Lobinstown Quarry

Environmental Impact Assessment Report

Section 6

Land, Soils & Geology

2024

BREEDON IRELAND

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6 LAND, SOILS & GEOLOGY

6.1 INTRODUCTION

This 'Land, Soils and Geology' chapter of the Environmental Impact Assessment Report (EIAR) has been prepared for a continuance of operation and extension of the existing working quarry at Heronstown, Lobinstown, Co. Meath.

The proposed development will consist of the the continuance of operation of the existing permitted quarry and associated infrastructure (ABP Ref. 17.QD.0017; P.A. Ref. LB200106 & ABP Ref. 309109-21), deepening of the quarry extraction area by 1 no. 15 metre bench from 50 m OD to 35 m OD, a lateral extension to the quarry over an area of c. 4.8 ha to a depth of 35 m OD, provision for aggregates and overburden storage, and restoration of the site to natural habitat after uses following completion of extraction, within an overall application area of c. 18.5 hectares. An extraction capacity of up to 300,000 tonnes per annum is sought to provide the applicant with the ability to respond to demand for aggregates in the region. Permission is sought for a period of 20 years in order to extract a known resource with a further 2 years to fully restore the site.

This chapter of the EIAR presents the baseline land, soils and geological environment and then assesses potential impacts, assigns mitigation measures, and then reassesses the potential residual impacts. Potential cumulative impacts are also addressed.

6.1.1 STUDY METHODOLOGY

The objectives of this assessment are, as per the EIA Directive (2014/52/EU) and EPA Guidance (2022), to:

- Use publicly available resources and historical site-specific literature to characterise the baseline land, soils and geological conditions for the site.
- Update this information using additional site investigation work (*e.g.,* drilling) and analysis.
- Assess the potential impact of the proposed development on land, bedrock, subsoils and soils.
- Specify appropriate mitigation measures for any identified potential impacts, as deemed necessary. The proposed development works, impacts and mitigation measures will then be reassessed, and residual impacts defined.

6.1.2 STATEMENT OF EXPERTISE

The Water Chapter and the Lands, Soils & Geology (LSG) Chapter of this EIAR have been completed collaboratively between Dr. Pamela Bartley (Hydro-G) and Dr. Colin O'Reilly (Envirologic).

Dr. Pamela Bartley (Hydro-G) is a water focused civil engineer with 24 years' field-based practice in groundwater, surface water and wastewater. Pamela completed her primary degree in Civil Engineering at Queen's University, Belfast and postgraduate education at the School of Civil Engineering at Trinity College, Dublin. She completed an MSc. in Environmental Engineering, at the School of Civil Engineering at TCD, with geotechnical, hydrogeological and legislation specialities and later a hydrogeologically focused Ph.D at TCD. Pamela has become a specialist in quarry and discharge evaluations in the context of enacted Irish Regulation and EU Directives. She has completed impact assessments for many regionally important quarries in SAC settings. Pamela's quarry assessments include Bennettsbridge Limestone, Co. Kilkenny, McGrath's Limestone of Cong, Cos. Galway and Mayo, Churchill Stone, Letterkenny, Co. Donegal, Harrington's of Turlough, Co. Mayo, Ardgaineen, Co. Galway and Mortimer's of Belclare, Co. Galway. Each of these quarries operate within SAC catchments and have successfully managed their discharge, under licence, for many years.

Dr. Colin O'Reilly has a doctorate degree in soil systems and hydrology. He has over 20 years' of professional and field-based experience as a hydrogeologist coupled with a doctorate degree in hydrology, awarded by the Centre for Water Resources Research, School of Architecture, Landscape and Civil Engineering, UCD, while a recipient of a Teagasc Walsh Fellowship. Colin is the principal of Envirologic, which has key competencies in hydrogeology and hydrology with expertise in flood assessments in addition to assessment of quarries across a range of diverse hydrogeological conditions across Ireland. Colin is a current and active member of Engineers Ireland and International Association of Hydrogeologists (Irish Group).

Hydro-G and Envirologic have collaborated recently in the compilation of EIAR: Water and LSG chapters for quarries at Spink, Castlepollard and Kinnegad (Breedon), Claremorris (McGrath's), Borrisoleigh (Kelly's of Fantane) and Castleisland (MC Group).

Both Hydro-G and Envirologic hold the required Professional Indemnity Insurances, Employers and Public Liability Insurances.

6.1.3 LEGISLATIVE INSTRUMENTS & PLANNING GUIDANCE

This report was prepared with consideration of European legislation, Irish Regulations and Guidance, listed as follows:

- Mines and Quarries Act (S.I. No. 7 of 1965).
- S.I. No. 349 of 1989, European Communities (Environmental Impact Assessment) Regulations, and subsequent amendments (S.I. No. 84 of 1994, S.I. No. 352 of 1998, S.I. No. 93 of 1999, S.I. No. 450 of 2000 and S.I. No. 538 of 2001).

- The Planning and Development Acts, 2000, as amended; and
- The Planning and Development (Amendment) Act 2010, S.I. 600 of 2001 Planning and Development Regulations and subsequent amendments, including S.I. No. 364 of 2005 and S.I. No. 685 of 2006.
- EIA Directive (2014/52/EU) of the European Parliament and of the Council of 16 April 2014, amending Directive 2011/92/EU, on the assessment of the effects of certain public and private projects on the environment.
- S.I. No. 473 of 2011, European Union (Environmental Impact Assessment and Habitats) Regulations 2011 and S.I. No. 584 of 2011, European Union (Environmental Impact Assessment and Habitats) (No. 2) Regulations 2011.
- Geology in Environmental Impact Statements: A Guide. Institute of Geologists of Ireland (2002).
- Quarries and Ancillary Activities: Guidelines for Planning Authorities. Department of Environment, Heritage, and Local Government (2004).
- Environmental Management Guidelines for the Extractive Industry (Non-Scheduled Minerals). Environmental Protection Agency (2006).
- Guidelines for the Preparation of Soils, Geology & Hydrogeology Chapters of Environmental Impact Statements. Institute of Geologists of Ireland (2013).
- Reclamation Planning in Hard Rock Quarries. Department of Civil & Structural Engineering, University of Sheffield and Edge Consultants, Mineral Industry Research Organisation (2004).
- Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes. Transport Infrastructure Ireland (undated, c. 2009). https://www.tii.ie/technical-services/environment/planning/Guidelines-on-Procedures-for-Assessment-and-Treatment-of-Geology-Hydrology-and-Hydrogeology-for-National-Road-Schemes.pdf
- A Quarry Design Handbook. GWP Consultants and David Jarvis Associates Limited, UK (2014).
- 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. European Union (2017).
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment. Department of Housing, Planning and Local Government (2018).
- Eastern & Midland Regional Spatial & Economic Strategy 2019-2031. Eastern and Midland Regional Assembly (2019).
- Guidelines on the Information to be contained in Environmental Impact Assessment Reports. Environmental Protection Agency (2022).
- Meath County Development Plan 2021-2027. Meath County Council (2021).

6.1.4 CONSULTATIONS

6.1.4.1 Mandatory Stakeholders

The project description and preliminary findings were issued to the Geological Survey of Ireland (GSI) who responded on 26th September 2023 (Refer to Table 6.7 below and Appendix 4 for details).

The authors of this chapter hereby confirm that this EIAR chapter and Impact Assessment has utilised all relevant and publicly available datasets available from the GSI.

The GSI requested that the operator might assist the GSI's geological heritage goals with the following (and ideally this would be written into the restoration / closure plan) and be included as a condition of planning as deemed appropriate by the planning authority:

1. Allowing access to quarry faces by appropriate scientists (upon request and with due regards to Health and Safety requirements) during quarrying to check for interesting new stratigraphies / relationships as they might become exposed and to establish if the quarry site is worthy of recognition post extraction and through aftercare/restoration planning.
2. If deemed appropriate in (1) above, leaving a representative section of the quarry face at the end of the quarry life or inclusion of information panels to promote the geology to the public or develop tourism or educational resources if appropriate depending on the future use of the site. Natural exposures are few, or deeply weathered, this measure would permit on-going improvement of geological knowledge of the subsurface.

Measures to address geological heritage have been proposed in Table 6.7 below.

6.1.4.2 Meath County Council Planning Section

John Sheils of J Sheils Planning & Environmental Ltd. managed all pre-planning discussions with Meath County Council, as per the provisions of Section 247 of the Planning and Development Acts 2000, as amended.

A pre-planning meeting took place between John Sheils and Meath County Council on 4th October 2023. Meath County Council issued minutes of the meeting in which the following items were noted that may or not be of relevance to this chapter:

- '*Geology and powerline create constraints regarding expansion of quarry'*.
- *'20-year life being requested. This will be assessed when a submission is received'.*

6.2 IMPACT ASSESSMENT METHODOLOGY (EPA, 2022)

The appraisal methodology for the EIAR was completed in accordance with "Guidelines on the Information to be contained in Environmental Impact Statement Reports" (EPA, 2022), "Geology in Environmental Impact Statements, a Guide" (IGI, 2002), and "Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements" (IGI, 2013). In addition, "Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes" (NRA, 2009) is referenced where the methodology for assessment of impact is appropriate.

The procedure for determination of potential impacts on the receiving land, soil and geological environment is to identify potential receptors within the site boundary and surrounding environment and use the information gathered during the desk study and field work to assess the degree to which these receptors will be impacted upon.

Criteria for assessing importance of site attributes and their magnitude of importance were taken from the NRA Guidelines (NRA, 2009) (as included in 'Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements' (IGI, 2013)).

The rating of potential environmental impacts on the land, soils and geological environment is based on the quality, significance, duration, and type of impact characteristic identified. Consideration is given to both the importance of an attribute and the magnitude of the potential environmental impacts of the proposed activities on that cited attribute.

6.2.1 ASSESSMENT OF MAGNITUDE AND SIGNIFICANCE OF IMPACT ON LAND, SOILS AND GEOLOGY

An impact rating has been developed for each of the phases of the proposed development based on the Institute for Geologists Ireland (IGI) Guidance for the preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements. In line with the IGI Guidance the receiving environment (Geological Features) was first identified. Using the NRA rating criteria in Appendix C of the IGI Guidance the importance of the geological features is rated (Table 6.1) followed by an estimation of the magnitude of the impact (Table 6.2). This determines the significance of the impact prior to application of mitigation measures as set out in Table 6.3.

Table 6.1 Criteria for Rating Site Importance of Geological Features (NRA, 2009)

Magnitude	Criterion	Description & Example
Very High	Attribute has a high quality, significance or value on a regional or national scale. Degree or extent of soil contamination is significant on a national or regional scale. Volume of peat and/or soft organic soil underlying the site is significant on a national or regional scale	• Geological feature on a regional or national scale (NHA). • Large existing quarry or pit. • Proven economically extractable mineral resource
High	Attribute has a high quality, significance, or value on a local scale. The degree or extent of soil contamination is significant on a local scale. Volume of peat and/or soft organic soil underlying the site is significant on a local scale	• Contaminated soil on site with previous heavy industrial usage • Large recent landfill site for mixed wastes • Geological feature of high value on a local scale (County Geological Site) • Well drained and/or high fertility soils • **Moderately sized existing quarry or pit** • Marginally economic extractable mineral resource
Medium	Attribute has a medium quality, significance, or value on a local scale. The degree or extent of soil contamination is moderate on a local scale. Volume of peat and/or soft organic soil underlying the site is moderate on a local scale	• Contaminated soil on site with previous light industrial usage • Small recent landfill site for mixed wastes • Moderately drained and/or moderate fertility soils • Small existing quarry or pit • Sub- economic extractable mineral resource
Low	Attribute has a low quality, significance, or value on a local scale. The degree or extent of soil contamination is minor on a local scale. Volume of peat and/or soft organic soil underlying the site is small on a local scale	• Large historical and/or recent site for construction and demolition wastes • Small historical and/or recent landfill site for construction and demolition wastes • **Poorly drained and/or low fertility soils** • Uneconomic extractable mineral resource

The assessment of the magnitude of an impact incorporates the timing, scale, size, and duration of the impact. The magnitude criteria for geological impacts are defined in Table 6.2.

Table 6.2 Criteria for Estimating Magnitude of Impact on Geology Attribute (NRA, 2008)

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

The matrix in Table 6.3 determines the significance of the impacts based on the site importance and magnitude of the impacts as determined by Table 6.1 and Table 6.2.

Table 6.3 Criteria for Rating of Significant Environmental Impacts (NRA, 2009; IGI, 2013)

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

The assessments completed in this Section of the EIAR considered phases as follows:

(i) Construction Phase.

(ii) Operational Phase.

(iii) Landscaping, Restoration, Decommissioning & Aftercare.

6.3 EXISTING ENVIRONMENT

The receiving environment is described in this section. Firstly, desktop mapping and published information is presented to describe the land, soils, underlying quaternary and bedrock geology, areas of geological heritage, areas of economic interest with respect to geological resources and potential for soil contamination.

6.3.1 DESK STUDY SITE INFORMATION RESOURCES

The following sources of information relating to published and mapped information for the site and its region were used in the compilation of this assessment:

- Gardiner, M.J., Radford, T. 1980. *Soil associations of Ireland and their land use potential.* National Soil Survey of Ireland.
- GSI 2004. Louth GWB Report 1st Draft.
- Finch, T.F., Gardiner, M.J., Comey, A., Radford, T. 1983. *Soils of County Meath*. An Foras Taluntais.
- Heritage Council 2007. *The Geological Heritage of Meath: An audit of County Geological Sites in Meath*. Irish Geological Heritage Programme.
- McConnell, B., Philcox, M., Geraghty, M. 2001. *Sheet 13: Geology of Meath.* 1: 100,000 Bedrock Geology Map Series. Geological Survey of Ireland;
- Ordnance Survey of Ireland. 1:50,000 Discovery Map Series.
- NPWS On-line. Database of Special Areas of Conservation, National Heritage Areas, National Parks, Special Protection Areas including Site Synopsis and Conservation Objectives.
- SLR 2020. Land, Soils & Geology Chapter within EIAR submitted to accompany PL. Ref. LB/200106.
- SLR 2021. *Lobinstown McGough Lands Geological Assessment*.

In addition to national available datasets and desktop available published information, this section also presents an overview of the significant body of historic site investigations at the site and the results of the more recent site investigation works, completed in 2023, to support the understanding of the baseline environment.

Desk study, historic and current site investigation results were then used to complete an impact assessment, identification of required mitigation measures and presentation of residual effects, if found.

6.3.2 SITE LAYOUT

The existing quarry is generally rectangular in shape with an axial orientation of NE-SW across the existing extraction area which covers an area of c. 4.5 ha and has permission to extract bedrock to a depth of 50 m OD (permitted under P.A. Ref. LB200106 & ABP 309109-21). The proposed extension will extend east from the northern section of the existing extraction area and result in a roughly inverted L-shaped extraction area.

The proposed development will consist of the continuance of operation of the existing permitted quarry and associated infrastructure (ABP Ref. 17.QD.0017; P.A. Ref. LB200106 & ABP Ref. 309109-21), deepening of the quarry extraction area by 1 no. 15 metre bench from 50 m OD to 35 m OD, a lateral extension to the quarry over an area of c. 4.8 ha to a depth of 35 m OD, provision for aggregates and overburden storage, and restoration of the site to natural habitat after uses following completion of extraction, within an overall application area of c. 18.5 hectares.

To date, extraction has taken place to a depth of 65 m OD in the southern and central sections of the active, permitted quarry. The quarry comprises disturbed ground with a level processing area located in the central section of the site and an oval-shaped extraction area developed into the central and southern sections of the site. The northern section of the site accommodates the settlement pond and screening embankment along the northern site boundary with the Killary Stream (KILLARY WATER_010, IE_NB_06K010100). The site holds a valid, current Section 4 Discharge Licence (Ref. 20/01), which was issued by Meath County Council in 2020, for a discharge from the treatment systems (settlement lagoons) to the Killary Stream.

In June 2022, Breedon were granted planning permission to develop a readymix concrete plant in the northern section of the quarry (P.A. Ref. 22/328). However, this concrete plant has not been developed to date.

In December, Breedon were granted planning permission for construction of a new single storey office building and associated ancillary works (P.A. Ref. 23/917) at the quarry entrance onto the L1603 local road. The internal access road extends from the site entrance from the L1603 local road on the southern boundary around the western perimeter, connecting to the northern part of the active quarry. The dispatch office, wheelwash and weighbridge are adjacent to the internal access road on the western side of the active quarry. The application area under consideration will require no new access roads and can be accessed from the internal routes already established within the quarry.

6.3.3 SITE LOCATION & TOPOGRAPHY

The site is located within the townland of Heronstown, c. 2 km southeast of Lobinstown, c. 9 km northwest of Slane and c. 9 km west of Collon (see Figure 6.1).

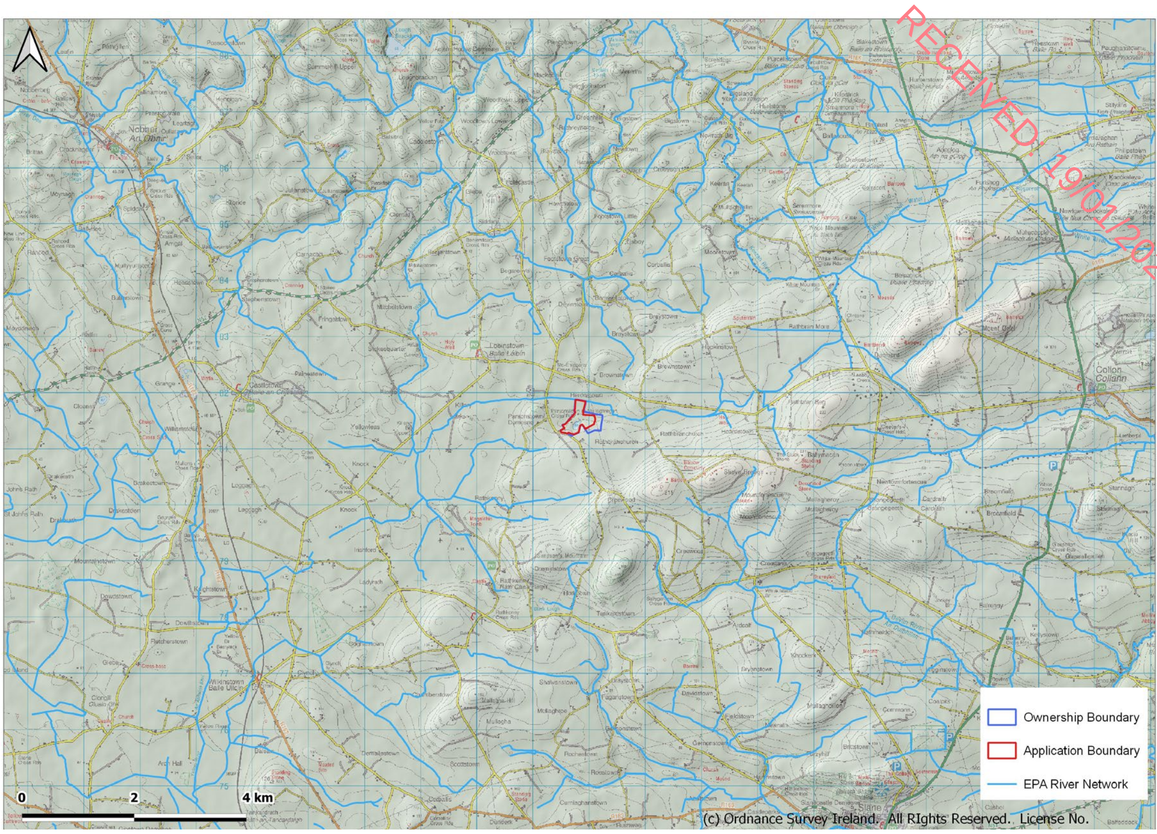


Figure 6.1 Site Location & Regional Topographical Setting

On a regional scale, the site is positioned between two notable topographical landforms, these being drumlin hills to the north and steeper Silurian hills to the southeast.

The site lies at the southeastern end of the drumlin hills that extend through north Meath and continue westwards across through Cavan and Longford. These rounded hills tend to reach up to 100 m OD along the N52 before tapering out into flatter ground on approach to the site. Minor drumlin valley floors of approximately 70 m OD run between these hills.

Setback to 1.6 km southeast of the site, the land climbs to a series of southwest-northeast trending hills, known locally as the Ferrard Hills. Locally, these hills reach 222 – 226 m OD at Slieve Breagh and Rathbran Beg, before falling away to lower ground at Rathkenny, 3 km south of the site. The hills mark the northwestern margins of more elevated ground that extends from Stackallen and Drogheda to the south, and as far north as Ardee, Duleek and Clogherhead.

At a more local scale, the hills at Slieve Breagh slope steeply at first to the northwest down to 120 m OD before levelling out on approach to the site. The southeast-northwest slope continues through the application area, from 110 to 90 m OD, down into a minor east-west valley at c. 83 m OD. A very narrow ridge runs along the western edge of the working quarry, commencing at a minor peak at Creewood (181 m OD), 1.4 km to the south, and terminating at Parsonstown Demesne, 800 m west of the application site.

The entrance to the site from the road is at the highest elevation of the quarry. The site's elevation falls from south to north, with elevations at the entrance on the southern boundary of c. 111 m OD, falling to a minor valley on the northern boundary at c. 83 m OD. The deepest part of the quarry void is at the southern end of the working floor at an elevation of 65.5 m OD and the sump's base elevation gives a water depth capacity 1 m deep. The site is benched up to the centre of the active quarry which is a flat area (c. 91 m OD) used for stockpiling crushed material. From the stockpiling area, the site gently falls in elevation to the grassland plain of the settlement lagoon area that is the northern section of the site (c. 84 m OD).

6.3.4 LAND USE

Land use in the area is almost exclusively agricultural, which is divided relatively evenly between tillage and moderate-intensity agricultural grassland supporting livestock production and dairy.

A 16 ha mature forestry plantation is present 120 m east of the application site and more recently planted tracts of forestry have been established outside the northern boundary of the overall quarry site.

Residential development in the area consists of sporadic one-off housing alongside local roads, with some of these having farmyards attached. Ribbon developments are evident around junctions at Rathkenny and Lobinstown, 3.2 km southwest and 2.0 km northwest of the site, respectively.

There are no occupied residences within the application site or landholding. The nearest residence is 120 m to the southwest of the permitted extraction area. There are 7 residences within 250 m, 15 within 500 m, 31 within 750 m and 45 within 1 km of the proposed extraction area. Heronstown National School is c. 627 metres north of the extraction area (Refer to Figure 4.1).

A recent history of activities on the application area was gained from aerial photography and historical mapping and is summarised in Table 6.4.

SLR (2020) note that the quarry has been in operation since the commencement of the operation in 1958. In more recent times, the quarry was operated by Irish Asphalts Ltd. (c. 2002), followed by Mountain House Quarries (c. 2012) and the current operators, Breedon Ireland, in 2017. Thus, the area has a long history of quarrying, such that these activities have co-existed with other, predominantly agricultural, land uses in the area. The proposed land use on-site will continue the tradition of quarrying activities and associated operations.

The GSI quarry register shows that the nearest active bedrock quarry is Roadstone Slane, located at Deerpark, 7.4 km to the south.

Table 6.4 Historical Land-Use at the Site and its Surroundings

Ordinance Survey Map Reference & / or dates	On-Site	Immediate Surroundings
OS 6 inch colour (1837-1842)	Site is labelled as a 'Quarry'. Small building shown in southeastern corner of existing quarry, no longer present. Small cluster of buildings on eastern boundary of application site, accessed via laneway extending north. No longer present.	Road network as per present. Site labelled 'Quarry' marked 200 m southeast of current quarry entrance.
OS 25 inch (1888-1913)	The 'Quarry' label on the site now includes '(Disused)'. Well marked adjacent to building at southeastern corner of current quarry.	The 'Quarry' label southeast of the current quarry entrance now states 'Gravel Pit (Disused)'. New drainage channel installed west of existing quarry, running northeast.
Aerial Map (1995)	Existing quarry appears similar to that present today. Possible discharge route extending north from quarried area. Extension Area (c. 4.8 ha) in greenfield condition (grassland).	Surrounding lands agricultural.
Aerial Map (2000)	No notable change.	No notable change.
Aerial Map (2005)	No notable change.	No notable change.
Aerial Map (2014)	No notable change.	No notable change.

Aerial photography shows that the nearest quarry to the site is a sand and gravel pit 3.0 km to the northwest, operated by O'Reilly Concrete (currently in final stages of restoration).

A historical bedrock quarry is evident 8.6 km to the southeast at Mullaghdillon. A recent planning application by Lorrac Developments Ltd. implies that this site is currently operating as a Soil Recovery Facility (SRF).

Tara mines is located 10.5 km to the southwest. Roadstone Barleyhill lies 16 km to the north.

There is an Uisce Eireann wastewater treatment plant (WWTP) serving Lobinstown's population of 44 people (Reg. No. A0052-01 WWTP capacity is equal to 60). A discharge license was applied for in 2009 and granted by the EPA in 2011. Treated effluent is discharged to an unnamed tributary which outfalls to the Killary Water, 900 m west of Lobinstown.

The nearest IE licensed facility is C & N Oils Ltd. (P0043), which lies 5 km southeast of the application site. The facility is derelict and partly overgrown, indicating that the facility ceased operations a number of years ago.

The nearest industrial/agricultural facility is a site 1.4 km to the north of the application, operated by Meade Potatoes.

6.4 RECEIVING ENVIRONMENT

6.4.1 GEOLOGY

6.4.1.1 Soils

Teagasc soil mapping is presented in Figure 6.2, which indicates that the application site is covered in shallow, poorly drained mineral soils with an acidic signature.

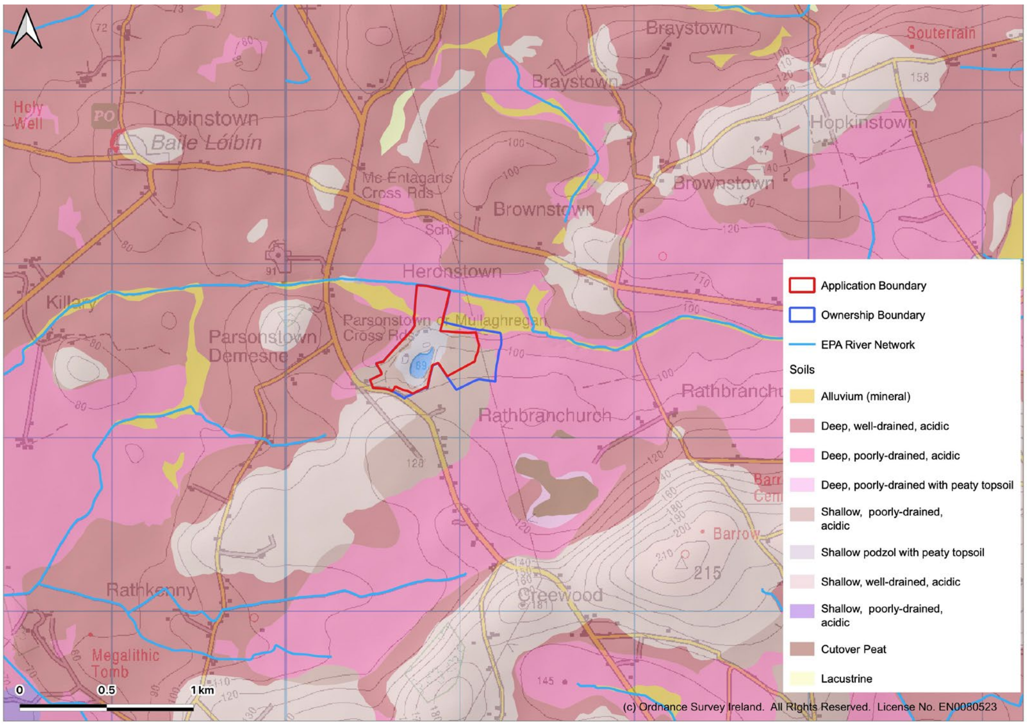


Figure 6.2 Teagasc Soils Classification

Soils in the wider area to the east tend to be similar but slightly deeper, whereas soils to the west and north of the existing quarry have better drainage characteristics. The map shows that soils tend to thin out on higher ground.

Peats are mapped in a small, depressed area 650 m southeast of the application site but outside this they are not mapped.

Reference was made to Soil Associations of Ireland (Gardiner and Radford, 1980), which shows that at the regional scale, soils which overlay the application site are principally Acid Brown Earths.

Soils of County Meath (Finch et al., 1983) describes soils at the site as gleys belonging to the Street Series. This soil unit is poorly-drained and has a greyish brown surface horizon of clay loam texture. Structure is weak fine crumb to weak subangular blocky in the A horizon, becoming prismatic in the B horizon. Mottling occurs close to the surface and intensifies down the profile. Because of its heavy texture, weak structure and poor internal drainage, this series has a limited use range.

6.4.1.2 Quaternary Deposits

The quaternary period incorporates the last 2.6 million years when subsoils and sediments were deposited over the bedrock. The Pleistocene (2.6 million years – 10,000 years ago) is commonly known as the last Ice Age. This was a period of concentrated glaciation separated by warmer inter-glacial periods. Subsoil mapping is presented as Figure 6.3.

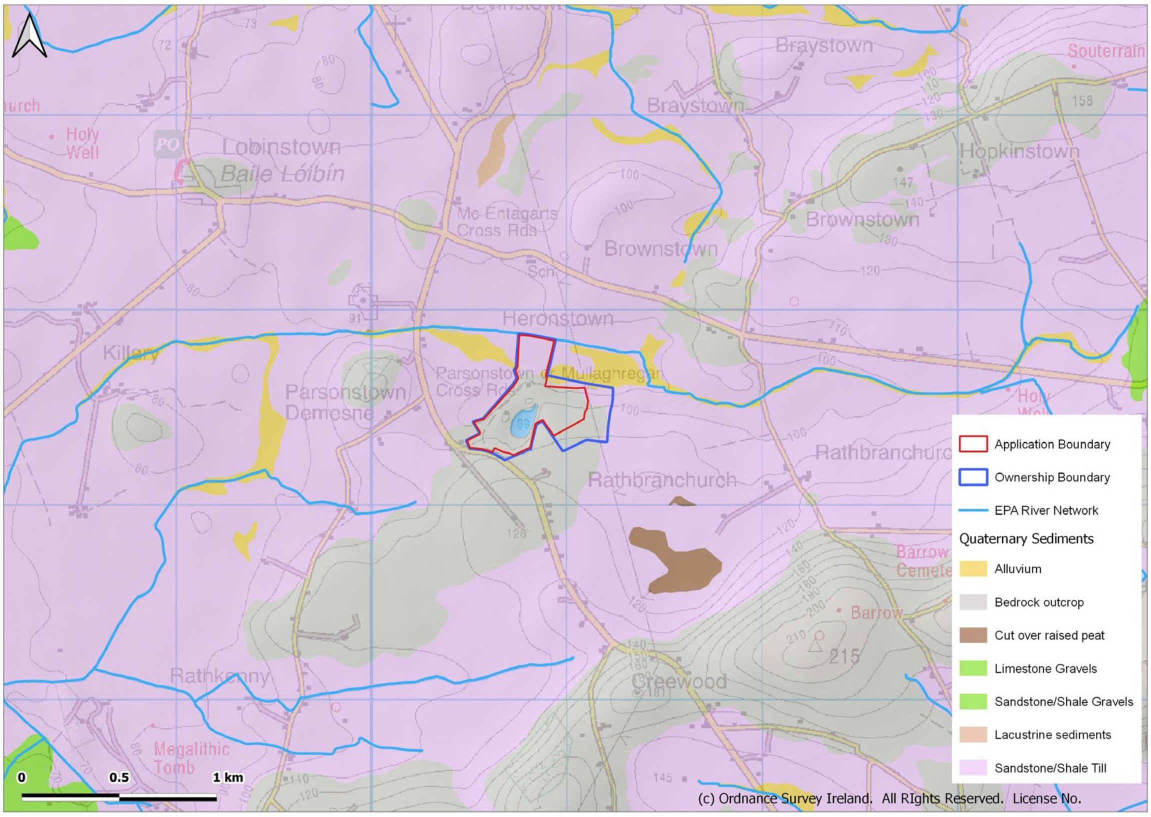


Figure 6.3 Quaternary Deposits

Finch et al. (1983) describes the subsoils of the area and how the general parent material consists of till of shale, sandstone, and some limestone composition. The limestone content of this subsoil diminishes significantly northwards, particularly in the soils occurring on the drumlins and hills where there is a much greater shale influence.

The stream mapped along the northern site boundary is partially flanked and underlain by alluvial deposits, which are a reliable indicator of original watercourse routings. The deposits encroach slightly southwards from the mapped watercourse, which may suggest that the original stream routing was south of its current course and subsequently straightened as part of historical drainage. This is not confirmed by historical mapping.

6.4.1.3 Bedrock Geology

North County Meath regional geology is dominated by the Longford-Down Inlier (or Longford-Down Massif, Fig. 6.4), a major geological feature that runs in a roughly NE-SW orientation from Northern Ireland (County Down) across the border into the Republic of Ireland (County Longford).

Map Sheet 13 of the Geology of Meath (McConnell et. al., 2001) outlines how the Longford-Down inlier is divided into nine discrete structural belts or tracts. These belts are defined as discrete, strike fault bounded units of continuity, internally characterised by distinct lithostratigraphic sequences. They consist mostly of shallow-marginal marine sedimentary (interbedded siltstones and sandstones) facies, volcanic arc deposits and basaltic intrusions that formed during the closure of the Iapetus Ocean during the Lower Palaeozoic Era (410-454 million years ago). The hills that lie to the south of the site along a line from Navan to Duleek, via Grangegeeth, consist of volcanics formed in an island arc. This arc was subsequently overlain by Silurian sediments laid down under deep marine conditions to form black shales.

The Salterstown Formation, which the site overlies (see Figure 6.4), is defined as one such tract (Tract 8), extending from east of Kells to Annagassan. The formation has cross faults at regular intervals orientated southwest-northeast. This unit is described by the GSI as "Calcareous greywacke & banded mudstone" composed of "dark, blue grey weathering siltstones, with interbedded quartzo-feldspathic thin to medium bedded sandstones, rare microconglomerates, several bentonites and thin quartzose sandstone units." The formation also contains some associations of greywacke and mudstone. The succession typically dips steeply (up to 40°) to the east-southeast with some local variability.

The southern boundary of the application site is bound by a minor unit within the Salterstown Formation that is distinguished by presence of chert.

The Clontail Formation to the north is composed of greywackes, more typically associated with the drumlin region.

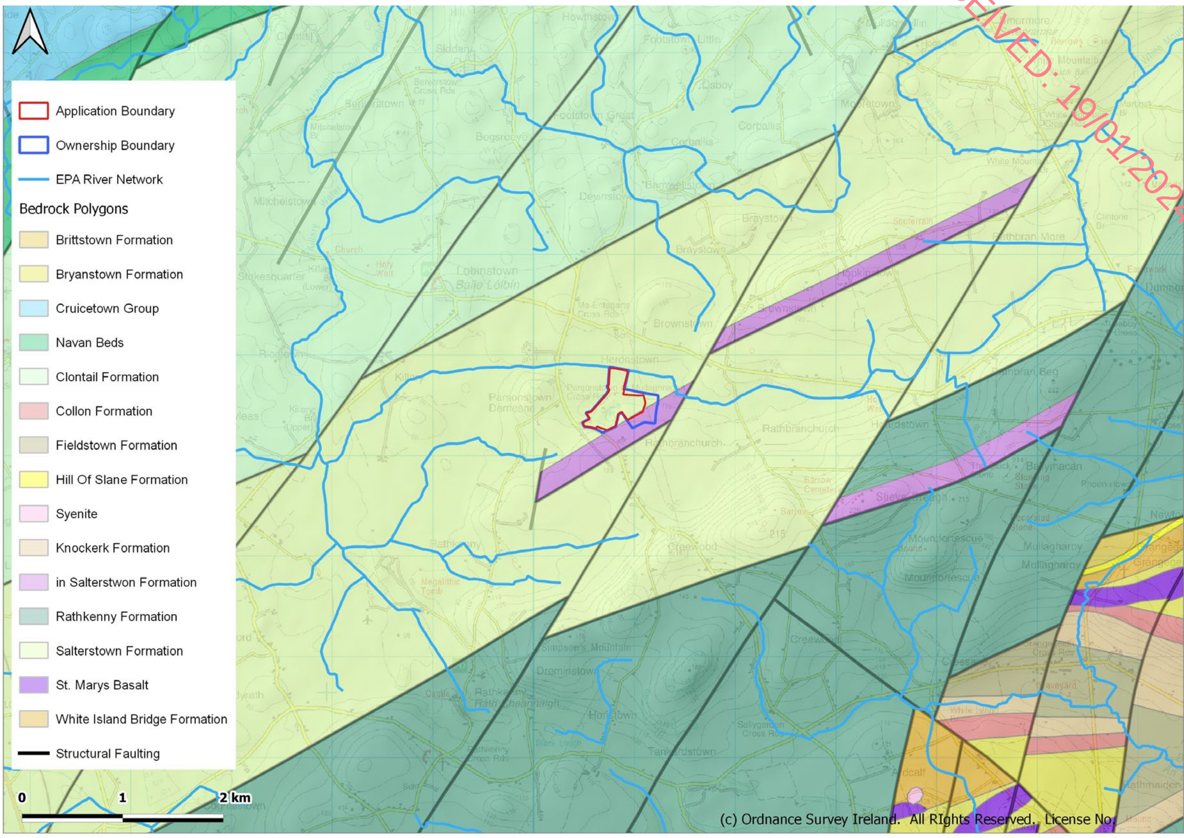


Figure 6.4 Bedrock & Structural Geology

Although no faults are identified as occurring in the site based on the GSI mapping, three faults pass within 350 m of the quarry. One fault with a Caledonian trend (NE-SW), and hence probably a reverse fault, bounds the lower contact of the black shale member and passes c. 250 m south of the quarry extension. A second fault with an NNE-SSW orientation truncates the eastern extent of the black shale member and passes c. 300 m east of the quarry extension. A third fault with a near N-S orientation truncates the western extent of the black shale member and passes c. 350 m west of the existing extraction area.

6.4.1.4 Geological Heritage

Lobinstown Quarry is not mapped by the GSI as a County Geological Heritage Site (CGS).

The closest CGS mapped by the GSI are, as follows:

- At a distance of 3 km to the south, Rathkenny subaerial fan, Rathkenny sandur (MH015). This is described as "Hummocky topography with gravel pit: an Ice contact sub-aerial fan and glacial outwash deposits".
- At a distance of 4 km to the northeast, the most southerly boundary of the Ardee-Newtown Bedform Field (LH001). This is described as "field of subglacial bedforms, which are features formed under the bed of an ice sheet, includes drumlins, crag-and-tails and ribbed moraines, and forms part of a small, discrete field of these features south and southwest of Ardee town. The field covers an area of 8 by 6 km and includes approx. 50 features. Some of the drumlins are superimposed on ribbed moraine features."

6.4.1.5 Economic Geology & Aggregate Potential (GSI)

The Mineral Section of the GSI provides a dataset of Aggregate Potential Mapping (APM) showing areas geologically suitable for quarry development. The quarry is considered to have a 'High potential' for quarrying of 'crushed rock aggregate'.

The GSI mineral database describes the site at Heronstown as '*a quarry producing high PSV surfacing gritstone*'.

6.5 SITE INVESTIGATION

6.5.1 INSPECTION OF EXPOSED FACES

SLR Consulting undertook a geological appraisal of the bedrock underlying the application site and immediate surrounds in 2021 (Appendix 6.1). The aim of this assessment was to confirm the quality of rock in this area. The visual inspection performed as part of those works confirmed that the existing quarry has been developed in medium to thickly bedded metasandstones and metamudstones. The ratio of metasandstone to metamudstone across the existing quarry varies with occasionally highly weathered areas of thinly bedded metamudstones, particularly on the western face.

There is a strongly developed bedding/cleavage dipping at 35-55 degrees to the south-east with local variability because of tight folding and shears. The main joint set also appears to run in a west-northwest to east-southeast orientation. A number of less persistent localised discontinuities were recorded across the faces.

An outcrop of cleaved, moderately strong to strong greywacke was observed on the hilltop towards the southern boundary of the quarry extension area.

The Project Hydrogeologists and Chartered Geologist inspected the quarry faces in various seasons and rainfall recharge events on numerous occasions in 2023.

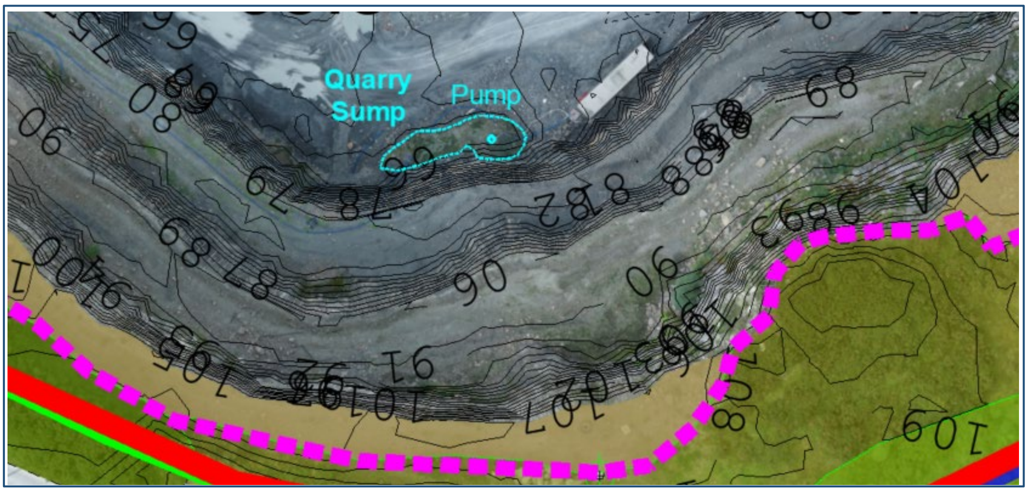
Three benches are currently exposed with the upper bench being thicker in places due to topography on the hilltop.

Bedrock is just below local area ground level. The high PSV (Polished Stone Value) of the greywacke has resulted from compression deformation, which is obvious from the multitude of strikes and dips and central bulges of very hard rock (Refer to Plate 6.1).

Plate 6.1 Bedrock Exposure on Southern face of the site (Site offices in background).

Plate 6.2 Quarry Sump.

View of Sump at Base of Southern Quarry Face



Aerial View of Sump at Base of Southern Quarry Face

The quarry sump is relatively small. This suggests that the bedrock is tight and there is little groundwater movement through it. The orientation of the dips of the bedrock are also evident in Plate 6.1.

6.5.2 GEOPHYSICS

Apex Geophysics carried out geophysics on the lands and underlying bedrock in, and around, the quarry extension subject lands of this application in July 2021 (Appendix 6.2). The objectives were to investigate overburden thickness, bedrock type, bedrock quality, presence of fault/fissure zones and resource volumes. The survey utilised EM31 Electromagnetic Survey, 2D Electrical Resistivity Tomography and Seismic Refraction Profiling.

Overburden in the southern part of the survey area was interpreted as between 1 to 5 m of soft/loose gravelly clay with weathered rock. Elsewhere, overburden consists primarily of soft/loose clay, silt, sand with an interpreted thickness of 4–7 m in the central part of the survey area, increasing to 10–20 m in the lower, flatter ground towards the northern end of the survey area.

Interpretation showed a moderately to highly weathered bedrock layer present across the survey area, which ranges in thickness from 3 to 10 m.

Greywacke with minor shale/mudstone beds occurs in the central-western part of the survey area and rock quality is fair-good on all ERT profiles. It is also fair-good along geological strike from the present quarry and likely to yield a similar rock resource suitable for production of crushed aggregate.

A moderately to highly weathered bedrock layer occurs to depths of up to 15 m at the south-eastern end of the site, where it marks the transition into the shale-rich unit of the Salterstown Formation. Apex (2021) concluded that the bedrock in the very southern portion of the survey area is likely to be of poor quality. Therefore, that land has not been included in the application area.

Seismic refraction returned velocities that correspond with the findings from the EM and ERT surveys (Apex, 2021).

The geophysical interpretation report recommended a series of rotary core boreholes should be drilled to confirm overburden thickness, weathered layer thickness and properties, and rock type and quality. A number of these borehole target locations were subsequently drilled during the follow-on SLR and Hydro-G ground investigation programmes in 2021 and 2023, respectively.

Hydro-G appointed Briody Drilling to drill PW2, which correlates with target PBH3 of Apex (2021). Hydro-G appointed Priority Geotechnical Site Investigation to drill PBH1 and PBH2, which correlates with PBH1 and PBH2 of Apex (2021) (Refer to Figure AGP20111_03, Apex 2021, Appendix 6.2 of this Chapter).

SLR drilled Borehole 20-LOB-05 (target location PBH4 of Apex (2021)) as part of their 2021 Ground investigation programme.

Apex (2021) target location PBH5 was not drilled as the geophysical survey indicated that the low-lying lands to the south, which have recently been planted with forestry, were underlain by 4 to 7 m of overburden (Alluvium) and as such the area was not considered economically viable to develop.

6.5.3 DRILLING

Drilling at the site has taken place in a number of phases as quarrying has progressed. The locations of all boreholes drilled at the site are shown in Figure 6.5.

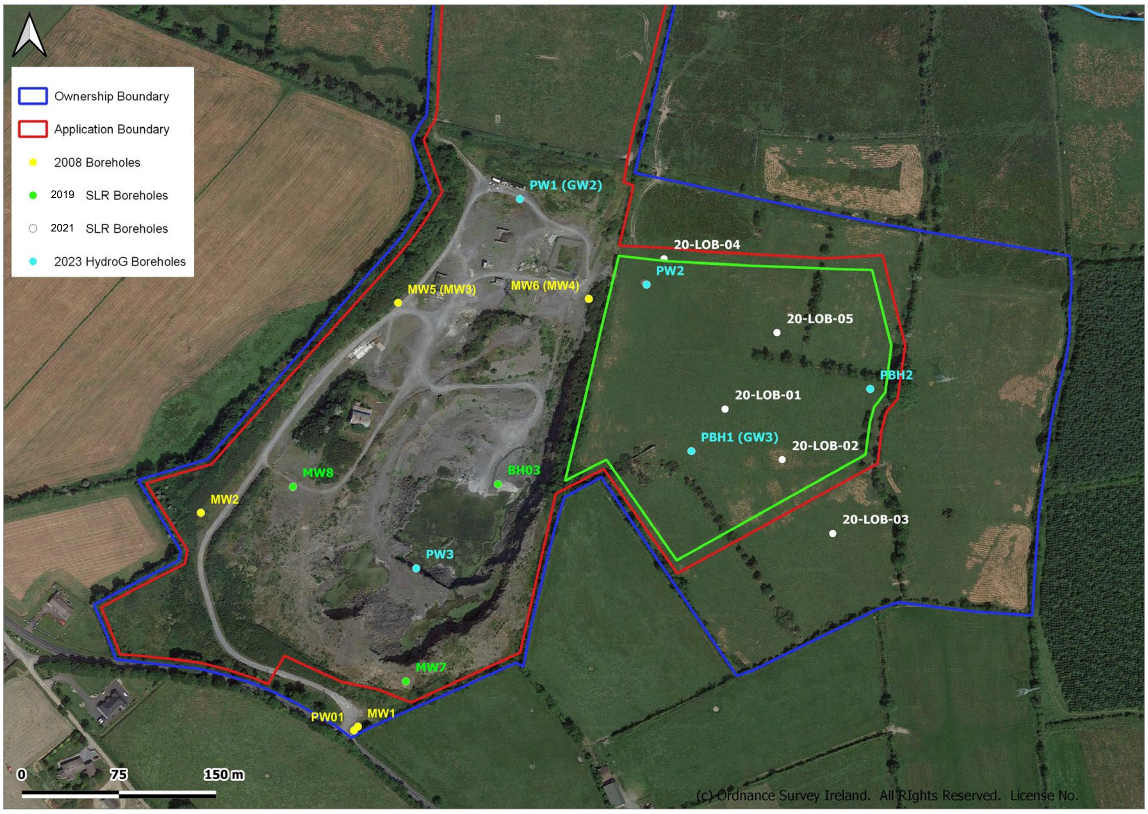


Figure 6.5 On-Site Boreholes

Five core holes (20-LOB-01 to 05) were drilled and described specifically for the assessment of the proposed development currently under consideration. Three 8" wells (PW1 to PW3) were drilled with the intention of enabling aquifer tests (which did not materialise because there were no water strikes) and two boreholes were drilled specifically to accommodate piezometer installations (PBH1 & PBH2) for water quality sampling, water level dataloggers and hydraulic response testing. The drilling results are presented in this section.

The BH Logs from SLR's Geotechnical Assessment Report (SLR, 2021) are presented with their report in this chapter's Appendix 6.1.

All historic application BH Logs and both the 2023 Drilling Records and BH Logs are presented in this chapter's Appendix 6.3.

Firstly, all drilling is discussed in the following sections and at the end of the discussion, while summary details for all wells are collated and presented as Table 6.5.

6.5.3.1 2008 Drilling Programme

In 2008, Dunnes Drilling were tasked with drilling five boreholes in the existing quarry area. Four of these wells were completed as groundwater monitoring wells (MW1 – MW4). The remaining borehole (PW01) was completed as a production well to supply water to the wheelwash, sprinkler system and welfare facilities (i.e., kitchen and toilet).

6.5.3.2 2019 Drilling Programme

Having been destroyed due to quarrying activities, MW3 and MW4 were replaced with MW5 and MW6, respectively.

Three additional boreholes were drilled (MW7, MW8 and BH03) to inform the permission application (P.A. Ref. LB/200106) that sanctions the current activities in the main quarry area. These were terminated below the permitted floor level of the existing quarry (50 m OD). Logs from boreholes MW7 and MW8 confirmed that the rock of interest continues to the proposed elevation for the application area's final floor level, respectively.

6.5.3.3 2021 Drilling Programme

SLR's 2021 geological assessment of lands east of the active quarry was informed by drilling five boreholes to a depth of 80 m bgl (SLR, 2021). Borehole positioning was guided by recommendations made in the 2021 geophysics survey report (Apex, 2021).

Drilling showed that overburden is generally thin, averaging depths of 3 m within the proposed quarry extension area. The weathering profile at the top of each of the boreholes is relatively limited within the fresh rock encountered in each of the holes close to the top of rock head.

Boreholes 20-LOB-01, 20-LOB-02 and 20-LOB-05, all of which are within the application area, encountered a similar sequence of predominantly massive to thickly bedded metasandstones with occasional interbedded metasiltstones and very rare metamudstones. These boreholes confirmed competent rock to full bore depth. It is these metasediments that are the high PSV rock of value in roads and other infrastructure projects.

Borehole 20-LOB-04 encountered a slightly different sequence of massive metasandstone with only very rare metasiltstone.

Borehole 20-LOB-03 returned a distinctly different lithology profile, which correlates with a different type of bedrock that is mapped by the GSI as the '**In** Salterstown Formation' (described as black shale and chert (bs)), and shown as a band of different bedrock to the south of the eastern extension's southern red line application boundary (Figure 6.4). At the 20-LOB-03 drill site location, the upper 30 m of rock consisted of a pyrite-rich banded tuff and slaty metamudstone, which is moderately to highly weathered rock in the upper 13 m. This bedrock unit is not desirable for quarrying and hence the results of borehole 20-LOB-03 were used by the applicant and their geologists to delineate the southern boundary of the application area.

Strength and durability testing indicates that the lithologies present in boreholes 20-LOB-01, 20-LOB-02 and 20-LOB-05 within the application area should be capable of producing a high PSV durable aggregate of excellent quality similar to those currently being worked in the quarry. These lithologies should be capable of producing aggregates compliant with the specifications below:

- TII Series 500, 600 and 800 unbound fill materials
- SR21: 2014 + A1: 2016 Annex E Guidance on the use of I.S. EN 13242 unbound fill materials
- S.R. 16 Guidance on the use of I.S. EN 12620:2002 aggregates for concrete products.

The metasandstone sequence identified in the lands to the east of the quarry are likely to produce high quality aggregates suitable for most end uses, including the production of surface dressing chips.

6.5.3.4 2023 Current Application Drilling

A project specific hydrogeological drilling programme was completed in 2023 to supplement the SLR 2021 drilling programme in the application area.

The 2023 drilling programme comprised five (Down the Hole hammer) boreholes in total, in two different forms of construction and with two different companies, as follows:

1. Firstly, P. Briody Water Well Drilling (Briody) were employed to drill three Test 'Production Wells' (PW1, PW2, PW3) that would enable hydrogeological testing of the bedrock underlying the application area and the active quarry to depths deeper than the application's proposed target depth of 35 m OD. The base elevation of the wells was c. 30 m OD. Hydro-G supervised the three PWs so that they could accommodate submersible pumps. The purpose was to test dewatering and hydraulic conveyance ability of the bedrock in the current working floor's bedrock to 30 m OD, i.e., 5 m below the proposed application floor area. The construction consisted of installing 200 mm steel casing below the top of competent bedrock head and continuing to target depth with open hole bedrock drilling.
2. Secondly, Priority Geotechnical Ltd (Priority) was commissioned to drill boreholes with piezometers installed to test bedrock competency and hydraulic conveyance in the eastern application area. Priority drilled two boreholes. The reasons for changing drilling company were twofold: (i) the test PWs resulted in no significant water strikes; and (ii) the PW drill rig was unable to negotiate the slope to the southeastern part of the application area. Instead, it was decided to bring the track mounted rig of Priority to site because the track mounted rig could negotiate the slope.

The hydrogeologist supervising the PWs did not create conventional 'BH Logs' because the PWs were not drilled solely for the purpose of pumping water from them and not geological logging, which was completed by SLR (2021) and Priority Geotechnical (2023). Summary details recorded by the on-site supervising hydrogeologist during the drilling of the PWs include, as follows:

- **PW1** was drilled in the stockpile area of the active quarry, i.e., the northern area. Details are summarised as follows:
    - GL = 90.62 m OD & 0–5 m = broken rock (possibly screenings/fill)

  - 5–5.25 m = cavity, tree roots
  - 5.25–10 m = broken rock/gravel
  - 10–40 m = competent dark grey/black bedrock*
  - 40–40.2 m = 200 mm anomaly, softer rock
  - 40.2–54 m = competent dark grey/black bedrock
  - 54–54.2 m = 200 mm anomaly, softer rock
  - 54.2–61 m = competent dark grey/black limestone.
  - **End PW Bore @ 29.63 m OD.**

- **PW2** was drilled in the northern portion of the application area. Details and lithology are summarised as follows:
  - GL = 92.78 m OD & 0–3 m = overburden
  - 3–10.7 m = weathered rock
  - 10.7–11 m = clay-filled cavity/lens
  - 11–20 m = competent dark grey/black bedrock
  - 20–25 m = softer rock
  - 25–61 m = competent dark grey/black bedrock.
  - Calcite noted at 35 m, 41 m, 54 m and 57 m.
  - **End Bore Elevation 31.8 m OD.**

- **PW3** was drilled close to the floor sump from a start elevation of 65.97 m OD on the existing quarry floor in the southern part of the active quarry. Competent dark / black bedrock (metasandstone) was encountered throughout the 37 m of drilling to the base elevation of 28.97 m OD, with no features of interest noted.

*NOTE: these PWs are drilled using compressed air and hammers to return chips and dust to ground level. Whilst drillers and field practitioners will record it as limestone or dark black rock on the basis of the actual experience during drilling, the academically correct geological description would be metasandstone / greywacke, i.e. the exact rock that is observed in the walls of the quarry and in the spoil heaps. The point is that the same rock exists under the working floor, and in the application rock, as is currently being worked.

Priority Geotechnical Investigation Drilling:

- Two wells were drilled to 75 m bgl and reached the target base elevation.
- PBH1 @ 107.74 m OD G.L and 75 m depth suggests 32.74 m OD base elevation, which is beneath the proposed floor elevation of 35 m OD. Drilled in the southern portion of the application area, returned 2.3 m of overburden and then competent limestone to the target depth, with a cavity / broken zone logged from 44–48 m bgl.
- PBH2 @ 99.622 m OD G.L and 75 m depth suggests 24.62 m OD base elevation, which is beneath the proposed floor elevation of 35 m OD. Drilled towards the eastern boundary of the application area and the lithology summarised as follows:
    - 0–1.7 m = overburden.
    - 1.7–16 m = weak weathered bedrock with sandy clay bands.
    - 16–75 m = competent bedrock.

The lithology of PBH1 and PBH2 concurs with the findings of Apex's geophysical survey interpretation (Apex, 2021), which was that the metasandstone sequence identified in the lands to the east of the quarry are likely to produce high quality aggregates suitable for most end uses, including the production of surface dressing chips.

As previously stated, summary details for all wells, historic and current, are presented in Table 6.5.

Table 6.5 Summary Details of Boreholes at Lobinstown Quarry

Year	Ref.*	Easting	Northing	Ground Elevation	Drilled Depth	Top of Casing	Base Elevation	Drilled diameter/ Casing diameter	Notes
		m	m	mOD	m	mOD	mOD	mm	
2008 (Dunnes)	PW01	690,617	781,246	111.49	73	111.73	38.49	150 / 125	
	MW1	690,621	781,248	111.32	63	111.39	48.32	150 / 50	
	MW2	690,500	781,413	95.56	50	95.98	45.56	150 / 50	
	MW3	Lost and replaced by MW5 and MW6		89.60	55	90.04	Lost and replaced	150 / 50	Lost in 2018
	MW4			91.30	76	91.63		150 / 50	Lost in 2018
2019	MW5	690,652	781,575	89.80	50	92.03	39.80	150 open hole	Replaced MW3
2019	MW6	690,799	781,578	93.35	28.7	94.97	64.65	150 open hole	Replaced MW4
2019 (Irish Drilling)	MW7	690,658	781,283	108.68	70	109.88	38.68	75 mm open core	
	MW8	690,571	781,433	94.56	60	95.75	34.56	75 mm open core	No longer in place
	BH03	690,729	781,435	81.54	30.4	82.95	51.14	75 mm open core	
2020 (SLR, 2021)	20-LOB-01	690,904	781,493	c. 103.35	80	n/a	c. 25	100 mm TCR	Not retained
	20-LOB-02	690,948	781,454	c. 105.05	80	n/a	c, 28	100 mm TCR	Not retained
	20-LOB-03	690,987	781,397	c, 108.77	80	n/a	c, 30	100 mm TCR	Not retained
	20-LOB-04	690,857	781,609	c. 89.26	80	n/a	c.15	100 mm TCR	Not retained
	20-LOB-05	690,944	781,552	c. 95.95	80	n/a	c.35	100 mm TCR	Not retained
2023 (Briody)	PW1 (GW2)	690,746	781,655	90.63	61.5	91.20	29.63	200 mm Open Hole	GW 2 Samples
	PW2	690,843	781,599	92.79	61.5	93.43	31.79	200 mm Open Hole	
	PW3	690,666	781,370	65.97	35	66.82	29.97	200 mm Open Hole	
2023 (Priority)	PBH1 (GW3)	690,878	781,461	107.74	75	108.29	32.74	100 mm Open Hole	GW 3 Samples
	PBH2	691,016	781,508	99.62	75	100.12	24.62	100 mm Open Hole	

6.5.4 SITE INVESTIGATION CONCLUSION

The current quarry extraction area has been stripped of overburden. It is proposed to deepen the quarry within the current permitted extraction area by 1 no. 15 metre bench from 50 m OD to 35 m OD. Drilling in the active quarry area confirms very hard competent metasediments at depth with no significant groundwater inflows. The southern, western, and northern boundaries of the active quarry are well defined and will remain as they were historically.

Site investigations in the proposed extension lands to the east of the working quarry indicate relatively shallow overburden of soils and subsoils (less than 3 m) requiring stripping and use in perimeter screening berms and/or quarry restoration works. The bedrock within the eastern extension application area is the same high PSV metasediment with little to no groundwater other than at the subsoil bedrock interface, which is normal.

The **southern boundary** of the proposed extension area was revised after the site investigations were completed and reported, specifically Apex's Geophysical Survey (Apex, 2021) and SLR's Site Investigation Geotechnical Assessment Drilling (SLR, 2021). The site investigations identified the transition from the highly competent 'Salterstown' sandstone/mudstone metasediment unit, that is the rock of interest, to the less suitable, highly weathered, banded tuff with slaty metamudstones unit with visible coarse pyrite. The bedding planes dip at c. 40° to the southeast, and therefore, it is projected that the proposed excavations under consideration will not intersect the weathered bedrock immediately south of the proposed extension area.

Extension further **to the east** is principally limited by above ground physical constraints rather than geological features. A 220 kV overhead transmission line traverses the eastern side of the landholding in an NNW-SSE orientation. A 10 and 20 m standoff will be maintained to the application and extraction areas respectively.

Another physical constraint is an ephemeral stream to the east of the application area that is rainfall runoff driven. It is proposed to retain this stream and associated hedgerow, while the extraction area will not encroach within 10 m of the eastern site boundary. The western boundary of the proposed extension area is the current eastern boundary of the existing operational quarry site.

The lands north of the northern boundary of the proposed extension area have recently been planted with forestry and were found to be underlain by 4 to 7 m of overburden (Alluvium), and as such the area was not considered economically viable to develop.

6.6 IMPACT ASSESSMENT

Using the impact assessment methodology presented in Tables 6.1 to 6.3, bedrock at the site is considered to be a geological attribute of High importance (moderately sized existing quarry) while the proposed works have a potential adverse impact of Moderate magnitude (Loss of moderate proportion of future quarry or pit reserves). Based on these criteria the impact to the geological (bedrock) attribute is deemed to be **'Significant/Moderate'**. Given their poor drainage properties and low fertility status, the soils/subsoils at the site are deemed to be a geological attribute of Low importance. Based on these criteria the impact to the geological (soils/subsoils) attribute is deemed to be **'Negligible'**.

However, the application of the framework and methodologies presented in Tables 6.1 to 6.3 provide a general screening of the likely impact to the land, soils, and geological environment. The procedure for determination of more specific potential impacts to the receiving land, soils and geology environment is to first characterise the land, soils, and geological environment (receptors) within the site boundary and surrounding environs. This information was gathered during the desk study and site walkover stages. The potential impacts to these receptors are described in terms of quality, significance, duration, and type, in accordance with the terminology given in Table 3.4 Description of Effects from the EPA guidance document 'Guidelines on the information to be contained in Environmental Impact Assessment Reports' (EPA, 2022).

6.6.1 POTENTIAL IMPACTS - DIRECT

Construction phase works involve stripping of overburden, stockpiling of overburden, etc. The primary activity with potential to impact the land, soil and geological environment during the operational phase is the extraction of bedrock. This will involve blasting of bedrock followed by loading of broken rock into crushers and screening crushed rock into suitable grades prior to haulage off-site. The site entrance, weighbridge, wheelwash and other necessary infrastructure are already in place.

A detailed assessment of impacts is presented in Table 6.6. Only likely or significant impacts are included in the analysis. The impacts are divided into the three primary project phases:

(i) Construction (enabling) phase.

(ii) Operational phase, and

(iii) Landscaping, restoration, decommissioning and aftercare phase.

The development of the existing quarry to date has involved the stripping of soils and overburden followed by the extraction and processing of rock. This has taken place within the footprint of the current permitted quarry. Removal of soils and subsoils to facilitate extraction of further bedrock is considered to be an impact of moderate significance, largely due to the areal footprint. The removal of soil/subsoil will remove the capacity of the subject lands to provide agricultural production. Soil/subsoil used in perimeter berms provides both site security screening (visual, noise & dust) and will be reused or integrated as a fundamental part of site rehabilitation.

Extraction of bedrock within the application site and associated activities, such as blasting and mechanical removal of rock, will have a direct impact on the geology of the sandstone/mudstone within the bedrock extraction area. This is therefore considered to be a direct and permanent impact to bedrock. This impact has occurred historically within the active quarry, and it is considered appropriate in order to continue extraction of bedrock at this site. The significance of the continued extraction of bedrock from this geological unit is considered to be significant/moderate, again as a function of scale. An extraction capacity of up to 300,000 tonnes per annum is being sought as part of this application. A quarry of this size would be considered to be at lower end of medium scale for quarry development.

The site will be worked from the existing quarry area in an easterly direction in a series of c. 15 m benches between c. 105 and 35 m OD (Refer to EIAR Figures 3.1 to 3.3). It is proposed to develop an additional extractive bench below the current quarry floor to 35 m OD. Development of the quarry at depth below the current floor will require increased dewatering of rainfall-runoff and groundwater and discharge to surface water in order to maintain a dry working environment on the floor of the quarry.

Discharge of water from the settlement lagoon at the northern boundary of the existing quarry into the adjacent Killary stream and ultimately the Dee River is subject to the requirements of an existing trade effluent discharge licence (DL 20/01) granted by Meath County Council dated 16/11/2020.

A total of c. 6 million tonnes of workable reserves are available within the proposed extraction area. The maximum annual output will be in the order of 300,000 tonnes giving an anticipated duration for the extraction of c. 20 years. By its nature, quarrying of the underlying rock would involve removal of an identified geological resource and therefore some impact upon land, soils and geology must be expected (Table 6.6).

Extracted material has been, and will continue to be, used both locally and regionally as a raw material in the construction and infrastructure industries. These are considered to be beneficial impacts. The necessity for such raw materials is recognised in the Meath County Development Plan 2021–2027.

The extracted resource is required for the viability of local and regional construction. The high PSV stone is considered a premium product primarily used as a constituent in bituminous mixtures for surface dressing and for surface treatments of roads. The crushed stone also has a use in added value concrete and concrete products.

There is potential for contamination of exposed overburden and bedrock as a result of spillages and leakages. Providing adequate mitigation control measures are in place, the risk of such is deemed to be negligible.

Quarrying presents a risk of potential impact on the stability of the bedrock environment. Subsidence, slope stability, compaction and slope failure are fully considered in the design of all extraction phases at this site, which ensures that these impacts will be prevented.

The decommissioning phase will provide a safer environment than is currently the case, with the removal of all plant and infrastructure, and creation of stable slopes in the interest of health

& safety and long-term sustainability. The site will be reinstated in accordance with the approved quarry restoration scheme, and thus integrated back into the surrounding landscape with the attendant improvement to the visual amenity of the area.

There are no designated sites, with respect to geological features, within the application area or within radius of influence of the proposed development.

The restoration stage of the project describes the aftercare phase that follows the cessation of extractive activities. The restoration plan will involve allowing water to accumulate in the quarry void. This confirms that the long-term land use will have changed from quarrying to biodiversity/amenity.

Table 6.6 Summary of potential impacts on Land, Soils & Geology Environment

Scenarios where impacts may arise	Activity	Attribute	Importance of attribute	Nature and description of the effect	Quality of effect	Significance / magnitude of effect	Extent & context of effect	Probability of effects (pre-mitigation)	Duration and frequency	Type of effect
Construction Phase	Stripping of overburden	Soils, Subsoils	Low: thin, poorly-drained soils supporting pasture & forestry	Excavation of soil/subsoil, storage in stockpiles and reuse in berms and landscaping	Moderate Adverse	Slight	Within application boundary	Likely	Permanent	Direct
	Handling of overburden	Soils, Subsoils	Low: thin, poorly-drained soils supporting pasture & forestry	Loss of overburden due to erosion and dust generation. Damage to soil structure	Moderate Adverse	Slight	Within application boundary	Likely	Temporary	Direct
	Use of hydrocarbons in excavator and dump trucks	Soils; Subsoils; Bedrock	Low: thin, poorly-drained soils supporting pasture & forestry High: Bedrock	Spillages during refuelling, use and storage of lubricants; contamination of exposed soils/subsoils/bedrock	Adverse	Moderate	Within application boundary	Unlikely	Short to medium term	Direct
Operational Phase	Extraction of bedrock	Bedrock	High	Loss of bedrock	Moderate Adverse	Significant/ Moderate	Removal of c. 6 million tonnes of metasandstone rock	Likely	Permanent	Direct
	Extraction of bedrock	Bedrock	High	Raw material for use in construction industry	Positive	Significant/ Moderate	Local & Regional resource generation	Likely	Long-term	Direct
	Use and storage of fuels/hydrocarbons	Bedrock	High	Potential for contamination of underlying bedrock during refuelling or due to leakage	Adverse	Significant	Within application boundary	Unlikely	Medium	Direct
Restoration Phase	Landscaping. movement of soils and stockpiles necessary to facilitate site restoration	Soil & Bedrock	High	Restoration of land to water-filled void	Positive	Significant	Application Area	Likely	Permanent	Direct

Scenarios where impacts may arise	Activity	Attribute	Importance of attribute	Nature and description of the effect	Quality of effect	Significance / magnitude of effect	Extent & context of effect	Probability of effects (pre-mitigation)	Duration and frequency	Type of effect
Unplanned Events	Fuel tank failure or large scale spillage	Exposed Bedrock	High	Hydrocarbon contamination	Negative	Significant	Within application site boundary	Unlikely	Medium	Direct

6.6.2 POTENTIAL IMPACTS - INDIRECT

Indirect impacts (or secondary impacts) are those which are not a direct result of the proposed activity, often produced away from the project site or because of a complex pathway. The extraction of bedrock will permanently remove the capacity of these lands to provide agricultural production. The indirect impact on the soils may be considered to be of a medium to long-term nature until the soils can be reused or integrated as a fundamental part of future site rehabilitation.

6.6.3 IMPACTS – TRANSBOUNDARY

The EIA Directive 2014-52-EU invokes the Espoo Convention on Environmental Impact Assessment in a Transboundary Context, 1991, and applies its definition of transboundary impacts. Given the location (c. 30 km from the border with N. Ireland), the nature, size, and scale of the proposed development, it is expected that the impacts of the development would not have any significant transboundary effects with respect to land, soils and geology.

6.6.4 IMPACTS – CUMULATIVE

The aim of the cumulative impact assessment is to examine whether any other proposed developments have the potential to act in-combination with the proposed application, subsequently giving rise to effects that would not otherwise be significant.

The cumulative impact assessment considered relevant activities within a 10 km radius. There are several quarries in the wider area, including O'Reilly Concrete Lobinstown Quarry c. 2.5 km to the west (currently in final stages of restoration), Roadstone's Slane Quarry, c. 7 km to the south, an unidentified quarry at Knockmooney on the N2 c. 8.5 km to the southeast, and a disused quarry, now operating as an SRF, at Mullaghdillon c. 6 km to the southeast. The only significant industrial/commercial activity within 5 km of the site is the industrial/warehouse estate in Grangegeeth, c. 4.5 km to the southeast. Given the above, no cumulative impacts with respect to land, soil, and geology due to the operation of the quarry at Heronstown have been identified. As such it is considered there is no significant cumulative impact with respect to the operation of the quarry.

6.6.5 'WORST CASE' IMPACTS

The removal of the in-situ mineral resources represents a moderate, long-term, negative impact on the bedrock geology, albeit an inevitable outcome of extractive operations. The geological bedrock exposures within the existing quarry were not previously considered of sufficient interest or importance to warrant designation or protection for earth science or geological heritage purposes. In addition, there are no geological sites of interest or proposed Geological National Heritage sites near the site of the quarry. However, if fresh exposures due to excavation are of geological/ scientific interest, and hence of high to very high importance, incorporation of such exposures in the restoration scheme would represent a moderate, long-term, positive impact. Provision for preservation, promotion, and access to designated geoheritage features would further mitigate the loss of the primary resource, in a manner not too different from the preservation of features by record or in-situ as practiced in Archaeology. Refer to Mitigation Summary Table 6.7 for details of mitigation measures with respect to Geological Heritage.

6.7 MITIGATION MEASURES

The mitigation measures set out in Table 6.7 will be adopted for the proposed extraction activities to reduce the potential impacts to the receiving land, soils and geology environment as identified in Table 6.6.

As a result of the mitigation measures implemented at the site, it is considered that any impacts associated with the quarrying related activities undertaken at the site will not contribute to cumulative impacts in combination with any developments in the surrounding area.

6.8 RESIDUAL IMPACTS

Residual impacts refer to the degree of environmental change that will occur after the proposed mitigation measures have taken effect.

As a result of the proposed mitigation and enhancement measures incorporated in the design (Refer to Table 6.7) no significant, long-term, adverse residual impacts are predicted in terms of Land, Soils and Geology during the operational phase, other than the inevitable loss of mineral resources (i.e., sandstone and siltstone bedrock) due to quarrying.

It is considered that following full restoration and closure of the site that there will be no significant, long-term, adverse impacts in terms of Land, Soils and Geology, again other than the permanent, significant negative impact due to extraction of the mineral resources. The restored quarry will provide a more manageable environment, than is currently the case, but with a change in land-use from Mineral extraction to the beneficial future land-use as a wildlife amenity.

The primary mitigating factor is that the overall resource area is large and homogeneous. The impact of the extraction of the proposed footprint of sandstone/mudstone bedrock is small relative to the volume of this type of calcareous greywacke and banded mudstone in the region. A large area within north County Meath and extending into counties Louth, Cavan and Monaghan is underlain by these Silurian metasediments.

Table 6.7 Mitigation Measures

	POTENTIAL IMPACT			MITITGATION MEASURES	RESIDUAL EFFECT FOLLOWING MITIGATION	
Scenarios where impacts may arise	Activity	Attribute	Character of Potential Impact	Description of Mitigation	Significance or quality of Effect	Probability
Construction Phase	Stripping of overburden	Soils, Subsoils	Excavation of soil/subsoil, storage in stockpiles and reuse in berms and landscaping	Soils are poorly drained and of low fertility and are considered an attribute of low importance. There will be no net loss of soils and subsoils as they will be retained on site and reused in landscaping berms.	Negative, Slight	Likely
	Stripping of overburden	Soils, Subsoils	Loss of overburden due to erosion and dust generation. Damage to soil structure	Movement of material shall be minimised to reduce degradation of subsoil structure and generation of dust. Handling and placement of soils/subsoils shall only take place during appropriate weather conditions and when the soils are in optimum condition (moist but friable). Soils shall not be moved when they are too dry or during unusually windy conditions. All temporary storage mounds will have slope angles not greater than 1:1.5 and will be re-vegetated as quickly as possible to avoid soil erosion by air and water. Topsoil shall be stored to a height not exceeding 3 metres to preserve organic constituents. Storage of soils within perimeter security / screening embankment of the site. This is to allow the vegetation of these screening embankments as soon as possible. Working contours shall be such that there are no direct pathways for suspended solids to leave the site via uncontrolled runoff. Sprinklers and road sweepers shall be used to suppress dust.	Imperceptible	Unlikely

	POTENTIAL IMPACT			MITITGATION MEASURES	RESIDUAL EFFECT FOLLOWING MITIGATION	
Scenarios where impacts may arise	**Activity**	**Attribute**	**Character of Potential Impact**	**Description of Mitigation**	**Significance or quality of Effect**	**Probability**
	Use of hydrocarbons in excavator and dump trucks	Soils; Subsoils; Bedrock	Spillages during refuelling, use and storage of lubricants; contamination of exposed soils/subsoils/bed rock	Breedon SOPs have been designed to ensure responsible activity on their sites. Potentially contaminating substances will be stored in a designated area that is isolated from surface water drains or open waters and not within 30 m of drainage ditches or surface waters. Hazardous wastes such as waste oil will be stored in designated, sealed containers. All waste containers and fuel tanks shall be stored within a secondary containment system (e.g., a bund for static tanks or a drip tray for mobile stores and drums). The bunds will be capable of storing 110% of tank capacity, plus a minimum 30 mm rainwater allowance where the bund is uncovered. Where more than one tank is stored, the bund must be capable of holding 110% of the largest tank or 25% above the aggregate capacity. Drip trays used for drum storage must be capable of holding at least 25% of the drum capacity. Regular monitoring of water levels within drip trays and bunds due to rainfall will be undertaken to ensure sufficient capacity is maintained at all times. Refuelling and lubrication of semi-mobile plant and haulage vehicles is carried out by a trained and dedicated operative. Control measures exist as standard operating procedures in the overall quarry. A double skinned fuel tank is provided on-site for refueling of some mobile plant and machinery. For larger mobile plant such as crushers and screeners, refuelling takes place on the quarry floor on an as-needs basis by a mobile fuel truck. Servicing of vehicles will take place off-site. Small amounts of oils and lubricants will be stored on-site for use on mobile equipment. Spill trays and hydrocarbon spill kits will continue to be provided as necessary.	Imperceptible	Unlikely

	POTENTIAL IMPACT			MITITGATION MEASURES	RESIDUAL EFFECT FOLLOWING MITIGATION	
Scenarios where impacts may arise	Activity	Attribute	Character of Potential Impact	Description of Mitigation	Significance or quality of Effect	Probability
				The operator has in place an emergency response procedure for hydrocarbon spills and appropriate training of site staff in its implementation. The site access from the wheel wash to the entrance has been paved. All waste oils will be collected and removed off-site by an approved waste collection contractor in the area. Regular monitoring and maintenance of silt traps will be undertaken in accordance with the manufacturer's specifications. Oil that accumulates within hydrocarbon interceptors shall be regularly removed by an appropriately licenced contractor. In addition, the hydrocarbon interceptor shall be appropriately maintained in accordance with the manufacturer's specifications.		
Operational Phase	Extraction of bedrock	Bedrock	Removal of bedrock within quarry footprint from c. 100 to 35 m OD.	There is no measure to mitigate against loss of bedrock. The amount to be extracted is considered moderate in terms of the overall quarry.	Negative, Significant	Likely
	Extraction of bedrock	Bedrock	Local & Regional Resource Generation	No mitigation required for the supply of materials because it is the planned, positive activity for the development.	Positive, Significant	Likely
	Extraction of bedrock	Soils; Subsoils; Bedrock	Long-term stability	A detailed working scheme/ restoration plan has been prepared (Refer to Figures 3.1 to 3.3). In preparing the design, standard criteria were adopted with regard to face slopes, standoffs to site boundaries, etc. The final quarry face angles have been assessed by a geotechnical engineer to ensure long-term stability after completion of extraction operations. The stability of restored faces observed in the existing quarry indicates that the long-term stability of the final quarry faces will be satisfactory in this geological environment.	Negative, Not-significant	Likely

	POTENTIAL IMPACT			MITITGATION MEASURES	RESIDUAL EFFECT FOLLOWING MITIGATION	
Scenarios where impacts may arise	**Activity**	**Attribute**	**Character of Potential Impact**	**Description of Mitigation**	**Significance or quality of Effect**	**Probability**
	Extraction of bedrock	Bedrock	Geological Heritage	Allowing access to quarry faces by appropriate scientists (upon request and with due regards to Health and Safety requirements) during quarrying to check for interesting new stratigraphies / relationships as they might become exposed and to establish if the quarry site is worthy of recognition post extraction and through aftercare/restoration planning. Leaving a representative section of the quarry face at the end of the quarry's life or inclusion of information panels to promote the geology to the public or develop tourism or educational resources if appropriate depending on the future use of the site. Natural exposures are few, or deeply weathered, this measure would permit on-going improvement of geological knowledge of the subsurface. Should any significant bedrock exposures of importance be identified, Breedon will work with the GSI to find a mutually beneficial arrangement on how best they can be designed to remain visible as rock exposure rather than covered with soil and vegetated, in accordance with safety guidelines and engineering constraints. This measure would permit on-going improvement of geological knowledge of the subsurface and could be included as additional sites of the geoheritage dataset, if appropriate. The final land restoration scheme will ultimately allow the site to be returned to a condition whereby there will be negligible residual impact on the geological heritage of the site and surrounding environment due to the excavation and removal of bedrock underlying the site. It is planned to minimise, eliminate, or decrease long-term ecological and visual impacts on the environment through the implementation of the final restoration scheme.	Positive, Significant	Likely
Restoration Phase	Landscaping. Restoration of Residual faces, movement of berms and stockpiles necessary to facilitate site restoration	Soils, subsoils& Bedrock	Restoration of land to water filled void	No mitigation is required for restoration as it is a planned part of the development. It is anticipated that final restoration will be achieved within 2 years of completion of extraction operations. Final restoration will be to a beneficial after-use as a secure wildlife refuge/ amenity with water feature. The intention is to create a habitat suitable for aquatic life and birds, such that the disused workings will eventually become of considerable amenity value.	Positive, Moderate	Likely

	POTENTIAL IMPACT			MITITGATION MEASURES	RESIDUAL EFFECT FOLLOWING MITIGATION	
Scenarios where impacts may arise	**Activity**	**Attribute**	**Character of Potential Impact**	**Description of Mitigation**	**Significance or quality of Effect**	**Probability**
				A detailed Restoration and landscaping plan has been prepared as part of the application (Refer to Figure 3.2) A well-coordinated restoration process (in consultation with the IGH) will ensure that representative areas of quarry faces are left unvegetated. Parts of the upper benches will also be seeded with suitable species of shrubs and climbers to create vegetated ledges. Vegetation and natural colonisation on these benches will encourage growth on the faces and will subsequently break up the natural harshness of the exposed rock face. This will occur in a progressive manner as quarrying progresses. he final land restoration scheme will ultimately allow the site to be returned to a condition whereby there will be negligible residual impact on the surrounding environment due to the extraction and removal of the sandstone/siltstone bedrock underlying the site. It is planned to minimise, eliminate, or decrease long-term ecological and visual impacts on the environment through the implementation of the landscaping & restoration scheme.		
Unplanned Events	Fuel tank failure or large-scale spillage	Exposed Bedrock	Potential for contamination of exposed bedrock as a result of spillages/leakages.	Breedon SOPs have been designed to ensure responsible activity on their sites. Potentially contaminating substances will be stored in a designated area that is isolated from surface water drains or open waters and not within 30 m of drainage ditches or surface waters. Hazardous wastes such as waste oil will be stored in designated, sealed containers. All waste containers and fuel tanks shall be stored within a secondary containment system (e.g., a bund for static tanks or a drip tray for mobile stores and drums). The bunds will be capable of storing 110% of tank capacity, plus a minimum 30 mm rainwater allowance where the bund is uncovered. Where more than one tank is stored, the bund must be capable of holding 110% of the largest tank or 25% above the aggregate capacity. Drip trays used for drum storage must be capable of holding at least 25% of the drum capacity.	Neutral	Unlikely

	POTENTIAL IMPACT			MITITGATION MEASURES	RESIDUAL EFFECT FOLLOWING MITIGATION	
Scenarios where impacts may arise	**Activity**	**Attribute**	**Character of Potential Impact**	**Description of Mitigation**	**Significance or quality of Effect**	**Probability**
				Regular monitoring of water levels within drip trays and bunds due to rainfall will be undertaken to ensure sufficient capacity is maintained at all times. Refuelling and lubrication of semi-mobile plant and haulage vehicles is carried out by a trained and dedicated operative. Control measures exist as standard operating procedures in the overall quarry. A double skinned fuel tank is provided on-site for refueling of some mobile plant and machinery. For larger mobile plant such as crushers and screeners, refuelling takes place on the quarry floor on an as-needs basis by a mobile fuel truck. Servicing of vehicles will take place off-site. Small amounts of oils and lubricants will be stored on-site for use on mobile equipment. Spill trays and hydrocarbon spill kits will continue to be provided as necessary. The operator has in place an emergency response procedure for hydrocarbon spills and appropriate training of site staff in its implementation. The site access from the wheel wash to the entrance has been paved. All waste oils will be collected and removed off-site by an approved waste collection contractor in the area. Regular monitoring and maintenance of silt traps will be undertaken in accordance with the manufacturer's specifications. Oil that accumulates within hydrocarbon interceptors shall be regularly removed by an appropriately licenced contractor. In addition, the hydrocarbon interceptor shall be appropriately maintained in accordance with the manufacturer's specifications.		

6.8.1 INTERACTION WITH OTHER IMPACTS

The EIAR guidelines (EPA, 2022) highlight that the interaction of impacts to the land, soils, and geological environment, arising from proposed activities, must be given due consideration alongside potential receptors identified in other EIAR sections. The likely interactions have been identified as follows:

- The movement of bedrock by blasting and mechanical means can give rise to increased dust emissions.
- The extraction of bedrock can impact upon surface and groundwater quality and flow patterns.
- The extraction of bedrock can impact upon biodiversity and cause disturbance to habitats in the area.

Each of these issues and the mitigation measures proposed are addressed in detail in the relevant sections of this EIAR (Refer also to EIAR Section 15 - Interactions of the Foregoing). These impacts are considered to be negative but with suitable measures in place, their significance can be mitigated, with the exception of the extraction of bedrock, the removal of which is permanent. However, this is an inevitable consequence of quarrying and extractive activities that is deemed essential to development of society.

6.8.2 DO-NOTHING SCENARIO

The 'Do Nothing Scenario' evaluation requires consideration of the effect on the environment as it would be in the future should the proposed works not be carried out.

If the development did not proceed, the aggregate resource would continue to be worked within the confines of what is permitted under the current planning permission (P.A. Ref. 200106) whilst the remainder of the proven mineral resource would remain unused in situ, and the local supply of quality aggregates would be more restricted. Under the 'Do Nothing' scenario, all quarrying and ancillary activities would be completed under P.A. Ref. 200106 and operations would cease thereafter. The site would then be restored as per the requirements of the existing planning permission (P.A. Ref. 200106).

As the proposed activities are a continuation and extension of activities into the adjoining lands, it is envisaged that no new or different potential impacts shall be introduced when compared to the current operational phase.

It is considered more appropriate to continue activities from the existing active quarry into the proposed extension area of the application site as opposed to opening a new quarry on a greenfield site to meet the needs of society for homes, transport networks, places of work and recreational areas. Quarrying is an established land use at this site, and it has been integrated into the local environment. As it is a continuation of existing activities, there will be effectively no construction or enabling phase with respect to access to the extraction area.

A maximum extraction capacity of 300,000 tonnes per annum is being sought as part of this application. A quarry of this size would be considered to be at lower end of medium scale for quarry development. This extraction capacity is sought to provide the applicant with the ability to respond to demand for aggregates in the region. Permission is sought for a period of 20 years.

Whilst machinery will be replaced as necessary, there will be no increase in site infrastructure associated with ongoing extraction, internal haulage, and processing of raw material.

Sourcing of bedrock at a greenfield site at a further remove would significantly increase impacts linked to traffic such as increased combustion of fossil fuels.

6.8.3 MONITORING

As no significant impacts are expected other than the loss of the mineral resource, no specific monitoring with respect to the land, soil or geological environment is likely envisaged.

The Company has established an environmental management system (EMS) designed to comply with the environmental requirements of the ISO 14001:2015 standard and the Quality Management requirements of ISO 9001:2015 (Refer to EIAR Section 3.3.3). A copy of the Environmental Management Plan (EMP) for the Lobinstown Quarry is included in Appendix 13. This will be updated in accordance with any new planning consents or licences.

The detailed procedures to be followed, in respect of monitoring for the purpose of demonstrating compliance with Permits/ Licences, etc. are outlined in the Depot Procedures Manual. Monitoring procedures, recording, and reporting procedures and specific procedures for dealing with non-compliances, and corrective actions are outlined in these procedures.

The EMP for the quarry includes regular monitoring activities (e.g., Water, Blasting, Noise and Dust) to demonstrate that the development is not having an adverse impact on the surrounding environment.

The locations of environmental monitoring stations used to inform the EIAR for the proposed development are shown on the Existing Site Plan of Figure 1.3.

Future environmental monitoring programmes for the site will be submitted to Meath County Council for their approval prior to the commencement of quarry activities.

The monitoring programs will be compiled to demonstrate compliance with any environmental conditions attached to any decision to grant planning permission, and also to ensure that the development is not having an adverse impact on the surrounding environment.

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