SSE Tarbert Next Generation Power Station

Environmental Impact Assessment Report (EIAR)
Volume I
Chapter 13 Land and Soils

SSE Generation Ireland Limited

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Delivering a better world

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13. Land and Soils

13.1 Introduction

This chapter of the Environmental Impact Assessment Report (EIAR) assesses the impacts on the land, soil, and groundwater environments associated with the Proposed Development.

This chapter provides a description of the baseline land, soils, and hydrogeology environments of the Site; and a statement of the likely significant effects associated with both the construction, operation and decommissioning phases of the development. A 'do nothing' scenario has also been considered. Mitigation measures are proposed in the form of avoidance, prevention, reduction, offsetting, and reinstatement or remedial measures and commitments for monitoring are included where appropriate predicted residual effects are described.

The application boundary (redline boundary) for the Proposed Development encloses an area of approximately 15.18 hectares (ha) and encompasses land within the SSE Tarbert site ('SSE Tarbert'), which is an area of 42ha, that is mostly under the management of the Applicant.

Full details on the background and site history are provided in EIAR Volume I Chapter 4 (Existing Site and Conditions), and details of the Proposed Development are provided in Chapter 5 (Description of the Proposed Development) and the Planning Statement submitted with this planning application.

13.2 Legislation, Policy, and Guidance

This chapter has been prepared in accordance with to the following:

- EPA (2022). *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* ('EPA Guidelines').
- IGI (2013). *Guidelines for the preparation of Soils Geology and Hydrogeology Chapters of Environmental Impact Statements*.
- IGI (2002). *Geology in Environmental Impact Statements, A Guide*.
- NRA (2009). *Guidelines on Procedures for the Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes*.
- CIRIA (2001). *C532 Control of Water Pollution from Construction Sites Guidance for Consultants and Contractors.*
- CIRIA (2000). *C512 Environmental Handbook for Building and Civil Engineering Projects*.
- Planning and Development Act 2000 (S.I. 30 of 2000), as amended
- Kerry County Council (KCC 2022). Kerry County Development Plan 2022-2028

13.3 Methodology

13.3.1 Study Area

The study area with regard to land and soils encompasses the entire area within the redline boundary of the Site and extending to 2km from the Site boundary. This area is considered appropriate for the consideration of historic and current potentially contaminative land uses and aligns with established industry practice and professional judgment for defining land contamination study areas for the assessment.

13.3.2 Determination of the Baseline Environment

The determination of the Baseline Environment objective was achieved by way of a geological desk study, Site visit and Site Investigation (SI), refer to EIAR Volume II Appendix 13A. The sources of the information are listed:

- Ordnance Survey of Ireland (OSI) maps (www.osi.ie, accessed July 2023).
- Geological Survey of Ireland (GSI) Groundwater and Geotechnical map viewer (www.gsi.ie, accessed July 2023).
- EPA Envision Maps (https://gis.epa.ie/EPAMaps/, accessed July 2023).
- AECOM (2022) "2022 Groundwater Monitoring Report - SSE Tarbert Generating Station" report reference 60673806 60673806_ACM_EN_RP_004 dated 14 April 2023
- AECOM Site Visit – 10 May 2023 by Kevin Forde, Contaminant Hydrogeologist, to assess the available site utility and environmental information and to inform the scope and locations of the subsequent site investigations.
- AECOM Site Investigation – September 2023. This site investigation was within the redline boundary and was intended to supplement earlier site investigation findings within the redline boundary and across the wider SSE Tarbert site (refer to Appendix 13A, EIAR Volume II for more details).

Additional information has been compiled through consultation and feedback from the other technical disciplines within the project / EIAR Team.

13.3.3 Determination of Sensitive Receptors

The sensitivity of the existing environment identifies the ability of the receptor to respond to potential effects. Receptors have been identified during the baseline study as set out in Section 13.3.2 and a qualitative assessment has been used to assign a sensitivity rating from low to extremely high based on the NRA '*Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes'* [1]. Assigning a sensitivity rating (refer to Table 13.1) considers an attribute's likely adaptability, tolerance, and recoverability, as well as their designation.

[1] NRA (2009). *Guidelines on Procedures for the Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes.*

With regards to natural resource use, the materials themselves have been identified as the sensitive receptors. Consuming materials impacts upon their immediate and (in the case of primary materials) long-term availability; this results in the depletion of natural resources and adversely impacts the environment.

Table 13.1: Estimation of Importance of Geological Attributes[2]

Importance	Criteria	Typical Examples
Very High	Attribute has a high quality or value on a regional or national scale. Degree or extent of soil contamination is significant on a national or regional scale. Volume of peat and / or soft organic soil underlying route is significant on a national or regional scale*.	**Soil and Geology:** • Geological feature rare on a regional or national scale (Natural Heritage Area, NHA) or of high value on a local scale (County Geological Site). • Large existing quarry or pit. • Proven economically extractable mineral resource.
High	Attribute has a high quality or value on a local scale. Degree or extent of soil contamination is significant on a local scale. Volume of peat and / or soft organic soil underlying route is significant on a local scale*.	**Soil and Geology:** • Contaminated soil on site with previous heavy industrial usage. • Large recent landfill site for mixed wastes. • Geological feature of high value on a local scale (County Geological Sites). • Well drained and/ or highly fertility soils. • Moderately sized existing quarry or pit. • Marginally economic extractable mineral resource.
Medium	Attribute has a medium quality or value on a local scale. Degree or extent of soil contamination is moderate on a local scale. Volume of peat and / or soft organic soil underlying route is moderate on a local scale*.	**Soil and Geology:** • Contaminated soil on site with previous light industrial usage. • Small recent landfill site for mixed wastes. • Moderately drained and / or moderate fertility soils. • Small existing quarry or pit. • Sub-economic extractable mineral resource.
Low	Attribute has a low quality or value on a local scale. Degree or extent of soil contamination is minor on a local scale. Volume of peat and / or soft organic soil underlying route is small on a local scale*.	**Soil and Geology**: • Large historical and / or recent site for construction and demolition wastes. • Small historical and / or recent landfill site for construction and demolition wastes. • Poorly drained and / or low fertility soils. • Uneconomically extractable mineral resource.

* *Relative to the total volume of inert soil disposed of and / or recovered*

13.3.4 Describing Potential Effects

The methodology used for describing the potential geo-environmental effects considers the 'quality' of the effects (i.e., whether it is adverse or beneficial), the 'probability' of the event occurring and the 'duration' of the effects (i.e., whether it is short or long-term) as per both Section 3.7.3 and Table 3.4 of the EPA Guidelines[3].

[2] *Source:* NRA (2009). *Based on criteria outlined in Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes.*
[3] EPA (2022). *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports.*

Specific assessment criteria and typical examples for soil and geology (based on information within the NRA '*Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes*'[4]) are outlined in Table 13.2.

Table 13.2: Criteria and Examples for Describing Potential Effects on Land and Soils Environment[5]

Magnitude of Effect	Criteria for Effects	Typical Examples (Positive and Negative)
Large Adverse	Results in loss of attribute	**Soil and Geology:** • Loss of high proportion of future quarry or pit reserves. • Irreversible loss of high proportion of local high fertility soils. • Removal of entirety of geological heritage feature. • Requirement to excavate/ remediate entire waste site. • Requirement to excavate and replace high proportion of peat, organic soils and / or soft mineral soils beneath alignment.
Moderate Adverse	Results in impact on integrity of attribute or loss of part of attribute	**Soil and Geology**: • Loss of moderate proportion of future quarry or pit reserves. • Removal of part of geological heritage feature. • Irreversible loss of moderate proportion of local high fertility soils. • Requirement to excavate/ remediate significant proportion of waste site. • Requirement to excavate and replace moderate proportion of peat, organic soils and / or soft mineral soils beneath alignment.
Small Adverse	Results in minor impact on integrity of attribute or loss of small part of attribute	**Soil and Geology**: • Loss of small proportion of future quarry or pit reserves. • Removal of small part of geological heritage feature. • Irreversible loss of small proportion of local high fertility soils and / or high proportion of local low fertility soils. • Requirement to excavate / remediate small proportion of waste site. • Requirement to excavate and replace small proportion of peat, organic soils and / or soft mineral soils beneath alignment.
Negligible	Results in an impact on attribute but of insufficient magnitude to affect either use or integrity	**Soil and Geology**: • No measurable changes in attributes.
Minor Beneficial	Results in minor improvement of attribute quality	• Minor enhancement of geological heritage feature.
Moderate Beneficial	Results in moderate improvement of attribute quality	• Moderate enhancement of geological heritage feature.
Major Beneficial	Results in major improvement of attribute quality	• Major enhancement of geological heritage feature.

[4] NRA (2009).
[5] NRA (2009).

13.3.5 Significance of Effects

A qualitative approach was used to determine the significance of effects as per the EPA Guidelines determination figure (Figure 3.4; page 53[6]). Due account was taken of both the sensitivity of the attributes (refer to Table 13.1) and the description of the potential effect (refer to Table 13.2).

Table 13.3: Significance Ratings[5]

		Magnitude of Effect			
		Negligible	**Small**	**Moderate**	**Large**
Importance of Attribute	**Extremely High**	Imperceptible	Significant	Profound	Profound
	Very High	Imperceptible	Significant / Moderate	Profound / Significant	Profound
	High	Imperceptible	Moderate / Slight	Significant / Moderate	Severe / Significant
	Medium	Imperceptible	Slight	Moderate	Significant
	Low	Imperceptible	Imperceptible	Slight	Slight / Moderate

With regard to use of natural resources, the following significance criteria have been used.

Table 13.4: Significance Criteria for Assessment of Natural Resource Usage

Effect	Criteria for Effects of Material Assets Used	Significance
Major	Large decrease material assets availability greater than 5% of current baseline potentially causing significant burden to the national material asset market.	Significant
Moderate	Moderate decrease in material asset availability between 2% and 5% of current baseline potentially causing moderate burden to the national material asset market.	
Minor	Minor decrease in material asset availability between 0.1% and 1.9% of current baseline causing a minor burden to the national material asset market.	Not Significant
Negligible	Negligible decrease in material asset availability less than 0.1% of current baseline causing insignificant burden to the local and regional material asset market.	

13.3.6 Limitations and Assumptions

The description of existing conditions is based on the available desk study, Site visit and Site investigation and information supplied by the design team as outlined in Sections 13.4.1.

13.4 Baseline Environment

13.4.1 Site Description

The Site is at the SSE Tarbert site, in Tarbert, County (Co.) Kerry, Ireland (Irish Grid Reference X; 475237; Y: 5826671) (refer to Section 4.4 in Chapter 4 Existing Site and Conditions, EIAR Volume I for further detail). The entire SSE Tarbert site is located within the administrative area of Kerry County Council (KCC). The Proposed Development Site, which is brownfield land located west of the N67, a National Secondary Road in Tarbert. The Temporary Emergency Generation (TEG) site and a National

[6] EPA (2022).

Oil Reserves Agency (NORA) tank farm are located to the west and south-west, of the Proposed Development Site boundary (refer to Figures 4.1 to 4.4 in EIAR Volume III).

The Site comprises brownfield land, with the western portion being the former contractors yard and containing two disused galvanised sheds (former Mechanical Workshop and former Riggers' Store), a bunded concrete slab (Chemical Storage Compound) and a large vertical cylindrical tank in the north corner (Boiler Wash Effluent (BWE) tank) and the northern portion containing a variety of structures, including a vertical cylindrical Demineralised Water tank, horizontal, cylindrical, bunded sulphuric acid tank, a caustic soda tank, the site Waste Water treatment system infrastructure (two caustic soda tanks and a disused ammonia tank within the water treatment building), a compressor house, a salt store and the Carpenter's workshop.

The surface of the Site consists of sealed tarmacadam and concrete (approximately 30%, mainly in the northern portion) and unsealed hardcore gravel and grassed areas (approximately 70%, mainly in the western portion).

The majority of the Site is generally flat and lies at an elevation of 3m to 5m above Ordnance Datum (AOD).

The area available for the Proposed Development (the 'redline' planning application area) is 15.18ha.

The Site is accessed from the existing SSE Tarbert entrances off the N67 to the power station site and would function independently of both the existing Tarbert HFO Power Station and the TEG Plant. The N67 connects Co. Kerry with Co. Clare and Co. Galway (via the Tarbert – Killimer ferry across the Shannon Estuary), running in a north-west to south-east direction.

13.4.2 Topography

A topographic survey was undertaken in 2023 for the Site, with contours produced for the Site of the Proposed Development, as presented in Appendix A of the Site-Specific Flood Risk Assessment (FRA) submitted with this planning application, refer to Appendix 12A, EIAR Volume II. Section 4.3.1 of the FRA indicates that the Proposed Development Site ranges from 3.08 to 4.83mAOD (Malin Head – current national datum).

13.4.3 Surrounding Land Use

Land use on and in a 2km radius surrounding the Site is summarised in Table 13.5.

Table 13.5: Adjacent Land Use[7]

Site Boundary	Land Use
North	Outbuildings, storage tanks, Tarbert Lighthouse and the Shannon Estuary.
South	Two ESB electrical transmission substations (110kV to southeast and 220Kv directly south and a lagoon south of the 220kV substation draining to the Shannon Estuary and with agricultural lands further south on the mainland
East	The northern site entrance and the Shannon Estuary. To the south-east are a reservoir, the Tarbert – Killimer ferry terminal and the N67 National Secondary Road.

[7] Source: Google Maps (2022).

Site Boundary	Land Use
West	Immediately west is the capped former landfill, the HFO fuel storage tanks and the jetty. To the south-west is the under-construction TEG site with the National Oil Reserves Agency (NORA) tankfarm further to the south-west on the mainland side of the lagoon.

13.4.4 Site History

OSI maps show that that historical land use at the overall SSE Tarbert site was largely as low-lying grassland and scrubland. The island portion of the SSE Tarbert site which includes the Proposed Development Site, was divided into fields, and included a lighthouse, several piers and slipways, a coastguard station and previous naval artillery facilities prior to the construction of the original Tarbert HFO Power Station. The Site is located on the southern shore of the Shannon Estuary, on Tarbert Island, originally agricultural land and made ground (i.e., infilled/reclaimed land), connected to the mainland via a causeway.

The Tarbert HFO Power Station was developed in the 1960's and has been operational since 1969.

There are four generating units at the Tarbert HFO Power Station, two with a capacity of 57MWe each and two with a capacity of 256MWe each. The Tarbert HFO Power Station was constructed in two stages:

- Units One and Two (both 57Mwe units) were commissioned in 1969 and are no longer used.
- Units Three and Four (both 256Mwe units) were commissioned in 1976 and 1977 respectively.

Units Three and Four were refurbished in 2003 and 2004 and are fuelled by HFO, with both Gas Oil and propane used as a start-up fuel.

Each of the units are independent and consist of a boiler, steam turbine and auxiliary plant.

There is an 'Island Tank Farm' adjacent to the location of the Proposed Development, which comprises four HFO tanks within the western boundary of the Proposed Development Site, each with the capacity of 25,000 tonnes. At present, only two of these tanks are in use, while the other two are currently not used. The tanks are filled from ship tanker via the jetty.

The mainland tank farm, located 410m to the south-west of the Proposed Development, is not related to the Tarbert HFO Power Station and is under the control of the National Oil Reserves Agency (NORA) providing a national fuel reserve.

On Site disposal of station waste was practised until the mid-1990s, with three waste disposal areas used over the Site's history. One of these areas is within the Proposed Development Site and capping works on these landfill areas was undertaken in 2006 and 2007 under EPA approval.

A number of localised incidents relating to HFO losses to ground are known to have occurred at the SSE Tarbert site, most recently one to the north-east of the turbine hall in May 2022 (within the Proposed Development Site).

A timeline of the SSE Tarbert site development and changes since it was developed from greenfield in 1966 is summarised in Table 13.6.

Table 13.6: Site Operational Timeline

Year	Discussion
1966	Construction started on the ESB Tarbert Power Station.
1969	ESB Tarbert Power Station Unit One and Two becomes operational.
1976/77	Units Three and Four operational
2003	ESB Tarbert receives its Industrial Emissions (IE) Licence from the EPA (P0607-01).
2005	ESB Tarbert receives its current IE Licence from the EPA (P0607-02).
2009	Power station sold by ESB to Endesa
2012	Power station sold by Endesa to SSE
2023	Cease operating at the end of December 2023.

13.4.5 Soils and Quaternary Deposits

GSI mapping indicates the entire island is underlain by Made Ground soil, with natural topsoil and subsoils in the surrounding area consisting of Till derived from sandstone and shale, refer to EIAR Volume III Figure 13.1.

Soils/subsoils, and potentially bedrock, are likely to have been removed or reworked in places during construction of the Tarbert HFO Power Station and facilities.

13.4.6 Bedrock

The GSI map indicates that bedrock geology underlying the site consists of the dark grey Shannon Group of undifferentiated mudstones, siltstones, and sandstones. Bedrock outcrops are shown along the shoreline to the north and west. Fault lines are not indicated to be present in the area. The bedrock geology is shown in EIAR Volume III Figure 13.2.

13.4.7 Hydrogeology

The bedrock aquifer underlying the Site is classified by the GSI as a ‘Locally Important Aquifer (Li)’ where the bedrock is moderately productive only in local zones. Groundwater elevations indicate that groundwater flow on Tarbert Island is radial towards the surrounding waterbodies (AECOM, 2022), with groundwater being brackish/saline (the 2023 site investigation reported groundwater chloride concentrations between 70 and 452 milligrams per litre – EIAR Volume II, Appendix 13A) and likely to be tidally-influenced. At the HVO power plant area groundwater flow is to the north and west.

The groundwater vulnerability beneath the Site is classified by GSI as ‘Moderate’ as shown in EIAR Volume III Figure 12.3.

The Site is not located in a groundwater source protection area.

Groundwater beneath the Site forms part of the Ballylongford groundwater body (code IE_SH_G_030), classified as a Poorly Productive bedrock aquifer. Under the most recent Water Framework Directive (WFD) data (2016-2021) groundwater quality for the Ballylongford groundwater body is classified by EPA as ‘Good’ but ‘At Risk’

13.4.8 Groundwater Recharge

The average groundwater recharge rate according to the GSI Groundwater Data Viewer is 145mm/year at the Site.

13.4.9 Groundwater Abstractions

The closest groundwater abstraction for public supply is the former Glin Public Supply scheme, which consisted of two supply wells south-east of the village of Glin, approximately 6.5km from the Site. This public water supply is noted to be no longer in use.

A search of the GSI well database found three private well records within 2km of the Site:

- Borehole (0813NEW025) located at E107000, N148600, approximately 1km south of the Site, drilled to a depth of 12.2m, and with rockhead recorded at 28m, which appears to be a data entry error as it is deeper than the reported drilled depth. The use of the borehole is for agricultural and domestic purposes only and it is recorded as having a 'Poor' yield (16.4m^3 per day).
- Borehole (0813NEW0145) located at E105650, N148280, approximately 1.5km south-west of the Site, drilled to a depth of 2.7m, with rockhead recorded at 30.5m, which again appears to be a data entry error as it is deeper than the reported drilled depth. The use of the borehole is for agricultural and domestic purposes only and it is recorded as having a 'Poor' yield (21.8m^3 per day).
- Borehole (0813NEW095) located at E106770, N147470 (the former Tarbert Creamery), approximately 2km south of the Site. No depths are recorded for this borehole. The use of the borehole is for industrial purposes, and it is recorded as having had a 'Good' yield (216.0m^3 per day).

It should be noted however, that the presence of additional private domestic wells in the vicinity of the Site cannot be ruled out, as these wells are not always identified fully on the GSI online mapping database. The necessity to register wells that have abstraction rates of 25m^3/day or more with the EPA only came into effect in November 2018 and that well register has not yet been published.

However, due to the Site's coastal setting and absence of dwellings between the Site and the Shannon Estuary, groundwater at and in the vicinity of the Site is likely to be brackish and unsuitable for potable supply.

13.4.10 Protected Areas

A search of the EPA interactive map viewer revealed the following protected areas within a 2km radius of the Site:

- River Shannon and River Fergus Estuaries Special Protection Area (SPA) (Code: 004077) and the Lower River Shannon Special Area of Conservation (SAC) (Code: 002165) border Tarbert Island on all sides.
- Tarbert Bay proposed Natural Heritage Area (pNHA) (Code:001386), 0.3km south-east of the Site.

13.5 Site Investigation

Several site investigations have been conducted at the SSE Tarbert Site as a whole and relevant information is summarised in the following sections.

13.5.1 2009 Site Investigation

URS Ireland Limited (now AECOM) undertook Phase 1 and Phase 2 Environmental Site Assessment (ESA) at the ESB Tarbert Power Generating Station in 2008 and 2009 on behalf of ESB, as part of the site divestment due diligence process at the Site (refer to EIAR Volume II, Appendix 13B).

The phased intrusive site investigations consisted of hand augering, test pitting and bore drilling. Monitoring wells were installed at strategic locations and groundwater samples were collected. Samples of soil, sediment, surface water and groundwater were analysed for a broad range of potential contaminants of concern.

The site investigations completed on the island portion of the SSE Tarbert site found bedrock, consisting of dark grey shale or siltstone with an upper weathered horizon, was generally encountered at shallow depths, <3.0m below ground level (bgl), across the Site. Bedrock strata on the east side of the island dip gently (at approximately 25^{o}) towards the east.

At the Proposed Development Site, depth to the top of rock changed markedly to the north-west of the current boiler hall, from approx. 1m bgl (at locations 2009 site investigation locations BH304, BH305, BH307, BH308) to more than 4m bgl (at BH313, BH315, BH316, 30-40m to the north-west). In deeper boreholes by the coast (BH309A, BH311, BH319) bedrock was between 5.5 and 9.3m bgl (refer to EIAR Volume II, Appendix 13B Figure 2).

Bedrock was directly overlain by compacted sand and gravel fill material at most locations. Stiff grey sandy gravelly or dark brown peaty clay subsoils underlaid the fill material at BH313, BH316 and BH320 and gravel and peat were encountered below the fill at TP08, TP10, BH315 and BH333.

Oily contamination was reported from trial pit soils (at TP08) and foreshore sediments (SED05) at the Heavy Waste Area, to the north-west of and outside of the Proposed Development Site (though not in groundwater from nearby well BH319). This localised contamination was thought to result from the previous practice of storing items of redundant plant and machinery in this area of unsealed ground.

A 4000 Litre diesel underground tank outside the mechanical workshop was noted to have been decommissioned in 2001.

Soils within the Site showed some slightly elevated hydrocarbon and heavy metals concentrations which exceeded the Generic Assessment Criteria (GAC) used to screen the data. Some of these GAC exceedances were considered to be due to natural background soil chemistry conditions in the wider area, but others suspected to be due to ash deposition and disposal of boiler washings on the power station site historically, however it was considered unlikely that these findings would represent significant liability issues.

No remedial action was considered necessary at the Site under a continued industrial land use scenario, from the perspective of environmental soil and groundwater quality.

13.5.2 2022 Targeted Site Investigation

A site investigation on the island was overseen by AECOM Ireland Limited in 2022 following a loss to ground of HFO due to pipe clamp failure on the north side of the Turbine Hall adjacent to north-east side of the Station A Chimney in April 2022 (reported to EPA as Incident Ref: INC1023056) (refer to EIAR Volume II Appendix 13C).

This site investigation and source removal was conducted by a combination of hand excavation (April 2022) and vacuum excavation (June 2022) to delineate the extent of hydrocarbon impacts to grounds.

Bedrock was encountered within 1-2m of the surface at the carpark north-east of the turbine hall, however up to 6.5m of subsoil was previously encountered in borehole BH9, adjacent to the 220kV switching yard on the south-west portion of the island, suggesting quite variable top of bedrock elevations across the island.

Analytical results for samples of the soils remaining in situ did not exceed GAC protective of human health on a commercial / industrial site. Analytical results for soil leachate from those samples indicate limited exceedances of GAC protective of controlled waters (reported concentrations <100 times GAC).

Downgradient monitoring well 309A was also sampled as part of this study and, with concentrations of some aromatic fractions and of C_3-C_{35} TPH exceeding the relevant GAC protective of groundwater. Due to the lack of any historic monitoring data for BH309A, it was not determined whether these detections were directly related to the 2022 HFO loss. AECOM considered that the absence of aliphatic hydrocarbons in the groundwater sample (which were detected in the source area soil samples, and which tend to be more soluble than the aromatic hydrocarbon fractions) indicated that the detection of hydrocarbons in groundwater at BH309A in 2022 was likely related to an older source.

13.5.3 2023 Site investigation

An intrusive geo-environmental site investigation was completed on the Site in July and August 2023 within the Proposed Development area to obtain recent soil and groundwater quality information to validate the use of the above 2009 soil and groundwater dataset (refer to Appendix 13A, EIAR Volume II).

As part of this 2023 site investigation, two monitoring wells (MW410 and MW402) were installed and four trial pits (TP101 to TP104) were completed in late July 2023 and groundwater samples were collected from both wells in early August 2023.

The purpose of this geo-environmental site investigation was to assess data gaps in relation to site geology and groundwater quality identified following historic site investigations and update historical geo-environmental findings with current soil and groundwater data.

The soils investigation concluded that:

- There was no visual or olfactory evidence of gross contamination at any of the sample locations (see EIAR Volume II, Appendix 13A Figure 1).
- Asbestos and Polychlorinated Biphenyls (PCBs) were not detected in any of the soil samples collected.

- Trace level concentrations of Volatile Organic Compounds (VOCs), Polycyclic Aromatic Hydrocarbons (PAHs), phenols and Total Petroleum Hydrocarbons (TPHs) were detected in one or more soil sample locations, but at concentrations significantly below relevant soil GAC.

Groundwater samples were collected from both newly installed wells (MW401 and MW402) and the groundwater assessment concluded that:

- VOCs, PAHs, PCBs and TPH were below laboratory Method Detection Limits (MDLs) in both groundwater samples collected.
- Where detected, PFAS, metals and major ions were below all relevant GAC in groundwater, with the exception of the following:
    - Marginal to minor GAC exceedances of arsenic were reported in the two groundwater samples.
    - Ammoniacal nitrogen exceeded the interim Guideline Value (IGV) and Groundwater Threshold Value (GTV) GACs at MW401 in the former contractor compound only.
    - Chloride exceeded the IGV and GTV in groundwater from both monitoring wells. Chloride exceedances are likely to be due to the site's coastal setting.
    - Faecal coliform detections in both groundwater samples indicate possible losses from on-Site foul sewer drainage.

A Conceptual Site Model (CSM) and a Qualitative Environmental Risk Assessment were developed by AECOM based on the results of the 2023 geo-environmental site investigation and historic investigations.

There were no sources of contamination in excess of human health criteria in soils.

Groundwater on the Site is not suitable for potable water use, given elevated salinity (as indicated by elevated chloride concentration in groundwater at well MW401) related to the Site's proximity to coastal waters, therefore there is no pathway to on-site humans for faecal coliforms or PFAS in groundwater.

Historic site investigation reports (URS, 2009 and AECOM, 2022) had identified metals and TPHs in soils as a potential risk to controlled waters receptors. The estimated soil GACs for the suite of heavy metals are calculated using conservative soil: water partitioning coefficients and result in theoretical soil leaching values for metals that are likely to be very conservative. Therefore, greater reliance has been placed on actual, site-specific, measured concentrations of these substances in groundwater, if available, to assess the potential risks to Controlled Waters in the vicinity of the Site.

TPHs and all metals in groundwater, with the exception of arsenic, in the 2023 site investigation were below GAC protective of controlled waters. Arsenic is inferred to be naturally occurring in groundwater beneath the Site, derived from the shale bedrock.

Based on the above assessment, the risk to human health and controlled waters receptors is assessed as **Low**.

Existing buildings and services in the area to the north of the main Tarbert HFO Power Station building prevented soil sampling from taking place in this section of the Proposed Development. Soil samples

will be collected from this area of the Site as part of confirmatory site investigations following the pre-construction decommissioning and demolition of these buildings and other infrastructure under the EPA-approved Residual Management Plan (RMP), to confirm this CSM.

13.6 Potential Impacts

The Proposed Development comprises an Open Cycle Gas Turbine (OCGT) generator (350MW output) fuelled by HVO, and all associated ancillary connection infrastructure, site works and services (refer to EIAR Volume I Chapter 5).

The Proposed Development includes new HVO storage tanks (three tanks in total, one x 1500m^3 and two x 4,400m^3) with a land based unloading facilities.

The Proposed Development is located in an area that is determined from previous site investigations to be composed of 1-3m thickness of sand and gravel fill material overlying either bedrock or clay-dominated subsoils.

A qualitative approach was used to determine the significance of effects as per the EPA Guidelines determination figure (Figure 3.4; page 53[8]). Due account was taken of both the sensitivity of the attributes (refer to Table 13.1) and the description of the potential effect.

13.6.1 Construction Phase

The potential construction phase impacts to geology, land, and soils (including pre-construction decommissioning and demolition activities) include the following:

- Accidental spills and leaks of oils and chemicals, which could impact soils and groundwater.
- Excavation and infilling of ground, which may lead to exposure of potentially contaminated subsoils, increased rainwater infiltration and the mobilisation of contaminants to groundwater.
- The depletion of non-renewable natural resources to be imported as aggregates and fill materials.
- The use of concrete and lime in construction works, which has the potential to impact the pH of groundwater.

13.6.1.1 Accidental Spills and Leaks

During the construction phase of the Proposed Development (which includes demolition and removal of ancillary buildings/structures associated with the existing Tarbert HFO Power Station), there is a risk of accidental pollution incidents from the following sources:

- Spillage or leakage of chemicals stored and used on-site or as part of construction works, particularly in relation to decommissioning and demolition of pre-existing chemical or fuel storage and conveyance infrastructure to be conducted under the IEL RMP agreed with the EPA.
- Spillage or leakage of oils and fuels from construction machinery or site vehicles.

[8] EPA (2022).

- Spillage of oil or fuel from refuelling machinery on-site.

Accidental spillage of fuels or chemicals could potentially result in the impact of soils and groundwater underlying the Site if inappropriately handled or stored, during construction. Potential contaminants could migrate through the subsoils and impact underlying groundwater.

Groundwater wells have been identified within a 2km radius of the Site, as per Section 13.4.7. However, it is noted that the Proposed Development is located on an island and groundwater flow direction is therefore radially towards the Shannon Estuary, so any accidental spillages of fuels or chemicals will not impact wells on the mainland. Any water quality impacts from the Proposed Development on mainland groundwater receptors is therefore considered unlikely.

However, the potential for impact to the aquifer exists, the quality of which will be considered under the WFD but which groundwater monitoring in 2023 has indicated is not of potable quality, due to the Site's coastal setting.

This is considered a direct negative effect and, if it occurs, would be confined to one-off releases. The impact could alter the character of soil and / or groundwater at the Site but would be temporary in nature. The impact would therefore result in a small effect on a **Low** sensitivity soil environment and the significance of the effect is **Imperceptible** with regard to soils.

It is considered to be a **Low** effect on a **Medium** sensitivity marine environment and the significance of the effect is **Slight** with regard to groundwater.

13.6.1.2 Excavation and Infilling

Construction earthwork impacts will mainly relate to removal of topsoil and shallow subsoils, while infill earthwork will mainly relate to the import and compaction of acceptable fill material to achieve the required engineering design and grades.

The Proposed Development will have a negative net cut / fill balance of up to 38,053 tonnes of fill material during the first six weeks of construction.

Excavation earthwork impacts will mainly relate to removal of topsoil and shallow subsoils, while infill earthwork will mainly relate to the import and compaction of acceptable fill material to achieve the required engineering design and grades. Stockpiling of unsuitable soils will be undertaken prior to removal from the Site. In the absence of mitigation, this would have the potential to impact on soil and groundwater, through the leaching of contaminants.

The removal of hardstanding during construction works may also expose potentially contaminated shallow soils to rainwater infiltration, increasing the potential for leaching of contaminants to groundwater. Previous site investigation soil sample analysis results and the results of the targeted 2023 geo-environmental site investigation (refer to Appendix 13A, EIAR Volume II) did not indicate any significant soil contamination at the Site with the potential to be leached and mobilised, indicating a low risk of potential impact to groundwater quality or to the Shannon Estuary via groundwater flow.

Where removal of the existing granular fill material is required, it will be replaced by fill material and paved surfaces / buildings, therefore groundwater vulnerability is unlikely to change from the current 'Moderate' assessment.

Excavation and infilling impacts will result in a permanent direct negative effect which is certain to occur and irreversible. This is considered to be a **Medium** effect on a soil and groundwater environment of **Medium** sensitivity and the significance of the effect is considered **Moderate**.

13.6.1.3 Use of Natural Resources

It is expected that there will be a requirement for import of 'clean', imported fill material for the Proposed Development. The source of imported fill material will involve careful selection and vetting in order to check that it is of a known origin and that it is 'clean' (i.e., will not cause contamination to the environment).

Aggregates will be imported to the Site for use in the establishment of contractor's compounds, and in fill placement and construction. The sourcing of these aggregates will be via importation of recycled aggregate material, as an alternative to primary aggregate (with procedures to ensure it is uncontaminated) or as primary aggregate from reputable, authorised quarries. Sourcing of uncontaminated fill materials is mandated by development requirements and for ensuring regulatory compliance and will be carried out. Potential local sources of primary aggregates include:

- Listowel Quarry (Shale, GSI ID 179, Quarry Number KY006, 17km from Site)
- Michael O'Donovan Quarries, Knockbweeheen, Co. Limerick (Shale, GSI ID 189, Quarry Number LK005, 20km from site)
- Knockbowheen Quarry, Knockbweeheen, Co. Limerick (Shale, GSI ID 188, Quarry Number LK004, 20km from site)
- Roadstone Barrigone Quarry, Askeaton, Co. Limerick (Limestone, GSI ID 115, Quarry Number LK008, 22km from site)
- Hogan's Quarry, Foynes, Co. Limerick (Limestone, GSI ID 125, Quarry Number LK009, 22km from site)
- Creeves Quarry, Shanagolden, Co. Limerick (Limestone, GSI ID 122, Quarry Number LK010, 22km from site)

Primary aggregates are natural non-renewable resources and their use results in depletion of the national stock of these resources. Use of natural resources is therefore considered a permanent direct impact of neutral quality which will be imperceptible on the quality or character of the wider environment but is certain to occur and irreversible. The use of natural resources is considered to be a **Low** impact on a soil environment of **Medium** sensitivity and the significance of the impact is considered **Slight**.

13.6.1.4 Use of Concrete and Lime

Lime and concrete (specifically, the cement component) is highly alkaline and any spillage which migrates through subsoil could impact groundwater quality. The activities most likely to result in contamination include concreting during foundation construction and laying of services.

As noted previously, any impacts are considered unlikely to impact on identified groundwater wells but may impact the WFD groundwater body (IE_SH_G_030).

The impacts will result in a direct negative effect but are unlikely to occur and, if they occur, would be confined to one-off releases. The impact could alter the character of soil and / or groundwater local to the Site but would be **Temporary** in nature. Therefore, it is considered to be a **Low** effect to a **Medium** sensitivity environment and the significance of the effect is **Slight**.

13.6.1.5 Land Use

The land use on the Site is industrial, as it is associated with power generation. Therefore, there are no effects associated with the change of land use.

13.6.2 Operational Phase

The potential impacts during the operational phase include the following:

- Accidental spills and leaks from fuel storage impacting soils and groundwater.

13.6.2.1 Accidental Spills and Leaks

There is the potential for accidental spills and leaks to occur from chemical storage, fuel storage and from vehicles using the Proposed Development during its operation. Accidental spills/leaks of chemicals may be associated with the water treatment plant, selective catalytic reduction (SCR) operation, lubricants (oils/greases), cleaning/sanitation chemicals and other significant chemicals (ammonia) to be used on Site.

All tanks containing liquids whose spillage could be harmful to the environment will be bunded. No tanks or pipework containing liquids such as fuel, oils or chemicals will be stored below ground. HVO fuel storage facilities and the road tanker fuel unloading area will be bunded, notwithstanding the fact that HVO is significantly less environmentally harmful to the environment in the event of a loss to ground than conventional hydrocarbon fuels. Drainage from paved areas will be collected and directed to interceptors prior to discharge, as such any accidental spill would be prevented from direct discharge to surrounding soils and groundwater.

The impact is considered a direct negative impact but unlikely to occur with the embedded mitigation measures. If it does occur, it would be confined to one-off releases. The impact has the potential to alter the character of soil and / or groundwater at the local Site but would be temporary in nature. Therefore, it is considered to be a **Low** impact on a **Medium** sensitivity environment and the significance of the impact is **Slight**.

13.6.3 Decommissioning Phase

Effects arising from the process of decommissioning of the Proposed Development are considered to be of a similar nature and duration to those arising from the construction phase and have therefore not been considered separately.

13.6.4 Do Nothing Scenario

The ‘do nothing’ alternative describes the circumstance where no development occurs. Under a ‘do nothing’ scenario, the land remains in its current use and no likely significant implications arise in respect of soil, geology, or hydrogeology. In this case, any future decommissioning of existing facilities would be managed under the IE licence via the EPA-approved RMP.

13.7 Mitigation Measures

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

Due to the inter-relationship between soils, hydrogeology, surface water and biodiversity, the mitigation measures discussed within this chapter should be read in conjunction with Chapter 9 Biodiversity and Chapter 12 Water Environment, EIAR Volume I.

13.7.1 Construction Phase

In order to reduce the impacts on the soils, geology and hydrogeological environment a number of mitigation measures will be adopted as part of the construction works (including demolition activities) on-site as described in EIAR Volume II Appendix 5A CEMP. The measures will address the main activities of potential impact.

13.7.1.1 Fuel and Chemical Handling, Transport and Storage

The following mitigation measures will be taken at the Site in order to prevent any spillages to ground of fuels and prevent any resulting soil and / or groundwater quality impacts:

- designation of bunded refuelling areas on the Site;
- provision of spill kit facilities across the Site;
- where mobile fuel bowsers are used the following measures will be taken:
- any flexible pipe, pump, tap or valve will be fitted with a lock and will be secured when not in use;
- all bowser units will carry a spill kit and operatives will have spill response training; and
- portable generators or similar static operation fuel containing equipment will be placed on suitable drip trays.

13.7.1.2 Excavation and Infilling

13.7.1.2.1 Control of Soil Excavation and Export from Site

Topsoil and subsoil will be excavated to facilitate the construction of foundations, sewers, drainage, roadways, and all other associated services.

The Proposed Development will incorporate the; reduce, reuse, and recycle approach in terms of soil excavations on-site. The construction will be carefully planned to ensure only material required to be excavated will be excavated, with as much material left in-situ as possible. All excavation arisings will be reused on-site where possible / if suitable.

Soil stripping, earthworks and stockpiling of soil will be carried out during the works. Stockpiles have the potential to cause negative impacts on air and water quality. The effects of soil stripping and stockpiling will be mitigated through the implementation of an appropriate earthworks handling protocol during construction. As described in the CEMP, it is anticipated that only local / low level of stockpiling

will occur as the bulk of the material will be excavated either straight into trucks for transport off site or will be reused in other areas of the Site as fill.

Dust suppression measures (e.g., damping down during dry periods), vehicle wheel washes, road sweeping, and general housekeeping will ensure that the surrounding environment are free of nuisance dust and dirt on roads.

13.7.1.2.2 Export of Surplus Material from Site

Where material cannot be reused onsite, it will be sent for recovery / disposal at an appropriately permitted / licenced site however, as indicated in Chapter 18 Waste Management (EIAR Volume I) and the CEMP (EIAR Volume II Appendix 5A) the Final / Contractor's CEMP will be produced by the contractor appointed by the Applicant to undertake the construction of the Proposed Development. By implementing the measures set out in the following sections, the Final CEMP will help to manage environmental issues appropriately during construction. Submission and approval of the Final / Contractor's CEMP prior to commencement of construction is proposed to be secured by a condition.

Detailed provisions of off-site management of excavation waste will be provided in the Final / Contractor's CEMP and Resource Waste Management Plan (RWMP).

13.7.1.2.3 Control of Water during Construction

Run-off from excavations / earthworks cannot be prevented entirely and is largely a function of the prevailing weather conditions. Earthwork operations will be carried out such that surfaces, as they are being raised, shall be designed with adequate drainage, falls and profile to control run-off and prevent ponding and flowing. Care will be taken to ensure that exposed soil surfaces are stable (in terms of angle and compaction) in order to minimise erosion. All exposed soil surfaces will be within the main excavation site, which limits the potential for any offsite impacts. Any run-off will be prevented from directly entering any watercourses.

Should any discharge of construction water be required during the construction phase, discharge to foul sewer will be regulated under a Discharge Licence obtained from the Regulator (Irish Water) issued under the Water Pollution Act. Attenuation, pre-treatment and monitoring of discharge water will likely be required under any Discharge Licence (Section 16 Licence).

Pre-treatment and silt reduction measures on-site will include some combination of silt fencing, settlement measures (silt traps, silt sacks and settlement tanks) and hydrocarbon interceptors. Active treatment systems such as Siltbusters or similar may be required depending on turbidity levels and discharge limits. Qualitative and quantitative monitoring will be implemented as per EPA requirements. The Applicant's environmental consultant will audit the sampling and analysis results as required to ensure conformance to the applicable IE Licence discharge licence limits and testing frequency requirements.

13.7.1.3 Sources of Fill and Aggregates for the Proposed Development

All fill and aggregate for the Proposed Development will be sourced from reputable suppliers as per the project Contract and Procurement Procedures. All suppliers will be vetted for:

- Aggregate compliance certificates / declarations of conformity for the classes of material specified for the Proposed Development.
- Environmental management status.
- Regulatory and legal compliance status.

Potential local sources of aggregates include:

- Listowel Quarry (Shale, GSI ID 179, Quarry Number KY006, 17km from Site)
- Michael O'Donovan Quarries, Knockbweeheen, Co. Limerick (Shale, GSI ID 189, Quarry Number LK005, 20km from Site)
- Knockbowheen Quarry, Knockbweeheen, Co. Limerick (Shale, GSI ID 188, Quarry Number LK004, 20km from Site)
- Roadstone Barrigone Quarry, Askeaton, Co. Limerick (Limestone, GSI ID 115, Quarry Number LK008, 22km from Site)
- Hogan's Quarry, Foynes, Co. Limerick (Limestone, GSI ID 125, Quarry Number LK009, 22km from Site)
- Creeves Quarry, Shanagolden, Co. Limerick (Limestone, GSI ID 122, Quarry Number LK010, 22km from Site).

13.7.1.4 Control of Concrete and Lime

Ready-mixed concrete will be brought to the Site by truck. There will be no onsite batching of concrete. A suitable risk assessment for wet concreting will be completed prior to works being carried out which will include measures to prevent discharge of alkaline wastewaters or contaminated water to the underlying subsoil and groundwater.

Washout of concrete transporting vehicles will take place at an appropriate facility, offsite where possible. Alternatively, where wash out takes place on-site, it will be carried out in carefully managed designated on-site wash out areas.

13.7.1.5 Construction Environmental Management Plan

A Construction Environmental Management Plan (CEMP) (refer to Appendix 5A, EIAR Volume II) and Resource and Waste Management Plan (RWMP) (Appendix 18A, EIAR Volume II) has been prepared as part of the planning application. In advance of work starting on-site, the appointed Contractor will expand and develop the CEMP into a Final/Contractor's CEMP, taking into account any additional requirements of the Design Team or Planning Conditions.

The CEMP sets out the overarching vision of how the construction of the Proposed Development will be managed in a safe and organised manner by the appointed Contractor with the oversight of the Developer. The CEMP is a live document, and it will go through a number of iterations before works commence and during the works incorporating the commitments provided in this planning application unless otherwise agreed with the local authority. It will set out requirements and standards which must

be met during the construction phase and will include the relevant mitigation measures in the EIAR and any subsequent conditions relevant to the Proposed Development.

13.7.2 Operational Phase

The Proposed Development will incorporate mitigation measures for potential spills of fuel and / or chemicals, including bunding, secondary containment, interceptors, and monitoring, in accordance with best practices which will reduce the impact of such events if they occur.

13.7.3 Decommissioning Phase

As outlined in EIAR Volume I Chapter 5 (Description of the Proposed Development), in the event of decommissioning, measures will be undertaken to ensure that there will be no significant, negative environmental effects from the development.

13.8 Residual Impacts

13.8.1 Construction Phase

Considering the implementation of the mitigation measures set out in Section 13.7.1, construction phase impacts are assessed to be a **Negligible** impact on a **Medium** sensitivity receptor. The residual impact on land, soil and groundwater environment is therefore **Imperceptible**.

13.8.2 Operational Phase

Considering the implementation of the mitigation measures set out in Section 13.7.2, operational phase impacts are assessed to be a **Negligible** impact on a **Medium** sensitivity receptor. The residual impact on land, soil and groundwater environment is therefore **Imperceptible**.

13.8.3 Decommissioning Phase

As outlined in EIAR Volume I Chapter 5 (Description of the Proposed Development), in the event of decommissioning, measures will be undertaken to ensure that there will be **No Significant**, **Negative** residual environmental effects from the development. Additional potential impacts and associated effects arising during the decommissioning phase are not anticipated above and beyond those already assessed during the construction phase of the Proposed Development.

13.9 Cumulative Impacts

A search of planning applications within 5km of the Site is presented in Chapter 4 Section 4.5.1. Applications of note that could give rise to cumulative effects on lands, soils, and geology. include a number of power infrastructure project at or in the vicinity of the SSE Tarbert site:

- EE08.3158 – SSE - The development of a Temporary Emergency Generation (TEG) facility at Tarbert Island adjacent to the Proposed Development under Section 4 of the Development (Emergency Electrical Generation) Act 2022 - Granted Conditional 29/03/2023;
- 18392 – SSE Renewables (Ireland) Limited - The development of a Battery Energy Storage System (BESS) at Tarbert Island - Granted Conditional 15/01/2019

- 18520 – ESB - The development of a c7.5 MW capacity Battery Energy Storage System (BESS); and
- 19746 - Moneypoint Synchronous Condenser - Granted Conditional 20/11/2019.
- ABP-305271-19 EirGrid 220kV cable replacement project

Should these developments be constructed at the same time as the Proposed Development, there is a potential for cumulative effects associated with the use of natural resources and accidental spills and leaks.

As reported in Section 13.8.1, potential emissions to soil and groundwater associated with the Proposed Development will be mitigated to the extent that the impact will not be significant. The committed developments listed above have also gone through the planning process, will also implement standard and best practice mitigation measures to the extent that impacts are not significant and are not considered to have a cumulative impact in terms of land, soils or geology impacts relative to the Proposed Development and therefore the cumulative impact will **not be significant**.

13.10 Summary

In summary:

- During the construction phase, potential impacts include accidental spills and leaks of fuels and chemicals, mobilisation of contaminants during excavation and infilling, the depletion of natural resources and potential for pH changes to water due to use of concrete and lime. The significance of effects was assessed as follows prior to mitigation:
    - A slight effect to soil and groundwater from accidental spillage and leaks of fuels and chemicals during construction.
    - A moderate effect on soil and groundwater associated with excavation and infilling works.
    - A slight impact associated with the depletion of non-renewable natural resources namely the use of aggregates as fill and the use of concrete.
    - A slight effect from local temporary pH alterations of groundwaters resulting from the use of concrete and lime.
- During the operational phase, a potential slight effect has been identified with respect to the soil and groundwater associated with accidental spills and leaks.
- Mitigation (including embedded mitigation) will ensure soils and groundwater are protected from adverse impacts of construction, operation, and decommissioning.
- It is considered that residual negative effects of the Proposed Development on land, soils and groundwater will overall be imperceptible provided that appropriate mitigation measures are implemented.
- It was concluded based on site locations and proposed mitigation measures that cumulative effects in relation to land, soil and geology will be not significant.

Table 13.7: Summary of Impacts and Mitigation

Phase	Activity	Mitigation
Construction	Discharge of contaminated water	Any discharge of construction water be required during the construction phase, discharge to foul sewer will be regulated under a Discharge Licence obtained from the Regulator (Irish Water) issued under the Water Pollution Act.
Construction	Storage of Hazardous Material / Accidental Spills	Good housekeeping and proper handling, storage and disposal of any potentially polluting substances will prevent soil and / or water contamination. Designated and bunded storage areas will be maintained.
Construction	Import / Export of Materials	All suitable surplus subsoil, if any exists, will be exported for reuse off site where a suitable reuse site can be identified. Soil reuse will be subject to the requirements under the Waste Management Act (e.g., Article 27 or 28). Where material cannot be reused it will be recovered or disposed of in accordance with the Waste Hierarchy and Waste Management Act. Aggregates will be required for sub-base under roads and buildings. All sub-base materials must meet the relevant engineering specification. The use of recycled or secondary aggregates will be considered as a replacement for primary aggregates.
Construction and Operational	Potential contaminated run-off percolating to ground and the underlying aquifer	There will be no direct discharge to groundwater during construction. Protection of groundwater from potentially polluting substances will be dealt with through a number of measures including correct handling and storage of potentially polluting substances. Concrete use and wash-out areas will be in designated areas, with measures to prevent alkaline wastewaters or contaminated storm water runoff to the underlying subsoil or to the surface water or marine environment.
Decommissioning	Effects arising from the process of decommissioning of the Proposed Development are considered to be of a similar nature and duration to those arising from the construction phase and have therefore not been considered separately.	
Operational / Unplanned Events	Storage of hazardous material	Good housekeeping and proper handling, storage and disposal of any potentially polluting substances can prevent soil and / or water contamination. Designated and bunded storage areas will be maintained. Integrity testing of fuel tanks will mitigate against any risk of leaks.

13.11 References

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