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

Non-Technical Summary

October 2020

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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.

The purpose of the FlexGen plants 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 each 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 locations within the environment of Dublin Bay, ESB decided to prepare a voluntary combined Environmental Impact Assessment Report (EIAR) for the four independent projects.

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

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

This document is the Non-Technical Summary (NTS) of the EIAR prepared to assess the likely significant effects of these four components on the environment.

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 which includes the temporary associated construction corridors, access routes and lay down areas are shown in Figure 1.1.

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Figure 1.1: Poolbeg Peninsula



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1.3 Preparation of the EIAR

1.3.1 Structure of this Report

This report has been prepared having regard to European Commission's *Environmental Impact Assessment of Projects Guidance on the preparation of the Environmental Impact Assessment Report (EIA Directive 2014/52/EU)* (2017) and Environmental Protection Agency's "*Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports*" (2017).

Each of the four developments are subject to separate planning applications. Each are independent of each other and can be built and commissioned in isolation. Conscious of the need to ensure that the Environmental Impact Assessment Report (EIAR) is readily accessible to general public stakeholders and statutory authorities, it has been structured into three volumes.

- Volume 1- Non-Technical Summary (NTS)- this report;
- Volume 2 – Main EIAR; and
- Volume 3- Technical Appendices.

The structure of this report is set out below.

- Chapter 1- Introduction;
- Chapter 2- Need for the Projects;
- Chapter 3- Assessment of Alternatives;
- Chapter 4- Description of the Proposed Developments;
- Chapter 5- Assessment of Effects
- Chapter 6-Interactions of Effects

In addition, a Natura Impact Statement (NIS) has been prepared and will support the planning consent applications to Dublin City Council.

1.3.2 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 (EIAs) and of writing EIARs 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 for 'competent expert'.

In terms of Air Quality and Climate AWN Consulting Ltd were commissioned to provide input and for Landscape and Visual Impact MacroWorks were engaged.

1.3.3 Community Engagement

1.3.3.1 Stakeholder Consultation

Table 1.1 lists the bodies notified via email of the EIAR on the four developments as described in this EIAR.

Table 1.1: 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

1.3.3.2 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.

2 Need for the Projects

The need for the proposed developments is founded on international and European binding agreements to facilitate climate resilience and sustainable development.

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 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. The four proposed developments are consistent with the above objectives.

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.

The proposed FlexGen plants 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.

3 Assessment of Alternatives

3.1 Introduction

The section summarises how the projects evolved by considering the following;

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

3.2 Do – Nothing Scenario

The East Coast Generation Opportunity Assessment (EirGrid, 2018) identified a steady increase in demand for power within the Greater Dublin Area. In response to binding National and European targets, EirGrid developed a multi-year programme, “*Delivering a Secure, Sustainable Electricity System*” (DS3). The DS3 programme 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 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.

3.3 Alternative Technologies

3.3.1 FlexGen

The Aero derivative open cycle gas turbines (OCGT) technology was specifically selected for its fast start-up times. 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.

3.3.2 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.

3.4 Alternative Locations

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.

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 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.

3.5 Alternative Layouts

3.5.1 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 potential 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.

3.5.2 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.

3.5.3 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 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.

3.5.4 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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4 Description of the Proposed Developments

4.1 Overview of Proposed Developments

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.

4.2 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 75MW 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 for Utilities requirements, low sulphur diesel oil will be required as a backup fuel.

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.

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.

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.

A typical FlexGen unit is shown in Figure 4.1.

Figure 4.1: Typical FlexGen Unit



Source: ESB

4.3 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. As EirGrid increase the amount electricity from renewable generators onto the grid, they will call upon these services to maintain the stability of the national electricity grid. The duration of these services varies from 2 seconds up to 60 minutes, and their frequency of use will be determined by EirGrid.

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 4.2.

Figure 4.2: Typical BESS



Source: ESB

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. 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.

4.4 Poolbeg Peninsula

The four proposed developments are located on the Poolbeg Peninsula. 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.

Each of the four proposed developments will utilise existing infrastructure on the Poolbeg Peninsula. This is described in Table 4.1 below:

Table 4.1: 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.

Shared Infrastructure	Poolbeg FlexGen	Ringsend FlexGen	Poolbeg BESS	South Wall BESS
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.
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	Not Required.	Not Required.

Shared Infrastructure	Poolbeg FlexGen	Ringsend FlexGen	Poolbeg BESS	South Wall BESS
		foul water drainage infrastructure.		
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.

4.5 Poolbeg FlexGen

4.5.1 Location

The proposed Poolbeg FlexGen development is located within the existing ESB Poolbeg Generating Station. The proposed development area (including connection corridors and construction laydown areas) is 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 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.

4.5.2 Site Layout and Processes

The proposed layout is shown in Figures 4.3 and 4.4 below (Drawing No: QP-000027-04-D460-010).

Figure 4.3: Proposed Layout for Poolbeg FlexGen (ESB Drawing No. QP-000027-04-D460-010)

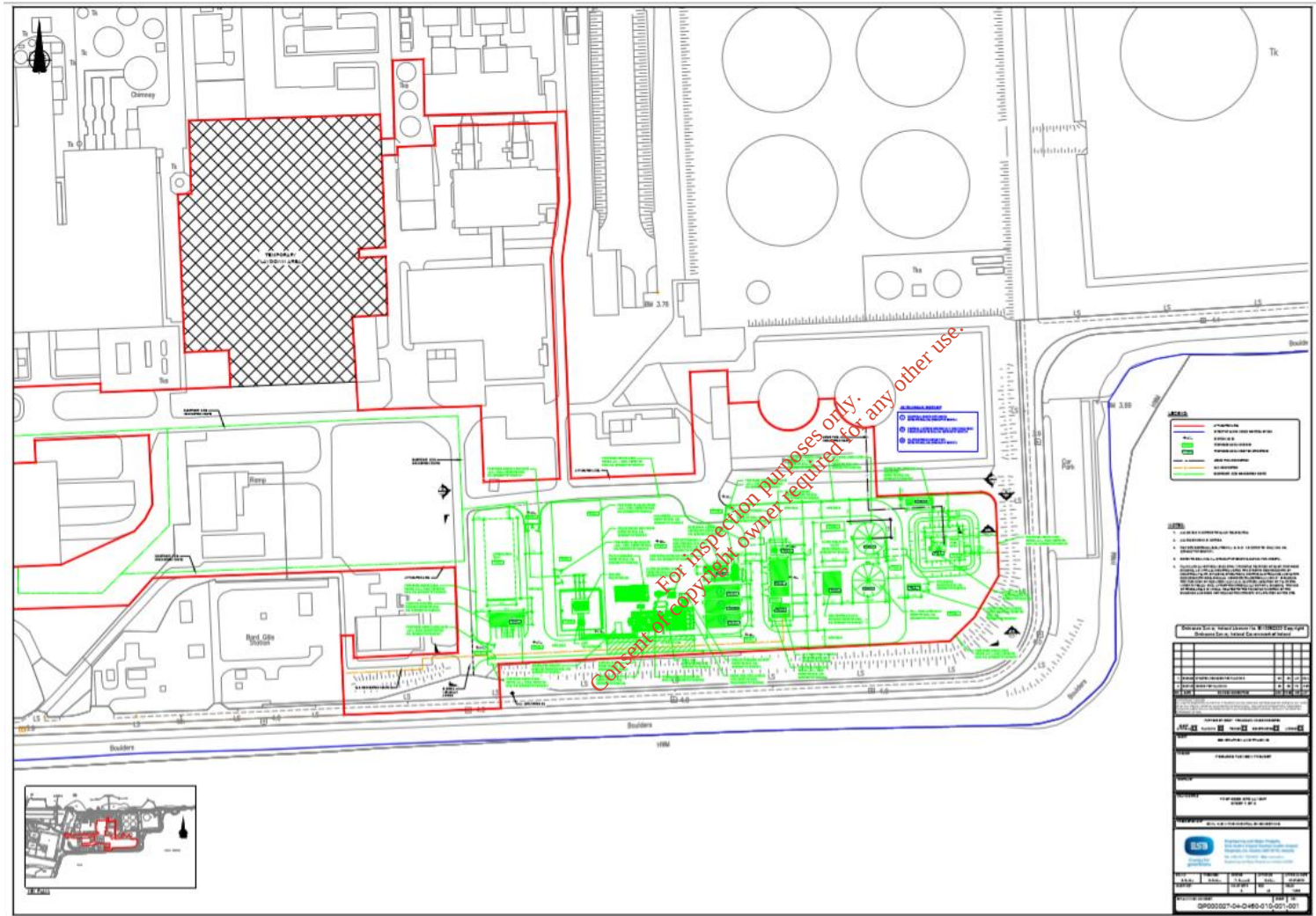
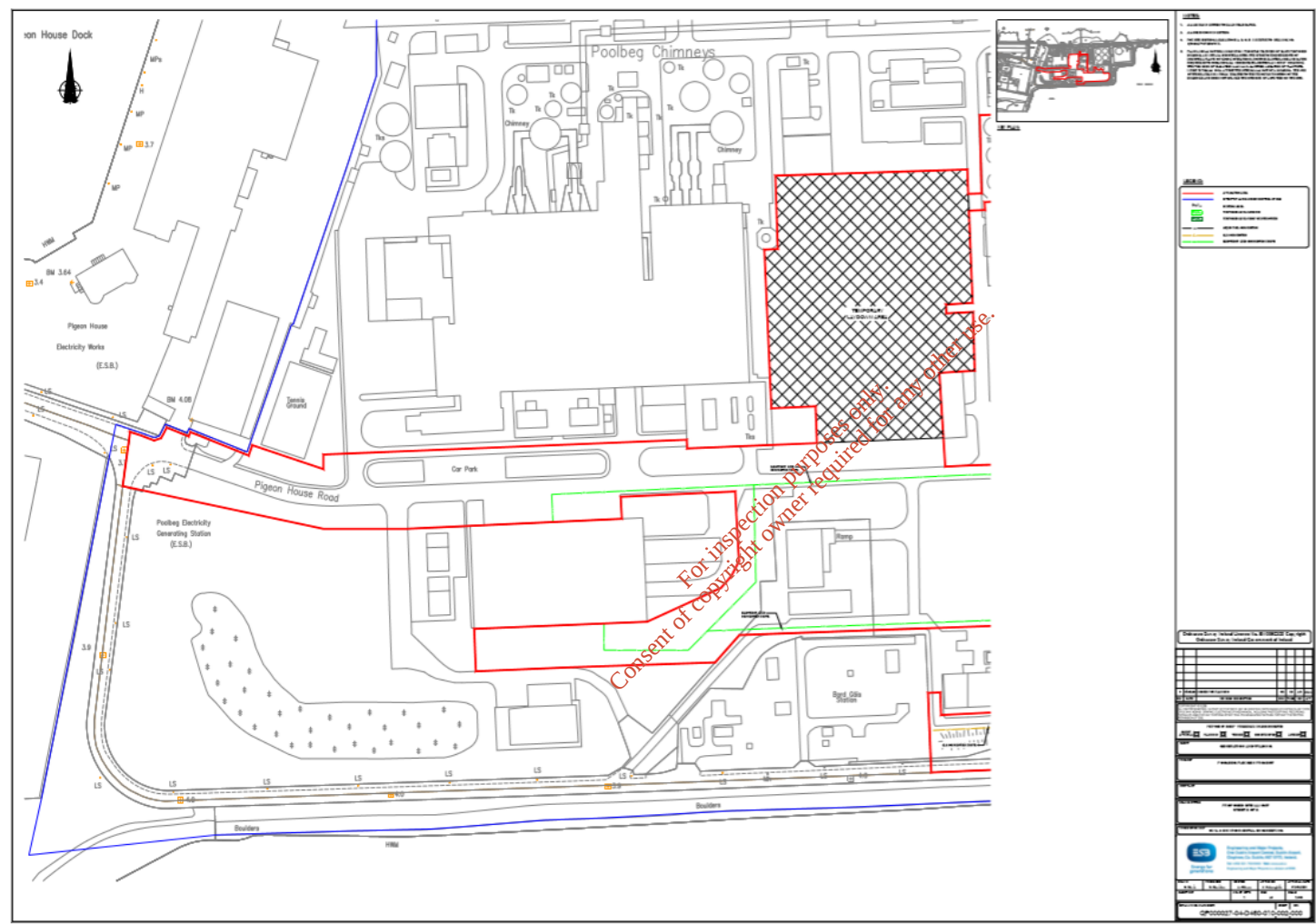


Figure 4.4: Proposed Layout for Poolbeg FlexGen (QP-000027-04-D460-010)



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 securi 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

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- wastewater

4.5.3 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. 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.

In order to comply with CRU 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 (182m³). This above ground fuel storage tank will be bunded.

4.5.4 Grid Connection

The proposed cable route 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.

4.5.5 Water Demand

Water supplies are required as follows:

4.5.5.1 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.

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

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.

4.5.5.2 Demineralised Water

The gas turbine will require injection of demineralised water for nitrogen oxides (NO_x) 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.

4.5.5.3 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.

4.6 Poolbeg BESS

4.6.1 Location

The Poolbeg BESS site lies within the existing ESB Generating station. The site (including connection corridors and construction laydown areas) 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).

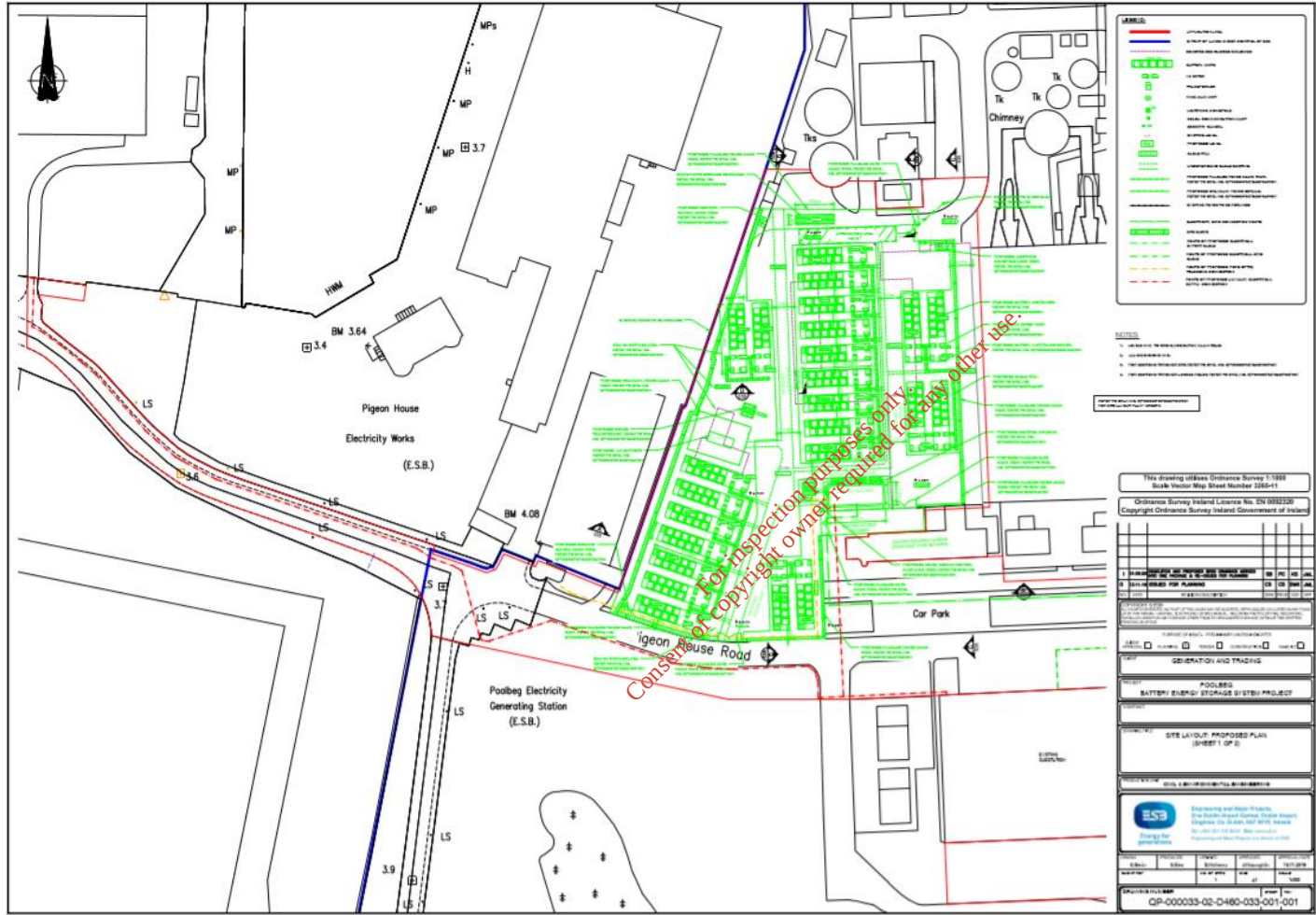
The existing access to the site is along the Pigeon House Road via the main Generating Station entrance.

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.

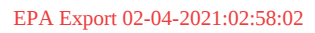
4.6.2 Site Layout and Processes

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. The proposed layout is shown in Figures 4.5 (Drawing No: QP-000033-02-D460-033-001-001) and 4.6 (Drawing No: QP-000033-02-D460-034-001-001).

Figure 4.5: Poolbeg BESS proposed layout (1) (Source: QP-000033-02-D460-033)



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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.

4.6.3 Grid Connection

The planning application includes the underground grid connection from the proposed development to the existing Poolbeg 220 kV substation connection point. The proposed cable route will run along the internal site road. 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.

4.6.4 Water Demand

A water supply is required to provide a potable water connection to the proposed services mini-pillar. 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.

4.6.5 Proposed Demolition

A demolition and construction management plan for the Poolbeg BESS has been prepared and includes 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 4.7 (Drawing No: QP-000033-02-P460-004-001-001) will be demolished. The existing administration building (Building 4) is to be retained and protected during the construction works.

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Source: ESB



4.7 Ringsend FlexGen

4.7.1 Location

The site for the proposed Ringsend FlexGen site is located on the Poolbeg Peninsula. The site (including connection corridors and construction laydown areas) 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.

4.7.2 Site Layout and Processes

The proposed layout is shown in Figures 4.8 and 4.9 (Drawing QP000026-04-D460-004).

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Legend

- Red outline: Site boundary
- Blue outline: Public domain
- Green outline: Proposed development
- Yellow outline: Existing development
- Purple outline: Proposed parking area
- Orange outline: Proposed pedestrian path
- Light green fill: Proposed landscaping
- Dark green fill: Existing vegetation
- White fill: Open space
- Grey fill: Water body
- Black dots: Trees
- Black lines: Roads
- Black lines: Fences
- Black lines: Paths
- Black lines: Utilities
- Black lines: Other infrastructure

Map Labels: SOUTHBRANK ROAD, SHELLYBANKS ROAD, T10, T11, T12, T13, T14, T15, T16, T17, T18, T19, T20, T21, T22, T23, T24, T25, T26, T27, T28, T29, T30, T31, T32, T33, T34, T35, T36, T37, T38, T39, T40, T41, T42, T43, T44, T45, T46, T47, T48, T49, T50, T51, T52, T53, T54, T55, T56, T57, T58, T59, T60, T61, T62, T63, T64, T65, T66, T67, T68, T69, T70, T71, T72, T73, T74, T75, T76, T77, T78, T79, T80, T81, T82, T83, T84, T85, T86, T87, T88, T89, T90, T91, T92, T93, T94, T95, T96, T97, T98, T99, T100.

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Inset Map: LOCATION MAP - L2000

Scale: 1:1000

North Arrow: Points North

Metadata:

Field	Value
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Client	[REDACTED]
Date	[REDACTED]
Author	[REDACTED]
Reviewer	[REDACTED]
Approved By	[REDACTED]
Version	[REDACTED]
Scale	[REDACTED]
Sheet No.	[REDACTED]
Total Sheets	[REDACTED]
Project No.	[REDACTED]
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Drawn By	[REDACTED]
Checked By	[REDACTED]
Approved By	[REDACTED]
Scale	[REDACTED]
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Total Sheets	[REDACTED]
Project No.	[REDACTED]
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Figure 4.9: Ringsend FlexGen Proposed Layout (2) (Drawing QP000026-04-D460-004)



The Ringsend FlexGen development will consist of a 75 MW 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, securimesh 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. 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.

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4.7.3 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.

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). Grid Connection

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 and from there onto the national grid.

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

4.7.4 Water Demand

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.

Water supplies are required as follows:

4.7.4.1 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).

4.7.4.2 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.

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.

4.7.4.3 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.

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.

4.8 South Wall BESS

4.8.1 Location

The site for the proposed South Wall BESS development is located on the Poolbeg Peninsula. The site (including connection corridors and lay down areas) 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 which in turn is bounded by a vegetated earth bund situated just north of Dublin Bay. The Covanta Dublin Waste-to-Energy 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.

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 an approach to a number of facilities, and is secured/manned at its northern end.

Until 2018, the site was used as a pitch and putt golf course. The site is now comprised of unbound granular stoned surfacing with some vegetated areas. There are multiple existing underground services crossing the site, mainly in the south.

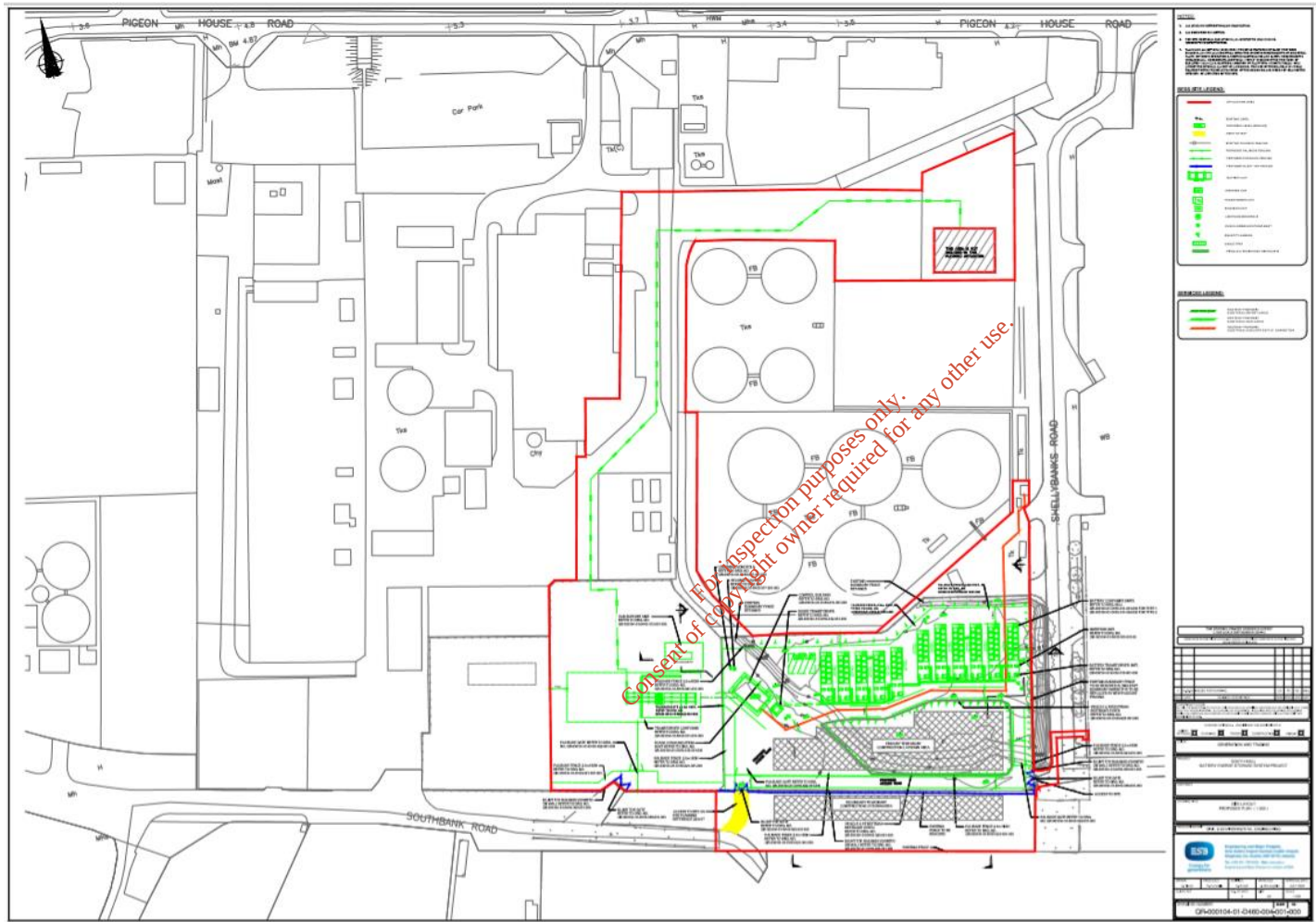
Access to the site will be gained via South Bank Road or via Shellybanks Road to the east. There will be a connecting gate between this site and the adjacent Ringsend FlexGen to the west.

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.

4.8.2 Site Layout and Processes

The site layout for the proposed South Wall BESS development is shown in Figure 4.10 (Drawing No. QR000104-01-D460-004-001-000) below.

Figure 4.10: Site Layout for South Wall BESS (Source: Drawing No. QR000104-01-D460-004)



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 bundled 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 bundled 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.

4.8.3 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.

4.8.4 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

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.

4.9 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.

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.

The design and undertaking of construction work associated with the connection of the development to the Electrical Grid Network are included as part of the works.

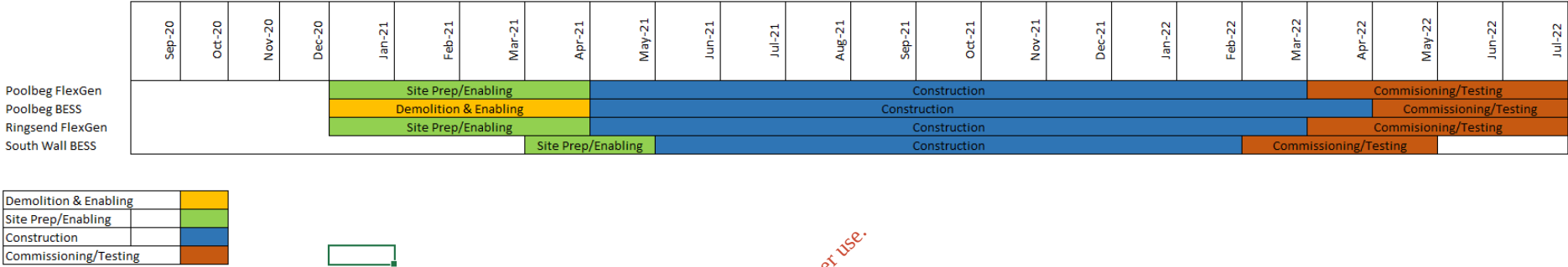
A detailed Construction Management Plan for each of the proposed developments has been prepared by ESB to inform this EIAR in Volume 3.

4.9.1 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 4.11, 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.

Figure 4.11: Proposed Construction Timeline Cumulative



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4.9.2 Working Hours

The intended construction working hours for each of the four developments are presented in Table 4.2. These hours are applicable to normal construction activities, piling installations and heavy commercial vehicle movements.

Table 4.2: 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 Dublin City Council.

4.9.3 FlexGen (Poolbeg and Ringsend)

4.9.3.1 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.

4.9.3.2 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.

4.9.3.3 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 appointed contractors Construction Environmental Management Plan (CEMP) agreed with ESB prior to commencement of works. It is anticipated that the compound and laydown area are facilitated within the proposed project works boundary.

4.9.4 Poolbeg BESS

4.9.4.1 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

4.9.4.2 Workforce

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.

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

4.9.4.3 Vehicle Movements

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.

Abnormal loads 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.

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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.

4.9.4.4 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 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.

4.9.5 South Wall BESS

4.9.5.1 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

4.9.5.2 Workforce

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.

4.9.5.3 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. Most of the vehicle movements for

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.

4.9.5.4 Temporary Construction Works Facilities

Dedicated primary and secondary 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 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.

During the construction phase it is anticipated that the existing gate at the east of the site onto the Shellybanks Road will be available.

4.10 Operational Phase Activities

4.10.1 Operational Management

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.

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.

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.

4.11 Firefighting Systems and Controls

4.11.1 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.

4.11.2 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.

4.12 Risk of Major Accidents and Disasters

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) COMAH 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.

In light of the proximity of the surrounding environment, the most significant risks of major accidents and disasters are associated with the COMAH establishments. Each of the proposed developments has been subject to a Land Use Planning assessment in accordance with the Health Service Authority's land use guidance.

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 in the land use planning assessments.

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

4.13 Decommissioning

4.13.1 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 (review) 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.

4.13.2 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.

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5 Assessment of Effects

Detailed studies into the potential impacts on key environmental receptors are described within the Environmental Impact Assessment Report (Volume 2). These studies are summarised below.

5.1 Planning Policy Considerations

The proposed FlexGen plants will operate as peaking power stations which can facilitate fluctuating electricity demands and compensate for intermittency associated with renewable energy generation from wind and solar. As discussed previously in Chapter 2, the plants will provide quick response capabilities to EirGrid as part of the DS3 Programme to ensure that the electricity grid network can operate efficiently with the integration of additional renewable energy.

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.

At both a regional and local planning policy level, there is significant support for renewable energy and less carbon intensive forms of energy production aimed at achieving Ireland renewables and electricity targets

The proposed developments are demonstrated to be consistent with the overarching policy drivers at each level of governance in support of renewable and less carbon intensive forms of energy production. In summary, the developments represent essential components of the flexible power generation fleet required to support the transition to a low carbon economy and increase renewable energy integration from wind and solar on the electrical transmission grid.

5.2 Biodiversity

This section of the report assesses the potential for significant effects on biodiversity from the four proposed developments. Along with the assessment of significance of any effects this section also considers 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.

5.2.1 Poolbeg FlexGen

The Poolbeg FlexGen site currently comprises a mix of gravelled tracks, areas of recolonising bare ground and scrub. 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. 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.

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.

A Natura Impact Statement (NIS) prepared for the four proposed developments determined potential for adverse effects on site integrity of European sites, due to a degradation of water quality from the runoff of construction pollution and visual and noise disturbance to Special Conservation Interest species during the construction phases at the Poolbeg FlexGen site. 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.

Natural Heritage Areas (NHA's) such as 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.

5.2.1.1 Poolbeg FlexGen Construction Impacts

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.

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.

The spatial limit of dust impacts from the Poolbeg FlexGen developments is determined as 100m from the site boundaries. The only protected habitat which occurs within the spatial limits of dust effects is Mudflats and sandflats which is designated within the South Dublin Bay Special Area of Conservation (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.

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. 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.

The construction works associated with the Poolbeg FlexGen development will result in an increase in noise which 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.

There is no potential for the construction works to result in disturbance to wintering bird roosting sites.

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.

5.2.1.2 Poolbeg FlexGen Operational Impacts

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 which indicates that there is negligible potential for significance disturbance during the operation of the facility.

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.

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.

The effects of released emissions during the operation of the facility on biodiversity is considered to be negligible.

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.

5.2.1.3 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 (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.

5.2.1.4 Poolbeg FlexGen Mitigation

A suitably qualified Ecological Clerk of Works (ECoW) will be appointed by the appointed Contractor and will be required on site during the construction works. The ECoW will ensure that all mitigation measures outlined within the EIAR 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)*.

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 the site 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.

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.

5.2.2 Poolbeg BESS Designated Sites

The NIS identified source-pathway-receptor links between the Poolbeg BESS development and four European sites; namely 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.

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 pNHA's are anticipated.

5.2.2.1 Poolbeg BESS Construction Impacts

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.

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.

The spatial limit of dust impacts from the two BESS developments was determined as 100m from the site boundaries. The only protected habitat which occurs within the spatial limits of dust effects is Mudflats and sandflats 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.

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. 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.

The construction works associated with the Poolbeg BESS development will result in an increase in noise. 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.

The intertidal area located to the east of the Irishtown Nature Reserve are located within the Zone of Influence (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.

Both common and Arctic tern breed on the ESB dolphin site which is located approximately 140m north of the Poolbeg Peninsula (NPWS, 2015b). 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. 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 outside the BESS site ca.120m from the BESS site boundary. Breeding peregrine falcon use a foraging core range of 2km¹. 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, 2007² and Kettle et al, 2019³). Potential negative effects on the peregrine falcon nest are therefore considered unlikely.

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.

5.2.2.2 Poolbeg BESS Operational Phase

The Poolbeg BESS development can operate at any time 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

¹ SNH (2017) Recommended bird survey methods to inform impacts assessment of onshore wind farms. Version 2.

² Ruddock, M., Whitfield, D., A Review of Disturbance Distances in Selected Bird Species.

³ 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).

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, there is no potential for disturbance during the operation of the facility.

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.

5.2.2.3 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.

5.2.2.4 Poolbeg BESS Mitigation

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)*.

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 the site during the wintering season (September-April inclusive). Hoarding will also be erected at the secondary access point located on Shellybanks Road to reduce visual disturbance of vehicles and machinery entering and leaving the site.

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.

5.2.3 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).

All habitats within the site were assessed as having Local Importance (Lower Value) due to the low ecological value the habitats provide.

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.

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.

5.2.3.1 Ringsend FlexGen Construction Impacts

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.

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.

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 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.

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.

The construction works associated with the Ringsend FlexGen development will result in an increase in noise.

The intertidal areas located to the south of the Irishtown Nature Reserve is located within the Zol of the Poolbeg FlexGen development. 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 Zol 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 Zol 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.

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, 2007⁴ and Kettle et al, 2019⁵). Potential negative effects on the peregrine falcon nest are therefore considered unlikely.

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.

5.2.3.2 Ringsend FlexGen Operational Impacts

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. This shows that there is no potential for disturbance during the operation of the facility.

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.

⁴ Ruddock, M., Whitfield, D., A Review of Disturbance Distances in Selected Bird Species.

⁵ 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 effects of drainage on biodiversity are considered to be negligible.

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.

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.

5.2.3.3 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. Impacts during decommissioning are expected to be of a similar type and magnitude to those anticipated during construction but generally of a shorter duration.

5.2.3.4 Ringsend FlexGen Mitigation

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)*.

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 located on Southbank Road to reduce the visual disturbance of vehicles and machinery entering and leaving the site.

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.

5.2.4 South Wall BESS

The South Wall BESS site currently consists of hard standing ground with some minor patches of recolonising bare ground. There are no permanent structures in this area to be demolished. The site is bounded by an earth bank along the eastern and northern boundary of the site.

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.

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.

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 pNHA's are anticipated.

5.2.4.1 South Wall BESS Construction Impacts

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.

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.

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 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.

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.

The construction works associated with the South Wall BESS development will result in an increase in noise. The South Wall BESS site 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.

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 Zol 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 Zol 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.

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 site which is located approximately 840m north-west of the South Wall development site. The 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 2km⁶. 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 (Ruddock & Whitfield, 2007⁷ and Kettle et al, 2019⁸). Potential negative effects on the peregrine falcon nest are therefore considered unlikely.

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.

5.2.4.2 South Wall BESS Operational Impacts

The South Wall BESS development can operate over a 24 hours period and can be operated remotely. The duration of these services varies from 2 seconds up to 60 minutes, and their frequency of use will be determined by EirGrid. The facilities will however require regular maintenance and site inspection visits. Disturbance will be minor and will be limited to within the ESB facilities.

⁶ SNH (2017) Recommended bird survey methods to inform impacts assessment of onshore wind farms. Version 2.

⁷ Ruddock, M., Whitfield, D., A Review of Disturbance Distances in Selected Bird Species.

⁸ 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 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. There is no potential for disturbance during the operation of the facility.

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.

5.2.4.3 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.

5.2.4.4 South Wall BESS Mitigation

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)*.

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.

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 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.

5.2.5 Cumulative Effects

Each of the four developments have been assessed individually 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.

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. 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 existing Poolbeg CCGT and DBP) was prepared. There is no potential for the

combined operational noise of the four developments to result in significant cumulative effects on the biodiversity.

5.3 Land, Soils and Ground Conditions

This section summarises the findings of the geology, soils and contaminated land technical assessments for the four proposed developments and presents the potential significant effects likely to be associated with the proposed developments related to these topics.

The nature of the underlying geology, hydrogeology and soils have been determined from published mapping, desk-based studies and ground investigations undertaken by ESB.

5.3.1 Poolbeg FlexGen

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. The underlying made ground and inter tidal deposits are granular in nature and no new pollutant pathways will be created.

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 resulting in no change.

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, during which some hydrocarbon contamination was noted. These contaminated soils were appropriately excavated and removed from site in June/July 2020⁹. This material has been removed from site and so the probability of mobilising existing contamination during construction is reduced.

Any further contamination discovered during 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. 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.

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.

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.

⁹ AECOM 2020. Poolbeg BESS and FlexGen SI and GQRA

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 (EnCOW) 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.

5.3.2 Poolbeg BESS

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 are limited areas of soils on site. There will be small loss of soil from the site which will be reused in landscaping resulting in no change.

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 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.

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.

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).

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.

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 the conditions set out in the IE licence issued by the EPA.

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 EnCoW 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.

5.3.3 Ringsend FlexGen

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 are no soils on site, a negligible environmental value is determined.

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. No contamination was noted during these investigations. Should 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 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.

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.

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.

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.

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 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.

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 EnCOW 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.

5.3.4 South Wall BESS

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.

There are no soils on site. 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 health¹⁰. 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.

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.

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.

¹⁰ AECOM 2020. Proposed BESS Site, Ringsend – SI and GQRA Interim Report

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.

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.

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.

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.

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 EnCoW 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.

5.3.5 Cumulative Effects

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.

5.4 Water Environment

This section considers the potential effects the construction of the four projects may have on water features and also considers flood risk.

A desktop study was undertaken to identify the baseline characteristics relating to the surface water environment and local flood risk of proximate surface waterbodies.

Poolbeg Peninsula is located within the Liffey and Dublin Bay catchment (Water Framework Directive -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]¹¹. These areas are designated under the EU Habitats or Birds Directive.

The *Urban Waste Water Treatment Regulations 2001*, 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 Dublin Waste-to-Energy facility and Ringsend WWTP all currently discharge to the Lower Liffey Estuary.

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 3,999µS/cm were frequently recorded, indicative of brackish groundwater conditions¹².

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

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

¹¹ <https://www.npws.ie/>

¹² AECOM 2020 Poolbeg Baseline Assessment

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 receptors¹³.

Groundwater quality has been monitored from boreholes installed in the Ringsend/South Wall sites in June 2020 (AECOM,2020). Groundwater was generally encountered at depths of 2.0m and 4.2m below ground level (bgl). Conductivity measurements 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). 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 low¹⁴ citing the likelihood for dilution and general elevated concentrations of hydrocarbons within groundwater across the Peninsula.

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

¹³ AECOM 2020 Poolbeg Baseline Assessment

¹⁴ AECOM 2020 Southwall 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.

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.

5.4.1 Poolbeg FlexGen

The proposed FlexGen site is located on a vacant site within the boundary of the existing Poolbeg power station. The site is bounded by an earth bund along the eastern and southern boundaries. The ground surface is 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.

The proposed site will comprise of a number of new buildings and plant to facilitate the operation of the FlexGen development. 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 ESB owned drainage network to the north of the site which ultimately discharges to Dublin Bay via the existing cooling water outfall. Surface water emissions will be regulated by the EPA under a revised Industrial Emissions Licence.

A flood risk assessment has been prepared which shows the site is located in Flood Risk Zone C¹⁵. 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.

The development platform will be raised outside the 0.1% annual exceedance probability with climate change factored flood risk level. The development will not cause increased risk of flooding in other areas.

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 to prevent spillages of polluting materials.

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. 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 tank¹⁶.

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. Construction activities with a potential to cause polluting run off will be managed; concrete wash water will be retained on site and prevented

¹⁵ ESB, 2020. Poolbeg Flexible Generation Flood Risk Assessment Report Reference P000344-PM01-0003

¹⁶ ESB 2020 Poolbeg Flexible Generation Drainage and Services Report P000344-PM01-0004

from entering drains; and refuelling will be undertaken using purpose designed equipment bunded to prevent leaks. With these control measures in place the effect on Dublin Bay the magnitude of impact from polluting run off is expected to be negligible.

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.

During ground investigations undertaken in 2020 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.

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 not significant impact.

Should the FlexGen plant be decommissioned the equipment will be dismantled and removed from site and the site left level. 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 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.

During construction the contractor will implement a Construction Management Plan which will set out control measures and procedures to ensure potentially polluting activities are controlled and managed.

5.4.2 Poolbeg BESS

The proposed BESS site is located 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.

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 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 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 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. Surface water emissions will be regulated by the EPA under a revised Industrial Emissions Licence.

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 C and will be built to the required level to account climate change as recommended in the

Greater Dublin Strategic Drainage Study¹⁷. The development will not cause increased risk of flooding in other areas.

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 tank¹⁸.

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.

Whilst no significant contamination was found during ground investigations undertaken in 2020, 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

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.

¹⁷ Dublin Drainage Consultancy 2005. Greater Dublin Strategic Drainage Study, Final Strategy Report

¹⁸ ESB 2020. Poolbeg BESS Drainage and Services Report QP-000033-02-R460-002

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.

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 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.

5.4.3 Ringsend FlexGen

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.

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 Study¹⁹. The development will not cause increased risk of flooding in other areas. The development platform is outside the 0.1% annual exceedance probability with climate change factored flood risk level.

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 tank²⁰.

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. 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.

¹⁹ Dublin Drainage Consultancy 2005. Greater Dublin Strategic Drainage Study, Final Strategy Report

²⁰ ESB 2020. Ringsend Flexible Generation Drainage Report

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.

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.

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.

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.

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 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 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.

Should the FlexGen plant be decommissioned the equipment will be dismantled and removed from site and the site left level. 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.

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.

5.4.4 South Wall BESS

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.

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 C²¹. 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. The development will not cause increased risk of flooding in other areas.

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 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 tank²².

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. 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.

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

²¹ ESB, 2020 South Wall BESS Flood Risk Assessment Report Reference QS-000266-01-R460-005

²² ESB 2020. South Wall BESS Drainage and Services Report QS-000266-01-R460-006

pollution pathways. A negligible magnitude of impact is assessed resulting in a slight adverse effect.

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.

During ground investigations undertaken in 2020 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.

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 Study²³.

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.

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. 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.

During construction the contractor will implement a Construction Environmental Management Plan which will set out control measures and procedures to ensure potentially polluting activities are controlled and managed

5.5 Landscape and Visual

The Landscape and Visual Impact Assessment (LVIA) describes the landscape context of each of the proposed developments and assesses the likely landscape and visual impacts of each on the receiving environment. Landscape and visual impacts are assessed separately for each proposed development.

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.

The four developments are located in four locations within the Poolbeg Peninsula, to the south of Dublin docks. The sites of the four proposed projects are all *de facto* (i.e. manmade) landscapes, located over approx. 1.5km of the peninsula. The only natural watercourses within the vicinity of the site is the River Liffey estuary, as well as Dublin Bay.

²³ Dublin Drainage Consultancy 2005. Greater Dublin Strategic Drainage Study, Final Strategy Report

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 Covanta Dublin Waste-to-Energy facility; 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 Strategic Development Zone (SDZ). Located within and around the site of the former Irish Glass Bottle Factory, this 43ha zone has recently been approved for the development of streets, parks and utilities infrastructure for 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 Liffey is a large and intact stone building that was built in 1760 as a “blockhouse” (i.e. a detached fort occupied by a garrison) and is a recorded protected structure.

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 fishermen.

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.

5.5.1 Poolbeg FlexGen

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 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.

There will be a 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. Construction-related impacts will only result in ‘short term’ landscape and visual effects. The magnitude of landscape impact during construction is High.

In terms of physical landscape effects, the proposed development will require a relatively minor degree of excavation. 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.

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.

Based on the landscape and visual impact judgements provided throughout this LVIA, the proposed FlexGen development is not considered to give rise to any significant landscape or visual impacts.

5.5.2 Poolbeg BESS

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. Construction-related impacts will only result in short-term landscape and visual effects. The magnitude of landscape impact during construction is High.

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 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.

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.

The proposed BESS development is not considered to give rise to any significant landscape or visual impacts.

5.5.3 Ringsend FlexGen

There will be a 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. Construction-related impacts will only result in 'short term' landscape and visual effects. The magnitude of landscape impact during construction is High.

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.

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.

The proposed Ringsend FlexGen development is not considered to give rise to any significant landscape or visual impacts.

5.5.4 South Wall BESS

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. Construction-related impacts will only result in short-term landscape and visual 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 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 involves moving from one form of relatively low-lying brownfield character for another, thereby effectively maintaining the existing landscape character of the site.

Furthermore, the site is within the outer compound of the wider ESB Ringsend /Dublin Bay Power Stations, 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.

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.

5.5.5 Cumulative Effects

In relation to the potential cumulative impacts arising from the proposed developments in conjunction with other proposed or permitted developments in the vicinity of the site, the likely cumulative effects are deemed to be negligible.

5.6 Noise and Vibration

This section 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.

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*.

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.

5.6.1 Poolbeg FlexGen

Noise impacts due to construction traffic is considered negligible within the context of the site locations.

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 concluded that there are no potential significant adverse effects due to construction noise.

On a precautionary basis, worst-case vibration due to percussive piling was assessed at five heritage assets. The results show the predicted vibration levels fall below the criteria significant effects associated with cosmetic or structural damage.

The operational noise impacts are predicted using a three-dimensional acoustic model within DataKustik CadnaA software, which implements the procedures of ISO 9613-2²⁴.

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 Environmental Protection Agency's 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. The predicted operational noise levels 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.

A Decommissioning Management Plan 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.

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.

5.6.2 Poolbeg BESS

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 concluded that there are no potential significant adverse effects due to construction noise.

On a precautionary basis, worst-case vibration due to percussive piling was assessed at five heritage assets. The results show the predicted vibration levels fall below the criteria significant effects associated with cosmetic or structural damage.

The operational noise impacts are predicted using a three-dimensional acoustic model within DataKustik CadnaA software, which implements the procedures of ISO 9613-2²⁵.

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. The predicted operational noise levels 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.

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 the IE licence (review) application.

²⁴ ISO 9613 (1996) Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation'.

²⁵ ISO 9613 (1996) Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation'.

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 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 CMP provided in Appendix 5A in Volume 3.

5.6.3 Ringsend FlexGen

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). There are no potential significant adverse effects due to construction noise.

On a precautionary basis, worst-case vibration due to percussive piling was assessed at five heritage assets. The results show the predicted vibration levels fall below the criteria significant effects associated with cosmetic or structural damage.

The operational noise impacts are predicted using a three-dimensional acoustic model within DataKustik CadnaA software, which implements the procedures of ISO 9613-2²⁶.

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 EPA's 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.

A Decommissioning Management Plan (DMP) will be prepared in accordance with any future IE licence.

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.

5.6.4 South Wall BESS

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). There are no potential significant adverse effects due to construction noise.

On a precautionary basis, worst-case vibration due to percussive piling was assessed at five heritage assets. The results show the predicted vibration levels fall below the criteria significant effects associated with cosmetic or structural damage.

The operational noise impacts are predicted using a three-dimensional acoustic model within DataKustik CadnaA software, which implements the procedures of ISO 9613-2²⁷.

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

²⁶ ISO 9613 (1996) Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation'.

²⁷ ISO 9613 (1996) Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation'.

accordance with best practice, to minimise the exposure site personnel to noise from operational plant.

5.6.5 Cumulative Effects

Each of the four projects 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.

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.

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 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 EPA's NG4 Guidance.

5.7 Architecture, Archaeology and Cultural Heritage

This section assesses the potential impacts and resulting effects as a result of each of the proposed developments on the archaeological and architectural heritage.

5.7.1 Poolbeg FlexGen Impact Assessment

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.

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. Where piles are to be bored through the made ground, they will be archaeologically monitored.

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 section.

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 contractor's CEMP during the closest phases of piling to ensure that real world vibrations remain within safe levels.

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.

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.

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 contractors CEMP.

5.7.2 Poolbeg BESS

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.

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).

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 contractor's CEMP during the closest phases of piling to ensure that real world vibrations remain within safe levels.

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.

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.

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.

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 Heritage Officer. This will be detailed in the contractor's 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.

Each of the 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 contractor's CEMP.

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.

5.7.3 Ringsend FlexGen

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).

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.

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.

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.

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.

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 Heritage Officer. This will be set out in the contractor's 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.

5.7.4 South Wall BESS

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.

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.

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.

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.

The principal risk of impact upon archaeology by the development is from any works that penetrate below the made ground layer. 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 Heritage Officer. This will be set out in the contractor's CEMP.

As no cultural heritage impacts have been identified for the operational phase, no mitigation measures are required.

5.7.5 Cumulative Effects

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.

5.8 Air Quality and Climate

This chapter evaluates the impacts which the four proposed developments may have on Air Quality & Climate.

Air dispersion modelling was carried out using the United States Environmental Protection Agency's regulated model AERMOD (USEPA, 2017, 2019). 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. Key pollutants of concern considered within the assessment were:

- Oxides of nitrogen (NO_x)
- Carbon monoxide (CO)
- Sulphur dioxide (SO₂)
- Particulate matter (PM)

The air quality impacts associated with the operation of the proposed developments have been assessed using atmospheric dispersion modelling.

5.8.1 Poolbeg FlexGen

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 (Nitrogen dioxide NO₂ modelling results for the Conservative Operational Scenario 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 99.8ththile) and 61% of the annual limit value at the worst-case off-site receptor for the worst-case year modelled (2018).

The Poolbeg FlexGen (Carbon Oxide's CO) modelling results for the Conservative Operational Scenario 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).

The Poolbeg FlexGen NO₂ modelling results for the *Worst-case Gas Scenario* 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 99.8thile) and 62% of the annual limit value at the worst-case off-site receptor for the worst-case year modelled (2018).

The Poolbeg FlexGen CO modelling results for the *Worst-case Gas Scenario* 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).

Potential impacts to climate during the construction phase are deemed short-term and imperceptible.

Provided dust mitigation measures are adhered to, the impact on air quality and dust in particular during construction will not be significant.

5.8.2 Poolbeg BESS

Impacts to climate during the construction, operational and decommissioning phases are deemed short-term and imperceptible.

Provided dust mitigation measures are adhered to, the impact on air quality and dust in particular during construction will not be significant.

Impacts to air quality during the operational and decommissioning phases phase are deemed long-term and imperceptible.

5.8.3 Ringsend FlexGen

Modelling of the Conservative Operational Scenario is the typical operation of the Dublin Bay Power Plant and the concurrent operation of the Ringsend FlexGen. The Ringsend FlexGen NO₂ modelling results for the Conservative Operational Scenario 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 99.8ththile) and 36% of the annual limit value at the worst-case off-site receptor for the worst-case year modelled (2018).

The Ringsend FlexGen CO modelling results for the Conservative Operational 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).

The Ringsend FlexGen NO₂ modelling results for the Worst-case Gas Scenario 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 99.8ththile) and 38% of the annual limit value at the worst-case off-site receptor for the worst-case year modelled (2018).

The Ringsend FlexGen CO modelling results for the Worst-case Gas Scenario 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).

Impacts to climate during the construction phase are deemed short-term and imperceptible.

Provided dust mitigation measures are adhered to, the impact on air quality and dust in particular during construction will not be significant.

5.8.4 South Wall BESS

Impacts to climate during the construction, operational and decommissioning phases are deemed short-term and imperceptible.

Provided dust mitigation measures are adhered to, the impact on air quality and dust in particular during construction will not be significant.

Impacts to air quality during the operational and decommissioning phases are deemed short-term and imperceptible.

5.8.5 Cumulative Effects

Modelling of the Cumulative Impact Scenario models the environment for 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.

The cumulative NO₂ modelling 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 99.8ththile) 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 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.

5.9 Waste

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 Plan²⁸ 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.

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.

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 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.

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 survey²⁹ 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

²⁸ Eastern - Midlands Region Waste Management Plan 2015 – 2021. Eastern-Midlands Region Waste Management Office, Environment and Transportation Department <http://emwr.ie/emwr-plan/>

²⁹ OHSS Safety Consultants 2020. Asbestos Demolition Survey Report of Poolbeg Ancillary Demolition Project Buildings 1 to 4 Poolbeg.

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.

An Outline Waste Management Plan (OWMP) has been prepared for each of the proposed developments 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*.

A final WMP for each development will be agreed with Dublin City Council prior to the commencement of construction on site for each development. 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.

5.9.1 Poolbeg FlexGen

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.

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 types and disposed of to appropriate recycling facilities.

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.

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.

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.

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 low significance is assessed. Decommissioning effects on Materials and Waste are assessed as not significant.

5.9.2 Poolbeg BESS

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.

A low significance is placed on the generation of surplus C&D waste in terms of material re-use; 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.

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.

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.

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.

5.9.3 Ringsend FlexGen

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. 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 the environmental management plan, waste management plan and regulatory requirements.

a low significance is placed on the generation of surplus C&D waste in terms of material re-use; 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.

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.

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.

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.

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 low significance is assessed. Decommissioning effects on Materials and Waste are assessed as not significant.

5.9.4 South Wall BESS

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.

Construction effects on Materials and Waste are assessed as not significant.

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.

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.

5.9.5 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.

5.10 Traffic, Transportation and Material Assets

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.

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.

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.

5.10.1 Poolbeg FlexGen

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.

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.

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.

The construction phase is anticipated to last approximately 19 months. However, the intensity of traffic will vary over the course of the construction programme.

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.

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 46 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.

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. 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.

5.10.2 Ringsend FlexGen

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.

The construction phase is anticipated to last approximately 19 months. However, the intensity of traffic will vary over the course of the construction programme.

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.

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.

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.

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.

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.

5.10.3 Poolbeg BESS

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

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.

There will be a 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.

The construction phase is anticipated to last approximately 19 months. However, the intensity of traffic will vary over the course of the construction programme.

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.

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

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.

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.

5.10.4 South Wall BESS

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.

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.

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.

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)

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.

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.

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.

5.10.5 Cumulative Effects

The individual projects and the cumulative effects were assessed, and the results show that the impact of the operational and construction traffic will have a minimal impact on the local road network.

5.11 Population and Human Health

This section reports the likely significant effects on population and human health as a result of the construction, operation and decommissioning of the four projects.

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 Irish Central Statistics Office (CSO) and data from local authorities.

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 phases of the developments. 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.

Given the industrial nature of the four sites, 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. This is discussed in Section 5.3.

5.11.1 Poolbeg FlexGen

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.

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

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.

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.

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.

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 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.

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.

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.

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. Given this, the magnitude of impact is considered to be negligible during operation.

5.11.2 Poolbeg BESS

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.

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, 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.

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.

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.

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.

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 temporary effect, on the local economy through enhancing local labour and supporting local businesses through direct spend on materials for the Poolbeg BESS Development.

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.

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.

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.

As it is located within the boundaries of an existing IE licence site, the Poolbeg BESS 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.

5.11.3 Ringsend FlexGen

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.

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 Southbank 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.

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.

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.

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 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 Ringsend FlexGen Development.

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.

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 SDZ to be developed is considered to be low.

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. South Wall BESS Impact Assessment

5.11.4 South Wall BESS

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.

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.

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.

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.

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 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 Ringsend BESS Development. Therefore, there is likely to be a direct, temporary slight beneficial effect (not significant) on economic receptors within the WIA.

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.

The Poolbeg West SDZ 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.

5.11.5 Cumulative Effects

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 additional developments planned in the area.

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.

Table 5.1 below provides an assessment of cumulative impacts on human health receptors during both construction and operation.

Table 5.1: 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 (PWSDZ3270/19) 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 residential developments are over 500 m away, so have not been considered as part of the assessment.	Due to the proximity of the residential receptors from the proposed development at Southbank 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 500m 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.	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.

Receptor	Assessment Type	Construction	Operation
		As a result of this management measure, no significant cumulative effects are envisaged.	
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 or the EIAR).	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.
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 temporary cumulative effect, on the local economy. This is not considered to be significant, given the size of the economy and the temporary 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.

6 Interactions of Effects

6.1 Introduction

This chapter describes the interactions and cumulative impacts between the various aspects of the Environmental Impact Assessments for each of the proposed developments.

6.2 Interactions

The main interactions between the various aspects of the Environmental Impact Assessments are presented in Table 6.1. A brief description of the interactions is presented in Table 6.2.

Table 6.1: 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 6.2: 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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