5 LAND, SOILS AND GEOLOGY

5.1 INTRODUCTION

This Chapter of the remedial Environmental Impact Assessment Report (rEIAR) considers and assesses any potential impacts resulting from quarrying related activities that have been carried out at Shillelagh Quarries Ltd. (SQL) quarry (the 'Site'), on the surrounding land, soils and geology.

It is noted that activity at the Site involved the extraction of rock by mechanical excavation and blasting techniques (the 'Development').

5.1.1 TECHNICAL SCOPE

The technical scope of this assessment is to consider the potential impacts and effects on soils, land and geology that could have resulted because of the quarrying related activities carried out at the Site. This assessment considers the potential sources of change resulting from Development activities detailed in the Chapter 2 (Project Description).

The loss of agricultural soils will be considered, as will the potential geotechnical risks, impact on geologically important sites and land quality. Associated secondary potential impacts from changes to land quality on human health are also considered. It should be noted that this assessment does not, however, constitute a contaminated land risk assessment, a geotechnical/geohazard risk assessment, or detailed quantitative human health risk assessment.

The potential effects associated with hydrogeological and hydrological receptors are considered in Chapter 6 (Water), with reference to water quality in relation to land quality in this chapter. The effects of the Development on population and human health are addressed in Chapter 3 (Population & Human Health). Any secondary (i.e. indirect) effects on ecology or biodiversity due to changes in land quality or habitat removal are considered in Chapter 4 (Ecology and Biodiversity).

5.1.2 GEOGRAPHICAL AND TEMPORAL SCOPE

The baseline for this rEIAR has been set to 29 December 2019, and the rEIAR process has assessed environmental impacts from that date to the present. The baseline date of 29 December 2019 is derived from the expiry date of the KCC Planning Reg. 07/443; ABP Ref. PL09.233338 (see section 2.4 and section 2.6 of Chapter 2 (Project Description) for further detail). This assessment period equates to approximately five years and is identified as 'short-term' duration (those lasting one to seven years). The earliest publicly available aerial imagery within the assessment period is from June 2020. In conjunction with information provided by SQL and topographical data available from 2019 and 2023, this imagery informs on the baseline conditions at the Development for this assessment.

The geographical study area for the assessment covers the EIA boundary (identified on Figure 5-1) and with a study area extending 1 km around the EIA Site boundary, because most potential effects to geological and soil receptors are anticipated to occur within the Development footprint or immediately adjacent to it. In the context of this rEIAR, the application boundary is located entirely within the EIA Boundary and contains lands which form the existing extraction area and quarry working areas (i.e. the stockpile area, the 2 No. soakaways, onsite haul routes) as well as the existing welfare facilities, carpark and site access/entrance.

The lands, the subject of this rEIAR (i.e. lands within the application boundary) extend to approximately 10.05 ha and are located within the EIA boundary for the rEIAR (approximately 18.45 ha). The existing quarry void extends to approximately 5 ha and is located entirely within the EIA boundary and the application boundary.

It is noted that quarrying works carried out at the Site following the expiry of the KCC Planning Reg. 07/443; ABP Ref. PL09.233338 occurred within the application boundary (also referred to as the substitute consent boundary) and is considered within this assessment. Full details of works and development carried out within the application boundary over the assessment period are provided in Chapter 2 (Project Description) and, in summary, comprise:

- Continued extraction and processing of blast rock,
- Continued use of stockpiling in the stockpile areas,
- Continued export of aggregate offsite,
- Installation of a primary soakaway and overflow soakaway, and use of pump to transport collected waters from the quarry floor to the soakaway(s), and,
- Upgrade of the closed system wheelwash through the addition of dry grate and the installation of a higher capacity concrete-lined tank.

The phased restoration of the Applicant's lands located outside of the Application Boundary, and located within the south east of the EIA study area, have been scoped out of this EIAR as they were carried out during restoration works undertaken pursuant to condition 6A of the planning permission (planning permission register reference: 07/433 ABP ref PL09253383) and the High Court settlement term no. 2 (see section for further detail)

The extension of the carpark area during the assessment period was carried out on third-party lands by the owner of those land and has therefore been scoped out of this assessment.

See Chapter 2 (Project Description) of this rEIAR for details of the proposed restoration plan for the lands within the Application Boundary.

Figure 5-1 - Location of the Site (EIA Boundary) and the 1 km Study Area

5.2 LEGISLATIVE AND POLICY CONTEXT

This section addresses the legislation and guidance that has been considered when preparing this chapter, and key policy context relevant to soils, land and geology that has guided the focus of the assessment. The overarching EIA legislation under which this assessment is required is addressed separately in Chapter 1 (Introduction, Scope and Methodology).

5.2.1 LEGISLATION

This assessment has been made with cognisance to relevant legislation, including but not limited to:

- European Union Directive 2011/92/EU as amended by Directive 2014/52/EU – these Directives required that certain private and public projects which are likely to have significant resultant environmental impacts are subject to a formalised Environmental Impact Assessment prior to their consent;
- European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (SI No. 296 of 2018) which amended the Planning and Development Act, 2000, and the Planning and Development Regulations, 2001. The 2014/52/EU Directive was transposed into Irish law through this Directive;
- The European Communities (Environmental Liability) Regulations 2008 (as amended) - These Regulations (SI 547/2008) transpose EU Directive 2004/35/CE on environmental

liability with regard to the prevention and remedying of environmental damage. The purpose of these Regulations is to establish a framework of environmental liability based on the 'polluter-pays' principle, to prevent and remedy environmental damage. The Environmental Protection Agency (EPA) is designated as the competent authority for all aspects of these Regulations; and

- The Environmental Protection Agency Act 1992 and the Protection of the Environment Act 2003 – which detail the requirements associated with general pollution control and activities that come under integrated pollution prevention and control;

5.2.2 RELEVANT POLICIES AND PLANS

- The National Planning Framework (Project Ireland 2040) includes National Policy Objective 60 to “Conserve and enhance the rich qualities of natural and cultural heritage of Ireland in a manner appropriate to their significance”;
- The Kildare County Development Plan 2017-2023 is the strategy document for County Kildare which covers most of the temporal scope of this assessment period. The key policies and objectives of this plan are listed in Section 2.7.5 of the Project Description (Chapter 2); and ,
- The Kildare County Development Plan 2023-2029 was adopted on 9th December 2022 and covers the temporal scope from this date to present day. The key policies and objectives of this current plan are listed in Section 2.7.6 of the Project Description (Chapter 2).

5.2.3 RELEVANT GUIDANCE

This assessment has been made cognisant of relevant guidance and advice, including but not limited to:

- Relevant European Commission guidance – Guidance on the Preparation of the Environmental Impact Assessment Report (2017);
- The EPA Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (May 2022) – which presents key topics of interest, high-level information on the interactions that should be considered in relation to EIA legislation, and overviews on the recommended approach to describing the baseline environment, completing impact assessments, describing effects, and addressing mitigation and monitoring;
- Department of Housing, Planning and Local Government. Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (August 2018);
- The National Roads Authority Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (2008) in relation to aspects to be considered and assessment approach (including relative receptor importance and cross discipline interactions);
- Institute of Geologists of Ireland. Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements (April 2013);
- The National Roads Authority Guidelines for the Creation, Implementation and Maintenance of an Environmental Monitoring Plan (undated) in relation to impact mitigation;
- CIRIA C741: Environmental Good Practice on Site (2015, Fourth Edition) in relation to source of impact and mitigation;

- The EPA guidelines on Environmental Management in the Extractive Industry (Non-Scheduled Minerals) (2006), for a more environmentally sustainable quarry & pit industrial sector, greater protection for the environment and human health; and
- The CIRIA guidance Publication C532 Control of water pollution from construction sites: guidance for consultants and contractors (2001), which provides advice on environmental good practice for the control of water pollution arising from construction activities.

5.3 ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

This section presents the method used to assess the impacts and effects of the Development on soils, land and geology, and to secondary associated human health receptors. It establishes the stages of the assessment, and the qualitative criteria used to assess impact magnitude and determine the level of effect significance.

5.3.1 QUALITATIVE ASSESSMENT METHOD

The assessment of potential effects has been undertaken using the qualitative assessment method outlined below, and is supported by the baseline condition information, desk-based information on land, soils and geology available from the Geological Survey of Ireland (GSI), the EPA and previous ground investigations carried out onsite. The assessment follows a staged approach, which is summarised below:

1. Confirm baseline conditions – determine baseline and develop conceptual site model by consideration of available records and data sets, site reports and published information;
2. Confirm the key receptors and their value/importance, this may vary over time as new receptors are added (e.g. addition of residential housing);
3. Qualitatively characterise the magnitude of impacts on the receptors – describe what potential changes could have occurred to each receptor because of the Development, identify source-pathway receptor linkages, and assign the magnitudes of impact. This stage considers embedded design mitigation, historical and existing site practices including good practice in construction environment management and pollution prevention;
4. Determine the effect significance of each potential impact on each sensitive receptor;
5. Consider the need for remedial measures if it is considered necessary to reduce the magnitude of any impact and associated effect. If remedial measures are considered necessary, a timeline will be presented in which the measures would be implemented;
6. Assess the residual impact magnitude and residual effect significance after all mitigation is carried out; and
7. Identify any monitoring that may be required to measure the success of the remedial measures.

Stages 1 and 2 have been completed using published literature, guidance and available information specific to the Development, which is presented in Chapter 2 of this rEIAR. For the identification of receptor value/importance that completes Stage 2, and for the description of impact magnitude (Stage 3), a common framework of assessment criteria and terminology has been used based on the EPA's Guidelines on the Information to be Contained in EIARs (EPA, 2022), with some

modifications made to increase clarity. The descriptions for sensitivity of receptors are provided in Table 5-1 and the descriptions for magnitude of impact are provided in Table 5-2.

The potential for an impact to have occurred at a receptor has been determined using the understanding of the baseline environment and its properties and consideration of whether there is a feasible linkage between a source of impact and each receptor.

Evaluation of sensitivity of Soils, Land, Geology requires a considerable degree of judgement, based on defined characteristics and values and applying professional experience, which is accordingly applied during this assessment.

Table 5-1 – Environmental value (sensitivity) and descriptions

Value (sensitivity) of receptor / resource	Typical description
High	High importance and rarity, national scale, and limited potential for substitution. For example: Global/European/National designation Large volumes of nationally or locally important peat Well drained and highly fertile soils Proven economically extractable mineral resource Areas of regionally important economic mineral deposits. Human health.
Medium	Medium or high importance and rarity, regional scale, limited potential for substitution. For example: Regionally important sites Moderately drained and/or moderate fertility soils. Areas of locally important economic mineral deposits.
Low	Low or medium importance and rarity, local scale. For example: Locally designated sites Poorly drained and/or low fertility soils.
Negligible	Very low importance and rarity, local scale.

Table 5-2 – Magnitude of impact and descriptions

Magnitude of impact (change)		Typical description
High	Adverse	Major or total loss of a geological site or mineral deposit, where the value of the site will be severely affected. Major or total loss of soils or where the value of the site will be severely affected. Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements.

Magnitude of impact (change)		Typical description
		Harm to human health – death, disease, serious injury, genetic mutation, birth defects or the impairment of reproductive functions.
	Beneficial	Large scale or major improvement of resource quality; extensive restoration; major improvement of attribute quality.
Medium	Adverse	Loss of resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements. Partial loss of a geological site or mineral deposit, with a major change to the settings, or where the value of the site will be affected. Partial loss of soils or where the value of the site will be affected.
	Beneficial	Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality.
Low	Adverse	Small loss to a geological site or mineral deposit, such that the value of the site will not be affected. Small loss of soils or where soils will be disturbed but the value not affected. Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements.
	Beneficial	Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring.
Negligible	Adverse	Minimal or no change to a geological site or mineral deposit. Minimal or no change to soils. Very minor loss or alteration to one or more characteristics, features or elements.
	Beneficial	Very minor benefit to or positive addition of one or more characteristics, features or elements.

The assessment of magnitude of impact considers whether the change that causes the impact is positive or negative, and whether the impact is direct or indirect, short, medium or long-term, temporary or permanent, and if it is reversible.

For the purposes of this assessment, a direct impact is one that occurred as a direct result of the Development and was likely to have occurred at or near the Development itself. Indirect impacts (or secondary/tertiary impacts) are those where a direct impact on one receptor has another knock-on impact on one or more other related receptor(s) (e.g. the Development results in a change in land quality, which then has an indirect impact on human health). Indirect impacts can occur within the study area or away from the Development.

For the purposes of this assessment, the following definitions of duration have been used:

- Temporary – effect likely to last less than 1 year without intervention;

- Short term – effect likely to last 1 to 7 years without intervention;
- Medium term – effect likely to last 7 to 15 years without intervention;
- Long term – effect likely to last 15 to 60 years without intervention; and
- Permanent – effect likely to last over 60 years without intervention.

An irreversible impact is defined as a change to the baseline that would not reverse itself naturally. Such impacts will usually be long-term and irreversible, such as the removal of best and most versatile agricultural soils. A reversible impact is defined as a change to the baseline conditions that would reverse naturally once the source of the impact is exhausted or has stopped.

5.3.2 SIGNIFICANCE CRITERIA

The approach followed to derive effects significance from receptor value and magnitude of impacts (Stage 4) is shown in Table 5-3. Where Table 5-3 includes two significance categories, reasoning is provided in the topic chapter if a single significance category is reported. A description of the significance categories used is provided in Table 5-4.

Table 5-3 – Significance matrix

	Magnitude of Impact (Degree of Change)			
Environmental value (Sensitivity)	**Negligible**	**Low**	**Medium**	**High**
High	Slight	Slight or moderate	Moderate or large	Profound
Medium	Imperceptible or slight	Slight or moderate	Moderate	Large or profound
Low	Imperceptible	Slight	Slight	Slight or moderate
Negligible	Imperceptible	Imperceptible or slight	Imperceptible or slight	Slight

Table 5-4 – Significance categories and typical descriptions

Significance Category	Typical Description
Profound	An effect which obliterates sensitive characteristics.
Large	An effect which, by its character, magnitude, duration or intensity alters a significant proportion of a sensitive aspect of the environment.
Moderate	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Imperceptible	An effect capable of measurement but without significant consequences.

Residual adverse effects of ‘large’ or ‘profound’ significance are considered to be ‘significant’ for the purposes of this assessment.

If required following the assessment of the current level of effect significance, additional mitigation measures (remedial measures) may be presented that will be used to avoid, prevent, or reduce the magnitude of the impact (Stage 5). The significance of the effect considering the additional mitigation is then assessed (Stage 6) to give the residual effect significance. Any monitoring that will be required to measure the success of the mitigation is included (Stage 7) (see section 5.11).

5.4 BASELINE AND SUBSEQUENT CONDITIONS (2019 TO PRESENT)

This section presents baseline information on soils, land use, land quality and geology. Information about the water environment (including hydrogeology) is presented in Chapter 6 (Water).

5.4.1 LAND USE

The Site comprises lands which are currently used for quarrying activities. The current extent of the quarry is ca. 5.1 ha in area. The assessment period covers the years from 29 December 2019 to present. A review of available aerial photography has been undertaken to assess the change in land use since December 2019.

There are several historical maps available for the area, which are related to the operational years that are the subject of this rEIAR, including:

- June 2020 aerial imagery (Google Earth);
- April 2021 aerial imagery (Google Earth);
- March 2022 aerial imagery (Google Earth);
- June 2023 aerial imagery (ESRI World Imagery);
- 05 September 2023 drone survey of the quarry area (Landmark Survey); and
- 19 October 2023 aerial imagery (Google Earth).

5.4.1.1 Study Area Land Use

The June 2020 aerial (Figure 5-2) provides the baseline for land use at the start of the review period. The June 2020 aerial is compared to October 2024 aerial (Figure 5-3) for land use changes within the Site and study area.

The topographical surveys from July 2019 and September 2023 also show the land use changes which have occurred within the Site and the study area during the assessment period (see Section 2.4.1.2 of Chapter 2 (Project Description)).

Between the 2020 and 2024 aerials, the land use for lands around the development has remained largely unchanged. Within the Application Boundary, continued extraction of bedrock has taken place with an estimated that an average of ca. 110,000 tonnes of rock was excavated from the Site each year over the assessment period (see section 2.4 of Chapter 2 (Project Description) for detail)). During the assessment period the quarry area has increased by approximately 0.4 ha. Additionally, 2 soakaways (with a combined area of approximately 0.2 ha) have been installed into bedrock within the southern area of the Site.

The phased restoration of the Applicant’s lands located outside of the Application Boundary, and located within the south east of the EIA study area, have been scoped out of this EIAR as they were carried out during restoration works undertaken pursuant to condition 6A of the planning permission

(planning permission register reference: 07/433 ABP ref PL09253383) and the High Court settlement term no. 2 (see section 2.4 and 2.6 of Chapter 2 (Project Description) for further detail).

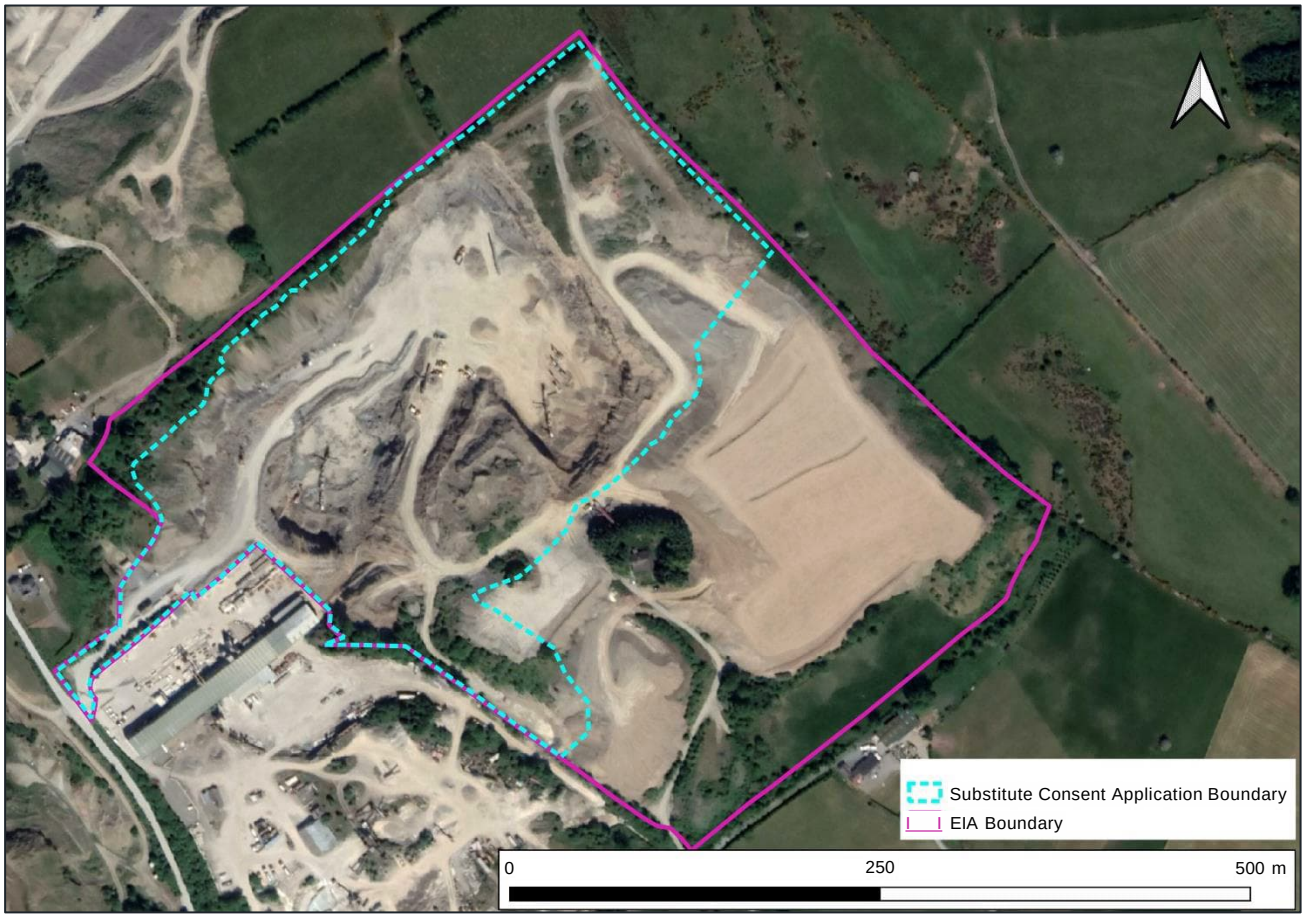

Figure 5-2 - Site aerial from June 2020

Figure 5-3 – Site aerial from October 2024

5.4.1.2 Changes in Quarry Area and Elevations

A description of the changes in the quarry area and the site elevations during the assessment period are available in section 2.4 in Chapter 2 (Project Description).

5.4.2 SUPERFICIAL GEOLOGY (SOIL AND QUATERNARY SEDIMENTS)

There are limited soils remaining in-situ in the existing extraction area due to extraction activities carried out onsite under the previous planning permission (KCC Planning Ref. No. 07/443; ABP Ref. PL09.233338). The working area at the Site is composed predominately of exposed bedrock.

Teagasc's Irish Soil Information System (SIS) mapping shows the soil cover over the entire Site area indicated in (Figure 5-4), however, as stated previously this soil map is more representative of the original baseline soils at the Site prior to activities within the extraction area.

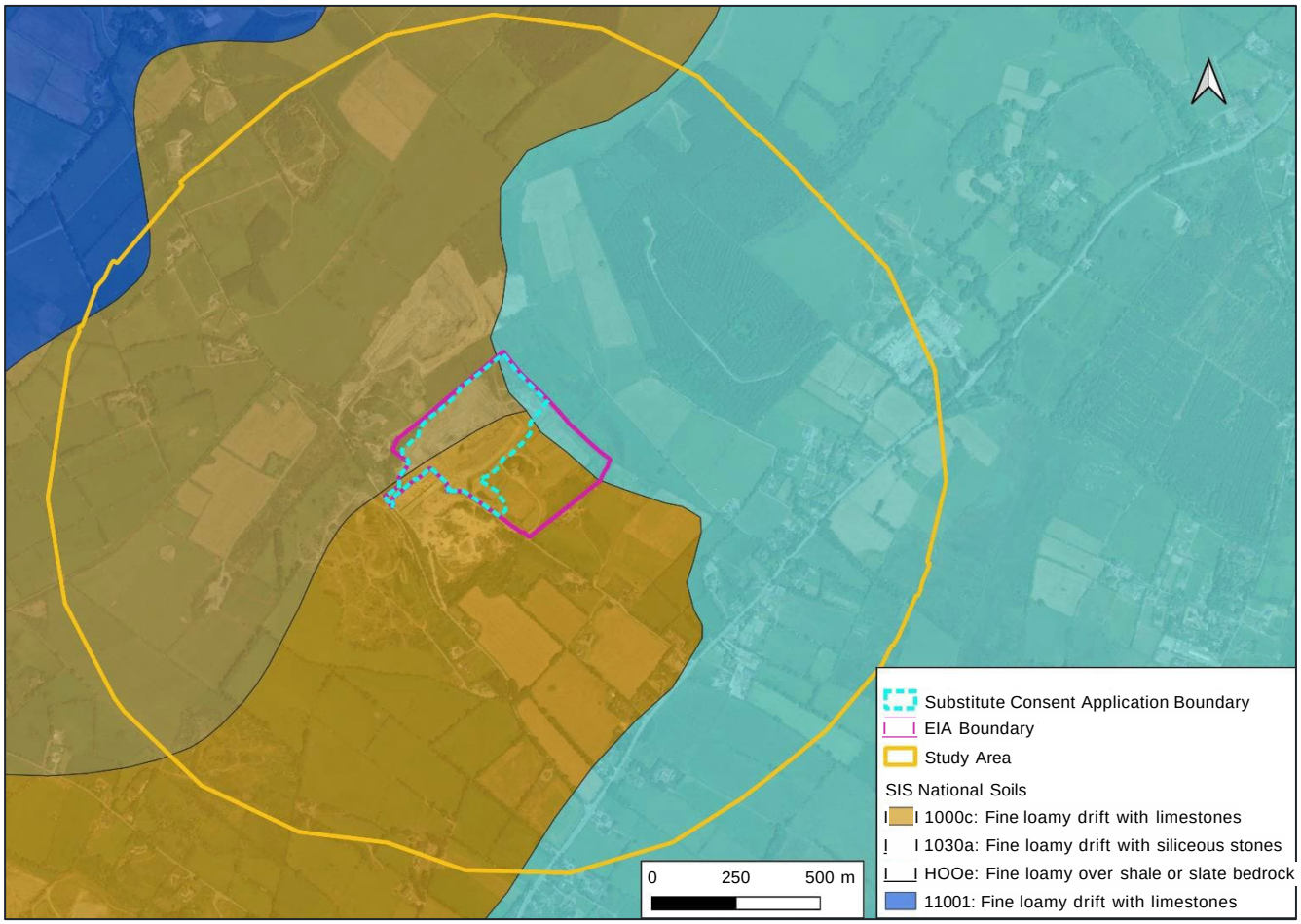

Figure 5-4 - Irish Soil Information System (SIS) Mapping overlain on ESRI Satellite aerial.

Soil associations are groups of soil types that commonly occur together in the landscape and these associations make up the Irish Soil Information System national database (EPA, 2024). There are 11 Soil Great Groups, which are a hierarchical arrangement that can be used for taxonomical classifications. Table 5-5 lists the different soil categories within the Study Area.

GSI (2024) data indicated that the soil associations mapped within the study area consists of luvisols and brown earth soils, which are described as follows:

- Luvisols have high activity clays throughout and lack the abrupt textural change of Planosols. These are soils in which clay is washed down from the surface soils to an accumulation horizon at some depth; and
- Brown Earths are well drained soils possessing rather uniform profiles with little differentiation between horizons. These soils have not been extensively leached or degraded.

Table 5-5 – SIS Associations within the study area.

Soil Association Code	Soil Great Group	Description
Elton (1000c)	Luvisol	Fine loamy drift with limestones

Soil Association Code	Soil Great Group	Description
Crosstown (1030a)	Luvisol	Fine loamy drift with siliceous stones
Ballylanders (1100e)	Brown Earth	Fine loamy over shale or slate bedrock
Kennycourt (1100l)	Brown Earth	Fine loamy drift with limestones

GSI (2024) data indicates that the subsoils underlying the Site are composed of gravels derived from Limestones. The area immediately to the north of the Site is underlain by bedrock close to surface (Figure 5-5). To the south of the study area there is also some areas of Till derived from Lower Palaeozoic sandstones and shales and a section to the southeast underlain by Lacustrine sediments. Glacial and fluvial deposits (known locally as the Blessington Gravels) are generally thick in the area, with deposits commonly > 30 m in thickness, into the base of the valleys.

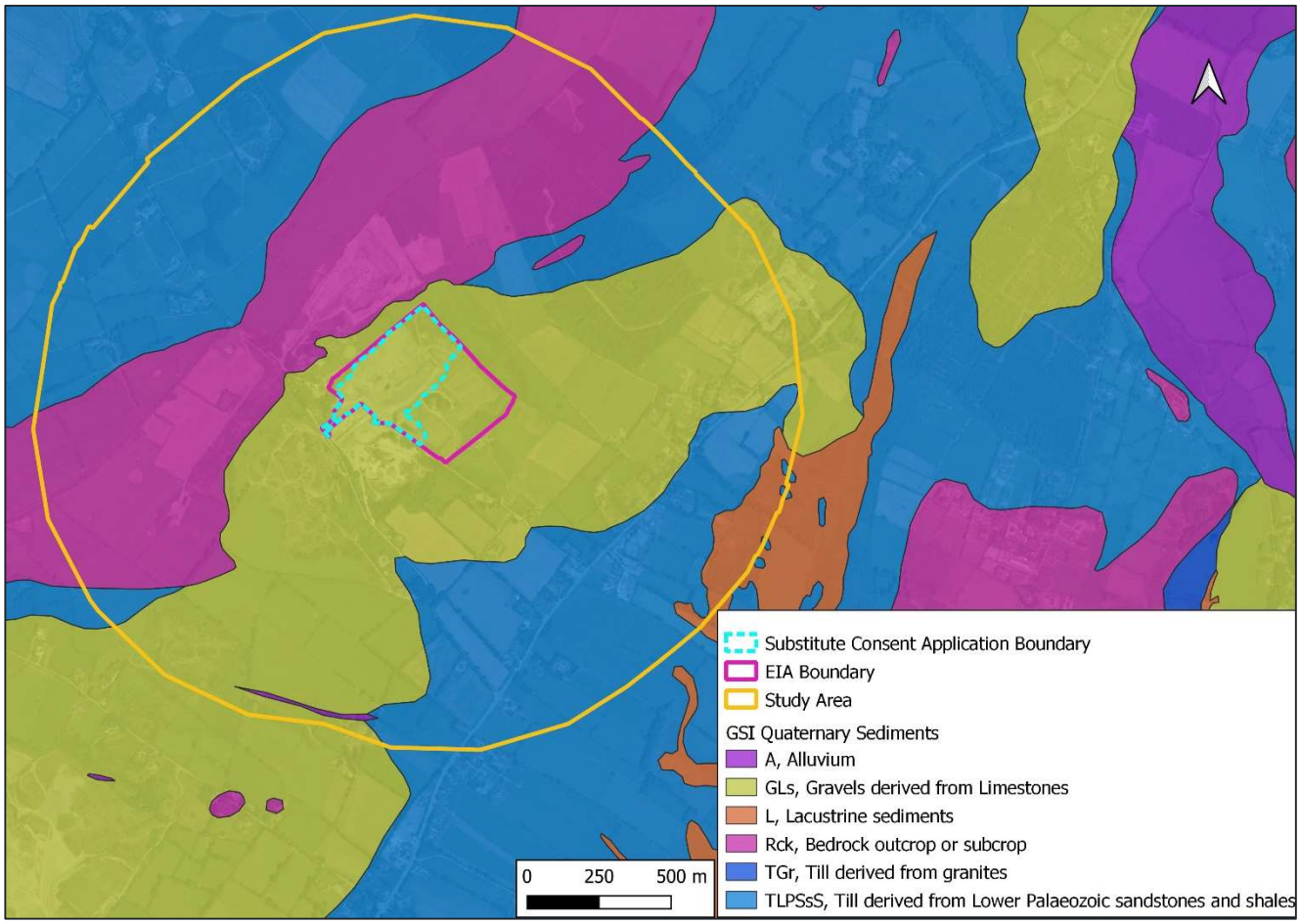

Figure 5-5 - Underlying Quaternary Sediments (subsoil) (GSI, 2022) overlain on ESRI Satellite aerial.

5.4.3 BEDROCK GEOLOGY

The GSI Bedrock Geology 1:100,000 map (Figure 5-6) indicates that the Site is underlain by the Pollaphuca Formation, which is described as consisting of coarse, graded greywackes, medium grey in colour, and dark grey shales, making up Bouma ae turbidite units. The "a" intervals are

always normally graded, most commonly with granule grade bases. The Pollaphuca Formation is Permian in age.

The area immediately to the north of the Site is underlain by the Slate Quarries Formation, which consists of predominantly of dark grey slate, with minor interbedded greywackes. The greywackes consist of Bouma "ae" turbidite units, with "a" intervals generally finer-grained than in the Pollaphuca Formation. The Slate Quarries Formation is Silurian in age.

The northwest of the study area is underlain by the Glen Ding Formation, which consists of dark green to grey greywackes and shales making up Bouma ‘a’ and ‘b’ turbidite units that are distinctly more chloritic and fledsphatic than the other formations, probably accounting for a regional lithogeochemical contrast across the Slate Quarries Formation-Glen Ding Formation contact. The Glen Ding Formation is Silurian in age (McConnell and Philcox,1994).

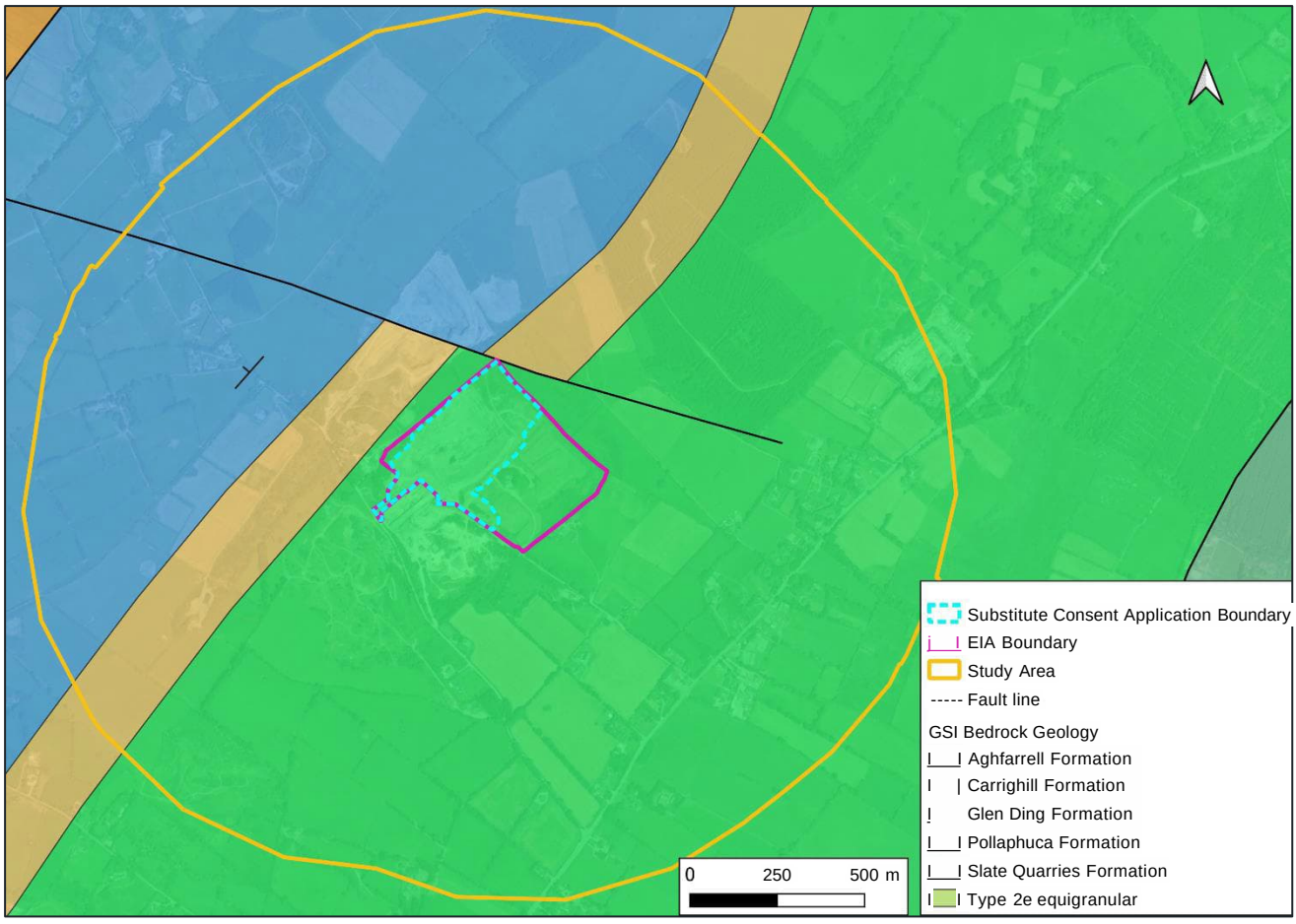

Figure 5-6 - Underlying Bedrock Geology (GSI, 2022) overlain on ESRI Satellite aerial.

5.4.4 SITE INVESTIGATIONS

Boreholes logs produced during the installation of groundwater monitoring wells in 2019 indicate drift (overburden, and sands and gravels) thickness ranges from ca. 5.4 m (GW4) to the north of the Site, to ca. 9 m (GW5) to the south of the Site. The sands and gravels of the drift therefore thicken to the south of the Site, towards the base of the valley. A summary of the borehole logs and a figure showing their locations is provided in Chapter 6 (Water).

5.4.5 GEOLOGICAL ASSETS AND HERITAGE

The EIA Boundary is located entirely within the Slate Quarries (KE004) County Geological Site (CGS) (GSI, 2005). The CGS is described as a series of quarries on the hillside and the primary rock type is Silurian slates of the Slate Quarries Formation.

The quarry assessed herein is identified as one of the quarries (through citation of the previous owner and operator, Stresslite) comprising the CGS. Although it should be noted that extraction at the quarry during the assessment period has been of the greywackes of the Pollaphuca Formation, not the Slate Quarries Formation which adjoins the Site.

The Site Importance is stated as '*The link between the name of the Townland, and the history of use of a natural earth resource is a strong reason for marking this area as a County Geological Site, and a good place to actually see the rocks well exposed*' (GSI 2005).

It is noted that the quarry assessed herein is not located within Slate Quarries townland, with that townland located south of Blessington. Furthermore, the quarry assessed herein is on lands privately owned by SQL and, due to wider local topography, bedrock exposures are largely not visible from the surrounding roads/walking routes. Although a view of the upper section of the north face of the quarry is visible from the local road when viewed across the third-party Stresslite Precast site.

GSI (2005) states that '*the proposal to include these working quarries as a CGS in no way is intended to limit the operations, but simply to mark their value as a place to see local geology well exposed, and to make the powerful connection between geology and people's everyday lives.*'

The extent of the CGS can be seen in Figure 5-7 below.

Figure 5-7 - Geological Heritage Site within the study area.

5.4.6 GEOHAZARDS

The GSI's landslide susceptibility classification layer (GSI, 2023) indicates that lands within the study area are mostly of 'Low' and 'Moderately Low' landslide susceptibility with some small areas of 'Moderately High' landslide susceptibility to the east of the Site and by the Site entrance. There have been no previously recorded landslide events within the study area (GSI, 2022).

GSI data indicates that there are no karst features in the area. Karst features in Ireland are typically associated with limestones, GSI data indicates that limestones are not present within the study area.

The Radon Map for Ireland (EPA, 2023) indicates that the Site and study area are located in an area where 1 in 10 homes are estimated to have high radon levels. A High Radon Area is classified by the EPA as any area where it is predicted that 10% or more of homes will exceed the Reference Level of 200 becquerel per cubic metre (Bq/m3). As radon is a naturally occurring gas derived from the decay of uranium in rocks and soils which is geologically controlled, the radon reference level during the assessment period is unlikely to have differed from the current reference level.

5.5 SELECTION OF SENSITIVE RECEPTORS

Taking account of the above and the receptor classification method described in Section 5.3.1, the receptors carried forward in this assessment and their assigned importance are presented in Table 5-6.

Table 5-6 - Soil, Land and Geology Receptors

Receptor	Importance and Reasoning
Mineral or aggregate reserves	Low (no rarity, ubiquitous across Ireland local importance)
Land (soil/sub-soils) at and immediately adjacent to the Development	Low (no designation, no rarity, local importance)
Human Health (workers during operation)	High (human health receptor)
Geological Heritage	Medium (designated site of local importance)

The superficial tills onsite are not an economic resource and, where they have been excavated to facilitate extraction of bedrock, have been retained within the confines of the wider Site (i.e. within the EIA Boundary). Therefore, the impacts to, and effects on, till have not been considered further in this assessment.

5.6 CHARACTERISTICS OF THE DEVELOPMENT

The rEIAR has been prepared to accompany a substitute consent application for an existing quarry located in the townland of Hempstown Commons, Co. Kildare. A detailed Project Description has been provided within Chapter 2 of this rEIAR. The lands, which are the subject of this rEIAR (EIA boundary) extend to 18.45 ha. The quarry operational area that makes up the application for substitute consent planning unit currently extends to approximately 10.05 ha.

Activities at the Site involved the extraction of rock (greywacke and shale) using various excavation techniques, such as drilling & blasting and rock breaking. Blasting of rock was periodically undertaken during the review period.

5.6.1 EMBEDDED MITIGATION

The initial assessment of the significance of potential effects resulting from the Development takes into consideration any embedded design and implemented Site management practices undertaken during the assessment period of 29 December 2019 to present. The elements of the Development design and good working practices that reduce the potential for impacts to soils and geology included the following:

- Site operations are managed with relevant health and Safety legislation (Safety, Health & Welfare at Work Act (2005, as amended); and the Mines and Quarries Act (1965, as amended)) and subsequent Quarries Regulations relating to safety health and safety, training, appropriate site management;
- Exposed edges of the quarry which are accessible to people are protected by safety berms and/or fencing;
- All HGVs exit the site via a closed system wheelwash for all vehicles exiting the quarry;
- The diesel generator is maintained regularly; and
- Refuelling is carried out by a third party on site using drip mats.

5.7 POTENTIAL EFFECTS

The main potential impacts and associated effects that are considered and assessed in the following sections relate to:

- Activities or events that might have impacted land quality or human health (e.g. leaks and spills from machinery or stored substances, or discharges);
- Change of land use/land take (i.e. loss of agricultural lands);
- Loss of superficial deposits and bedrock;
- Destabilisation and/or subsidence of unconsolidated soils, sub-soils or rock faces; and
- Activities that have led to loss or exposure of geological sequences associated with heritage sites.

5.7.1 LAND QUALITY AND HUMAN HEALTH

Fuel and other substance leaks or spills from machinery/equipment[1] and vehicles used during development could have affected the chemistry of the soil/sub-soils (where it was still in-situ) or the health of workers that could come into contact with it.

Given the implementation of the measures set out in section 5.6.1 it is considered that there is limited potential for contamination to lands from leaks and/or spills. No spills or leaks have been recorded onsite by SQL during the assessment period. Therefore, magnitude of effect to both land and human health is *Negligible (adverse),* and therefore level of effect has been at most, *Slight.* Therefore, impacts to land quality and human health from site operations during the assessment period are considered to have been **Not Significant**.

5.7.2 CHANGE OF LAND USE / LAND TAKE

Extraction of rock during the assessment period increased the quarry area by approximately 0.3 ha. Furthermore, two soakaways were installed to the south of the quarry pit in the assessment period. This land was within the EIA boundary and was not used for agriculture at the beginning of, or within the review period. Any removed topsoil from these activities has been stored on Site. The magnitude of the impact on land use is therefore considered to be *Negligible.* Therefore, impacts to land use / land take from site operations during the assessment period are considered to have been **Not Significant.**

5.7.3 LOSS OF SOILS AND BEDROCK (AS AGGREGATE RESERVE)

Topsoil within the EIA boundary which was removed for quarrying and the creation of the soakaway has been stored on site. However, the area where topsoil has been removed is relatively small, given that extraction of aggregate has remained with a ca. 5 ha area during the assessment period and topsoil has been removed from the extraction and working areas prior to the assessment period. Therefore, magnitude of effect on topsoil is therefore *Low (adverse),* therefore level of effect has been at most, *Slight*.

By the nature of quarrying, the greywacke bedrock was removed with quarrying, which resulted in a direct and irreversible impact on the Site. However, the removed material has a medium to high resource potential and will be used in future construction projects. The Site is also located in an area

[1] No fuels have been stored onsite during the assessment period.

where the greywacke bedrock is abundant. The subsoils on Site were largely removed prior to the assessment period. The impact of site operations to bedrock as an aggregate reserve is therefore *Medium (adverse),* therefore level of effect has been at most, *Slight*.

Therefore, impacts to soil and bedrock (aggregate reserve) from site operations during the assessment period are considered to have been **Not Significant.**

5.7.4 GEOTECHNICAL INSTABILITY

The Site is in an area of low seismic activity and the importance of this attribute is considered to be *Low*. There were no geotechnical incidents, which would include collapse of a wall or surface, recorded over the review period. Therefore, the magnitude of the impact is *Negligible.*

Therefore, impacts to geotechnical instability from site operations during the assessment period are considered to have been **Not Significant.**

5.7.5 GEOLOGICAL HERITAGE

The Development is located within Slate Quarries County Geological Site (KE004). The management/promotion of this site states '*to include these working quarries as a CGS in no way is intended to limit the operations, but simply to mark their value as a place to see local geology well exposed, and to make the powerful connection between geology and people's everyday lives*.' It should be noted that the quarry is located entirely on private lands owned by SQL. Furthermore, there are limited viewpoints into the quarry from surrounding public lands (e.g. local roads) with views of bedrock exposures within the quarry are largely restricted due to local topography and hedge/treelines. Therefore, it is considered that the operations at the Site have not negatively impacted the CGS management objectives and the magnitude of effect is *Negligible,* therefore level of effect has been at most, *Imperceptible.*

Therefore, impacts to geological heritage from site operations during the assessment period are considered to have been **Not Significant.**

Table 5-7 - Evaluation of Impacts and their Effect Significance taking into account embedded mitigation

Receptor	Sensitivity	Source of Impact / Description of Change	Impact Magnitude	Level of Effect
Land Quality	Low	Land contamination from site operations	Negligible (adverse)	Imperceptible (mitigation considered sufficient for lower significance category)
Human Health	High	Health of works in contact with contamination	Negligible (adverse)	Slight
Land (agricultural use)	Low	Change in land use by the advancement of the extraction area	Negligible (adverse)	Imperceptible

Receptor	Sensitivity	Source of Impact / Description of Change	Impact Magnitude	Level of Effect
Topsoil at the Site and within the study area	Negligible	Removal of topsoil at the Site	Low (adverse)	Imperceptible
Bedrock Geology as aggregate reserve	Low	Removal of bedrock at the Site	Medium (adverse)	Slight
Geotechnical Instability	Low	Destabilisation and/or subsidence of unconsolidated soils, sub-soils or rock faces	Negligible (adverse)	Imperceptible
Geological Heritage	Medium	Changes to designated CGS site	Negligible (adverse)	Imperceptible (management/promotion status considered sufficient for lower significance category)

5.8 REMEDIAL MEASURES REQUIRED

There are no effects on the land, soils and geology from the activities on the Site that require remedial measures.

5.9 RESIDUAL EFFECTS

The assessment concludes that the existing Site has not given rise to significant adverse effects on the land, soil or geology at or surrounding the Site during the assessment period of 29 December 2019 to present. In all cases the residual adverse effect is **Not Significant** and not greater than *Slight*.

5.10 CUMULATIVE EFFECTS

The cumulative effects associated with other permitted / under construction third-party developments have been considered in Chapter 15 of this rEIAR. Cumulative effects are considered to be **Not Significant**.

5.11 MONITORING

The ongoing monitoring programme at the Site will include regular stability surveys of the quarry faces. Monitoring of groundwater quality in monitoring wells and water quality within artificial ponds will be conducted quarterly. Drone surveys will be conducted when necessary to determine quarried depths and extents are consistent with those planned and approved.

5.12 DIFFICULTIES ENCOUNTERED

No particular difficulties were encountered in the preparation of this chapter of the rEIAR.

5.13 SUMMARY AND CONCLUSIONS

This assessment considers the potential impacts and effects on the land, soils and geology over the review period from 29 December 2019 to present.

The main receptors that could be affected by changes to the land, soils and geology due to the Development through the review period were identified and potential effects were assessed. A Moderate residual level of affect with the removal of rock is attributed. This removal of economically valuable material is inherent with any quarrying activity.

Known design and embedded mitigation measures were considered during the initial assessment of impacts and effects.

5.14 REFERENCES

Aggregate Potential Mapping online map viewer (GSI, 2016) [Accessed: November 2024]

McConnell B. and Philcox, M.E., (1994), Geology of Kildare and Wicklow, Geological Survey of Ireland, Ireland.

EPA soils guide [online]. Available at: http://gis.teagasc.ie/soils/soilguide.php [Accessed: October 2024]

EPA Guidelines on the Information to be Contained in Environmental Impact Assessment Reports, Environmental Protection Agency (May 2022).

GSI online map viewer (GSI, 2023) [Accessed: November 2024]

GSI (2005) Slate Quarries Site Report in 'The Geological Heritage of Kildare'.

Guidelines to the Safety, Health and Welfare at Work (Quarries) Regulations 2020 HSA 2020.

Parkes M. and Sheehan-Clarke A. (2005) The Geological Heritage of Kildare

Revised EIAR and NTS EPA online map viewer (EPA, 2023) [Accessed: November 2024]