing traffic flow was undertaken.

15.3 Baseline Environment

15.3.1 Site Location

The four development sites are located on the Poolbeg Peninsula. The R131, which crosses over the River Liffey at Tom Clarke Bridge, is the main route into and out of the peninsula and is shared by several businesses including Ringsend Recycling Centre, the 3Arena and Dublin Port Company. The Poolbeg Peninsula is a heavily industrialised area and there are busy roads mostly transporting a regular stream of HGVs serving the numerous shipping tanker and ferry channels.

15.3.1.1 Poolbeg FlexGen

The proposed Poolbeg Flex Gen development is located entirely within the existing ESB Poolbeg Generating Station complex. Pigeon House Road approaches the site from the west and provides the main access to the ESB Generating station. There are no existing residential properties in close proximity to the proposed development. The nearest residential properties are in Sandymount approximately 1.7km from the site across Dublin Bay, the future development of the Irish Glass Bottle site may result in closer residences should the development go ahead (no residential planning application has been submitted to date).

The primary access is via the existing Poolbeg Generating Station entrance at Pigeon House Road with an alternative access, normally locked, via the existing entrance off the road immediately south of the site.

15.3.1.2 Ringsend FlexGen

The proposed site for the Ringsend FlexGen can be seen in Figure 15.1 below. The site is approximately 6.1ha in extent. The FlexGen development will be built on the northern part of the site with the southern area used for a temporary lay down area.

Access is via the accesses located on the southern boundary, from South Bank Road.

15.3.1.3 Poolbeg BESS

The proposed Poolbeg BESS site, shown in Figure 15.1 below, occurs entirely within the existing ESB Generating station complex. This site is approximately 5.3ha in extent. There are no residential properties in close proximity to the proposed development. The nearest residential properties are approximately 1.5km from the site across Dublin Bay.

The existing access to the site is along the Pigeon House Road via the main Generating Station entrance.

15.3.1.4 South Wall BESS

The South Wall BESS site, shown in Figure 15.1 below, is approximately 3.5ha in extent. Access to the site is from South Bank Road with additional access via Shellybanks Road to the east. The nearest residential properties are approximately 1.5km from the site across Dublin Bay.

15.3.2 Existing Traffic Flows

A Junction Turning Count Survey was completed by Irish Traffic Surveys Ltd from the 21st of May 2019 to the 23rd of May 2019 to assess the volumes of vehicles passing through the junctions every 15 minutes. The survey recorded Car, Light Goods Vehicle (LGV), Ordinary Goods Vehicle 1 (OGV1) ridged with up to 3 axels, Ordinary Goods Vehicle 2 (OGV2) ridged with 4 or more axels, Public Service Vehicles (PSV), Motorcycles (MCL), Pedal Cycles (PCL) and Pedestrians at each of the two junctions between the hours of 00:00 and 24:00.

Figure 15.1: below outlines the locations of the traffic survey sites.

Figure 15.1: Traffic Survey Locations



Table 15.1: Traffic Survey Site Locations

Traffic Survey Site No.	Location	Junction Type	Date of Survey
1	R131 / Pigeon House Road	Roundabout	21/05/2019 – 23/05/2019
2	South Bank Road / Pigeon House Road	T Junction	21/05/2019 – 23/05/2019

The AM and PM peak hour traffic were determined based on the data recorded by the Junction Turning Count Survey. An AM peak hour of 7:15 – 8:15 and a PM peak hour of 16:45-17:45 was recorded at Site 1 and an AM peak hour of 11:00-12:00 and a PM peak hour of 15:15-16:15 was recorded at Site 2.

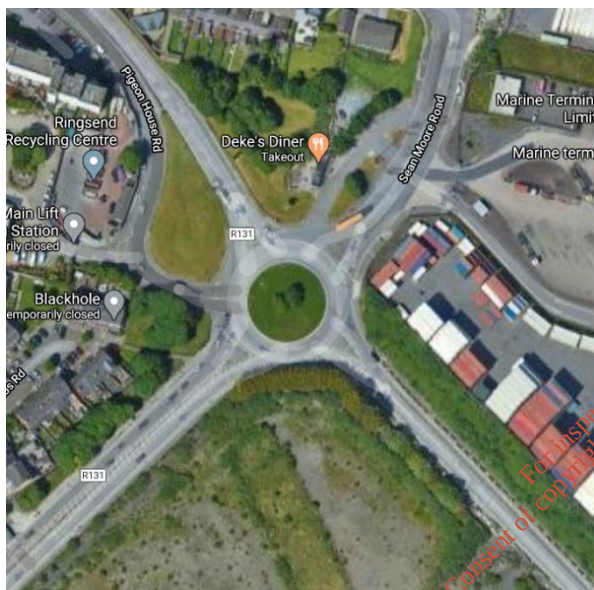
15.3.2.1 Traffic Survey Site 1

Traffic Survey Site 1 is pictured below in Figure 15.2. Below in Table 15.2 a breakdown of the total transport recorded travelling through the junction between the 21st of May 2019 to the 23rd of May 2019 between the hours of 00:00 – 24:00 and the total of each mode of transport during the AM peak hour and PM peak hour is given.

Table 15.2: Breakdown of Total Transport for Site 1

Mode of Transport	Total	AM Peak Hour	PM Peak Hour
PCL	1079	113	111
MCL	983	88	90
CAR	54214	4163	4045
LGV	7286	714	405
OGV1	1627	141	45
OGV2	7136	621	281
PSV	418	31	17
PEDS	1067	48	82
Total (ex PCL & PED)	71664	5758	4883

Figure 15.2: Traffic Survey Site 1



Source: Google maps

15.3.2.2 Traffic Survey Site 2

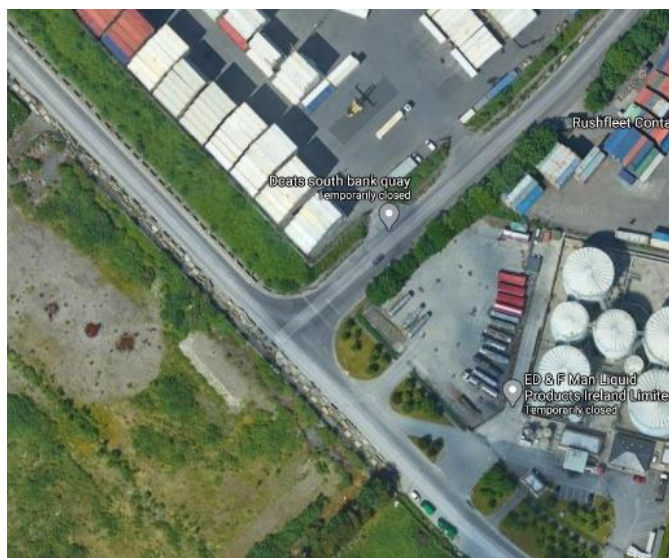
Traffic Survey Site 2 is pictured below in Figure 15.3. Below in Table 15.3 a breakdown of the total transport recorded travelling through the junction between the 21st of May 2019 to the 23rd of May 2019 between the hours of 00:00 – 24:00 and the total of each mode of transport during the AM peak hour and PM peak hour is given.

Table 15.3: Breakdown of Total Transport for Site 2

Mode of Transport	Total	AM Peak Hour	PM Peak Hour
PCL	575	12	34
MCL	126	5	9
CAR	4505	291	344
LGV	1273	124	124
OGV1	725	105	72
OGV2	4826	457	392
PSV	12	0	0

Mode of Transport	Total	AM Peak Hour	PM Peak Hour
PEDS	400	14	23
Total (ex PCL & PED)	11467	982	941

Figure 15.3: Traffic Survey Site 2



Source: Google maps

15.3.3 Public Transport

Rail

There is a DART line within 2 kilometres of the site. DART services operate every 10 minutes all day.

Bus

There are bus facilities within the vicinity of the site. Both route 1 and 47 pass approximately 2km from the site. Below is a timetable showing the bus routes and frequency.

Route	From	Towards	Frequency (Mon-Fri)	Frequency (Sat-Sun)
1	Sandymount	Santry	10-20 minutes	20-30 minutes
1	Santry	Sandymount	10-20 minutes	20-30 minutes
47	Belarmine	Poolbeg St.	30-75 minutes	60 minutes
47	Poolbeg St.	Belarmine	30-75 minutes	60 minutes

Source: dublinbus.ie

Walking and Cycling

There is a poor network of pedestrian paths along the Pigeon House Road with reinforced concrete bollards along the outside of the footpath and sections of South Bank Road containing no pedestrian paths. No designated cycle lanes are available. There is a good pedestrian network once you exit the industrial estate.

It should be noted that according to a Dublin City Council Memo dated the 14 August 2020 to the Lord Mayor and Elected Members of the City Council, titled: COVID-19 Mobility Measures Update states:

"The final design for a filtered permeability trial on Pigeon House Road has been approved. Signage for the trial is due to commence on 14 August with full bollards, signs, poles and planters in place on 16 August. The trial will run from 16 August to 27 September. A letter drop was carried out informing all local residents and businesses of the trial. The aim of the trial is to create a safer space for local residents and for the large volumes of pedestrians and cyclists using this route. Local vehicular access to Pigeon House Road will be retained although some journeys will be required to take a more circuitous route"

15.4 Poolbeg FlexGen Impact Assessment

15.4.1 Poolbeg FlexGen Construction Effects

Primary access to the development site will be via the existing Poolbeg Generating Power Station entrance located on Pigeon House Road, and via the internal roadways within the Poolbeg Power Generating Station. This existing entrance is controlled by security control positioned at the entrance.

During construction of the proposed development site, it is planned to use both this existing access off Pigeon House Road, and another existing access route from the ESB owned roadway to the south (unnamed), immediately adjacent to the proposed development site. There will be a need for the same access routes to be used for Emergency access and this will be liaised with the Poolbeg Power Generating Station. There are no envisaged changes required to the existing highway network as part of the development.

Construction equipment used will be typical of a project of this scale; including heavy duty earthmoving and excavating equipment, heavy goods vehicles (HGV's), concrete trucks, mobile cranes and hoists. The construction works, in summary, will involve site clearance and levelling, laying of foundations, including piling where required, for plant and buildings, structural steelwork and cladding, installation of plant and equipment, concrete works, hard surfacing and paving, landscaping and fencing.

It is anticipated that site works for the FlexGen development will commence in Q1 2021 with design, construction and commissioning activities lasting approximately 19 months.

15.4.1.1 Traffic Management During Construction

There will be a moderate, temporary impact on the local road network associated with the construction phase. This will occur in the context of other existing developments in the vicinity. During construction of the project no parking of cars by persons associated with the project will be permitted on the surrounding public roads. Parking arrangements (within the Poolbeg site) and other traffic mitigation measures and / or restrictions will be specified in the Construction Traffic Management Plan (CTMP) prepared in advance of construction commencement.

15.4.1.2 Construction Duration

The construction phase is anticipated to last approximately 19 months. However, the intensity of traffic will vary over the course of the construction programme.

The values referenced herein are only anticipated during peak periods and therefore representative of worst-case scenario. Due to the short term nature of those impacts these are not deemed to have a significant adverse impact on the local road network.

15.4.1.3 Working Hours

Normal working hours during the construction period are expected to be Monday to Friday 7am to 7pm and Saturday from 8am to 2pm. No construction works will take place outside these hours unless such work is required under exceptional circumstances or is carried out with the prior written approval of the Local Authority.

15.4.1.4 Personnel Volumes

A maximum daily workforce of approximately 60 people is expected during the peak period for construction works on site. However, typical daily workforce requirements will be less than this.

A vehicle occupancy rate of 1.25 is assumed and in the worst-case scenario this would result in average daily personnel movements of 96 vehicles at each site (approximately 48 vehicles per day). This would mean a requirement for up to 48 temporary car parking in the worst-case scenario.

Table 15.4, which has been given in the Poolbeg FlexGen Construction Method Statement prepared by ESB, below expands on the personnel and vehicle movements across envisaged construction phases (assumed 20 days per month).

It should be noted that workforce and traffic management calculations are based on the resumption of normal construction activities in 2021 following the Covid pandemic.

Table 15.4: Construction Personnel and Personnel Vehicle Movements

Description	Duration	Average Personnel on site per day	Average Personnel Vehicle Movements per day	Total per Construction Phase
Site Preparation	Months 1 to 4	20	32	2560
Heavy Civils & Building Erection	Months 5 to 12	30	48	7680
Mechanical and Electrical Erection	Months 13 to 15	60	96	5760
Commissioning	Months 16 to 19	60	96	7680
Total		39	63	23680

Source: Poolbeg FlexGen Construction Method Statement

15.4.1.5 Heavy Goods Vehicle Volumes

During construction it is estimated that there will be approximately 46 HGV movements per day during peak construction stages

The majority of the deliveries will be during the construction of the groundworks and the foundations for the proposed development. All civil construction materials are anticipated be delivered using standard rigid and articulated trucks, low-loaders and ready mix concrete trucks etc.

15.4.1.6 Abnormal Load Volumes

An abnormal load must adhere to the maximum weight limits set down by Road Traffic (Construction and Use of Vehicles) Regulations 2003, S.I. 5 of 2003 and the maximum height limit set down in Road Traffic (Construction and Use of Vehicles) (Amendment) Regulations 2008, S.I.366 of 2008. If any of these thresholds are exceeded, then the load is considered abnormal.

It is estimated that there will be approximately 30 abnormal load movements over the course of the development (15 abnormal loads). However, the final requirements will be established during detailed design and are dependent upon whether the proposed tanks, buildings will be delivered to site in modular format pre-fabricated or construction on site.

Appropriate permits will be sought in due course from DCC subject to final detailed design. As per the personnel vehicles and HGV's the final requirements and management of abnormal load vehicles will be detailed in the CTMP document.

15.4.2 Poolbeg FlexGen Operational Effects

15.4.2.1 Operational Life

The proposed development has a currently anticipated project lifetime of at least 25 years or as long as is required by grid infrastructure. While the plant will be available to operate 24 hours per day the operational period for the plant will be non-continuous.

The FlexGen plant is anticipated to operate during the peak demand periods, e.g. during early morning and evening peak periods.

Staffing

During its operational phase the FlexGen plant will be generally unmanned with periodic site inspections throughout the week by a site engineer and / or security and periodic maintenance inspections.

There will also be sporadic occasions when staff will be on site for meetings, monitoring or testing purposes, including those required in accordance with EPA IE licence requirements.

Site management systems will be implemented in accordance with ESB procedures and policies. Out of hours security services and maintenance will be arranged as required.

Operational Activity

Primary access to the will be via the existing ESB Poolbeg Generating Station entrance located on the Western boundary of the Generating Station site, from Pigeon House Road, and via the internal roadways within the existing Generating Station. As the proposed FlexGen development will for the most part be an unmanned site the traffic generated by the development in operation will relate to its maintenance, and intermittent deliveries and / or meetings on site. During the operational phase, the maximum number of vehicle movements anticipated is 2 per day.

It is not envisaged that there will be any mitigation measures required for the operation phase of the proposed development.

15.4.3 Poolbeg FlexGen Decommissioning

The Poolbeg FlexGen is expected to be operational for at least 25 years or as long as is required by grid infrastructure. On cessation of activities the plant will be decommissioned, and the site remediated and restored in line with any requirements of a planning permission and IE licence, unless otherwise authorised.

On decommissioning the following steps will be implemented:

- All plant and equipment will be dismantled and either sold, recycled or disposed of through licenced waste contractors.

- All waste will be removed to a licenced facility by licenced waste contractors.
- Services will be disconnected.
- The site will be left level.

A Decommissioning Management Plan (DMP) will be prepared in accordance with the IE licence. It will include details of decommissioning of all plant and equipment ensuring that there will be no environmental pollution. The modular nature of the FlexGen construction will assist any decommissioning in that modules can be disconnected and removed from site.

15.5 Poolbeg FlexGen Mitigation

Mitigation measures are detailed below in Section 15.13.

A high-level Construction Management Plan has been prepared and is included in Appendix 5A. A more detailed Demolition and Construction Traffic Management Plan (CTMP) will be prepared by prior to the commencement of the works.

15.6 Poolbeg BESS Impact Assessment

15.6.1 Poolbeg BESS Construction Effects

15.6.1.1 Traffic Management During Construction

The site access is via the Poolbeg Generating Station main gate on Pigeon House Road. Secondary access is available to the southern boundary of Poolbeg Generating Station and it is expected that this may only be limited to heavy deliveries, cranes or long vehicles.

Within the existing Poolbeg ESB landholding the development site will be fenced off, access for the demolition, construction and operational phases will be via the construction of a new access gate and entrance roadway onto the internal station road at the south of the proposed development. This entrance has clear lines of sight achievable in the East and West directions. Existing low speed limits for vehicles are enforced within the internal station roads.

The construction phase if the BESS development requires the removal of some existing buildings and plant to ground level commencing in Q1 2021 (subject to consent).

During the demolition the following steps will be implemented:

- All plant equipment will be dismantled and either sold, recycled or disposed of through licenced waste contractors.
- All waste will be removed to a licenced facility by licenced waste contractors.

A Demolition Management Plan will be prepared, which will include details of decommissioning of all plant and equipment ensuring that there will be no environmental pollution.

There will be a short term impact on the local road network associated with the construction phase. This will occur in the context of other existing developments in the vicinity.

During construction of the project no parking of cars by persons associated with the project will be permitted on the surrounding public roads. Parking arrangements and other traffic mitigation measures and / or restrictions will be specified in the Construction Traffic Management Plan (CTMP) prepared in advance of construction commencement.

15.6.1.2 Construction Duration

The construction phase is anticipated to last approximately 19 months. However, the intensity of traffic will vary over the course of the construction programme.

The values referenced herein are only anticipated during peak periods and therefore representative of worst case scenario. Due to the short term nature of those impacts these are not deemed to have a significant adverse impact on the local road network.

15.6.1.3 Working Hours

Normal working hours during the construction period are expected to be Monday to Friday 7 am to 7 pm and Saturday from 8 am to 2 pm. No construction works will take place outside these hours, unless such work:

- Is required under exceptional circumstances; or,
- Is carried out with the prior written approval of the local authority.

15.6.1.4 Personnel Volumes

An average daily workforce of 20-24 is anticipated on each of the BESS sites, reaching a maximum daily workforce of approximately 30-35 people during the peak period for construction works on each site. However, typical daily workforce requirements will be less than this.

A vehicle occupancy rate of 1.25 is assumed and in the worst-case scenario this would result in average daily personnel movements of 52 vehicles (approximately 26 vehicles per day) per BESS site. This would mean a requirement for up to 26 temporary car parking spaces in the worst-case scenario at each of the BESS sites.

It should be noted that workforce and traffic management calculations are based on the resumption of normal construction activities in 2021 following the Covid pandemic.

15.6.1.5 Heavy Goods Vehicles Volumes

During construction it is estimated that the maximum daily movements will be approximately 60 HGV movements (30 HGV vehicles) during peak construction stages which will take place during site preparation. Most of the vehicle movements for the project will be during the infrastructure and building construction works.

Other deliveries will include import of granular material, reinforcing steel, geo-textiles, electrical cable, switchgear and general building materials with the majority of those delivered to site during the initial construction stages. All civil construction materials are anticipated to be delivered using standard rigid and articulated trucks, low-loaders and ready-mix concrete trucks etc

15.6.1.6 Abnormal Load Volumes

It is estimated that there will be approximately 20 abnormal load movements over the course of the development (10 abnormal loads). However, the final requirements will be established during detailed design and are dependent upon whether the proposed equipment and infrastructure will be delivered to site in modular format, pre-fabricated or construction on site.

Appropriate permits will be sought in due course from DCC subject to final detailed design. As per the personnel vehicles and HGVs the final requirements and management of abnormal load vehicles will be detailed in the CTMP document.

15.6.2 Poolbeg BESS Operational Effects

15.6.2.1 Operational Life

The proposed development has a project lifetime of at least 25 years or as long as is required by grid infrastructure. While the plant will be available to operate 24 hours per day the BESS will typically be in standby mode and is anticipated to export power for a maximum of 3 hours per day, with power import typically anticipated to occur during night time periods over a maximum of 4 hours.

Staffing

During its operational phase the BESS plant will be unmanned with periodic site inspections by security and periodic maintenance inspections.

The BESS will be monitored and operated remotely by an assigned Systems Operator, where a dedicated management team with responsibility for managing, operating and maintaining the proposed BESS.

Site management systems will be implemented in accordance with ESB procedures and policies. Out of hours security services and maintenance will be arranged as required.

Traffic Management during Operation

Primary access to the site will be via the existing access to the Poolbeg Generating Station located at the western end of the overall site, from Pigeon House Road. As the proposed BESS development will for the most part be an unmanned site the traffic generated by the development in operation will relate to its maintenance, and intermittent deliveries and / or meetings on site. During the operational phase, the maximum number of vehicle movements anticipated is 2 per day.

15.6.3 Poolbeg BESS Decommissioning

The BESS development is expected to be operational for at least 25 years or as long as is required by grid infrastructure. On cessation of activities the batteries will be decommissioned, and the site remediated and restored, unless otherwise authorised.

On decommissioning the following steps will be implemented:

- All plant equipment will be dismantled and either sold, recycled or disposed of through licenced waste contractors;
- All waste will be removed to a licenced facility by licenced waste contractors;
- Services will be disconnected; and
- The site will be reinstated.

A Decommissioning Management Plan (DMP) will be prepared, which will include details of decommissioning of all plant and equipment ensuring that there will be no environmental pollution. Given the modular nature of the plant, decommissioning would be expected to be straightforward, each unit would be disconnected from the grid and craned onto a lorry and removed. Service runs would be removed, and materials taken off site. The foundations would be broken down to ground level and any surplus material taken off site. The site would be left as a flat development platform.

15.7 Poolbeg BESS Mitigation

Mitigation measures are detailed below in Section 15.13.

In addition, a high-level Demolition and Construction Management Plan has been prepared and includes measures to mitigate the traffic impacts. This is included in the CMP which is provided in Appendix 5A. Note that a more detailed Demolition and Construction Traffic Management Plan (CTMP) will be prepared by both the Demolition and Civil Enabling Works Contractor and EBOP Contractor prior to the commencement of the works.

15.8 Ringsend FlexGen Impact Assessment

15.8.1 Ringsend FlexGen Construction Effects

It is anticipated that site works for the FlexGen development will commence in Q1 2021 (subject to consent) with, construction and commissioning activities lasting approximately 19 months.

This timeline may vary depending on the time of year, weather conditions and the availability of specialised equipment.

15.8.1.1 Traffic Management During Construction

There will be a moderate, short term impact on the local road network associated with the construction phase. This will occur in the context of other existing developments in the vicinity.

During construction of the project no parking of cars by persons associated with the project will be permitted on the surrounding public roads. Parking arrangements and other traffic mitigation measures and / or restrictions will be specified in the Construction Traffic Management Plan (CTMP) prepared in advance of construction commencement.

15.8.1.2 Construction Duration

The construction phase is anticipated to last approximately 19 months. However, the intensity of traffic will vary over the course of the construction programme.

The values referenced herein are only anticipated during peak periods and therefore representative of worst-case scenario. Due to the short term nature of those impacts these are not deemed to have a significant adverse impact on the local road network.

15.8.1.3 Working Hours

Normal working hours during the construction period are expected to be Monday to Friday 7 am to 7 pm and Saturday from 8 am to 2 pm.

No construction works will take place outside these hours, unless such work:

- Is required under exceptional circumstances; or,
- Is carried out with the prior written approval of the local authority.

15.8.1.4 Personnel Volumes

A maximum daily workforce of approximately 60 people is expected during the peak period for construction works on site. However, typical daily workforce requirements will be less than this.

A vehicle occupancy rate of 1.25 is assumed and in the worst case scenario this would result in average daily personnel movements of 96 vehicles (approximately 48 vehicles per day). This would mean a requirement for up to 48 temporary car parking spaces in the worst case scenario.

It should be noted that workforce and traffic management calculations are based on the resumption of normal construction activities in 2021 following the Covid pandemic.

15.8.1.5 Heavy Goods Vehicle Volumes

The intended construction traffic movements are described further below:

- Civil and mechanical works; two-way heavy goods vehicle (HGV) movements are expected to peak during the early stages of construction. During this time, up to approximately 36 two-way traffic movements are expected per day

The majority of the deliveries will be during the construction of the groundworks and the foundations for the proposed development. All civil construction materials are anticipated to be delivered using standard rigid and articulated trucks, low-loaders and ready mix concrete trucks etc.

15.8.1.6 Abnormal Load Volumes

An abnormal load must adhere to the maximum weight limits set down by Road Traffic (Construction and Use of Vehicles) Regulations 2003, S.I. 5 of 2003 and the maximum height limit set down in Road Traffic (Construction and Use of Vehicles) (Amendment) Regulations 2008, S.I.366 of 2008. If any of these thresholds are exceeded, then the load is considered abnormal.

It is estimated that there will be approximately 30 abnormal load movements over the course of the development (15 abnormal loads). However, the final requirements will be established during detailed design and are dependent upon whether the proposed tanks, and buildings will be delivered to site in modular format, pre-fabricated or constructed on site.

Appropriate permits will be sought in due course from DCC subject to final detailed design. As per the personnel vehicles and HGVs the final requirements and management of abnormal load vehicles will be detailed in the CTMP document.

15.8.2 Ringsend FlexGen Operational Effects

15.8.2.1 Operational Life

The proposed development has a currently anticipated project lifetime at least 25 years or as long as is required by grid infrastructure. While the plant will be available to operate 24 hours per day the operational period for the plant will be non-continuous.

The FlexGen plant is anticipated to operate during the peak demand periods, e.g. during early morning and evening peak periods.

Staffing

During its operational phase the FlexGen plant will be generally unmanned with periodic site inspections throughout the week by a site engineer and / or security and periodic maintenance inspections.

There will also be sporadic occasions when staff will be on site for meetings, monitoring or testing purposes, including those required in accordance with EPA IE licence requirements.

Site management systems will be implemented in accordance with ESB procedures and policies. Out of hours security services and maintenance will be arranged as required.

Operational Activity

Access to the site will be via two existing access locations. As the proposed FlexGen development will for the most part be an unmanned site the traffic generated by the development in operation will relate to its maintenance, and intermittent deliveries and / or meetings on site. During the operational phase, the maximum number of vehicle movements anticipated is 2 per day.

It is not envisaged that there will be any mitigation measures required for the operation phase of the proposed development.

15.8.3 Ringsend FlexGen Decommissioning

The Ringsend FlexGen is expected to be operational for at least 25 years or as long as is required by grid infrastructure. On cessation of activities the plant will be decommissioned, and the site remediated and restored in line with any requirements of a planning permission and IE licence, unless otherwise authorised.

On decommissioning the following steps will be implemented:

- All plant and equipment will be dismantled and either sold, recycled or disposed of through licenced waste contractors;
- All waste will be removed to a licenced facility by licenced waste contractors;
- Services will be disconnected; and
- The site will be left level.

A Decommissioning Management Plan (DMP) will be prepared in accordance with the IE licence. It will include details of decommissioning of all plant and equipment ensuring that there will be no environmental pollution. The modular nature of the FlexGen construction will assist any decommissioning in that modules can be disconnected and removed from site.

15.9 Ringsend FlexGen Mitigation

Mitigation measures are detailed below.

A high-level Construction Management Plan has been prepared and is included in Appendix 5A. A more detailed Demolition and Construction Traffic Management Plan (CTMP) will be prepared by prior to the commencement of the works.

15.10 South Wall BESS Impact Assessment

15.10.1 South Wall BESS Construction Effects

15.10.1.1 Traffic Management during Construction

Associated with the construction phase there will be a moderate, temporary impact on the local road network. This will occur in the context of an established industrial area where the existing road network serves industrial developments – rather than a mix of uses that may be typical of a different receiving environment.

Construction plant movements will consist of HGV civil and mechanical works traffic, and a smaller number of other deliveries and abnormal loads.

15.10.1.2 Construction Duration

The construction phase will last 14 months but the intensity of traffic will not be present for the full duration of the construction phase. Therefore, it is not deemed to have any adverse impact on the local road network.

15.10.1.3 Working Hours

Normal working hours during the construction period are expected to be Monday to Friday 7am to 7pm; and Saturday 8am to 2pm.

No construction works will take place outside these hours, unless such work:

- Is required under exceptional circumstances; or,
- Is carried out with the prior written approval of the local authority.

15.10.1.4 Personnel Volumes

An average daily workforce of 20-24 is anticipated on each of the BESS sites, reaching a maximum daily workforce of approximately 30 people during the peak period for construction works on each site. However, typical daily workforce requirements will be less than this.

A vehicle occupancy rate of 1.25 is assumed and in the worst-case scenario this would result in average daily personnel movements of 52 vehicles (approximately 26 vehicles per day) per BESS site. This would mean a requirement for up to 26 temporary car parking spaces in the worst-case scenario at each of the BESS sites.

During construction the parking arrangements will be as specified in the Construction Traffic Management Plan (TMP).

It should be noted that workforce and traffic management calculations are based on the resumption of normal construction activities in 2021 following the Covid pandemic.

15.10.1.5 Heavy Goods Vehicles

During construction it is estimated that the maximum daily movements will be approximately 48 HGV movements (24 HGV vehicles) during peak construction stages which will take place during site preparation. Most of the vehicle movements for the project will be during the infrastructure and building construction works.

15.10.1.6 Other Deliveries

This will include the import of granular material, reinforcing steel, geo-textiles, electrical cable, switchgear and general building materials with the majority of those delivered to site during the initial construction stages. All civil construction materials are anticipated to be delivered using standard rigid and articulated trucks, low-loaders and ready-mix concrete trucks etc.

15.10.1.7 Abnormal Loads

These may include the delivery of battery units, transformers and prefabricated modular unit for the control building. During construction it is estimated that there will be maximum of 20 abnormal load movements over the course of the development (10 abnormal loads). However, the final requirements will be established during detailed design and are dependent upon whether the proposed equipment and infrastructure will be delivered to site in modular format, prefabricated or constructed on site.

15.10.2 South Wall BESS Operational Effects

15.10.2.1 Operational Life

Access to the site will be made from South Bank Road with additional access via Shellybanks Road to the east. There will be a connecting gate between this site and the adjacent Ringsend FlexGen to the west.

The proposed BESS will for the most part, be an unmanned site as it will be operated remotely. As such the traffic generated by the permanent development will be due to its maintenance, deliveries and meetings on site. For the operational phase, the maximum number of vehicle movements will be 4 per day. Overall, this represents a significant reduction in the traffic volumes accessing the site which, it is noted, currently facilitates a transportation / truck storage yard.

It is not envisaged that there will be mitigation measures required for the operation phase of the proposed development.

Staffing

During the operational phase, the BESS will generally be unmanned but may have daily visits by security and/or maintenance personnel. There will also be sporadic occasions when staff will be on site for meetings, monitoring or testing purposes.

The BESS will be monitored and operated remotely by an assigned Systems Operator, where a dedicated management team with responsibility for managing, operating and maintaining the proposed BESS.

Site management systems will be implemented in accordance with ESB procedures and policies. Out of hours security services and maintenance will be arranged as required.

Traffic Management during Operation

Access to the site will be made from South Bank Road with additional access via Shellybanks Road to the east. There will be a connecting gate between this site and the adjacent Ringsend FlexGen to the west.

The proposed BESS will for the most part, be an unmanned site as it will be operated remotely. As such the traffic generated by the permanent development will be due to its maintenance, deliveries and meetings on site. For the operational phase, the maximum number of vehicle

movements will be 4 per day. Overall, this represents a significant reduction in the traffic volumes accessing the site which, it is noted, currently facilitates a transportation / truck storage yard.

It is not envisaged that there will be mitigation measures required for the operation phase of the proposed development.

15.10.3 South Wall BESS Decommissioning

The BESS development is expected to be operational for at least 25 years or as long as is required by grid infrastructure. On cessation of activities the batteries will be decommissioned, and the site remediated and restored, unless otherwise authorised.

On decommissioning the following steps will be implemented:

- All plant equipment will be dismantled and either sold, recycled or disposed of through licenced waste contractors;
- All waste will be removed to a licenced facility by licenced waste contractors.
- Services will be disconnected; and
- The site will be reinstated.

Given the modular nature of the plant, decommissioning would be expected to be straightforward, each unit would be disconnected from the grid and craned onto a lorry and removed. Service runs would be removed and materials taken off site. The foundations would be broken down to ground level and any surplus material removed from site. The site would be left as a flat development platform.

15.11 South Wall BESS Mitigation

Mitigation measures are detailed below in Section 15.13.

A high-level Construction Management Plan has been prepared and is included in Appendix 5A. A more detailed Demolition and Construction Traffic Management Plan (CTMP) will be prepared by prior to the commencement of the works.

15.12 Traffic Effects

The individual projects and the cumulative effects at assessment sites 1 & 2 are presented below. As detailed above the existing morning (AM) traffic is a worse case than the PM. The peak personnel movement in the AM are a worst case for each of the developments. The AM personnel movement are presented below as a percentage of the total AM traffic.

Table 15.5: Summary of potential Effects – Survey Site 1

Construction Stage Site 1				
	AM Base Traffic	Development Traffic AM	AM Base + Development	Percentage Increase
Poolbeg FlexGen	5758	48	5806	0.83%
Poolbeg BESS		26	5784	0.45%
Ringsend FlexGen		48	5806	0.83%
South wall BESS		26	5784	0.45%
Totals (cumulative)	5758	148	5906	2.51%

Table 15.6: Summary of potential Cumulative Effects – Survey Site 2

Construction Stage Site 2				
	AM Base Traffic	Development Traffic AM	AM Base + Development	Percentage Increase
Poolbeg FlexGen	982	48	1030	4.66%
Poolbeg BESS		26	1008	2.58%
Ringsend FlexGen		48	1030	4.66%
South wall BESS		26	1008	2.58%
Totals (cumulative)	982	148	1130	13.10%

The results in the above tables show that the impact of the operational and construction traffic will have a minimal impact on the local road network.

15.13 Summary of Mitigation and Monitoring

The summary of mitigation and monitoring measures for the four proposed developments are outline in Chapter 18.

16 Population and Human Health

16.1 Introduction

This chapter of the EIAR reports the likely significant effects on population and human health as a result of the construction, operation and decommissioning of two 75MWe (megawatts electrical) of flexible thermal generation (FlexGen) and two battery energy storage systems (BESS, one 75MW and one 30MW) on the Poolbeg Peninsula ('the Proposed Developments').

The chapter describes: the national, regional, and local policy context; assessment methodology; baseline conditions; and an assessment of the likely significant effects of the Proposed Developments on population and human health receptors. Specifically, the effects on community resources, businesses, recreation and open space, human health and employment are included within the assessment. Where appropriate, it also identifies proposed mitigation measures to reduce or prevent the likely adverse population and human health effects arising as a result of the Proposed Developments, both individually and in combination, and the subsequent residual effects.

This Chapter is intended to be read as part of the wider EIAR, with particular reference to Chapter 15: Traffic and Transportation, Chapter 13: Air Quality, Chapter 11: Noise and Vibration and Chapter 10 Landscape and Visual and the Construction Management Plans submitted with the planning applications.

16.2 Methodology

16.2.1 Legislation, policy and guidance

The Draft EPA Guidelines (2017)⁹⁸ state that:

'in an EIAR, the assessment of impacts on population and human health should refer to the assessments of those factors under which human health effects might occur, as addressed elsewhere in this EIAR e.g. under the environmental factors of air, water, soil etc'

The Draft Guidelines state that factors to consider include employment, human health (with reference to other topics such as water and air) and amenity (e.g. effects on amenity uses of a site or of other areas in the vicinity, although this may be addressed under the Landscape and Visual Assessment'). The Draft Guidelines further states that:

'EIA legislation does not generally require assessment of land-use planning, demographic issues or detailed socio-economic analysis. Coverage of these can be provided in a separate Planning Application Report to accompany an application for planning permission. This should be avoided in an EIAR, unless issues such as economic or settlement patterns give rise directly to specific new developments.'

The population and health assessment is also guided by national and European EIA regulations and the Irish Government's planning policy and guidance, including:

⁹⁸ <https://www.epa.ie/pubs/advice/ea/EPA%20EIAR%20Guidelines.pdf>

- EIA Directive 2011/92/EU on the assessment of the effect of certain public and private projects on the environment (codification), as amended by EIA Directive 2014/52/EU (the EIA Directive);
- Dublin City Development Plan 2016- 2022;
- Dublin Port Masterplan 2040 - MP2 Project;
- Regional Spatial and Economic Strategy for Eastern and Midland Region;
- Draft Guidelines on the Information to be Contained in Environmental Impact Statements Environmental Protection Agency 2002 (and revised draft guidelines 2017);
- Draft Advice Notes for Preparing Environmental Impact Statements (Environmental Protection Agency, 2015); and
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (2018).

Chapter 4 of this EIAR contains analysis of the specific national, regional and local policy relevant to the construction, operation and decommissioning of the four proposed developments.

16.2.2 Scope of Assessment

16.2.2.1 Technical scope

The scope of the population and human health assessment includes the following assessment areas:

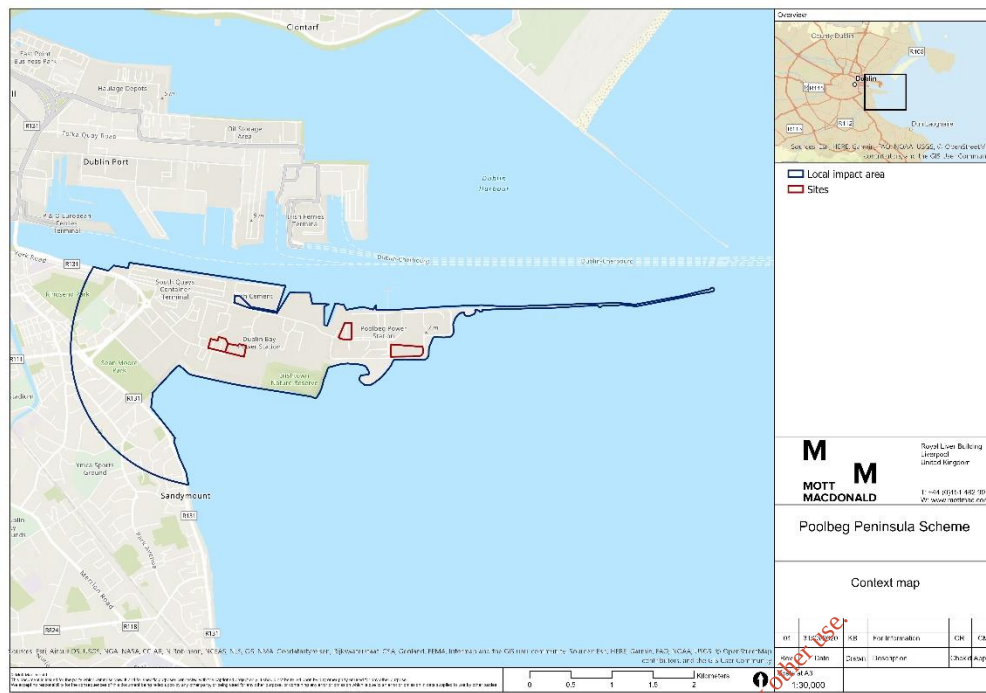
- Impacts on residential receptors (potential impacts on access/amenity and loss of land)
- Impacts on community facilities
- Impacts on access and the operation of businesses
- Impacts on recreation, open space, including on walking and cycling routes
- Human health impacts
- Impacts on the economy from increased employment
- Impacts on development land

16.2.2.2 Spatial scope

Baseline data has been calculated for a Local Impact Area (LIA) and Wider Impact Area (WIA). The LIA and WIA have been identified based on professional judgement and are defined as follows:

- The LIA: The area on Poolbeg Peninsula located within 1 km of the Proposed Developments. This is the primary study area for this topic and will be used to assess all effects with the exception of employment. This excludes Dublin Harbour and Dublin Port which is less than 1 km from the Proposed Developments but is separated from Poolbeg Peninsula by Dublin Harbour. The LIA is shown on Figure 16.1.
- The WIA: The area covered by Dublin City Council local authority. The WIA will be used for the consideration of employment effects.

Figure 16.1: Local Impact Area



Source: Mott MacDonald

16.2.2.3 Temporal scope

The Proposed Developments have the potential to impact on the environment during the following phases

- Construction phase – for the duration of the construction activities for each of the proposed developments, which are outlined in Chapter 5.
- Operational phase – the Proposed Developments are expected to be operational for at least 25 years or as long as is required by grid infrastructure.
- Decommissioning phase – following the operational phase, the Proposed Developments will be decommissioned.

16.2.3 Assessment Methodology

This section describes the methodology which has been used for the assessment of the population and health which may be affected by the construction or operation of the Proposed Developments.

The assessment methodology comprises first assessing the sensitivity of receptors that have the potential to be affected by the construction or operation of the Proposed Developments. A combination of the sensitivity of receptor and the magnitude of impact in relation to the receptor has been used to determine the significance of effects. Effects have been determined as neutral, slight, moderate, large or very large, and either beneficial or adverse.

16.2.3.1 Sensitivity of Receptors

The sensitivity (value) of receptors has been determined according to the descriptions provided within Table 16.1.

Table 16.1: Sensitivity assessment criteria

Sensitivity	Sensitivity criteria
High	- An already vulnerable receptor with very little capacity and means to absorb changes. - No alternative resources, access arrangements or opportunities are available within an easily accessible distance. - A highly or frequently accessed resource
Medium	- A non-vulnerable receptor with limited capacity and means to absorb changes. - A limited range of alternative resources, access arrangements or opportunities are available within and easily accessible distance. - A moderately, or semi-frequently accessed resource.
Low	- A non-vulnerable receptor with sufficient capacity and means to absorb changes. - A wide range of alternative resources, access arrangements or opportunities are available within an easily accessible distance. - An infrequently accessed resource.

16.2.3.2 Magnitude of Impact

The magnitude of impact is determined by the predicted deviation from the baseline conditions and the scale of the effect. The qualitative magnitude of each impact (in the absence of quantitative data) has been determined according to the descriptions provided within Table 16.2.

Table 16.2: Magnitude assessment criteria

Magnitude	Criteria
Major	- Affects receptors within the LIA and potentially beyond - Affects many receptors - A substantial change (positive or negative) from the baseline position - A large widening or narrowing of inequalities - Majority of communities affected have high levels of deprivation - The impact is permanent or long-term (e.g. more than a year) - Requires considerable intervention to return to the baseline
Moderate	- Affects receptors beyond the application site into the LIA - Affects a moderate number of receptors - A notable change (positive or negative) from the baseline position - A widening or narrowing of inequalities - Majority of communities affected have average or above average levels of deprivation - The duration over which the impact is experienced is medium-term (e.g. between six months and a year) - May require some intervention to return to the baseline
Minor	- Affects receptors in the LIA only, and mostly within the application site - Affects a small number of receptors - A slight change (positive or negative) from the baseline position with evidence available to demonstrate change

	• A slight widening or narrowing of inequalities with evidence available to demonstrate change • Few people in a community affected (positively or negatively) • The duration over which the impact is experienced is short-term (e.g. between three and six months) • Baseline returns without intervention or with only limited intervention
Negligible	• Affects receptors within the site boundary only • Baseline remains consistent/no discernible change (positive or negative) from the baseline position • Majority of communities affected are not deprived • Impact is very short-term (e.g. less than three months) • Affects the well-being of very few receptors

16.2.3.3 Significance of Effect

Subsequent to identifying an appropriate receptor sensitivity and magnitude of impact using Tables 16.1 and 16.2 the likely significance category and overall significance of effects has been assessed by using the matrix provided within Chapter 3 along with professional judgment to consider site specific factors that may be of relevance.

16.2.4 Assessment Approach

A desktop study of the four facilities and surrounding area was undertaken to establish the baseline conditions. This involved reviewing national guidance documents, publicly available data sets and resources within the LIA and WIA.

A range of publicly available datasets has used to form the baseline and inform the assessment. Sources include; the Irish Central Statistics Office (An Bhliain-Oifig Staidrimh) datasets including the 2016 Census, Population Estimates, the Annual Population Survey and Geographical Profiles of Income in Ireland. Health related data from the E Health Ireland 'Open Data Portal' service was also utilised. Information on Public Rights of Way (PRoWs) and other walking and cycling routes has been obtained using data from Dublin City Council.

To achieve a holistic assessment of health, inputs from a number of other EIA topics are relevant. The following relevant EIA topic chapters will provide input to potential health effects requiring assessment related to their area of expertise:

- Air quality and climate (Chapter 13);
- Landscape and visual (Chapter 10);
- Noise and vibration (Chapter 11); and
- Traffic and transport (Chapter 15).

The assessment of each health effect will draw on quantitative and qualitative analysis and stakeholder engagement. The assessment will be professional judgements with appropriate reference to supporting evidence.

16.2.5 Assumptions and Limitations

The following assumptions should be considered when reading this population and human health assessment:

- The construction and operation of the Proposed Developments will not render any properties unusable and there will be no displacement of local residents; and

- The level of community infrastructure provision will not alter as a result of the Proposed Developments. It is assumed that health, education and community provision will remain unchanged.

The following limitations should be considered when reading this population and health assessment:

- The assessment of the potential for significant effects has been carried out against a benchmark of current baseline conditions. As with any dataset, these may be subject to change over time, which may influence the findings of the assessment and could lead to the assessment being subject to statistical time lag;
- Information presented within this assessment is from 2018 and 2019 and therefore does not reflect any changes to the economy and employment associated with the Covid-19 pandemic in 2020. As comparable information becomes available for the 2020 period, the baseline can be updated if required; and
- No formal consultation or primary research, such as engagement with affected resources, has been undertaken in production of this chapter.

16.3 Scoping of Potential Population and Human Health Effects

A Scoping Report has not been submitted to the local planning authority. This section provides confirmation of the scope of assessment and outlines the evidence base for insignificant effects which have not been included for further assessment.

Table 16.3: Scope of Assessment for Construction and Operation

Receptor	Assessment Type	Construction	Operation	Rationale
Residential receptors	Impacts on residential receptors (potential impacts on access/amenity and loss of land)	• Scoped Out	• Scoped Out	<i>There is not expected to be any loss of residential land as a result of the Proposed Developments. Therefore, impacts from loss of private property will not be considered further.</i> <i>The nearest residential properties are in Leukos Road which is over 500 m from the westernmost of the four sites. Therefore, there are unlikely to be impacts on access or amenity due to the distance between the construction activities and the receptors. Effects on residential receptors during the construction and operation will not be included within the assessment.</i>
Community resources	Impact on community resources	• Scoped In	• Scoped Out	<i>There is not expected to be any loss community land as a result of the Proposed Developments. The nearest community facility is Roslyn Park College which is located in Sandymount located over 500 m from the Proposed Developments. Therefore, impacts on community facilities will not be considered during operational period. Impacts from an increase in traffic on the</i>

Receptor	Assessment Type	Construction	Operation	Rationale
				amenity of community resources within the LIA will be considered during the construction period.
Businesses	Impacts on access and the operation of businesses	● Scoped In	● Scoped Out	Access to business properties is not expected to be affected during operation of the four facilities as the Proposed Developments are located on land already owned by the applicant and no additional land is required. Therefore, the impact on the operation and access to businesses will not be considered during the operational phase. Disruption to access from increased traffic and other construction activities are anticipated during the construction phase.
Recreation and open space	Impacts on recreation, open space, including on walking and cycling routes	● Scoped In	● Scoped In	There may be temporary/short term disruption for recreational receptors during the construction and operation of the Proposed Developments which will temporarily impact on people's use and enjoyment of the Peninsula area.
Human health receptors	Human health impacts	● Scoped In	● Scoped In	Construction of the Proposed Developments could potentially have human health effects for nearby recreational and residential receptors during construction and operation of the Proposed Developments through environmental impacts such as noise or air quality impacts.
The Economy in WIA	Impacts on the economy from increased employment	● Scoped In	● Scoped Out	None of the Proposed Developments will be permanently manned. Due to this, there are not anticipated to be impacts on the local economy in relation to job, creation and employment opportunities during the operational phase. There are anticipated to be positive effects on the local economy and employment in relation to job creation, the supply chain, and employment opportunities during construction of the Proposed Developments.
Development land	Impacts on development land	● Scoped Out	● Scoped In	The Dublin City Council Development Plan (DCCDP) sets out a range of land use zoning objectives in order to promote the orderly development of Dublin City by eliminating potential conflicts between incompatible land uses and to establish an efficient basis for investment in public infrastructure and facilities. All proposed FlexGen and BESS plants are located in lands designated as Employment (Heavy) – Zone Z7, as illustrated within DCDP Map F. The objective of Z7 zoning is to provide for heavy industrial development, specifically; "To provide for the protection and creation of industrial uses and facilitate opportunities for employment creation including Port Related Activities". Adjacent to the South Wall BESS and FlexGen sites is the Poolbeg West Strategic Development Zone (SDZ). This SDZ will provide both commercial and residential use and is projected to accommodate up to one million square feet of commercial floorspace and 3,500 residential

Receptor	Assessment Type	Construction	Operation	Rationale
				united. Further details of this development area are provided in Chapter 6 of this EIAR. As this development land is adjacent to the South Wall BESS and FlexGen sites, the potential effects on the ability to develop this land, as a result of the operational impacts of the proposed development, will be considered in this chapter. Construction impacts have been scoped out as potential temporary/short term effects from increased traffic, air quality and noise will not compromise the ability to develop the land in the long term.

16.4 Baseline Environment

A range of publicly available data sources have been used to determine the community and health baseline. These include statistics on population and employment from the Central Statistics Office (CSO) and data from local authorities.

16.4.1 Population

The total population of the LIA as of 2018 is 5,801. The total population of the WIA is 554,554. The table below shows the population and age baseline in the LIA, WIA, Dublin (County Area) and Ireland.

Table 16.4: Population baseline data

Area	Total pop.	Age		
		Under 16	16-64	65+
LIA	5,801	16%	72%	12%
WIA	554,554	16%	71%	13%
Dublin (County Area)	1,347,359	20%	67%	12%
Ireland	4,761,865	22%	64%	13%

Source: 2016 census

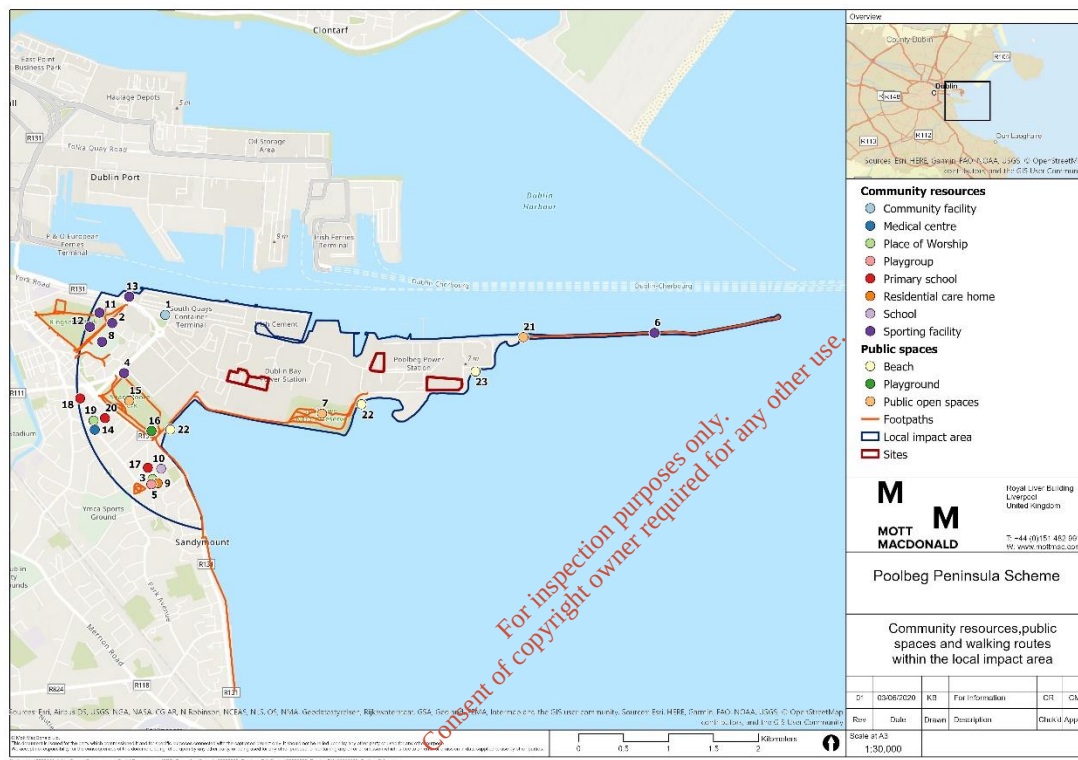
The proportion of older people and children within the LIA is consistent with the WIA. However, the WIA and LIA have a slightly lower proportion of children and a relatively higher proportion of people of working age people compared to Dublin and Ireland.

The closest residential settlements to the Proposed Developments are Ringsend located approximately 500 m to the west.

16.4.2 Community Resources

There are multiple community resources located in the LIA, especially in Ringsend, Irishtown and Sandymount, as shown in Figure 16.2 below. The sporting facilities are concentrated mostly in Ringsend and Irishtown. In Sandymount are located almost all other facilities, including 4 schools, 2 places of worship, 1 residential care home, 1 medical centre.

Figure 16.2: Community resources



Source: Mott MacDonald

Table 16.5: Community resources within the LIA

Number	Community Resources
1	1st Port of Dublin, Ringsend Sea Scouts
2	Cambridge Boys Football Club
3	Christ Church Sandymount
4	Clanna Gael Fontenoy GAA Club
5	Gymboree at Sandymount

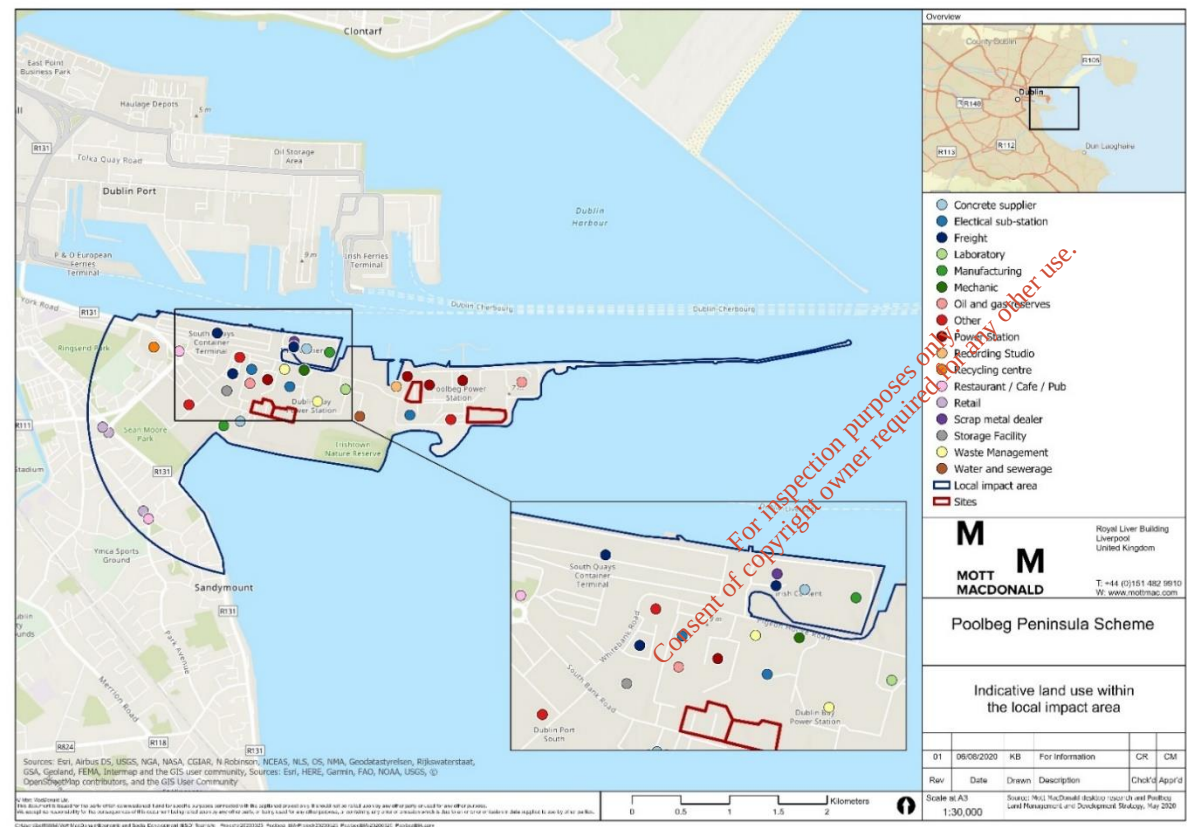
Number Community Resources

6	Half Moon Swimming and Water Polo Club
7	Irishtown Nature Reserve
8	Irishtown Stadium
9	Mount Tabor Residential Home
10	National Learning Network Roslyn Park
11	Outdoor basketball courts
12	Playing fields at Ringsend Park
13	Poolbeg Yacht and Boat Club
14	Sandymount Road Medical Centre
15	Sean Moore Park
16	Sean Moore Park playground
17	Shellybanks Educate Together School
18	St Matthew's National School
19	St. Mary's, Star of the Sea
20	Star of the Sea Boys National School
21	Accessway to Poolbeg Lighthouse
22	Strand / beach amenity area
22	Strand / beach amenity area
23	Shellybanks beach and amenity area

16.4.3 Businesses

Business properties are primarily located within the western half of the Poolbeg Peninsula, most of which are industrial facilities such as freight businesses, power stations, manufacturing units and recycling/waste management facilities. There are also a small number of retail businesses to the west of the Proposed Developments close to the Sean Moore Park.

Figure 16.3: Indicative land uses within the LIA



Source: Mott MacDonald

16.4.4 Development Land

Chapter 6 outlines relevant strategic infrastructure development land. The Poolbeg West Planning Scheme was approved by An Bord Pleanála on April 9th 2019 (subject to modifications). The Poolbeg West SDZ illustrated in Figure 6.4 within Chapter 6. Poolbeg West SDZ consists of a spatial area of 34 hectares between Pigeon House Road, Sean Moore Road, Sean Moore Park and extends in an easterly direction along Sandymount Strand as far as Irishtown Nature Park. The area has the capacity to provide up to 3,500 residential units and one million square feet of commercial floorspace. Recreation and Open Space.

On the southern edge of Poolbeg Peninsula there is a walkway that leads to the Irishtown Nature Park, the Irishtown nature reserve and Poolbeg beach. This is shown on Figure 16.2 above. At low-tide, Sandymount Strand (accessed via Poolbeg beach) is also a popular and much-used amenity for walking and birdwatching. The Clanna Gael Fontenoy GAA Club and associated parkland area (Sean Moore Park) are located within the LIA and form part of the walkway to Irishtown Nature Park.

The Dublin Bay biosphere reserve is located on the South-Western edge of the Poolbeg Peninsula. The reserve is home to internationally recognised rare habitats and species and is a popular amenity for walking and birdwatching.

The iconic red lighthouse, to the east of Poolbeg Peninsula, is accessible by a lengthy seawall that attracts sightseers, anglers & cyclists. During summer months, the seawall is also used as starting and finishing point for sea swims hosted by the Half-Moon Swimming and Water Polo Club.

16.4.5 Health

Trinity Deprivation Index 2016 is used for the measurement and comparison of relative levels of deprivation in Ireland. The index uses indicators of material deprivation from the 2016 Census to calculate a measure of deprivation for small areas in Ireland. Most LIA residents (71%) live in the 20% most deprived neighbourhoods in the country. This is double the proportion living in the most deprived neighbourhoods within the WIA and much higher than Dublin and national averages (15% and 19% respectively). However, the percentage of LIA residents living in 20% least deprived neighbourhoods in the country (29%) is higher than the WIA, Dublin and Ireland proportions. This means that the residents within the LIA are either within the most or least deprived quintiles.

Table 16.6: Population by deprivation quintiles

Area	Most deprived quintile	Second most deprived quintile	Third most deprived quintile	Fourth most deprived quintile	Least deprived quintile
LIA	71%	0%	0%	0%	29%
WIA	35%	21%	15%	13%	16%
Dublin (County)	15%	9%	6%	5%	6%
Ireland	19%	19%	19%	20%	22%

Source: Trinity Deprivation Index 2016

The table below presents key health indicators, with data provided for the WIA where this is publicly available. Statistics are generally available at the local authority levels (Dublin) so there is limited data available for the LIA and WIA. As there is limited data available for the LIA, it is

difficult to comment on the health profile. However, the WIA generally perform worse than the Dublin and Ireland average on public health indicators. This includes the number of deaths from respiratory and cardiovascular diseases, and the number of people with a long-term health problem or disability.

Table 16.7: Public health baseline data

Measure	LIA	WIA	Dublin	Ireland
Long-term health problem or disability (2016)	14%	15%	13%	14%
Life expectancy at birth (male, 2015-17)	n/a	n/a	78.3	78.3
Life expectancy at birth (female, 2015-17)	n/a	n/a	82.7	82.7
Deaths of diseases from respiratory system (per 100,000, 2016)	n/a	96.1	29.8	34.7
Deaths from diseases of the cardiovascular system (per 100,000, 2016)	n/a	210.3	157.6	194.0
Physically active adults (% , 2013)	n/a	n/a	73.3	72.6

Source: 2011 Irish Life Table, Central Statistics Office; 2016 Census; 2016 Deaths Occurrence, Central Statistics Office.

16.4.6 Employment and economic activity

The following table shows the economic baseline for the LIA, WIA, Dublin County and Ireland. Employment in the LIA is higher than the WIA, Dublin County and Ireland rates. The unemployment rate in the LIA is consistent with the WIA, Dublin and Ireland rates.

Table 16.8: Economic activity and employment baseline data

Area	Economically active (15 and over)	Student	Employment rate (15-64)	Unemployment (15-64)	Retired
LIA	4,928	9%	62%	6%	13%
WIA	471,341	11%	56%	7%	14%
Dublin	1,087,406	12%	57%	7%	13%
Ireland	3,755,313	11%	53%	7%	15%

Source: Census 2016

Major industries of employment in the LIA are shown in Table 16.9 below.

Table 16.9: Industries of employment

Industry	LIA	WIA	Dublin	Ireland
Agriculture, forestry and fishing	0.1%	0.1%	0.3%	4%
Building and construction	3%	3%	4%	5%
Manufacturing industries	5%	5%	7%	11%
Commerce and trade	35%	27%	29%	24%
Transport and communication	14%	13%	12%	9%
Public administration	4%	5%	5%	5%
Professional services	21%	23%	23%	24%
Other	19%	23%	20%	18%

Source: Census 2016

Commerce and trade are the most relevant sources of employment in the LIA, with the proportion of people employed in these industries higher when compared to WIA, Dublin and national proportions. The southern section of Dublin Port is located on the Poolbeg Peninsula. The section of Dublin Port located on Poolbeg peninsula contains multiple container companies

(Marine Terminal LTD and Rushfleet containers) and a container terminal which may account for the large number of those in the commerce and trade industry. Manufacturing industries are in line with WIA and Dublin averages, but notably lower compared to national averages. Transport and communication industry are in line with WIA and Dublin averages, but higher than the Ireland average.

16.5 Poolbeg FlexGen Impact Assessment

16.5.1 Poolbeg FlexGen Construction Effects

16.5.1.1 Community resources

The closest community resource to the FlexGen Development is Roslyn Park College which is located in Sandymount. There will be no impacts on access or use of this facility as it is located over 1km from the site, to the south west of the FlexGen Development on the other side of Dublin Bay. Air quality, noise and transport assessments have not identified any effects on this receptor or any other community receptors within the LIA as a result of construction activities.

Roslyn Park College is considered to have a high sensitivity in accordance with Table 16.1 as there are no alternative resources within a similar area which could provide the same service to the community. However, the magnitude of change is negligible as there is no discernible change from the baseline conditions from activities that may cause disturbance such as changes in access, noise or air quality. The significance of effect on community resources, in relation to access and use is slight adverse (not significant) during construction with mitigation.

16.5.1.2 Businesses

As identified on Figure 16.3, Poolbeg Peninsula accommodates activities typical of a port, including berthing facilities, container storage yards and associated infrastructure. It also has a significant concentration of Dublin City's utilities and infrastructure providers. The closest facilities to the FlexGen Development are located to the north of the site and are the National Oil Reserve Agency and Poolbeg Combined Cycle Gas Turbine.

During construction, access for construction vehicles will be via the main Generating Station entrance via Pigeon House Road off the R131 and from an existing ESB-owned road to the south of the site. Pigeon House Road is shared by several businesses such as City Analysts Limited, Hammond Lane Metal Recycling, and Rushfleet Containers. Given businesses on Poolbeg Peninsula have complementary land uses, providing a range of infrastructure and manufacturing services, it is anticipated that increases in construction traffic will not significantly impact the ability of these businesses to operate or reduce footfall. Additionally, the Transport Assessment in Chapter 15 states that parking arrangements and other traffic mitigation measures will be specified in the Construction Traffic Management Plan (CTMP) which will be prepared in advance of construction commencing. This will include potential impacts on businesses, resulting from construction traffic, and will also outline mitigation measures.

The businesses on Poolbeg Peninsula are well established but their sensitivity is high as the businesses are frequently utilised and accessed and have limited capacity to move to alternative premises due to the size and complexity of the operations.

The magnitude of impact on users of the commercial properties along the construction route is minor as construction activity would potentially disrupt access to the commercial properties for a protracted period due to increased traffic. Mitigation measures, which will be detailed in the CTMP, would be put in place to reduce potential impacts from increased traffic and to maintain

access. As such, there is a direct, slight adverse (not significant) effect on businesses with mitigation.

16.5.1.3 Recreation and open space

Figure 16.2 above shows the areas utilised for recreation on the Poolbeg Peninsula. The Poolbeg FlexGen Site borders a road and a walking and cycling route that provides access to Poolbeg Beach to the west and Poolbeg Lighthouse to the east.

No construction activities are proposed outside of the Poolbeg FlexGen Site boundary and the site is bounded by an earth bund and vegetation, along its eastern and southern boundaries. The ability for the community to use and enjoy the area will not be substantially impacted as people will still be able to access and use these popular routes.

Increased traffic from construction vehicles may cause short term disturbance along local routes. This is likely to have an impact on people trying to access popular recreational areas, such as Irishtown Stadium by causing temporary delays or requiring alternative routes. However, these are likely to be temporary effects and will be managed using a traffic mitigation measures and / or restrictions specified in the CTMP which will be prepared in advance of construction commencing. A CTMP will be prepared by the D&B Contractor prior to the commencement of the works. Requirements for traffic signage, banksmen and vehicle routing onto the Pigeon House Road shall be addressed diligently. If a secondary access is required for the deliveries of transformer units or otherwise the Contractor is to adopt similar mitigation measures and take full account of the proximity of all public use.

Areas of open and recreational space within the LIA are of medium sensitivity value as there are limited alternative facilities for communities near to Poolbeg Peninsula. Additionally, on the Peninsula there is Poolbeg lighthouse which people travel from further afield to visit. The magnitude of change is negligible as the community would still be able to access and use the walking and cycling routes and areas of open and recreational space. Therefore, the significance of effect on communities in relation to their ability to use recreational and open space is slight adverse (not significant) during construction with mitigation.

16.5.1.4 Human health

The HSA land use planning department have been informed of the proposed planning applications..

The requirements of the Safety, Health and Welfare at Work (Construction) Regulations, 2006, as amended will be implemented and complied with in full during the construction phase of the development. However, as with any construction project, there is still potential for adverse impacts associated with the natural environment and nuisance (such as noise and dust emissions). The potential for these effects is discussed separately within the respective chapters. There will be no significant offsite health risks.

Given the industrial nature of the site, there is the possibility for some of the material which is being removed from site to being contaminated or hazardous, which may put construction workers at risk. Chapter 8 Land, Soils and Ground Conditions concluded that a slight adverse effect is predicted.

Given that there are no residential properties and community facilities located in close proximity to the FlexGen Development, and walking and cycling routes are buffered by existing vegetation and bunds, the sensitivity of human health receptors is considered to be low.

Impacts on human health arise as a result of changes to environmental conditions, such as increases in noise or a reduction in air quality. Chapter 13 Air Quality states that, provided the mitigation measures designed to manage dust generation are adhered to, the impact on air quality during construction in particular will not be significant. This includes the pro-active control of fugitive dust. Chapter 11: Noise and Vibration states that there are no potential significant adverse effects due to construction noise. Therefore, the magnitude of change is considered to be negligible during construction for human health receptors.

In addition to the mitigation outlined above in relation to noise and air quality, the requirements of the Safety, Health and Welfare at Work (Construction) Regulations, 2006, as amended will be implemented and complied with in full during the construction phase of the development.

Taking into consideration the mitigation measures, there is likely to be a short term slight adverse effect (not significant) on human health receptors.

16.5.1.5 Employment

The works are expected to last approximately 19 months. The total number of construction staff on-site will vary during the construction phase of the works and are expected to peak at approximately 60 persons.

The sensitivity of economic receptors within WIA is medium and the magnitude of change is minor given the size of the construction industry in the WIA compared to the number of construction workers required. The construction phase would have a beneficial, though short term effect, on the local economy through enhancing local labour and supporting local businesses through direct spend on materials for the FlexGen Development. Therefore, there is likely to be a direct, short term slight beneficial effect (not significant) on economic receptors within the WIA.

16.5.2 Poolbeg FlexGen Operational Effects

16.5.2.1 Recreation and Open Space

The operation of the FlexGen Development is within the existing boundary of the ESB Poolbeg Generation Station and is consistent with the existing character of the area. Recreational receptors using the coastal walking route between Sandymount and the Great South Wall are not likely to be significantly affected as access to the route is not impacted and users will be used to the presence of manufacturing, electrical and port related activities on the Poolbeg Peninsula.

As mentioned above, the areas of open and recreational space are of medium sensitivity as there are limited alternative facilities for communities' near to Poolbeg Peninsula. The magnitude of change is considered to be negligible as recreational receptors would still be able to access and use the walking and cycling routes and other areas of open space on Poolbeg Peninsula. Therefore, during operation there is likely to be a permanent adverse effect on communities within WIA in relation to their ability to use recreational and open space which is considered to be negligible (not significant).

16.5.2.2 Development Land

The sensitivity of Poolbeg West SDZ is medium as it is a strategically important piece of land which is allocated for both residential and commercial use. The development of the land is considered to be of both economic and social importance to Dublin. The FlexGen Development is located on the eastern portion of the Poolbeg Peninsula and shares no boundaries with the

Poolbeg West SDZ. The development of Poolbeg WDZ will not be inhibited by the FlexGen Development. Given this, the impact on the ability for the Poolbeg WDZ to developed is considered to be negligible.

Therefore, during operation, there is likely to be a neutral effect (not significant) on development land.

16.5.2.3 Human Health

The FlexGen development has been designed and will be operated in accordance with the requirements of the Industrial Emissions Directive (IED) and will have no adverse effect in terms of human health due to the location and scale of the proposed upgrade and refurbishment. The air quality and noise chapters have not identified any significant effects on receptors during operation of the FlexGen Development.

The Poolbeg FlexGen is located within the 300m consultation distance of the National Oil Reserves Agency Ltd. (NORA) fuel storage establishment located to the north which is notified to the Health and Safety Authority (HSA) as an Upper Tier Seveso site and is subject to the provisions of the Chemical Act (Control of Major Accident Hazards Involving Dangerous Substances) Regulations 2015 (S.I 209 of 2015).

The proposed development has been subject to a Land Use Planning assessment in accordance with the HSA guidance. Copies of the COMAH assessment is provided in Appendix 5D of this EIAR.

Therefore, during operation, there is likely to be a permanent, long-term slight adverse effect (not significant) on human health receptors.

16.5.3 Poolbeg FlexGen Decommissioning Effects

The Poolbeg FlexGen Development is expected to be operational for at least 25 years or as long as is required by grid infrastructure. On cessation of activities the plant will be decommissioned, and the site remediated and restored in line with any requirements of a planning permission and IE licence, unless otherwise authorised.

A Decommissioning Management Plan (DMP) will be prepared. It is recommended that the effects on population and human health receptors are evaluated once the specific activities associated with decommissioning are confirmed. This is because the effects on population and human health receptors should be based on the demographic profile of the population of the area at that time, and the location and use of facilities important to the community such as areas of open space, recreational and community facilities. Potential effects should be managed through the DMP and other relevant assessments methods.

16.6 Poolbeg FlexGen Mitigation

There are no additional mitigation measures proposed to address population and human health effects in relation to the FlexGen Development. It is assumed that relevant mitigation measures would be implemented and are proposed within Chapter 13: Air Quality, Chapter 11: Noise and Vibration and Chapter 15: Traffic, Transport and Material Assets of this EIAR.

16.7 Poolbeg BESS Impact Assessment

16.7.1 Poolbeg BESS Construction Effects

16.7.1.1 Community resources

The closest community resource to the Poolbeg BESS Development is Roslyn Park College which is located in Sandymount. There will be no impacts on access or use of the facility as it is located over 1km from the site, across Dublin Bay. Air quality, noise and transport assessments have not identified any effects on this receptor as a result of construction activities.

Roslyn Park College is considered to have a high sensitivity in accordance with Table 16.1, as there are no alternative resources within a similar area which could provide the same service. However, the magnitude of change is negligible as there is no discernible change from the baseline conditions from activities that may cause disturbance such as changes in access, noise or air quality. In accordance with Figure 3.1 in Chapter 3, the significance of effect on community resources, in relation to access and use is considered to be slight adverse (not significant) during construction.

16.7.1.2 Businesses

As identified on Figure 16.3, Poolbeg Peninsula accommodates activities typical of a port and has a significant concentration of Dublin City's utilities and infrastructure providers such as a wastewater treatment works and electricity generation and transmission infrastructure and industrial and light industrial uses. The closest facilities to the Poolbeg BESS Development are located to the east of the site and are the National Oil Reserve Agency and Poolbeg Combined Cycle Gas Turbine. This land is also owned by the applicant. To the south west of the site is the Ringsend Waste Water Treatment Works.

During construction, the Traffic Assessment in Chapter 15 concluded that there will be a moderate, short term impact on the local road network. This will occur in the context of an established industrial area where the existing road network serves industrial developments – rather than a mix of uses that may be typical of a different receiving environment. Additionally, the Transport Assessment in Chapter 15 states that parking arrangements and other traffic mitigation measures and / or restrictions will be specified in the CTMP which will be prepared in advance of construction commencement. This will specify how the potential impacts on businesses, resulting from construction traffic, is mitigated.

The sensitivity of businesses on Poolbeg Peninsula are high as they are frequently utilised/accessed and have limited capacity to move to alternative premises due to the size and complexity of the operations.

The magnitude of impact on users of the commercial properties along the construction route is considered to be negligible as construction activity would potentially disrupt access to the commercial properties for a protracted period due to increased traffic. Mitigation measures, which will be detailed in the CTMP, would be put in place to reduce potential impacts from increased traffic and to maintain access. As such, there is considered to be a direct, slight adverse effect on businesses (not significant) with mitigation.

16.7.1.3 Recreation and open space

Figure 16.2 above shows the areas utilised for recreation on the Poolbeg Peninsula. The Poolbeg BESS Development is located approximately 100 metres north of Irishtown Nature Reserve and Poolbeg Beach.

As no construction activities are proposed outside of the Poolbeg BESS Development site, the ability for the community to use and enjoy the area will not be significantly impacted. This is because access to the beach will still be possible via Pigeon House Road and the walking and cycling route, along the eastern side of Poolbeg Peninsula, will not be impacted. The construction activities within the Poolbeg BESS Development site are considered to be sufficient distance away to not adversely impact users use and enjoyment of the area.

The areas of open and recreational space within the LIA are of medium sensitivity value as there are limited alternative facilities for communities' near to Poolbeg Peninsula. Additionally, the Peninsula is known to provide unique opportunities to access nature sites and there is no alternative way to access the lighthouse. The magnitude of change is considered to be negligible as the community would still be able to access and use areas of open space and recreation. The industrial activity forms part of the existing environment on the Peninsula. Therefore, the significance of effect on communities in relation to their ability to use recreational and open space is considered to be slight adverse (not significant) during construction.

16.7.1.4 Human health

The HSA land use planning department have been informed of the proposed planning applications..

The requirements of the Safety, Health and Welfare at Work (Construction) Regulations, 2006, as amended will be implemented and complied with in full during the construction phase of the development. However, as with any construction project, there is still potential for adverse impacts associated with the natural environment and nuisance (such as noise and dust emissions). The potential for these effects is discussed separately within the respective chapters. There will be no significant offsite health risks.

Given the industrial nature of the site, there is the possibility for some of the material which is being removed from site to being contaminated or hazardous, which may put construction workers at risk. Chapter 8 Land, Soils and Ground Conditions concluded that a slight adverse effects is predicted.

Given that, there are no residential properties and community facilities located in close proximity to the Poolbeg BESS Development, and walking and cycling routes are approximately 100 m away, the sensitivity of human health receptors is considered to be low.

Chapter 13 Air Quality states that provided the mitigation measures are adhered to, the impact on air quality and from dust during construction will not be significant. This includes the pro-active control of fugitive dust. Chapter 11: Noise and Vibration states that there are that there are no potential significant adverse effects due to construction noise. Therefore, the magnitude of change is considered to be negligible during construction for human health receptors.

In addition to the mitigation outlined above in relation to noise and air quality, the requirements of the Safety, Health and Welfare at Work (Construction) Regulations, 2006, as amended will be implemented and complied with in full during the construction phase of the development.

Taking into consideration the mitigation measures, there is likely to be a short term slight adverse effect (not significant) on human health receptors

16.7.1.5 Employment

The works are expected to last 19 months. The total number of construction staff on-site will vary during the construction phase of the works which are expected to peak at approximately 35 persons.

The sensitivity of economic receptors within WIA is medium and the magnitude of change is negligible given the size of the construction industry in the WIA compared to the number (30) of construction workers required. The construction phase would have a beneficial, though short term effect, on the local economy through enhancing local labour and supporting local businesses through direct spend on materials for the Poolbeg BESS Development. Therefore, there is likely to be a direct, short term slight beneficial effect (not significant) on economic receptors within the WIA.

16.7.2 Poolbeg BESS Operational Effects

16.7.2.1 Recreation and Open Space

The operation of the Poolbeg BESS Development is within the existing boundary of the ESB Poolbeg Generation Station and is consistent with the existing character of the area. As such, recreational receptors using nearby recreation and open spaces such as the coastal walking route between Sandymount and Great South Wall, Poolbeg Beach or Irishtown Nature Park are not likely to be significantly affected as access to these areas not impacted and users will be used to the presence of manufacturing, electrical and port related activities on the Poolbeg Peninsula.

As mentioned above, the areas of open and recreational space on the Peninsula are of medium sensitivity value. The magnitude of change is considered to be negligible as the community would still be able to access and use the walking and cycling routes and areas of open space. Therefore, during operation there is likely to be a permanent adverse effect on communities within WIA in relation to their ability to use recreational and open space which is considered to be **negligible (not significant)**.

16.7.2.2 Development Land

The sensitivity of Poolbeg West SDZ is medium as it is a strategically important piece of land which is allocated for both residential and commercial use. The development of the land is considered to be of both economic and social importance to Dublin. The Poolbeg BESS Development is located on the eastern portion of the Poolbeg Peninsula and shares no boundaries with the Poolbeg West SDZ. The development of Poolbeg WDZ will not be inhibited by the FlexGen Development. Given this, the impact on the ability for the Poolbeg WDZ to developed is considered to be negligible.

Therefore, during operation, there is likely to be a neutral effect (not significant) on development land.

16.7.2.3 Human Health

The Noise and Vibration chapter has not identified any significant effects on receptors during operation of the Poolbeg BESS Development. Given this, the magnitude of impact is considered to be negligible during operation.

Therefore, during operation, there is likely to be a permanent, long-term slight adverse effect (not significant) on human health receptors. It should be noted that the Poolbeg BESS Development is located within an existing IE Licence boundary but is not a licensable activity.

16.7.3 Poolbeg BESS Decommissioning Effects

The Poolbeg BESS Development is expected to be operational for at least 25 years or as long as is required by grid infrastructure. On cessation of activities the plant will be decommissioned, and the site remediated and restored in line with any requirements of a planning permission and IE licence, unless otherwise authorised.

A Decommissioning Management Plan (DMP) will be prepared. It is recommended that the effects on population and human health receptors are evaluated once the specific activities associated with decommissioning are confirmed. This is because the effects on population and human health receptors should be based on the demographic profile of the population of the area at that time, and the location and use of facilities important to the community such as areas of open space, recreational and community facilities. Potential effects should be managed through the DMP and other relevant assessments methods

16.8 Poolbeg BESS Mitigation

There are no additional mitigation measures proposed to address population and human health effects in relation to the Poolbeg BESS Development. It is assumed that relevant mitigation measures would be implemented and are proposed within Chapter 13: Air Quality, Chapter 11: Noise and Vibration and Chapter 15: Traffic, Transportation and Material Assets of this EIAR.

16.9 Ringsend FlexGen Impact Assessment

16.9.1 Ringsend FlexGen Construction Effects

16.9.1.1 Community resources

The closest community resource to the Ringsend FlexGen Development is Roslyn Park College which is located in Sandymount. There will be no impacts on access or use of the facility as it is located over 550 m from the site, across Dublin Bay. Air quality, noise and transport assessments have not identified any effects on this receptor as a result of construction activities.

Roslyn Park College is considered to have a high sensitivity in accordance with Table 16.1, as there are no alternative resources within a similar area which could provide the same service. However, the magnitude of change is negligible as there is no discernible change from the baseline conditions from activities that may cause disturbance such as changes in access, noise or air quality. The significance of effect on community resources, in relation to access and use is considered to be slight adverse (not significant) during construction with mitigation.

16.9.1.2 Businesses

As identified on Figure 16.3 Poolbeg Peninsula accommodates activities typical of a port, including berthing facilities, container storage yards and associated infrastructure. It also has a significant concentration of Dublin City's utilities and infrastructure providers such as a

wastewater treatment works and electricity generation and transmission infrastructure and industrial and light industrial uses.

During construction, access for construction vehicles will be from South Bank Road. Given businesses on Poolbeg Peninsula have complementary land uses, providing a range of infrastructure and manufacturing services, it is anticipated that increases in construction traffic will not significantly impact the ability for these businesses to operate. Additionally, the Transport Assessment in Chapter 15 states that parking arrangements and other traffic mitigation measures and / or restrictions will be specified in the Construction Traffic Management Plan (CTMP) prepared in advance of construction commencement. This will be developed and ensure that potential impacts on businesses, resulting from construction traffic, is mitigated.

The businesses on Poolbeg Peninsula are well established but their sensitivity high as the businesses are frequently utilised and accessed and have limited capacity to move to alternative premises due to the size and complexity of the operations.

The magnitude of impact on users of the commercial properties along the construction route is considered to be negligible as construction activity would potentially disrupt access to the commercial properties for a protracted period due to increased traffic. Mitigation measures, which will be detailed in the CTMP, would be put in place to reduce potential impacts from increased traffic and to maintain access. As such, there is considered to be a direct, slight adverse effect on businesses (not significant) with mitigation

16.9.1.3 Recreation and open space

Figure 16.2 above shows the areas utilised for recreation on the Poolbeg Peninsula. The Ringsend FlexGen Site is approximately 150 m to the north of Dublin Bay and the walking and cycling route along the eastern edge of Poolbeg Peninsula. As no construction activities are proposed outside of the Ringsend FlexGen Site boundary and the site, the ability for the community to use and enjoy recreational areas will not be impacted.

Areas of open and recreational space within the LIA are of medium sensitivity value as there are limited alternative facilities for communities' near to Poolbeg Peninsula. Additionally, the Peninsula is known to provide unique opportunities to access nature sites which people travel from further afield to visit. The magnitude of change is considered to be negligible as the community would still be able to access and use the walking and cycling routes and areas of open and recreational space. Therefore, the significance of effect on communities in relation to their ability to use recreational and open space is considered to be slight adverse (not significant) during construction.

16.9.1.4 Human health effects

The HSA land use planning department have been informed of the proposed planning applications.

The requirements of the Safety, Health and Welfare at Work (Construction) Regulations, 2006, as amended will be implemented and complied with in full during the construction phase of the development. However, as with any construction project, there is still potential for adverse impacts associated with the natural environment and nuisance (such as noise and dust emissions). The potential for these effects is discussed separately within the respective chapters. There will be no significant offsite health risks.

Given the industrial nature of the site, there is the possibility for some of the material which is being removed from site to being contaminated or hazardous, which may put construction workers at risk. Chapter 8 Land, Soils and Ground Conditions concluded that a slight adverse effect is predicted.

The noise assessment concluded that there are no potential significant adverse effects due to construction noise. Chapter 13 Air Quality states that provided the mitigation measures are adhered to, the impact on air quality and from dust in particular during construction will not be significant. This includes the pro-active control of fugitive dust. Therefore, the magnitude of change is considered to be negligible during construction for human health receptors.

In addition to the mitigation outlined above in relation to noise and air quality, the requirements of the Safety, Health and Welfare at Work (Construction) Regulations, 2006, as amended will be implemented and complied with in full during the construction phase of the development.

Taking into consideration the mitigation measures, there is likely to be a short term slight adverse effect (not significant) on human health receptors

16.9.1.5 Employment effects

The works are expected to last 19 months. The total number of construction staff on-site will vary during the construction phase of the works and are expected to peak at approximately 60 persons.

The sensitivity of economic receptors within WIA is medium and the magnitude of change is minor given the size of the construction industry in the WIA compared to the number of construction workers required. The construction phase would have a beneficial, though short term effect, on the local economy through enhancing local labour and supporting local businesses through direct spend on materials for the Ringsend FlexGen Development. Therefore, there is likely to be a direct, short term slight beneficial effect (not significant) on economic receptors within the WIA.

16.9.2 Ringsend FlexGen Operational Effects

16.9.2.1 Recreation and Open Space

The operation of Ringsend FlexGen is consistent and compatible with the existing land uses of the broader Poolbeg Peninsula. Chapter 10 Landscape and Visual states that the site is in close proximity to the ESB Dublin Bay Power Station, which is a near-identical and compatible land use. Therefore, the operation of Ringsend FlexGen is consistent and compatible with the existing land uses of the broader Poolbeg Peninsula. The operation of Ringsend FlexGen will not detract from the amenity value of the area and people's ability to use and enjoy the existing walking and cycling paths as well as the coastal area.

As mentioned above, the areas of open and recreational space are of medium sensitivity value. The magnitude of change is considered to be negligible as recreational receptors would still be able to access and use the walking and cycling routes and other areas of open space on Poolbeg Peninsula. Therefore, during operation there is likely to be a permanent adverse effect on communities within WIA in relation to their ability to use recreational and open space which is considered to be negligible (not significant).

16.9.2.2 Development Land

The sensitivity of Poolbeg West SDZ is medium as it is a strategically important piece of land which is allocated for both residential and commercial use. The development of the land is considered to be of both economic and social importance to Dublin.

The Ringsend FlexGen Development is located adjacent to eastern portion of the Poolbeg West SDZ. The Poolbeg West SDZ was granted within the context of some adjacent land uses being industrial. Given that the Ringsend FlexGen Development is consistent with the existing industrial use of the site and the character of the Poolbeg Peninsula, it will not impact on the ability for the Poolbeg West SDZ to be developed. The Ringsend FlexGen Development brings industrial activities closer to the boundary of the Poolbeg West SDZ, but it is not envisaged that this will prevent development of the site. Given this, the impact on the ability for the Poolbeg West WDC to be developed is considered to be low.

Therefore, during operation, there is likely to be a permanent slight adverse effect (not significant) on development land.

16.9.2.3 Human Health

The Ringsend FlexGen Development has been designed and will be operated in accordance with the requirements of the Industrial Emissions Directive (IED) and will have no adverse effect in terms of human health due to the location and scale of the proposed upgrade and refurbishment. The air quality and noise chapters have not identified any significant effects on receptors during operation of the FlexGen Development. Given this, the magnitude of impact is considered to be negligible during operation.

The Ringsend FlexGen is located within the 300m consultation distance of another NORA fuel storage site located to the northeast. This NORA site is also notified to the HSA as an Upper Tier Seveso site and as such the proposed development at Ringsend is subject to the provisions of the Chemical Act (Control of Major Accident Hazards Involving Dangerous Substances) Regulations 2015 (S.I 209 of 2015). The existing Dublin Bay Power Station is notified to the HSA as a Lower Tier Seveso site.

Each of the proposed developments has been subject to a Land Use Planning assessment in accordance with the HSA guidance. Copies of the COMAH assessment is provided in Appendix 5D of this EIAR.

Therefore, during operation, there is likely to be a permanent, long-term slight adverse effect (not significant) on human health receptors.

16.9.3 Ringsend FlexGen Decommissioning Effects

The Ringsend FlexGen Development is expected to be operational for at least 25 years or as long as is required by grid infrastructure. On cessation of activities the plant will be decommissioned, and the site remediated and restored in line with any requirements of a planning permission and IE licence, unless otherwise authorised.

A Decommissioning Management Plan (DMP) will be prepared. It is recommended that the effects on population and human health receptors are evaluated once the specific activities associated with decommissioning are confirmed. This is because the effects on population and human health receptors should be based on the demographic profile of the population of the area at that time, and the location and use of facilities important to the community such as areas

of open space, recreational and community facilities. Potential effects should be managed through the DMP and other relevant assessments methods.

16.10 Ringsend FlexGen Mitigation

There are no additional mitigation measures proposed to address population and human health effects relation to the Ringsend FlexGen Development. It is assumed that relevant mitigation measures would be implemented and are proposed within Chapter 13: Air Quality, Chapter 11: Noise and Vibration and Chapter 15: Traffic, Transportation and Material Assets of this EIAR.

16.11 South Wall BESS Impact Assessment

16.11.1 South Wall BESS Construction Effects

16.11.1.1 Community resources

The closest community resource to the Ringsend BESS Development is Roslyn Park College which is located in Sandymount. There will be no impacts on access or use of the facility as it is located over 550 m from the site, across Dublin Bay. Air quality, noise and transport assessments have not identified any effects on this receptor as a result of construction activities.

Roslyn Park College is considered to have a high sensitivity in accordance with Table 16.1, as there are no alternative resources within a similar area which could provide the same service.

However, the magnitude of change is negligible as there is no discernible change from the baseline conditions from activities that may cause disturbance such as changes in access, noise or air quality. The significance of effect on community resources, in relation to access and use is considered to be slight adverse (not significant) during construction with mitigation.

16.11.1.2 Businesses

As identified on Figure 16.3, Poolbeg Peninsula accommodates activities typical of a port, including berthing facilities, container storage yards and associated infrastructure. It also has a significant concentration of Dublin City's utilities and infrastructure providers such as a wastewater treatment works and electricity generation and transmission infrastructure and industrial and light industrial uses.

During construction, access for construction vehicles to the site will be via Southbank Road or Shellybanks Road. The entrance to the proposed development for both the construction and operational phases will be via the construction of a new access gate and entrance roadway in the south-west corner of the site. This entrance will extend onto the existing Southbank Road. During the construction phase it is also anticipated that the existing gate at the east of the site onto the Shellybanks Road will be available. There are also no changes required to the existing highway. Given businesses near to the Proposed Development also provide industrial services, it is anticipated that the increases in construction traffic will not significantly impact the ability for these businesses to operate. Additionally, the Transport Assessment in Chapter 15 states that parking arrangements and other traffic mitigation measures will be specified in the Construction Traffic Management Plan (CTMP) which will be prepared in advance of construction commencing. This will include potential impacts on businesses, resulting from construction traffic.

The businesses on Poolbeg Peninsula are well established but their sensitivity high as the businesses are frequently utilised and accessed and have limited capacity to move to alternative premises due to the size and complexity of the operations.

The magnitude of impact on users of the commercial properties along the construction route is considered to be minor as construction activity would potentially disrupt access to the commercial properties for a protracted period due to increased traffic. Mitigation measures, which will be detailed in the CTMP, would be put in place to reduce potential impacts from increased traffic and to maintain access. As such, there is considered to be a direct, slight adverse (not significant) effect on businesses with mitigation.

16.11.1.3 Recreation and open space

Figure 16.2 above shows the areas utilised for recreation on the Poolbeg Peninsula. The South Wall BESS site is approximately 150 m north of Dublin Bay and the walking and cycling route along the edge of Poolbeg Peninsula. No construction activities are proposed outside of the South Wall BESS site boundary. The ability for the community to use and enjoy the area will not be substantially impacted as people will still be able to access and use these popular routes.

Areas of open and recreational space within the LIA are of medium sensitivity value as there are limited alternative facilities for communities' near to Poolbeg Peninsula. Additionally, on the Peninsula there is Poolbeg lighthouse which people travel from further afield to visit and which the walking and cycling route along the eastern edge of the Peninsula leads to. The magnitude of change is considered to be negligible as the community would still be able to access and use the walking and cycling routes and areas of open and recreational space. Therefore, the significance of effect on communities in relation to their ability to use recreational and open space is considered to be slight adverse (not significant) during construction.

16.11.1.4 Human health

The HSA land use planning department have been informed of the proposed planning applications.

The requirements of the Safety, Health and Welfare at Work (Construction) Regulations, 2006, as amended will be implemented and complied with in full during the construction phase of the development. However, as with any construction project, there is still potential for adverse impacts associated with the natural environment and nuisance (such as noise and dust emissions). The potential for these effects is discussed separately within the respective chapters. There will be no significant offsite health risks.

Given the industrial nature of the site, there is the possibility for some of the material which is being removed from site to being contaminated or hazardous, which may put construction workers at risk. Chapter 8 Land, Soils and Ground Conditions concluded that a slight adverse effect is predicted.

Given that there are no residential properties and community facilities located in close proximity to the Ringsend BESS Development, and walking and cycling routes are buffered by existing vegetation and bunds, the sensitivity of human health receptors is considered to be low.

Impacts on human health arise as a result of changes to environmental conditions, such as increases in noise or a reduction in air quality. Chapter 13 Air Quality states that, provided the mitigation measures designed to manage dust generation are adhered to, the impact on air quality during construction in particular will not be significant. This includes the pro-active control of fugitive dust. Chapter 11 Noise and Vibration states that there are that there are no potential

significant adverse effects due to construction noise. Therefore, the magnitude of change is considered to be negligible during construction for human health receptors.

16.11.1.5 Employment

The construction works are expected to last approximately 14 months. The total number of construction staff on-site will vary during the construction phase of the works and are expected to peak at approximately 30 persons.

The sensitivity of economic receptors within WIA is medium and the magnitude of change is negligible given the size of the construction industry in the WIA compared to the number of construction workers required. The construction phase would have a beneficial, though temporary effect, on the local economy through enhancing local labour and supporting local businesses through direct spend on materials for the South Wall BESS Development. Therefore, there is likely to be a direct, temporary slight beneficial effect (not significant) on economic receptors within the WIA.

16.11.2 South Wall BESS Operational Effects

16.11.2.1 Recreation and Open Space

The operation of the South Wall Development is within the existing boundary of the site which is currently not used for any specific purpose. Recreational receptors using the coastal walking route between Sandymount and the Great South Wall are not likely to be significantly affected as access to the route is not impacted and users will be used to the presence of manufacturing, electrical and port related activities on the Poolbeg Peninsula.

As mentioned above, the areas of open and recreational space are of medium sensitivity. The magnitude of change is considered to be negligible as recreational receptors would still be able to access and use the walking and cycling routes and other areas of open space on Poolbeg Peninsula. Therefore, during operation there is likely to be a permanent adverse effect on communities within WIA in relation to their ability to use recreational and open space which is negligible (not significant).

16.11.2.2 Development Land

The sensitivity of Poolbeg West SDZ is medium as it is a strategically important piece of land which is allocated for both residential and commercial use. The development of the land is considered to be of both economic and social importance to Dublin.

The South Wall BESS Development is located adjacent to eastern portion of the Poolbeg West SDZ. The Poolbeg West SDZ was granted within the context of some adjacent land uses being industrial. Given that the South Wall BESS Development is consistent with the existing industrial use of the site and the character of the Poolbeg Peninsula, it will not impact on the ability for the Poolbeg West SDZ to be developed. The South Wall BESS Development brings industrial activities closer to the boundary of the Poolbeg West SDZ, but it is not envisaged that this will prevent development of the site. Given this, the impact on the ability for the Poolbeg West SDZ to be developed is low.

Therefore, during operation, there is likely to be a permanent slight adverse effect (not significant) on development land.

16.11.2.3 Human Health

The and Noise and Vibration chapter has not identified any significant effects on receptors during operation of the South Wall BESS Development. Given this, the magnitude of impact is considered to be negligible during operation.

Therefore, during operation, there is likely to be a permanent, long-term slight adverse effect (not significant) on human health receptors.

16.11.3 South Wall BESS Decommissioning Effects

The South Wall BESS Development is expected to be operational for at least 25 years or as long as is required by grid infrastructure. On cessation of activities the plant will be decommissioned, and the site remediated and restored in line with any requirements of a planning permission and IE licence, unless otherwise authorised.

It is recommended that the effects on population and human health receptors are evaluated once the specific activities associated with decommissioning are confirmed. This is because the effects on population and human health receptors should be based on the demographic profile of the population of the area at that time, and the location and use of facilities important to the community such as areas of open space, recreational and community facilities. Potential effects should be managed through the DMP and other relevant assessments methods.

16.12 South Wall BESS Mitigation

There are no additional mitigation measures proposed to address population and human health effects in relation to the South Wall BESS Development. It is assumed that relevant mitigation measures would be implemented and are proposed within Chapter 13: Air Quality, Chapter 11: Noise and Vibration and Chapter 15: Traffic, Transportation and Material Assets of this EIAR

16.13 Summary of Mitigation and Monitoring

The summary of mitigation and monitoring measures for the four proposed developments are outline in Chapter 18.

16.14 Summary of Significant Residual Effects

Based on the assessment provided within this chapter, all four of the Proposed Developments located on the Poolbeg Peninsula are not considered to give rise to any significant population and human effects.

16.15 Cumulative Effects

16.15.1 Introduction

The impacts that are relevant to the assessment of cumulative and in-combination effects on population and human health receptors will include:

- Impacts on residential receptors (potential impacts on access/amenity and loss of land)
- Impacts on community facilities
- Impacts on access and the operation of businesses
- Impacts on recreation, open space, including on walking and cycling routes

- Human health impacts
- Impacts on the economy from increased employment

The Dublin City Council Development Plan (DCCDP) sets out a range of land use zoning objectives in order to promote the orderly development of Dublin City As mentioned above, all four of the proposed FlexGen and BESS plants are located in lands designated as Employment (Heavy) – Zone Z7. The proposed land uses are consistent with the aspirations of the DCCDP.” Therefore, the impact on development land has been scoped out of the cumulative assessment during construction and operation as there will be no significant impact on the land use of the area.

16.15.2 Assessment Methodology

A worst-case scenario has been utilised and that considers the potential impacts on human health receptors from the construction and operation of all four of the Proposed Developments plus the developments outlined in Table 6.2 in Chapter 6.

Similar to the assessment approach used for a foregoing assessment in the preceding sections of this chapter, to achieve a holistic assessment of health, inputs from a number of other EIA topics are relevant. The following relevant EIA topic chapters will provide input to potential health effects requiring assessment related to their area of expertise:

- Air quality and climate (Chapter 13);
- Landscape and visual (Chapter 10);
- Noise and vibration (Chapter 11);
- Land use and soils (Chapter 8): and
- Traffic and transport (Chapter 15).

16.16 Impact Assessment

Table 16.10 below provides an assessment of cumulative impacts on human health receptors during both construction and operation.

Table 16.10: Assessment of cumulative effects

Receptor	Assessment Type	Construction	Operation
Residential receptors	Impacts on residential receptors (potential impacts on access/amenity and loss of land)	There is one residential development (PWSZ3270/19) located on South Bank Road which is approximately 220 m from the westernmost of the Proposed Ringsend FlexGen. Due to the proximity of these residential receptors to construction activities at the Ringsend FlexGen site, there is a potential for a reduction on amenity from air quality and noise effects and an increase in traffic. However, the noise, air quality and traffic assessments do not identify any significant effects on this receptor, no cumulative effects from a reduction on amenity are anticipated on residential receptors. All other	Due to the proximity of the residential receptors from the proposed development at South Bank Road to the Ringsend FlexGen site, there is a potential for a reduction on amenity from air quality and noise effects during operation. However, the noise, air quality and traffic assessments do not identify any significant effects on this receptor, no cumulative effects from a reduction on amenity are anticipated on residential receptors. All other residential developments are over 500 m away, so have not been considered as part of the assessment.

Receptor	Assessment Type	Construction	Operation
		residential developments are over 500 m away, so have not been considered as part of the assessment.	
Community resources	Impact on community resources	The closest community resource to the four Proposed Developments is Roslyn Park College which is located in Sandymount. This is over 1 km from all four sites. Given no significant effects were identified as a result of the construction effects from these developments, no cumulative effects are envisaged. The potential cumulative effects from other proposed developments which are closer to this receptor will not be significant as a result of the activities associated with the four Proposed Developments.	The impacts on community resources was scoped out of the population and human health assessment so has not been considered within the cumulative assessment.
Businesses	Impacts on access and the operation of businesses	The traffic related to the construction activities associated with the Proposed Developments has the potential to disrupt access to businesses on the Poolbeg Peninsula and cause delays. However, the Transport Assessment in Chapter 15 states that parking arrangements and other traffic mitigation measures and / or restrictions will be specified in the CTMP which will be prepared in advance of construction commencement which will consider impacts on businesses. As a result of this management measure, no significant cumulative effects are envisaged.	Access to business properties is not expected to be affected during operation of the four facilities as the Proposed Developments are located on land already owned by the applicant and no additional land is required. Therefore, the impact on the operation and access to businesses was not considered during the operational assessment and has not been assessed in the cumulative assessment.
Recreation and open space	Impacts on recreation, open space, including on walking and cycling routes	Proposed construction activities at all four Proposed Developments will not inhibit the ability for people to use recreation and open space, including walking and cycling routes on the Peninsula. This is because all developments are located sufficient distance away from these receptors, including those developments which already have planning permission (as identified in Table 6.1).	All operational activities is within the existing boundaries of all four of the Proposed Developments. These developments, and those identified as being part of the future development on the Peninsula, are consistent with the existing character of the area. As such, recreational receptors using nearby recreation and open spaces such as the coastal walking route between Sandymount and Great South Wall, Poolbeg Beach or Irishtown Nature Park are not likely to experience cumulative effects as a result of the operation of these new developments. Users will be used to the presence of manufacturing, electrical and port related activities on the Poolbeg Peninsula.

Receptor	Assessment Type	Construction	Operation
Human health receptors	Human health impacts	The noise, air quality, traffic and land use and soils assessment have concluded that the cumulative effects on receptors are not significant. Taking into account these assessments, and the proposed mitigation measures, the cumulative effects on human health receptors are not considered to be significant.	The noise, air quality, traffic and land use and soils assessment have concluded that the cumulative effects on receptors are not significant. Taking into account these assessments, and the proposed mitigation measures, the cumulative effects on human health receptors are not considered to be significant.
The Economy in the WIA	Impacts on the economy from increased employment	The total number of construction staff on the respective sites of the four Proposed Developments will vary during the construction phase of the works. Assuming that all four sites have the peak number of construction workers, approximately 202 persons will be employed. This is a beneficial cumulative effect as a result of the four Proposed Developments. Details of the number of construction workers required for the other sites included within the cumulative effects assessment are not available. The construction phase would have a beneficial, though short term cumulative effect, on the local economy. This is not considered to be significant, given the size of the economy and the short term nature of these effects.	None of the four Proposed Developments will be permanently manned. Due to this, there are not anticipated to be impacts on the local economy in relation to job, creation and employment opportunities during the operational phase. Cumulative effects have not been assessed.

17 In-combination Effects

17.1 Introduction

Chapters 7 to 16 of this EIAR assess the likely significant impacts arising from the four proposed developments: Poolbeg FlexGen, Poolbeg BESS, Ringsend FlexGen and South Wall BESS. This chapter describes the interactions between the various aspects of the Environmental Impact Assessments for each of the proposed developments.

17.2 Interactions

The main interactions between the various aspects of the Environmental Impact Assessments are presented in Table 17.1. A brief description of the interactions is presented in Table 17.2.

Table 17.1: Interactions Identified for Poolbeg FlexGen, Poolbeg BESS, Ringsend FlexGen and South Wall BESS developments

	Biodiversity	Landscape & Visual	Air Quality & Climate	Waste	Traffic, Transportation & Material Assets	Noise and Vibration	Water	Land, Soils & Ground Conditions	Cultural Heritage	Population & Human Health
Biodiversity										
Landscape & Visual	None									
Air Quality & Climate	(A)	None								
Waste	None	None	None							
Traffic, Transportation & Material Assets	None	None	(E)	None						
Noise and Vibration	(B)	None	None	None	None					
Water	(C)	None	(F)	None	None	None				
Land, Soils & Ground Conditions	None	None	(G)	None	None	None	(K)			
Cultural Heritage	None	None	None	None	None	(M)	None	None		
Population & Human Health	None	(D)	(H)	None	(i)	(H)	None	(L)	None	

Table 17.2: Interactions

Description of interactions between the Environmental Impact Assessment topics

A	Interaction between Biodiversity and Air Quality & Climate	Construction and Operation activities have potential to create air pollutants and dust which could have an effect on flora and fauna. This is examined in detail in chapter 7 with the assessment determining the development is unlikely to impact significantly on the biodiversity.
B	Interaction between Biodiversity and Noise	Construction noise also has the potential to temporarily disturb birds. This is examined in detail in chapter 7 with the assessment determining that the developments are unlikely to impact significantly on the biodiversity.
C	Interaction between Biodiversity and Water	The potential risk of pollution incidents to water during the construction and operational phases of the developments can be harmful to birds, marine mammals benthic ecology and fisheries, This is examined in detail in chapters 7 and 9 with the assessment determining the developments are unlikely to impact significantly on the biodiversity.
D	Interaction between the landscape and Population & Human Health	The proposed developments have the potential to alter the landscape character and have visual impacts from nearby viewpoints This is examined in detail in chapter 10 with the assessment determining the Visual Impact is not considered significant.
E	Interaction between Air Quality & Climate and Traffic & Transportation	Construction and operational traffic have the potential to impact on air quality. This is deemed negligible and addressed in chapter 13.
F	Interaction between Air Quality & Climate and Water	Dust or other pollutants during construction or operation phases of each of the proposed developments could impact water quality, this has been addressed in chapters 7 and 13 with potential impacts considered insignificant.
G	Interaction between Air Quality & Climate and Land and Soils	General construction works associated with demolition and the movement of materials can also give rise to a dust nuisance, this has been addressed in chapters 8 and 13 with potential impacts considered insignificant.
H	Interaction between Air Quality & Climate, Noise & Vibration and Population & Human Health	During the construction phases, the generation of noise, dust, emissions and vibration has the potential to temporarily disturb people, this has been assessed and given the distance to the nearest sensitive receptors is expected to be negligible. Equally during the operation phase given the distance to the nearest sensitive receptors and impact is expected to be negligible
I	Interaction between Traffic & Transportation and Population & Human Health	The developments have the potential to increase the traffic on roads on the Poolbeg Peninsula. The traffic assessment in chapter 15 deems this effect to be negligible.
K	Interaction between Land & Soils and Water	There is potential that excavation of material from the sites may result in impacts on surface water. This is addressed in Chapters 7 and 8 and is not considered significant.

Description of interactions between the Environmental Impact Assessment topics

L	Interaction between Population & Human Health & Land & Soils	Given the industrial nature of the site, there is the possibility for some of the material which is being removed from site may be contaminated or hazardous, which may put construction workers at risk. This has been assessed in Chapter 8.
M	Interaction between Cultural Heritage and Noise & Vibration	The Poolbeg FlexGen and Poolbeg BESS developments have the potential to impact on the following structures of cultural heritage value during the construction phase due to construction vibration: the Pigeon House Power Station, Pigeon House Hotel, Pigeon House Fort and the Poolbeg Power Station Chimneys. This has been assessed in Chapters 11 and 12, and the predicted impact is considered not significant.

Interaction between the environmental experts who have undertaken the environmental impact assessments has taken place on a continual basis throughout the preparation of the EIAR. This has enabled the environmental assessment of each topic to take into consideration the issues associated with all other topics and to develop appropriate mitigation measures to eliminate the risk of potential impact or to reduce the potential risk to an acceptable level.

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18 Summary of Mitigation Measures

18.1 Overview

Mitigation measures are the measures proposed in order to avoid, reduce or, where possible, remedy significant adverse environmental effects of the four proposed developments. Mitigation measures have been incorporated into the design of the individual developments and will be applied during construction, operation and decommissioning phases where they have been assessed as required.

This chapter provides a summary of the mitigation measures for each proposed development as contained in the EIAR. This is a summarised version stating only the measure to be provided and does not provide the detail on the mitigation measures required. The reader is referred to the appropriate environmental chapter for full details on the measures.

All work will be carried out having regard to international and national legislation, and best practice guidance, including but not limited to guidance on preventing pollution from construction sites and pollution prevention guidance.

18.2 Poolbeg FlexGen

18.2.1 General Mitigation

The Project Construction Environmental Management Plan (CEMP) to be prepared by the appointed Contractor will incorporate the control measures detailed in the Outline CEMP and the Construction Management Plan, in addition to specified conditions that may be prescribed in any grant of planning consent for the project, measures outlined in the Natura Impact Statement and the Environmental Impact Assessment Report and any commitments given by the applicant in relation to environmental protection associated with the activities outlined in the Outline CEMP. The proposed works area will be demarcated, and pollution prevention measures will be implemented prior to commencement of construction works. Prior to commencement of development, the Contractor will prepare a Construction Waste Management Plan informed by the OWMP in Appendix 14 which will provide for the segregation of all construction wastes into recyclable, biodegradable and residual wastes to facilitate optimum levels of re-use, recovery, and recycling operations.

18.2.2 Biodiversity

18.2.2.1 Construction Phase

Pollution Control

A suitably qualified Ecological Clerk of Works (ECoW) will be appointed by the appointed Contractor and will be required for the project on site during the construction works. The ECoW will ensure that all mitigation measures outlined within this report are implemented correctly during the construction works.

All construction works will be carried out in accordance with the Outline Construction Environmental Management Plan (OCEMP) which will define measures to ensure that any contaminants resulting from the site preparation or construction will not enter the surface water.

All pollution control measures will be designed, installed, and maintained in accordance with CIRIA guidance for '*Environmental Good Practice on Site*' (C741) and '*Control of water pollution from linear construction projects. Technical guidance*' (C648).

Noise Disturbance

The appointed Contractors will be required to adhere to the codes of practice for construction work provided in British Standard BS 5228:2009+A1:2014 Part 1 and Part 2, and the guidance given therein, for minimising noise emissions from construction.

The appointed ECoW will liaise with the Contractor in relation to potential for significantly noisy works and will advise on when such works must be restricted.

To minimise disturbance, noise reducing hoarding should be erected around the southern and eastern perimeter of all four proposed development sites during the wintering season (September-April inclusive). Hoarding will also be erected along at the access points to reduce the visual disturbance of vehicles and machinery entering and leaving the site.

Vegetation Clearance

In accordance with Section 40 of the Wildlife Acts, the removal vegetation, which may be used as nesting sites by breeding birds, will be cleared outside of the birds nesting season (1st March to 31st August inclusive).

In the event that works within the bird nesting season cannot be avoided a derogation license will be sought from NPWS to facilitate the within the season, following a survey of the vegetation to establish the absence/presence of breeding nests. Where a nest is found, the clearance of vegetation can only occur once the chicks have fledged or where nesting has failed.

During the construction works, the appointed Contractor, in order to comply with Regulations 49 and 50 of the European Communities (Birds and Natural Habitat) Regulations (2011), will ensure biosecurity measures are implemented throughout the construction phase to ensure the introduction and translocation of invasive species is prevented.

18.2.2.2 Operational Phase

Operational impacts on Biodiversity were deemed Negligible. There is no requirement for mitigation measures.

18.2.3 Land, Soils and Ground Conditions

Risk mitigation measures have been designed into the initial design of the FlexGen, such as bunded fuel tank, bunded transformers and impermeable surfacing reducing infiltration. No further mitigation is considered necessary for the operational phase.

The Environmental Clerk of Works will be responsible for identifying any ground contamination during the construction phase. Any contaminated soils, sediment or groundwater that is encountered will be managed in accordance with best practice guidelines and all relevant legislation in consultation with EPA and any other relevant authorities as outlined in the OCEMP in Appendix 5D.

Storage of contaminated material if encountered on-site will be avoided where possible. If storage on site is necessary, contaminated material, if present, will be strictly segregated into designated bunded areas where contaminants cannot leach into the underlying ground. If spoil

is to be stored on site, consultation with the EPA will be undertaken, prior to commencing storage, to ensure that any relevant authorisations are obtained and that spoil is managed, at all times, in accordance with all relevant legislation.

As no significant impacts are assessed as likely, no monitoring is required.

18.2.4 Water

18.2.4.1 Construction Phase

During construction the contractor will implement an environmental management plan which will set out control measures and procedures to ensure potentially polluting activities are controlled and managed. These measures will include the following:

- Fuel storage – bunded tanks to prevent spillages and designated fuelling areas with spillage control;
- Chemical storage – all potentially polluting chemicals will be stored in secure weatherproof enclosures with spill kits;
- Concrete wash water will be collected;
- Should dewatering be required any discharges will be treated to remove contaminants and silt and disposed of in accordance with EPA requirements; and
- The site will be kept secure to prevent vandalism which can lead to pollution from stored liquids escaping and entering drains.

The CEMP will include emergency procedures in the event of a pollution event and routine monitoring of the site to ensure potentially contaminating activities remain under control. Monitoring will include daily visual monitoring of any surface water outfalls.

18.2.4.2 Operational Phase

Operational risk mitigation measures have been designed into the FlexGen design.

The drainage system has been designed to mitigate the effects of severe rainfall. Incident rainwater will collect in an attenuation tank which will slowly empty, reducing the surge of water entering the drainage system and reducing flood risk.

The development platform will be raised outside the 0.1% annual exceedance probability with climate change factored flood risk level.

The safety systems designed into the plant will monitor rainfall levels in bunded areas and maintain these free of rainwater. These systems are designed to prevent contaminated water being discharged into the drainage system.

18.2.5 Landscape and Visual

18.2.5.1 Construction Phase

There are no specific landscape mitigation measures proposed during the construction phase. Details on the construction site management are set out in the OCEMP in Appendix 5C.

18.2.5.2 Operational Phase

There are no additional mitigation measures proposed in relation to the proposed Poolbeg FlexGen development. The siting and design of the proposed development are the main mitigation measures associated with this project (i.e. the mitigation measures are already

embedded). In addition, any proposed screening is not considered necessary or effective in this overtly industrial context. Owing to this, monitoring of these measures is neither necessary nor applicable.

18.2.6 Noise and Vibration

18.2.6.1 Construction Phase

No specific mitigation measures are proposed for the mitigation of construction noise impacts at off-site sensitive receptors. Noise emissions will be minimised at source, in accordance with best practice, to minimise the exposure site personnel to noise from construction plant.

The majority of construction activity that generates noise is expected to be undertaken within daytime working hours. Predicted noise impacts due to daytime construction works do not indicate potential significant effects. Where works are required to be undertaken outside daytime working hours the predicted noise impacts should be assessed to identify any requirement for mitigation.

18.2.6.2 Operational Phase

The siting and design of the developments is the main mitigation measure associated with this project (i.e. the mitigation measures are already embedded). Noise emissions will be minimised at source, in accordance with best practice, to minimise noise from operational plant. It is expected that the noise limits will be in line with those specified in NG4 against which this development has been assessed.

18.2.7 Archaeology, Architecture and Cultural Heritage

18.2.7.1 Construction Phase

Archaeology

The principal risk of impact upon archaeology by the development is from any works that penetrate below the made ground layer. The variation in depth of the made ground layer makes it difficult to predict where excavations might have an impact. It is proposed that a programme of archaeological investigation will be implemented in accordance with an archaeological excavation strategy and methodology. This will be in line with guidance set out by the Department of Arts, Heritage, Gaeltacht and the Islands and agreed with the Dublin City Archaeologist. This will be detailed in the CEMP.

Piles

Although the predicted impact of vibration is below harmful levels, care will need to be taken to ensure that real world vibrations remain at safe levels. During the phases of piling that are closest to the Poolbeg Power Station towers, monitoring of sensitive structures will be undertaken in line with the CEMP to ensure that real world vibrations remain within safe levels.

Temporary Construction Compounds

Where construction compounds require any sub-surface works that will penetrate to a depth below that of the made ground, any excavation work will be monitored by a suitably qualified archaeologist.

Cranes

Where construction of hard standing for cranes will require sub-surface works to a depth that will penetrate the made ground layer, any excavation work will be monitored by a suitably qualified archaeologist.

Cranes should preferably be sited where their operation will avoid the possibility of accidental damage to the Poolbeg Power Station Chimneys or the retained administration building within the Poolbeg power Station. Operations will be planned and monitored accordingly to avoid any risk of impact to the buildings.

18.2.7.2 Operational Phase

As no cultural heritage impacts have been identified for the operational phase, no mitigation measures are required.

18.2.7.3 Decommissioning Phase

Cranes

Where construction of hard standing for cranes will require sub-surface works to a depth that will penetrate the made ground layer, any excavation work will be monitored by a suitably qualified archaeologist.

Cranes should preferably be sited where their operation will avoid the possibility of accidental damage to the Poolbeg Power Station Chimneys or the retained administration building within the Poolbeg power Station. Operations will be planned and monitored accordingly to avoid any risk of impact to the buildings.

18.2.7.4 Monitoring

Where piles are to be bored through the made ground, they will be archaeologically monitored.

Where construction compounds require sub-surface works to a depth that will penetrate the made ground layer, the excavation work will be archaeologically monitored.

Where construction of hard standing for cranes will require sub-surface works to a depth that will penetrate the made ground layer, the excavation work will be archaeologically monitored.

18.2.8 Air Quality and Climate

18.2.8.1 Construction Phase

The following Dust Management Plan as described in the OCEMP provided in Appendix 5C will be implemented in order to mitigate potential adverse effects:

Site Management

The aim is to ensure good site management by avoiding dust becoming airborne at source. This will be done through good design and effective control strategies.

At the construction planning stage, the siting of activities and storage piles will take note of the location of sensitive receptors and prevailing wind directions in order to minimise the potential for significant dust nuisance (see **Error! Reference source not found.** for the windrose for Dublin Airport). As the prevailing wind is predominantly westerly to south-westerly, locating construction compounds and storage piles downwind (to the east or north-east) of sensitive receptors will minimise the potential for dust nuisance to occur at sensitive receptors.

Good site management will include the ability to respond to adverse weather conditions by either restricting operations on-site or quickly implementing effective control measures before the potential for nuisance occurs. When rainfall is greater than 0.2mm/day, dust generation is generally suppressed (UK Office of Deputy Prime Minister (2002), BRE (2003)). The potential for significant dust generation is also reliant on threshold wind speeds of greater than 10 m/s (19.4 knots) (at 7m above ground) to release loose material from storage piles and other exposed materials (USEPA, 1986). Particular care should be taken during periods of high winds (gales) as these are periods where the potential for significant dust emissions are highest. The prevailing meteorological conditions in the vicinity of the site are favourable in general for the suppression of dust for a significant period of the year. Nevertheless, there will be infrequent periods where care will be needed to ensure that dust nuisance does not occur. The following measures shall be taken in order to avoid dust nuisance occurring under unfavourable meteorological conditions:

- The Principal Contractor or equivalent will monitor the contractors' performance to ensure that the proposed mitigation measures are implemented, and that dust impacts and nuisance are minimised;
- During working hours, dust control methods will be monitored as appropriate, depending on the prevailing meteorological conditions;
- The name and contact details of a person to contact regarding air quality and dust issues shall be displayed on the site boundary, this notice board will also include head/regional office contact details;
- A complaints register will be kept on site detailing all telephone calls and letters of complaint received in connection with dust nuisance or air quality concerns, together with details of any remedial actions carried out;
- It is the responsibility of the contractor at all times to demonstrate full compliance with the dust control conditions herein;
- The procedures put in place will be reviewed at regular intervals and monitoring conducted and recorded by the principal contractor. It is recommended that reviews are conducted on a monthly basis as a minimum.

The dust minimisation measures shall be reviewed at regular intervals during the works to ensure the effectiveness of the procedures in place and to maintain the goal of minimisation of dust through the use of best practice and procedures. In the event of dust nuisance occurring outside the site boundary, site activities will be reviewed and satisfactory procedures implemented to rectify the problem. Specific dust control measures to be employed are described below.

Site Roads / Haulage Routes

Movement of construction trucks along site roads (particularly unpaved roads) can be a significant source of fugitive dust if control measures are not in place. The most effective means of suppressing dust emissions from unpaved roads is to apply speed restrictions. Studies show that these measures can have a control efficiency ranging from 25 to 80% (UK Office of Deputy Prime Minister, 2002).

- A speed restriction of 20 km/hr will be applied as an effective control measure for dust for on-site vehicles using unpaved site roads;
- Access gates to the site shall be located at least 10m from sensitive receptors where possible;
- Bowsers or suitable watering equipment will be available during periods of dry weather throughout the construction period. Research has found that watering can reduce dust

emissions by 50% (USEPA, 1997). Watering shall be conducted during sustained dry periods to ensure that unpaved areas are kept moist. The required application frequency will vary according to soil type, weather conditions and vehicular use; and

- Any hard surface roads will be swept to remove mud and aggregate materials from their surface while any unsurfaced roads shall be restricted to essential site traffic only.

Land Clearing / Earth Moving

Land clearing / earth-moving works during periods of high winds and dry weather conditions can be a significant source of dust.

- During dry and windy periods, and when there is a likelihood of dust nuisance, watering shall be conducted to ensure moisture content of materials being moved is high enough to increase the stability of the soil and thus suppress dust; and
- During periods of very high winds (gales), activities likely to generate significant dust emissions shall be postponed until the gale has subsided.

Storage Piles

- The location and moisture content of storage piles are important factors which determine their potential for dust emissions;
- Overburden material will be protected from exposure to wind by storing the material in sheltered regions of the site. Where possible storage piles should be located downwind of sensitive receptors;
- Regular watering will take place to ensure the moisture content is high enough to increase the stability of the soil and thus suppress dust. The regular watering of stockpiles has been found to have an 80% control efficiency (UK Office of Deputy Prime Minister, 2002); and
- Where feasible, hoarding will be erected around site boundaries to reduce visual impact. This will also have an added benefit of preventing larger particles from impacting on nearby sensitive receptors.

Site Traffic on Public Roads

Spillage and blow-off of debris, aggregates and fine material onto public roads will be reduced to a minimum by employing the following measures:

- Vehicles delivering or collecting material with potential for dust emissions shall be enclosed or covered with tarpaulin at all times to restrict the escape of dust;
- At the main site traffic exits, a wheel wash facility shall be installed. All trucks leaving the site must pass through the wheel wash.
- 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

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.

18.2.8.2 Operational Phase

The stack height of the development has been designed to ensure that an adequate height was selected to aid dispersion of the emissions and achieve compliance with the EU ambient air quality standards at all off-site locations (including background concentrations).

There are no significant impacts to climate predicted as part of the operational phase of the proposed development therefore no mitigation is proposed.

18.2.9 Waste

18.2.9.1 Construction Phase

An OWMP has been prepared and is included in Appendix 14. A final WMP will be agreed with Dublin City Council prior to the commencement of construction on site. The final WMP will be available for inspection at the site of the proposed development at all reasonable times for examination by Dublin City Council.

All waste arising will be managed and disposed of in a way that ensures the provisions of the Waste Management Act 1996 and associated amendments and regulations are applied and fully complied with.

18.2.9.2 Operational Phase

The facility is small and will not generate process wastes during its operation and so no further mitigation is considered to be required. There will be a small amount of domestic type waste produced in the welfare facilities which will be managed in accordance with the requirements an IE licence. This will have no significant effect on waste management resources.

Mitigation has been built into the design and procurement of the FlexGen. The modular nature of the construction has been selected to increase resource efficiency by reducing waste generated during the construction process.

An OWMP has been prepared and is included in Appendix 14. A final WMP will be agreed with Dublin City Council prior to the commencement of construction on site. The final WMP will be available for inspection at the site of the proposed development at all reasonable times for examination by Dublin City Council.

All waste arising will be managed and disposed of in a way that ensures the provisions of the Waste Management Act 1996 and associated amendments and regulations are applied and fully complied with.

18.2.10 Traffic, Transportation and Material Assets

18.2.10.1 Construction Phase

All construction impacts will be temporary/short term in nature and will cease on completion of the works. Mitigation measures to reduce or eliminate construction phase impacts will be implemented as follows:

- A Construction Traffic Management Plan (CTMP) will be implemented during the construction stage of the proposed plant that will ensure that potential impacts resulting from construction traffic on the local community, businesses and other industry adjacent to the site. This will also include the following items;
 - Details of wheel washes and/or judder bars on site to minimise the impact of dust and prevent vehicles transporting detritus onto public roads;
 - Lowering the speed limit on the public road for all construction traffic entering the site;
 - Clearly displayed signs on approach to the site;
 - Tracked excavators must be moved to and from site using a low loader. Tracked vehicles will not travel along public roads;
 - A routing policy will be developed to ensure the strategic road network is used by HGV traffic accessing and departing the site and that any travel through residential areas is kept to a minimum.
 - During periods of dry weather, a water source shall be available to dampen the ground and any dust produced or transported from site.

18.2.10.2 Operational Phase

Given the significantly lower traffic movements during the operational phase when compared to the construction phase. It is not envisaged that there will be mitigation measures required for the operation phase.

18.2.11 Population and Human Health

18.2.11.1 Construction Phase

No additional mitigation measures are required. The mitigation measures proposed to address Noise and Vibration, Air quality and Climate, and Traffic and Transportation are addressed under the respective headings.

18.2.11.2 Operational Phase

No mitigation measures are required.

18.3 Poolbeg BESS

18.3.1 General Mitigation Measures

The Project Construction Environmental Management Plan CEMP to be prepared by the appointed Contractor will incorporate the control measures detailed in the Outline CEMP and the Construction Management Plan in addition to specified conditions that may be prescribed in any grant of planning consent for the project, measures outlined in the Natura Impact Statement and the Environmental Impact Assessment Report and any commitments given by the applicant in relation to environmental protection associated with the activities outlined in the Outline CEMP. The proposed works area will be demarcated, and pollution prevention measures will be implemented prior to commencement of construction works. Prior to commencement of development, the Contractor will prepare a Construction Waste Management Plan (as part of the Project CEMP) which will provide for the segregation of all construction wastes into recyclable, biodegradable and residual wastes to facilitate optimum levels of re-use, recovery, and recycling operations.

18.3.2 Biodiversity

18.3.2.1 Construction Phase

Pollution Control

A suitably qualified Ecological Clerk of Works (ECoW) will be appointed by the Contractor and will be required for the project on site during the construction works. The ECoW will ensure that all mitigation measures outlined within this report are implemented correctly during the construction works.

All construction works will be carried out in accordance with the Outline Construction Environmental Management Plan (OCEMP) provided in Appendix 5C which will define measures to ensure that any contaminants resulting from the site preparation or construction will not enter the surface water. No Additional mitigation measures are required.

All pollution control measures will be designed, installed, and maintained in accordance with CIRIA guidance for '*Environmental Good Practice on Site*' (C741) and '*Control of water pollution from linear construction projects. Technical guidance*' (C648).

Noise Disturbance

The appointed Contractors will be required to adhere to the codes of practice for construction work provided in British Standard BS 5228:2009+A1:2014 Part 1 and Part 2, and the guidance given therein, for minimising noise emissions from construction.

The appointed ECoW will liaise with the Contractor in relation to potential for significantly noisy works and will advise on when such works must be restricted.

To minimise disturbance, noise reducing hoarding should be erected around the southern and eastern perimeter of all four proposed development sites during the wintering season (September-April inclusive). Hoarding will also be erected at the secondary access points to reduce visual disturbance of vehicles and machinery entering and leaving the site.

Vegetation Clearance

In accordance with Section 40 of the Wildlife Acts, the removal vegetation, which may be used as nesting sites by breeding birds, will be cleared outside of the birds nesting season (1st March to 31st August inclusive).

In the event that works within the bird nesting season cannot be avoided a derogation license will be sought from NPWS to facilitate the within the season, following a survey of the vegetation to establish the absence/presence of breeding nests. Where a nest is found, the clearance of vegetation can only occur once the chicks have fledged or where nesting has failed.

During the construction works, the appointed Contractor, in order to comply with Regulations 49 and 50 of the European Communities (Birds and Natural Habitat) Regulations (2011), will ensure biosecurity measures are implemented throughout the construction phase to ensure the introduction and translocation of invasive species is prevented.

18.3.2.2 Operational Phase

Operational impacts on Biodiversity were deemed Negligible. There is no requirement for mitigation measures.

18.3.3 Land, Soil and Ground Condition

Operational risk mitigation measures have been designed into the initial design of the BESS, such as bunded transformers and impermeable surfacing reducing infiltration. No further mitigation is considered necessary.

The Environmental Clerk of Works will be responsible for identifying any ground contamination during the construction phase. Any contaminated soils, sediment or groundwater that is encountered will be managed in accordance with best practice guidelines and all relevant legislation in consultation with EPA and any other relevant authorities as outlined in the OCEMP in Appendix 5D.

Storage of contaminated material if encountered on-site will be avoided where possible. If storage on site is necessary, contaminated material, if present, will be strictly segregated into designated bunded areas where contaminants cannot leach into the underlying ground. If spoil is to be stored on site, consultation with the EPA will be undertaken, prior to commencing storage, to ensure that any relevant authorisations are obtained and that spoil is managed, at all times, in accordance with all relevant legislation.

18.3.4 Water

18.3.4.1 Construction Phase

During construction the contractor will implement an environmental management plan which will set out control measures and procedures to ensure potentially polluting activities are controlled and managed. These measures will include the following:

- Fuel storage – bunded tanks to prevent spillages and designated fuelling areas with spillage control;
- Chemical storage – all potentially polluting chemicals will be stored in secure weatherproof enclosures with spill kits;
- Concrete wash water will be collected;
- Should dewatering be required any discharges will be treated to remove contaminants and silt and disposed of in accordance with EPA requirements; and
- The site will be kept secure to prevent vandalism which can lead to pollution from stored liquids escaping and entering drains.

The CEMP plan will include emergency procedures in the event of a pollution event and routine monitoring of the site to ensure potentially contaminating activities remain under control. Monitoring will include daily visual monitoring of any surface water outfalls.

18.3.4.2 Operational Phase

Operational risk mitigation measures have been designed into the BESS design.

The drainage system has been designed to mitigate the effects of severe rainfall. Incident rainwater will collect in an attenuation tank which will slowly empty, reducing the surge of water entering the drainage system and reducing flood risk.

The development platform will be raised outside the 0.1% annual exceedance probability with climate change factored flood risk level.

The safety systems designed into the plant will monitor rainfall levels in bunded areas and maintain these free of rainwater.

18.3.5 Landscape and Visual

There are no additional mitigation measures proposed in relation to the proposed Poolbeg BESS development. The siting and design of the proposed development are the main mitigation measures associated with this project (i.e. the mitigation measures are already embedded). In addition, any proposed screening is not considered necessary or effective in this overtly industrial context. Owing to this, monitoring of these measures is neither necessary nor applicable.

18.3.6 Noise and Vibration

18.3.6.1 Construction Phase

The assessment indicates that worst case from vibration during percussive piling may result in feelable ground-borne vibration at the closest part of Pigeon House Power Station and Poolbeg Power Station Chimney 1 to the works. Vibration monitoring will be undertaken when the works is close to these heritage assets. More detail is provided in the OCEMP provided in Appendix 5A.

The majority of construction activity that generates noise is expected to be undertaken within daytime working hours. Predicted noise impacts due to daytime construction works do not indicate potential significant effects. Where works are required to be undertaken outside daytime working hours the predicted noise impacts should be assessed to identify any requirement for mitigation.

18.3.6.2 Operational Phase.

No specific mitigation measures are proposed for the mitigation of operational noise impacts at off-site sensitive receptors. However, noise emissions should be minimised at source, in accordance with best practice, to minimise the exposure site personnel to noise from operational plant.

The siting and design of the development is the main mitigation measure associated with this project (i.e. the mitigation measures are already embedded). Noise emissions will be minimised at source, in accordance with best practice, to minimise noise from operational plant. It is expected that the noise limits will be in line with those specified in NG4 against which this development has been assessed.

18.3.7 Archaeology, Architecture and Cultural Heritage

18.3.7.1 Construction Phase

Archaeology

The principal risk of impact upon archaeology by the development is from any works that penetrate below the made ground layer. The variation in depth of the made ground layer makes it difficult to predict where excavations might have an impact. It is proposed that a programme of archaeological investigation will be implemented in accordance with an archaeological excavation strategy and methodology. This will be in line with guidance set out by the Department of Arts, Heritage, Gaeltacht and the Islands and agreed with the Dublin City Archaeologist. This will be detailed in the CEMP.

Demolition

Each of the three buildings will be recorded through photographs and a written description prior to demolition. The resulting reports will be lodged in the Dublin City Library and Archive and in the Irish Architectural Archive. This will be detailed in the CEMP.

Piles

Although the predicted impact of vibration is below harmful levels, care will need to be taken to ensure that real world vibrations remain at safe levels. During the phases of piling that are closest to the Poolbeg Power Station towers, monitoring of sensitive structures will be undertaken in line with the CEMP.

Temporary Construction Compounds

Where construction compounds require any sub-surface works that will penetrate to a depth below that of the made ground, any excavation work will be monitored by a suitably qualified archaeologist.

Cranes

Where construction of hard standing for cranes will require sub-surface works to a depth that will penetrate the made ground layer, any excavation work will be monitored by a suitably qualified archaeologist.

Cranes should preferably be sited where their operation will avoid the possibility of accidental damage to the Poolbeg Power Station Chimneys or the retained administration building within the Poolbeg power Station. Operations will be planned and monitored accordingly to avoid any risk of impact to the buildings.

18.3.7.2 Operational Phase

As no cultural heritage impacts have been identified for the operational phase, no mitigation measures are required.

18.3.7.3 Decommissioning Phase

Cranes

Where construction of hard standing for cranes will require sub-surface works to a depth that will penetrate the made ground layer, any excavation work will be monitored by a suitably qualified archaeologist.

Cranes should preferably be sited where their operation will avoid the possibility of accidental damage to the Poolbeg Power Station Chimneys or the retained administration building within the Poolbeg power Station. Operations will be planned and monitored accordingly to avoid any risk of impact to the buildings.

18.3.7.4 Monitoring

Where piles are to be bored through the made ground, they will be archaeologically monitored.

Where construction compounds require sub-surface works to a depth that will penetrate the made ground layer, the excavation work will be archaeologically monitored.

Where construction of hard standing for cranes will require sub-surface works to a depth that will penetrate the made ground layer, the excavation work will be archaeologically monitored.

18.3.8 Air Quality and Climate

18.3.8.1 Construction Phase

The Dust Management Plan outlined in Section 18.2.8 will be applied in order to mitigate potential adverse effects during the construction phase. This is included in the OCEMP provided in Appendix 5C.

18.3.8.2 Operational Phase

No mitigation measures are required.

18.3.9 Waste

18.3.9.1 Construction Phase

An OWMP has been prepared and is included in Appendix 14. A final WMP will be agreed with Dublin City Council prior to the commencement of construction on site. The final WMP will be available for inspection at the site of the proposed development at all reasonable times for examination by Dublin City Council.

All waste arising will be managed and disposed of in a way that ensures the provisions of the Waste Management Act 1996 and associated amendments and regulations are applied and fully complied with.

18.3.9.2 Operational Phase

The facility is small and will not generate process waste during its operation and so no further mitigation is considered to be required. There will be a small amount of domestic type waste produced in the welfare facilities which will be managed in accordance with ESB's existing waste disposal procedures. This will have no significant effect on waste management resources.

Mitigation has been built into the design and procurement of the BESS. The modular nature of the construction has been selected to increase resource efficiency by reducing waste generated during the construction process.

All waste generated during the operational phase will be managed in accordance with the relevant provisions of the Waste Management Act 1996 and associated amendments and regulations, particularly with regard to the use of appropriately permitted waste contractors and destinations for waste materials.

18.3.10 Traffic, Transportation & Material Assets

18.3.10.1 Construction Phase

A high-level Demolition and Construction Management Plan has been prepared and includes measures to mitigate the traffic impacts. This is included in the CMP which is provided in Appendix 5A. Note that a more detailed Demolition and Construction Traffic Management Plan (CTMP) will be prepared by both the Demolition and Civil Enabling Works Contractor and EBOP Contractor prior to the commencement of the works.

18.3.10.2 Operational Phase

Given the significantly lower traffic movements during the operational phase when compared to the construction phase. It is not envisaged that there will be mitigation measures required for the operation phase.

18.3.11 Population and Human Health

18.3.11.1 Construction Phase

No additional mitigation measures are required. The mitigation measures proposed to address Noise and Vibration, Air quality and Climate, and Traffic and Transportation are addressed under the respective headings.

18.3.11.2 Operational Phase

No additional mitigation measures are required. The mitigation measures proposed to address Noise and Vibration and Traffic and Transportation are addressed under the respective headings.

18.4 Ringsend FlexGen

18.4.1 General Mitigation

The Project Construction Environmental Management Plan CEMP to be prepared by the appointed Contractor will incorporate the control measures detailed in the Outline CEMP and the Construction Management Plan in addition to specified conditions that may be prescribed in any grant of planning consent for the project, measures outlined in the Natura Impact Statement and the Environmental Impact Assessment Report and any commitments given by the applicant in relation to environmental protection associated with the activities outlined in the Outline CEMP. The proposed works area will be demarcated, and pollution prevention measures will be implemented prior to commencement of construction works. Prior to commencement of development, the Contractor will prepare a Construction Waste Management Plan (as part of the Project CEMP) which will provide for the segregation of all construction wastes into recyclable, biodegradable and residual wastes to facilitate optimum levels of re-use, recovery, and recycling operations.

18.4.2 Biodiversity

18.4.2.1 Construction Phase

Pollution Control

A suitably qualified Ecological Clerk of Works (ECoW) will be appointed by the Contractor and will be required on site during the construction works. The ECoW will ensure that all mitigation measures outlined within this report are implemented correctly during the construction works.

All construction works will be carried out in accordance with the Outline Construction Environmental Management Plan (OCEMP) provided in Appendix 5C which will define measures to ensure that any contaminants resulting from the site preparation or construction will not enter the surface water. No Additional mitigation measures are required.

All pollution control measures will be designed, installed, and maintained in accordance with CIRIA guidance for *'Environmental Good Practice on Site' (C741)* and *'Control of water pollution from linear construction projects. Technical guidance' (C648)*.

Noise Disturbance

The appointed Contractors will be required to adhere to the codes of practice for construction work provided in British Standard BS 5228:2009+A1:2014 Part 1 and Part 2, and the guidance given therein, for minimising noise emissions from construction.

The appointed ECoW will liaise with the Contractor in relation to potential for significantly noisy works and will advise on when such works must be restricted, particularly (but not limited to), in relation to the light-bellied Brent geese which utilise the Compensatory Grassland.

To minimise disturbance, noise reducing hoarding should be erected around the southern and eastern perimeter of the development site during the wintering season (September-April inclusive). Hoarding will also be erected at the site access point to reduce the visual disturbance of vehicles and machinery entering and leaving the site.

Vegetation Clearance

In accordance with Section 40 of the Wildlife Acts, the removal vegetation, which may be used as nesting sites by breeding birds, will be cleared outside of the birds nesting season (1st March to 31st August inclusive).

In the event that works within the bird nesting season cannot be avoided a derogation license will be sought from NPWS to facilitate the within the season, following a survey of the vegetation to establish the absence/presence of breeding nests. Where a nest is found, the clearance of vegetation can only occur once the chicks have fledged or where nesting has failed.

During the construction works, the appointed Contractor in order to comply with Regulations 49 and 50 of the European Communities (Birds and Natural Habitat) Regulations (2011), will ensure biosecurity measures are implemented throughout the construction phase to ensure the introduction and translocation of invasive species is prevented.

18.4.2.2 Operational Phase

Operational impacts on Biodiversity were deemed Negligible. There is no requirement for mitigation measures.

18.4.3 Land, Soils and Ground Condition

Operational risk mitigation measures have been designed into the initial design of the FlexGen, such as bunded fuel tank, bunded transformers and impermeable surfacing reducing infiltration. No further mitigation is considered necessary.

The Environmental Clerk of Works will be responsible for identifying any ground contamination during the construction phase. Any contaminated soils, sediment or groundwater that is encountered will be managed in accordance with best practice guidelines and all relevant legislation in consultation with EPA and any other relevant authorities as outlined in the OCEMP in Appendix 5D.

Storage of contaminated material if encountered on-site will be avoided where possible. If storage on site is necessary, contaminated material, if present, will be strictly segregated into designated bunded areas where contaminants cannot leach into the underlying ground. If spoil is to be stored on site, consultation with the EPA will be undertaken, prior to commencing storage, to ensure that any relevant authorisations are obtained and that spoil is managed, at all times, in accordance with all relevant legislation.

18.4.4 Water

18.4.4.1 Construction Phase

During construction the contractor will implement an environmental management plan which will set out control measures and procedures to ensure potentially polluting activities are controlled and managed. These measures will include the following:

- Fuel storage – bunded tanks to prevent spillages and designated fuelling areas with spillage control;
- Chemical storage – all potentially polluting chemicals will be stored in secure weatherproof enclosures with spill kits;
- Concrete wash water will be collected;
- Should dewatering be required any discharges will be treated to remove contaminants and silt and disposed of in accordance with EPA requirements; and
- The site will be kept secure to prevent vandalism which can lead to pollution from stored liquids escaping and entering drains.

The CEMP will include emergency procedures in the event of a pollution event and routine monitoring of the site to ensure potentially contaminating activities remain under control. Monitoring will include daily visual monitoring of any surface water outfalls.

18.4.4.2 Operational Phase

Operational risk mitigation measures have been designed into the FlexGen design.

The drainage system has been designed to mitigate the effects of severe rainfall. Incident rainwater will collect in an attenuation tank which will slowly empty, reducing the surge of water entering the drainage system and reducing flood risk.

The development platform is outside the 0.1% annual exceedance probability with climate change factored flood risk level.

The safety systems designed into the plant will monitor rainfall levels in bunded areas and maintain these free of rainwater. These systems are designed to cut out should contamination of the rainwater occur so as to prevent contaminated water being discharged into the drainage system.

18.4.5 Landscape and Visual

There are no additional mitigation measures proposed in relation to the proposed Ringsend FlexGen development. The potential for enhancements to the southern boundary of the site have been considered and therefore the design of the facility incorporates a more aesthetic 2.6m-high system railing (i.e. 1.6m-high dark green railings on top of a 1m-high wall). Noting the alignment of underground services along that southern boundary, planted or green edges are not proposed in this location.

The siting and design of the proposed development are the main mitigation measures associated with this project (i.e. the mitigation measures are already embedded), including the proposed systems railing as an alternative, more aesthetic boundary treatment along the southward/public facing side of the site. Owing to this, monitoring of these measures is neither necessary nor applicable.

18.4.6 Noise and Vibration

18.4.6.1 Construction Phase

The majority of construction activity that generates noise is expected to be undertaken within daytime working hours. Predicted noise impacts due to daytime construction works do not indicate potential significant effects. Where works are required to be undertaken outside daytime working hours the predicted noise impacts should be assessed to identify any requirement for mitigation.

18.4.6.2 Operational Phase.

No specific mitigation measures are proposed for the mitigation of operational noise impacts at off-site sensitive receptors. However, noise emissions should be minimised at source, in accordance with best practice, to minimise the exposure site personnel to noise from operational plant.

The siting and design of the development is the main mitigation measure associated with this project (i.e. the mitigation measures are already embedded). Noise emissions will be minimised at source, in accordance with best practice, to minimise noise from operational plant. It is expected that the noise limits will be in line with those specified in NG4 against which this development has been assessed.

18.4.7 Archaeology, Architecture and Cultural Heritage

18.4.7.1 Construction Phase

Archaeology

The principal risk of impact upon archaeology by the development is from any works that penetrate below the made ground layer. The variation in depth of the made ground layer makes it difficult to predict where excavations might have an impact. It is proposed that a programme of archaeological investigation will be implemented in accordance with an archaeological excavation strategy and methodology. This will be in line with guidance set out by the Department of Arts, Heritage, Gaeltacht and the Islands and agreed with the Dublin City Archaeologist. This will be set out in the CEMP. Where works take place for the installation of utilities within the Zone of Archaeological Interest associated with The South Wall (Ballast Office Wall), the works will be archaeologically monitored.

Temporary Construction Compounds

Where construction compounds require any sub-surface works that will penetrate to a depth below that of the made ground, any excavation work will be monitored by a suitably qualified archaeologist.

Cranes

Where construction of hard standing for cranes will require sub-surface works to a depth that will penetrate the made ground layer, any excavation work will be monitored by a suitably qualified archaeologist.

18.4.7.2 Operational Phase

As no cultural heritage impacts have been identified for the operational phase, no mitigation measures are required.

18.4.7.3 Decommissioning Phase

Cranes

Where construction of hard standing for cranes will require sub-surface works to a depth that will penetrate the made ground layer, any excavation work will be monitored by a suitably qualified archaeologist.

18.4.7.4 Monitoring

Where piles are to be bored through the made ground, they will be archaeologically monitored.

Where construction compounds require sub-surface works to a depth that will penetrate the made ground layer, the excavation work will be archaeologically monitored.

Where construction of hard standing for cranes will require sub-surface works to a depth that will penetrate the made ground layer, the excavation work will be archaeologically monitored.

18.4.8 Air Quality and Climate

18.4.8.1 Construction Phase

The Dust Management Plan outlined in Section 18.2.8 will be applied in order to mitigate potential adverse effects during the construction phase. This is included in the OCEMP provided in Appendix 5C.

18.4.8.2 Operational Phase

The stack height of the development has been designed to ensure that an adequate height was selected to aid dispersion of the emissions and achieve compliance with the EU ambient air quality standards at all off-site locations (including background concentrations).

There are no significant impacts to climate predicted as part of the operational phase of the proposed development therefore no mitigation is proposed.

18.4.9 Waste

18.4.9.1 Construction Phase

The facility is small and will not generate process wastes during its operation and so no further mitigation is considered to be required. There will be a small amount of domestic type waste produced in the welfare facilities which will be managed in accordance with the requirements an IE licence. This will have no significant effect on waste management resources.

Mitigation has been built into the design and procurement of the FlexGen. The modular nature of the construction has been selected to increase resource efficiency by reducing waste generated during the construction process.

An OWMP has been prepared and is included in Appendix 14. A final WMP will be agreed with Dublin City Council prior to the commencement of construction on site. The final WMP will be

available for inspection at the site of the proposed development at all reasonable times for examination by Dublin City Council.

All waste arising will be managed and disposed of in a way that ensures the provisions of the Waste Management Act 1996 and associated amendments and regulations are applied and fully complied with.

18.4.9.2 Operational Phase

All waste generated during the operational phase will be managed in accordance with the relevant provisions of the Waste Management Act 1996 and associated amendments and regulations, particularly with regard to the use of appropriately permitted waste contractors and destinations for waste materials.

All operational waste will be subject to the conditions of the Industrial emissions licence, regulated by the EPA. Application for an IE Licence will be made following planning consent.

18.4.10 Traffic, Transportation & Material Assets

18.4.10.1 Construction Phase

All construction impacts will be temporary/short term in nature and will cease on completion of the works. Mitigation measures to reduce or eliminate construction phase impacts will be implemented as follows:

- A Construction Traffic Management Plan (CTMP) will be implemented during the construction stage of the proposed power plant that will ensure that potential impacts resulting from construction traffic on the local community, businesses and other industry adjacent to the site. This will also include the following items;
 - Details of wheel washes and/or judder bars on site to minimise the impact of dust and prevent vehicles transporting detritus onto public roads;
 - Lowering the speed limit on the public road for all construction traffic entering the site;
 - Clearly displayed signs on approach to the site;
 - Tracked excavators must be moved to and from site using a low loader. Tracked vehicles will not travel along public roads;
 - A routing policy will be developed to ensure the strategic road network is used by HGV traffic accessing and departing the site and that any travel through residential areas is kept to a minimum.
 - During periods of dry weather, a water source shall be available to dampen the ground and any dust produced or transported from site.

18.4.10.2 Operational Phase

Given the significantly lower traffic movements during the operational phase when compared to the construction phase. It is not envisaged that there will be mitigation measures required for the operation phase.

18.4.11 Population and Human Health

18.4.11.1 Construction Phase

No additional mitigation measures are required. The mitigation measures proposed to address Noise and Vibration, Air quality and Climate, and Traffic and Transportation are addressed under the respective headings.

18.4.11.2 Operational Phase

No additional mitigation measures are required. The mitigation measures proposed to address Noise and Vibration, Air quality and Climate, and Traffic and Transportation are addressed under the respective headings.

18.5 South Wall BESS

18.5.1 General Mitigation

The Project Construction Environmental Management Plan CEMP to be prepared by the appointed Contractor will incorporate the control measures detailed in the Outline CEMP and the Construction Management Plan in addition to specified conditions that may be prescribed in any grant of planning consent for the project, measures outlined in the Natura Impact Statement and the Environmental Impact Assessment Report and any commitments given by the applicant in relation to environmental protection associated with the activities outlined in the Outline CEMP. The proposed works area will be demarcated, and pollution prevention measures will be implemented prior to commencement of construction works. Prior to commencement of development, the Contractor will prepare a Construction Waste Management Plan (as part of the Project CEMP) which will provide for the segregation of all construction wastes into recyclable, biodegradable and residual wastes to facilitate optimum levels of re-use, recovery, and recycling operations.

18.5.2 Biodiversity

18.5.2.1 Construction Phase

Pollution Control

A suitably qualified Ecological Clerk of Works (ECoW) will be appointed by the Contractor and will be required on site during the construction works. The ECoW will ensure that all mitigation measures outlined within this report are implemented correctly during the construction works.

All construction works will be carried out in accordance with the Outline Construction Environmental Management Plan (OCEMP) provided in Appendix 5C which will define measures to ensure that any contaminants resulting from the site preparation or construction will not enter the surface water. No Additional mitigation measures are required.

All pollution control measures will be designed, installed, and maintained in accordance with CIRIA guidance for *'Environmental Good Practice on Site' (C741)* and *'Control of water pollution from linear construction projects. Technical guidance' (C648)*.

Noise Disturbance

The appointed Contractors will be required to adhere to the codes of practice for construction work provided in British Standard BS 5228:2009+A1:2014 Part 1 and Part 2, and the guidance given therein, for minimising noise emissions from construction.

The appointed ECoW will liaise with the Contractor in relation to potential for noisy works and will advise on when such works must be restricted, particularly (but not limited to), in relation to Brent geese which utilise the compensatory grassland.

In addition to avoid disturbance of the wintering species within the intertidal habitats, significantly noisy works will be avoided at low tide when usage of the intertidal flats is at its highest. The requirement for same will be dictated by the ECoW.

To minimise disturbance, noise reducing hoarding should be erected around the southern and eastern perimeter of the South Wall BESS development site during the wintering season (September-April inclusive). Hoarding will also be erected at the site access points and at the existing entrance on the Shellybanks Road to the east to reduce the visual disturbance of vehicles and machinery entering and leaving the site.

Vegetation Clearance

In accordance with Section 40 of the Wildlife Acts, the removal vegetation, which may be used as nesting sites by breeding birds, will be cleared outside of the birds nesting season (1st March to 31st August inclusive).

In the event that works within the bird nesting season cannot be avoided a derogation license will be sought from NPWS to facilitate the within the season, following a survey of the vegetation to establish the absence/presence of breeding nests. Where a nest is found, the clearance of vegetation can only occur once the chicks have fledged or where nesting has failed.

During the construction works, the appointed Contractor, in order to comply with Regulations 49 and 50 of the European Communities (Birds and Natural Habitat) Regulations (2011), will ensure biosecurity measures are implemented throughout the construction phase to ensure the introduction and translocation of invasive species is prevented.

Japanese Knotweed

Japanese knotweed was identified along an access track located immediately south of the South Wall BESS. There is a risk that the invasive species could be translocated during the proposed construction works.

A suitably qualified Ecologist will be appointed by the Contractor to carry out a pre-construction survey to determine the full extent of the Japanese knotweed infestation located adjacent to the South Wall BESS prior to the construction works commencing. If the area of infestation can be safely isolated from the proposed construction site at this point, then this shall be done. A site-specific Japanese Knotweed management plan will be prepared by the Ecologist which will be in accordance with Irish Water's *Information and Guidance Document on Japanese knotweed Asset Strategy and Sustainability IW-AMT-SOP-009*. All works will be carried out in accordance with the management plan. All Contractors carrying out works will be appropriately trained (e.g. through toolbox talks) on the identification of invasive plant and animal species, which are known to occur within or adjacent to the proposed works area, and actions to be taken if such species are observed on site.

18.5.2.2 Operational Phase

Operational impacts on Biodiversity were deemed Negligible. There is no requirement for mitigation measures.

18.5.3 Land, Soils and Ground Condition

Operational risk mitigation measures have been designed into the initial design of the BESS, such as bunded transformers and impermeable surfacing reducing infiltration. No further mitigation relating to the operation of the site is considered necessary.

The Environmental Clerk of Works will be responsible for identifying any ground contamination during the construction phase.

Any contaminated soils, sediment or groundwater that is encountered will be managed in accordance with best practice guidelines and all relevant legislation in consultation with EPA and any other relevant authorities as outlined in the OCEMP in Appendix 5D.

Storage of contaminated material if encountered on-site will be avoided where possible. If storage on site is necessary, contaminated material, if present, will be strictly segregated into designated bunded areas where contaminants cannot leach into the underlying ground. If spoil is to be stored on site, consultation with the relevant authorities will be undertaken, prior to commencing storage, to ensure that any relevant authorisations are obtained and that spoil is managed, at all times, in accordance with all relevant legislation.

18.5.4 Water

18.5.4.1 Construction Phase

During construction the contractor will implement an environmental management plan which will set out control measures and procedures to ensure potentially polluting activities are controlled and managed. These measures will include the following:

- Fuel storage – bunded tanks to prevent spillages and designated fuelling areas with spillage control;
- Chemical storage – all potentially polluting chemicals will be stored in secure weatherproof enclosures with spill kits;
- Concrete wash water will be collected;
- Should dewatering be required any discharges will be treated to remove contaminants and silt and disposed of in accordance with EPA requirements; and
- The site will be kept secure to prevent vandalism which can lead to pollution from stored liquids escaping and entering drains.

The CEMP will include emergency procedures in the event of a pollution event and routine monitoring of the site to ensure potentially contaminating activities remain under control. Monitoring will include daily visual monitoring of any surface water outfalls.

18.5.4.2 Operational Phase

Operational risk mitigation measures have been designed into the BESS design.

The drainage system has been designed to mitigate the effects of severe rainfall. Incident rainwater will collect in an attenuation tank which will slowly empty, reducing the surge of water entering the drainage system and reducing flood risk.

The development platform will be raised outside the 0.1% annual exceedance probability with climate change factored flood risk level.

The safety systems designed into the plant will monitor rainfall levels in bunded areas and maintain these free of rainwater.

18.5.5 Landscape and Visual

There are no additional mitigation measures proposed in relation to the proposed South Wall BESS development. The potential for enhancements to the southern boundary of the site have been considered and therefore the design of the facility incorporates a more aesthetic 2.6m-high system railing (i.e. 1.6m-high dark green railings on top of a 1m-high wall). Noting the alignment of underground services along that southern boundary, planted or green edges are not proposed in this location.

The siting and design of the proposed development are the main mitigation measures associated with this project (i.e. the mitigation measures are already embedded), including the proposed systems railing as an alternative, more aesthetic boundary treatment along the southward/public facing side of the site. Owing to this, monitoring of these measures is neither necessary nor applicable.

18.5.6 Noise and Vibration

18.5.6.1 Construction Phase

The majority of construction activity that generates noise is expected to be undertaken within daytime working hours. Predicted noise impacts due to daytime construction works do not indicate potential significant effects. Where works are required to be undertaken outside daytime working hours the predicted noise impacts should be assessed to identify any requirement for mitigation.

18.5.6.2 Operational Phase

No specific mitigation measures are proposed for the mitigation of operational noise impacts at off-site sensitive receptors. However, noise emissions should be minimised at source, in accordance with best practice, to minimise the exposure site personnel to noise from operational plant. The siting and design of the development is the main mitigation measure associated with this project (i.e. the mitigation measures are already embedded). Noise emissions will be minimised at source, in accordance with best practice, to minimise noise from operational plant. It is expected that the noise limits will be in line with those specified in NG4 against which this development has been assessed.

18.5.7 Archaeology, Architecture and Cultural Heritage

18.5.7.1 Construction Phase

Archaeology

The principal risk of impact upon archaeology by the development is from any works that penetrate below the made ground layer. The variation in depth of the made ground layer makes it difficult to predict where excavations might have an impact. It is proposed that a programme of archaeological investigation will be implemented in accordance with an archaeological excavation strategy and methodology. This will be in line with guidance set out by the Department of Arts, Heritage, Gaeltacht and the Islands and agreed with the Dublin City Archaeologist. This will be set out in the CEMP.

Temporary Construction Compounds

Where construction compounds require any sub-surface works that will penetrate to a depth below that of the made ground, any excavation work will be monitored by a suitably qualified archaeologist.

Cranes

Where construction of hard standing for cranes will require sub-surface works to a depth that will penetrate the made ground layer, any excavation work will be monitored by a suitably qualified archaeologist.

18.5.7.2 Operational Phase

As no cultural heritage impacts have been identified for the operational phase, no mitigation measures are required.

18.5.7.3 Decommissioning Phase

Cranes

Where construction of hard standing for cranes will require sub-surface works to a depth that will penetrate the made ground layer, any excavation work will be monitored by a suitably qualified archaeologist.

18.5.7.4 Monitoring

Where piles are to be bored through the made ground, they will be archaeologically monitored.

Where construction compounds require sub-surface works to a depth that will penetrate the made ground layer, the excavation work will be archaeologically monitored.

Where construction of hard standing for cranes will require sub-surface works to a depth that will penetrate the made ground layer, the excavation work will be archaeologically monitored.

18.5.8 Air Quality and Climate

18.5.8.1 Construction Phase

The Dust Management Plan outlined in Section 18.2.8 will be applied in order to mitigate potential adverse effects during the construction phase. This is included in the OCEMP provided in Appendix 5C.

18.5.8.2 Operational Phase

No mitigation measures are required.

18.5.9 Waste

18.5.9.1 Construction Phase

An OWMP has been prepared and is included in Appendix 14. A final WMP will be agreed with Dublin City Council prior to the commencement of construction on site. The final WMP will be available for inspection at the site of the proposed development at all reasonable times for examination by Dublin City Council.

All waste arising will be managed and disposed of in a way that ensures the provisions of the Waste Management Act 1996 and associated amendments and regulations are applied and fully complied with.

18.5.9.2 Operational Phase

The facility is small and will not generate process waste during its operation and so no further mitigation is considered to be required. There will be a small amount of domestic type waste

produced in the welfare facilities which will be managed in accordance with ESB's existing waste disposal procedures. This will have no significant effect on waste management resources.

Mitigation has been built into the design and procurement of the BESS. The modular nature of the construction has been selected to increase resource efficiency by reducing waste generated during the construction process.

18.5.10 Traffic, Transportation & Material Assets

18.5.10.1 Construction Phase

A high-level Construction Management Plan has been prepared and is included in Appendix 5A. A more detailed Demolition and Construction Traffic Management Plan (CTMP) will be prepared by prior to the commencement of the works. Operational Phase

Given the significantly lower traffic movements during the operational phase when compared to the construction phase. It is not envisaged that there will be mitigation measures required for the operation phase.

18.5.11 Population and Human Health

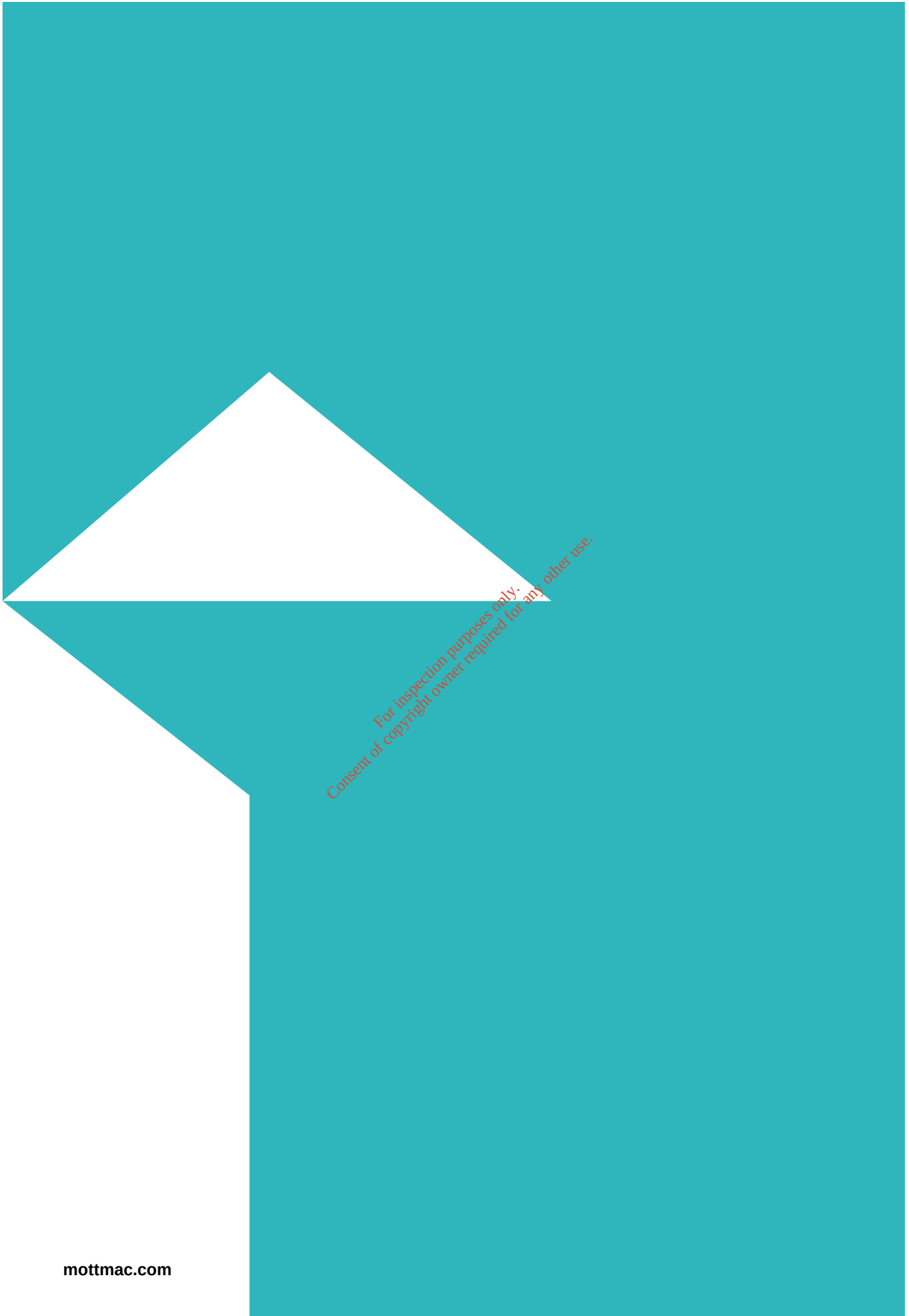
18.5.11.1 Construction Phase

No additional mitigation measures are required. The mitigation measures proposed to address Noise and Vibration, Air quality and Climate, and Traffic and Transportation are addressed under the respective headings.

18.5.11.2 Operational Phase

No additional mitigation measures are required. The mitigation measures proposed to address Noise and Vibration and Traffic and Transportation are addressed under the respective headings.

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