5 LAND, SOILS AND GEOLOGY

5.1 INTRODUCTION

This chapter of the Environmental Impact Assessment Report (EIAR) provides an assessment of potential impacts to, and the significance of effects on, soils, land and geology from the continuation and extension of quarrying activities at the Shillelagh Quarries Ltd quarry (the 'Site'). This EIAR is submitted in support of an application under Section 37L of the Planning and Development Act, as amended.

The following assessment was prepared by Lisa Cleary (B.A. (mod), GradIEMA) and Rhian Llewellyn (MGeol, PhD, PIEMA). Lisa is an environmental scientist with over 1 years' experience, and Rhian is a geologist and EIA specialist with over 9 years' experience.

5.1.1.1 Technical Scope

The technical scope of this assessment is to consider the potential impacts and effects on soils, land and geology that can be reasonably foreseen as consequences of the normal construction and operation of the Proposed Development. This assessment considers the potential sources of change resulting from the Proposed Development activities detailed in the project description (Chapter 2) of this EIAR.

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) of this EIAR, with reference to water quality in relation to land quality in this chapter. The effects of the Proposed Development on population and human health are addressed in Chapter 3 (Population & Human Health) of this EIAR. Any secondary effects on ecology or biodiversity due to changes in land quality or habitat removal are considered in Chapter 4 (Ecology and Biodiversity).

5.1.1.2 Geographical Scope

The geographical study area for the assessment covers lands within the EIA boundary[1] with a study area extending to 1 km from the EIA boundary (see Figure 5-1), because most potential effects to geological and soil receptors are anticipated to occur within the Proposed Development footprint or immediately adjacent to it. The Proposed Development area (ca. 10.03 ha.) is entirely contained within the EIA project boundary (18.45 ha). In the context of the EIAR, the 37L Planning Application boundary contains lands which form the existing quarry area, the proposed extension of the quarry area, existing soakaways, and current and proposed working areas, internal haul routes, and private access lane and site entrance. The Section 37L Planning Application boundary is shown on the drawing set which accompanies the planning application and is presented in Figure 5-1.

[1] the Section 37L application boundary is located entirely within the EIA boundary.

The temporal scope of this assessment is 12 years for extraction and processing of the rock resource within the 37L Planning Application Boundary[2] and a subsequent 2 years for restoration of the Site.

The temporal scope of this assessment covers the proposed quarrying activities on the Site and the extension of these permitted activities into the future, within the Section 37L planning application boundary. Given the phased nature of the extractive industry and the similarities between the construction and operational phases of the Proposed Development, these will be considered together in this chapter as the overall operational phase.

Under the current programme provided for fluctuations in market demands for the aggregate. The duration of the extraction phase is therefore classified as 'medium-term' by the Environmental Protection Agency's (EPA) 2022 'Guidelines on the information to be contained in environmental impact assessment reports'. The Proposed Development totals a volume of ca. 703,000 m3 (1,757,500 tonnes) of rock resource

The restoration phase of the Proposed Development will follow the extraction phase and will be 2 years in duration, which is 'short-term' - those lasting from one to seven years (EPA, 2022).

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

[2] see section 2.5 of Chapter 2 (Project Description) of this EIAR for detail.

5.1.2 PROJECT DESCRIPTION SUMMARY

A full description of the proposed development is provided in Chapter 2 (Project Description) of this EIAR. A high-level summary of the proposed development is provided below.

The proposed development for further extraction of rock is to be within the existing void area with lateral extension of the void proposed in a north-easterly direction. The estimated total quantity of aggregate resource to be extracted in the life-of-quarry is c. 1,757,500 tonnes. A proposed 12 year life-of-quarry requirement is based on an average production rate of ca. 2,929 tonnes per week for rock. Dry processing of mechanically broken and blast rock onsite will comprise crushing and screening to produce aggregate materials for market.

SQL proposed to relocate the existing office container, wheel wash and water recycling tank, weighbridge to fully within the Application Site to provide space for realignment of the private access lane on SQL lands and to develop dedicated carparking facilities for the quarry operation on SQL owned lands.

The proposed car parking facilities will provide parking for HGVs and private vehicles, including guest parking.

SQL propose to decommission the existing abstraction borehole located off the access road to facilitate the road realignment on their own lands. SQL propose to undertake periodic extraction of groundwater from an abstraction borehole located on Stresslite Precast Ltd to provide water for SQL's closed-loop system wheelwash recycling tank and the mobile bowser.

There will be no direct discharge to surface or groundwater from the quarry operations. Collected waters from the base of the quarry void will continue to be pumped to the primary soakaway (which is connected to an overflow soakaway). It is proposed that the collect waters will pass through a bypass separator prior to discharge to the primary soakaway. It is proposed to extend the existing sump on the quarry floor to provide additional temporary holding capacity for collected waters, if required.

Following end-of-quarry life, a 2 year restoration period is proposed. This is detailed in a Restoration and Habitats Management Plan provided in appendix 2B of Chapter 2 (Project Description) of this EIAR.

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 2023-2029 was adopted on 9th December 2022. The key policies and objectives of this plan are listed in Section 2.7.5 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 Proposed 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 site investigations carried out at the Site. The assessment follows a staged approach, which is summarised below:

1. Confirm baseline conditions – determine baseline 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 occur to each receptor because of the Proposed Development, identify source-pathway receptor linkages, and assign the magnitudes of impact. This stage considers embedded design mitigation, 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 additional mitigation if it is considered necessary to reduce the magnitude of any impact and associated effect.
6. Assess the residual impact magnitude and residual effect significance after all mitigation is applied.
7. Identify any monitoring that may be required to measure the success of the mitigation measures.

Stages 1 and 2 have been completed using published literature, guidance and available information specific to the Proposed Development, which is presented in Chapter 2 of this EIAR. 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 occur 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. This follows the method of preliminary risk assessment that is widely presented in some of the guidance documents listed in Section 5.2.

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 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.
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. 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.

Magnitude of impact (change)		Typical description
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 occurs as a direct result of the Proposed Development and is likely to occur at or near the Proposed 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 Proposed 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 Proposed 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 (i.e. less than the construction phase);
- 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 the 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 level of effect significance, additional mitigation measures will be presented that will be used to avoid, prevent, or reduce the magnitude of the

potential 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 CONDITIONS

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

5.4.1 LAND USE

The Site comprises lands which are currently used for quarrying activities. The current extent of the extracted quarry area is ca. 5.1 ha in area.

The current land usage is identified from October 2024 aerial photography for the lands surrounding the quarry and the quarry area (Figure 5-2).

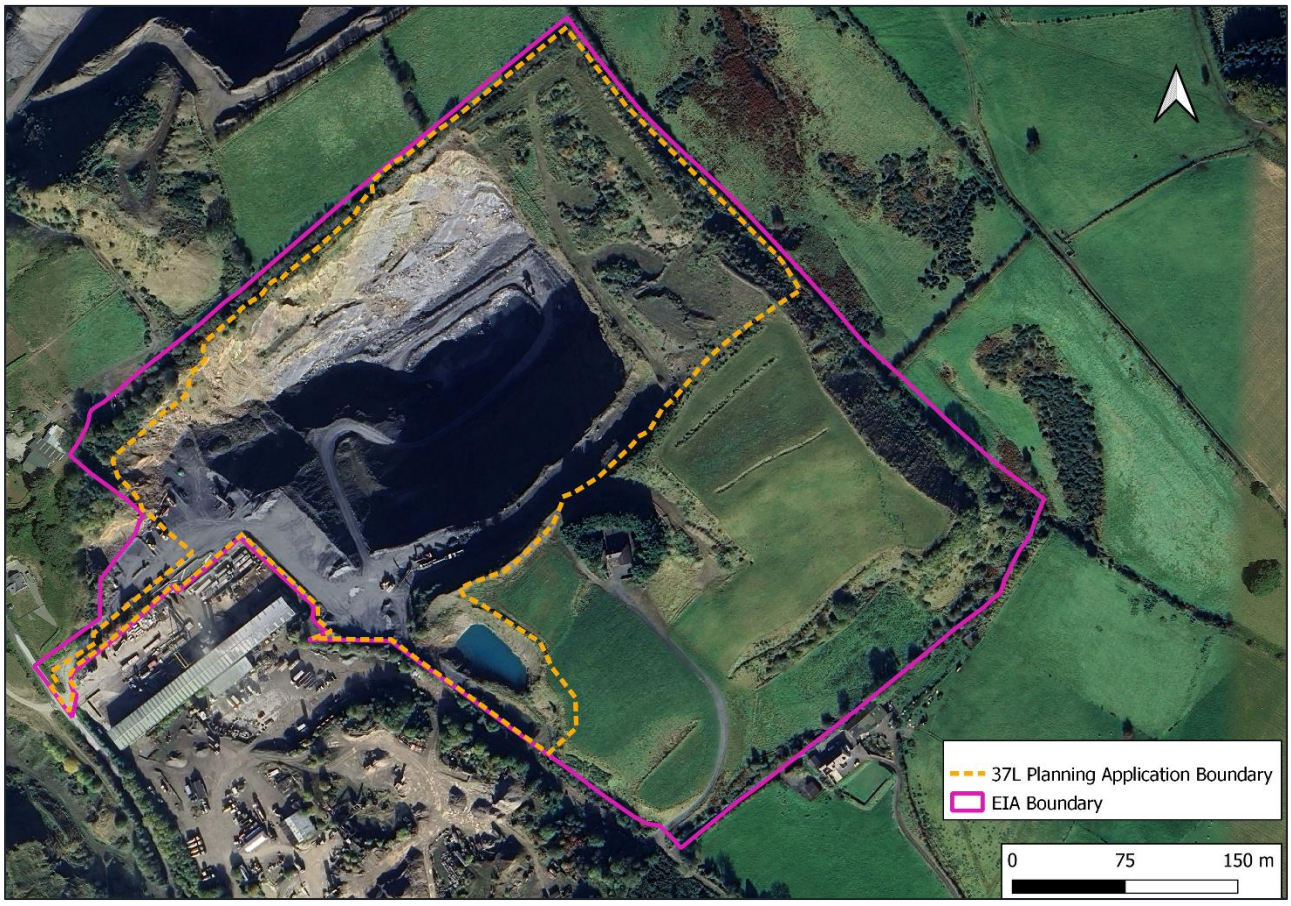

Figure 5-2 - Site aerial from October 2024

Three main land uses have been identified within the Site and the study area (1 km from the Site boundary). These are the agricultural and single-house residential lands, and other quarry operations. The lands to the north and west can be characterised as rural in nature, with land uses in the area being agricultural and single-house residential. Sheep rearing and grazing of cattle are the main activities in the area. The N81 road passes through the 1 km buffer to the southeast of the Site and the lands immediately to the north and southwest of the Site are taken up by quarrying

activities operated by unrelated parties. The Site consists of planted grassland within the boundary and the quarry area (including the processing plant, welfare facilities, and two soakaways). The two soakaways have been extracted down to the competent bedrock.

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 5-3), 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.

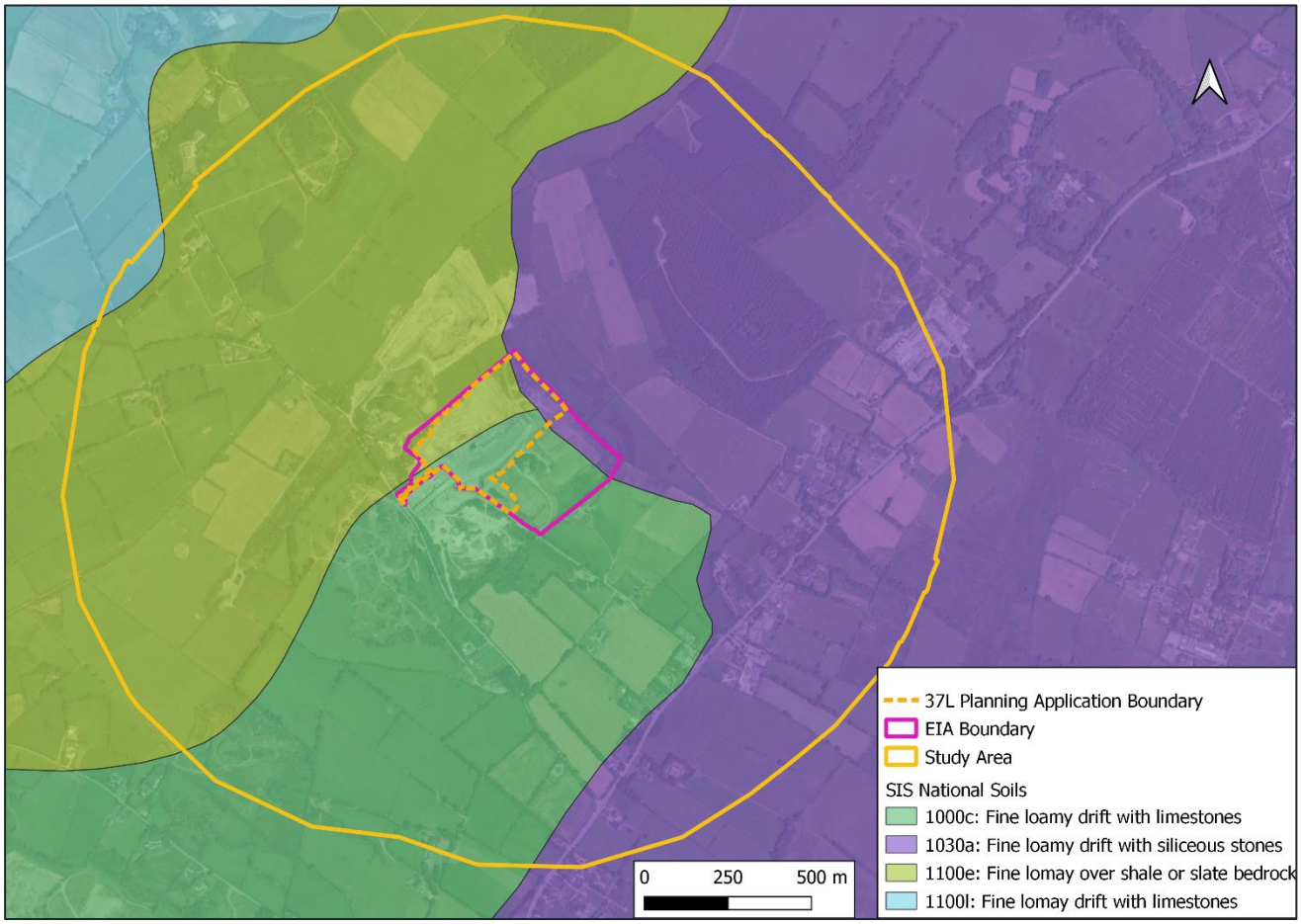

Figure 5-3 - Irish Soil Information System (SIS) Mapping overlain on ESRI Satellite aerial.

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
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 5-4). 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.

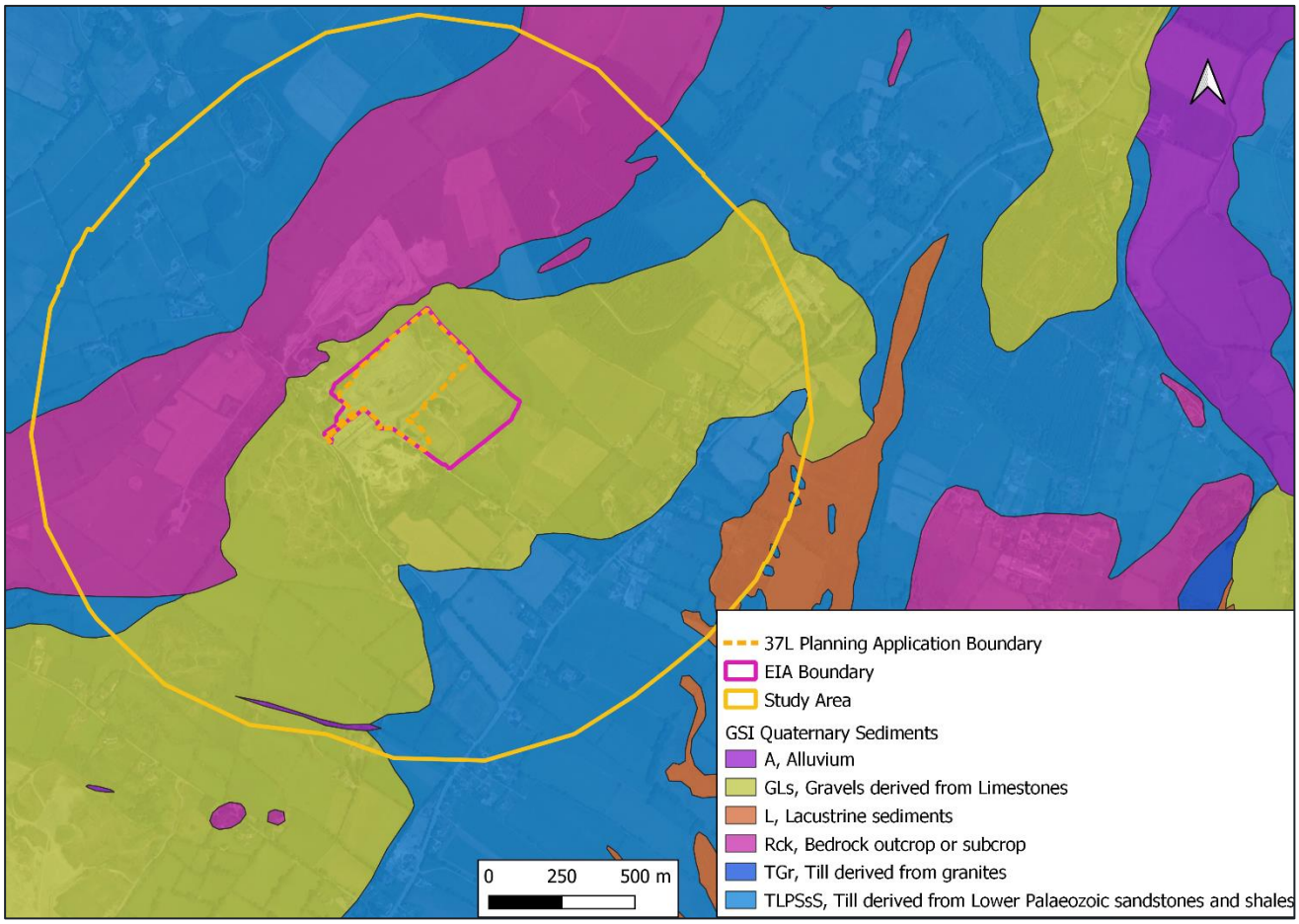

Figure 5-4 - Underlying Quaternary Sediments (subsoil) (GSI, 2022) overlain on ESRI Satellite

5.4.3 BEDROCK GEOLOGY

The GSI Bedrock Geology 1:100,000 map (Figure 5-5) 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 5-5 - Underlying Bedrock Geology (GSI, 2022) overlain on ESRI Satellite aerial.

5.4.4 SITE INVESTIAGATIONS

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 Ltd 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 5-6 below.

Figure 5-6 - 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 is unlikely to change as a result of the Proposed Development.

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 – Sensitive 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 will be excavated to facilitate extraction of bedrock, they will be 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 EIAR has been prepared to accompany a Section 37L for the continuation and extension of quarrying activities at the Site. The lands, the subject of this EIAR extend to 10.03 ha. and are located within the EIA project boundary for the EIAR (18.45 ha).

A continuation of extraction and processing activities at the Site are proposed with a lateral extension of the quarry to the northeast of the existing void space. Proposed activities will involve the extraction of the rock (greywacke) using excavation techniques, which include drilling and blasting, and rock-breaking. Processing of crushed blast rock will be by mobile crusher and screen(s).

SQL propose to relocate the existing office container, wheel wash and tank, weighbridge within the Site to provide space for realignment of the private access lane on SQL lands and to develop dedicated carparking facilities for the quarry operation on SQL owned lands. SQL propose to decommission the existing abstraction borehole located off the access road to facilitate a road realignment on their own lands. SQL propose to undertake periodic extraction of groundwater from an abstraction borehole located on Stresslite Precast Ltd to provide water for SQL's closed-loop system wheelwash recycling tank and the mobile bowser.

This application for further development of the quarry is made concurrent with an application for substitute consent for the quarry that is accompanied by an rEIAR.

The lands surrounding the Site can be characterised as rural in nature, with land uses in the area being agricultural, industrial and single-house residential. The lands contiguous to the boundaries of the Site are in agricultural use to the east and west. To the north, lands adjacent to the Site are used for the aggregate extractive industry. To the south, lands are in use by a precast concrete manufacturing company (Stresslite Precast Ltd.) There are scattered residential properties in the vicinity of the Site, primarily concentrated to the south of the site along the Local Road L6030.

5.6.1 EMBEDDED MITIGATION

This initial assessment of the significance of potential effects resulting from the Proposed Development takes into consideration any embedded design and commonly undertaken good practice mitigation. The elements of the Proposed Development design and good working practices that reduce the potential for impacts to soils and geology include 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;
- Wheel wash for all vehicles exiting the quarry;
- Refuelling takes place on-site by third party contractors using drip mats;
- Exposed edges in the quarry are protected with safety berms, which also act to screen the Proposed Development; and
- Monitoring of groundwater and surface water quality. Groundwater and surface water quality monitoring will provide assessment of the effectiveness of the mitigation measures.

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[3] used during the Proposed Development could affect the chemistry of the soil (where it is still in-situ) or could infiltrate to the groundwater through the sands and gravels or bedrock.

Given the measures set out in section 5.6.1 are implemented, it is considered that there is limited potential for contamination to lands from leaks and/or spills. Therefore, magnitude of effect to both

[3] No fuels are proposed to be stored onsite.

land and human health is '*Negligible (adverse)',* and the level of effect is at most, '*Slight'*. Therefore, the potential impacts to land quality and human health from site operations at the Proposed Development are considered to be **Not Significant**.

5.7.2 CHANGE OF LAND USE / LAND TAKE

Extraction of rock is proposed to increase the quarry area by approximately 1.89 ha. This land is within the EIA boundary and is not currently used for agriculture. Any removed topsoil from these activities will be stored on Site. The potential magnitude of the impact on land use is therefore considered to be '*Negligible'*. Therefore, potential impacts to land use / land take from site operations are considered to be **Not Significant**.

5.7.3 LOSS OF SOILS AND BEDROCK (AS AGGREGATE RESERVE)

Topsoil within the EIA boundary will be removed for quarrying and a small section will be removed for the realignment of the entrance road. However, the area where topsoil will be removed from is relatively small, given that extraction is extending by 1.89 ha. Where topsoil is removed it will be stored on site.

By the nature of quarrying, the sub-soils as sands and gravels and greywacke bedrock will be removed with quarrying, will result 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 where the greywacke bedrock is abundant. The potential impact of site operations to bedrock as an aggregate reserve is therefore '*Medium (adverse)',* therefore the potential level of effect is at most, '*Slight'.* Therefore, potential impacts to soil and bedrock (aggregate reserve) from site operations are **Not Significant.**

5.7.4 GEOTECHNICAL INSTABILITY

The Site is in an area of low seismic activity; however, the extraction activities will create new quarry faces within the sands and gravels and bedrock. Stability issues may arise during the excavation of the quarry faces. Extraction activities have the potential to affect the health of workers if the ground were to become unstable. The importance of this attribute therefore is considered to be *Low* in terms of a land, soils and geology receptor and *High* in terms of human health.

The proposed extraction plan has incorporated industry standard for slope design, thus mitigating any potential geotechnical / geohazard risks and the existing quarry is well maintained and managed.

The management of the existing quarry faces will be carried out in accordance with the Health and Safety Authority's 'Guidelines to the Safety, Health and Welfare at Work (Quarries) Regulations 2020' (amended), and the recommendations of geotechnical appraisals carried out on site.

The stability of excavations and stockpiles will be monitored and managed, so the potential impact is predicated to be *Negligible (adverse).* Therefore, potential impacts from geotechnical instability are **Not Significant.**

5.7.5 GEOLOGICAL HERITAGE

The Proposed 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 will not negatively impact the CGS management objectives and the potential magnitude of effect is '*Negligible'*, therefore the potential level of effect will be at most, '*Imperceptible'*.

Therefore, potential impacts to geological heritage are considered to be **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
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 MITIGATION MEASURES

Additional mitigation and/or management is intended to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment. The initial assessment of potential effects (considering embedded mitigation) has not identified any significant adverse effects. However, to further mitigate the initial effects associated with land, soils and geology, geotechnical appraisals are to be carried out on site to assess the stability of the worked faces.

5.9 RESIDUAL EFFECTS

Considering the sources of impact, predicted magnitudes of residual impact (accounting for embedded mitigation and additional mitigation), the subsequent residual effect significance is no 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 EIAR. Cumulative effects are considered to be **Not Significant**.

5.11 MONITORING

The ongoing monitoring programme at the Site will include regular geotechnical stability surveys of the quarry faces. Monitoring of the groundwater quality in monitoring wells and surface water quality within artificial ponds will be conducted in line with the Site's environmental programme. Drone surveys will be conducted when necessary to determine whether 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 EIAR.

5.13 SUMMARY AND CONCLUSIONS

This assessment considers the potential impacts and effects on the land, soils and geology as a result of the Proposed Development.

The main receptors that could be affected by changes to the land, soils and geology due to the Proposed Development 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 potential 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.

Irish Soil Information System (Teagasc, 2014) [Accessed: November 2024]

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]