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INTRODUCTION

Background

6.1 This chapter of the EIAR identifies, describes and assess the direct and indirect significant effects of the proposed renewable plant at the existing Medite MDF production facility site on land, soils and geology.

6.2 The proposed project is described in **Chapter 2: Project Description**. Chapter 2 includes details of the site and a detailed description of the proposed development.

6.3 This chapter of the EIAR provides a description of the existing land, soils and geological setting at the regional and local scale, an assessment of the potential significant effects of the proposed activities on the land, soils and geology at the site and surrounding area to the existing site. Mitigation measures, if required, are proposed.

6.4 Available information on the land, soils and geology of the Redmondstown, Clonmel area and its surrounds was collated and evaluated.

6.5 Unmitigated potential impacts on the land, soils and geology are considered for the initial assessment, before appropriate mitigation measures for the potential impacts identified are discussed, and then the identified potential impacts are reassessed assuming the identified mitigation measures are in place.

Existing Development and Site Location

6.6 The site is located at Redmondstown, Clonmel, Co. Tipperary, approximately 4 km east of the centre of Clonmel, refer to Figure 2-1. The existing development at the site is described in detail in **Chapters 1 and 2** of this EIAR.

6.7 The site is situated in what can be predominantly characterised as an agricultural area to the north and industrial area to the south, located approximately 4 km east of the centre of Clonmel town and approximately 0.9 km north of the N24. The application site boundary has an area of 29.7 ha. which is part of the overall Medite landholding of 68.3 ha.

6.8 The site is located north of the River Suir and is accessed via a local access road off the N24. The existing buildings in the Medite facility are situated approximately 50 m back from this local access road. The site is composed of the main production plant building and materials storage areas. All areas associated with the facility's operations are located on hardstanding.

6.9 Prior to construction of the Medite facility, the original land surface sloped from 45 mOD in the northwest of the site to 20 mOD in the southeast. During the construction in 1982 the topography of the site was regraded to form a level working area. This has resulted in the formation of steep embankments along the northwest boundary of the site.

6.10 There is an existing historic uncapped landfill facility located on the site which is no longer in use. The landfill covers an area of approximately 1 ha within the overall Medite landholding. The landfill area is located to the northwest of the existing plant at the site adjacent to the log storage area and is outside of the application site boundary.

6.11 The landfill is monitored and managed under the existing EPA industrial emissions licence (P0027-04) for the site. Further details of the landfill and monitoring are included in **Chapter 7** of this EIAR.

Proposed Development

6.12 The proposed development is described in Detail in **Chapter 2 (Project Description)**. The applicant is proposing the replacement of existing aging biomass boilers and, biomass thermal fluid heater serving both of Medite's two MDF production lines. The new renewable energy plants will have a rated thermal capacity of up to 60 MW and 30 MW for Line 1 and Line 2 production lines respectively, at the existing MDF manufacturing plant site.

6.13 The proposed development will be located within the confines of the existing Medite site and within three primary development areas as outlined in **Chapter 2** of this EIAR.

Scope of Work / EIA Scoping

6.14 The scope of this chapter includes:

- An assessment of the existing Land, Soil and Geology at and within c. 5 km of the site application area, as per the IGI Guidelines for EIAR set out below;
- An assessment of the potential impact of the proposed development on Land, Soil and Geology; and
- Where necessary, recommendation(s) of mitigation measures to reduce or eliminate any potential impact(s).

Consultations / Consultees

6.15 Consultations regarding the proposed development have been undertaken with statutory bodies as set out in **Chapter 1** of this EIAR. In relation to this chapter consultation specific consultation was undertaken with the Geological Survey of Ireland (GSI) and the Environmental protection Agency (EPA).

6.16 A number of queries were raised during the consultations in relation to the proposed development and the existing infrastructure at the site. The consultation responses are set out in **Chapter 1** of this EIAR and, where the responses relate specifically to Land, Soil and Geology, they have been addressed in this chapter.

6.17 A number of sources of information were consulted in the preparation of this EIAR section for Land, Soil and Geology. The sources of information consulted are outlined below in this EIAR.

Authors

6.18 This chapter of the EIAR was prepared by SLR. The project team consists of:

- Dominica Baird BSc, MSc, CGeol, EurGeol, MIAH (Hydrogeology); and
- Peter Glanville MSc, PhD. PGeo. EurGeol. (Hydrology).

6.19 Dominica Baird BSc (Earth Science), MSc (Hydrogeology), CGeol, EurGeol is Technical Director (Hydrogeology) and has over twenty years' experience in environmental consulting, specialising in hydrogeology and water. Dominica's areas of expertise cover hydrogeology, groundwater risk assessment and contaminated land with experience gained in London, Edinburgh and Dublin. Dominica has worked on various renewable projects, mainly wind farms, as well as cable routes in Ireland and Scotland as lead hydrogeologist and has undertaken field surveys including installation of groundwater monitoring wells, water supply surveys and peat surveys. Dominica has presented findings of hydrogeological assessments at oral hearings and prepared briefs of evidence in arbitration cases. Examples of major projects include EirGrid Laois-Kilkenny Reinforcement Scheme and East-West Interconnector.

6.20 Peter is a Technical and Project Director in the Water (Hydrology and Hydrogeology) team in SLR's Dublin office. He has over twenty years' experience in environmental consulting including hydrology, geomorphology and geology and is a Professional Geologist (PGeo. EurGeol.) with the Institute of Geologists of Ireland. Peter's specialist experience is in the field of water assessments, hydrological monitoring (hydrology and hydrogeology) and hydromorphology. He has overseen the design and practical implementation of a number of field scientific monitoring programmes, supported the management, analysis and interpretation of the scientific data collected, and written and reviewed the resultant EIAR Chapters, including Land, Soil and Geology and Water chapters, and he has also completed technical reports. Peter leads and manages a multi-disciplinary team and is very knowledgeable of health and safety considerations relevant to water related project. He has hands-on experience delivering hydrological and environmental management plans, baseline surface water and groundwater monitoring (including peat landslide hazard risk assessments), preparation of peat construction management plans, water feature survey reporting, fluvial geomorphology assessments and audits, hydromorphology assessments, Quaternary geomorphology and subsoil investigations, site specific flood risk assessments, discharge licencing and consents. Peter has worked on a wide range of projects in the minerals and mining, power, commercial and infrastructure sectors. He often leads as project manager on multi-disciplinary projects and also acts as project director for multi-disciplinary teams.

Limitations / Difficulties Encountered

6.21 The assessment of the land, soils and geological environment is based on published information, site visits undertaken by SLR in June and October 2020, and ground investigations undertaken at the site previously between 1995 and 2017 as part of previous studies at the site.

6.22 The assessment undertaken here should be viewed as a largely qualitative assessment of the land, soils and geology.

REGULATORY BACKGROUND

Planning Policy and Development Control

6.23 The following Planning Policy and Development Control relating to land, soils and geology at the site in this EIAR is set out in the:

- Tipperary County Development Plan (2022-2028): Land (Planning Policy 11-1 and 11-4), soils (Planning Policy 11-4), County Geological Sites and Geological Heritage (Planning Policy 11-12).

Guidelines

6.24 This land, soils and geology EIAR chapter has been prepared with regard to the following guidelines:

- Environmental Protection Agency *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports.* May 2022;
- European Commission, Environmental impact assessment of projects - Guidance on the preparation of the environmental impact assessment report (Directive 2011/92/EU as amended by 2014/52/EU), Publications Office, 2017;
- Institute of Geologists of Ireland (2013) Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements;

- National Roads Authority (2008) Environmental Impact Assessment of National Road Schemes - A Practical Guide;
- National Roads Authority (2008) Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes;
- National Roads Authority (2006) A Guide to Landscape Treatments for National Road Schemes in Ireland; and
- Transport Infrastructure Ireland (March, 2013). Specification for Road Works Series 600 – Earthworks.

RECEIVING ENVIRONMENT

Study Area

6.25 The site is located in the townland of Redmondstown, c. 4 km east of Clonmel town in County Tipperary. The site is accessed via a Local Road L2506 off the National Road N25.

6.26 For the purposes of this assessment, the study area comprises the application site the surrounding area up to 5 km reflect the sensitivity of the geology; this is in line with the Institute of Geologists of Ireland's (IGI) guidelines (2013).

6.27 The IGI guidelines state that the minimum distance of 2 km should be reviewed in the context of the geological environment as well as the scale of development and increased to reflect the sensitivity of the subsurface. The IGI guidelines also state that maps should be sourced to allow for the review of the geological and hydrogeological conditions that exist within a minimum of 2 km of the site boundary (from the outer limit of the planning and/or licence area) and presented at a scale of 1:25,000. The baseline maps produced in this EIAR are at a scale of 1:25,000 and include an area up to c. 3.5 km from the lands under the control of the applicant, although the actual study area extends up to 5 km as stated above.

Baseline Study Methodology

6.28 The baseline study undertaken for soils and geology, presented herein involves a review of published literature and information and the findings from a walkover survey/ inspection of the application site and the surrounding geological/ landscape/ environmental context.

6.29 This baseline study describes the receiving environment at and in the immediate vicinity of the site using the available baseline information gathered, specifically the:

- **Context** of the receiving environment - location/ magnitude/ spatial extent and trends of the environmental factors;
- **Character** of the receiving environment - distinguishing aspects of the environment being considered here;
- **Significance** of the receiving environment - the quality, value or designation is assigned to the existing environment; and
- **Sensitivity** of the receiving environment - how sensitive is the aspect of the environment to change.

6.30 The baseline study is a qualitative assessment of the available information based on professional experience and interpretation of the available data.

Sources of Information

6.31 The following sources of information were consulted in the preparation of the receiving environment baseline study for Soils and Geology:

- Groundwater monitoring borehole installed across the site between 1995 and 2017;
- Geological Survey of Ireland (*www.gsi.ie*);
- Teagasc soil and subsoil mapping for Irish Forestry Soils Project (*www.epa.ie*);
- Irish Soils Information System (*www.teagasc.ie/soils*);
- Irish Geological Heritage Programme (*www.gsi.ie*); and
- Tailte Éireann (*www.osi.ie*).

Land Baseline

6.32 Within the EIA EU Directive (2014/52/EU) Land is recognised as a 'natural resource' and the Directive also refers to the importance of the sustainable use of soil and the need to address the unsustainable increase in settlement areas over time ('land take'). Therefore, the issues of land as both a natural resource and land take must be considered in an assessment.

6.33 The introduction section to the EU Directive (2014/52/EU) notes that the:

'final document of the United Nations Conference on Sustainable Development held in Rio de Janeiro on 20-22 June 2012, which recognises the economic and social significance of good land management, including soil, and the need for urgent action to reverse land degradation. Public and private projects should therefore consider and limit their impact on land, particularly as regards land take, and on soil, including as regards organic matter, erosion, compaction and sealing; appropriate land use plans and policies at national, regional and local level are also relevant in this regard'.

6.34 Land can be considered to be a resource with a beneficial use to society, for example agricultural land-use, extractive industry land-use or urban residential land-use. Excess or unnecessary land take may therefore result in the loss or sterilisation of key land resources. This in turn has the potential to have adverse social and economic consequences for society.

Topography, Physical Features, and Land-use

6.35 The land in the area of the site slopes in a south-easterly direction towards the River Anner which is a tributary of the River Suir. The 1:50,000 scale Ordnance Survey of Ireland map (OSI) indicates that the site is located at elevation of 20 mOD to 35 mOD. Prior to construction of the Medite facility, the original land surface sloped from 45 mOD in the northwest of the site to 20 mOD in the southeast. During the construction in 1982 the topography of the site was regraded to form a level working area. This has resulted in the formation of steep embankments along the northwest boundary of the site.

6.36 The overall site, which has an area of c. 68.3 hectares, within which is located Medite's manufacturing plant. The landscape in the immediate vicinity of the site is also generally flat. The Comeragh Mountains are located c. 2 km south and the Slievenamon Mountain is located c. 5 km north-east.

6.37 The Ordnance Survey Ireland (OSI) x, y coordinates for the site are 624181, 624033 (close to the site entrance of the local road).

6.38 Land-use surrounding the site to the west and north is agricultural with dispersed residential. To the east of the site is the Anner River which flows in a southerly direction, it flows into the Suir River c. 900 m south of the site. Beyond the Anner River to the east of the site is agricultural land with dispersed residential land. To the south of the site is Martins Tiles & Bathrooms and Bulmers Limited.

Site History

6.39 The facility which manufactures medium-density fibreboard was established in 1982. The facility was developed on a green field site previously used for agricultural purposes.

6.40 GeoHive is an initiative by Ordnance Survey Ireland to provide easy access to publicly available spatial data. GeoHive has several historical maps and aerial photographs of the site which are available:

- Aerial 2005-2012,
- Aerial 2005,
- Aerial 2000,
- Aerial 1995,
- Historic Map 25 inch 1888-1913,
- Historic Map 6 inch 1837-1842.

6.41 The GeoHive Historic Map 25 inch 1888-1913 shows a green field site, as does the 1928-1942 map. The 1995 map shows the facility comprising two large main buildings along with additional smaller structures, car park and storage areas. The 2000 aerial photo shows an additional structure near western boundary of site. In 2005, an additional structure near eastern & southern boundary of site, and an extension is noted to the structure directly south of eastern main factory building. The 2012 aerial photograph shows no visible change.

Soils Baseline

6.42 Soil is defined as the top layer of the earth's crust and is formed by mineral particles, organic matter, water, air and living organisms. Soil is an extremely complex, variable and living medium and its characteristics are a function of parent subsoil or bedrock materials, climate, relief and the actions of living organisms over time.

6.43 Soil formation is an extremely slow process and can take thousands of years to evolve; soil can be considered essentially as a non-renewable resource.

6.44 As the interface between the earth, the air and the water, soil performs many vital functions; it supports food and other biomass production (forestry, biofuels etc.) by providing anchorage for vegetation and storing water and nutrients long enough for plants to absorb them. Soil also stores, filters and transforms other substances, including carbon and nitrogen, and has a role supporting habitats serving as a platform for human activity.

National Soils

6.45 EPA data and Geological Survey Ireland (GSI) online mapping publish soil maps from Teagasc. The regional soils map is shown on Figure 6-1.

6.46 The majority of the soils at the site is the soil group Acid Brown Earths, Brown Podzolics (AminDW), and is described as deep well drained and mainly acidic. A small area of the soils at the site is the soil group Surface water Gleys, Groundwater Gleys (AminPD), and is described as mineral poorly drained and mainly acidic.

6.47 The soils at the site are shown on the Teagasc mapping as being classified as 'made ground' which comprise reworked and regraded soils and subsoils, with a concrete cover to facilitate the current land use at the site.

6.48 To the east of the site is a c. 200 m wide strip of alluvium soils along the floodplain of the River Anner.

6.49 Further details on soils in the area are provided by the Irish Soils Information System project, which was undertaken for EPA in association with Teagasc and Cranfield University. The Irish Soils

Information System soils mapping indicates that the soil association at the site and in the immediate vicinity is Clonroche Association (1100a), which is described as fine loamy drift with siliceous stones.

Subsoils Baseline

Regional Subsoils

6.50 The Subsoils (Quaternary Deposits) were deposited during the last 2 million years and comprise the unconsolidated materials overlying bedrock. The two predominant types of Quaternary subsoils in Ireland are glacial till deposited at the base of ice sheets, and sand and gravel deposits associated with the melting of the ice sheets and are generally termed 'glaciofluvial outwash sands and gravels'. Other extensive Quaternary subsoils in Ireland include peat, river alluvium and coastal process deposits. Most Quaternary subsoils in Ireland were deposited after the maximum of the last glaciation, the Midlandian, which occurred approximately 17,000 years ago.

6.51 EPA data and GSI online mapping show Quaternary subsoils. Natural subsoils at the site and in the immediate vicinity consist of till derived from Namurian sandstones and shales, see Figure 6-2. The subsoil permeability is classified as being o moderate permeability.

6.52 The subsoils at the site are shown to consist of Made Ground, which is expected to comprise reworked and regraded soils and subsoils, with a concrete cover.

Bedrock Geology Baseline

Regional Setting

6.53 The GSI Bedrock Geology (100k) shows that the majority of the proposed site is underlain by the Waulsortian Limestone Formation from the Dinantian Series. The formation is typified by dominantly pale grey, massive unbedded / crudely bedded limestone, see Figure 6-3.

6.54 A small area to the north of the application area is underlain by the Silverspring Formation. The formation is typified by pale bedded cherts and dark biomicrite limestones. The formation is less than 10 m in thickness towards Clonmel (Keeley, 1983).

6.55 Both of these formations formed during the Dinantian Epoch of the Carboniferous Period.

6.56 Although the bedrock underlying the site is not mapped as WAdo (Waulsortian dolomititised), site specific drilling records indicate the site is underlain by dolomitised limestones, see **Table 6-1** below (AGW1, AGW2, AGW3, AGW7, AGW8, AGW9, AGW10). Dolomitisation has the effect of increasing the porosity and thus permeability of limestone. The variable depth to bedrock recorded is indicative of a mature karst bedrock landscape. This bedrock contains original cavities filled with calcareous cement.

Karst Features

6.57 Dinantian Series Limestones are well known to host karstic landforms and subterranean features.

6.58 The GSI karst landform map shows there are no known mapped karst features at the site or its surrounds.

6.59 The closest GIS mapped karst feature is c. 4.6 km to the west, where a borehole intercepts the Glenpatrick spring water source in the Burgagery-Lands West townland.

Structure

6.60 Available information form the GSI indicates that the limestone bedrock is characterised by zones of intense fracture cleavage, typically the upper 2-3 m is loose and weathered. The dip of the bedding in the bedrock is in a southward direction.

6.61 The closest regional fault is mapped c. 1.35 km east of the site. The regional faults trend predominantly in north-south and east-west directions. In a regional geological context, the site is mapped within a heavily faulted east-west aligned structure, namely the Carrick-On-Suir Syncline.

Site Investigation Ground Conditions

6.62 Site-specific information on ground conditions is available from the drilling of groundwater monitoring boreholes, which were drilled between 1995 to 2017. A summary of the borehole logs is presented in **Table 6-1**. Borehole logs can be seen in **Chapter 7**, borehole locations can be seen in **Figure 7-1** in **Chapter 7 Water**. Borehole AG7 is located to the north of the Development Area 2 and boreholes AGW9 and AGW10 are located to the south of Development area 2.

6.63 Site-specific information on subsoils is available from drilling of the eight groundwater monitoring boreholes. Subsoils encountered comprised mainly sandy/gravelly CLAY. In AGW4 in the north-eastern area of the site the subsoils comprised 10 m of SAND/GRAVEL over bedrock. In AGW1, immediately east of the landfill, a thick band of SAND/GRAVEL was encountered from 18-24 m. Small pockets of gravel such as this are common along the Anner River (GES Report 98/29/01).

6.64 The depth to bedrock across the site ranges from 2.7 m to 27 m bgl with an average of 9.0 m bgl.

6.65 Fill/concrete/made ground is only encountered in boreholes AGW7, AGW8, AGW9, and AGW10. The thickness ranges from 0.35 m to 1.0 m with an average of 0.6 m.

6.66 Subsoils encountered comprised mainly sandy/gravelly clay. Several bands of sand and gravel were also encountered which is common along the Anner River (GES Report 98/29/01).

6.67 In addition, subsoil information was available from a geotechnical investigation undertaken in 1981 to assess ground conditions for the plant foundations. The site investigation comprised 21 No. boreholes to depths ranging from 2.0-6.0 m bgl. The original report with logs dating from 1981 were not available for review as part of this EIAR but the findings are summarised in the IE Consulting Annual Groundwater Monitoring Reports for the site and reference GES Report No. 98/29/01 as the source. The but the subsoils encountered during the 1981 investigation were summarised as comprising mainly gravelly CLAY or SILT/CLAY overlying 2-3 m of dense, fine to medium grained GRAVEL transitioning into weathered bedrock (GES Report 98/29/01).

Table 6-1
Summary of ground conditions from borehole logs

	AGW1	AGW2	AGW3	AGW4	AGW5	AGW6	AGW7	AGW8	AGW9	AGW10
Year of Installation	1997	1997	1995	1995	1995	1995	2016	2016	2017	2017
Borehole Coordinates	E223939 N124326	E223951 N124298	E223766 N124442	E224160 N124298	E224317 N124040	E224301 N123887	E623963 N624045	E624038 N624103	E623952 N623938	E623912 N623932
Drilled well depth (m)	37	25	34	18	16.5	20	15.4	15.7	17	17
Depth to bedrock (m)	27	4	4	10	12	18	3.5	2.7	5	3
Drilling log summary	0-6 m: CLAY and STONES 6-18m: Brown, silty CLAY 18-24 m: Brown, silty SAND and GRAVEL 24-27 m: Red, hard, consolidated CLAY 27-30 m: Weathered DOLOMITE and CLAY 30-33 m: Weathered DOLOMITE	0-2 m: CLAY and STONES 4-14 m: Pale coloured, hard DOLOMITE 16-25 m: Red coloured weathered DOLOMITE and silty veins.	0-4 m: Gravelly CLAY 4-34 m: LIMESTONE with DOLOMITE bands	0-6 m: Loose very clayey/silty, fine SAND 8-10 m: GRAVEL 10-18 m: LIMESTONE	0-12 m: Loose, very sandy CLAY, with silty fine SAND 12-16.5 m: LIMESTONE	0-16 m: Stiff, orange, sandy/gravelly CLAY 18-20 m: LIMESTONE	0-0.1 m: Fill 0.1-0.35 m: MADE GROUND 0.35-0.6 m: Grey brown firm CLAY 0.6-1.5 m: Orange brown sandy CLAY 1.5 -3.5 m: Light brown SAND with fine gravel 3.5-15.4 m: Varying weathered / competent DOLOMITE	0-0.1 m: Fill 0.1-0.35 m: MADE GROUND 0.35-0.6 m: Sandy gravelly CLAY 0.6-2.7 m: Gravelly SAND 2.7 -7.0 m: LIMESTONE 7.0 – 8.7 m: DOLOMITE 8.7 – 15.7 m: LIMESTONE	0-0.2 m: Concrete 0.2-1.0 m: FILL 1.0-4.2 m: Sandy GRAVEL 4.2-5.0 m: Gravelly SAND 5.0 -6.0 m: Weathered DOLOMITE 6.0-10.0 m: Competent DOLOMITE 10.0-10.5 m: Highly Fractured DOLOMITE 10.5-17.0 m:	0-0.15 m: Concrete 0.15-0.50 m: FILL 0.5-2.0 m: Gravelly SAND 2.0-3.0 m: Gravelly CLAY 3.0 -3.3 m: Weathered DOLOMITE 3.3-17.0 m: Competent DOLOMITE. Some fracturing 8.5-8.7 and 9.0-10.0.

	AGW1	AGW2	AGW3	AGW4	AGW5	AGW6	AGW7	AGW8	AGW9	AGW10
	33-37 m: Pale grey DOLOMITE								Competent DOLOMITE	

Geological Heritage Baseline

6.68 An audit of County Geological Sites in County Tipperary was completed in 2019 by the GSI Irish Geological Heritage (IGH) Programme.

6.69 The GSI geological heritage map shows there are no geological heritage sites at the site or its surrounds. The closest geological heritage site, Marlfield (IGH16), is located c. 7 km south-west of the site.

6.70 The site at Marlfield falls under the Hydrogeology Theme (Theme no. IGH16) and includes a holy well site and downstream lake. The site is located on the western side of Clonmel Town and is upgradient from the Medite site.

Sensitive Receptors

6.71 Based on the above baseline description of the receiving environment in terms of land, soils and geology, the following receptors have been identified:

- Soils and subsoils consisting of tills derived from sandstone and shale; and
- Waulsortian Limestone bedrock.

6.72 The Geological Heritage Site at Marlfield is not considered a sensitive receptor due to the distance to this site. The proposed development will not interact with the designated heritage site as it is up catchment and upgradient of the Medite site.

IMPACT ASSESSMENT

Evaluation Methodology

6.73 The evaluation of impacts of the proposed development is based on a methodology similar to that outlined in the '*Guidelines for the Assessment of Geology, Hydrology and Hydrogeology for National Road Schemes' published by the National Roads Authority (2009)* and the *Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements published by the IGI (2013).*

6.74 The potential Significant Effects at the Construction, Operational and Decommissioning stages are set out here including the identification of direct and indirect effects on Land, Soil and Geology.

6.75 The description of effects are set out in terms of duration, frequency, extent and probability, see **Appendix 6-B**, and the classification of significance of effects, see **Appendix 6-C**.

Evaluation of Impacts

6.76 This assessment will focus on the potential impact of the proposed activities on soils and geology at the application site and surrounding local area. Details of the proposed development are provided in **Chapter 2** of this EIAR.

6.77 The status and importance of existing land, soil and geology attributes identified at the application site is assessed in **Table 6-2** below.

6.78 The importance of the attributes are based on the NRA and IGI guidance, see **Appendix 6-A**.

Table 6-2
Status and Importance Land, Soil and Geology Attributes

Attribute	Status/Occurrence	Importance
Land	The land at the site currently comprises industrial landuse.	The land at the site is already used for industrial purposes and is important on a local, regional and national level due to the nature of the manufacturing activities at the site. The existing industrial land at the site is considered to be of **Medium** importance as the land attribute has a medium quality, significance or value on a local Scale only as the industrial land use area is considered to be small in scale only.
Soils	The majority of soils at the site have been removed in the past to facilitate the existing development. The soils at the site are classified as comprising 'Made Ground'	The soils at the application area have been largely removed in the past for the construction of the existing development at the site. A number of areas at the site have been sealed at the surface with hard stand areas or by building roofs. There are limited productive or useable soils remaining at the site, hence soils are considered to be of **Low** importance as the attribute is considered to have a low quality, significance or value on a local scale only.

Attribute	Status/Occurrence	Importance
Subsoils	The subsoils at the site comprise sandy/gravelly clay and sands & gravels.	The subsoils at the site cannot be developed as a resource at this location and therefore have no economic value. The subsoils are considered to be of **Low** importance as the attribute is considered to have a low quality, significance or value on a local scale only.
Geology	The geology beneath the site is Waulsortian Dinantian series Limestone.	The bedrock geology cannot be developed as a resource at this location and therefore has no economic value. Hence, the bedrock geology is considered to be of **Low** importance as the attribute is considered to have a low quality, significance or value on a local scale only.

Construction Stage

6.80 In the context of the proposed development at Redmondstown, the construction stage consists of site preparation works and construction activities within the development areas at the site, see **Chapter 2 Project Description**. The potential effects, without mitigation are set out in Table 6-3 below.

Direct Effects

6.81 During the construction stage, the moving/disturbance of made ground, soils and subsoils has the potential to mobilise fines and suspended solids in any storm water runoff; this is a potential direct effect on soils and subsoils.

6.82 During the construction stage, the moving/disturbance of potentially contaminated made ground, soils and subsoils has the potential to impact on receptors; this is a potential direct effect on soils and subsoils receptors.

6.83 The accidental leakage/spillage of fuel and/or other petroleum-based products from plant and machinery undertaking construction work has potential to impact on the soils and subsoils; this is a potential direct effect.

Indirect Effects

6.84 Indirect effects identified associated with the construction stage include suspended solids in runoff from stockpiled excavated materials and the contaminated excavated soils and subsoils.

Table 6-3
Description of Potential Significant Effect of Construction Stage on Land, Soils and Geology (without mitigation)

Attribute	Potential Impact at Construction Stage	Description of Effects (Without Mitigation)	Potential Effects
Land	Loss of land.	• Duration and frequency:	Direct and Not Significant as

Attribute	Potential Impact at Construction Stage	Description of Effects (Without Mitigation)	Potential Effects
		Short term during each construction phase and a once off event. • Extent: Construction covers only a small area within the existing site. • Probability: Unlikely as existing site.	development located within existing industrial site.
Soils	Loss of Soils. Soils have already been removed at the site, the ground sealed over, and the development is located within an existing industrial site.	• Duration and frequency: Short term during each construction phase and a once off event. • Extent: Construction covers only a small area within the existing site. • Probability: Unlikely as existing site.	Direct and Not Significant as development located within existing industrial site.
	Contamination of Soils. Accidental leakage/spillage of fuel and/or other petroleum-based products	• Duration and frequency: Short term during each construction phase and a once off event. • Extent: Construction covers only a small area within the existing site. • Probability: Likely as construction machinery present on site.	Direct and Not Significant as volumes will be small.
Subsoils	Loss of Subsoils. Subsoils have already been removed at the site, the ground sealed over, and the development is located within an existing industrial site.	• Duration and frequency: Short term during each construction phase and a once off event. • Extent: Construction covers only a small area within the existing site. • Probability: Unlikely as existing site.	Direct and Not Significant as development located within existing industrial site.
	Contamination of Subsoils. Accidental leakage/spillage of fuel and/or other petroleum-based products	• Duration and frequency: Short term during each construction phase and a once off event. • Extent: Construction covers only a small area within the existing site. • Probability:	Direct and Not Significant as volumes will be small

Attribute	Potential Impact at Construction Stage	Description of Effects (Without Mitigation)	Potential Effects
		Likely as construction machinery present on site.	
Excavated Soils and Subsoils	Potential for suspended solids in runoff from the construction area and from stockpiled soils and subsoils material to contaminate receptors.	• Duration and frequency: Short term during each construction phase and a once off event. • Extent: Limited to a small area where stockpiled material occurs and immediate surrounding area. • Probability: Likely (without mitigation) as material will be excavated.	Indirect and Not Significant as volumes of material will be small.
Excavated Soils and Subsoils	Potential for contaminated soils and subsoils in runoff from the construction area and from stockpiled material to effect receptors.	• Duration and frequency: Short term during each construction phase and a once off event. • Extent: Limited to a small area where stockpiled material occurs and immediate surrounding area. • Probability: Unlikely as outside of identified landfill within Medite landholding area.	Indirect and Not Significant as volumes of material will be small.
Geology	Loss of bedrock or Geological Heritage. No bedrock will be excavated as part of proposed development and the Medite site is not designated as a Geological Heritage site.	• Duration and frequency: None. • Extent: None. • Probability: None.	Direct and Not Significant as no excavation of bedrock at the site. Indirect and Not Significant for geological heritage.

6.85 In the basis of the findings set out in Table 6-3 the identified potential effects identified at the construction stage on Land and Geology are considered to be direct and not significant effects based on the importance of the attribute and the duration, frequency, extent and probability as set out in Table 6-3 above.

6.86 The potential effects on the soils and subsoils at the Medite site are considered to be direct and not significant effects based on the importance of the attribute and the duration, frequency, extent and probability as set out in Table 6-3 above.

6.87 Indirect significant effects are identified in terms of suspended solids and / or contaminated soils and subsoils which have been excavated at the site during construction and may be stored in stockpiles at the site during construction. This is based on the importance of the attribute and the duration, frequency, extent and probability as set out in Table 6-3 above.

Operational Stage

6.88 In the context of the proposed development at the site the operational stage is taken to be the ongoing continued operation of the site. This operation stage is scheduled to be for the lifetime of the development.

6.89

6.90 The rating of potential unmitigated impacts, i.e. without mitigation measures in place, on each of the potential receptors/attributes identified above is presented in Table 6-4 below.

Direct Effects

6.91 During the operational stage, the accidental leakage/spillage of fuel and/or other petroleum-based products (lubricating oils, greases etc.) from plant and machinery has potential to contaminate soils and the geology.

Indirect Effects

6.92 There is a potential indirect impact on land and soils in areas of forestry which supply the site with the raw product. The specific source of the product is not known as it can be sourced from Coillte and private forestry plantations across Ireland and no forests are felled solely to provide biomass for Medite's heat production. The felling of trees is therefore not an indirect effect of The Proposed Development.

6.93 Forestry is also regulated separately under other separate enactments and all biomass used for feedstock and the increased fuelstock will be felled under and in accordance with licences designed to minimise significant effects on the environment issued by the Department of Agriculture, Food and the Marine (DAFM)

Table 6-4
Descriptions of Potential Impacts of Operational Stage on Soils and Geology (without mitigation)

Attribute	Potential Impact at Operational Stage	Description of Effects (Without Mitigation)	Potential Effects
Land	Loss of land. Development located within industrial site.	• Duration and frequency: none. • Extent: none. • Probability: none.	Direct and Not Significant as no loss of land and development located within industrial site.
Soils	Loss of Soils. Soils have already been removed at the site.	• Duration and frequency: none. • Extent: none. • Probability: Unlikely as existing site.	Direct and Not Significant as no loss of soils and development located within

Attribute	Potential Impact at Operational Stage	Description of Effects (Without Mitigation)	Potential Effects
			existing industrial site.
	Contamination of Soils. Accidental leakage/spillage of fuel and/or other petroleum-based products	• Duration and frequency: Short term if accidental spillage occurs. • Extent: Likely to be localised within the existing site. • Probability: • Likely as vehicles / machinery present on site.	Direct and Not Significant as volumes will be small.
Subsoils	Loss of Subsoils. Subsoils have already been removed at the site.	• Duration and frequency: none. • Extent: none. • Probability: Unlikely as existing site.	Direct and Not Significant as no loss of subsoils and development located within existing industrial site.
	Contamination of Subsoils. Accidental leakage/spillage of fuel and/or other petroleum-based products	• Duration and frequency: Short term if accidental spillage occurs. • Extent: Likely to be localised within the existing site. • Probability: Likely as vehicles / machinery present on site.	Direct and Not Significant as volumes will be small.
Geology	Loss of bedrock or Geological Heritage. No bedrock will be excavated as part of proposed development and the Medite site is not designated as a Geological Heritage site.	• Duration and frequency: none. • Extent: none. • Probability: none	Direct and Not Significant as no excavation of bedrock at the site. Indirect and Not Significant for geological heritage.

Decommissioning Stage

6.94 In the context of the decommissioning stage the works will be similar to those of the Construction Stage with construction activities on site. Details of the site decommissioning are outlined in **Chapter 2 Project Description**.

6.95 The potential effects, without mitigation are set out in Table 6-3 below.

Direct Effects

6.96 During the decommissioning stage, the moving/disturbance of made ground, soils and subsoils has the potential to mobilise fines and suspended solids in any storm water runoff; this is a potential direct effect on soils and subsoils.

6.97 During the decommissioning stage, the moving/disturbance of potentially contaminated made ground, soils and subsoils has the potential to impact on receptors; this is a potential direct effect on soils and subsoils receptors.

6.98 The accidental leakage/spillage of fuel and/or other petroleum-based products from plant and machinery undertaking decommissioning work has potential to impact on the soils, subsoils and bedrock, this is a potential direct effect.

Indirect Effects

6.99 There are no indirect effects identified or associated with the decommissioning stage.

Table 5
Description of Potential Significant Effect of Decommissioning Stage on Land, Soils and Geology (without mitigation)

Attribute	Potential Impact at Decommissioning Stage	Description of Effects (Without Mitigation)	Potential Effects
Land	Loss of land.	• Duration and frequency: No loss of land. • Extent: Decommissioning covers only the existing site. • Probability: Unlikely - No loss of land.	Direct and Not Significant as no loss of land with decommissioning stage.
Soils	Loss of Soils. Soils have already been removed at the site.	• Duration and frequency: No loss of soils. • Extent: Decommissioning covers only the existing site. • Probability: Unlikely - No loss of soils	Direct and Not Significant as no loss of soils with decommissioning stage.
	Contamination of Soils. Accidental leakage/spillage of fuel and/or other petroleum-based products	• Duration and frequency: Short term during decommissioning and a once off event. • Extent: Limited to small area within existing site. • Probability: Likely as construction machinery present on site.	Direct and Not Significant as volumes will be small.

Attribute	Potential Impact at Decommissioning Stage	Description of Effects (Without Mitigation)	Potential Effects
Subsoils	Loss of Subsoils. Subsoils have already been removed at the site.	• Duration and frequency: No loss of subsoils. • Extent: Decommissioning covers only the existing site. • Probability: Unlikely - No loss of subsoils	Direct and Not Significant as no loss of subsoils with decommissioning stage.
	Contamination of Subsoils. Accidental leakage/spillage of fuel and/or other petroleum-based products	• Duration and frequency: Short term during decommissioning and a once off event. • Extent: Limited to small area within existing site. • Probability: Likely as construction machinery present on site.	Direct and Not Significant as volumes will be small
Excavated Soils and Subsoils	Potential for suspended solids in runoff from the decommissioning area and from stockpiled soils and subsoils material to contaminate receptors.	• Duration and frequency: Short term during decommissioning and a once off event. • Extent: Limited to a small area where stockpiled material occurs and immediate surrounding area. • Probability: Likely (without mitigation) as material will be excavated.	Indirect and Not Significant as volumes of material will be small.
Excavated Soils and Subsoils	Potential for contaminated soils and subsoils in runoff during decommissioning and from stockpiled material to effect receptors.	• Duration and frequency: Short term during decommissioning and a once off event. • Extent: Limited to a small area where stockpiled material occurs and immediate surrounding area. • Probability: Unlikely as outside of identified landfill within Medite landholding area.	Indirect and Not Significant as volumes of material will be small.
Geology	Loss of bedrock or Geological Heritage.	• Duration and frequency: None. • Extent:	Direct and Not Significant as no

Attribute	Potential Impact at Decommissioning Stage	Description of Effects (Without Mitigation)	Potential Effects
	No bedrock will be excavated as part of proposed development and the Medite site is not designated as a Geological Heritage site.	None. • Probability: None.	excavation of bedrock at the site. Indirect and Not Significant for geological heritage.

Unplanned Events

6.100 It is considered highly unlikely that any unplanned events within the application site would have a noticeable impact on Land, Soils and Geology.

Cumulative Impacts

6.101 The existing operations at the Medite site and both consented and planned projects within 10 km of the site are listed in Appendix 1.5. Taken together, these existing and planned projects have the potential to result in cumulative effects in terms of Land, Soil and Geology.

6.102 All elements of the proposed project have been cumulatively assessed together, and in combination, for their overall impact, including on Land, Soil and Geology.

6.103 Based on the impact assessment undertaken for the construction stage, operational stage and decommissioning stage of the proposed project, no significant effects on the land, Soil and Geology have been identified. As the proposed site is located within the existing Medite permitted site and land holding it is not considered that the development will have a cumulative impact on the Land, Soils and Geology with the existing Medite operations.

6.104 Based on a review of the identified consented projects and proposed developments within 10 km of the site, and the fact that no Significant Effects have been identified in terms of Land, Soil and Geology, then it is considered that there will be no cumulative effects associated with the proposed development.

Interaction with Other Impacts

6.105 The risks associated with a potential fuel spill and mobilisation of contaminants due to the movement of material could, with no mitigation measures in place, have implications for surface water and groundwater quality.

6.106 These potential interactions with water related impacts are addressed in **Chapter 7** of this EIAR (Water).

'Do-nothing Scenario'

6.107 Under a 'do-nothing scenario', the existing site would continue to operate as normal under the current conditions until the full site decommissioning stage takes place. The effect on Land, Soil and Geology from this scenario is considered to be neutral as the site will continue operating as it does at present.

MITIGATION MEASURES

6.108 Strategies for mitigation of identified effects, which are commonly referred to as 'Mitigation Measures', are prioritised in terms of:

- Avoidance;
- Prevention; and
- Reduction.

6.109 Mitigation by 'Avoidance' is usually undertaken at the project design stage and refers to strategic issues in relation to the proposed project such as site selection, site configuration or the selection of process technologies. This method of mitigation is generally the most effective form of mitigation by avoidance.

6.110 Mitigation by 'Prevention' generally refers to technical measures associated with the proposed project, where measures are put in place to limit the source of effects to a permissible and acceptable level. These measures are normally focused on emissions form the proposed development, for example emissions to land, soils, surface water or groundwater, where there is a potential for identified significant effects to occur.

6.111 Mitigation by 'Reduction' is a strategy to deal with effects which cannot be avoided or prevented. Reduction measures concentrate on the emissions and effects and seek to limit the exposure of the receptor. There are to basic approaches to mitigation by reduction, to either:

- Reduce the effect; or
- Reduce exposure to the effect.

6.112 Mitigation by reduction can be referred to 'end of pipe' approach, and such measures can include the prevention of erosion of stored soils, the treatment of discharge waters to remove suspended solids, or the attenuation of site runoff.

6.113 Although the identified effects on the land, soil and geology at the site is considered to be Not Significant, without any mitigation measures in place at the site, it is considered that best practice mitigation measures will be implemented during the construction, operational and decommissioning stages to ensure that there are no adverse negative impacts on Land, Soil and Geology attributes. These mitigation existing measures are outlined below.

Construction Stage

6.114 The following prevention mitigation measures will be implemented at the site to minimise any potential adverse impacts:

- If any contaminated soils / material is identified during construction stage excavations then the material will be seta side, tested and characterised and will be dealt with according the results of the characterisation;
- Stockpiled soils and/or subsoils during the construction stage will be managed to ensure that no suspended solids runoff and go into the site water management system;
- no refuelling or plant/machinery maintenance/repairs will take place in the proposed development areas to prevent accidental leakage/spillages reaching the land, soil and geology or being washed off by surface water run-off;
- any extensive / non-routine maintenance of plant and machinery will take place on a hard stand area within the overall land holding;

- all plant will be regularly maintained and inspected daily for leaks of fuels, lubricating oil or other contaminating liquids;
- a spill kit and drip trays will be kept on site and will be deployed if there is an accidental leak from any plant/machinery;
- no petroleum-based products (lubricating oils, waste oils, greases etc.) will be stored within the construction area at the site thereby eliminating any associated pollution risk arising from accidental leakages/spillages;
- plant operators will be briefed during 'toolbox' talks and site induction on where the spill kit is kept and how and when it should be deployed;
- a site construction traffic management system will be put in place to reduce the potential accidents between vehicles and the potential for fuel leaks/spills; and
- A closure plan will be developed for the site which outlines how the site will be decommissioned in accordance with best practice and the best available techniques, at that time.

Operational Stage

6.115 During the operation of the site the existing mitigation measures which form part of the development and are included under IE Licence P0027-04 will continue to be implemented at the site.

6.116 In particular, Condition 6 (Control and Monitoring) includes soil monitoring as set out in Schedule C.6.5 of the licence and is discussed below under Monitoring).

RESIDUAL IMPACT ASSESSMENT

6.117 The potential effects of the proposed development upon land, soil and geology have been identified and assessed as being not significant. Notwithstanding these findings mitigation measures to prevent and reduce any identified potential adverse environmental impacts which may arise have been proposed on the Land, Soil and Geology attributes.

6.118 With the implementation of the proposed mitigation measures at the site, it is considered that there will be no residual adverse impacts on Land, Soil or Geology attributes during the construction stage, operational stage or decommissioning stage at the site.

MONITORING

6.119 In accordance with the IE Licence P0027-04 (Schedule C.6.5) soil monitoring shall be carried out at least once every ten years. The Licence states:

- 'The licensee shall carry out monitoring for relevant hazardous substances in soil at the site of the installation. The substances shall be identified by the licensee by undertaking a risk-based assessment. Soil monitoring shall be carried out at the site of the installation at least once every ten years.'

6.120 If permission is granted for the proposed development the requirements of the current soil monitoring under the licence will continue.

REFERENCES

Creamer, R. & O'Sullivan, L., (2018) The Soils of Ireland

EPA Report No. 130 (2014), Irish Soil Information System Synthesis Report.

EPA (2008), Irish Soil Information System Final Technical Report 10.

Geological Survey of Ireland (2007), 1:100,000 Bedrock Geology of Ireland (Digital-Map).

Institute of Geologists of Ireland (2013) 'Guidelines for the preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements'.

National Roads Authority (2006) A Guide to Landscape Treatments for National Road Schemes in Ireland

Teagasc, 2004, Ireland Subsoil Parent Materials Map (digital version).

Teagasc, 2007, Ireland Soils Map (digital version).

FIGURES

NOTES

Extract from Ordnance Survey Discovery Map Series Sheets no. 66, 67, 74 & 75

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LEGEND

- MEDITE LANDOWNERSHIP BOUNDARY
- PLANNING APPLICATION AREA (C. 29.7 HA)
- MADE
- AminDW-ACID BROWN EARTH / BROWN PODZOLICS
- AminPD - SURFACE WATER GLEYS / GROUND WATER GLEYS ACIDIC
- AlluvMIN - MINERAL ALLUVIUM

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0 800m 2000

Metres 1:25,000

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ENVIRONMENTAL IMPACT ASSESSMENT REPORT

PROPOSED ENERGY PROJECT
AT THE MEDITE FACILITY,
REDMONDSTOWN, CLONMEL, CO. TIPPERARY

REGIONAL SOILS MAP

FIGURE 6-1

Scale: 1:25,000 @ A3

Date: DECEMBER 2023

ABP-311991-21.EIAR Fig6-1.0.Regional Soils Map.dwg

NOTES

Extract from Ordnance Survey Discovery Map Series Sheets no. 66, 67, 74 & 75

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LEGEND

- MEDITE LANDOWNERSHIP BOUNDARY
- PLANNING APPLICATION AREA (C. 29.7 HA)
- MADE GROUND
- TNSSs
- A - ALLUVIUM UNDIFFERENTIATED GRAVELLY
- TDSs - SANDSTONE TILL DEVONIAN

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0 800m 2000

Metres 1:25,000

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ENVIRONMENTAL IMPACT ASSESSMENT REPORT

PROPOSED ENERGY PROJECT
AT THE MEDITE FACILITY,
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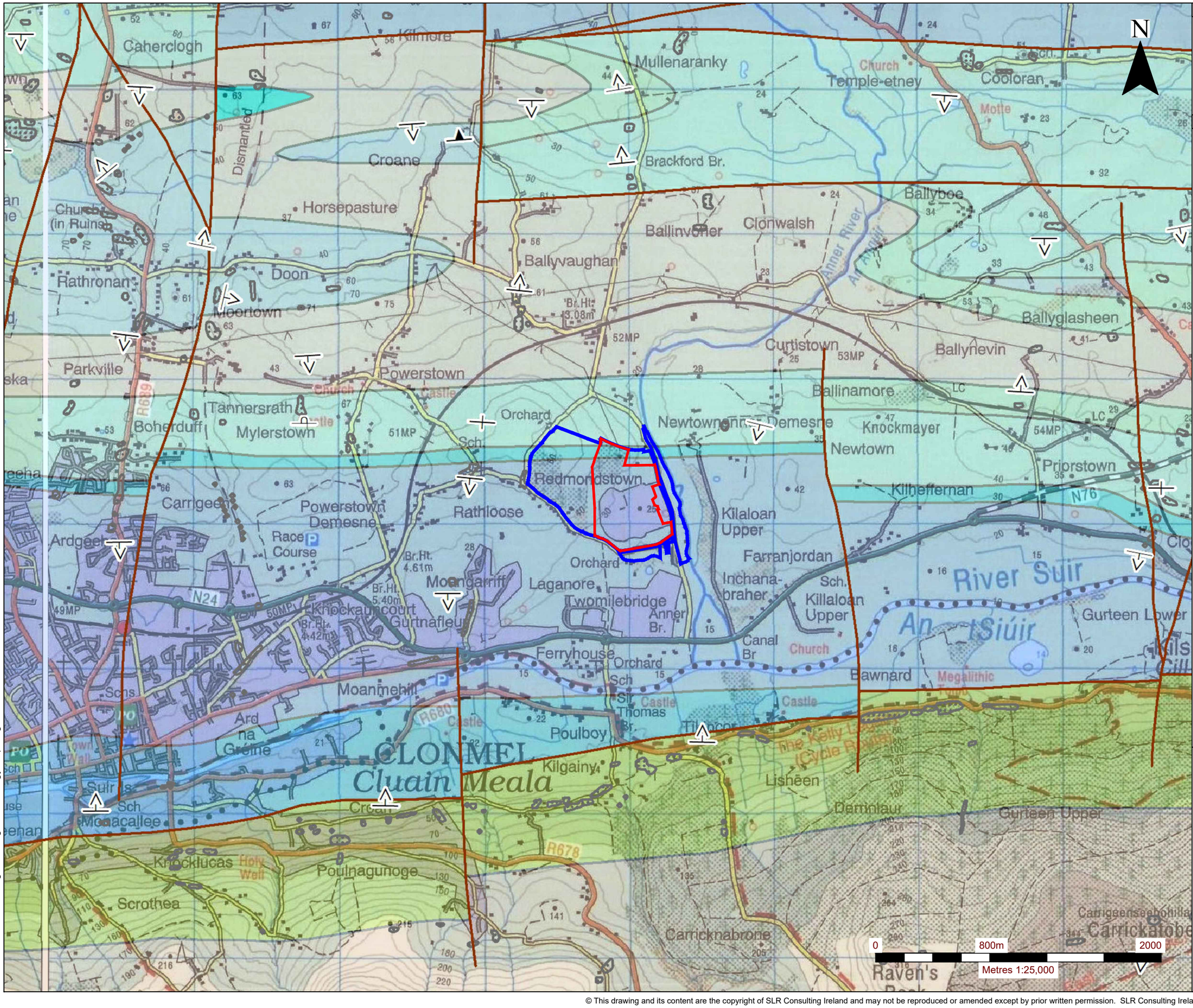
REGIONAL SUBSOILS MAP

FIGURE 6-2

Scale: 1:25,000 @ A3

Date: DECEMBER 2023

ABP-311991-21.EIAR Fig6-2.0.Regional Subsoils Map.dwg



NOTES

Extract from Ordnance Survey Discovery Map Series Sheets no. 66, 67, 74 & 75

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LEGEND

- MEDITE LANDOWNERSHIP BOUNDARY
- PLANNING APPLICATION AREA (C. 29.7 HA)
- WAULSORTIAN LIMESTOE
- SILVERSPRING FORMATION
- KILSHEELAN FORMATION
- BALLYSTEEN FORMATION

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REGIONAL GEOLOGY MAP

FIGURE 6-3

Scale	Date
1:25,000 @ A3	DECEMBER 2023

ABP-311991-21.E\AR Fig6-3.0.Regional Geology Map.dwg

APPENDICES

Appendix 6-A Criteria for Rating Site Importance of Geological Features

Appendix 6-B Criteria for Rating Site Importance of Geological Features

Appendix 6-C Typical Classifications of Significance of Effects, after Figure 3.4 (EPA, 2022)

(Refer to EIAR Volume 3 for Appendices)