MWP

ENVIRONMENTAL IMPACT ASSESSMENT REPORT (EIAR)

Ros an Mhíl Deep Water Quay

Chapter 6: Land and Soils

Department of Agriculture, Food and the Marine

November 2025

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6. Land and Soils

6.1 Introduction

This chapter of the Environmental Impact Assessment Report (EIAR) considers the potential effects on the land and soils from the proposed development. A full description of the development and the associated project elements are provided in Chapter 2 Project Description of this EIAR. The nature and probability of effects on the existing land, soil and geology environment arising from the proposed development are assessed. The assessment comprises:

- A review of the existing receiving environment for the proposed works to be completed.
- Prediction and characterisation of likely effects;
- Evaluation of significance of effects; and
- Review of mitigation measures for the proposed development.

6.2 Methodology

6.2.1 Desktop Review

The soils and geology assessment methodology included a desk-based study, a site visit, and a qualitative assessment of the potential effects. The assessment criteria for geology, land and soils are based on the following guidelines:

- Environmental Protection Agency (2015): Draft - Advice Notes on Current Practice (in the preparation of Environmental Impact Statements);
- Environmental Protection Agency (2022): Guidelines on the Information to be contained in Environmental Impact Assessment Reports;
- European Union (2017): Guidance on the preparation of the EIA Report (Directive 2011/92/EU as amended by 2014/52/EU);
- Institute of Geologists Ireland (2013): Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements;
- National Roads Authority (2005): Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (DoHPLG, 2018);
- National Roads Authority (2009): Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes.

6.2.2 Site Investigation Methodology

A geotechnical site investigation (SI) was undertaken by Fugro Limited between July and August 2001 when planning permission for the proposed deep water quay was first sought.

The objective of the SI was to determine the ground conditions and obtain geotechnical data for the Cashla harbour area including the location of the proposed deep water quay and also related development including the small craft harbour development and dedicated ferry berths.

The site investigation comprised 81 no. boreholes using cable percussive boring techniques. Samples of soil were taken with in-situ testing carried out where applicable in the cable percussive section of each borehole. Rock core samples were generally obtained in the rotary drill holes, with in situ testing being carried out in a few instances where considered necessary. The location of these boreholes is shown in Figure 6-1.

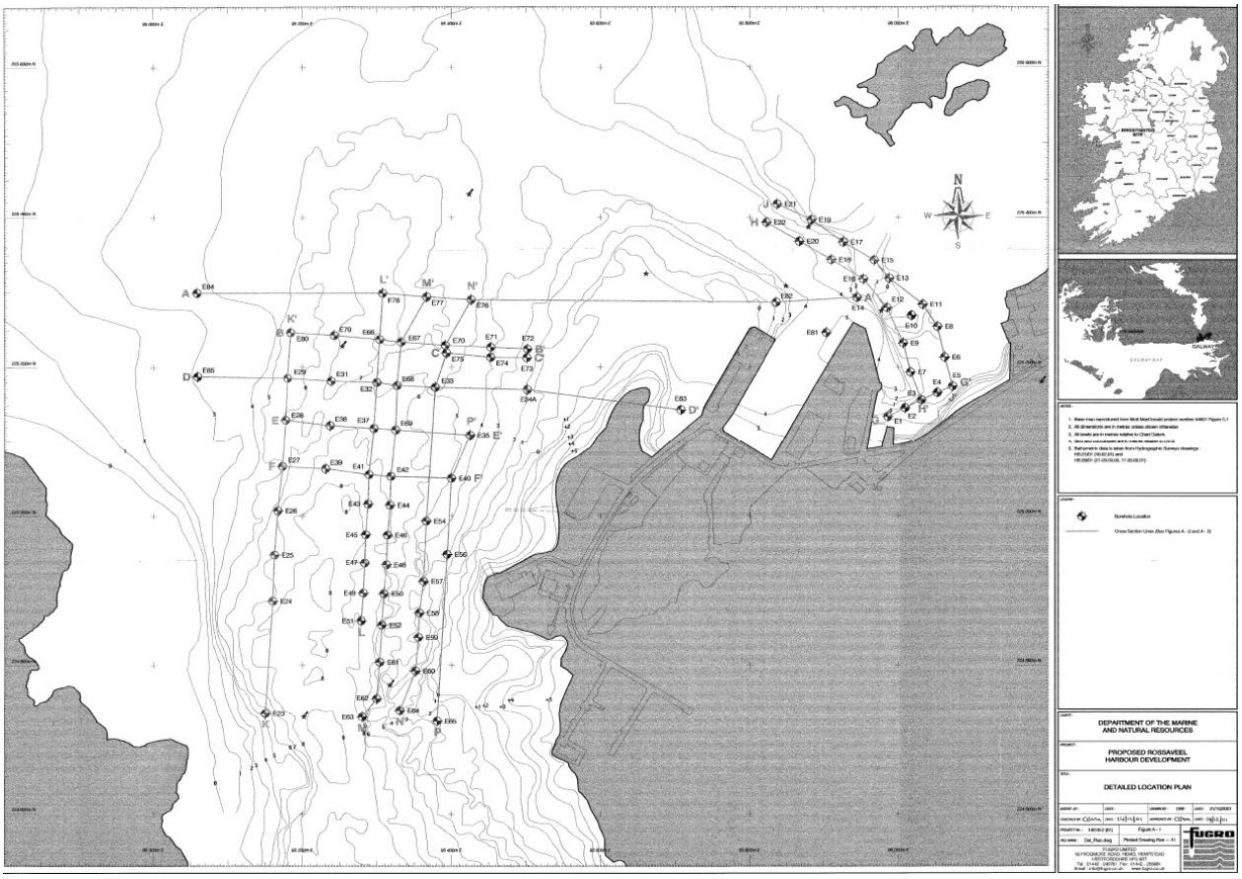

Figure 6-1: Site Investigation Boreholes

All fieldwork was directed on site by an Engineering Geologist from Fugro. The work was carried out on a 24 hour working day, with two 12-hour shifts worked daily, seven days a week. All samples obtained were logged by the Fugro shift engineer on site. All drilling was carried out from the jack-up platform Skate 1.

Cable percussive boring techniques were used in all of the boreholes to advance casing of 150mm diameter through soil and superficial material until no further progress was possible. Rotary coring was employed for drilling into bedrock. A Geobor-S triple tube wireline system with seawater flush was used to obtain 102mm nominal diameter core samples in rock. Samples were recovered and in situ tests performed.

Bulk disturbed samples were taken at regular intervals during cable percussive boring. The bulk samples were collected with a drill tube and non-return valve assembly. There was potential for some loss of fines in the samples, however undisturbed samples were also obtained to confirm laboratory test results.

The samples were described and labelled on site before being transferred to the laboratory. Small disturbed samples were also taken during boring for laboratory tests and as an aid to the production of borehole logs.

Standard Penetration Tests (SPTs) were carried out where appropriate in the boreholes to assess the relative density of the material encountered. The test procedures and equipment used were in accordance with British Standard 1337: 1990. The material recovered in the split spoon was sealed in a polythene bag and retained as a disturbed sample. The penetration resistance ('N' value) obtained was recorded on the borehole logs.

A transparent, semi-rigid plastic pipe (Coreline) acting as a third inner tube was provided for nearly all core runs, and most core samples were recovered within the Coreline tube. On completion of each core run, the core samples were removed from the barrel, retained within the Coreline which was then capped, sealed, labelled and transferred to a wooden corebox.

Core was logged in detail and photographed on site. Selected samples were transported to Fugro's laboratory in Glasgow for geotechnical testing. Contaminant testing was carried out by Robertson Laboratories in Wales under subcontract to Fugro.

All samples obtained from the boreholes were logged in accordance with BS5930: 1999 Code of Practice for Ground Investigations on site by the Fugro Engineering Geologist. Rock core from each of the boreholes was removed from the liner on site, photographed and logged in detail. The details were entered into the daily site reports and later incorporated into the borehole logs.

The laboratory tests were performed in accordance with BS1377 and ISRM Suggested Methods. The following tests were carried out:

- Moisture Content;
- Plasticity Index;
- Bulk Density;
- Hydrometer and Sieve Analysis of Grain Size;
- Particle Density;
- Unconsolidated Undrained Triaxial Compression;
- Lab Vane Shear Test;
- Shear Box Test;
- One-Dimensional Consolidation;
- 2.5kg Compaction;
- Organic Matter Content;
- Sulphate Content / pH value;
- Chloride Content;
- Heavy Metal Analysis;
- Polychlorinated Biphenyls (PCB) Analysis (Pesticide);
- Dibutyltin (DBT) and Tributyltin (TBT) Analysis (Marine Paint Antifoulant);
- Uniaxial Compressive Strength Tests (Rock);
- Point Load Tests (Rock); and

- Brazilian Indirect Tensile Strength (Rock).

Further details on these works are provided in the Ground Investigation Interpretative Report which is contained in **Appendix 6A.**

6.2.3 Geophysical Survey

A geophysical survey consisting of a sub bottom profiling and side scan sonar surveying was undertaken by Hydrographic Surveys Ltd at Ros an Mhíl Harbour main channel (see **Appendix 6B**).

Fieldwork was undertaken on the 19th and 20th January 2016 across the survey area as indicated on **Figure 6-2**. The survey objectives were to:

- Define the top of rock across the survey area;
- Identify any obstructions on the surface; and
- Calculate volumes of overburden and bedrock requiring removal for the proposed development.

The geophysical survey was a non-invasive process and involved the interpretation of readings made from the ground surface through the water column. A Knudsen Pinger Sub Bottom Profiler operating at a frequency of 3.5kHz was utilised during the survey. The instrument was mounted to the side of the survey vessel. A time varying gain was applied to the data during acquisition to maximise the return signal. Various frequency filters were used to improve the signal to noise ratio.

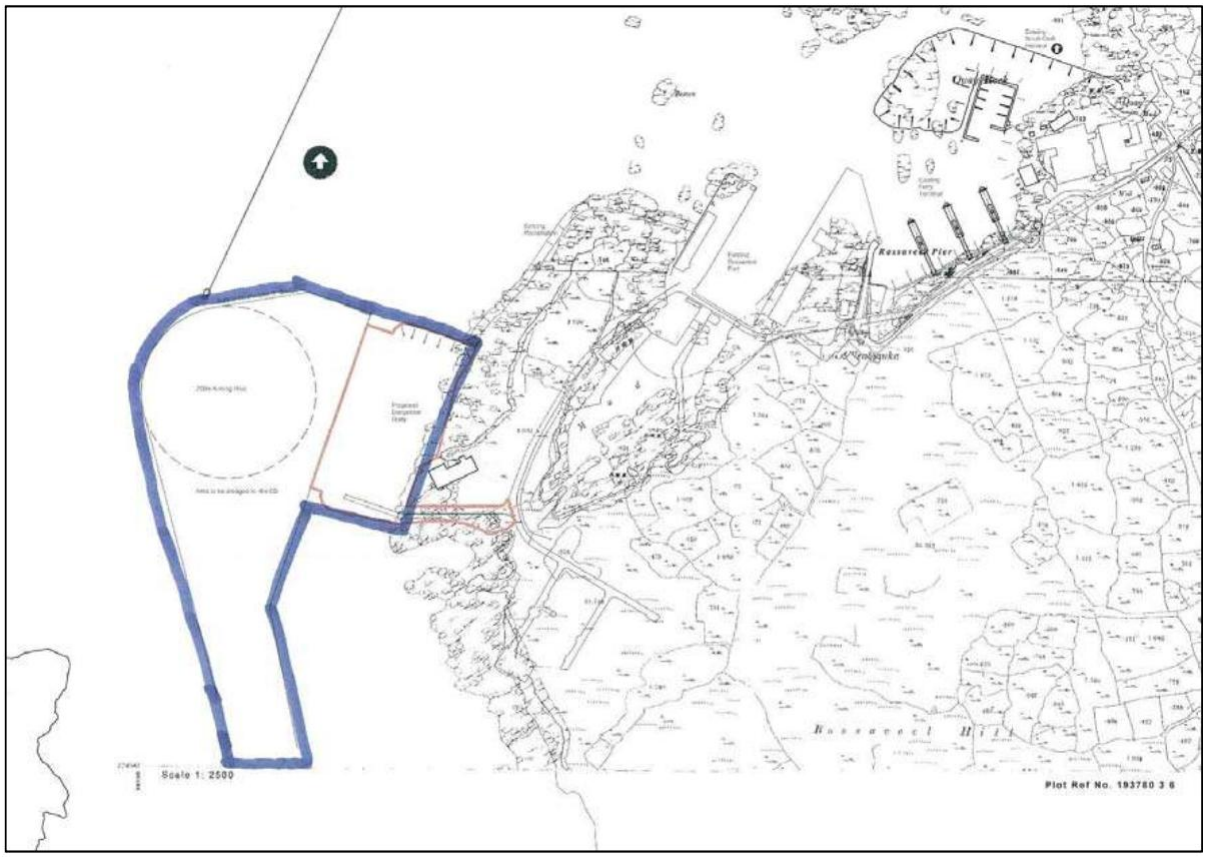

Figure 6-2: Extents of Geophysical Survey Area shown as Blue Line

6.3 Legislation and Best Practice

This document is in compliance with the following European and Irish legislation:

- EU Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the Environment as amended by Directive 2014/92/EU of the European Parliament and of the Council;
- Heritage Act 2018;
- S.I. No. 296 of 2018 European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018; European Communities (Environmental Impact Assessment) Regulations 1989 to 2017;
- Planning and Development Act 2000; and
- Planning and Development Regulations, 2001 – 2024 Consolidated.

6.4 Site Location

Ros an Mhíl Harbour is located on the north-east shore of Cashla Bay near the village of Ros an Mhíl in Connemara. Ros an Mhíl is located, approximately 40 kilometres to the west of Galway city, within the functional area of Galway County Council.

Ros an Mhíl village is located approximately 1km north-east of the harbour. A number of residential dwellings, a local shop, a school, and a church are located within the village. Throughout the surrounding area there are a few commercial and fisheries businesses and industries making use of the harbour facilities. These include fish processing, net repairs, boat repairs and diesel and oil supply companies. These industries are dependent on the continued operation of Ros an Mhíl Harbour.

Ros an Mhíl is connected to Galway and the national primary road network via the regional R336 and R372 roads. The R336 / R372 provides a reasonable, albeit low capacity, highway route connecting Ros an Mhíl to Galway and the rest of the country.

Ros an Mhíl Harbour is primarily a fishing port and serves the Irish and foreign fishing fleet that operates off the coast of Galway. It lies between the major fishing ports of Killybegs to the north and Dingle and Castletownbere to the south. It can accommodate vessels up to approximately 5m draught.

The inner harbour is positioned on the north-east shore of upper Cashla Bay and is well sheltered. The existing harbour currently comprises two piers, known as Piers 1 and 2, along with a dedicated passenger ferry terminal and a small craft harbour. Pier 2 is the more recent development of the two piers. The disposition of these piers is such that they create an approximately rectangular shaped basin at the centre of the harbour. The existing harbour layout is shown in **Figure 6-3.**

Údarás na Gaeltachta have invested in basic infrastructure in the harbour area. To date the investment has taken the form of two commercial buildings; service roads and a slipway. The commercial units are leased to private fisheries tenants. Other employers operating in the Harbour area include Bord Iascaigh Mhara (BIM) who operate an Ice Plant; and Iasc Mara Teoranta who operate a pelagic fish (mainly mackerel and herring) processing facility.

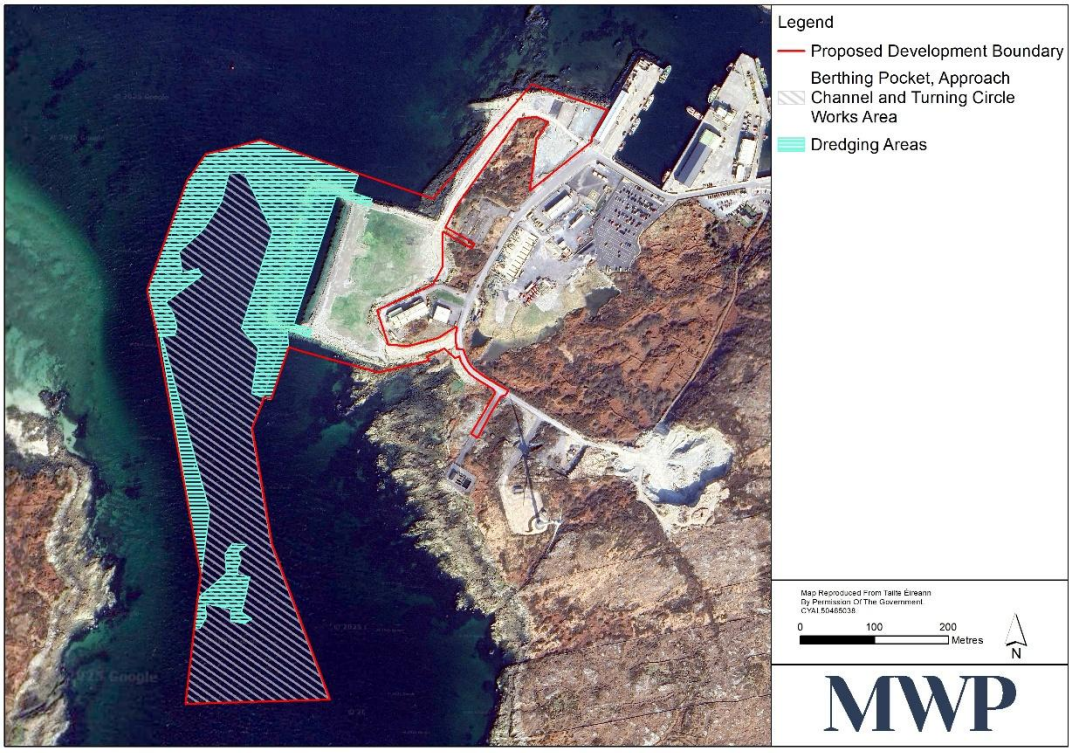

Figure 6-3: Proposed Harbour Works Area

6.5 Baseline Environment

6.5.1.1 Existing Land Use

The land use at the development site has been mapped as shown in **Figure 6-4.** The land cover mapping was created using information from CORINE Land Cover 2018 available on the EPA online mapping system. The reclaimed area would be identified as made ground, which does not appear on the CORINE Land Cover 2018 map as the reclamation took place after 2018.

The following land uses have been identified within and around the development site:

- 123 – Sea ports
- 322 – Moors and heaths
- 231 – Pastures

The development is situated on land primarily composed of '123 - Artificial Surfaces with Industrial. Commercial and transport units' and is described as 'sea ports'. To the east of the development '231 – Pastures' are present. '322 – Forest and semi-natural areas' described as Moors and heaths are mapped in the northeast and south of the development.

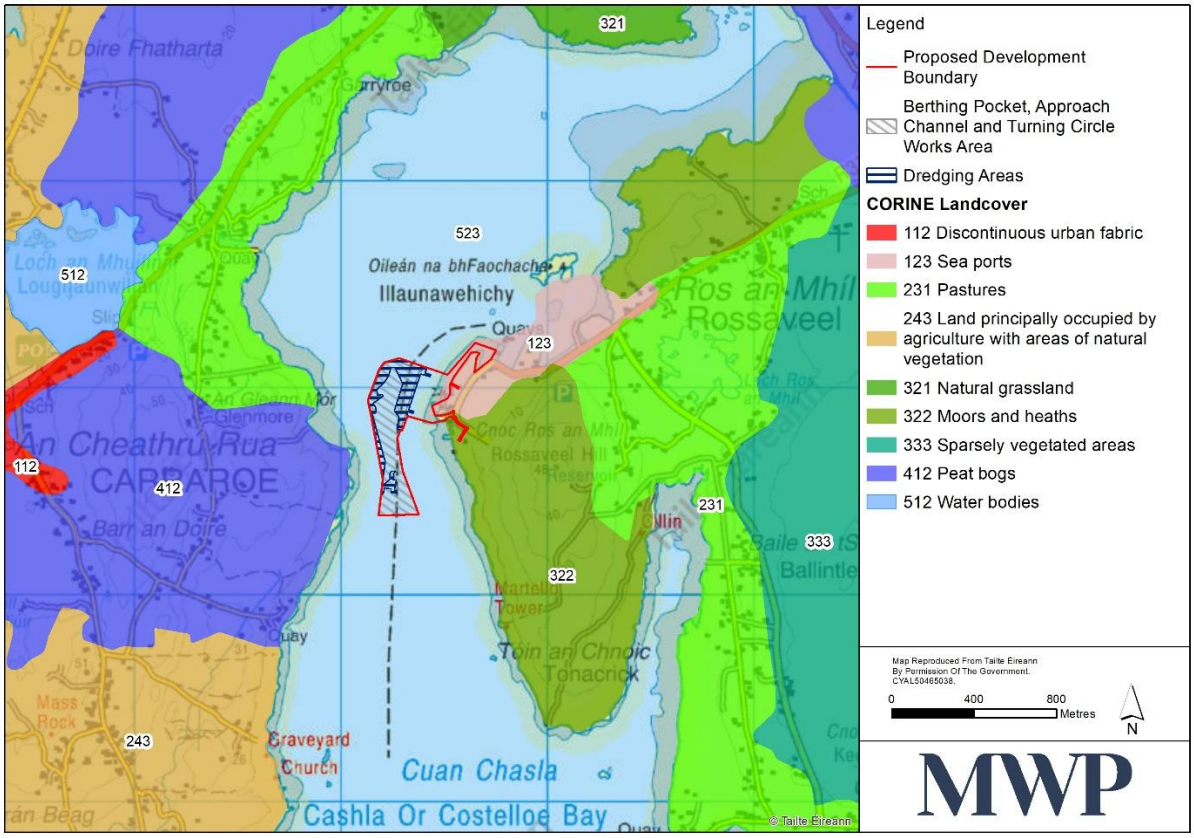

Figure 6-4: Corine Landcover

The development works reclaimed 2.4ha of land that was part of the sea. This consists of made ground constructed mostly with imported rock and some dredged material to a level of +5m cd. Plate 6.1 shows the status of the development site on 29th October 2024 when all works were completed and all temporary construction equipment and facilities removed. A large part of this reclaimed land still gets inundated during spring high tides.

Plate 6.1: Status of the development on 29th October 2024

6.5.1.2 Topography

The proposed development is mainly located on a gentle slope with elevations ranging between 1.60 – 7.20m. The maximum elevation of the site is approximately 7.20m. This elevated point exists because of a descent into a wetland below. The adjacent terrain slopes gradually as a result of the natural rise in elevation away from the site (Figure 6-5).

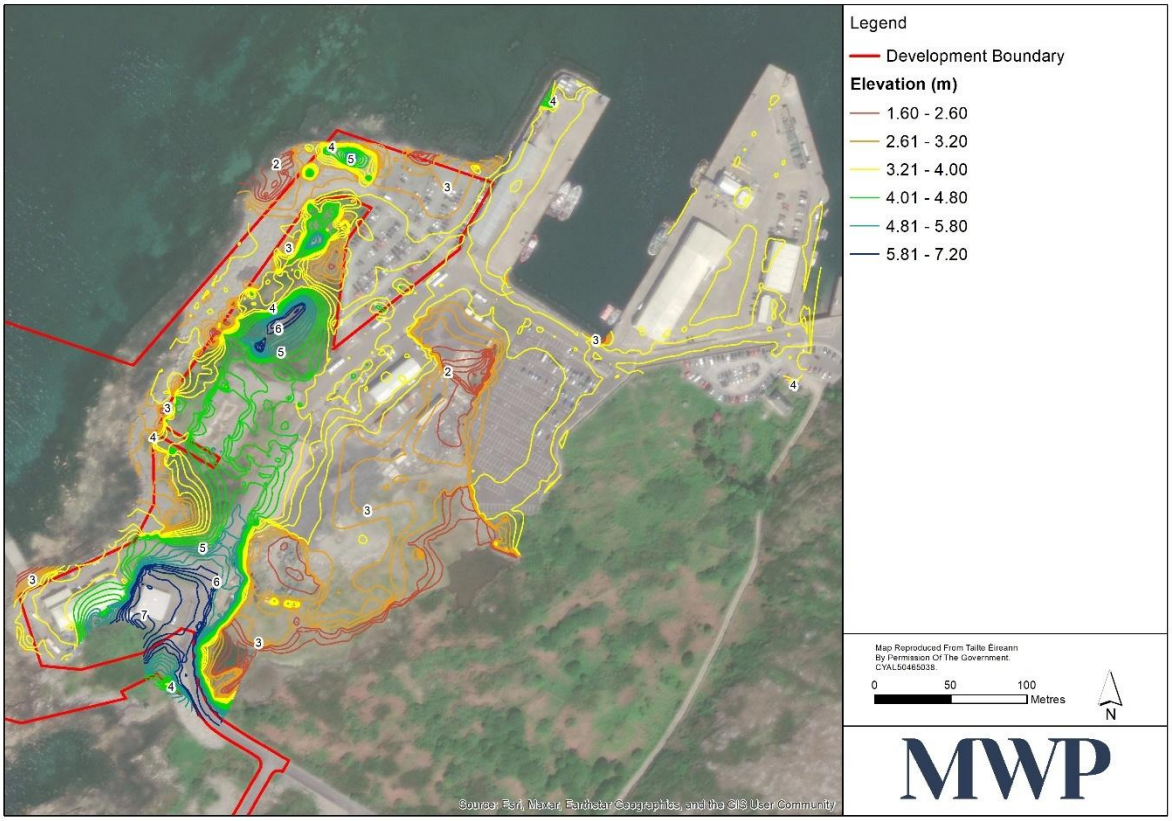

Figure 6-5: Topography

6.5.1.3 Regional & Quaternary Geology

The lithology of county Galway is mainly composed of 64, Marine shelf facies; Limestone & calcareous shale. whose Geology Age is considered to be Palaeozoic, Carboniferous, Mississippian and 65, Marine basinal facies (Tobercolleen & Lucan Fms - 'Calp'); Dark-grey argillaceous & cherty limestone & shale whose Geology age is Palaeozoic, Carboniferous, Mississippian. The proposed development is mainly composed of 8, Granite, granodiorite whose Geology Age is (Silurian-Devonian) (See Figure 6-6).

The quaternary sediments present at the proposed development are Rck, Bedrock outcrop or subcrop. TGr, Till derived from granites are present to the east of the proposed development (see Figure 6-7).

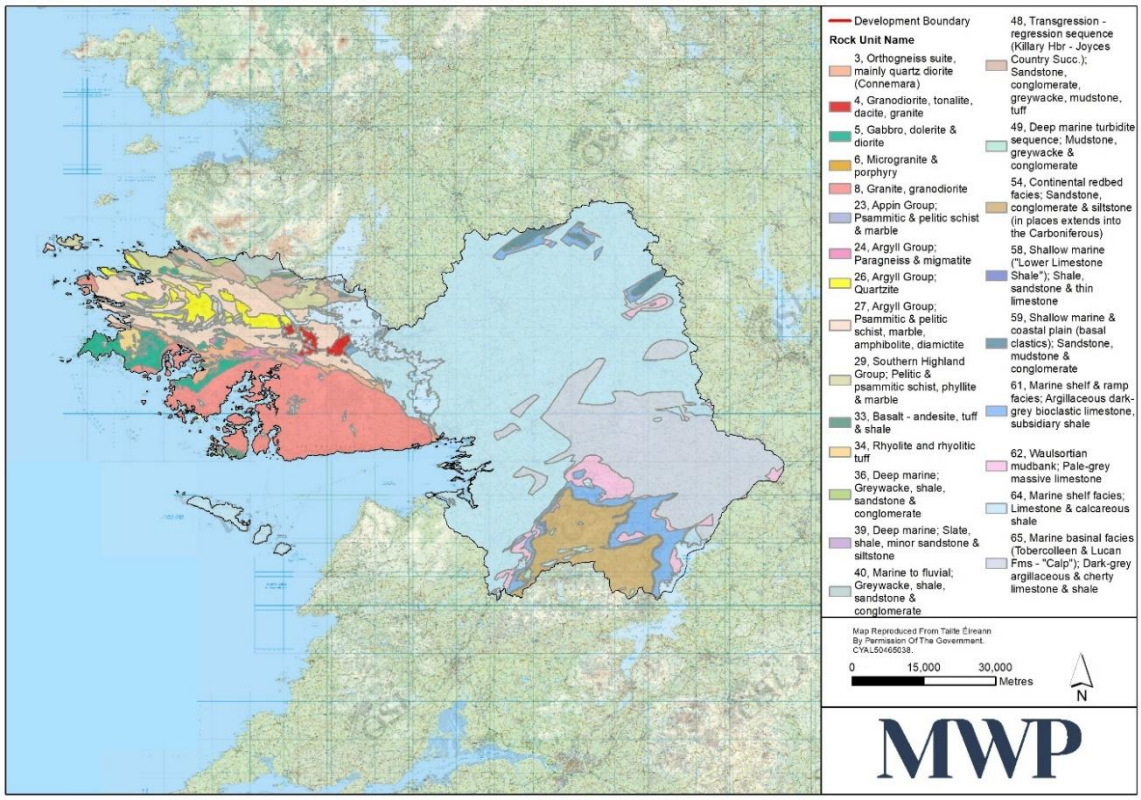

Figure 6-6: Regional Geology

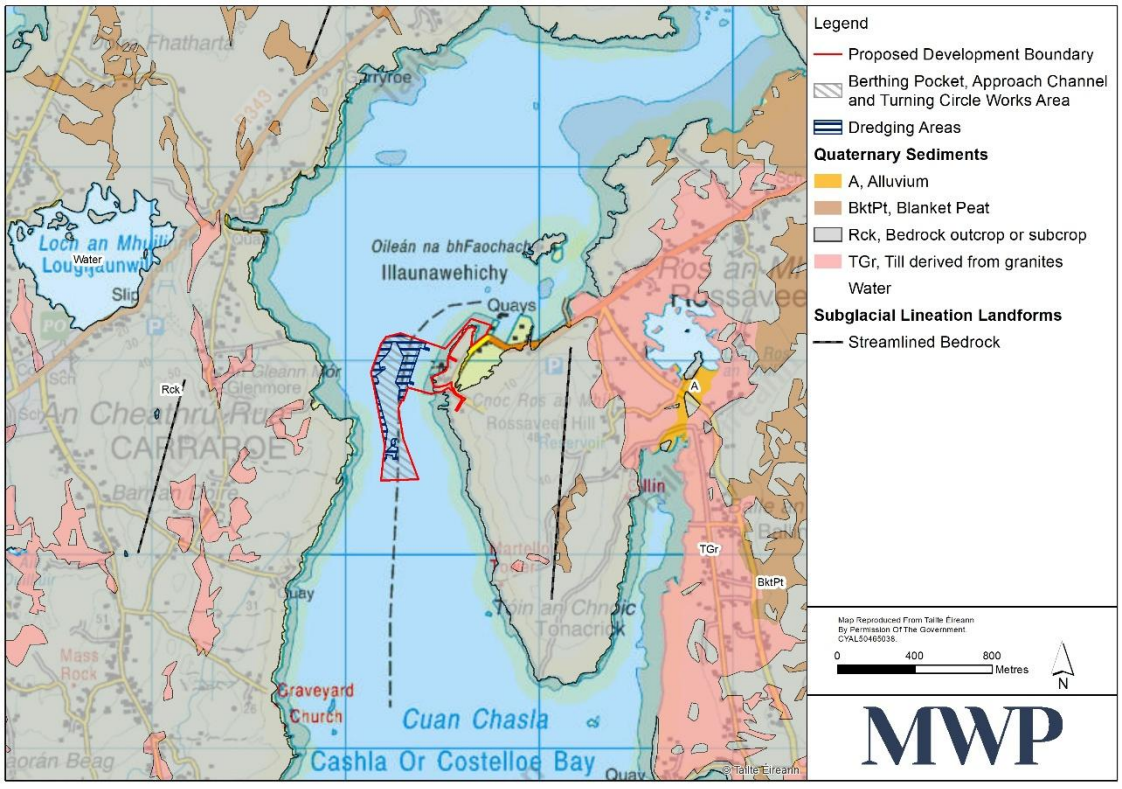

Figure 6-7: Quaternary Sediments

6.5.1.4 Local Geology

The geology of the site is Banded Zone (Galway Granite). The banded zone is also known as the Magma Mixing-Mingling Zone, is a 4-6km wide, east-west trending, foliated, arcurate mixed zone of granodiorite or granite and mafic quartz diorite. This rock type is complex banded zone. The system is Devonian.

Connemara is characteristically an area of glacial erosion and not deposition, however there is evidence of glacial material having been deposited in the Ros an Mhíl Harbour area in the form of large boulders and occasional till (boulder clay). Within the sheltered area of the harbour there is a deposit of alluvium comprising an organic clay/silt with shelly horizons. There are also occasional pockets of peat, interspersed within the alluvium. Carbonate sands and gravels are also present.

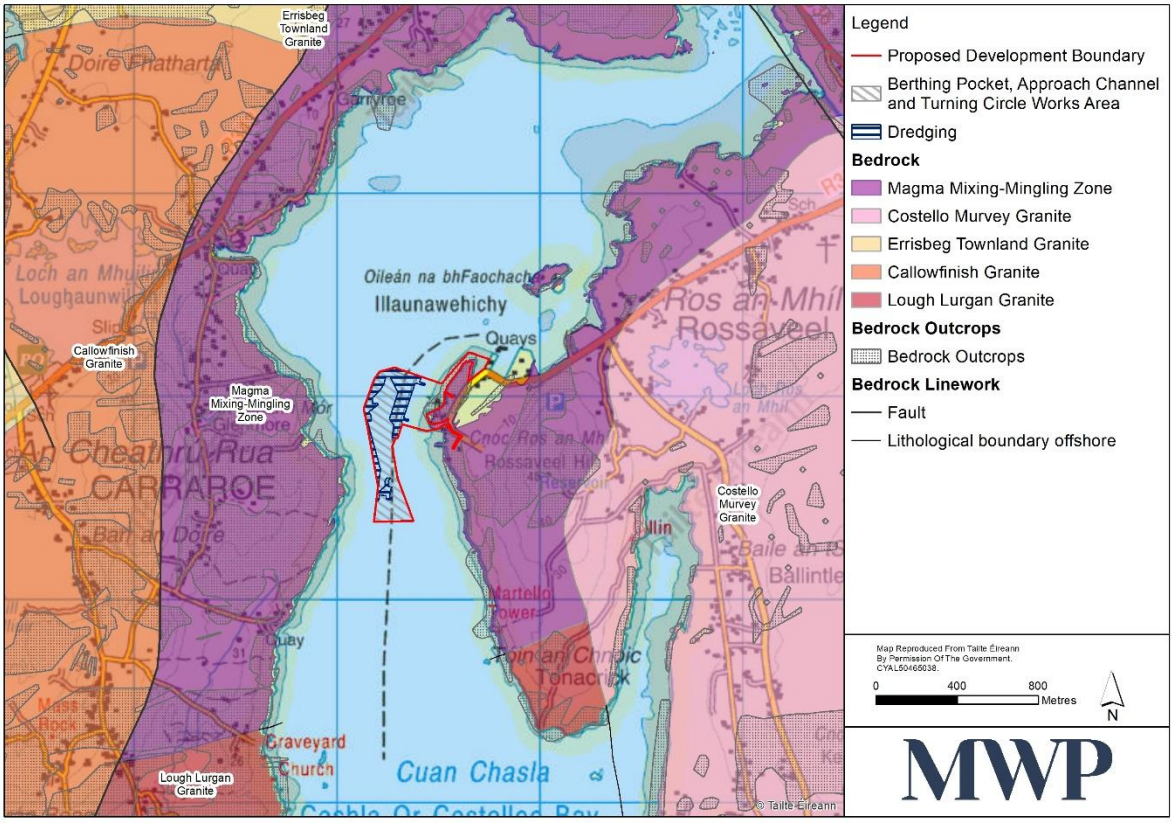

Figure 6-8: Local Geology

6.5.1.5 Geological Heritage

The Geological Survey of Ireland (GSI) partnered with National Parks and Wildlife Service (NPWS) to identify, protect and promote the geologically important areas under the program of Irish Geological Heritage (IGH). These areas are protected and designated as National Heritage Areas (NHA) after audits carried out by local county authorities along with the heritage council. These protected areas are differentiated based on themes varying from Karst, Palaeontology, Quaternary, Hydrogeology, and many others.

A review of the GSI Geological Heritage Database available on the GSI online mapping system indicates that there is a Geological Heritage Site located approximately 2.71km from the proposed development (see Figure 6-9). This site is named Costelloe Road Cutting and its County Geological Site Code is GY043. This site is described as being

significant in terms of the variety of features that are observable in outcrop. Costelloe Murvey Granite Quarry is also located approximately 3.7km from the proposed development. Given the distances to the proposed development, no effects to geological heritage are predicted as a result of the proposed development.

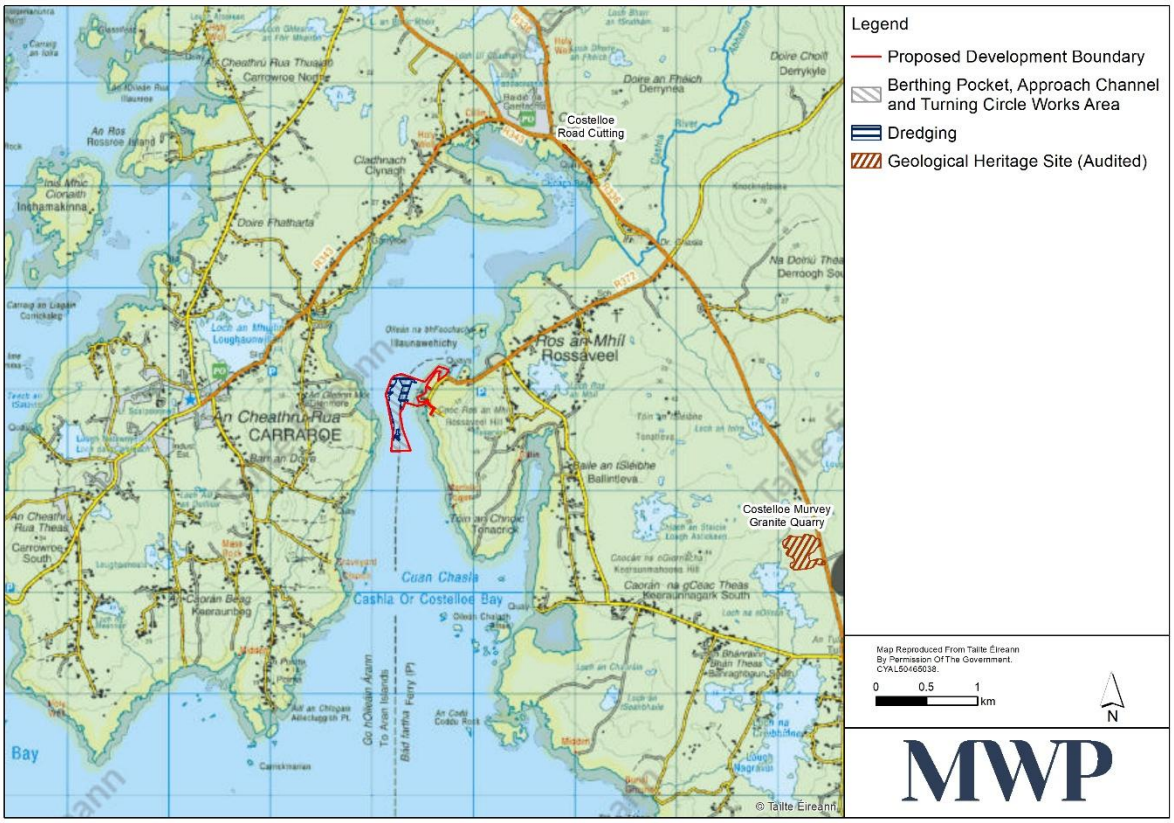

Figure 6-9: Geological Heritage

6.5.1.6 Economic Geology

The closest quarry to the proposed development is Ros a Mhíl Quarries located approximately 500m north of development site.

Recorded mineral locations have the potential to be used for future mineral extraction. According to the GSI, there are a number of recorded metallic and non-metallic mineral locations in the area, mainly composed of granite (**Figure 6-10**). There are no records of any metallic or non-metallic mineral locations within the proposed development.

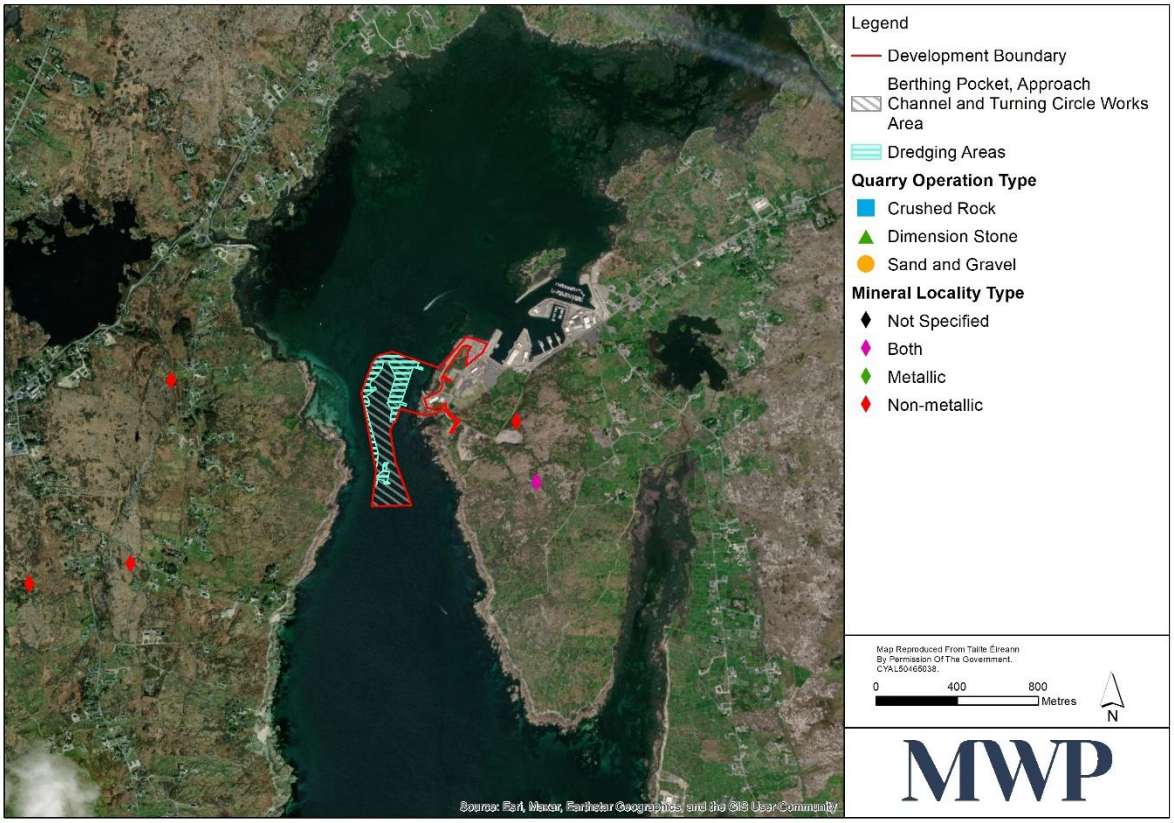

Figure 6-10: Economic Geology

6.5.1.7 Soil and Subsoil

2.4ha of land was reclaimed during the previous development works. This consists of made ground mostly composed of imported rock fill from local quarries.

The adjacent land is generally covered with poorly drained bogland peaty podzols, shrubs and grasses over shallow bedrock. The topsoil is very thin, or not present, resulting in very sparse tree growth and a relatively barren appearance to the landscape.

According to the EPA soils map shown in **Figure 6-11,** the proposed development is located near 'AminSRPT – Podzols Peaty'.

According to the EPA Subsoils map in **Figure 6-12,** 'Rck – Bedrock at surface' is present adjacent to the proposed development.

According to the Teagasc Soils map shown in **Figure 6-13,** the Teagasc soils present in the proposed development area considered to be rock and water body.

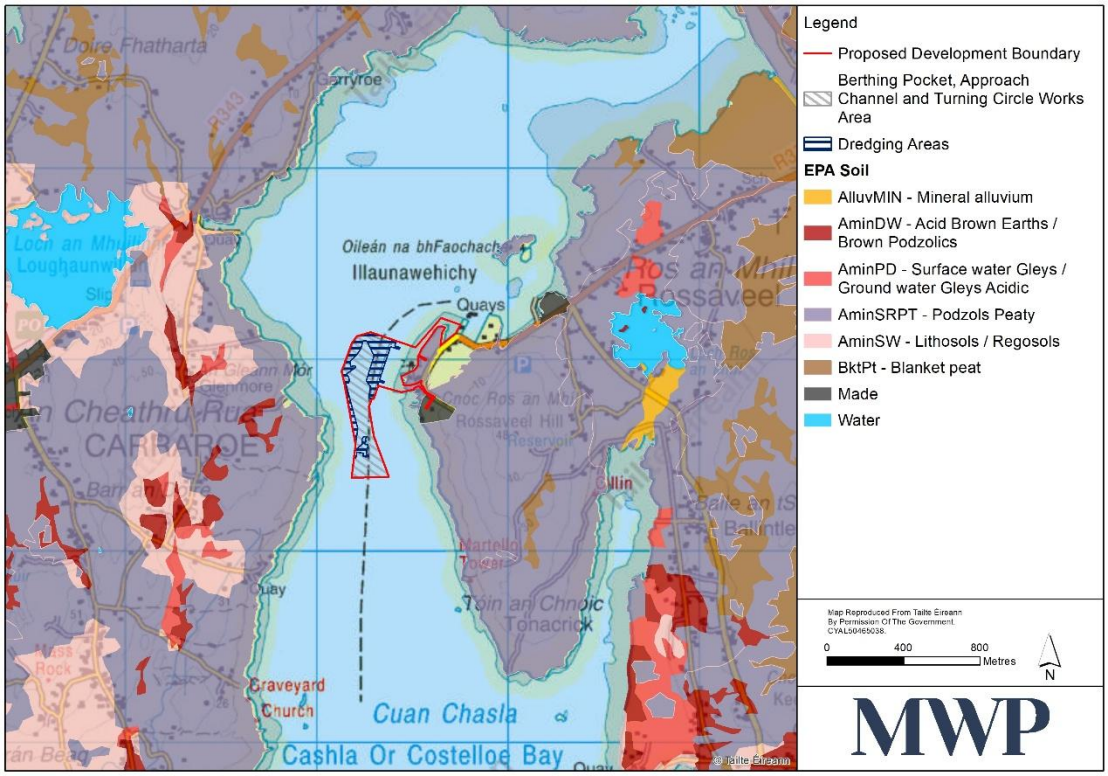

Figure 6-11: EPA Soils

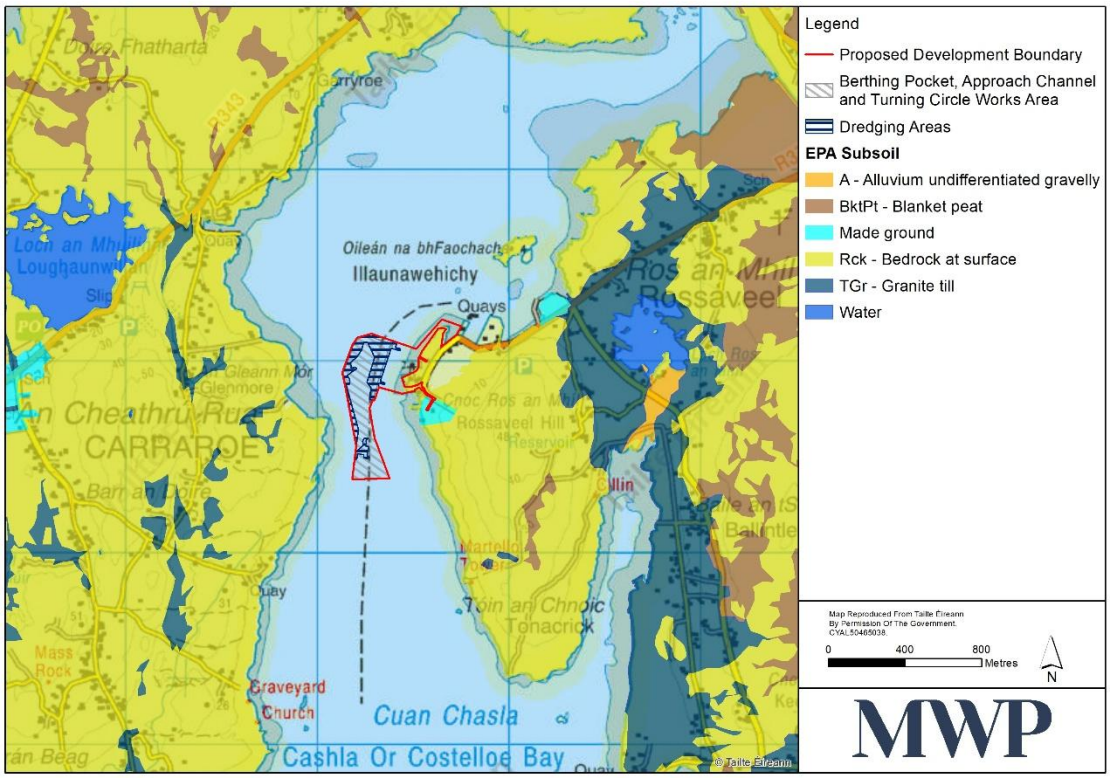

Figure 6-12: EPA Subsoils

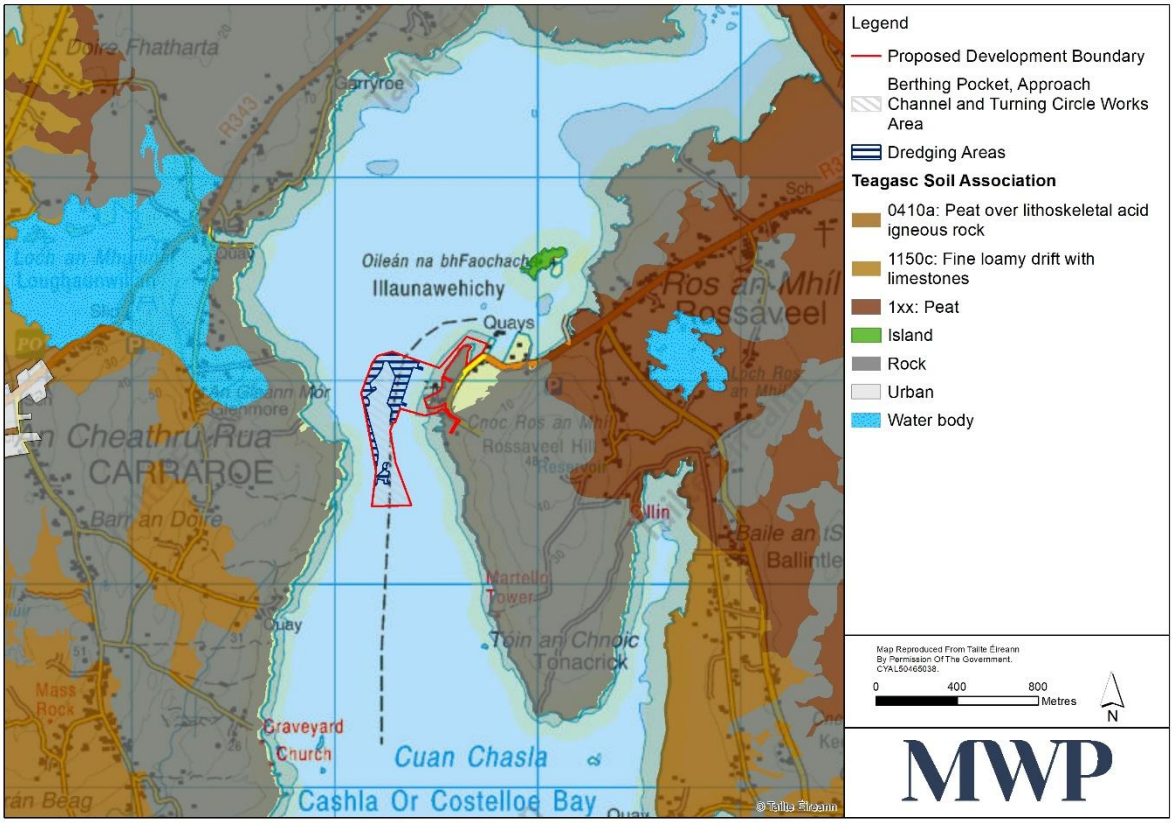

Figure 6-13: Teagasc Soils

6.5.1.8 Groundwater

The hydrogeology of the Galway granite is controlled by the presence of fractures in the rock mass. Where present, water tends to flow along lines of structural weakness, particularly along fault zones. The overlying peat exhibits poor drainage due to the low rock mass permeability and is generally wet.

The proposed development is located on an aquifer that is described as 'Pl – Poor Aquifer – Bedrock which is Generally Unproductive except for local zones' (see Figure 6-14).

The groundwater vulnerability at the proposed development is described as 'Rock at or near Surface or Karst' (see Figure 6-15).

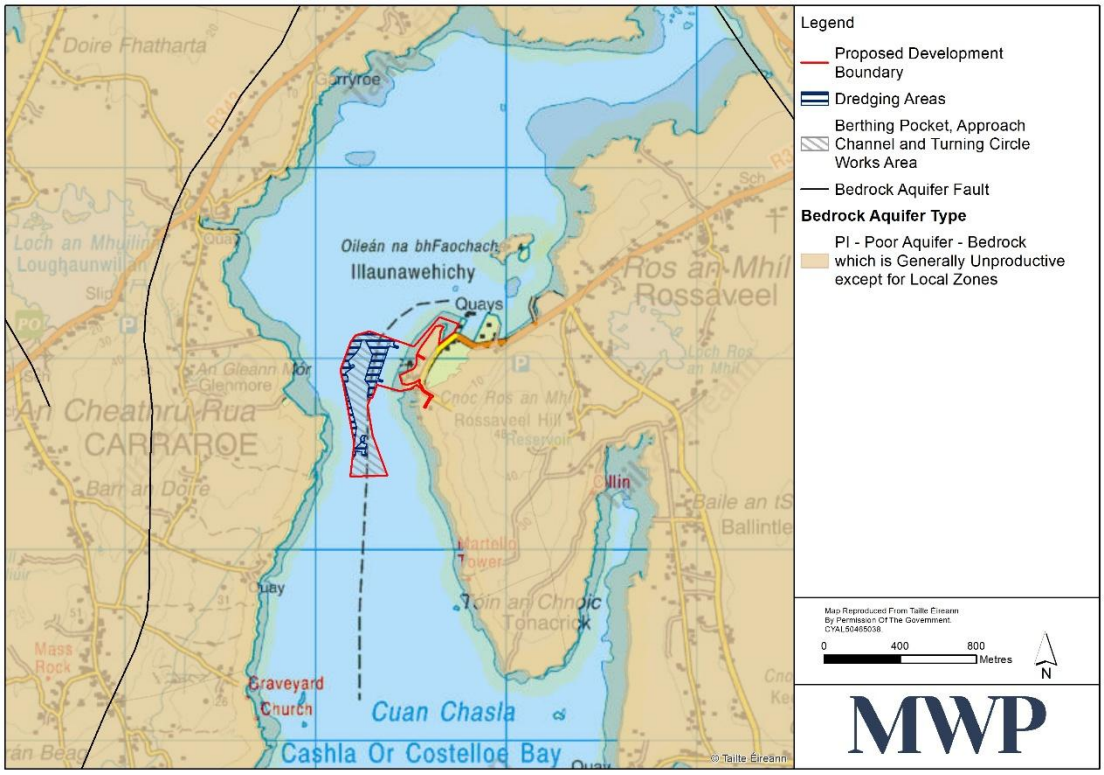

Figure 6-14: Groundwater Aquifer

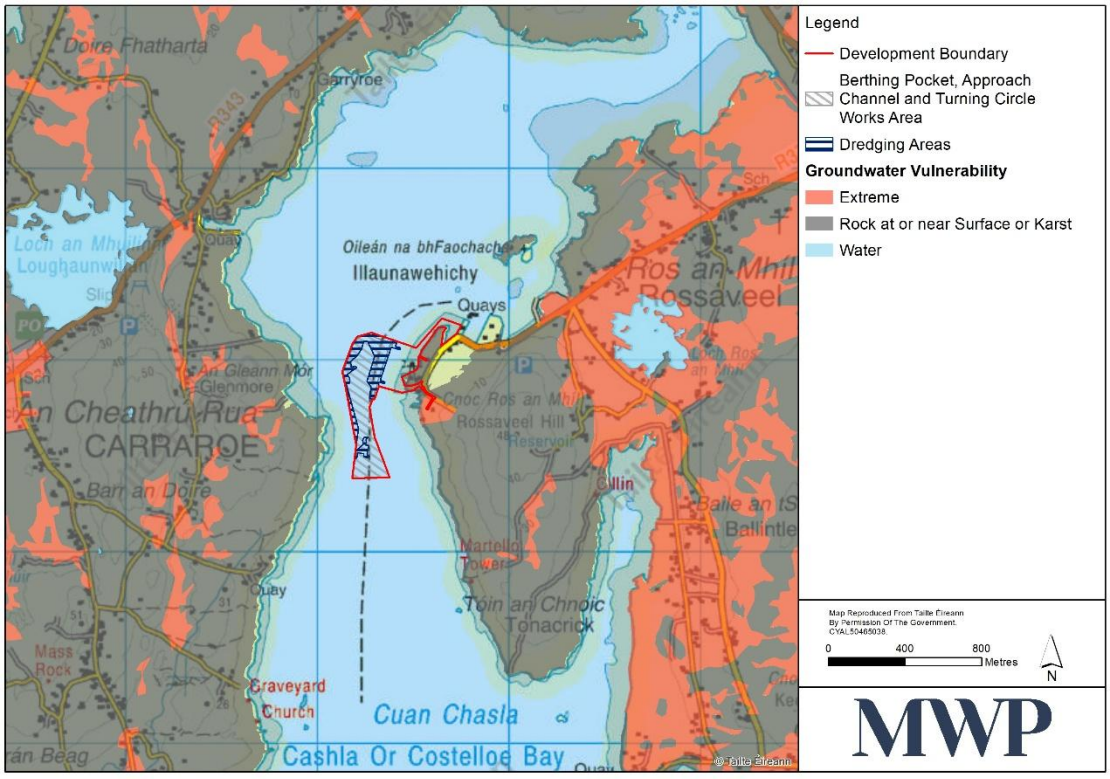

Figure 6-15: Groundwater Vulnerability

6.5.1.9 Geohazards

Geohazards are in essence, natural Earth processes that pose a risk to human life. They can range from naturally occurring radioactive gases such as radon to geological hazards such as landslides, bog-bursts, coastal erosion or subsidence to hydro-meteorological hazards like floods and high tides.

Radon gas is a naturally occurring radioactive gas, originating from the decay of uranium on rocks and soils. It is a colourless, odourless and tasteless gas and its presence can only be measures using specialist equipment. Radon dissipates readily in open air and is not considered harmful. However, in enclosed spaces, such as a building, radon can accumulate to unacceptably high concentrations.

Radon is measured in Becquerels per cubic metre of air (Bq/m^3). A Becquerel is a unit of radioactivity and corresponds to one radioactive disintegration per second. A High Radon Area is one where more than 10% of buildings are predicted to have radon levels in excess of 200 Bq/m^3. Information on radon levels around the development site was obtained from the radon risk map on the EPA website. The radon risk map on the EPA website illustrated that for County Galway, the proposed deep water quay is within a High Radon Area, where approximately 1 in 5 homes in this area are likely to have high radon levels.

A search of the karst database on the GSI website identified as faults occurring through the general Cashla Bay area, striking roughly Southeast – Northwest from the inner harbour area. However, none of these faults are within 1.5km of the proposed deep water quay.

6.6 Description of Likely Effects

6.6.1 Construction Phase Effects

The remaining construction works are expected to take 24 months in total.

The construction activities will be divided between two primary work streams, as follows:

- The dredging of the deep water quay marine area, the vessel approach channel, and turning circle, and the continued reclamation using dredged material and imported materials; and
- The construction of the deep water quay concrete structure and the associated civil engineering works such as the surfacing, access road, drainage, seawalls, fencing, barriers, lighting, and other underground services and substation etc.

Further information on these work activities is provided in the following sections. Overall, construction phase activities will result in short-term impacts.

The following detailed list of the works that still need to be undertaken to complete the proposed deep water quay include:

1. Works to complete a Deep Water Quay development as previously permitted by Galway County Council under Planning Ref 17/967 comprising
   (i) Completion of a 200m quay wall construction using precast beams, precast caissons and precast L-wall units to full height of the quay wall;
   (ii) Dredging of a 30m wide x 200m long berthing pocket adjacent to the new quay to a depth of -10.0m CD (previously permitted to -12.0m CD);
   (iii) Dredging for a turning circle of 150m diameter (previously permitted at 200m diameter) to a depth of -7.0m CD (previously permitted to -8.0m CD) ;

(iv) Backfilling behind the quay wall and raising ground level of reclaimed lands using rockfill up to +7mCD;
(v) Reinforced concrete deck behind the quay wall;
(vi) Surfacing of the reclaimed lands;
(vii) Asphalt roadway connecting the concrete apron at the quayside to the existing road;
(viii) Install lighting columns, underground ducts, surface water drainage, outfalls, interceptor, foul water drainage system including pumping station;
(ix) Placement of rock armour for revetments along northern and southern extent of reclaimed land;
(x) Excavation by dredging and rock blasting (if required) of the navigation channel to provide for a fully dredged navigation channel of -7m CD and minimum width of 100m (previously permitted to -8.0m CD and minimum width of 74m);
(xi) A temporary site compound for contractor personnel including an effluent holding tank;
(xii) A temporary concrete batching plant to provide on-site concrete for the quay wall construction;
(xiii) Install palisade fencing, roadside guard rails, gates and traffic barrier around land boundary of quay area; and

2. Further development comprising:

(i) A wastewater pipeline to connect proposed wastewater discharge points along the proposed quay to a new pumping station for onward discharge to an Údarás na Gaeltachta wastewater treatment network and plant at Ros an Mhíl; and
(ii) A new ESB electrical sub-station for dedicated power provision to the new deep-water quay

6.6.1.1 Change of Land Use

Land use is the term to describe the human activities which take place within a given area of space. All new development proposals have the potential to affect the character of a local area and human environment by introducing a new land use activities which could result in physical disruption, severance or exclusion of the user's ability to continue existing activities, or the sterilisation of lands that adversely affect future land use potential.

The proposed development site is located along the seashore in an area that forms part of the Ros an Mhíl harbour The whole harbour area is classified as '123 - Artificial Surfaces with Industrial. Commercial and transport units' and is described as 'seaports'. The construction of the proposed development will not result in any change in land use within the defined harbour area. The area where the proposed development works are to be undertaken are located on existing unused land within the harbour area and on the land reclaimed from the sea. Other harbour facilities and activities will continue and will not be displaced by the proposed development works. During the period since the suspension of the construction works, the reclaimed area has been fenced off and remained unused.

The surrounding land uses outside the harbour area will remain agricultural areas and semi-natural areas.

During construction, it is likely that the proposed development will cause a neutral, not significant, local, permanent, direct effect on the land use.

Table 6-1: Construction Effect 1: Change of Land Use

Construction Effect 1: Change of Land Use					
	Quality of Effect	Significance	Spatial Extent	Duration	Other Relevant Criteria
Pre-Mitigation	Neutral	Not Significant	Local	Permanent	Direct

6.6.1.2 Reclaimed Land

The reclaimed made ground will consist of imported rock and dredged rock with some sand, gravel and silt. On completion, the ground will be covered with a 36m wide concrete slab along the quay wall and the rest of the reclaimed area will be topped with a surface dressing using a bituminous tack coat with stone chips. This will be used as a running surface for fisheries related traffic in the hinterland area during the operational phase. An appropriate drainage network with interceptors will be installed in this area. Consequently, the reclaimed land will be an impermeable surface.

During construction, it is likely that the proposed development will cause a negative, not significant, local, permanent, direct effect on the existing soils and geology of the site (i.e. reclaimed land).

Table 6-2: Construction Effect 2: Reclaimed Land

Construction Effect 2: Reclaimed Land					
	Quality of Effect	Significance	Spatial Extent	Duration	Other Relevant Criteria
Pre-Mitigation	Negative	Not Significant	Local	Permanent	Direct

6.6.1.3 Caisson Wall Construction and Removal of protective berm

The remaining works will involve the construction of the remainder of the foundations for the quay wall (152m) and then the laying and filling of the caissons with concrete. Once the wall is constructed the rock currently used in the protective berm will be dredged again and used for the filling and reclamation on the land side of the quay wall. This will result in another change in the profile of the seabed where the protective berm is currently located. As the rock material of the protective berm originates from the blasted seabed, there is expected to be no contamination risk. The filling of the caissons with concrete will also be contained within the protected quay wall trench and will be managed and directed by divers. Consequently, no contamination of the soils and geology of the seabed is expected.

During construction of the caisson wall and removal of the protective berm, it is likely that the proposed development will cause a negative, not significant, local, permanent, direct effect on the soils and geology.

Table 6-3: Construction Effect 3: Caisson Wall Construction

Construction Effect 3: Caisson Wall Construction					
	Quality of Effect	Significance	Spatial Extent	Duration	Other Relevant Criteria
Pre-Mitigation	Negative	Not Significant	Local	Permanent	Direct

6.6.1.4 Accidental Spills & Contamination/Pollution

Contamination, or pollution, is the presence of human-made chemicals entering and altering the natural environment. It can occur as a result of waste-related activities, historical activities, leakages and accidental spillages of chemicals. Contamination can lead to the degradation and the physio-chemical alteration of the land, ground and surface water and soils environment as well as cause indirect effects to the biodiversity, human health and material asset environments.

Construction materials, including any hazardous substances such as fuel and oil, have the potential to affect the soil and geological environment should a spill occur. The accumulation of spills of fuels and lubricants during routine plant use can also be a pollution risk. Construction plant and machinery will run on hydrocarbon fuel and oil and activities relating to hydrocarbons (storage, bunding, refuelling) will be managed during the works. Any effect from a hydrocarbon spill to soil may also indirectly effect the hydrological/hydrogeological environment.

Cement / concrete will be transported to and used across the site. Without proper management, cement spills and other construction materials pose a threat to the land and soils environment (soil matrix) and may indirectly impact on the hydrological environment and groundwater environment, as pH would likely be altered.

Wastewater from construction processes or leakage from poor welfare facilities can alter the nutrient and microbial balance of the land and soils environment. Contaminated runoff arising from soil erosion on construction sites can pose a risk to the land and soils environments, if allowed to percolate into the soil matrix. Sedimentation can also affect safety on the site from build-up, flooding from drain blockages, and maintenance issues from soil erosion. Soil loss due to erosion can result if areas are left exposed.

The effect of hydrocarbon spills on lands within the deep water quay development site during the construction phase were assessed and rated. Without appropriate mitigation measures, contamination from accidental spills of hydrocarbons, cement or contaminated waters represents a negative, significant, local, short-term, direct effect on the land and soils environment.

Table 6-4: Construction Effect 4: Accidental Spills & Contamination/Pollution

Construction Effect 4: Accidental Spills & Contamination/Pollution					
	Quality of Effect	Significance	Spatial Extent	Duration	Other Relevant Criteria
Pre-Mitigation	Negative	Significant	Local	Short-term	Direct

6.6.1.5 Dredging

The additional dredging works still required are largely in the vessel turning circle and approach channel, and the berthing pocket. The marine area west of the -10mCD dredged berthing pocket will be dredged to a depth of -7mCD, with a ship turning circle of 200m diameter provided. It is expected that approximately 3,000 cu m of sand, gravel and silt materials will need to be dredged in this area. Bathymetric surveys have been undertaken in the areas where dredging in the channel would be required and the effects on marine life are assessed in Chapter 8, Marine, of this EIAR.

When dredging soft or weak materials such as silts and soft clays, there is a need to reduce the volume of water brought up with the material. For this reason, hydraulic methods of dredging, which dilutes the dredged mixture, are not suitable. Backhoe dredgers, for rock dredging, are suitable for removing sands and clays at close to their *in situ* density. In addition, backhoes can be used to remove general soft underlying material above the rock before drilling and blasting if required. Since the rock dredging has and will be carried out using backhoe dredgers, the same technology will be used to remove all the soft material as well.

As the seabed material is dredged, it will be loaded by the backhoe dredger onto a self-propelled barge. Once loaded, the barge will then sail to the adjacent shoreline where it will be unloaded by land based plant which will then place the material within the reclamation area. Some dredged material may be stored temporarily onshore within the development footprint before it is reused in the reclamation. Materials stored temporarily onshore may also be subject to engineering ground improvement methods, or mixing with other imported fill materials, in order to optimise its use in the construction of the reclamation area.

Without mitigation, the effect of dredging and the use of the dredged material in the reclamation process are rated as a negative, not significant, local, short-term, direct effect on the land and soils.

Table 6-5: Construction Effect 5: Dredging

Construction Effect 5: Dredging					
	Quality of Effect	Significance	Spatial Extent	Duration	Other Relevant Criteria
Pre-Mitigation	Negative	Not Significant	Local	Short-term	Direct

6.6.2 Operational Phase Effects

6.6.2.1 Change of Land Use

The proposed development site is located along the seashore in an area that forms part of the Ros an Mhíl harbour. The whole harbour area is classified as '123 - Artificial Surfaces with Industrial. Commercial and transport units' and is described as 'seaports'. The proposed development will not result in any change in land use within the existing harbour area but will enhance the existing harbour facilities for the fishing industry. The current facilities are cramped, and the deeper quay wall will enhance the continued future viability of the local fishing industry and is therefore seen as a significant economic benefit to the local communities who rely very heavily on the fishing sector.

The surrounding land uses outside the harbour area will remain agricultural and semi-natural areas.

During the operational phase, it is likely that the proposed development will have a positive, significant, local, permanent, and direct effect on the existing land use.

Table 6-6: Operational Phase Effect 1: Change of Land Use

	Quality of Effect	Significance	Spatial Extent	Duration	Other Relevant Criteria
Pre-Mitigation	Positive	Significant	Local	Permanent	Direct

6.6.2.2 Effect on Soils and Geology

Once complete the reclaimed and covered made ground will be level with the existing ground levels on the adjacent land and will be impermeable. An appropriate drainage network with interceptors will be installed on the site to manage the drainage and prevent contamination of the sea. Consequently, there will be no potential for erosion and no effect on the underground soils and geology. The surface changes will be permanent. During the operational phase, it is likely that the proposed development will have a positive, significant, local, permanent, and direct effect on the soils and geology.

During the operational phase, it is likely that the proposed development will have a positive, significant, local, permanent, and direct effect on soils and geology.

Table 6-7: Operational Phase Effect on Soils and Geology

	Quality of Effect	Significance	Spatial Extent	Duration	Other Relevant Criteria
Pre-Mitigation	Positive	Significant	Local	Permanent	Direct

6.6.2.3 Effect on Water Quality

Once complete the reclaimed and covered made ground will be level with the existing ground levels on the adjacent land and will be impermeable. An appropriate drainage network with interceptors will be installed on the site to manage the drainage and prevent contamination of the sea. Consequently, there will be little potential for negative water quality effects on the adjacent sea. During the operational phase, it is likely that the proposed development will have a negative, not significant, local, long term, and indirect effect on water quality.

During the operational phase, it is likely that the proposed development will have a negative, not significant, local, long term, and indirect effect on water quality.

Table 6-8: Operational Phase Effect on Water Quality

	Quality of Effect	Significance	Spatial Extent	Duration	Other Relevant Criteria
Pre-Mitigation	Negative	Not Significant	Local	Long Term	Indirect

6.7 Mitigation Measures

Appropriate mitigation measures to avoid or significantly reduce any potential effects of the proposed development are outlined in this section. It is predicted that subject to the recommended mitigation measures being adhered to, there will be minimal effects on the land and soil environment during the construction and operational phases of the proposed deep water quay.

6.7.1 Construction Phase Mitigation Measures

- In order to minimise disruption a Construction Environmental Management Plan (CEMP) will be developed and implemented during the construction phase of the development (see Appendix 2A in EIAR Vol. 3). The CEMP will be reviewed regularly and revised as necessary to ensure that the measures implemented are effective;
- Temporary storage of any spoil will be carefully managed in such a way as to prevent any potential negative impact on the receiving environment and the material will be stored away from the sea;
- Excavated spoil will be stockpiled at appropriate heights and slope angles;
- To minimise the potential risk of pollution to the sea by sediment laden run off, sediment entrainment measures will be incorporated into the development. These measures will include: blocking of all drainage trenches to prevent runoff reaching the sea, intercepting run off, lining ditches with geotextile and placing hay bales to trap sediment;
- Bunds for the storage of chemicals and hydrocarbons will be lined or constructed of materials resistant to damage by the materials stored therein. In addition, the capacity of such bunds will be a minimum of 110% of the volume of the largest container stored therein. Bunds will be designed in accordance with EPA guidance in relation to the storage of potentially polluting liquids ('IPC Guidance Note on Storage and Transfer of Materials for Scheduled Activities', 2004);
- Where refuelling is to take place on site it will be within a designated impermeable, bunded area, away from all drains. In the event of a machine requiring refuelling outside of this area, fuel will be transported in a mobile double skinned tank. An adequate supply of spill kits and hydrocarbon adsorbent packs will be stored in this area. All relevant personnel will be fully trained in the use of this equipment. Guidelines such as 'Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors' (CIRIA C532, 2001) will be referred to;
- Drip trays will be used where hydrocarbons are being used for vehicle maintenance/refuelling;
- All plant will be inspected at the beginning and end of each shift and if leaks are evident they are to be repaired immediately or removed from site and replaced; and
- Explosive materials and detonators will be stored, transported, handled and used in the manner recommended by the manufacturer and in accordance with all statutory requirements or otherwise as

advised by the Firearms and Explosives Unit of the Department of Justice and Equality (DOJE) and the Garda Síochána. It should be noted that these requirements will be set out in a Method Statement which will be agreed with the DOJE and the Garda Síochána in advance of the commencement of drilling and blasting works;

- Portable chemical toilets will be provided for the duration of the works and all waste material will be removed from site and disposed of to an appropriately licensed facility;

6.7.2 Operational Phase Mitigation Measures

The following mitigation measures are proposed to address the likely effects associated with the operational phase of the proposed deep water quay:

- The installed surface water drainage system and interceptors will be monitored for blockages and integrity and maintained to ensure their ongoing optimal effectiveness.
- No waste will be disposed of at sea;
- Hazardous wastes will be stored in sealed, labelled drums in locked chemical cabinets;
- Spills on deck will be contained and controlled using absorbing materials;
- Vessels without sewage treatment systems will have suitable holding tanks and will bring waste onshore for treatment in the sewage system operated by Údarás na Gaeltachta;
- All chemicals used on-board should be handled in compliance with COSHH instructions on handling hazardous materials;
- Chemicals will be stored appropriately in suitably bunded areas and with material safety data sheets; and;
- All waste discharges will be monitored and recorded as per vessel procedures.

It is expected that with the implementation of these mitigation measures there will be a slight impact on the receiving soils, geology and hydrogeology environment. This impact is associated most directly with the ongoing operation of Ros an Mhíl Harbour.

6.8 Residual Effects

The post-mitigation residual effects of construction and operation phases are assessed below.

Table 6-9: Residual Effects

Impact/ Activity/ Receptor	Quality Of Effect	Pre-Mitigation Significance Rating	Mitigation Measures	Post Mitigation Significance Rating
CONSTRUCTION PHASE				
Change of Land Use	Neutral	Not Significant	No mitigation measures required.	Not Significant
Reclaimed Land	Negative	Not Significant	Spoil storage, drainage, chemical storage, pollution prevention measures	Not Significant

Impact/ Activity/ Receptor	Quality Of Effect	Pre-Mitigation Significance Rating	Mitigation Measures	Post Mitigation Significance Rating
Caisson Wall Construction	Negative	Not Significant	Spoil storage, drainage, chemical storage, pollution prevention measures	Not Significant
Accidental Spills & Contamination	Negative	Significant	Spoil storage, drainage, chemical storage, pollution prevention measures	Not Significant
Dredging	Negative	Not Significant	Spoil storage, drainage, chemical storage, pollution prevention measures	Not Significant
OPERATIONAL PHASE				
Change of Land Use	Positive	Not Significant	No mitigation measures required.	Not Significant
Effects on Soils and Geology	Positive	Not Significant	Spoil storage, drainage, chemical storage, pollution prevention measures, waste discharge monitoring.	Not Significant
Water Quality Effects	Negative	Not Significant	Spoil storage, drainage, chemical storage, pollution prevention measures, waste discharge monitoring.	Not Significant

6.9 Cumulative Effects

A review of the planning applications in the locality (see **Section 1.4.3** of Chapter 1, Introduction, of this EIAR) found no other significant developments that would have a cumulative effect together with the proposed development.

Based on the finding of the assessment of effects on land and soils arising from previous works and the proposed works still to be completed, as well as other developments in the area, the potential for cumulative effects associated with the quay wall development is considered to be negligible. No specific measures to mitigate against cumulative effects are considered necessary.

6.10 Conclusion

In conclusion, no significant effects on the land, soil and geology of development will occur during construction or operation of the proposed development due to correct procedures and outlined mitigations being implemented.

The assessment also confirms that there will be no significant cumulative effects on the land, soil and geology environment as a result of the development and other proposed projects.

6.11 References

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