Environmental Impact Assessment Report

For

JOHN NULTY LIMITED

Ardkill More and Drumcrow, Carrickaboy, Cavan, Co. Cavan

Prepared By:

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CHAPTER 1

INTRODUCTION

Traynor Environmental Ltd.

1.0 INTRODUCTION

1.1 BACKGROUND CONTEXT

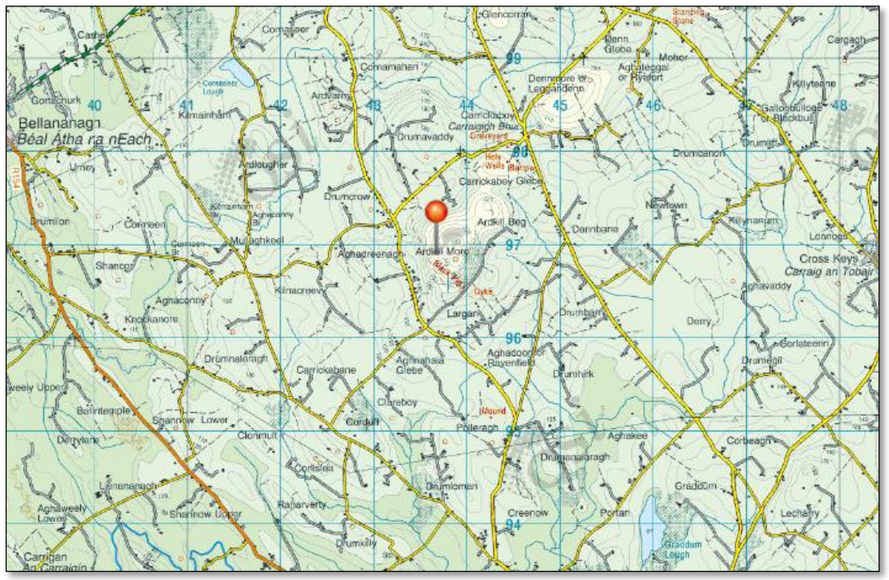
This Environmental Impact Assessment Report (EIAR) has been prepared on behalf of John Nulty Ltd. to assess the likely significant environmental effects of the proposed development. John Nulty Ltd intends to apply for a 20-year permission for quarrying and extraction of rock that will include drilling, blasting, crushing and screening along with alterations to boundaries & all associated site works on lands at Ardkill More Townland and Drumcrow Townland, Carrickaboy, County Cavan.

Works will also include for the provision of new settlement ponds and installation of associated site drainage infrastructure and surface water pump to proposed new settlement ponds along with provision of discharge outlet via a Klargester Interceptor. Ancillary site works to include for landscape works, planting restoration of the quarry perimeter and reprofiling of overburden as required to facilitate development of the quarry and restoration of the associated site area.

The EIAR has been completed in accordance with Directive 2011/92/EU (as amended by 2014/52/EU) and relevant Irish legislation as well as in conformity with guidance in the European Commission's 'Environmental Impact Assessment of Projects Guidance on the preparation of the Environmental Impact Assessment Report' (2017) and EPA's Guidelines on the Information to be Contained in Environmental Impact Assessment Reports' (2022).

The subject site is located at Ardkill More and Drumcrow, Carrickaboy, Cavan, Co. Cavan. The location of the site is shown in the context of the surrounding area in Site Location Map (Figure 1.1). The quarry is located approximately 7km south west of Cavan town, the most proximate urban settlement, along the Cavan to Kilnaleck road (L2517). Other small towns in the vicinity to the application site are Ballinagh and Kilnaleck, which are located approximately 4.5 km and 6.3 km to the west and southeast of the application site, respectively. The surrounding land use is predominantly agricultural. A full description of the proposed development is provided in Chapter 2 of this EIAR.

Figure 1.1 Site Location Map



1.2 PURPOSE OF EIA

EIA requirements are now governed by Directive 2014/52/EU, which amends Directive 2011/92/EU ("the EIA Directive"). The primary function of the EIA Directive is to ensure that projects that are likely to have significant effects on the environment are subjected to an assessment of their likely impacts.

Ireland's obligations under the EIA Directive have been transposed into Irish law and, in particular, the planning consent process through the provisions of Part X of the Planning and Development Act 2000, as amended, and the Planning and Development Regulations, 2001, as amended.

Article 1(1)(g) of the 2014 EIA Directive (2014/52/EU) outlines the stages and steps taken when completing an EIA.

i. the preparation of an environmental impact assessment report by the developer, as referred to in Article 5(1) and (2).

ii. the carrying out of consultations as referred to in Article 6 and, where relevant, Article 7.

iii. the examination by the competent authority of the information presented in the environmental impact assessment report and any supplementary information provided, where necessary, by the developer in accordance with Article 5(3), and any relevant information received through the consultations under Articles 6 and 7.

iv. the reasoned conclusion by the competent authority on the significant effects of the project on the environment, taking into account the results of the examination referred to in point (iii) and, where appropriate, its own supplementary examination; and

v. the integration of the competent authority's reasoned conclusion into any of the decisions referred to in Article 8a.

This is reflected in Article 171A of the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 which states that 'Environmental Impact Assessment' means a process—

(a) consisting of—

i. the preparation of an environmental impact assessment report by the developer in accordance with this Act and regulations made thereunder,

ii. the carrying out of consultations in accordance with this Act and regulations made thereunder,

iii. the examination by the planning authority or the Board, as the case may be, of —

(I) the information contained in the environmental impact assessment report,

(II) any supplementary information provided, where necessary, by the developer in accordance with section 172(1D) and (1E), and

(III) any relevant information received through the consultations carried out pursuant to subparagraph (ii)

iv. the reasoned conclusion by the planning authority or the Board,as the case may be, on the significant effects on the environment of the proposed development, considering the results of the examination carried out

pursuant to subparagraph (iii) and, where appropriate, its own supplementary examination, and

(v) the integration of the reasoned conclusion of the planning authority or the Board, as the case may be, into the decision on the proposed development, and

(b) which includes—

(i) an examination, analysis, and evaluation, carried out by the planning authority or the Board, as the case may be, in accordance with this Part and regulations made thereunder, that identifies, describes, and assesses, in an appropriate manner, in the light of each individual case, the direct and indirect significant effects of the proposed development on the following:

(I) population and human health.

(II) biodiversity, with particular attention to species and habitats protected under the Habitats Directive and the Birds Directive.

(III) land, soil, water, air, and climate.

(IV) material assets, cultural heritage, and the landscape.

(V) the interaction between the factors mentioned in clauses (I) to (IV), and

(ii) as regards the factors mentioned in subparagraph (i)(I) to (V), such examination, analysis, and evaluation of the expected direct and indirect significant effects on the environment derived from the vulnerability of the proposed development to risks of major accidents or disasters, or both major accidents and disasters, that are relevant to that development.

This EIAR has been prepared in accordance with the relevant provisions of the EIA Directive, the Planning and Development Acts and Planning and Development Regulations. In addition, the EIAR conforms to the guidance contained in the relevant EU and Irish guidance in respect of the preparation of an EIAR.

The objective of the EIA Directive is to ensure a high level of protection of the environment and human health, through the establishment of minimum requirements for EIA, prior to development consent being given, of developments that are likely to have significant effects on the environment.

In addition to the legislation and guidelines referenced above, the Department of Housing, Local Government and Heritage's 'Guidelines for Planning Authorities on Carrying out Environmental Impact Assessment' (2018) provide practical guidance to on procedural issues and the EIA process, and outline the key changes introduced by Directive 2014/52/EU.

The EPA guidelines list the following fundamental principles to be followed when preparing an EIAR:

- Anticipating, avoiding, and reducing significant effects.
- Assessing and mitigating effects.
- Maintaining objectivity.
- Ensuring clarity and quality.
- Providing relevant information to decision makers; and
- Facilitating better consultation.

The amended EIA Directive prescribes a range of environmental factors which are used to organise descriptions of the environment and the environmental impact assessment should identify, describe, and assess in an appropriate manner, in the light of each individual case, the direct and indirect significant effects of a project on the prescribed environmental factors which are:

- population and human health.
- biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC.
- land, soil, water, air, and climate.
- material assets, cultural heritage, and the landscape.
- the interaction between the factors referred to in points (a) to (d).

The EPA published 'Guidelines on the Information to be Contained in Environmental Impact Assessment Reports,' in May 2022. This EIAR has been prepared having regard to this guidance. The EIAR documents the assessment process of the prescribed environmental factors in relation to the proposed extraction of material from the existing quarry envelope at Ardkill More and Drumcrow, Carrickaboy, Co. Cavan.

1.3 EIA METHODOLOGY

As per Article 5(1) of the 2014 Directive, an EIAR should provide the following information:

- Description of Project.
- Description of Baseline Scenario.
- Description of Likely Significant Effects.
- Description of Avoidance / Mitigation Measures.
- Description of Reasonable Alternatives (and rationale for chosen option); and
- A Non-Technical Summary.

Annex IV of the Directive sets out a more detailed outline of the information required in an EIAR. The subject EIAR has been prepared in full accordance with these stated requirements of Annex IV.

In addition to the 2014 Directive, this EIAR has been informed by, but not limited to:

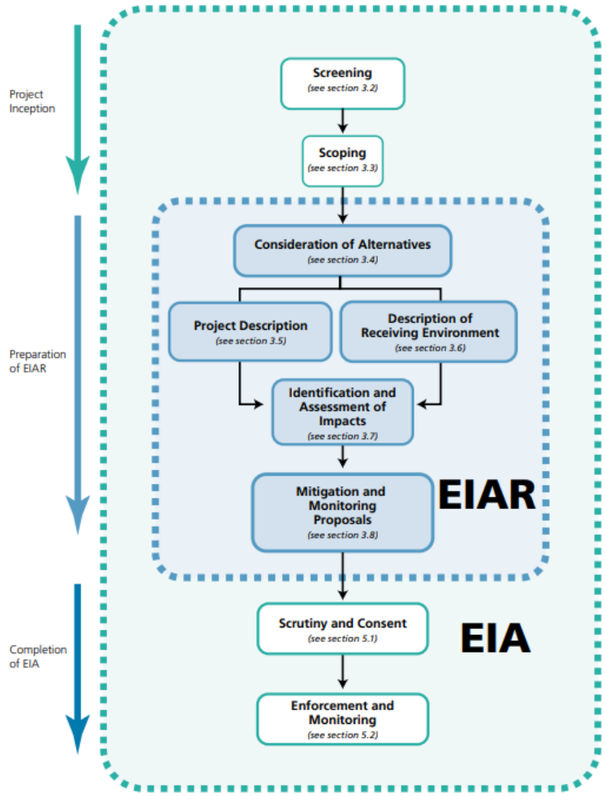
- Guidelines for Planning Authorities on carrying out Environmental Impact Assessment, (Department of Housing, Local Government and Heritage, August 2018).
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports, (EPA, May 2022).
- Environmental Impact Assessment of Projects: Guidance on Screening (European Commission, 2017).
- Environmental Impact Assessment of Projects: Guidance on Scoping (European Commission, 2017).
- Environmental Impact Assessment of Projects: Guidance on the Preparation of the Environmental Impact Assessment Report (European Commission, 2017).

- Advice Notes for Preparing Environmental Impact Statements, Draft, (EPA, September 2015).
- Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment (European Union, 2013).
- Transposition of 2014 EIA Directive (2014/52/EU) in the Land Use Planning and EPA Licensing Systems - Key Issues Consultation Paper, Department of Housing, Planning, Community and Local Government, 2017.
- Circular letter PL 1/2017 - Advice on Administrative Provisions in Advance of Transposition (2017).
- An Bord Pleanála's last Refusal & Inspector Report.

We would also note that the pre-application discussions with the Planning Authority informed the content of the EIAR. The EIA process has been managed to ensure that the EIAR documentation and relevant analysis are confined to topics which are explicitly described in the legislation, and where environmental impacts may arise. Evaluation and analysis have been limited to topics where the indirect, secondary, or cumulative impacts are either wholly or dominantly due to the project under consideration.

The EIA process can be broadly described as set out in figure 1.2 as shown.

Figure 1.2 EIA Process (Source: Guidelines on the information to be contained in Environmental Impact Assessment Reports- May 2022).



1.4 EIA SCREENING & SCOPING

Screening is the term used to describe the process for determining whether a proposed development requires an EIA by reference to mandatory legislative threshold requirements or by reference to the type and scale of the proposed development and the significance or the environmental sensitivity of the receiving baseline environment. Article 93 of, and Schedule 5 to, the Planning and Development Regulations 2001 set out the classes of development for which a planning application must be accompanied by an environmental impact assessment report (EIAR).

Part 1 and Part 2 Schedule 5 of the Planning and Development Regulations, 2001 prescribes the categories of, and thresholds for, prescribed development requiring EIA.

Under Item 2(b) of Part 2 of Schedule 10 to Article 93 of the Planning and Development Regulations, 2001 – 2021, EIA is required where:

(b) Extraction of stone, gravel, sand, or clay, where the area of extraction would be greater than 5 hectares"

Having regard to the scale and nature of the project it is necessary for the development application to be accompanied by an EIAR in conjunction with the overall size of the development.

The proposed development has been subject to several pre-planning consultations, including formal pre-planning meetings held with Cavan County Council. An informal scoping process was carried out to identify the issues that are likely to be most important during the Environmental Impact Assessment process. This approach is consistent with the Environmental Protection Agency's Guidelines on the information to be contained in Environmental Impact Assessment Reports which provides that formal scoping, as per section 173(2)(a) of the Act, is not mandatory.

1.4.1 Consultation

The preparation of this EIAR has been informed by several pre-planning meetings with various departments of Cavan County Council. The approach adopted in undertaking this EIAR was discussed and largely agreed in principle during these consultations. Issues raised in consultations have been taken on board and addressed in the compilation of this document. Where relevant, statutory bodies were consulted by the experts assigned to each topic assessed under this EIAR, details of which are provided in the relevant Chapters.

1.5 PURPOSE & STRUCTURE OF THE EIAR

The primary purpose of this EIAR is to inform the EIA process, by identifying likely significant environmental impacts resulting from the proposed development, to describe the means and extent by which they can be reduced or mitigated, to interpret and communicate information about the likely impacts and provide an input into the decision-making planning process.

The fundamental principles to be followed when preparing an EIAR are:

- Anticipating, avoiding, and reducing significant effects.
- Assessing and mitigating effects.
- Maintaining objectivity.

- Ensuring clarity and quality.
- Providing relevant information to decision makers.
- Facilitating better consultation.

The EIAR document provides information on any identified effects arising as a consequence of the proposed development. The EIAR documents the manner in which the project design incorporated mitigation measures; including impact avoidance, reduction, or amelioration; to explains the manner in which significant effects will be avoided.

The key purpose of this EIAR document is to enable the competent authority to form a reasoned conclusion, in the context of the decision-making process, on the significant effects of the project on the environment, based on the examination of the EIA Report.

Pursuant to the provisions of Article 5(1) of the EIA Directive, where an environmental impact assessment is required, the developer shall prepare and submit an EIAR which shall include at least:

(a) a description of the project comprising information on the site, design, size, and other relevant features of the project.

(b) a description of the likely significant effects of the project on the environment.

(c) a description of the features of the project and/or measures envisaged in order to avoid, prevent, or reduce and, if possible, offset likely significant adverse effects on the environment.

(d) a description of the reasonable alternatives studied by the developer, which are relevant to the project and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the

(e) project on the environment.

(f) a non-technical summary of the information referred to in points (a) to (d); and

(g) any additional information specified in Annex IV relevant to the specific characteristics of a particular project or type of project and to the environmental features likely to be affected.

EIAR shall include the information that may reasonably be required for reaching a reasoned conclusion on the significant effects of the project on the environment, taking into account current knowledge and methods of assessment. In addition, the developer shall, with a view to avoiding duplication of assessments, take into account the available results of other relevant assessments under European Union or national legislation, in preparing the EIAR.

The EIAR is divided into 2 volumes:

I. the non-technical summary comprising a concise, but comprehensive description of the project, its environment, the effects of the project on the environment, the proposed mitigation measures, and the proposed monitoring arrangements.

II. The main report consisting of 17 chapters and associated appendix as outlined in the table of contents.

A Natura Impact Statement (NIS) has been prepared regarding the proposed development by Noreen McLoughlin, of Whitehill Environmental Ltd.

The EIAR prepared for the scheme has endeavoured to be as thorough as possible and therefore the provisions included in the revised EIA Directive and all of the issues listed in Schedule 6, Sections 1, 2 and 3 of the Planning and Development Regulations 2001-2018 and in recent guidance documents have been addressed in the EIAR. In this context, the following topics/issues have been reviewed and addressed in the context of the proposed development:

- Altennatives & Planning
- Population and Human Health;
- Biodiversity;
- Land and Soils;
- Hydrology & Hydrogeology;
- Air & Climate;
- Noise & Vibration;
- Material Assets;
- Cultural Heritage
- Landscape and Visual
- Traffic & Transport;
- Risk Management;
- Interactions and;
- Mitigation

1.5.1 Risk of Major Accidents and Disasters

In accordance with Article 3(2) and Annex IV of the 2014 EIA Directive, the vulnerability of the project to risks of major accidents and/or disasters, as well as likely significant effects on the environment if it did occur, are considered.

Article 3(2) of the 2014 EIA Directive states that an EIAR should consider the following: -

> 'The effects referred to in paragraph 1 on the factors set out therein shall include the expected effects deriving from the vulnerability of the project to risks of major accidents and/or disasters that are relevant to the project concerned'.

In addition, an EIAR should also contain the following information prescribed in 5(d) of Annex IV of the 2014 EIA Directive:

- "A description of the likely significant effects of the project on the environment resulting from, inter alia:

(d) the risks to human health, cultural heritage or the environment (for example due to accidents or disasters);"

The 2018 Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment sets out two key considerations to address this: -

• "The potential of the project to cause accidents and/or disasters, including implications for human health, cultural heritage, and the environment;

• The vulnerability of the project to potential disasters/accidents, including the risk to the project of both natural disasters (e.g., flooding) and man-made disasters (e.g., technological disasters)."

During the construction and operation phases, the risk of accidents and/ or disasters caused by the project, arising from the potential for accidents, are addressed under Health and Safety Regulations and other codes. When directly relevant to the planning and EIA process, certain mitigation measures are identified in order to prevent and/ or mitigate any significant effects.

The risk of flooding and vulnerability of the project is addressed in Chapter 7 of the EIAR and finds that there are no significant flood risks associated with the proposal.

The site is not a Seveso7 site as it does not exceed the prescribed hazard criteria. The development and all details during construction and operation will be required to comply with strict safety standards. Compliance with these standards will ensure that risks are avoided or managed with safeguards put in place where appropriate. There is no significant environmental risk arising from elements of the proposal which could cause, or be affected by, accidents or disasters.

1.6 EIAR TEAM & QUALIFICATIONS

Traynor Environmental Ltd. has coordinated the subject EIAR. Environmental specialist consultants were also commissioned for the various technical chapters of the EIAR document which are mandatorily required as per the EIA Directive and Planning and Development Regulations 2018.

The amended EIA Directive (Directive 2014/52/EU) states the following in relation to the persons responsible for preparing the environmental impact assessment reports:

'Experts involved in the preparation of environmental impact assessment reports should be qualified and competent. Sufficient expertise, in the relevant field of the project concerned, is required for the purpose of its examination by the competent authorities in order to ensure that the information provided by the developer is complete and of a high level of quality"

Each environmental specialist was required to characterise the receiving baseline environment; evaluate its significance and sensitivity; predict how the receiving environment will interact with the proposed development and to work with the EIA project design team to devise measures to mitigate any adverse environmental impacts identified.

In accordance with the EIA Directive 2014/52/EU, we confirm that the EIAR has been carried out by fully qualified and competent experts in their relevant fields as outlined in this chapter. A full list of all consultants and the corresponding chapters that have been prepared is detailed below.

Table 1.1 - Qualifications of EIAR Authors

EIAR Section	Area of Expertise	Company
Chapter 1 - Introduction Chapter 2 – Project Description Chapter 3 – Alternatives & Planning Context Chapter 4 – Population and Human Health Chapter 6 – Land, Soil & Geology Chapter 8 – Air Quality Chapter 9 – Climate Chapter 10 - Noise and Vibration Chapter 11 – Material Assets Chapter 15 – Risk Management Chapter 16 – Interactions Chapter 17 – Summary of Mitigation Measures	Environmental Specialists	Traynor Environmental Ltd.
Study Consultant / Address		
Mr Nevin Traynor *BSc. Env, H. Dip I.T, Cert SHWW, EPA/FAS Cert.* Mrs Angela Kelly *BSc.Hort, PG. Dip.Env*/ Ms Zita Mc Cann *BSc. Forensic Science* Mr Killian Bannon *BSc.Agri* / Mr Aaron Mc Bennett *BSc. Env* **Add:** Belturbet Business Park, Creeny, Belturbet, Co. Cavan **Tel:** (087) 7947793 **Email:** nevin@traynorenv.ie **Web:** www.traynorenvironmental.com		

EIAR Section	Area of Expertise	Company
Chapter 13 - Landscape	Architectural/Engineering Services	Michael Fitzpatrick Architects
Study Consultant / Address		
Mr. Michael Fitzpatrick *BA(Hons) Arch, Dip Arch.* MRIAI, of Michael Fitzpatrick Architects Ltd. **Add:** Main Street, Butlersbridge, Co Cavan **Tel :** 049 4365800 / 086 6039689 **Email:** info@mfarchitects.ie		

EIAR Section	Area of Expertise	Company
Chapter 5 – Biodiversity	Flora and Fauna / Biodiversity	Whitehill Environmental
Study Consultant / Address		
Ms. Noreen Mc Loughlin MSc. of Whitehill Environmental Ltd **Add:** Whitehill, Edgeworthstown Co. Longford **Tel:** (087) 412724 **Email:** noreen.mcloughlin@gmail.com		

EIAR Section	Area of Expertise	Company
Chapter 12 - Cultural Heritage	Archaeology	WOLFHOUND ARCHAEOLOGY
Study Consultant / Address		
Mr. Mick Drumm BA, MIAI Director of Archaeological Services Wolfhound Archaeology **Add:** Killag, Duncormick, Co. Wexford **Tel :** (087) 1689599 **Email:** wolfhoundarchaeology@gmail.com		

EIAR Section	Area of Expertise	Company
Chapter 14 - Traffic & Transport	Traffic and Transport	RSTTA Traffic Transport and Road Safety Associates Ltd.
Study Consultant / Address		
Mr. Matt Steele of Traffic Transport and Road Safety Associates Ltd. **Add:** Barran, Blacklion, Co Cavan Tel: (089) 4209704 / 071 9853847 **Email:** info@ttrsa.com		

EIAR Section Reviewed	Area of Expertise	Company
Chapter 7 – Hydrology & Hydrogeology	Hydrology & Hydrogeology	MWP
Study Consultant / Address		
Mr. Tim Moynihan BSc MSc(Geotech) C.Eng IEI P. Geol IGI Euro. Geol FRS of Malachy Walsh and Partners Ltd. **Add:** 2 Exchange Tower, 1-2 Harbour Exchange Square, London E14 9GE, UK. Tel: +44 (0) 20 7253 0893 **Email:** tim.moynihan@MWPEng.co.uk		

1.7 CUMULATIVE IMPACTS

The potential environmental effects of the proposed development have not been assessed in isolation and other relevant permitted or proposed projects in the vicinity of the site which may result in cumulative environmental impacts have also been considered. All projects in the environs of the proposed development site have been assessed for potential cumulative impacts. These projects were identified by using Cavan County Council's Planning Enquiry Systems and An Bord Pleanála's website and are outlined below.

Table 1.2 Permitted or proposed projects in the vicinity

Applicant Reference	Description	Outcome/Current Status
7325	Quarry production of stone, asphalt tarmacadam plant, storage and office accommodation, car park, and machinery repair workshop.	Granted in 1977.
97/166	Erect offices, material testing laboratory, canteen, toilets, store and machinery work-shop, the provision of weigh-bridge, wheel wash facility and 2 no. mobile crushers.	Granted 16/09/1997
05/1801	Include additional 3.37 hectares of land within the existing quarry envelope - planning reg. no. 7325 & 97/166, new entrance onto county road and all ancillary site works	Granted at appeal PL02.219928 on 27th April 2007 for a 12-year period plus an extra year for restoration.
11/62	To retain and complete partially constructed structure, which will be used as a conveyor system to transfer crushed materials from the upper levels to the quarry floor, and all ancillary works:	Granted 27/05/2011
19227	To extend existing quarrying facility on a site of c 10.25 hectares (existing quarry permitted under Cavan County Council Reg. Ref. 051801, 1162 and Quarry Registration No. QY7). The development will consist of the inclusion of an additional extraction of 1.04 hectares to the southeast boundary. The quarry extension is sought to a maximum depth of c. 40 metres od and will be extracted at a rate of c. 50,000 tonnes per annum. The proposed development includes all ancillary site development, areas of stockpiling, landscaping and boundary treatment works above and below ground, including the progressive restoration of the site.	Granted, but appealed to An Bord Pleanála. and then refused.
QY7	Applied for registration on 11th February 2005. This process imposed conditions on the quarry that related to landscaping and restoration, contoured survey, discharge of waters, settlement ponds, noise, storage of overburden material, installation of wheel wash, monitoring programme for noise, vibration and dust emissions, installation of effluent treatment plant, bunding of fuel tanks, areas for storage of fuel and storage details of duel storage tanks, details of rate of extraction and benching of quarry.	QY7 Granted
20222	to complete extraction of material granted within existing quarry envelope as per previously approved planning (Ref No. 051801) for a 10 year lifespan of the quarry & all associated site works.	Granted, but appealed to An Bord Pleanála. and then refused.

1.7.1 PLANS

The National Planning Framework (NPF) recognises quarries as a national resource that are of key importance in their provision of aggregates to the construction sector and in their provision of employment within the rural economy. They also recognise that aggregates are a finite resource, which needs to be safeguarded. The Quarries and Ancillary Activities Guidelines recognise, too, the land use reality that "aggregates can only be worked where they occur" and the economic reality that in order to limit transportation costs quarries need to be excavated throughout the country.

The County Development Plan 2022-2028 acknowledges that, the County contains a wealth of natural resources including many raw materials critical to the construction industry. The Council acknowledges the need for extractive industries in terms of supply of aggregate materials for the construction sector. This industry material yields an important contribution to the economy. Such material is a significant natural resource, and it is important to safeguard this material for future use, whilst also ensuring that impacts on the environment and the community are acceptable. Cavan County Council will ensure that all natural resources are exploited in an environmentally sound and sustainable manner.

1.8 DIFFICULTIES ENCOUNTERED

No difficulties were encountered in compiling any of the specified information contained in the EIAR, such that that the prediction of impacts has not been possible. The relevant chapters of the EIAR, identify any specific difficulties which were encountered during preparation of this EIAR.

1.9 AVAILABILITY OF EIAR DOCUMENTATION

This EIAR will be available in printed form at the offices of Cavan County Council.

The EIAR will also be available to view electronically at the following website: www.cavancoco.ie e-plan section and the EIA portal.

1.10 EIAR QUALITY CONTROL & REVIEW

Traynor Environmental Ltd oversaw the preparation of this EIAR. A key aspect of the EIAR has been to make the documentation as accessible and clear as possible to the public and other relevant stakeholders. This EIAR has been prepared in accordance with the relevant legislation regarding the preparation of EIARs including the 'Guidelines on the Information to be Contained in an Environmental Impact Assessment Report, Environmental Protection Agency, 2022' and 'Transposition of 2014 EIA Directive (2014/52/EU) in the Land Use Planning and EPA Licensing Systems - Key Issues Consultation Paper, Department of Environment, Community and Local Government, 2017'.

CHAPTER 2

PROJECT DESCRIPTION

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Figures

2 PROJECT DESCRIPTION

2.1 Introduction

This chapter of the EIAR was completed by Taynor Environmental and provides details on the various elements of the proposed development over an application site area of 3.53ha. at Ardkill More and Drumcrow, Carrickaboy, Cavan, Co. Cavan. The site was subject to Cavan County Council Planning Ref 051801 and An Bord Pleanála (Ref PL 02.219928) which was granted with conditions in 2007.

Existing operations are carried out on the lower lever at the quarry under the conditions of Quarry Registration No QY7. The current quarry operations comprise extraction of rock using blasting techniques; processing (crushing and screening) of the fragmented rock to produce aggregates for use in the manufacture of value-added products, road construction and site development works. The current application relates to the upper level of the quarry.

2.2 The Applicant

John Nulty Ltd is the owner of the landholding comprising the existing quarry. The quarry deepening subject to this application was previously granted permission for continued use and extension as part of planning reference 05/1801: "to include 3.37ha of land within the existing quarry envelope – planning reg. no. 7325 & 97/166,". John Nulty Ltd. has been quarrying the lands in accordance with the conditions attached to these planning permissions/approvals. Nulty's quarry has been in existence since the 1940's and is an established part of the landscape. The existing quarry area which is outside of the red line boundary is currently operating under QY7 conditions.

2.3 Project Description

- John Nulty Ltd intends to apply for a 20 year permission for quarrying and extraction of rock that will include drilling, blasting, crushing and screening along with alterations to boundaries & all associated site works on lands at Ardkill More Townland and Drumcrow Townland, Carrickaboy, County Cavan.
- Works will also include for the provision of new settlement ponds and installation of associated site drainage infrastructure and surface water pump to proposed new settlement ponds along with provision of discharge outlet via a Klargester Interceptor.
- Ancillary site works to include for landscape works, planting restoration of the quarry perimeter and reprofiling of overburden as required to facilitate development of the quarry and restoration of the associated site area.
- Deepening of extraction from it's current level of 209mOD down to 175mOD over the proposed 20-year lifespan. The previously permitted planning permission proposed a quarry floor level of 175mOD under planning Ref 051801.
- The quarry is located in a naturally occurring rock outcrop which rises above the surrounding area. The top of the quarry face is approximately 248 mOD with the bottom of the quarry face being approximately 209mOD. The road level at the quarry entrance is 154mOD and 150mOD at the Site Office.
- It is proposed that surface water runoff will be collected and processed by passing through a cleaning/polishing system of settling pond and oil water separator to remove silt and any potential contaminants before being discharged into the naturally occurring surface water drain at green field discharge rates.
- The quarry has an existing discharge licence in accordance with the Water Pollution Discharge Licensing Regulations.
- Approximately 500,000 tonnes of material will be extracted over a twenty-year period, resulting in an average extraction rate of 25,000 tonnes per year up to a maximum of 50,000 tonnes per annum.
- It is proposed to install a new settlement pond and oil water separator to service the application site area.
- The settlement pond will be located to the north of the existing site office on lands in the ownership of John Nulty Ltd.
- The existing ponds on site will continue to service the existing QY7 Registered quarry and are outside the proposed red line boundary for this application and will not be discussed further.

2.4 Site Location & Context

The subject site is located at Ardkill More and Drumcrow, Carrickaboy, Cavan, Co. Cavan. The location of the site is shown in the context of the surrounding area in Site Location Map (Figure 2.1 & 2.2). The quarry is located approximately 7km southwest of Cavan town, the most proximate urban settlement, along the Cavan to Kilnaleck road (L2517). Other small towns in the vicinity to the application site are Ballinagh and Kilnaleck, which are located approximately 4.5 km and 6.3 km to the west and southeast of the application site, respectively. The surrounding land use is predominantly agricultural.

The surrounding lands comprise of rough agricultural land with a number of detached residential houses located to the east and west of the site. There is also an industry unit located to the west of the site along the L2517 which belongs to Breffni Air. Residences within the general area consist of one-off rural houses and farmsteads with some ribbon development along the local road network – refer to EIAR Chapter 4 Population and Human Health.

As the application site forms part of the overall quarry, activities that will be undertaken at the application site and overall quarry are discussed in order to assess any potential cumulative impact associated with the application area. The proposed development consists of completing extraction of material within the existing quarry envelope. The processed aggregate will be then transported to market. Quarrying activity to date has altered the natural topography of the land and has resulted in the creation of a quarry void. The topography of the quarry land varies in height from 209mOD which is the lowest level of the existing quarry void to 248mOD which is the highest point of site located along the eastern boundary.

Figure 2.1 - Site Location Map (Site indicated by Pin)

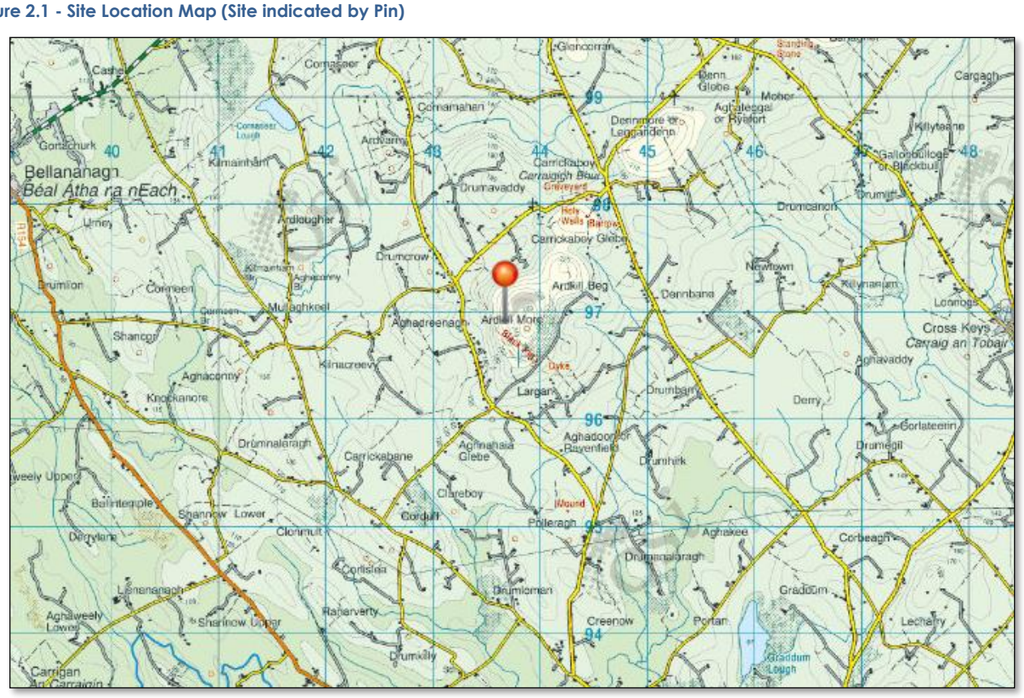


Figure 2.2 - Site Location Map (Site to which this application relates Outlined in Red)

Figure 2.3 - Site Location Map (Area outlined in Green approved previously under QY7)

2.5 Existing Conditions

Existing operations are carried out on the lower lever at the quarry under the conditions of Quarry Registration No QY7. The existing quarry operations involve the extraction of rock using drilling/blasting techniques; processing (crushing and screening) of the fragmented rock to produce aggregates for use in road construction and site development works. Rock is fragmented using conventional drilling and blasting methods which will reduce the rock into a manageable size.

Ancillary facilities at the existing site include office, weighbridge, canteen, toilets and a garage/workshop, septic tank and percolation area, wheel-wash, and oil water separator. These facilities are located at the west of the site beside the site entrance along the L2517 and are not included in the planning application area.

A topographic survey was carried out by Michael Fitzpatrick Architects. Figure 2.4, showing the existing extraction levels at the quarry and the proposed extraction levels as part of the planning application. The applicant proposes to extract rock from the application area down to the level of 175mOD as part of the proposal.

2.5.1 Rock type and Quantities

The greywacke rock at Nultys quarry is described as "strong" to "very strong" using the definitions of BS 5930:1999 according to a Geotechnical Assessment carried out at the quarry by BMA GeoServices. As part of the Planning permission granted in 2005 for an extension to the existing quarrying facility, it was estimated that the development would provide c.150,000-200,000 tonnes of aggregate material per annum over a period of 13-25 years. Quantities of rock which have been extracted to date, from the area granted planning by An Bord Pleanála, is approximately 480,000 tonnes, which is significantly less than the previously approved quantities. All detailed technical data in relation to bedrock and fault lines are outlined in a professional Geologist Report carried out by John Colthurst PhD, PGeo. (See full report in the Appendix)

Photograph 2.1 – Current View of the Application Area.(Upper Level – Application Site)

Photograph 2.2 - Current View of the Application Area

Photograph 2.3 - Current View of the Application Area

2.6 The Quarry Process

There are three broad stages in the quarrying process:

1) Blasting of rock faces;
2) Processing of Rock; and
3) Stockpiling of Rock.

2.6.1 Drilling and Blasting of in-Situ Material

Drilling and Blasting will continue to be the method used to fragment the material to a manageable size In order to enable extraction, the active rock face must be blasted using explosives. Specialist blast contractors (Irish Industrial Explosives (IIE)) will design and carry out each blast in the quarry. All blasts at the site will be carried out in accordance with the relevant standards, which establish best practice and safety.

Each blast is specifically designed to release a quantum of rock from the working quarry face. In this regard, a pre-determined grid of vertical holes is drilled on top of the quarry face to a required depth. The intervals between the drill holes are specifically designed having regard to the explosives to be placed within each of the holes and the depth of the rock which is sought to be released. Drilling undertaken using pneumatic down the hole, top drive, or rotary percussive methods. After the shot holes are drilled, the surveyed to check that they correspond to the blast design. There are pre-determined intervals or delays in the detonation of explosives in the drilled holes. This process minimises vibration arising from the blasting and increases the efficiency with which the rock can be removed.

On the day of the blast, the explosives are delivered to the site. A detonator placed in each hole and the holes are loaded with high explosives to within a few metres of the top. The remaining depth will be 'stemmed' with quarry dust or fine aggregate. Prior to the blast, the site is cleared, and a siren sounded to make sure that everyone nearby is warned. When the final all clear is given, the shot firer sets off the explosives. Vibration and air overpressure levels associated with this part of the operation are monitored using monitors set up at predetermined sensitive locations. The blast must have a vibration level below 12mm/s and a noise level of 55dB LA_{eq} at the nearest noise sensitive location. After the blast, the face and shot pile are inspected to check that all the shot holes are fired correctly. The blasting charges are designed so as to not exceed recommended guidelines in relation to blasting. Blasting will be undertaken on an as required basis by competent contractors.

The shot-firing of the blasts and the explosives used are monitored by the Quarry Manager. A site-specific protocol for blasting in cooperation with the blasting contractor and in accordance with current international best practice will be adhered to. The protocol considers all activities related to blasting, especially the selection of explosives, storage and handling controls, blast design considerations and loading controls.

2.6.2 Processing of Rock

Once blasting has occurred, the blasted rock is fed into the mobile crushers. There are two crushing stages, primary crushing and secondary crushing. The primary crusher is typically a jaw crusher and the secondary is typically a cone crusher which function to reduce the particle size of the rock to a scale that can be easily transported using dump trucks and belt conveyors. The quarry operations propose extraction of rock using blasting techniques; processing (crushing and screening) of the fragmented rock to produce aggregates for use in road construction and site development works. Rock is fragmented using conventional drilling and blasting methods which will reduce the rock into a manageable size. Oversize material will be reduced in size using a hydraulic impact breaker attached to an excavator. Blasting will be undertaken on an as required basis by competent contractors namely Irish Industrial Explosives Limited. The blasted material will be processed into a range of aggregates which will be sold to market.

2.6.3 Stockpiling of Rock

Material extracted from the quarry area will be processed within the quarry void using mobile processing plant. Material produced by the in-pit crushing will be stockpiled within the quarry void for loading directly onto lorries when required and transported to the weigh bridge where it is weighed prior to delivery to customers.

2.7 Site Infrastructure & Facility Services

2.7.1 Site Security

There is an existing entrance gate which has adequate fencing in place. There are no other vehicular access points to the application site. The entrance gates to the site are locked to prevent unauthorised access outside of the working hours. Safety and security measures are in place for the existing quarrying operations on the subject site.

2.7.2 Site Access Road

All HGVs utilising the quarry are confined within the Applicant's landholding. Adequate car parking provision for employees and visitors is provided at the existing weighbridge office. There will be no extra parking on site. The proposed development will be accessed via a local County Road (L2517) to the west of the application site. There is an existing hard surfaced haul route providing access to the existing aggregate stockpiles, which will be used to serve the proposal to complete the extraction of this 3.53ha. area of the quarry site. The alignment of this haul route will not change. The extracted rock/gravel will be transported by trucks from the site along the dedicated on-site haul route.

Photograph 2.4 – View of Existing Entrance to the Site

2.7.3 Wheel-Wash

A concrete wheel-wash currently exists on Site, which will be maintained, and the water is directed to the existing onsite settlement ponds after a Class 1 oil water separator. All trucks exiting the quarry use the wheel wash facility.

2.7.4 Fuel Storage Areas

There will be no fuel or hydraulic oil stored onsite. A new bunded area for refuelling will be located in the southern corner of the application site. No chemicals will be stored at the site.

2.7.5 Traffic Control

All traffic to and from the Site will use the existing entrance to the west of the site along the L2517. All trucks using the site will be confined within the Site boundary. There will be no queuing on the local road network. For all detailed information on traffic and transportation please refer to chapter 14 of the EIAR.

2.7.6 Offices and Ancillary Facilities

Ancillary facilities at the quarry include the main office, weighbridge, canteen, toilets, and a garage / workshop, which are outside this application boundary. A toilet is located within the site office building. Wastewater emanating from on-site employees, is diverted to an EN Certified Septic Tank and percolation area, designed, and certified by Traynor Environmental Ltd. Treated wastewater is then discharged to ground via a percolation area in the area immediately northwest of the site office.

2.7.7 Quarry Activities

The natural resources on site will be utilised in an efficient and prudent manner to ensure the potential of the site is maximised. Blasting practices currently employed are in accordance with best industry practice and are carried out by independent, licensed contractors Irish Industrial Explosives (IIE) who also monitor and report each blast.

2.7.8 Utilities and Services

Electrical power is currently provided to the application site via mains supply. Site based staff are contactable by mobile phone. Runoff from storm water in the lower level of the quarry is accumulated in the exiting settlement ponds prior to discharge to the local watercourse and then to the Ballinagh Stream, in accordance with Discharge Licence granted for the site (Ref No. SS/WW004/18)

There is a bored well, which is used for groundwater sampling located on the northwest corner of the site upgradient of the Tricel Septic Tank and percolation area which serve the office. This has been used in the past to top up evaporation losses in the wheel wash and discharges to the settlement ponds for treatment.

2.7.9 Lighting

There is no requirement for lighting outside of the subject lands but within the lands, certain working hours (after dark in winter periods) necessitate lighting that is extinguished when the site is closed thus causing no external light pollution. Any lighting required on site is temporary in winter months and will be supplied by mobile light stands powered by generator. Sufficient lighting is provided at the site to ensure safe operations during winter periods.

2.7.10 Landscape and Boundary Treatment

Fencing is currently in place along several portions of the quarry boundary including along the local road L2517. It is proposed to maintain 5 m buffer zone around the perimeter of the site. It will be fenced and planted with native hedgerow as per environmental specifications.

2.7.11 Overburden

Overburden is the earth, clay and glacial till material that must be removed before the underlying rock can be extracted. All overburden in relation to this area of the quarry has already been removed.

2.8 Site Management

2.8.1 Working Hours.

It is proposed that the following working hours will be adhered to at the quarry with no operations permitted outside of those times:

- 07:00 to 18:00 hours Monday to Friday; and
- 07:00 to 14:00 hours Saturday
- No operations will be carried out on Sundays and public holidays.

2.8.2 Personnel

The Applicant employs 5 permanent employees on the site in addition to a number of indirect employees such as, HGV drivers and maintenance contractors, etc. The continued development of the site is consistent with the policies set out in the National Planning Guidelines for the sector; the Regional Planning Guidelines and the Cavan County Development plan which recognise the requirement for:

- A secure supply of construction aggregates and related products is necessary for the continued development of the region.
- Proven aggregate reserves need to be safeguarded for future extraction.
- 'Best environmental management practice' to be implemented within quarry developments.

2.8.3 General Waste

General waste consisting of canteen/office waste is stored in wheelie bins supplied by the waste contractor and collected on a weekly basis. This waste is recovered/ recycled or disposed of at a licensed facility namely Wilton Waste Recycling Limited.

2.8.4 Plant and Equipment

Plant currently in use for at the site includes a loading shovel, excavator with rock breaker, crusher, secondary and tertiary mobile screeners, and mobile fuel bowser (as required).

2.8.5 Duration of Extraction

Approximately 500,000 tonnes of material will be extracted over a twenty-year period, resulting in an average extraction rate of 25,000 tonnes per year up to a maximum of 50,000 tonnes per annum.

2.9 Restoration Plan

Upon the cessation of extraction operations, it is proposed to return the extracted areas to natural habitat after-use. Where feasible, restoration of exhausted and redundant areas will be carried out at the earliest opportunity. However, it is envisaged that the majority of the restoration will be carried out after extraction operations at the site have ceased.

2.10 Aftercare

Where possible, in this area soil will be used for vegetation to develop naturally, with heath and scrub species colonising the bare ground. On completion of the restoration works, redundant structures, plant equipment and stockpiles will be removed from site on permanent cessation of extraction activity.

2.11 Environmental Nuisance Control

2.11.1 General

The site has an established environmental monitoring programme on site. Water, noise, dust, is carried out on a regular basis, to demonstrate that the development is not having an adverse impact on the surrounding environment, this will include the existing quarry envelope.

2.11.2 Settlement Ponds

The new settlement pond will have the following dimensions and comply with CIRIA requirements.

- 30m Length x 10m Width x 1m Depth. (10no.)
- Proposed Primary Settlement Compartments will be 30m length x 20m wide x 1m deep. (2no).

The existing settlement ponds currently servicing the site will continue to be used for the lower section of the quarry under the conditions of QY7. The upper level, under this application will be diverted to the new settlement pond.

2.11.3 Dust Control

In dry, windy weather conditions, site activities may give rise to dust blows across and beyond the existing or proposed development site areas.

The incidence of fugitive dust outside of the operation is reduced by some of the mobile crushing and screening plant to be located within the quarry void. Generation of fugitive dust is generally limited to periods of very low rainfall (refer to Chapter 11 – Air Quality). Dust generation occurs from three main sources.

- Point sources – such as operating plant and machinery.
- Line sources – such as roads and conveyors.
- Dispersed Sources– such as quarry floors and stockpiles.

In order to control dust emissions, the following measures will be implemented: -

- Water sprayed from a tractor drawn bowser on dry exposed surfaces and stockpiles (paved roads, unsealed haul roads and hardstand areas).
- Dust blows at the existing site are largely screened by the side wall of the existing quarry void.
- Areas of bare or exposed soils will, insofar as practicable, be kept to a minimum.
- The amount of dust or fines carried onto the public road network will be reduced by periodic sweeping of surrounding public roads as required.
- Emission of fugitive dust from machinery such as processing plant will be minimised by utilising dust suppression and by locating such plant within the quarry area.
- A volume of water is used during the crushing process to supress potential fugitive dust emissions.

Monitoring results are included in each relevant chapter of the EIAR.

2.11.4 Litter Control

As the proposed development will be largely free of litter, the daily operational activities are unlikely to give rise to problems with windblown litter. Accordingly, there is no requirement to implement any specific litter control measures at the site. In the unlikely event that any litter waste is identified, it will be immediately removed off-site to an authorised waste disposal or recovery site.

2.11.5 Odour Control

As the gravel extraction activities at the site are not biodegradable and do not therefore emit odorous gases, site activities do not give rise to odour nuisance. No odour control is required.

2.11.6 Vermin Control

As the proposed development is free of putrescible (food / kitchen) waste, on-site activities will not attract vermin for the duration of the extraction or subsequent restoration operations. Accordingly, no specific vermin control measures are required.

2.11.7 Fire Control

In the unlikely event that a fire does occur, the local fire station in Cavan town will be contacted and emergency response procedures will be implemented. Fire extinguishers (water and foam) are provided at the site office and on the diggers to deal with any small outbreaks which may occur.

2.12 Environmental Monitoring

2.12.1 General

The site has an established environmental monitoring programme on site. Water, noise, dust, and blast monitoring is carried out on a regular basis, to demonstrate that the development is not having an adverse impact on the surrounding environment. This will include the previously permitted quarry development.

2.12.2 Dust Monitoring

Dust deposition monitoring is carried out annually at the site. The results of the dust monitoring are available in chapter 11 Air.

2.12.3 Ecological Monitoring

In the absence of any rare or protected species within the application site, it is considered that there is no requirement for ongoing ecological monitoring during extraction operations.

2.12.4 Surface Water and Groundwater Management

Operational quarrying techniques have ensured that there is no requirement for dewatering within the existing quarry void. In the absence of dewatering activities, it is considered that the quarry operation will not impact upon groundwater levels or flow levels.

Thus, there will be no quarry-related impact upon the yield of any of the local wells. Rainfall run-off from the site area is proposed to be directed into settlement pond prior to discharge. Runoff from the wheel wash and weighbridge is directed through the existing oil water separator prior to entering the existing settlement ponds.

2.12.5 Meteorological Monitoring

At the present time, no meteorological monitoring is undertaken at the application site. It is understood that temperature, rainfall, sunshine, wind speed and direction are recorded at Ballyhaise Meteorology Station. It is currently envisaged that representative meteorological data will be acquired from the existing weather station at Ballyhaise Meteorology Station, as and if required.

2.12.6 Noise Monitoring

Noise monitoring is carried out at the existing site annually. Locations include N1, N2, N3, NSL 1 and NSL 2. Measurements are undertaken using a Larson Davis sound meter). This instrument is a Type 1 data-logging integrated sound level meter and meets the requirements of the International Electrotechnical Commission (IEC) Publication 651.

2.12.7 Stability and Settlement Monitoring

Quarry slopes are visually inspected on an ongoing basis, by site staff and a record kept of same. Should these inspections give rise for concern, an inspection of the affected area(s) will be undertaken by a qualified engineer and measures will be implemented to address any instability issues.

2.13 Do-nothing scenario

A 'do nothing scenario' will result in no predicted impacts at the subject quarry, and the site would remain in its existing state.

2.14 References

- Cavan County Development Plan 2022 – 2028.
- Archaeological Code of Practice (Irish Concrete Federation, 2009).

Figure 2.4 Site Location (Application Area Outlined in Pink)

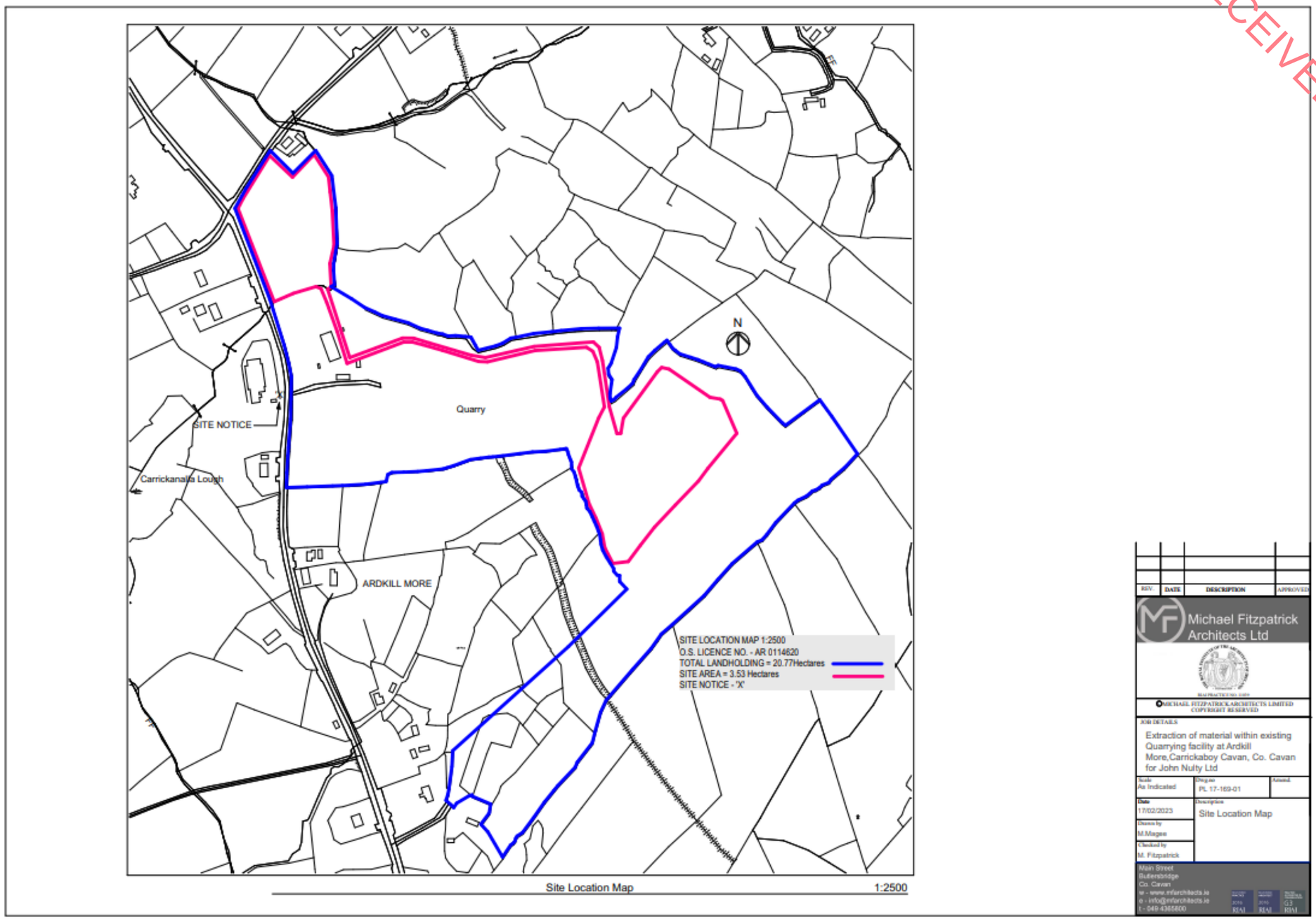


Figure 2.5 –Site Layout and Topographical Survey

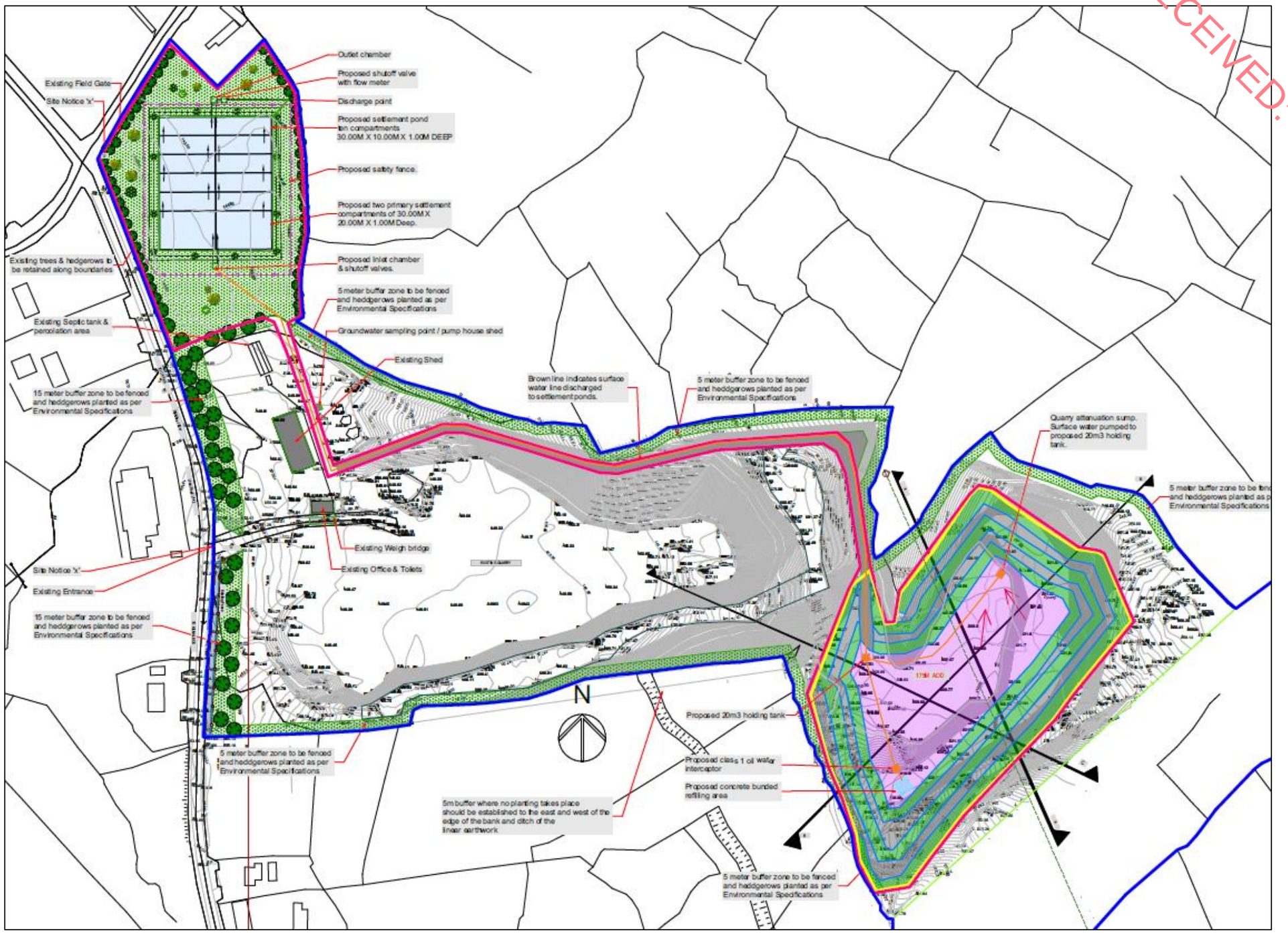
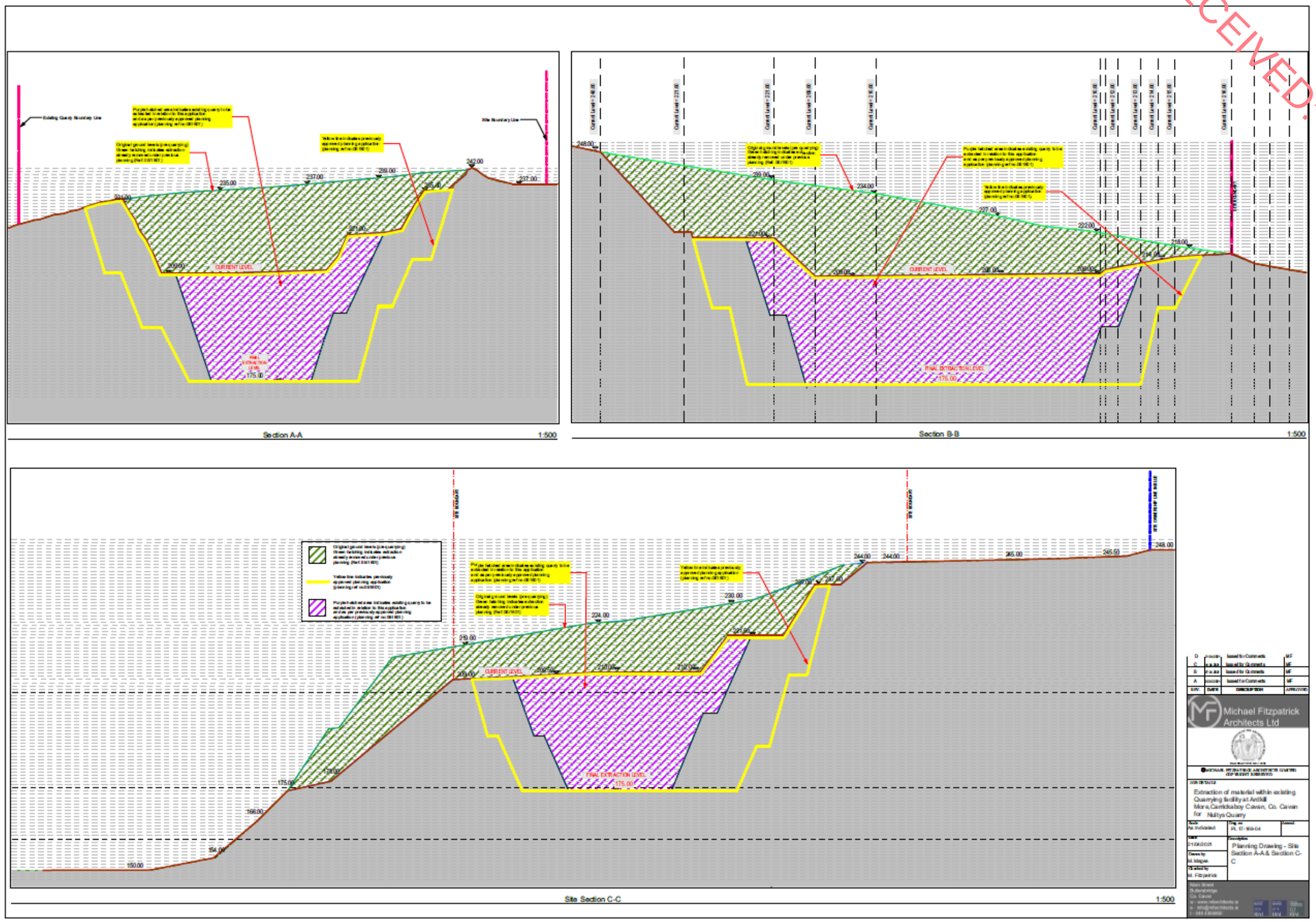


Figure 2.6 – Cross Section (Benches and Faces)



CHAPTER 3

ALTERNATIVES & PLANNING CONTEXT

CHAPTER THREE | ALTERNATIVES & PLANNING CONTEXT

Traynor Environmental Ltd.

3.0 ALTERNATIVES CONSIDERED

3.1 Introduction

Article 5(1) of the Directive 2011/92/EU, as amended by Directive 2014/52/EU states that.

> d) a description of the reasonable alternatives studied by John Nulty Ltd, which are relevant to the project and its specific characteristics, and an indication of the main reasons for the option chosen, considering the effects of the project on the environment.
>
> f) any additional information specified in Annex IV relevant to the specific characteristics of a particular project or type of project and to the environmental features likely to be affected.

Annex IV point two expands further.

> 2) A description of the reasonable alternatives (for example in terms of project design, technology, location, size, and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.

Article 94 and Schedule 6, paragraph 1(d) of the Planning and Development Regulations 2001, as amended, requires the following information to be furnished in relation to alternatives:

> "(d) A description of the reasonable alternatives studied by the person or persons who prepared the EIAR, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the proposed development on the environment."

The purpose of this Chapter is to describe the reasonable alternatives considered by the applicant, including alternatives considered through the design and consultation phases of the project, considering, and comparing environmental effects and illustrating the manner in which, and reasons for, choosing the proposed development.

Regarding 'Reasonable Alternatives,' the Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment' (2018) states that:

> ''The Directive requires that information provided by the developer in an EIAR shall include a description of the reasonable alternatives studied by the developer. These are reasonable alternatives which are relevant to the project and its specific characteristics. The developer must also indicate the main reasons for the option chosen considering the effects of the project on the environment. Reasonable alternatives may relate to matters such as project design, technology, location, size, and scale. The type of alternatives will depend on the nature of the project proposed and the characteristics of the receiving environment. For example, some projects may be site specific so the consideration of alternative sites may not be relevant. It is sufficient for the developer to provide a broad description of each main alternative studied and the key environmental issues associated with each.

Further the 2022 EPA Guidelines on the Information to be Contained in Environmental Impact Assessments are also instructive in stating:

> "Analysis of high-level or sectoral strategic alternatives cannot be expected within a project level EIAR… It should be borne in mind that the amended Directive refers to 'reasonable alternatives… which are relevant to the proposed project and its specific characteristics."

This chapter provides an outline of the main alternatives examined throughout the design and consultation process to indicate the primary reasons for choosing the proposed development, considering and providing a comparison of the environmental effects.

3.2 Do-Nothing Alternative

If no further works within the planning application area were carried out, the existing site would be restored to natural habitat after-uses as per the previously permitted proposals.

3.3 Site Selection and other Options Considered

The current planning application is to complete extraction of material, granted within existing quarry envelope as per previously approved planning. The existing permitted quarry area is located in an area favourable to extraction activities, due to, inter alia:

- Established long history of extraction at this location (since 1940).
- The quarry deepening has the benefit of planning from both An Bord Pleanála and Cavan County Council
- Proven reserves of Greywacke – refer to chapter 6 (Land, Soil & Geology)
- Located with direct access to the Local Road network – refer to EIAR Chapter 14 (Traffic and Transport)
- Best practice industry standard extraction and processing methods being used.
- Low development costs because infrastructure already in place at the site and the application is for the extension to a long-established quarry development.

3.3.1 Rationale for the Proposed Development

The rationale for the proposed development is based on the need to safeguard the existing and future operation of the quarry, as well as all buildings, infrastructure and employment, in the longer-term. In this regard, the proposed development is intended to safeguard the high-quality rock reserve at this location and the significant capital investment already provided in the existing quarry.

This proposal is supported by the Department of the Environment, Heritage and Local Government's *Quarries and Ancillary Activities – Guidelines for Planning Authorities* (2004), which states the following regarding proposals for quarries:

"In considering whether a further permission should be granted, the planning authority should have regard (inter alia) to the following factors:

a) The extent of the remaining mineral resources and
b) The extent of existing capital investment in infrastructure, equipment, etc."

The previously approved planning extraction (Ref No.051801) has not been fully completed. As a result, the proposed development intends to apply for a 20-year permission to complete extraction granted within existing quarry envelope. This will help to safeguard the reserve and secure employment on the site in the longer- term. All of the necessary infrastructure is already in place and will serve the continued extraction at the quarry site. Therefore, the site and its high-quality rock reserve is a significant resource that should be supported and protected.

In addition, the *Guidelines* state that:

"In deciding the length of the planning permission, planning authorities should have regard to the expected life of the reserves within the site."

The proposed continued extraction contains reserves of approximately 500,000 tonnes of rock, an average permitted output rate of 25,000 tonnes up to a maximum of 50,000 in any one year.

Given the quality of rock reserves in the existing quarry, the importance of the other facilities on-site (associated buildings, machinery, crusher, graders, ancillary infrastructure) result in a significant capital investment made at the site. Therefore, the proposed quarry continuation is considered appropriate and in accordance with the provisions of the *Guidelines*.

3.3.2 Alternative Locations

It is widely known that appropriate sites for rock extraction are finite, and this site is ideal for quarrying operations to develop further given the existing site infrastructure and local road infrastructure that is capable of accommodating traffic movements.

The Applicant has already provided a significant capital investment in the existing quarry and an alternative location is not considered to be viable or make best use of the existing reserves in the local area. The propose deepening of the existing quarry at the subject site is considered to be the most appropriate development.

In addition, as a result of Section 261 and Section 261A of the *Planning and Development Acts, 2000 (as amended)*, a large number of quarries across Ireland that do not have the requisite permissions and particulars in place or that have significant negative impacts on the environment, will be required to cease operations. As a consequence, the importance of the high-quality rock reserve on this site for use in construction activities cannot be underestimated.

Aggregates can only be worked where they exist and where the environmental effects of working them can be minimised. However, this is not the only prerequisite which determines a suitable location for an aggregates site. Others include a willing seller, distance from market, required quality and quantity to justify capital investments, etc. It is usually the case that a number of these prerequisites are not met, and the alternative is discounted.

Typically, the alternatives available to an applicant in respect to quarry developments relate to:

- further development (increase of the existing quarry footprint and/or deepening) and final restoration of the existing established quarry which has been in operation for over 50 years; or
- development of a new replacement 'greenfield' quarry site to serve the established clients and markets in this region

The established nature and planning history of Nulty's Quarry are such that the deepening of the existing quarry would represent the most economic and sustainable way forward.

3.3.3 Alternative Designs/Layout

Alternative designs, including alternative layouts within the site were considered. A planning application was submitted in 2019 and was subsequently refused by An Bord Pleanála. No changes to the previously permitted quarry extraction area are proposed as part of this EIAR. Quarry deepening will be carried out within existing quarry envelope as per previously approved planning (Ref No.051801). This is considered to best minimise the potential impacts on the environment from noise, dust, visual impacts.

3.3.4 Alternative Mitigation Measures

The mitigation measures outlined in this EIAR, where appropriate, have been developed by competent experts relevant to the aspect of the environment under consideration and represent best practice with a view to avoiding or otherwise minimising potential impacts on the environment.

There are no predicted residual impacts once mitigation measures have been successfully applied and as such alternative mitigation is not considered necessary.

3.4 Alternative Processes

John Nulty Ltd are a company with expertise and experience in the field of quarrying and aggregates production. As this planning application is to complete extraction of material granted within existing quarry envelope as per previously approved planning (Ref No.051801), alternative processes are not considered relevant in this instance.

3.5 Planning Policy

3.5.1 Introduction

The planning and policy context give an overview of the relevant legislation and planning policy that supports the subject development at a local, regional, and national Level.

3.5.2 National Framework Plan

The Project Ireland 2040. National Planning Framework (NPF) was published on 16th February 2018 and is the Government's high-level strategic plan for shaping the future growth of the country to the year 2040. It will guide public and private investment and create and promote opportunities for people, and to protect and enhance the environment.

The NPF: outlines key future planning and development place making policies for the Eastern and Midland Regions including:

- Sustainable Management of Water, Waste and other Environmental Resources Ireland has abundant natural and environmental resources such as our water sources that are critical to our environmental and economic wellbeing into the future.
- Conserving and enhancing the quality of these resources will also become more important in a crowded and competitive world as well as our capacity to create beneficial uses form products previously considered as waste, creating circular economic benefits.

Under the heading "Aggregates and Minerals" the following commentary is set out:
Extractive industries are important for the supply of aggregates and construction materials and minerals to a variety of sectors, for both domestic requirements and for export. The planning process will play a key role in realising the potential of the extractive industries sector by identifying and protecting important reserves of aggregates and minerals from development that might prejudice their utilisation. Aggregates and minerals extraction will continue to be enabled where this is compatible with the protection of the environment in terms of air and water quality, natural and cultural heritage, the quality of life of residents in the vicinity, and provides for appropriate site rehabilitation.

Furthermore, National Policy Objective 23 is to '*Facilitate the development of the rural economy through supporting a sustainable and economically efficient agricultural and food sector, together with forestry, fishing and aquaculture, energy and extractive industries, the bio-economy and diversification into alternative on-farm and off-farm activities, while at the same time noting the importance of maintaining and protecting the natural landscape and built heritage which are vital to rural tourism.*'

The Proposed Development supports the Policies and goals outlined an the NPF.

3.5.3 Regional Planning Guidelines

Regional Planning Guidelines (RPGs) were first adopted in March 2004 as a key implementation mechanism of the Government's overall framework for achieving more balanced regional development and more strategic physical and spatial planning. The RPG were developed directly from the Governments 2002 National Spatial Strategy (NSS). The principal function for RPGs is to link national strategic spatial planning policies to the planning process at City and County Council level by co-ordinating the Development Plans through the Regional Planning Guidelines. Furthermore, the element of transport planning of Cavan County Council's Development Plan must be consistent with the transport strategy of the National Transport Authority, and it must be consistent with the Regional Planning Guidelines for the Greater Dublin Area. Finally, Cavan County Council's Development Plan must have regard to the Development Plans of adjoining authorities. The local authorities adjoining County Cavan are Meath, Louth, and Monaghan.

3.5.4 Cavan County Development Plan

The Cavan County Council Development Plan is the statutory planning policy document for the County and sets out the policies and objectives for the proper planning and sustainable development of the County from 2022 to 2028.

As demonstrated below the proposed development directly supports these polices and will help to achieve the objectives outlined in the Development Plan as follows:

Q 01 Safeguard for future extraction all identified locations of major mineral deposits in the County.

Q 02 Promote development involving the extraction of mineral reserves and their associated processes, where Cavan County Council is satisfied that any such development will be carried out in a sustainable manner, that does not adversely impact on the environment or on other land uses. Consideration in this regard shall be given to the impact of the development on the local economy.

Q 03 Facilitate adequate supplies of aggregate resources to meet the future growth needs of the County and the wider region while addressing key environmental, traffic and social impacts and details of rehabilitation.

Q 04 Ensure that projects associated with the extractive industry carry out screening for Appropriate Assessment in accordance with Article 6(3) of the E.C. Habitats Directive and comply with all relevant Environmental Legislation as required.

Q 05 Facilitate the exploitation of the County's natural resources and to exercise appropriate control over the types of development, including rural housing, taking place in areas containing proven deposits, whilst also ensuring that such developments are carried out in a manner which would not unduly impinge on the visual amenity or environmental quality of the area.

Q 06 Support the extractive industry where it would not compromise the environmental quality of the County and where detailed rehabilitation proposals are provided.

Q 07 Seek to ensure that the extraction of minerals and aggregates minimise the detraction from visual quality of the landscape and does not adversely affect the environment or adjoining land uses.

Q 08 Ensure that development for aggregates/mineral extraction, processing and associated processes does not significantly impact on the following

- Existing and proposed Special Area of Conservation and Special Protection Areas
- Existing and proposed Natural Heritage Areas.
- Areas of importance for the conservation of fauna
- Areas of significant archaeological potential
- Recorded Monuments
- Sensitive landscapes
- Public Rights of Way, Walking/Cycling Routes
- Drinking Water Supplies
- County Geological Sites

Q 09 Ensure that all quarrying activities and projects associated with the extractive industry comply with all relevant Planning and Environmental Legislation including the Geological Heritage Guidelines for the Extractive Industry.

Q 10 To encourage the rehabilitation of disused quarries and extractive sites to possible uses including habitat restoration, agriculture, recreation/amenities, commercial, industrial, and residential or a combination of same, subject to normal planning and environmental considerations.

3.6 Environmental Policy

"In response to the challenges faced regarding the sustainable use of resources linking issues such as the extraction of raw materials, the production and use of products and how we handle waste. the EU signed up to a Circular Economy Package (CE Package) in December 2015. The policy documents and Legislative proposals contained in the CE Package are designed to aid the transition towards a circular economy and provide the legal framework to enable the Circular Economy.

The concept of a circular economy is one in which materials and resources are used sustainably, where resources are conserved, and waste is managed in such a way as to reduce materials and recycling. While ensuring minimal environmental and human health impacts are created through the use of products and materials.

The Circular Economy Action Plan (CE Action Plan)' sets out the Commission's mandate for supporting the transition towards a Circular Economy in terms of production, consumption, waste management, boosting the secondary market for raw materials, innovation, investment and other 'horizontal measures and monitoring of progress. A table of proposed actions and timelines is included in the Annex to the Circular Economy Plan.

3.6.1 National Policy Position on Climate Action & Low Carbon Development (2013)

In 2014, the Government adopted the National Policy Position on Climate Action and Low Carbon Development. This Policy Position establishes the fundamental national objective of achieving transition to a competitive, low carbon, climate-resilient and environmentally sustainable economy by 2050. It sets out the context for the objective, clarifies the level of greenhouse gas mitigation and establishes the process to pursue and achieve the overall objective. Specifically, the Policy position envisages that development will be guided by a long-term vision based on:

- an aggregate reduction in carbon dioxide (CO_2) emissions of at least 80% (compared to 1990 levels) by 2050 across the electricity generation, built environment and transport sectors; and
- in parallel, an approach to carbon neutrality in the agriculture and land-use sector, which does not compromise capacity for sustainable food production.

3.6.2 Climate Action Plan 2023

The Climate Action Plan 2023 (CAP23) is the second annual update to Ireland's Climate Action 2019. This plan is the first to be prepared under the Climate Action and Low Carbon Development (Amendment) Act 2021, and following the introduction, in 2022, of economy-wide carbon budgets and sectoral emissions ceilings.
The plan was launched on 21 December 2022. The supplementary Annex of Actions will be published early in 2023.

The plan implements the carbon budgets and sectoral emissions ceilings and sets out a roadmap for taking decisive action to halve our emissions by 2030 and reach net zero no later than 2050, as committed to in the Programme for Government. Climate Action Plan 2023 sets out how Ireland can accelerate the actions that are required to respond to the climate crisis, putting climate solutions at the centre of Ireland's social and economic development.

3.6.3 The EIA Directive

The EIA Directive (85/337/EEC) is in force since 1985 and applies to a wide range of defined public and private projects. The EIA Directive was amended in 1997, 2003, 2009, 2011 and 2014. The EIA Directive requires environmental impact assessments to be carried out for certain projects as listed in Annex I of the Directive. EIA Directive and amendments are transposed into Irish law through the Planning and Development Acts 1996 to 2019 in particular S I. No. 296 of 2018.

Schedule 5. Part 1. of the Planning Regulations transposes Annex 1 of the EIA Directive directly into Irish planning legislation. An EIAR is required to accompany a planning application for development of a class set out in Schedule 5, Part 1 of the Planning Regulations which exceeds a limit, quantity or threshold set for that class of development.

Schedule 5, Part 2 of the Planning Regulations defines projects that are assessed on the basis of set mandatory thresholds for each of the project classes including:

(b) Extraction of stone, gravel, sand, or clay, where the area of extraction would be greater than 5 hectares"

The development does require a mandatory EIA due to the site been greater than 5ha.
Draft "Guidelines on the information to be contained in Environmental Impact Assessment Reports " published by the Environmental Protection Agency (EPA) in May 2022 detail the key changes made by the amended 2014 EIA Directive. This document has also been used in the preparation of this EIAR. In August 2018, the Department of Housing, Planning and Local Government published a document entitled ' Guidelines for Planning Authorities and An Bord Pleanála on carrying cut Environmental Impact Assessment. That document has also been used in the preparation of this EIAR.

The Revised EIA Directive defines EIA as a process. Article 1(2) (g) states that EIA means:

i. the preparation of an environmental impact assessment report by the developer, as referred to in Article 5(1) and (2).
ii. the carrying out of consultations as referred to in Article 6 and, where relevant, Article 7.
iii. the examination by the competent authority of the information presented in the environ- mental impact assessment report and any supplementary information provided, where necessary, by the developer in accordance with Article 5(3). and any relevant information received through the consultations under Articles 6 and 7.
iv. the reasoned conclusion by the competent authority on the significant effects of the project on the environment, considering the results of the examination referred to in point and where appropriate, its own supplementary examination; and
v. the integration of the competent authority's reasoned conclusion into any of the decisions referred to in Article 8a".

The Revised EIA directive requires the EIA to identity, describe and assess. in an appropriate manner and considering each individual case the direct and indirect significant effects of the Proposed Development on factors of the environment including:

a) population and human health.
b) biodiversity, with particular attention to species and habitats protected under the Habitats and Bird Directives:
c) land, soil, water, air, and climate:
d) material assets, cultural heritage, and the landscape"
e) the interaction between the factors referred to in points (a) to (d)

The requirements of the Revised EIA Directive in relation to each chapter are addressed in the EIAR as follows.

- Chapter 2: Description of Development
- Chapter 3: Planning and Policy Context
- Chapter 4: Population and Human Health
- Chapter 5: Biodiversity.
- Chapter 6: Land, Soil and Geology.
- Chapter 7: Hydrology & Hydrogeology.
- Chapter 8: Air Quality.
- Chapter 9: Climate.
- Chapter 10: Noise and Vibration.
- Chapter 11: Material Assets.
- Chapter 12: Archaeology and Cultural Heritage.
- Chapter 13: Landscape and Visual.
- Chapter 14: Traffic & Transportation.
- Chapter 15: Risk Management.
- Chapter 16: Interactions.
- Chapter 17: Summary of Mitigation Measures.

3.7 Difficulties Encountered

No particular difficulties were encountered in compiling any of the specified information contained in the EIAR, such that that the prediction of impacts has not been possible. The relevant chapters of the EIAR, identify any specific difficulties which were encountered during preparation of this EIAR.

CHAPTER 4

POPULATION AND HUMAN HEALTH

4 POPULATION & HUMAN HEALTH

4.1 Introduction

This Chapter of the EIAR, complied by Traynor Environmental Ltd. describes the human environment and identifies and assesses any impacts from the continuing extraction activities at the Application Site. In practice, the Safety, Health and Welfare at Work (Quarries) Regulations, 2008 (as amended), in conjunction with the primary health and safety legislation govern the management of quarry operations, including quarry faces. The human environment and potential impacts on the 'quality of life' as a consequence of the development are discussed under the following headings:

- Land-use and social considerations.
- Populations.
- Socio-economic.
- Tourism and Recreation.
- Age Profile.
- Employment.
- Traffic; and
- Health.

Impacts on population and human health is one of the most important aspects considered in an EIAR. Interactions between humans and other facets of the environment are discussed under relevant sections of this EIAR, including:

- Biodiversity (Flora and Fauna) (Chapter 5.0).
- Hydrology & Hydrogeology (Chapter 7.0).
- Air Quality (Chapter 8.0).
- Climate (Chapter 9.0).
- Noise and Vibration (Chapter 10.0).
- Landscape and Visual (Chapter 13.0); and
- Risk Management (Chapter 15.0).

4.1.1 Methodology

Information for the assessment of potential impacts on local populations was obtained by means of a desk-based review, and included the following sources:

- Census Returns (Central Statistics Office (CSO) 1991, 1996, 2002, 2006, 2011 and 2016 Census).
- Spatial information relevant to planning applications and decisions in Ireland from MyPlan.ie and An Bord Pleanála
- Cavan County Council Development Plan (2022-2028).
- Field surveys of the Application Site.
- DCENR Eircode maps; and
- Aerial and ordnance survey maps of the area.

The existing / past environment is described. Any impacts from proposed activities at the Site are identified and assessed, and where possible mitigation measures are proposed.

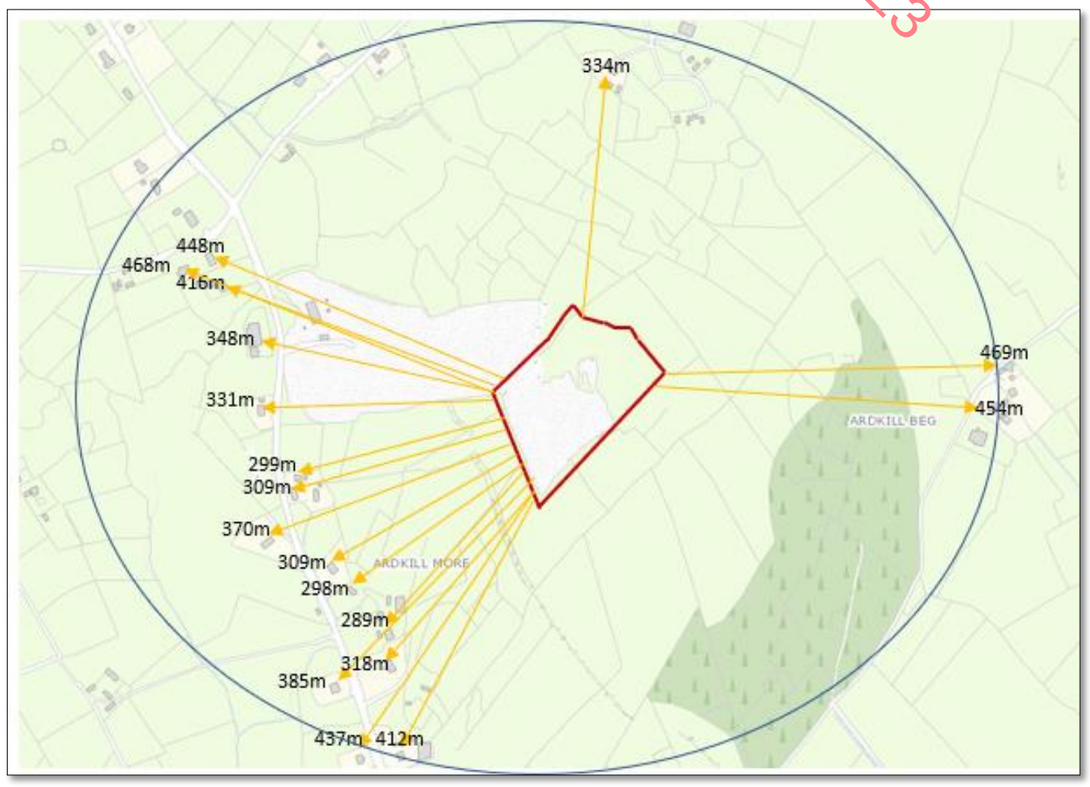
4.2 Environment

4.2.1 Land-use and Social Consideration

The Application Site is situated in the Cavan Electoral Division. The area in which the subject site is located is predominantly rural in character. Agriculture is the dominant land use in the surrounding area. The landscape is undulating and is characterised by drumlins which are typical of this part of County Cavan.

Residential development in the vicinity of the subject site is confined to single houses located along the local road to the west and other minor public roads to the north and south. The closest dwellings to the site are located > 200m to the south. Figure 4.1 identifies residential properties within 500m from the boundary of the application.

Figure 4.1 – Receptor Locations



4.2.2 Populations

The review of population is based on the electoral divisions of Cavan, in which the application site is located. The change in population from 2016 to 2023, as per Census 2016 for the electoral divisions, the county, the province, and the state is outlined below.

Census 2022 results show that Ireland's population stood at 5,123,536 in April 2022, an increase of 361,671 (7.6%) since April 2016. The population of County Cavan stood at 81,201, an increase of 6.6% over the five years.

With regard to population growth in the surrounding counties of the proposed development, Table 5.1 indicates that the total population of the border region grew by 0.6% in the period 2011-2016. County Cavan grew by 4.1%.

Table 4.1 Population for state, regions, counties, hinterland 2011, 2016 (The Census 2022 Summary Report will not be published in April 2023.)

Region and County	Population			Share of total population %	
	2011	2016	Change %	2011	2016
Border	392.0	394.3	0.6	8.5	8.3
Cavan	73.2	76.2	4.1	1.6	1.6
Donegal	161.1	159.2	-1.2	3.5	3.3
Leitrim	31.8	32.0	0.8	0.7	0.7
Monaghan	60.5	61.4	1.5	1.3	1.3
Sligo	65.4	65.5	0.2	1.4	1.4
Midland	282.4	292.3	3.5	6.2	6.1

4.2.3 Socio-economic context

The site is located approximately 1.4km south-west of Carrickaboy village and 4.9km south-east of Ballinagh. In terms of socio-economic impacts, Cavan can be regarded as the immediate hinterland. The secondary hinterland can be regarded as Meath and the surrounding counties of Meath and Leitrim as direct and indirect employment, employees' residences etc. are likely to be located throughout this region. The following socio-economic analysis concentrates mainly on this hinterland in terms of population and employment as this is the area where most impacts will arise.

4.2.4 Age Profile

In April 2011 Cavan had a population of 73,183, consisting of 37,013 males and 36,170 females. The average age of Cavan's population in April 2016 was 37.2 years, compared to 36.0 years in April 2011. Nationally, the average age of the population was 37.4, up from 36.1 in April 2011. The number of males aged 65 and over increased by 22% to 296,837, while the number of females aged 65 and over increased by 16.7% to 340,730. The Census 2022 Summary Report will not be published in April 2023.

The age profile of the population is important in terms of the potential labour force, the demand for schools, amenities and other facilities and the future housing demand. The age profile of the population of the area, reveals that the working age group of 25-44 has the highest number of people, and high numbers of the working age group of 45-64year olds. The 0-14 figures are indicative of a youthful population in these areas, and an increasing pool of labour.

In summary, the development will be located in an area that has experienced population growth in the last census period. The 2011 to 2016 period was characterised by strong population growth at 4.1% for Co. Cavan. These strong rates of population growth are indicative of the need for quarry material for the construction industry in the future. Initial results from the 2022 census indicate that there has been population growth in all counties.

4.2.5 Employment

There were 34,640 persons aged 15 years and over in the labour force and of these, 78.8 per cent (27,309 persons) were at work. The unemployment rate for this area was 21.2 per cent compared with a national average rate of 19.0 per cent. Of the 21,311 persons aged 15 years and over who were outside the labour force, 25.7 per cent were students, 28.1 per cent were looking after the home/family and 34.0 per cent were retired. Of the 27,309 workers enumerated in Cavan, 5,463 worked outside the area. The daytime working population (resident and non-resident) of Cavan was 19,251 with commerce and trade being the largest industry. The Census 2022 Summary Report will not be published in April 2023.

4.2.6 Tourism and Recreation

The Cavan County Development Plan considers tourism in Chapter 9 'Tourism'. Tourism makes an important contribution to the economy of Cavan with income derived from tourist activity being distributed across a wide range of economic sectors. The objectives of the Local Authority are as follows:

T 01 Promote the development and strengthening of the overall value of Cavan as a tourist destination by encouraging the enhancement and development of sustainable and high-quality visitor attractions, activities and infrastructure, enabling an increase in the overall capacity and long-term development of the county's tourism industry, subject to appropriate siting and design criteria and the protection of environmentally sensitive areas.

T 02 Engage and collaborate with key stakeholders, relevant agencies, sectoral representatives and local communities to develop the tourism sector in Cavan, to ensure that the economic potential of the tourism sector is secured for the local economy.

T 03 Support the implementation of the County's Tourism Strategy in line with national and regional policy, tourism trends and identified challenges, in collaboration with Fáilte Ireland, Waterways Ireland, tourism businesses and communities and other supporting agencies.

T 04 Continue to work closely with Fáilte Ireland to maximise the benefit of national and regional initiatives/plans/strategies for the county, with a particular emphasis on initiatives which will increase the economic benefit from tourism, support local business development and encourage new enterprise opportunities.

T 05 Utilise the county's natural and heritage resources to foster the development of tourism as a viable sector of the economy in a sustainable manner which complements the scale, quality and unique features of the location and county.

T 06 Protect and conserve the natural, built and cultural heritage features which add value to the visitor experience in Cavan and seek to restrict developments which would damage or detract from the quality of scenic areas and identified natural and cultural heritage assets.

T 07 Support actions to increase access to state and semi-state lands such as National Parks, Forest Parks, Waterways, together with Monuments and Historic Properties, for recreation and tourism purposes, subject to the requirements of the Habitats Directive, National Monuments Act and other provisions and policies to protect and safeguard these resources and subject to the ability of local infrastructure to support the resulting increased tourism.

T 08 Support the development and expansion of tourism-related enterprise including visitor attractions, services and accommodation and food and craft businesses, particularly those offering a visitor experience, such as tastings, tours and demonstrations.

T 09 Ensure all tourism developments shall integrate climate change adaptation, the enhancement of nature and biodiversity measures into their activities, plans and proposals.

T 10 Monitor and manage any increase in visitor numbers and/or any change in visitor behaviour in order to avoid significant effects, including loss of habitat and disturbance. Visitor/Habitat Management Plans will be required for proposed projects as relevant and appropriate.

T 11 Promote Tourism as an integral part of Cavan's economic profile supporting urban and rural enterprises.

T 12 Carry out an audit of existing tourism signage and notice boards in the county to ensure that they meet the needs of visitors and prepare a county wide coordinated strategy for the enhancement of same.

T 13 It is an objective of the Council to support the provision of accessible tourism.

T 14 Support the development of a new Discovery Centre at the Shannon Pot in collaboration with Fáilte Ireland as a key tourism product under the Fáilte Ireland Platforms for Growth capital investment programme.

T 15 The Council will support the preparation of Destination Experience Development Plans (DEDP) and other tourism masterplans both within the county and also those which crosses from the county into neighbouring counties in collaboration with Fáilte Ireland and other tourism stakeholders.

There is significant scope to improve the existing tourism offering in Cavan and support the policies and objectives of the County Development Plan to improve the numbers of tourists visiting Cavan.

4.2.7 Traffic

A detailed Traffic and Transportation Assessment (TTA) has been undertaken for the Application Site; and is included in Chapter 14.0.

4.2.8 Health and Safety

The World Health Organisation [WHO] definition of health 'Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity' has been in continuous and undisputed international usage since 1948. This assessment seeks to identify and assess any aspect of the proposed development with a potential to give rise to effects on human health. Health impacts are assessed via biophysical factors such as water, air, and noise that are covered elsewhere in this EIAR in sections 5 - 15. These are the vectors by which human health could be affected. These assessments are based on a constantly evolving body of fundamental references that provide the appraisal criteria and indicators used for assessment of the potential biophysical effects used in environmental assessment and licencing.

These criteria are the emissions standards and related emission limit values that set the conformance requirements which in turn determine whether anticipated environmental and associated health effects are likely to be acceptable or not.

The assessment of each of the relevant factors in sections refer to these emission limit values to determine whether any adverse effects or risks due to emissions could occur. These assessments seek to measure whether any increase in the normal or 'background' level of risk could occur.

4.3 Impact Assessment

4.3.1 Land-use and Social Considerations

The quarry operations comprise of the extraction of rock using blasting techniques; processing (crushing and screening) of the fragmented rock to produce aggregates for use in the manufacture of, road construction and site development works. With respect to social considerations, there has been little or no change to local activities as a result of extraction activities in the vicinity of the Site since operations began.

4.3.2 Populations

It is not anticipated that the development will result in any change in population as a result of the proposed activities at the Application Site.

4.3.3 Economic Activity

Five persons are employed on a full-time basis as operatives and will continue in employment if the application is granted permission. It is therefore considered that the operation of the Application Site will have a positive impact on economic activity in the area.

4.3.4 Tourism and Recreation

It is unlikely that the deepening and extraction of the proposed site will impact the tourist potential of the local area. Further information regarding landscape and visual impact and mitigation measures is included in Chapter 13.0 (Landscape) of this EIAR. The post operational stage mitigation comprises a restoration plan to be implemented at the end of the life of the quarry. The restoration plan includes a range of measures to restore the quarry site to an after use which would be more sympathetic with the surrounding landscape.

4.3.5 Traffic

An in-depth analysis of the impact of the proposed development in terms of traffic was carried out through the preparation of a Traffic and Transport Assessment (TTA). TTRSA Limited was commissioned to undertake a review of the traffic impacts associated with the operation of the proposed development site.

4.3.6 Health and Safety

A Site Manager is responsible for safety management on site. All site employees, contractors and subcontractors are required to wear a minimum personal protective equipment (PPE) whilst on site, these are steel toed boots and a high visibility jacket or vest. Other task specific PPE which will be used at the Application Site include hard hats and gloves. The requirement to use such additional PPE is documented in task specific risk assessments. All contractors and subcontractors operating at the Application Site are required to comply with John Nulty's Ltd. procedures.

Hedging and fences will be maintained around the perimeter of the site to reduce the risk to livestock and the public accessing the site. As the site is a working quarry under QY 7, members of the public are not permitted on the site unless accompanied by a staff member at all times due to the risks. The entrance gate is locked during periods when the site is closed, this will be controlled by the site management. All remedial works have been carried out and mitigation measures put in place following recommendation of the previous geotechnical assessments carried out at the site. In the event that emergency services are required at the Application Site the closest Accident and Emergency unit operates out of Cavan General Hospital. Fire emergency services operate out of Cavan town.

4.3.7 Air Quality

The impact of the development on climate and air quality is outlined in Chapter 8 & 9 of this EIAR. It is expected that impacts from dust as a result of the proposed development will be not significant. The mitigation measures outlined in Chapter 8 & 9 include the implementation of proven site management practices including wet suppression techniques to minimise dust emissions. In summary, there will be no adverse impacts on ambient air quality in the vicinity of the facility, on local residences or on the local environment as a result of emissions from the activities at the site.

4.3.8 Noise and Vibration

An assessment of the noise impacts associated with the proposed development has been conducted, and mitigation measures outlined in Chapter 10 of this EIAR. Due to the proposal to continue extraction and deepening of a previously approved quarry, there will be no adverse noise impacts predicted at noise sensitive receptors in the vicinity of the site as a result of the proposed development.

4.3.9 Landscape and Visual

Chapter 13.0 of the EIAR assesses the landscape and visual impact of the development. A Landscape Impact Assessment was carried out by MF Architects to assess changes in the physical landscape brought about by the development, and how the development may alter the character of the landscape.

4.3.10 Water

The impact of the development on the hydrology and hydrogeology of the area is assessed in Chapter 7 of this EIAR. The development area is not located within a Source Protection Area for public water supply scheme, and there are no changes in the hydrology or hydrogeology of the area expected; it is therefore considered that there will be no impact on human beings as a result. The site is services by a series of settlement ponds for surface water runoff treatment. Subject to planning a new settlement pond will be constructed in accordance with CIRIA guidelines.

4.4 Mitigation

Mitigation measures for air quality, noise and visual impacts are described in Chapter 8.0 (Air Quality), Chapter 9.0 (Climate), Chapter 10.0 (Noise and Vibration), Chapter 13.0 (Landscape) and Chapter 11.0 (Material Assets). Once the appropriate measures have been implemented, it is considered that no significant effects on the socio-economic and human being environment in the vicinity of the Application Site will occur.

4.5 Residual/Likely Significant Impacts

Impacts on population and human health are dealt with in the individual topic sections of this report (below) and whilst impacts are likely to arise, for example, by way of noise, dust, and traffic, due to the location of the quarry relative to sensitive receptors and proposed mitigation measures direct, indirect, cumulative and in combination impacts are unlikely to be significant, except for instances of blasting where short term and localised effects will arise. The Application Site will adhere to standard environmental, health and safety policies. Potential emissions relate to dust, water, waste, and noise are dealt with in the relevant chapters of the EIAR.

4.6 Cumulative Impacts

No other permitted extraction activities are currently taking place in the vicinity of the proposed development with the exception of QY 7 which is in the same landholding. Cumulative impacts on Air Quality on the Human environment are considered not significant due to distances from receptors and site management practices employed. There is no discernible effect in cumulative noise anticipated as a result of proposed activities at the Application Site.

4.7 The 'Do Nothing' Scenario

There would be no potential impact at the existing quarry if the development did not proceed.

4.8 The 'Worst Case' Scenario

The worst-case scenario would be the development negatively impacting upon traffic conditions, Air quality, Noise emissions and visual impairment. None of these are considered likely given the nature of the development set out in the planning application.

4.9 References

- Central Statistics Office – www.cso.ie.
- Central Statistics Office. Census Returns 1991, 1996, 2002, 2006, 2011 and 2016 – hppt://www.cso.ie/en/census/-
- Cavan County Development Plan 2022-2028

CHAPTER 5

BIODIVERSITY

Traynor Environmental Ltd.

5 BIODIVERSITY

5.1 Introduction

This section of the EIAR has been prepared by Noreen McLoughlin, MSc, MCIEEM of Whitehill Environmental to identify and assess the potential ecological impacts associated with continued extraction of material granted within the existing quarry envelope at Ardkill More and Drumcrow, Carrickaboy, Co. Cavan. This chapter includes:

- Complete a desk study and all necessary field surveys to obtain relevant terrestrial and ecological data for the Zone of Influence (ZoI) of the proposed works.
- Identify and describe sites of known or potential ecological interest.
- Assess the significance of the likely impacts of the quarry operations on each of these environmental aspects for the operational phase of the activity and for the post-remediation phase.
- Where possible, propose mitigation measures to remove or reduce those impacts at the quarry during the continued extraction, as necessary.

This assessment presents a summary of ecological features which are likely, or have the potential to be, residually affected by the proposed extractive works. It evaluates the importance of the ecological resources present and defines the degree of significance of potential impacts resulting from the proposed further quarrying activities. The report also identifies appropriate mitigation measures and defines residual impacts should they be identified.

Upon the cessation of extraction operations, it is proposed to return the worked lands to natural habitat after-uses. Where feasible, restoration of exhausted and redundant areas will be carried out at the earliest opportunity. However, it is envisaged that the majority of restoration proposals will only be carried out after extraction operations at the site have ceased.

5.1.1 Zone of Influence

The 'zone of influence' for a project is the area over which ecological features may be subject to significant effects because of the proposed project and associated activities. This is likely to extend beyond the project site, for example where there are ecological or hydrological links beyond the site boundaries. The zone of influence will vary for different ecological features depending on their sensitivity to an environmental change.

5.2 Characteristics of development

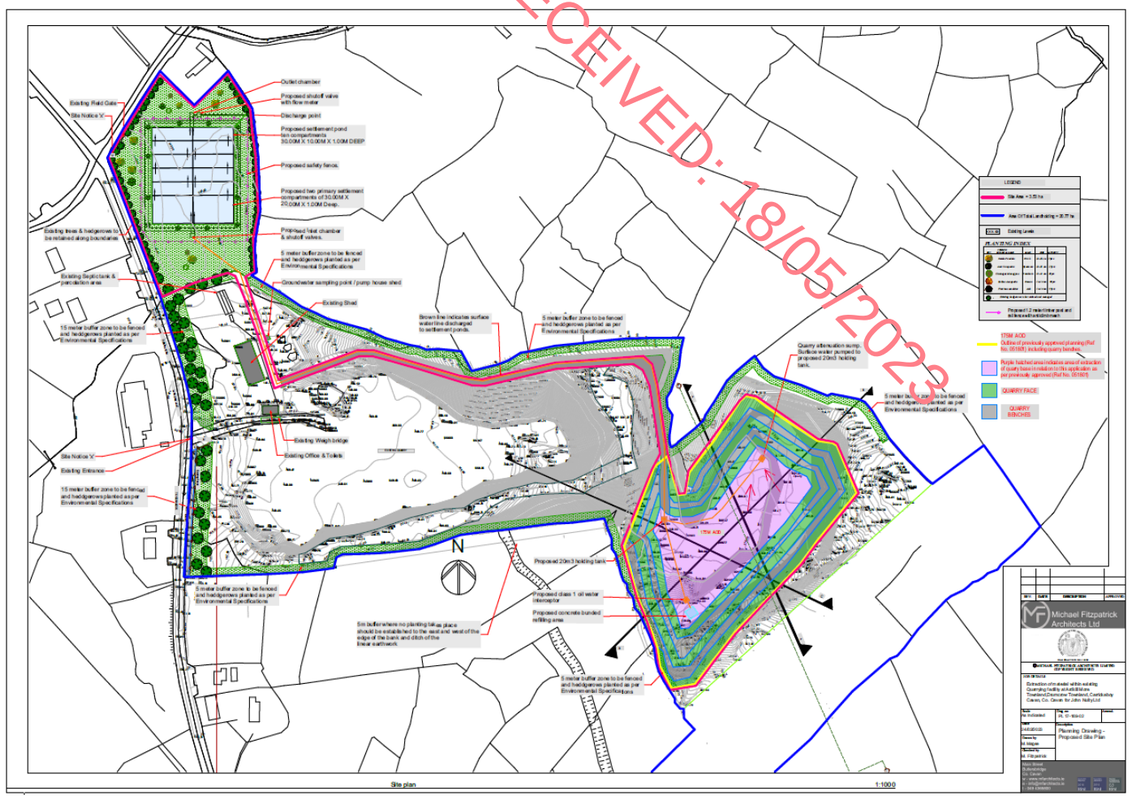
The proposed development will consist of:

2for a 20 year permission for quarrying and extraction of rock that will include drilling, blasting, crushing and screening along with alterations to boundaries & all associated site works on lands at Ardkill More Townland and Drumcrow Townland, Carrickaboy, County Cavan.

Works will also include for the provision of new settlement ponds and installation of associated site drainage infrastructure and surface water pump to proposed new settlement ponds along with provision of discharge outlet via a Klargester Interceptor. Ancillary site works to include for landscape works, planting restoration of the quarry perimeter and reprofiling of overburden as required to facilitate development of the quarry and restoration of the associated site area."

The Application site is located in the townland of Ardkill More and Drumcrow. It is located approximately 1.4km south-west of Carrickaboy village and 4.9km south-east of Ballinagh.

Figure 5.1 - Site Layout. Extract from Planning Drawing



5.3 Methodology

5.3.1 Statement of Competence

In accordance with Article 5(3)(a) of the EU Directive, by appointing Whitehill Environmental Ltd, John Nulty Ltd. has ensured that this chapter has been prepared by "Competent experts". In accordance with the guidelines issued by the Environmental Protection Agency (EPA) and the Chartered Institute of Ecology and Environmental Management (CIEEM).

The site survey and NIS report was carried out by Noreen McLoughlin BA, MSc, MCIEEM. Noreen is the owner and main ecologist at Whitehill Environmental. Noreen holds a BA (Hons) in Natural Science (Mod) Zoology and an MSc in freshwater ecology (TCD, Meath). She has been a full member of the CIEEM (Chartered Institute of Ecology and Environmental Management) for over 17 years. Noreen has over 18 years' experience as a professional ecologist in Ireland.

5.3.2 County Planning Policies

National

Nationally, the Government's commitment to sustainable development is set out in a number of documents including the National Development Plan 2007-2013, the National Spatial Strategy 2002-2020, and Sustainable Development: A Strategy for Ireland 1997.

Regional

Planning at the regional level is now guided by the Regional Spatial and Economic Strategy (RSES). The RSES is a strategic plan which identifies regional assets, opportunities and pressures and provides appropriate policy responses in the form of Regional Policy Objectives.

Local

Planning policy at the local level is provided by the Cavan County Development Plan 2022 –2028. This plan contains a number of objectives and policies relevant to ecology, biodiversity, green infrastructure, and nature conservation.

5.3.2.1 History, Heritage, and Ancient Sites Development Objectives

In accordance with the County Development Plan 2022 - 2028 It is the policy of Cavan County Council to:

HHAS 01 Encourage sustainable tourism enterprise development associated with rural life style, landscape, natural and heritage locations to develop Cavan's infrastructure and gain the benefit from increased visitors, subject to development management standards.

HHAS 02 Support sustainable initiatives and projects that enable visitors to enjoy and connect with our natural heritage, including walking or cycling trails, glamping, viewing points, facilities for bird-watching and angling, tours and events, subject to the requirements for protecting this valuable and sensitive heritage.

HHAS 03 Support enhanced access to state, semi-state, and private lands such as bogs, forests, waterways, together with National Monuments and Historic Properties, for recreation and tourism purposes. Access should be planned and managed in a sustainable manner that protects heritage, environmental sensitivities, ecological corridors, and the ability of local infrastructure to support increased tourism.

HHAS 04 Support the diversification and innovation of our tourism product with opportunities arising for the development of new tourism offerings such as nature, culturally curious and slow tourism.

HHAS 05 Support the conservation of estates and demesnes by way of facilitating appropriate development that contributes to their economic viability.

5.3.2.2 Designated sites for nature conservation – policies

Planning policy at the local level is provided by the Cavan County Development Plan 2022–2028. This plan contains a number of policies relevant to the ecology and nature conservation in Co. Cavan. These are summarised below as.

NHDS1 Protect and conserve Special Areas of Conservation, Special Protection Areas, Natural Heritage Areas and proposed Natural Heritage Areas.

NHDS 2 Ensure an Appropriate Assessment is carried out in respect of any plan or project not directly connected with or necessary for the management of the site but likely to have a significant effect on the integrity of a European Site(s), either individually or in-combination with other plans or projects, in view of the site's conservation objectives.

NHDS3 Ensure that any plan or project that could have an adverse impact on a NHA, pNHA, SAC, SPA (either by themselves or in combination with other plans and projects) or upon the conservation objectives of the site or would result in the deterioration of any habitat or any species reliant on that habitat will be subject to the requirements of Article 6(3) and Article 6(4) of the Habitats Directive.

NHDS4 Ensure an Appropriate Assessment (AA) in accordance with Article 6(3) and Article 6(4) of the Habitats Directive, and in accordance with the Department of the Environment, Heritage and Local Government *Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities, 2009* and relevant EPA and European Commission guidance documents, is carried out in respect of any Plan or Project likely to have significant effect on a Natura 2000 site(s), either individually or in combination.

NHDS5 Require an ecological appraisal for development not directly connected with or necessary to the management of Natura Sites, or a proposed Natura Site and which are likely to have significant effects on that site either individually or cumulatively.

NHDS6 Support the development of a Strategic Habitat Map for the Cuilcagh Lakelands UNESCO Global Geopark in consultation with National Parks and Wildlife Service and relevant stakeholders.

NHDS7 Promote the maintenance and as appropriate, achievement of favourable conservation status of habitats and species and to improve the ecological coherence of the Natura 2000 network, by maintaining and where appropriate, developing features in the landscape which are of major importance for wild fauna and flora.

NHDS8 Ensure that new development proposals affecting designated sites have regard to the sensitivities identified in the SEA Environmental Report prepared in respect of this plan.

NHDS9 Have regard to the views of the National Parks and Wildlife Service in respect of proposed development where such development may have an impact on a designated National or European site or proposed site for designation.

NHDS10 Consult with National Parks and Wildlife Service (NPWS) in regard to any developments (those requiring planning permission and those not requiring planning permission) which the council proposes to carry out within pNHAs, NHAs, SACs, SACs, SPAs, SPAs and other important ecological sites.

NHDS11 Maintain the conservation value of Council owned land within NHAs and pNHAs and promote the conservation value of Council owned land adjoining NHAs.

NHDS12 Continue to undertake surveys and collect data that will assist Cavan County Council in building its knowledge base and meeting its obligations under Article 6 of the Habitat Directives.

NHDS 13 Projects giving rise to adverse effects on the integrity of European sites (cumulatively, directly or indirectly) arising from their size or scale, land take, proximity, resource requirements, emissions (disposal to land, water or air), transportation requirements, duration of construction, operation, decommissioning or from any other effects shall not be permitted except as provided for in Article 6(4) of the Habitats Directive, viz there must be: (a) no alternative solution available, (b) imperative reasons of overriding public interest for the plan to proceed; and (c) adequate compensatory measures in place.

NHDS 14 Contribute towards the protection and enhancement of biodiversity and ecological connectivity where these form part of the ecological network and/or may be considered as ecological corridors or steppingstones.

5.3.2.3 Invasive species policies

It is the policy of Cavan County Council to:

IN1 Support initiatives, which reduce the risk of invasions, help control and manage new and established invasive species, monitor impacts, and raise public awareness.

IN2 Encourage the use of native species in amenity planting and stocking and related community actions to reduce the introduction and spread of non-native species.

IN3 Prevent the spread of invasive species within the plan area, including requiring landowners and developers to adhere to best practice guidance in relation to the control of invasive species.

IN4 Ensure proposals for development do not lead to the spread or introduction of invasive species. If developments are proposed on sites where invasive species are or were previously present, the applicant will be required to submit a control and management programme for the particular invasive species as part of the planning process and to comply with the provisions of the European Communities Birds and Habitats Regulations 2011 (S.I 4777/2011)

IN5 Support the National Parks and Wildlife Service's efforts to seek to control and manage the spread of non-native invasive species on land and water.

5.3.2.4 Biodiversity Plans

Ireland's National Biodiversity Plan identifies actions that need to be taken in order to understand and protect biodiversity in Ireland. It states that biodiversity and ecosystems in Ireland should be conserved and restored, to deliver benefits that are essential to all sectors of society and that Ireland should contribute to the efforts to halt the loss of biodiversity and the degradation of ecosystems in the EU and globally.

5.3.3 Study Area and Zone of Influence

The study area encompasses all the land within the area defined in the plan submitted for planning permission, i.e., the proposed application site. In addition, important ecological habitats, and receptors within the zone of influence of the proposed development were also studied.

5.3.4 Desk Based Studies

Information on the site and the area of the development was studied prior to the completion of this statement. The following data sources were accessed in order to complete a thorough examination of all impacts:

- National Parks and Wildlife Service - aerial photographs and maps of designated sites, information on habitats and species within these sites and information on protected plant or animal species; conservation objectives, site synopses and standard data forms for relevant designated sites.
- Environmental Protection Agency (EPA)- Information pertaining to water quality, geology, and licensed facilities within the area.
- National Biodiversity Data Centre (NBDC) – Information pertaining to protected plant and animal species within the study area.
- MF Architects / Traynor Environmental – Details of the proposed project, including site plans, cross sections, and specifications etc.
- Cavan County Council – Information on planning history in the area.
- Planning Permission (Ref No. 051801)

5.3.5 Field Based Studies

Site visits were conducted in September 2020 when field notes, species lists, and photographs were taken. The site was surveyed in accordance with the Heritage Council's Habitat Survey Guidelines (Smith et al., 2010) and the Institute of Environmental Assessment's Guidelines for Baselines Ecological Assessment (IEA, 1995). Habitats within the application site were classified in accordance with Level 3 of A Guide to Habitats in Ireland (Fossit, 2000). These habitats are denoted in the text along with their habitat code, e.g., the habitat code for improved agricultural grassland is GA1. A species list was compiled, and target notes were made. Any mammal and bird activity were also noted.

5.3.6 Seasonal Constraints

There were no seasonal constraints associated with the habitat assessment element of the field work for this Chapter.

5.3.7 Assessment Methodology

The methodologies used to determine the value of ecological resources, to characterise the impacts of the proposed scheme, and to assess the significance of impacts and any residual effects are described below. This approach is in accordance with the following guidelines and methodologies:

- Guidelines for Ecological Impact Assessment in the United Kingdom by the Chartered Institute of Ecology and Environmental Management (CIEEM, 2018)
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, May 2022)
- Guidelines for Assessment of Ecological Impacts of National Road Schemes. (NRA, 2009).

CIEEM suggest that to ensure a consistency of approach, ecological features are valued in accordance with their geographical frame of reference, as defined below:

- International.
- National (Ireland).
- Regional (Border).
- County (Cavan).
- Local/Townland (Ardkill More and Drumcrow).

The above categories are then applied to the ecological features identified. Ecological features can be defined as:

- Designated sites (i.e., SACs, SPAs, NHAs, pNHAs, National Nature Reserves) or non-statutory locally designated sites and features.
- Non-designated sites and habitats and features of recognised biodiversity value, such as rivers and streams. The features being evaluated can be considered in the context of the site and locality and thus a more accurate assessment of the impacts in the locality can be made.

The criteria used in evaluating ecological habitats follow the NRA (2009) and CIEEM (2006). The site evaluation criteria are detailed in Table 5.1.

Table 5.1 - Conservation Evaluation (after Natura Site Evaluation Scheme, NRA, 2009).

Ecological Valuation	Description
Internationally	• Sites designated (or qualifying for designation) as an SAC or SPA under the EU Habitats or Birds Directives. • Undesignated sites that fulfil criteria for designation as a European Site. • Features essential to maintaining the coherence of the Natura 2000 network. • Sites containing 'best examples' of the habitat types listed in Annex I of the Habitats Directive. • Resident or regularly occurring populations of birds listed in Annex I of the Birds Directive and species listed in Annex II and/or Annex IV of the Habitats Directive. • Ramsar Sites, World Heritage Sites or Biosphere Reserve. • Site hosting significant species populations under the Bonn Convention or Berne Convention. • Salmonid waters.
Nationally	•Sites or waters designated or proposed as an NHA*or Statutory Nature Reserve. •Refuge for fauna and flora protected under the Wildlife Acts. •National Park. •Undesignated sites fulfilling criteria for designation as an NHA. •Refuge for Fauna and Flora protected under the Wildlife Act. •Resident or regularly occurring populations (assessed to be important at the national level) of species protected under the Wildlife Acts and/or species listed on the relevant Red Data list). •Site containing viable areas of the habitat types listed in Annex I of the Habitats Directive.
Regional	Sites, habitats, or species which may have regional importance, but which are not protected under legislation e.g., viable areas or populations of Regional Biodiversity Action Plan habitats or species
Local/County	•Areas of Special Amenity. •Area subject to a Tree Preservation Order. •Area of High Amenity, or equivalent, designated under the County Development Plan. •Resident or regularly occurring populations (assessed to be important at the County level) of species of birds listed in Annex I of the Birds Directive, species listed in Annex II and/or IV of the Habitats Directive, species protected under the Wildlife Acts and/or species listed on the relevant Red Data list. •Site containing area(s) of the habitat types listed in Annex I of the Habitats Directive that do not fulfil criteria for valuation as of International or National Importance. •County important populations of species, or viable areas of semi-natural habitats or natural heritage features identified in the National or local BAP. •Sites containing semi-natural habitat types with high biodiversity in a county context and a high degree of naturalness or populations of species that are uncommon within the county. •Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level.
Local (higher value)	• Locally important populations of priority species or habitats or natural heritage features identified in the Local BAP. • Resident or regularly occurring populations (assessed to be important at the Local level) of species of birds listed in Annex I of the Birds Directive, species listed in Annex II and/or IV of the Habitats Directive, species protected under the Wildlife Acts and/or species listed in the relevant Red Data list. • Sites containing semi-natural habitat types with high biodiversity in a local context and a high degree of naturalness, or populations of species that are uncommon in the locality. •Sites or features containing common or lower value habitats, including naturalised species that are nevertheless essential in maintaining links and ecological corridors between features of higher ecological value.
Local (lower value)	• Sites containing small areas of semi-natural habitat that are of some local importance for wildlife. • Sites of features containing non-native species that are of some importance in maintaining habitat links.
Within Site	Very Low importance. Ecological feature of no significant value beyond the Site boundary.

5.3.8 Assessment of Impacts

The assessment of potential ecological impacts has been published by the EPA and the CIEEM. They can be summarised as follows:

- The identification of the range of potential impacts which can reasonably be expected to occur should the proposed developments receive planning consent.
- The consideration of the systems and processes in place to avoid, reduce and mitigate the possible effects of these impacts.
- The identification of opportunities for ecological enhancement within the site.

Impacts are defined as being positive, negative, or neutral. A significant impact is defined as an impact upon the integrity of a defined ecosystem and/or the conservation status of a habitat or species within a given area.

Where a potential negative impact has been identified, mitigation measures have been formulated using best practices techniques and guidance to prevent, reduce or offset the impact.

5.3.9 Characterising Impacts

Table 5.2 - Definition of Impact Characteristics

Characteristics	Definition of Impact Characteristics
Positive or negative	Positive and negative impacts/effects should be determined according to whether the change is in accordance with nature conservation objectives and policy: - Positive impact - a change that improves the quality of the environment e.g., by increasing species diversity, extending habitat, or improving water quality. Positive impacts may also include halting or slowing an existing decline in the quality of the environment. - Negative impact - a change which reduces the quality of the environment e.g. destruction of habitat, removal of species foraging habitat, habitat fragmentation, pollution.
Magnitude	The extent is the spatial or geographical area over which the impact/effect may occur.
Duration	Duration should be defined in relation to ecological characteristics (such as a species' lifecycle) as well as human timeframes. For example, five years, which might seem short-term in the human context or that of other long-lived species, would span at least five generations of some invertebrate species. The duration of an activity may differ from the duration of the resulting effect caused by the activity. For example, if short-term construction activities cause disturbance to birds during their breeding period, there may be long-term implications from failure to reproduce that season. Effects may be described as short, medium, or long-term and permanent or temporary. Short, medium, long-term, and temporary will need to be defined in months/years.
Frequency and timing	The number of times an activity occurs will influence the resulting effect. For example, a single person walking a dog will have very limited impact on nearby waders using wetland habitat, but numerous walkers will subject the waders to frequent disturbance and could affect feeding success, leading to displacement of the birds and knock-on effects on their ability to survive. The timing of an activity or change may result in an impact if it coincides with critical life-stages or seasons e.g., bird nesting season.
Reversibility	An irreversible effect is one from which recovery is not possible within a reasonable timescale or there is no reasonable chance of action being taken to reverse it. A reversible effect is one from which spontaneous recovery is possible or which may be counteracted by mitigation. In some cases, the same activity can cause both reversible and irreversible effects. For example, placement of a temporary access through an ancient wood could cause the loss of food and shelter for common woodland birds that may be reversible, but the compaction of fragile woodland soils and damage to ancient woodland ground flora along the access route is effectively irreversible.

5.4 Receiving Environment.

This section provides an overview of the existing ecological conditions within the site and the surrounding environment.

5.4.1 Desktop Study results

5.4.1.1 Site Location & General Description

The site in question is 3.53 hectares and forms part of the overall quarry envelope. It is located in a rural area, within the townland of Ardkill More and Drumcrow. Access to the site is just off a local, third-class road the L2517. The site is located approximately 1.4km south-west of Carrickaboy village and 4.9km south-east of Ballinagh. Site location maps can be seen in Figure 5.2 and 5.3.

5.4.1.2 Habitats and Land-Use Surrounding the Site

The main habitats and species recorded within the site and surrounding area during surveys are described, classified, and evaluated in this section. Aerial photographs were also used to assist this process. The site is located in an area where the dominant natural habitats include wet and dry heaths, scrub, improved agricultural grassland, wet grassland, treelines, and hedgerows.

The site is bounded to the north, south, east, and west by agricultural lands. An overview of the local habitats surrounding the application site can be seen in the aerial photograph in Figure 5.3.

Figure 5.2 - Site Location Map (Site Pinned)

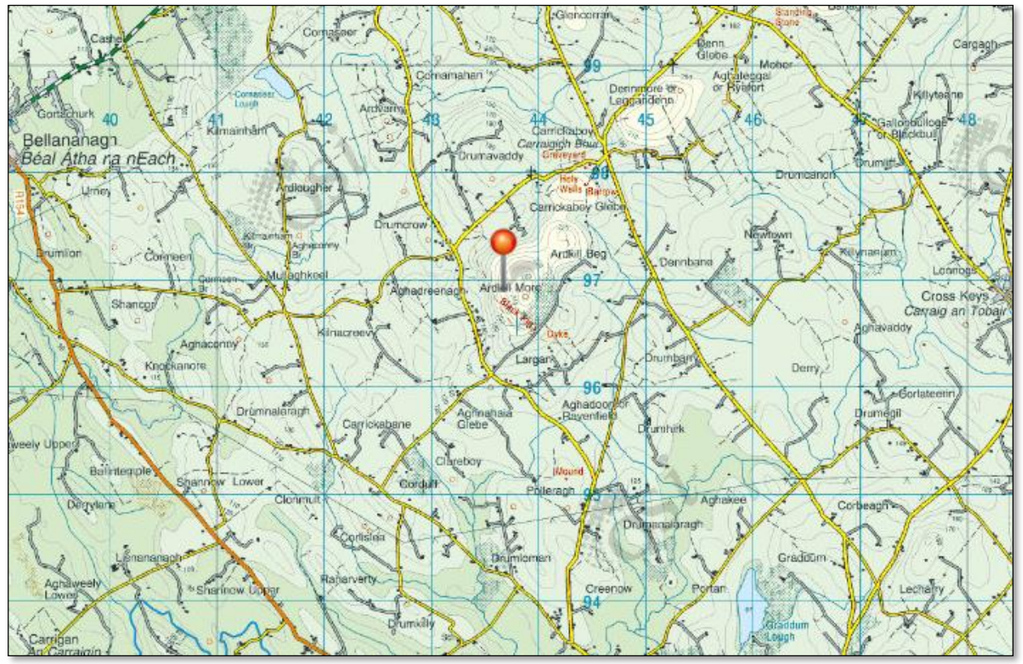
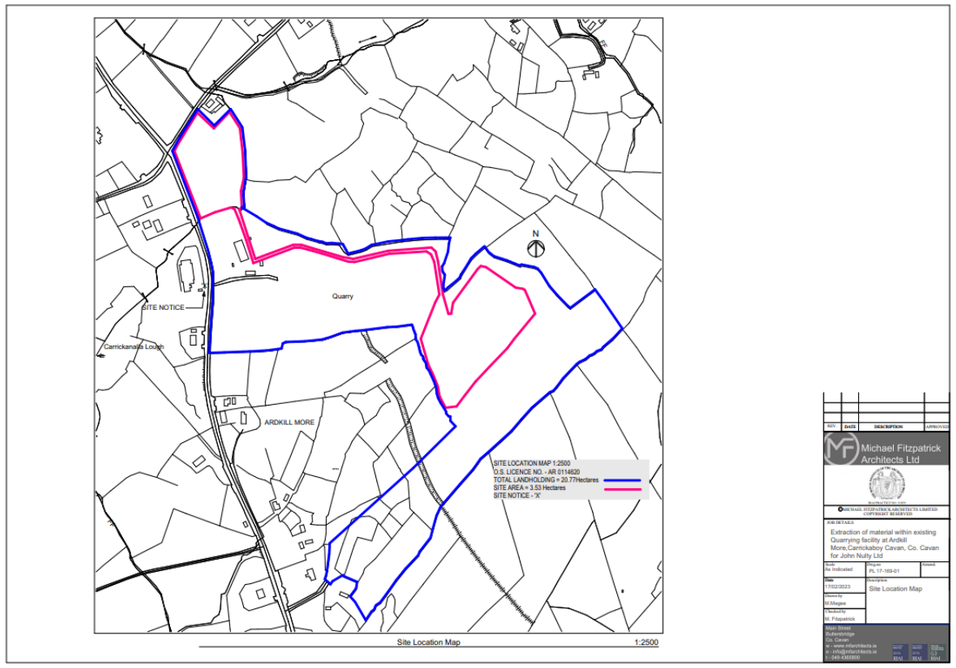


Figure 5.3 – The Extent of the Proposed Quarry Works are Outlined in Red. The Entire Landholding is Outlined in Blue.



5.4.1.3 Designated Sites

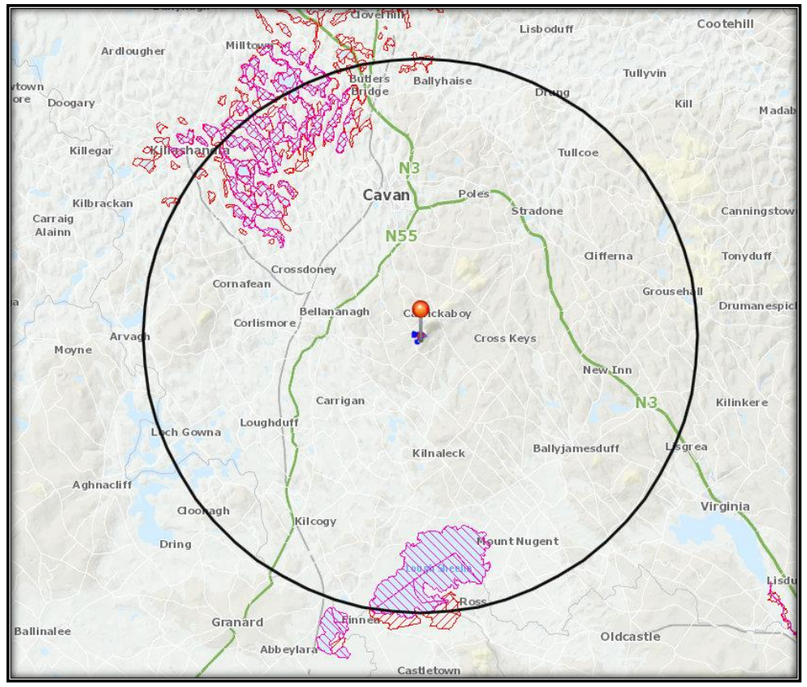
A list of Natura 2000 sites within 15km of the proposed development have been identified and described according to their site synopsis, qualifying interests, and conservation objectives. Other sites further than this, but potentially within its zone of interest were also considered.

The zone of impact is determined by an assessment of the connectivity between the application site and the designated areas by virtue of hydrological connectivity, atmospheric emissions, flight paths, ecological corridors etc. Four Natura 2000 designated sites and their closest points to the proposed development site have been identified and are summarised in Table 5.3 with a map showing their location relative to the application site, Figure 5.4. A full description of the sites can be read on the website of the National Parks and Wildlife Service (www.npws.ie).

Table 5.3 - Natura 2000 Sites within 15km of the Proposed Site

Site Name & Code	Distance from Site	Qualifying Interests	Potential Significant Effects
Lough Oughter and Associated Loughs SAC 000007	9km north-west / 18km downstream	• Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition*-type vegetation • Bog woodland Otter *Lutra lutra*	As the quarry is within the Erne catchment, potential significant effects will be considered further.
Lough Oughter Complex SPA 004049	9km north-west / 18km downstream	• Great Crested Grebe (*Podiceps cristatus*) • Whooper Swan (*Cygnus cygnus*) • Wigeon (*Anas penelope*) • Wetlands & Waterbirds	As the quarry is within the Erne catchment, potential significant effects will be considered further.
Lough Sheelin SPA 004065	10.5km south	• Great Crested Grebe *Podiceps cristatus* • Pochard *Aythya ferina* • Tufted Duck *Aythya fuligula* • Goldeneye *Bucephala clangula* • Wetlands & waterbirds	No hydrological connectivity therefore potential significant effects upon this site can be ruled out.
Moneybeg and Clare island Bog SAC 002340	14.5km south	• Active raised bog • Degraded raised bog. • Rhynchosporion vegetation	No hydrological connectivity therefore potential significant effects upon this site can be ruled out.

Figure 5.4 - Designated Sites within 15km of the Application Site (Pinned). SACs – Red Hatching, SPAs – Pink Hatching.



A Natura Impact Statement , as required under Article 6(3) of the Habitats Directive has been prepared for this planning application. The favourable conservation status of a habitat is achieved when:

- Its natural range and area it covers within that range is stable or increasing and the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future.
- The conservation status of its typical species is favourable.
  The favourable conservation status of a species is achieved when:
- The population dynamics data on the species concerned indicate that it is maintaining itself on a long -term basis as a viable component of its natural habitats.
- The natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future.
- There is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

5.4.1.4 Nationally Important Sites

The application site is not within or immediately adjacent to any nationally designated site, such as a Natural Heritage Area or a Proposed Natural Heritage Area. It is within 10km of two sites that have been designated as proposed Natural Heritage Areas. These are summarised in Table 5.4.

Table 5.4 - Nationally Important Sites within 15km of the Proposed Development

Site Name	Distance from Proposed Development	Ecological Connectivity
Lough Oughter and Associated Loughs p NHA 000007	8.9 km north-west	Yes
Lough Gowna pNHA 000992	10km south-west	No

5.4.1.5 Evaluation of Ecological Receptors Flora and Fauna

5.4.2 Overview

No part of the site lies within any area that is designated for nature conservation purposes. The proposed continued extraction works will occur on lands that are currently associated with the existing quarry. This area will be excavated further, and no previously unquarried land will be excavated. However, a settlement pond will be created on lands to the immediate north of the application site.

5.4.2.1 Habitat Description

The main habitats within and close to the application site include those habitats directly associated with the quarry, i.e., exposed sand, gravel, or till (ED1), spoil and bare ground (ED2), recolonising bare ground (ED3), active quarries and mines (ED4), Exposed Siliceous Rock (ER3) and undisturbed habitats immediately surrounding the quarry, i.e., dry siliceous heath (HH1), wet heath (HH3), dry-humid acid grassland (GS3), wet grassland (GS4) and scrub (WS1).

Areas of improved agricultural grassland (GA1), treelines (WL2), hedgerows (WL1) and Drainage Ditch (FW4) occur beyond the areas surrounding the quarry.

Exposed sand, gravel, or till (ED1), Spoil and Bare Ground (ED2), Recolonising Bare Ground (ED3)

Gravel was recorded adjacent to existing infrastructure, often resulting in acid grassland forming on the periphery of the quarry areas. Small areas of recolonising bare ground were recorded within the study area. These areas were heavily trafficked and dominated by bare soil and ruderal plant species. These areas included species such as Rib-wort Plantain (Plantago lanceolata), Annual Meadow-grass (Poa annua), Creeping Bent Grass (Agrostis stolonifera) and occasionally Creeping Thistle (Cirsium arvense).

Paved trackways and areas dominated by spoil were classified as Spoil and bare ground (ED2). This habitat generally supported little vegetation cover except for common grasses and herbs growing up through the road gravel, e.g. Yorkshire Fog (Holcus lanatus), Annual Meadow-grass (Poa annua), Common Mouse-ear (Cerastium fontanum), and Rib-wort Plantain (Plantago lanceolata).

Active Quarry (ED4)

Active Quarry is the dominant habitat type within the site and can be broadly described as exposed rock faces, stockpiles and bare ground sparsely recolonising with ruderal species. Little or no vegetation was recorded in this habitat due to the high rates of disturbance. This habitat is of negligible ecological significance. There are occasional clumps of yellow-wort and creeping bent. Around the edges of the quarry void species such as gorse Ulex europaeus and bramble Rubus Fruticosus agg. Are encroaching and re-establishing which were previously worked.

Exposed Siliceous Rock (ER3)

This habitat occurs along the northern boundary of the application site, at the transition between the worked areas of the quarry and the undisturbed areas. Fossit (2000) recommends this category for all natural and artificial exposures of siliceous bedrock or loose rock. Vegetation is patchy within this area and does not exceed 50% cover. Species recorded from here included colt's foot *Tussilago farfara, ragwort Senecio jacobaea, pendulous sedge Carex pendula, New Zealand willowherb Epilobium brunnescens, heath milkwort Polygala serpyllifolia and foxglove Digitalis purpurea.*

Dry Siliceous Heath (HH1)

Dry siliceous heath can be found on flat to steeply sloping ground in upland are surrounding the east of the site. The underlying soils are relatively dry or free-draining but are acid and poor in nutrients. The most prolific vegetation included *Bilberry (Vaccinium myrtillus), Heath bedstraw (Galium saxatile) and low-growing Western Gorse (Ulex gallii)*.

Wet Heath (HH3)

Vegetation with at least 25% cover of dwarf shrubs on peaty soils and shallow wet peats that typically have an average depth of 15-50 cm. Wet heath was identified in upland and lowland areas east, north, and south of the site. This habitat is common on the lower slopes of hills and mountains that are either too dry or too steep for deep peat accumulation.

Dry- Humid Acid Grassland (GS3)

This habitat is present to the south and east of the proposed continued extraction site. Fossit (2000) describes this habitat as being unimproved or semi-improved grassland that occurs on free-draining acid soils, which may be dry or humid, but not waterlogged. It mainly occurs on mineral-rich or peaty podzols in upland area but can also be found on siliceous sandy soils in the lowlands. Within this site, this habitat is semi-improved and grazed. This habitat grades into wet grassland at the lower ends of the slopes.
Species recorded in this habitat included grasses such as fescues Festuca sp., bents Agrostis sp., sweet vernal grass Anthoxanthum odoratum and Yorkshire fog Holcus lanatus. These grasses are being grazed by cattle. Other species recorded in this habitat included heath bedstraw Galium saxatile, pignut Conopodium majus, woodrush Luzula sp., compact rush Juncus conglomerates, creeping buttercup Ranunculus repens, tormentil Potentilla erecta, white clover Trifolium repens and sheep's sorrel Rumex acetosella.

Wet Grassland (GS4)

In the lower areas of the overall quarry envelope, drainage is poor, and the ground becomes waterlogged. The habitat was dominated by grasses such as bents Agrostis sp, meadow grasses Poa sp. and Yorkshire fog. The abundance of broadleaved species in this habitat was low and those recorded were typical of this type of habitat and included meadowsweet Filipendula ulmaria, aquatic mint Mentha aquatica, soft rush Juncus effusus, silverweed Potentilla ansrina and marsh bedstraw Galium palustre.

Scrub WS1

Scattered areas of scrub occur throughout the application site. Fossit (2000) classifies scrub habitats as those that are dominated by a 50% cover of shrubs, stunted trees, or bramble, with a canopy height generally less than 5m. The dominant shrub species within the application site is gorse Ulex europaeus whilst bramble Rubus fruticosus, blackthorn Prunus spinosa and hawthorn Crataegus monogyna are also common.

Agricultural Grassland (GA1)

Improved Agricultural grassland is the dominant habitat in the wider surrounding area and it is also the dominant habitat in the proposed location of the settlement pond. Much of this land is managed and would revert to scrub in the absence of current land management practices. Commonly occurring species recorded from the agricultural fields included Perennial Ryegrass (Lolium perenne), White Clover (Trifolium repens), Dandelion (Taraxacum officinale), Silverweed (Potentilla anserina), Yorkshire Fog (Holcus lanatus), Cocksfoot (Dactylis glomerata), Creeping Buttercup (Ranunculus repens), Annual Meadow Grass (Poa annua) and Mousear (Cerastium fontanum).

Treelines (WL2)

There are sections of tree lines around the boundary of the quarry to the north and south. Section of treeline on the southern bordar consist of semi mature Ash and Willow outside the boundary. The longer treeline on the northern boundary contains species such as sycamore, Ash, Willow, and occasional beech. These sections of treelines are positions within area of hedgerow.

Hedgerows (WL1)

Hedgerows were recorded adjacent to the quarry workings on the periphery of the Site. These hedgerows are generally species -poor. However, many of the hedgerows also exhibit associated features such as standard trees and connecting hedges that provide ecological connectivity. Frequent standard trees include ash and elder Sambucus nigra. Other woody species include blackthorn and privet Ligustrum vulgare. The scramblers, bramble Rubus fructicosus and dog rose rosa canina are also frequent.

Drainage Ditch (FW4)

At the north western boundary of the Site a surface water ditch flows in a north-to-north westerly direction adjacent to the site. This feature had a continuous flow at the time of survey. However, the floral assemblages recorded within indicates that this feature is periodically inundated in accordance with the seasons. *Water mint Mentha aquatica, watercress Rorippa nasturtium-aquaticum, willow and great willowherb Epilobium hirsutum* were evident and symptomatic of seasonally wet conditions.

5.4.2.2 Flora (Rare and Protected Plant Species)

An examination of the website of the National Biodiversity Data Centre, revealed that there are records for the presence of one protected species from the relevant 1km squares (N4396) of this proposed development. This species is the badger *Meles,* and it is protected under the Irish Wildlife Acts. An assessment of the application site for signs of the badger was made during the preparation of the EIAR for the proposed development. It was concluded that there are no badger setts within the application site.

5.4.2.3 Invasive Species

No non-native invasive species that are regulated for control under the European Communities (Birds and Natural Habitats) Regulations 2011 (SI 477) were recorded from within the study area.

Table 5.5 Plant Species List

Common Name	Scientific Name
Aquatic mint	*Mentha aquatic*
Ash	*Fraxinus excelsior*
Autumn hawkbit	*Scorzoneroides autumnalis*
Bent grasses	*Agrostis sp*
Billberry	*Vaccinium myrtillus*
Blackthorn	*Prunus spinosa*
Bramble	*Rubus fruticosus agg.*
Broadleaved Dock	*Rumex obtusifolius*
Cat's-ear	*Hypochaeris radicata*
Cock's-foot	*Dactylis glomerata*
Colt's foot	*Tussilago farfara*
Common chickweed	*Stellaria media*
Compact rush	*Juncus conglomerates*
Creeping buttercup	*Ranunculus repens*
Creeping thistle	*Cirsium arvense*
Dandelion	*Taraxacum officinale*
Fescue grasses	*Festuca sp*
Foxglove	*Digitalis purpurea*
Gorse	*Ulex europaeus*
Greater plantain	*Plantago major*
Hawthorn	*Crategus monogyna*
Heath bedstraw	*Galium saxatile*
Heath milkwort	*Polygala serpyllifolia*
Heath speedwell	*Veronica officinalis*
Holly	*Ilex aquifolium*
Ivy	*Hedera helix*
Lady's mantle	*Alchemilla vulgaris*
Lesser celandine	*Ficaria verna*
Ling heather	*Calluna vulgaris*
Marsh bedstraw	*Galium palustre*
Meadow buttercup	*Ranunculus acris*
Meadow grasses	*Poa* sp.
Meadowsweet	*Filipendula ulmaria*
Nettle	*Urtica dioica*
New Zealand willowherb	*Epilobium brunnescens*
Oxeye daisy	*Leucanthemum vulgare*

Pendulous sedge	*Carex pendula*
Pignut	*Conopodium majus*
Primrose	*Primula vulgaris*
Ragwort	*Senecio jacobaea*
Red clover	*Trifolium pratense*
Rye grasses	*Poa sp.*
Ribwort plantain	*Pantago lanceolate*
Rosebay willowherb	*Chamerion angustifolium*
Sheep's sorrel	*Rumex acetosella*
Silverweed	*Potentilla ansrina*
Slender St John's wort	*Hypericum pulchrum*
Soft rush	*Juncus effusus*
Spear thistle	*Cirsium vulgare*
Sweet vernal grass	*Anthoxanthum odoratum*
Sycamore	*Acer pseudoplatanus*
Timothy grass	*Phleum pratense*
Tormentil	*Potentilla erecta*
Tufted vetch	
White clover	*Trifolium repens*
Willow	*Salix sp.*
Wood anenome	*Anemone nemorosa*
Wood rush	*Luzula sp*
Yorkshire fog	*Holcus lanatus*

Figure 5.5 - Aerial Photograph of the Site and its Surrounding Habitats.

5.4.3 Fauna

5.4.3.1 Protected Mammals

Records from the National Biodiversity Data Centre revealed the presence of the following protected mammals from within the 10km square (N49) of this proposed application site:

- Badger *Meles meles**
- Pygmy shrew *Sorex minutes*
- Hedgehog *Erinaceus europaeus*
- Daubenton's Bat *Myotis daubentoniid*
- Lesser Noctule *Nyctalus leisleri*
- Pipistrelle *Pipistrellus sensu lato*
- Soprano Pipistrelle *Pipistrellus pygmaeus*
- Irish Hare *Lepus timidus subsp. Hibernicus*
- Pine Marten *Martes*
- *Stoat Mustela ermine subsp. Hibernica*
- Otter *Lutra lutra*
- Red squirrel *Sciurus vulgaris*

All these species are protected under the Irish Wildlife Acts. In addition, the otter *Lutra lutra* is protected under Annex II of the European Habitats Directive. During the site walkover, all possible mammal evidence was recorded. No badger setts were noted on site and no tracks or other signs of mammal activity was noted.

5.4.3.2 Birds

A range of birds were seen / heard within development site during the site survey, these species included:

- Blackbird *Turdus merula*
- Robin *Erithacus rubecula*
- Great tit *Parus major*
- Coal tit *Parus ater*
- Robin *Erithacus rubecula*
- Chaffinch *Fringilla coelebs*
- Magpie *Pica*
- Jackdaw *Corvus monedula*
- Kestral Falco tinnunculus
- Raven Corvus corax
- Meadow pipit Anthus pratensis
- Pied wagtail Motacilla alba yarrellii
- Blackbird Turdus merula
- Wren Troglodytes

5.4.3.3 Amphibians, Reptiles, and Invertebrates

No amphibians, reptiles or invertebrates were observed during the course of the field survey. However, it is likely that the common frog *Rana temporaria* occurs in certain areas around Ardkill More. This species is protected under the Irish Wildlife Acts. The presence of the smooth newt *Lissotriton vulgaris* is also possible as the rocks would provide suitable basking sites for this species. The presence of the viviparous lizard *Lacerta vivipara* close to the area of the proposed works should also be considered as there are suitable basking areas within the site.

5.4.4 Aquatic Environment

5.4.4.1 Water Features

Ardkill More and Drumcrow are within the Erne Hydrometric Area, Catchment, Sub-Catchment and Sub-Basin. There is a field drain present alongside the northern boundary of the site and this field drain is the receiving water for the discharge from the settlement ponds. Water in this field drain connects to the Ballinagh Stream which is north-west of and 1.2km downstream of the application site. The Ballinagh Stream flows generally north, though the towns of Ballinagh and Crossdoney and on towards its confluence with the River Erne at Legalana, at a point approximately 14km downstream of the application site.

The EPA have defined the ecological status of the Ballinagh Stream and its tributaries as moderate status, deteriorating to poor status downstream of Ballinagh. The River Erne at its confluence with the Ballinagh Stream is noted to be of moderate status. Under the requirements of the Water Framework Directive, this is unsatisfactory and good status must be achieved in this water course by 2027.

Table 5.6 Summary of Evaluation of Ecological Features

Ecological Feature	Level of Importance	Evaluation
Nature 2000 Sites	International (European)	Scoped out of the assessment as the AA Screening report for the proposal found significant effects are not likely.
NHA/pNHA	National	Scoped out of the assessment as significant effects are not likely.
Flora and Fauna		
Rare and Protected Plant Species	Local	No species protected under the Flora Protection Order occurs within the relevant 10km square (N49) of the proposed development site.
Protected Mammals	Local	Records from the National Biodiversity Data Centre revealed the presence of no.12 protected mammals within the 10km square (N49) of this proposed application site. No records for any of these species exist from within the development site itself (as revealed by generating a custom polygon). Records exist from the relevant 1km square (N4396) for the badger. Evaluated as Important Locally.
Birds	Townland	A number of small bird species were recorded on site and in the general vicinity. Evaluated as Important Locally.
Amphibians, Reptiles, and Invertebrates	Site	No amphibians, reptiles or invertebrates were observed during the course of the site survey.
Habitats		
Exposed sand, gravel, or till (ED1), Spoil and Bare Ground (ED2), Recolonising Bare Ground (ED3), Active Quarry (ED4)	Site	The only habitat to be affected by the proposed continuation of use is the active quarry habitat. There will be no reduction in any other habitats within the site.
Exposed Siliceous Rock (ER3)	Site	Overall, this habitat is of some value to local populations of pollinating insects, such as bees and hoverflies. The species present are generally locally common in the heath-land areas adjacent to the application site. Overall, this habitat could be considered as being transient in nature and of relatively low value.
Dry Siliceous Heath (HH1)	Local	This type of habitat is considered to be ubiquitous and not inherently biodiverse or rare in accordance with ecological value. Not considered further in this assessment.
Wet Heath (HH3)	Local	This feature is not considered to be inherently Unique, irreplaceable, or able to host species of conservation concern in isolation. Not considered further in this assessment.
Dry- Humid Acid Grassland (GS3)	Site	Overall, this habitat can be considered as semi-improved rather than unimproved. Biodiversity within this habitat is low and the habitat is represented widely in a local context. It is therefore not considered further in this assessment.
Wet Grassland (GS4)	Local	Overall, biodiversity within this habitat was low and the area was dominated by common grass species. The habitat is well represented locally. It is therefore not considered further in this assessment.
Scrub WS1	Site	The scrub habitat has ecological value as it provides shelter and sources of food for local populations of nesting birds. However, it is well represented locally, and It is therefore not considered further in this assessment.
Agricultural Grassland (GA1)	Local	This type of habitat is considered to be ubiquitous and not inherently biodiverse or rare in accordance with ecological value. Not considered further in this assessment.
Treelines (WL2)		This type of habitat is considered to be ubiquitous and not inherently biodiverse or rare in accordance with ecological value. Not considered further in this assessment.
Hedgerows (WL1)	Local	Hedgerow quality on the site periphery is generally poor. However, these features may still offer nesting, commuting and foraging resource for species. Moderate value
Drainage Ditch (FW4)	Local	The drainage ditch habitat has ecological value as it provides shelter and sources of food for local populations of nesting birds. As the quarry is within the Erne catchment, potential significant effects will be considered as there is a hydrological connection with this watercourse and a sensitive waterbody and overall, it can be considered as being of moderate value as it is hydrologically connected to a Natura 2000 Site (9km away)

5.5 Potential Impacts

Construction

Deterioration in downstream surface water quality in the field drain within the site and further downstream in the Ballinagh Stream arising from suspended sediments generated during soil stripping /removal - There will be a requirement to strip and store soil/subsoil from the proposed settlement pond area. Soil removal will be an intermittent operation but will be completed in the early stages of the work, This material will be retained and used during restoration activities such as vegetating the upper benches of the quarry during restoration.

Operation

1. Increased groundwater vulnerability and potential for groundwater contamination - The proposed development will not result in an increase of the quarry size from that previously approved. It will involve the extraction of material granted within existing quarry envelope planning (Ref No.051801). This will not increase groundwater vulnerability and potential for groundwater contamination.
2. Deterioration in surface water quality in the field drain close to the settlement ponds and further downstream in the Ballinagh Stream arising from sediment laden surface water run-off generated from the proposed development.
3. Deterioration in water quality locally arising from leakages and spillages from oil / diesel refuelling.
4. Deterioration in water quality locally arising from unsuitable discharge of wastewater effluent to groundwater.

5.5.1 Predicted Impacts

Provided that the mitigation measures are implemented in full then it is not anticipated that there will be any residual significant negative impacts on fauna as a result of the proposed scheme.

5.5.2 Post-Restoration Phase

No residual impacts will occur during the post restoration phase.

5.5.3 Impacts Upon Designated Sites

The drainage ditches to the north of the site and the receiving waters for the discharge from the ponds are hydrologically connected to the Lough Oughter and Associated Loughs SAC / pNHA and the Lough Oughter SPA. In the absence of mitigation, deteriorations in water quality locally cannot be ruled out, and any deteriorations in water quality in the catchment as a whole could give rise to significant effects upon the QIs of these designated sites.

5.5.4 Impacts within the Application Site

Should this development be allowed to proceed then the following impacts will / may occur during the continued extraction of material:

- **Habitat loss and fragmentation** – The deepening of quarry works will not cause the loss or fragmentation of any important habitats. The surrounding area is dominated by grassland and scrub habitats. These habitats were considered to be of low value on a local level. In addition, areas of exposed rock will be lost, but with the deepening of the quarry additional exposed rock surfaces will be created.
- **Habitat disturbance** – Previously undisturbed heath habitats outside of the development site itself could be impacted upon or disturbed by the storage of machinery or rock/stone.
- Habitat disturbance from the proposed construction of the settlement ponds on site.
- **Disturbance to local wildlife** – During site preparation and construction, local populations of birds and mammals may be disturbed by the increase in noise, traffic, and human activity. However, it is likely that birds and mammals of the area are used to the baseline levels of noise and activity from the current quarrying operations.
- **Dust deposition -** The extraction and processing of rock and the associated traffic and human movement has the potential to generate dust. The greatest proportion of the dust generated is comprised of larger particles, greater than 30µm and these are mostly deposited within 100m of the source. Where large amounts of dust are deposited on vegetation over a long timescale (a full growing season for example) there may be some adverse effects upon plants, e.g., restricting photosynthesis, respiration, and transpiration. Furthermore, it can lead to phytotoxic gaseous pollutants penetrating the plants. The overall effect would be a decline in plant productivity, which may then have indirect effects on the quality of the surrounding habitats and associated fauna. The amounts of dust deposited, and its effects are also dependent upon weather conditions as in wet weather less dust will be generated and that which has been deposited upon foliage is likely to be washed off. In the case of the quarry at Ardkill More and Drumcrow, there are no protected habitats or plant species within 9km of the quarry boundary, therefore risk to protected habitats from dust deposition from the operation of this quarry is negligible.
- **Deterioration in water quality** – Quarrying operations near water have an associated risk of pollution as a result of fuel spillages, oil leakages, loss of sediment and other accidents that could lead to a serious impact on local water quality. Groundwater may also be impacted upon. Consequently, this would have a negative impact upon the local habitats and species present in any such an affected watercourse. The stripping of vegetation, ground disturbance and improper storage of stripped soils also increases the risk of large volumes of material being washed into local watercourses during periods of heavy and prolonged rainfall or flood events. This can indirectly affect the water quality through increased turbidity levels and sedimentation. There will be no stripping of overburden associated with this application. The quarrying operations at are over 700m from the Ardkill More Stream. This distance is sufficient to ensure that there will be no direct impacts upon this stream arising from the quarrying operations.

5.5.5 Post-Restoration Phase

Following the cessation of quarrying activities, the non-vegetative sections will be restored to a natural habitat mitigating the visual impact of the quarry and enhancing the ecological integrity. There will be ample opportunity at this stage to create a range of habitats with positive benefits for wildlife and local biodiversity.

5.5.6 'Do Nothing' Scenario

The existing quarry, as permitted, would be restored in line with the conditions associated with the existing permission. The Do-Nothing Impact would result in moderate significant positive change in the ecological interest of the Site should the quarry cease operating, and restoration take place.

5.5.7 'Worst Case' Scenario

In the worst-case, the proposed development would result in the disturbance to fauna considered to be of local conservation value and loss of nesting habitat to birds of low conservation concern.

5.5.8 Cumulative Impact

The potential for cumulative impacts arising from other significant existing or permitted infrastructure are assessed here. Cumulative impacts encompass the combined effects of multiple developments or activities on a range of receptors. Potential cumulative impacts

associated with the existing and permitted significant infrastructure within the same water catchments as the proposed development should be considered.

As part of the Appropriate Assessment, in addition to the proposed works, other relevant projects and plans in the region must also be considered. This step aims to identify at this stage any possible significant in-combination or cumulative effects / impacts of the proposed works on the Natura 2000 sites with other such plans and projects.

In relation to current and future planning applications, Cavan County Council, as the competent authority, will screen each application for AA. Any new application will be examined and the requirement for screening for AA (NIS) will be determined on a case by case basis to comply with the requirements of Article 6 of the Habitats Directive. Therefore, it is not considered that there will be any significant adverse in combination effects with the proposed works and any other development.

In summary, it is considered that with the implementation of effective mitigation to avoid/negate any potential adverse impacts, there will be no potential for cumulative impacts arising in combination with any other plans or project which would be of significance in respect of impacts affecting the conservation objectives or integrity of Lough Oughter and Associated Loughs SAC and the Lough Oughter Complex SPA.

Cumulative effects are considered unlikely to occur as result of the quarry proposal when considered with other plans and projects.

5.6 Mitigation Measures to be Implemented.

In order to protect the existing ecological features on site and surrounding area, the following mitigation measures are recommended:

- All works associated with the development should be confined to the proposed development site. There should be no encroachment of activities into the heathland habitats to the east of the existing quarry.
- All quarrying activities on site should follow current best practice guidelines, including the Geological Heritage Guidelines for the Extractive Industry produced by Geological Survey of Ireland and Environmental Management in the Extractive Industry produced by the EPA.
- To avoid disturbances to local bird species and their suitable nesting habitats, including shrubs and ground nesting vegetation, it is recommended that areas of scrub are removed and stripped from the application site outside of the bird nesting season, i.e., between October and February.
- Machinery and gravel / stone storage areas should only occur within the boundaries of the current application site or the previous boundaries. There must be no disturbances to the heath habitats outside of the application boundaries.
- Where possible, only native shrubs and trees should be planted for screening purposes. Suitable native screening could be provided with the further planting of native stocks of gorse.
- Any excavated topsoil will be retained for future reinstatement of the quarry, either on a phased basis or at the end of its operational phase. Measures must be taken to minimise sediment generation during the storage of these soils. The exposed surfaces should be minimised and any exposed surfaces should be reinstated or re-vegetated as soon as possible.
- Following cessation of all quarrying activities on the site, it is recommended that a landscape architect engage to devise a restoration plan which is cognisant of achieving a high level of biodiversity on the site in the future.

In order to protect designated sites that are downstream of the receiving waters of the discharge, a number of mitigation measures should be included. These measures are also outlined in the accompanying NIS.

Pre-Development

- Prior to the commencement of any site works, the applicant and the contactors must be made aware of the overall sensitivity of this site. They must be made familiar with the overall content of this NIS and they must be made aware of the mitigation measures contained in this NIS and accompanying EIAR.
- Site preparation and construction should be confined to the development site only and should adhere to the particulars laid out in the plan for submissions, and all the mitigation measures outlined in this NIS and the accompanying EIAR.
- Work areas must be kept to the minimum area required to carry out the proposed works and the area must be clearly marked out in advance of the proposed works.

Initial Construction Phase of Settlement Pond

- Prior to the commencement of soil excavation to facilitate the new settlement pond, silt fencing will be placed downslope of the proposed area. This will be embedded into the local soils to ensure all site water is captured and filtered.
- Daily monitoring of the soil stripping/landscaping earthworks will be completed by a suitably qualified person.
- All necessary preventative measures will be implemented to ensure no entrained sediment, or deleterious matter will enter the downstream receiving waters.
- Soil stripping and landscaping works will be scheduled for periods of low rainfall (summer months) to reduce run-off and potential siltation.
- The Construction Industry Research and Information Association (CIRIA) provides guidance on the control and management of water pollution from construction sites (Control of Water Pollution from Construction Sites, guidance for consultants and contractors, CIRIA, 2001). This guidelines will be followed in full and this will ensure that surface water arising during the course of soil stripping and landscaping activities will contain minimum sediment.

Operation / Extraction Phase

- No untreated water will discharge directly to the watercourse. All such water will pass through the settlement pond followed by discharge to the nearby watercourse. The discharge water quality from the settlement pond will be monitored on an annual basis. Discharge volumes will be continuously monitored at the discharge point location as per the current Discharge License requirements (Ref: SS/WW004/18).
- A sampling and analysis programme of the discharge from the settlement pond prior to discharge to the watercourse will be in place.
- John Nulty Ltd. will inform the Cavan County Council of any exceedances.
- A logbook will be maintained, noting all transactions associated with the proposed oil/water separator, settlement pond and other details as required.
- Weekly visual examination of the oil/water separator, settlement pond and the receiving watercourse will be carried out by a competent person. All inspection findings will be recorded in the logbook.
- Routine servicing and maintenance of the oil/water separator and settlement ponds will be carried out. A record of all service and maintenance will be maintained in the logbook. This will include the frequency of the work and the name of the person and or company carrying out the work.
- John Nulty Ltd. will provide and maintain a sampling location prior to discharge to the watercourse and direct access to the sampling location will be available at all reasonable times to personnel authorised by Cavan County Council.
- All sludges generated at the oil/water separator and settlement pond will be disposed of taking cognisance of the relevant Waste Management Regulations. A record of all sludges removed from the oil/water separator and silt in the settlement pond will be kept in the logbook noting the date, volumes removed and name of waste contractor involved.

- Sources of hydrocarbons are and will be located within safely bunded areas that safely contain all spillages and prevent the migration of contaminants into the underlying bedrock aquifer.
- Refuelling of quarry plant will only take place in designated bunded refuelling area which drains to an oil water separator. All discharge from the development area will pass through the proposed impermeable lined settlement pond, to be being released into the receiving surface water drain.
- The domestic wastewater from the site will continue to be discharged via the existing on site-septic tank and percolation area which complies with the EPA guidelines 2021.

5.7 Residual impacts and Conclusions

With the recommended mitigation measures, it can be concluded that the proposed development at Ardkill More and Drumcrow will have a minor negative to neutral impact upon local ecological receptors. No monitoring of the site is required.

5.8 Relevant Monitoring

The mitigation measures provided in Section 5.5 are routinely applied in quarry projects. Therefore, no monitoring to test the efficacy of the terrestrial ecology mitigation measures provided for the proposed development.

5.9 Reinstatement Measures Proposed

Upon cessation of the quarrying activities, the creation of new habitats on the site will be a positive benefit to local ecology and with proper management of the site and its green areas, then local areas of biodiversity will be allowed to develop.

CHAPTER 6

LAND, SOILS AND GEOLOGY

6 LAND, SOILS & GEOLOGY

6.1 Introduction

Traynor Environmental have been engaged by John Nulty Ltd to undertake an Environmental Impact Assessment report (EIAR) for land, soil, and geology in relation to planning for quarry works at Ardkill More and Drumcrow, Carrickboy, Cavan Co. Cavan. The planning relates to a 20 year permission for quarrying and extraction of rock that will include drilling, blasting, crushing and screening along with alterations to boundaries & all associated site works on lands at Ardkill More Townland and Drumcrow Townland, Carrickaboy, County Cavan.

Works will also include for the provision of new settlement ponds and installation of associated site drainage infrastructure and surface water pump to proposed new settlement ponds along with provision of discharge outlet via a Klargester Interceptor. Ancillary site works to include for landscape works, planting restoration of the quarry perimeter and reprofiling of overburden as required to facilitate development of the quarry and restoration of the associated site area.

6.1.1 The objectives of this assessment include:

- Undertake a detailed review of the Land, soil, and geological characteristics of the Site.
- Identify any potential impacts that the Proposed Development may have on land, soils, and geology.
- Identify potential mitigation measures to avoid, remediate or reduce any likely and impact of the works on the area.
- Carry out a design for proposed works to ensure that the proposed works will not have a negative impact on the surrounding land soils and geology of the area.

6.1.2 Summary of Proposed Development

- The proposed development consists of a time extension of 20 years to an existing quarry which was granted planning in 2007.
- Deepening of extraction from its current level of 209mOD down to 175mOD over the proposed 20-year lifespan The previously permitted quarry floor level was 175mOD similar to that proposed.
- The quarry is located in a naturally occurring rock outcrop which rises above the surrounding area. The top of the quarry face is approximately 248 mOD with the bottom of the quarry face being approximately 209mOD. The road level at the quarry entrance is 154mOD and 150mOD at the Site Office.
- It is proposed that surface water runoff and any potential groundwater seepages will be collected and processed by passing through a new settlement pond to remove silt. Any potential oil or grease will be removed at the oil water separator positioned after the concrete bunded are for refuelling area, before being discharged into the naturally occurring surface water drain at green field discharge rates.
- The existing connection between the upper quarry and the existing ponds will be redirected via a pipe to the new settlement pond.
- Currently surface water from the site is discharged to the open drainage ditch adjoining the site under the existing discharge license Ref: SS/WW004/18, Granted by Cavan County Council. An amendment to the existing discharge licence will be sought if planning is granted as the location of the discharge point will be moved 130m to the North.
- Existing rainwater at the quarry flows through a series of settlement ponds located on the north side of the quarry. The settlement ponds discharge to a field drain located north of the site. (Under discharge licence, Ref: SS/WW004/18).
- The continued extraction and completion of this area of the quarry will involve the removal of a further 500,000 tonnes of rock over 20 years.

Figure 6.1 - Site Location Map (Site indicated by Pin)

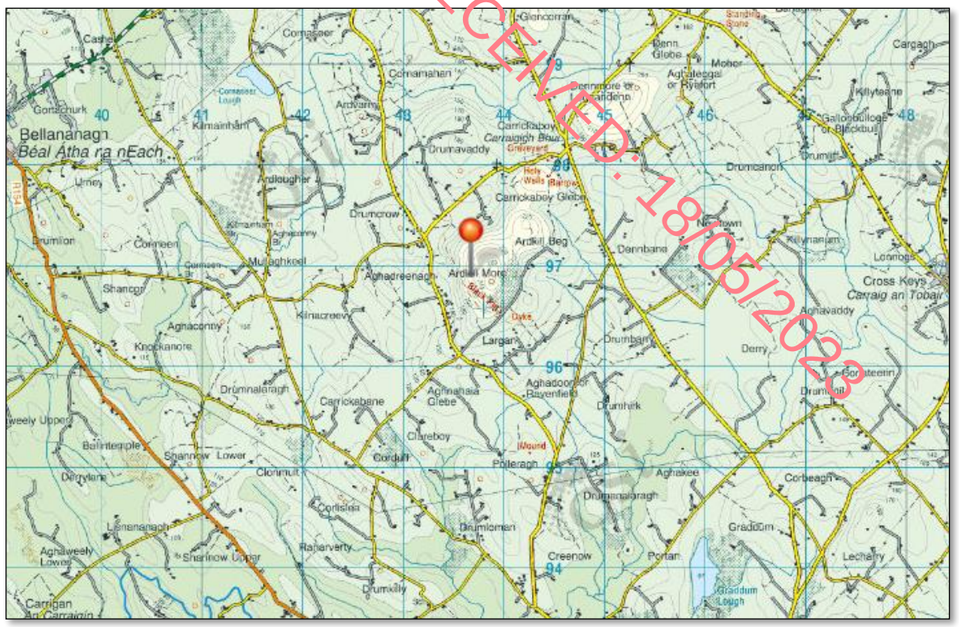


Figure 6.2 - Site Location Map (Site Outlined in Red)

Figure 6.3 - Site Location Map (Area outlined in Green approved previously under QY7)

Photograph 6.1 – Application area for continued extraction.

Photograph 6.2 – South Face of the Application area.

Photograph 6.3 – North Face of the Application area.

Photograph 6.4 – East Face of the Application area.

6.2 Relevant Guidance

The Lands, Soils and Geology section of the EIAR is carried out in accordance with relevant guidance contained in the following documents:

- Environmental Protection Agency (2017): *Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports*;
- European Commission (2017): *Environmental Impact Assessment of Projects – Guidance on the Preparation of the Environmental Impact Assessment Report*.
- Institute of Geologists Ireland (2013) *Guidelines for Preparation of Soils, Geology & Hydrogeology Chapters in Environmental Impact Statements*;
- National Roads Authority (2008): *Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes*;
- Department of the Environment, Heritage and Local Government; *Quarries and Ancillary Activities – Guidance for Authorities* (April 2004);
- Environmental Protection Agency (2006): *Environmental Management in the Extractive Industry (Non-Scheduled Minerals)*;
- *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment* (DoHPLG, 2018);
- *Guidance on the preparation of the EIA Report* (Directive 2011/92/EU as amended by 2014/52/EU), (European Union, 2017).
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (May 2022)

The above legislation regulates the information contained in an EIAR and planning at the site. Planning Policy and Development Control.

6.2.1 Technical Standards

The following Technical Standard relating to Land, Soils, and geology at the site in this EIAR:

- British Standards (2015). Code of Practice for Site Investigations BS5930:2015.
- British Standard (2001). Geotechnical investigation and testing – Identification and classification of soil BS EN ISO 14688-2:2004
- British Standard (2003). Geotechnical investigation and testing – Identification and classification of rock BS EN ISO 14689-1:2003

The above guidelines are relevant to the preparation of a Land, Soils and Geology section of this EIAR.

6.3 Methodology

6.3.1 Desk Study

A desk study of the proposed development site, surrounding area and receiving environment was completed in advance of undertaking the site visits, monitoring and investigations. This involved collecting all relevant geological and meteorological data for the area, and included review and consultation with the following data sources:

- Environmental Protection Agency databases (www.epa.ie).
- Geological Survey of Ireland – Groundwater, Geological and Heritage Databases (www.gsi.ie);
- Met Eireann Meteorological Databases (www.met.ie);
- National Parks & Wildlife Services Public Map Viewer (www.npws.ie);
- EPA/WFD River
- Catchments Map Viewer (www.catchments.ie).
- Bedrock Geology 1:100,000 Scale Map Series, (Geology of Cavan). Geological Survey of Ireland (GSI, 1999).
- Geological Survey of Ireland (2014) – Cavan Groundwater Body Initial Characterization Report.
- OPW Past Flood Events Mapping (www.floodinfo.ie).
- Environmental Protection Agency – "Hydrotool" Map Viewer (www.epa.ie); and,
- CFRAM Flood Risk Assessment maps (www.floodinfo.ie).

6.3.2 Site Specific Sources of Information

Data from the following sources of site monitoring and investigations were used in the EIAR assessment:

- Site visits and surveys of the proposed site and surrounding area were undertaken by Nevin Traynor on 15th November 2022 and 24th November 2022;
- Previous site investigation and sampling.
- All detailed technical data in relation to bedrock and fault lines are outlined in a professional Geologist Report carried out by John Colthurst PhD, PGeo.

6.3.3 Authors/Contributors

Traynor Environmental (TE) are a specialist environmental practice which delivers a range of water and environmental management consultancy services to the private and public sectors across Ireland. Our office is located in Belturbet, County Cavan. This chapter of the EIAR was prepared by Nevin Traynor BSc. Env. Nevin Traynor (BSc. Env) is an Environmental specialist.

6.4 Site Description

The existing quarry site for which continued development is being sought is located approximately 1.5km to the southwest of Carrickaboy, Co. Cavan.

The existing quarry site is bordered by mainly agricultural land along its northern, eastern, and southern boundaries. The site is accessed from a local road to the west. The site is situated on an elevated hilltop (pre-existing quarry development elevation 209 – 237m OD) overlooking the surrounding landscape. The adjacent land slopes away from the site along all boundaries of the quarry. A maintenance shed, canteen, office and other ancillary quarry infrastructure are located at the west of the site adjacent to the site entrance. All vehicles leaving the site pass through a wheel wash.

There are three broad stages in the quarrying process:

1) **Blasting of rock faces:**
   Blasting will continue to be the method used to fragment the material to a manageable size In order to enable extraction, the active rock face must be blasted using explosives.

2) **Processing of Rock:**
   Once blasting has occurred, the blasted rock is fed into the mobile crushers. There are two crushing stages, primary crushing, and secondary crushing, which function to reduce the particle size of the rock to a scale that can be easily transported using dump trucks and belt conveyors.

3) **Stockpiling of Rock:**
   Material produced by crushing will be stockpiled within the quarry void for loading directly onto trucks for delivery to the market.

Rainwater at the proposed development area will flow through the new settlement pond to be located on the north side of the quarry. The settlement pond will discharge to a field drain located north of the site. (Under discharge license, Ref: SS/WW004/18). It is proposed to construct a new settlement pond and associated infrastructure which will discharge to the existing field drain as before. There is 1 no. well (groundwater abstraction well) at the quarry.

Photograph 6.5 Proposed Development Site (Continued extraction of existing approved quarry)

6.5 Receiving Environment.

6.5.1 Study Area

The study area for this Land, Soils and Geology section of the EIAR comprises the application area (3.53 ha). The subject site is located at Ardkill More and Drumcrow, Carrickaboy, Cavan, Co. Cavan. The location of the site is shown in the context of the surrounding area in Site Location Map (Figure 6.1 & 6.2). The quarry is located approximately 7km southwest of Cavan town, the most proximate urban settlement, along the Cavan to Kilnaleck road (L2517). Other small towns in the vicinity to the application site are Ballinagh and Kilnaleck, which are located approximately 4.5 km and 6.3 km to the west and southeast of the application site, respectively. The surrounding land use is predominantly agricultural.

6.5.2 Baseline Study Methodology

Existing information on the regional soils, superficial deposits, and bedrock geology of the Ardkill More and Drumcrow area and its surrounds was collated and evaluated. Subsequent to this data compilation and review, site visits and inspections were undertaken to review the superficial deposits and bedrock geology at Ardkill More/Drumcrow and in the surrounding area. All remedial works have been carried out and mitigation measures put in place following recommendation of the previous geotechnical assessments carried out at the site.

6.5.3 Sources of Information

The following activities were undertaken as part of this geological assessment:

- Examination of GSI 1:100,000 geology map sheet 07 Geology of Cavan.
- Review of available geological information and literature.
- Site / quarry face inspections; and
- Review of previous and on-going geology and geotechnical assessments and aggregate testing results.
- Trial Hole assessments in the proposed area for the new settlement pond.

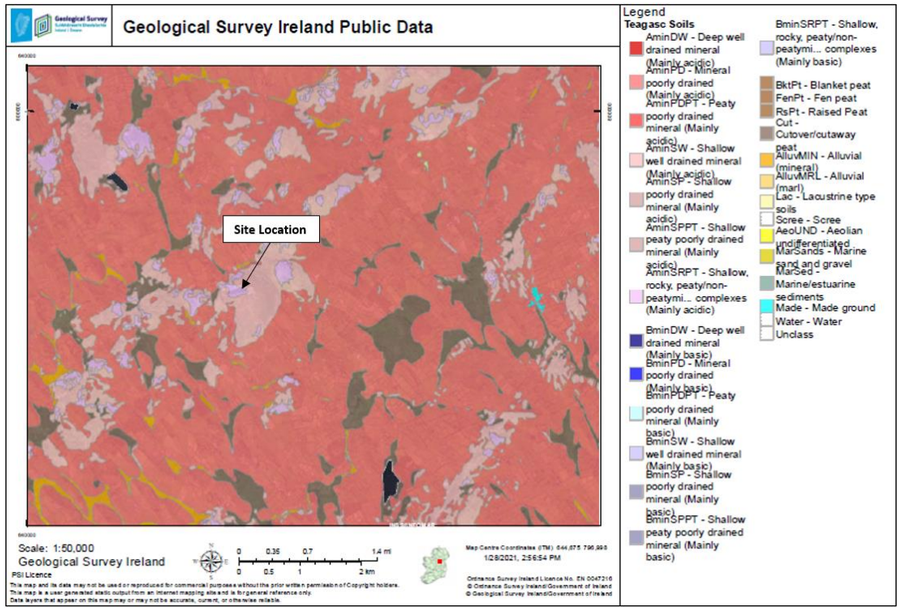
6.6 Regional Geology

6.6.1 Soil

Soils in the area have been mapped in Figure 6.4, with those at the site, where present, shown as shallow, well-drained acidic mineral soils. These are described as a mainly dry, grey/brown podzolic mineral. The profile is characterised by a slightly plastic consistency and weak structure which becomes massive in the lower part of the B horizon at about 65 cm. Surface texture is sandy loam to loam, and the soils are moderately shallow with rapid permeability.

Photograph 6.6 Soil in Trial Hole at the location of the new Settlement pond (During Site Investigation works)

Figure 6.4 Teagasc Soils Classification Map



Clay content increases into the B horizon. Gleys occur on flatter, low-lying ground while peats have developed in topographically depressed areas prone to seasonal saturation. To facilitate operations on site, soil and overburden has been removed to expose the bedrock formation. The removed material has been stockpiled and formed into earthen bunds which partly define the site boundary.

6.6.2 Quaternary Deposit

GSI mapping shows the majority of the existing quarry as exposed bedrock (due to historic quarrying operations at the site). Where quaternary sediments are mapped, they are shown to be derived from sandstone and shale.

6.6.3 Bedrock & Structural Geology

The proposed development area of the quarry is situated in the Slieve Glah Formation, which is described as Silurian siltstone, mudstone and thin tubidite. The Red Island Formation is located just west of this and encompasses the remainder of the quarry site. Red Island Formation is described as an Ordovician Greywacke conglomerate and argillite rock which is characterised as "green to greyish medium to coarse grained conglomerate, volcanistic greywacke. Greywacke is an impure sandstone, characterised as poorly sorted angular grains within a muddy matrix.

6.7 Local Geology

6.7.1 Introduction

The current extraction area at the site is located to the eastern side of the site. It is accessed via a steep gravel track which traverses the northern rock face of the excavation. A site office, weighbridge and wheel washing facilities are located inside the quarry entrance.

6.7.2 Bedrock Geology

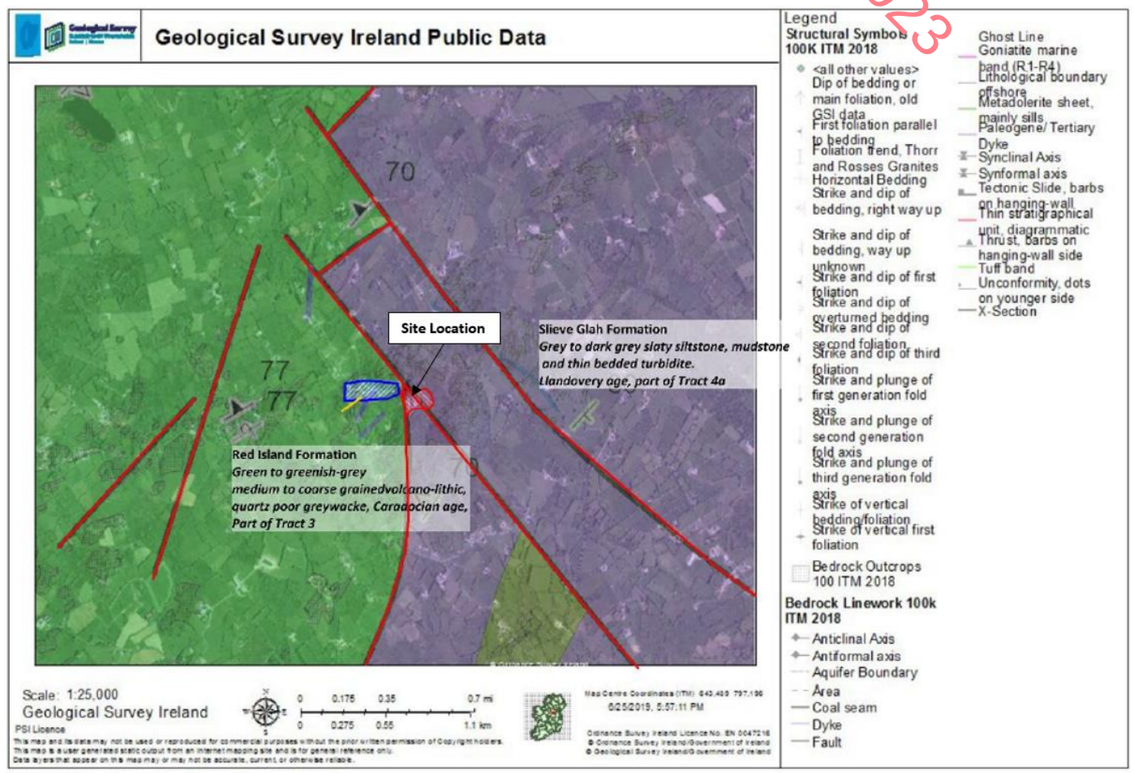
The operational quarry is predominately situated within the Slieve Glah formation. Extraction operations at the site have exposed vertical rock faces. The lithology of the rock to the east and northeast sections of the quarry is predominantly grey to dark grey slaty siltstone, mudstone and thin bedded, fine to coarse grained microconglomeratic greywacke, which dips at an angle of 70 - 80° to the east – northeast.

The lithology in the east-southeast extent of the quarry differs from the southern exposed wall of the site. Here the structure and colour of the rock changes, the incidence of fracturing is decreased along with a noticeable change in rock type. The GSI bedrock geology 1:100,000 scale map indicates the presence of a felsite dyke which transects the southern portion of the quarry. The remains of this large volcanic feature are clearly evident on the exposed wall towards the southern section of excavation illustrated in Photographs 6.1. and 6.2 The eastern extent of the site is indicated as being within the Red Island Formation. Morris et al. (2003) describes the Red Island Formation as a 'greenish-grey medium or coarse grained, locally conglomeratic, volcanistic greywacke'. In sections of the older quarry workings there is considerable intermittent weathering of previously exposed greywacke which has weathered drab brown.

Table 6.1 summarises the Lower Palaeozoic stratigraphy of Tracts 3 and 4a. The two tracts are separated by the Orlock Bridge Fault.

Geological Unit	Age	Lithology
Tract 4a Slieve Glah Formation	Silurian, Llandovery	Blue to bluish grey siltstone turbidites, intercalated mudstones, sub-ordinate conglomerates, and green greywackes.
Tract 3 Red Island Formation	Ordovician, Caradoc to Ashgill	Green to greenish grey greywackes with sub-ordinate grey to black shales

Figure 6.5 Bedrock Geology - The red lines are faults associated with the Orlock Bridge Fault, also known as the Slieve Glah Shear Zone.



6.7.3 Depth to Bedrock

Bedrock is exposed across the floor of the existing quarried area. The operational section of the site is elevated above the existing quarry floor (QY7) and is accessed via a haul road which is supported by exposed bedrock along the northern face of the excavation.

6.7.4 Geological Heritage

The site does not lie within a geological heritage area. The nearest such designation is 10 km to the northeast where a formation of ribbed moraines form part of a large moraine field. The Black Pigs Dyke, which is believed to be an historical defensive man-made structure, characterised as a linear earthwork trench transects the lower foothills of Ardkill More Mountain.

6.7.5 Use of natural Resources

The destinations of this quarried out material will most likely be within the Cavan region. Diesel will be consumed in haulage from the site machinery use. Electricity will also be used on-site.

Photograph 6.7 Crushed Aggregate, produced from Greywacke.

6.8 Potential Impacts

The procedure for determination of potential impacts on the receiving 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 site walkover to assess the degree to which these receptors will be impacted upon. Impacts are described in terms of quality, significance, duration, and type. In accordance with the NRA Guidelines (2009) the site is deemed to be an attribute of 'Low' importance as a function of the thin depth of overburden and of 'Medium' importance in terms of being a small existing quarry. Bedrock as an attribute has a medium quality, significance, or value at a local scale.

The potential impacts from the enabling and operational phases of the proposed development are summarised below and in further detail in Table 6.1, using the headings discussed under the criteria for determination of impacts (Tables 6.2, 6.3, 6.4). The impact definitions and criteria are further detailed in EPA EIAR Guidelines (EPA, 2022).

6.8.1 Soil/Subsoils

There will be no removal of overburden to facilitate the continued extraction of rock within the application area. In the long term there will be no deleterious effects on the soils. During the construction of the new settlement pond, 6,000m^3 soil will be excavated and stored on site for future use. Excess soil will be used for restoration purposes when the need arises. Prior to the commencement of soil excavation to facilitate the new settlement pond, silt fencing will be placed down-slope of the proposed area; These will be embedded into the local soils to ensure all site water is captured.

6.8.2 Geology

Proposed extraction of bedrock in the application site and associated activities such as blasting and mechanical removal of rock will have a direct impact on the geology of the Slieve Glah formation within the footprint of the quarry. This is therefore considered to be a permanent impact to an attribute of medium importance. This impact has occurred historically at the existing site. There has been no impact to bedrock outside of the overall site boundary.

The extracted material has been and will continue to be used locally as a raw material in the construction and infrastructure industries, which is considered to be a positive impact. The requirement of such raw materials is recognised in the Cavan County Development Plan 2022 – 2028. There is potential for contamination of exposed bedrock as a result of spillages and leakages. Providing adequate mitigation measures are in place the risk of such is deemed to be negligible. There will be no discharges or emissions to the soil or geological environment.

6.9 Impact Assessment

6.9.1 Evaluation Methodology

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

6.10 Evaluation of Impacts

6.10.1 Direct Impacts

The importance of existing land, soil and geology attributes identified at the application site is assessed in Table 6.2 below:

Table 6.2 Estimation of importance of sensitive geological attributes

Importance of attribute	Criteria	Example
Very High	Attribute has a high quality, significance, or value on a regional or national scale	Large quarry or designated area
High	Attribute has a high quality, significance, or value on a local scale	High value soils, county geological site, heavily contaminated soil on brownfield site
Medium	Attribute has a medium quality, significance, or value on a local scale	Small existing quarry, moderately drained soils, small landfill site, lightly contaminated soil
Low	Attribute has a low quality, significance, or value on a local scale	Site for C & D waste, uneconomically extractable mineral resource, poor quality soils

Table 6.3 Estimation of the significance of a potential impact on an attribute

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 magnitude of these impacts on the soil and geology attributes is assessed in Table 6.4:

Table 6.4 Impact Magnitude and Type

Impact Type	Magnitude of impact	Example
Adverse	Negligible	No measurable changes in attributes
	Small	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
	Moderate	- 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 and replace moderate proportion of peat, organic soils and/or soft mineral soils beneath alignment
	Large	- 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
Beneficial	Minor	Minor enhancement of geological heritage feature
	Moderate	Moderate enhancement of geological heritage feature
	Major	Major enhancement of geological heritage feature

There will be no impact on geological heritage in the vicinity of the site. Unplanned Events (i.e., Accidents). It is highly unlikely that any unplanned events within the application site would result in a noticeable impact on the land, soils, and geology.

6.10.2 'Do-nothing Scenario'

The proposed development site and activities are a continuation of use in line with planning permissions previously approved for the site in 2005. This will not introduce any new potential impacts to the soils and geological environment when compared to the previously approved.

6.10.3 'Worst Case' Scenario

The worst-case scenario for the environmental profile of Soils, Geology and Land arising from the development occurs during the operational phase. With mitigation measures proposed the magnitude of impact resulting from the ultimate development is however considered to be Negligible.

Table 6.5 - Estimation of the magnitude of a potential impact on an attribute

Activity	Attribute	Character of potential Impact	Importance of attribute	Magnitude of potential impact	Term	Significance of potential impact
Enabling Phase						
Stripping of soil necessary to facilitate extraction of rock & settlement pond	Soil	Excavation and removal of topsoil	Low (poor quality soils) – Medium (moderately drained soils)	Adverse: Moderate (excavate and remove soft, mineral soils)	Temporary	None
Handling of stone	Soil, subsoil	Potential for erosion and dust generation	Low (poor quality soils) – Medium (moderately drained soils)	Adverse: Negligible	Temporary	Imperceptible
Extraction of bedrock	Bedrock	Blasting and excavation of bedrock	Medium - greywacke bedrock	Adverse: Large	Permanent	Significant
Use of fuels/hydrocarbons	Soil, subsoil, bedrock	Potential for contamination of exposed subsoils and/or bedrock as a result of spillages/leakages.	Medium	Adverse: Moderate	Short term	Moderate
Slope blasting excavation	Bedrock, subsoil	Bench stability	Low	Adverse: Moderate	Permanent	Slight
Operational Phase of Proposed Development						
Use of fuels/hydrocarbons	Subsoil, bedrock	Potential for contamination of exposed bedrock as a result of spillages/leakages.	Medium	Adverse: Moderate	Short – long term	Moderate/Significant
Overall development	Bedrock	Impact to geological heritage sites	None present	n/a	n/a	n/a

6.11 Mitigation Measures

The significant potential impacts identified in Table 6.4 are resolved under the mitigation measures set out under Table 6.6.

Table 6.6 – Summary of Mitigation Measures

Activity	Attribute	Character of Potential Impact	Mitigation Measure	Predicted Impact
Enabling phase				
Stripping of soil necessary to expose the bedrock resource	Soil	Excavation and removal of topsoil	There will be no overburden removal associated with the continued extraction of rock. Over burden from the application area was removed already a number of years ago. Movement of material should be minimised in order to reduce degradation of soil structure and generation of dust.	None
Handling of soils, subsoils	Soil, subsoil	Potential for soil erosion and dust generation	A silt fence will be erected around the area where the new settlement pond will be constructed.	Neutral
Use of fuels/hydrocarbons	Soil, subsoil, bedrock	Potential for contamination of exposed subsoils and/or bedrock as a result of spillages/leakages.	Fuelling, lubrication, and storage areas will be in a designated area, not within 30 m of drainage ditches or surface waters. All waste containers will 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. There will be minimal storage of fuels on site. Refuelling shall be carried out by an external fuel supplier at the new concrete bunded area which will drain to an oil water separator. An adequate supply of spill kits and hydrocarbon absorbent will be maintained on site.	Neutral
Operational Phase				
Slope blasting and excavation	Soil, subsoil	Rock face stability	Conventional side slopes will be adopted during bench formation (blasting and excavation). Bench slopes are blasted at an angle of about 15 degrees. Slopes should be protected by netting. A narrow exclusion area at the base of the excavation is recommended. Slope stability to be assessed by suitably qualified engineer.	Neutral
Use of fuels/hydrocarbons	Soil, subsoil, bedrock	Potential for contamination of subsoils as a result of spillages/leakages.	In order to minimise any impact on the underlying subsurface strata and groundwater, all oils, solvents, and chemicals used on site shall be stored within labelled, sealed containers in suitable bunded lockable storage containers. Refuelling of quarry plant will only take place in designated bunded refuelling area which drains to an oil water separator.	Negligible

			All discharge from the development area will pass through the proposed impermeable lined settlement pond, to be being released into the receiving surface water drain. Sources of hydrocarbons are and will be located within safely bunded areas that safely contain all spillages and prevent the migration of contaminants into the underlying bedrock aquifer.	
Discharge Point	Surface water	Potential for contamination of surface water	No untreated water will discharge directly to the watercourse. All such water will pass through the settlement pond followed by discharge to the nearby watercourse. The discharge water quality from the settlement pond will be monitored on an annual basis. Discharge volumes will be continuously monitored at the discharge point location as per the current Discharge License requirements (Ref: SS/WW004/18).	Neutral
Settlement Pond	Surface water	Potential for contamination of surface water	A sampling and analysis programme of the discharge from the settlement pond prior to discharge to the watercourse will be in place. John Nulty Ltd. will inform the Cavan County Council of any exceedances.	Negligible
Oil/Water Separator	Surface water, Soil, Subsoil	Potential for contamination of surface water	A logbook will be maintained, noting all transactions associated with the proposed oil/water separator, settlement pond and other details as required. Weekly visual examination of the oil/water separator, settlement pond and the receiving watercourse will be carried out by a competent person. All inspection findings will be recorded in the logbook.	Negligible
Oil/Water Separator	Surface water, Soil, Subsoil	Potential for contamination of surface water, soil, subsoil	Routine servicing and maintenance of the oil/water separator and settlement ponds will be carried out. A record of all service and maintenance will be maintained in the logbook. This will include the frequency of the work and the name of the person and or company carrying out the work.	Neutral
Discharge License	Surface water	Potential for contamination of surface water	John Nulty Ltd. will provide and maintain a sampling location prior to discharge to the watercourse and direct access to the sampling location will be available at all reasonable times to personnel authorised by Cavan County Council.	Negligible
domestic wastewater	Surface water, Soil, Subsoil, Bedrock	Potential for contamination of surface water, soil, subsoil, bedrock	The domestic wastewater from the site will continue to be discharged via the existing on site-septic tank and percolation area which complies with the EPA guidelines 2021.	None

6.12 Residual Impact Assessment

Residual impacts refer to the degree of environmental change that will occur after the proposed mitigation measures have taken effect. The operational phase will primarily involve the excavation of the bedrock via blasting and mechanical means. Assuming implementation of the mitigation measures described above the residual impacts on the soil and geological environment during the operational phase are assessed to be long-term and negligible.

6.13 Monitoring

Gareth Nulty from John Nulty Ltd. will have overall responsibility for ensuring that all operations are carried out in such a way as to minimise potential impacts to soils and geological receptors. Gareth Nulty will also have the responsibility of monitoring the performance of any pollution control measures adopted.

A project-specific Environmental Management Plan (EMP) will be established and maintained by John Nulty Ltd. during all phases of work. The EMP will cover all potentially polluting activities and include an emergency response procedure. All personnel working on the site will be trained in the implementation of the procedures during a site induction meeting.

6.14 Lifetime of Quarry

The proposed development seeks for a 20-year permission to complete extraction of material granted within existing quarry envelope as per previously approved planning (Ref No.051801) & all associated site works at Ardkill More and Drumcrow, Carrickaboy, Cavan, Co. Cavan.

Approximately 500,000 tonnes of material will be extracted over a twenty-year period, resulting in an average extraction rate of 25,000 tonnes per year up to a maximum of 50,000 tonnes per annum.

6.15 Difficulties Encountered in Compiling Information

There were no difficulties encountered in compiling information for the existing environment.

Figure 6.6 Quaternary Geology Map

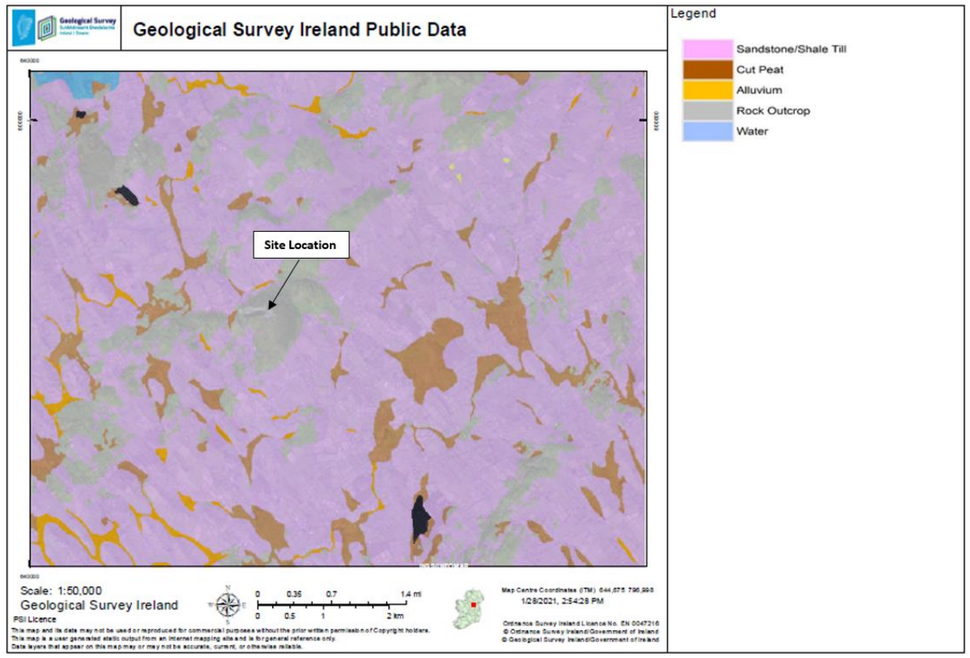
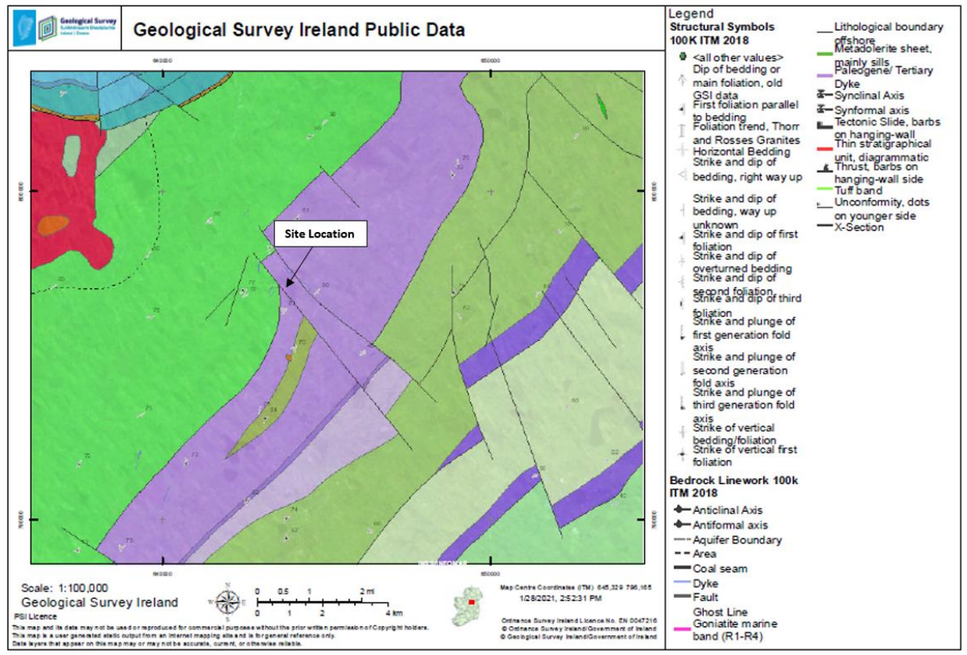


Figure 6.7 Bedrock & Structural Geology Map



Photograph 6.8 Exposed bedrock at existing upper level (east section)

CHAPTER 7

WATER (HYDROLOGY & HYDROGEOLOGY)

Traynor Environmental Ltd.

7 WATER (HYDROLOGY AND HYDROGEOLOGY)

7.1 Introduction

7.1.1 Background and Objectives

Traynor Environmental have been engaged by John Nulty Ltd to undertake an Environmental Impact Assessment report (EIAR) for hydrology and hydrogeology in relation to planning for quarry works at Ardkill More and Drumcrow, Carrickboy, Cavan Co. Cavan. The planning application relates to a 20 year permission for quarrying and extraction of rock that will include drilling, blasting, crushing and screening along with alterations to boundaries & all associated site works.

Works will also include for the provision of new settlement ponds and installation of associated site drainage infrastructure and surface water pump to proposed new settlement ponds along with provision of discharge outlet via a Klargester Interceptor. Ancillary site works to include for landscape works, planting restoration of the quarry perimeter and reprofiling of overburden as required to facilitate development of the quarry and restoration of the associated site area.

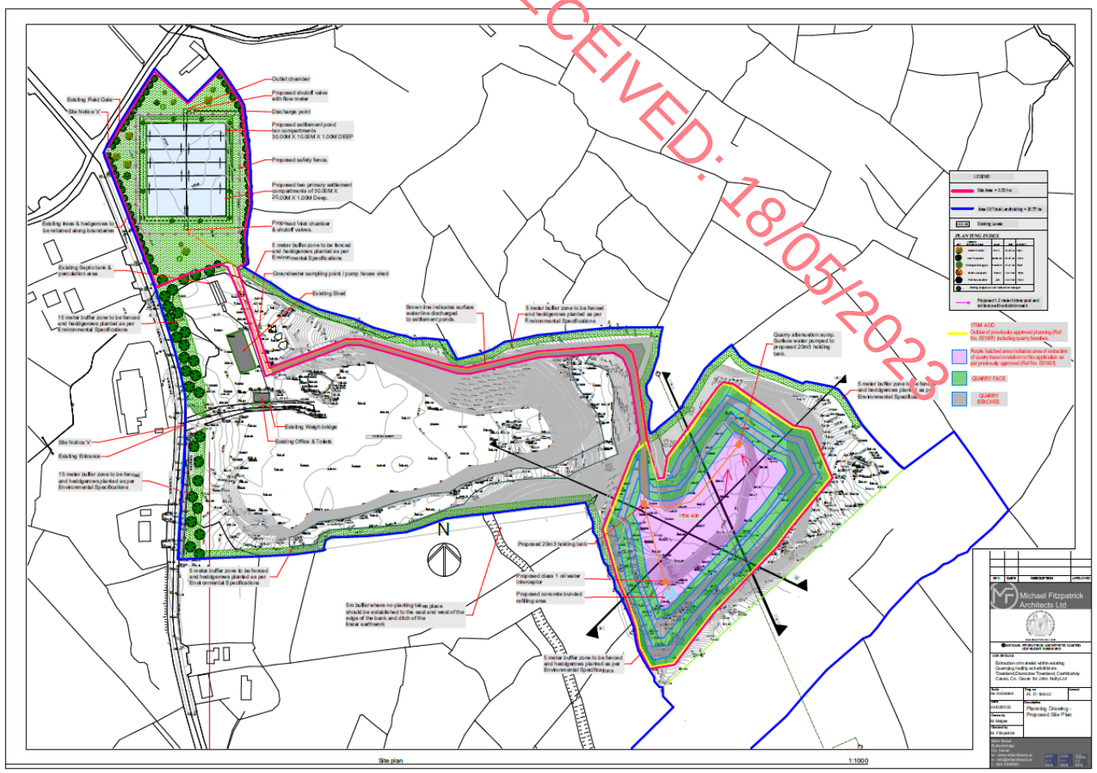
The objectives of this assessment include:

- Undertake a detailed review of the hydrology and hydrogeology of the area and of the proposed development using published data followed by a site survey of the site and surrounding area to assess flow paths both above and below ground.
- Identify any potential impact on surface water and groundwater due to the proposed development.
- Identify potential mitigation measures to avoid, remediate or reduce any likely and impact of the works on the area.
- Carry out a design for proposed works to ensure that the proposed works will not have a negative impact on the surrounding hydrology or hydrogeology of the area.

7.1.2 Summary of Proposed Development

- The proposed development consists of a time extension of 20 years to an existing quarry which was granted planning in 2007.
- Deepening of extraction from its current level of 209mOD down to 175mOD over the proposed 20 year lifespan The previously permitted planning permission proposed a quarry floor level of 175mOD.
- The quarry is located in a naturally occurring rock outcrop which rises above the surrounding area. The top of the quarry face is approximately 248 mOD with the bottom of the quarry face being approximately 209mOD. The road level at the quarry entrance is 154mOD and 150mOD at the Site Office.
- It is proposed that surface water runoff will be collected and processed by passing through a cleaning/polishing system of settling pond and oil water separator to remove silt and any potential oil or grease before being discharged into the naturally occurring surface water drain at green field discharge rates.
- Currently surface water from the site is discharged to the open drainage ditch adjoining the site under the existing discharge license Ref: SS/WW004/18 granted by Cavan County Council in January 2020. An amendment to the existing discharge license will be sought if planning is granted as the location of the discharge point will be moved 130m to the North.
- Approximately 500,000 tonnes of material will be extracted over a twenty-year period, resulting in an average extraction rate of 25,000 tonnes per year up to a maximum of 50,000 tonnes per annum.

Figure 7.1 – Proposed Site Layout.



Photograph 7.1 – Application area for continued extraction.

Figure 7.2 - Site Location Map (Site indicated by Pin)

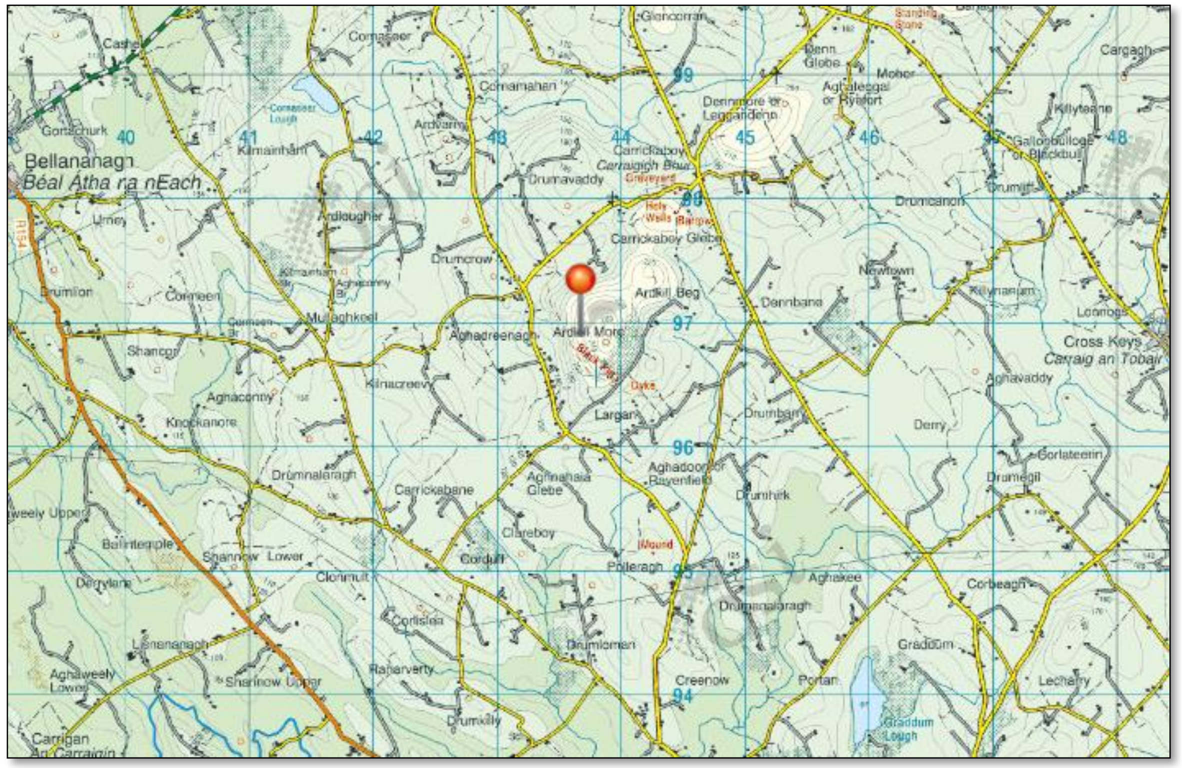
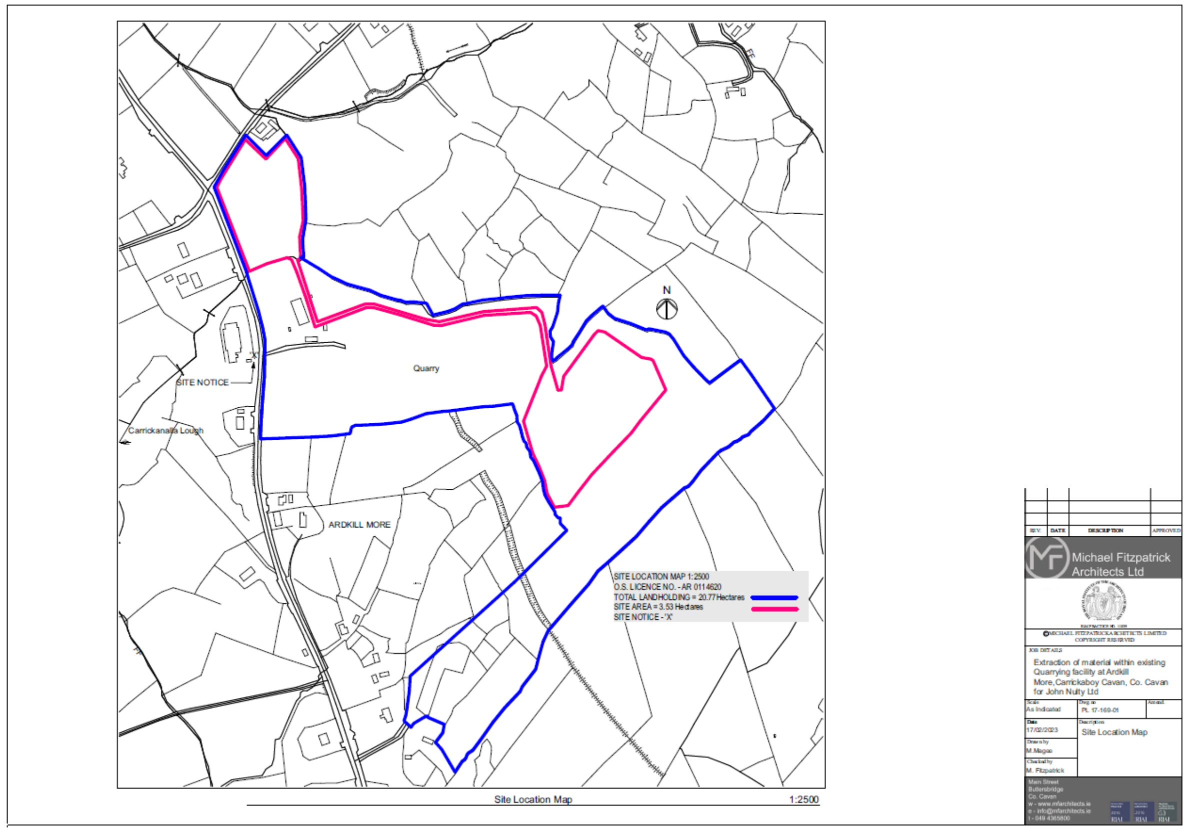


Figure 7.3 - Site Location Map (Site Outlined in Red)

Figure 7.4 - Site Location Map (Area outlined in Green approved previously under QY7)

Figure 7.5 - Site Location Map and Land Holding



Photograph 7.2 – North Face of the Application area.

Photograph 7.3 – East Face of the Application area.

Photograph 7.4 – South Face of the Application area.

7.1.3 Relevant Guidance

The Hydrology / Hydrogeology section of the EIAR is carried out in accordance with relevant guidance contained in the following documents:

- Environmental Protection Agency (2017): *Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports*;
- European Commission (2017): *Environmental Impact Assessment of Projects – Guidance on the Preparation of the Environmental Impact Assessment Report*;
- Institute of Geologists Ireland (2013) *Guidelines for Preparation of Soils, Geology & Hydrogeology Chapters in Environmental Impact Statements*;
- National Roads Authority (2008): *Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes*.
- Department of the Environment, Heritage, and Local Government; *Quarries and Ancillary Activities – Guidance for Authorities* (April 2004).
- Environmental Protection Agency (2006): *Environmental Management in the Extractive Industry (Non-Scheduled Minerals)*.
- *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment* (DoHPLG, 2018); and,
- *Guidance on the preparation of the EIA Report* (Directive 2011/92/EU as amended by 2014/52/EU), (European Union, 2017).
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (May 2022)

7.1.4 Authors/Contributors

Traynor Environmental (TE) are a specialist environmental practice which delivers a range of water and environmental management consultancy services to the private and public sectors across Ireland. Our office is located in Belturbet, County Cavan.

This chapter of the EIAR was prepared by:
Mr. Nevin Traynor BSc. Env. And reviewed by Mr. Tim Moynihan BSc MSc (Geotech) C. Eng. IEI P. Geol IGI Euro. Geol FRS of Malachy Walsh and Partners Ltd. has carried out a review of this Hydrology and Hydrogeology chapter.

7.2 Methodology

7.2.1 Desk Study

A desk study of the proposed development site, surrounding area and receiving water environment was completed in advance of undertaking the site visits. This involved collecting all relevant geological, hydrological, hydrogeological, and meteorological data for the area, and included review and consultation with the following data sources:

- Environmental Protection Agency databases (www.epa.ie);
- Geological Survey of Ireland – Groundwater, Geological and Heritage Databases (www.gsi.ie);
- Met Eireann Meteorological Databases (www.met.ie);
- National Parks & Wildlife Services Public Map Viewer (www.npws.ie);
- EPA/WFD River
- Catchments Map Viewer (www.catchments.ie).

- Bedrock Geology 1:100,000 Scale Map Series, (Geology of Cavan). Geological Survey of Ireland (GSI, 1999).
- Geological Survey of Ireland – Cavan Groundwater Body Initial Characterization Report.
- OPW Past Flood Events Mapping (www.floodinfo.ie);
- Environmental Protection Agency – "Hydrotool" Map Viewer (www.epa.ie); and,
- CFRAM Flood Risk Assessment maps (www.floodinfo.ie).

7.2.2 Site Specific Sources of Information

Data from the following sources of site monitoring and investigations were used in the EIAR assessment:

- Surface water discharge quality monitoring as part of the Discharge License SS/WW004/18 monitoring conditions.
- Site visits and hydrological surveys of the proposed site and surrounding area were undertaken by Nevin Traynor on 15th November 2022 and 24th November 2022;
- Surface water sampling results.
- Groundwater sampling from the groundwater abstraction point was completed on 15th November 2022.
- Previous site investigation and sampling carried out by Envirologic.

7.3 Receiving Environment

7.3.1 Site Description

The existing quarry site for which continued development is being sought is located approximately 1.5km to the southwest of Carrickaboy, Co. Cavan. The existing quarry site is bordered by mainly agricultural land along its northern, eastern, and southern boundaries. The site is accessed from a local road to the west. The site is situated on an elevated hilltop (pre-existing quarry development elevation 209 – 237m OD) overlooking the surrounding landscape. The adjacent land slopes away from the site along all boundaries of the quarry. A maintenance shed, canteen, office and other ancillary quarry infrastructure are located at the west of the site adjacent to the site entrance. All vehicles leaving the site pass through a wheel wash.

Photograph 7.5 – Proposed Quarry Area for continued extraction.

There are three broad stages in the quarrying process:

1) **Blasting of rock faces:**
   Blasting will continue to be the method used to fragment the material to a manageable size in order to enable extraction. The active rock face must be blasted using explosives.

2) **Processing of Rock:**
   Once blasting has occurred, the blasted rock is fed into the mobile crusher. There are two crushing stages, primary crushing, and secondary crushing, which function to reduce the particle size of the rock to a scale that can be easily transported using dump trucks and belt conveyors.

3) **Stockpiling of Rock:**
   Material produced by crushing will be stockpiled within the quarry void for loading directly onto trucks for delivery to the market.

Existing rainwater at the quarry flows through a series of settlement ponds located on the north side of the quarry. The settlement ponds discharge to a field drain located north of the site. (Under discharge license, Ref: SS/WW004/18).

It is proposed to construct a new impermeable lined settlement pond and associated infrastructure which will discharge to the existing field drain. Currently surface water discharge from the site is discharged to the open drainage ditch adjoining the site under the existing discharge license Ref: SS/WW004/18. There is 1 no. well (groundwater abstraction well) at the quarry which is used for groundwater monitoring. Potable water is sourced from a group water scheme.

7.3.2 Rainfall and Evapotranspiration

Rainfall (2012 – 2022) and evaporation data was sourced from Met Éireann. The 10- year annual average rainfall (AAR) recorded at Ballyhaise, 14.5km north of the site are presented in Table 7.1.

Table 7.1: Local Annual Average long term Rainfall Data

Year	Period	Rainfall (mm)
2012	Annual Mean	1030.60
2013	Annual Mean	958.80
2014	Annual Mean	997.20
2015	Annual Mean	1269.00
2016	Annual Mean	891.50
2017	Annual Mean	953.10
2018	Annual Mean	937.00
2019	Annual Mean	1114.70
2020	Annual Mean	1161.80
2021	Annual Mean	932.60
2022	Annual Mean	1048.90
Mean		**1026.84**

The closest synoptic station where the average potential evapotranspiration (PE) is recorded is at Ballyhaise, approximately 14.5km north of the site. The 2020 - 2022 average PE for this station is 509.46mm/year. This value is used as a best estimate of the site PE. Actual evapotranspiration (AE) at the site is estimated as 698.1mm/year.

The effective rainfall (ER) represents the water available for runoff and groundwater recharge. The ER for the site is calculated as follows:

Effective rainfall (ER) = AAR - AE
= 1026.84mm/yr. – 698.1mm/yr.
ER = 328.74mm/yr.

Based on recharge coefficient estimates from the GSI, an estimate of 100mm/year recharge is taken for the site and surrounding area. A 100mm/year recharge cap is applied due to the low recharge acceptance ability of the underlying Poor Bedrock Aquifer (refer to Section 7.3.11 below for the site hydrogeological setting).

7.3.3 Regional and Local Hydrology

A field drain is located along the northeastern boundary of the quarry. This drain flows northwest towards the Ballinagh Stream which is located 1.2km downstream of the site. This Ballinagh stream a tributary of the Erne River. Figures 7.3 and 7.4 below shown the water network in the vicinity of the site.

On a regional scale, the majority of the site is mapped in the Erne_SC_030 sub-catchment which is a collection of small separate stream sub-basins that drain northwest towards the Erne River, approximately 8.5km to the northwest of the site.

The south-western of the site is mapped in the Erne_SC_010 sub-catchment. However, due to the void created by the quarry there is no surface water drainage from the site into the Erne_SC_010 sub-catchment (i.e., all surface water runoff and licensed discharges are into the Erne_SC_030 sub-catchment).

On a more local scale, the majority of the site is located in the Ballinagh Stream (Ballinagh_010) sub-basin (of the Erne_SC_030). The south-west corner of the site is mapped in the Erne_020 sub-basin but as described above all surface water runoff is discharged, following the settlement pond, to the adjoining surface water drain which meets the Ballinagh Stream approximately 1.2km downstream of the site.

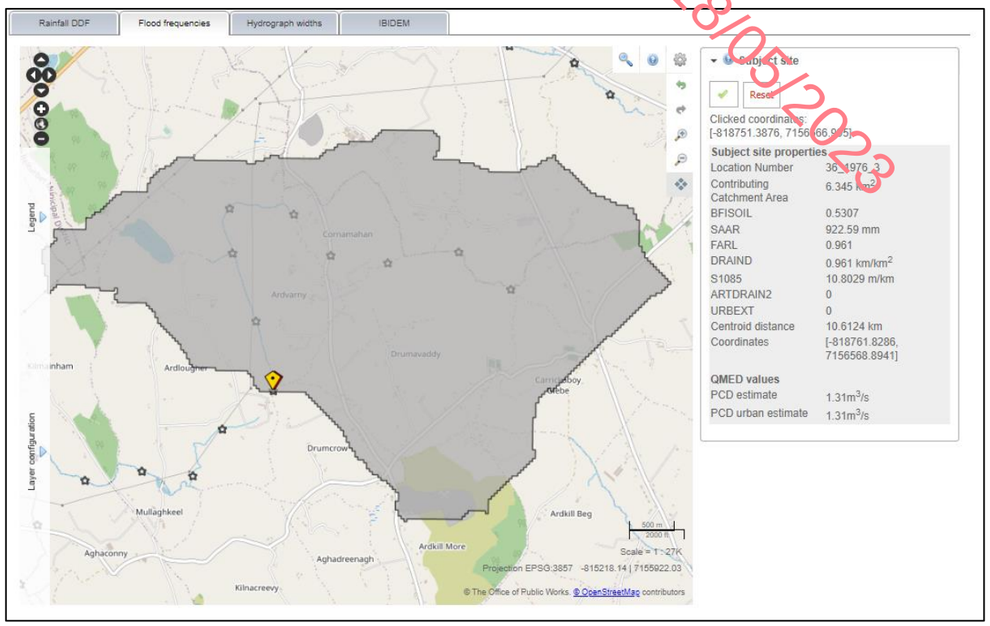
A regional hydrology map is shown as drawn TE22.011.001 and a local hydrology map is shown as drawn TE22.011.002.

7.3.4 Ballinagh Stream Surface Water Flows

There are no published flow data or water levels available for the Ballinagh Stream beside the site.

The estimated flow QMED PCD value of the Ballinagh Stream downstream of the discharge point is 1.31m³/s. This figure was taken from the EPA hydro Tool ungauged catchment. The total upstream catchment is approximately 6.345km².

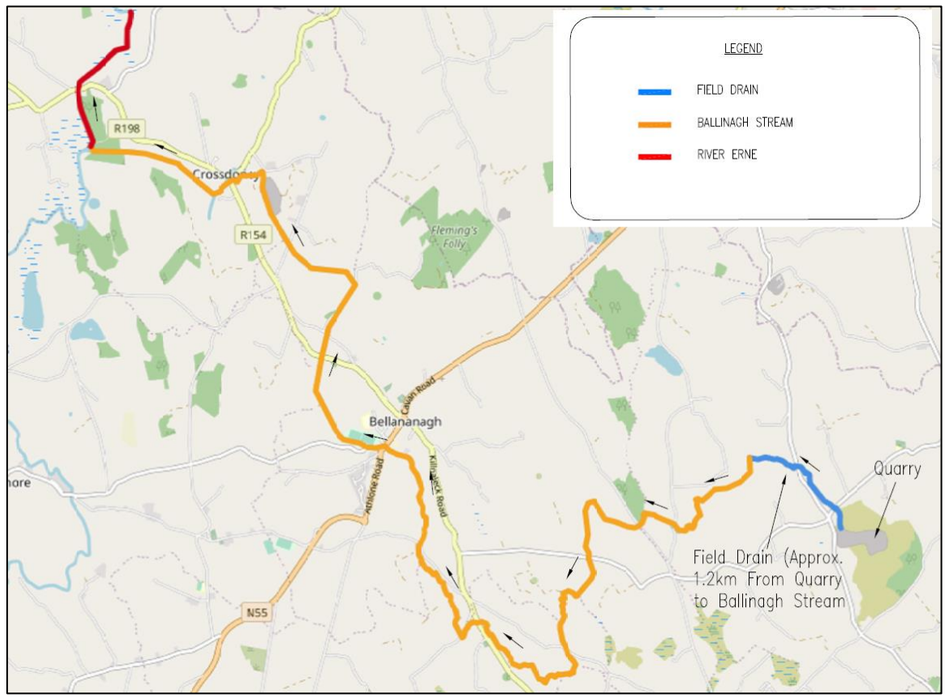
Figure 7.2 – OPW Ungauged Catchment for Ballinagh Stream



The channel hydraulic capacity of the Ballinagh Stream is much greater than 1.31m³/s due to the channel capacity within a 1.2km distance range downstream of the quarry site.

Figure 7.3 – Water Network After Settlement Pond

Figure 7.4 – Surface water flow map



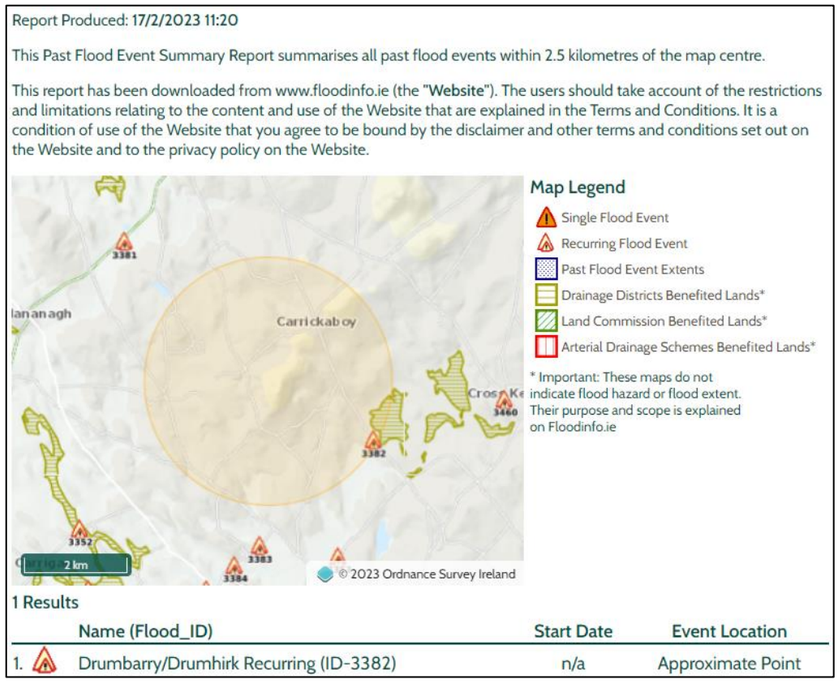
7.3.5 Flood Risk Identification

OPW's River Flood Extents Mapping, National Indicative Fluvial Mapping, Past Flood Event mapping (https://www.floodinfo.ie/map/floodmaps/) and historical mapping (i.e. 6" & 25" base maps) were consulted to identify those areas of the development as being at risk of flooding.

No recurring flood incidents within the proposed development site boundary were identified from OPW's Past Flood Event Mapping. Identifiable map text on local available historical 6" or 25" mapping for the proposed development site area do not identify any lands that are "liable to flooding". There is no OPW River Flood Extents Mapping or National Indicative Fluvial Mapping available for the site due to the elevated nature of the location.

However, due to the elevated (above local major watercourses) and sloping nature of the local area there is a low risk of both pluvial and fluvial flooding at the proposed development areas. Surface water on the quarry floor is managed by a sump as described below. Groundwater inflows will not occur in the extraction area. Based on the above information there is low potential risk of flooding at the development site (Flood Zone C).

Figure 7.5 - OPW's Flood Map



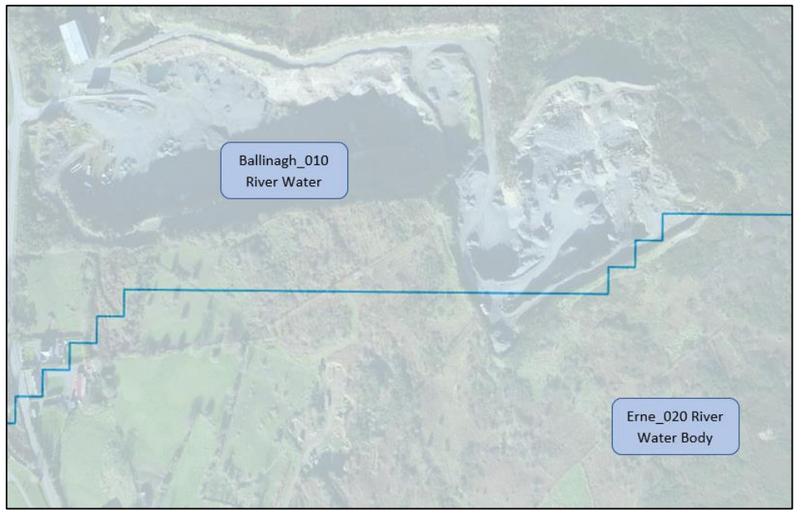
7.3.6 Surface Water Discharge Rates

The existing discharge license for the site (License Ref: SS/WW004/18) has a maximum flow rate of 4000m³/day. An amendment to the existing discharge license will be sought should planning be granted. The discharge rate will be controlled with a hydro Valve prior to the new settlement pond and monitored with a flow meter shut off prior to discharge.

7.3.7 Receiving Water Quality

There are no EPA Q-rating data available for the Ballinagh Stream within the last 20 years. The latest and closest result to the site was at 1st Br u/s Ballinagh (Station Code RS36B010100) in 1989. The Q-rating was 4. The western portion of the quarry is located in the Ballinagh river water body.

Figure 7.6 Surface Water Bodies at the quarry



Surface water samples (2 no.) were taken from the field drain approximately 0.8km downstream of the existing settlement pond discharge point and Ballinagh Stream approximately 2km downstream of the discharge point on 15th November 2022 and the results are shown in Table 7.2 below. There is no channel flow in the field drain upstream of the existing discharge point therefore only downstream sampling is possible (the quarry site is located at the start of the field drain).

Table 7.2: Field Drian & Ballinagh Stream Water Sampling Results

Parameter	Existing Discharge License ELV (Ref: SS/WW004/18)	EQS	Sample Date – 15/11/2022	
			SW1 Field Drian	SW2 Ballinagh Stream
pH	6-9	-	7.4	7.2
Total Suspended Solids (mg/L)	30	25	< 5	<5
Ammonia (mg/L)	0.16	Good Status: ≤0.065 High Status ≤ 0.04	0.06	0.02
Nitrite NO2 (mg/L)	-	-	0.03	<0.01
Total Phosphorus (mg/l)	0.05	-	<0.02	0.02
Nitrate - NO3 (mg/L)	-	-	5.9	5.1
COD (mg/L)	-	-	7	11
BOD (mg/l O2)	3	Good Status: ≤ 1.5 High Status: ≤ 1.3	1.4	1.1
Total Hydrocarbons (mg/l)	1	-	<0.5	<0.5

Suspended solids are reported to be < 5mg/L or less which is significantly below the threshold of 25mg/L with regard S.I. No. 293/1988. Results for phosphorus are below the existing discharge license threshold limit. Ammonia N was below the Good Status threshold in SW1 and below the High-Status threshold in SW2.

7.3.8 Surface Water Discharge Water Quality

A condition of the existing Discharge License (Ref: SS/WW004/18) requires annual sampling of discharge water quality. It is evident from the samples taken to date that the discharge complied with the provisions of the license at all times.

Discharge from the existing site comprises of water by gravity from the extraction area (upper and lower voids). The samples are taken at the discharge point downstream of the existing settlement ponds. A summary of the annual discharge water quality data for the years 2020, 2021 & 2022 are shown in Table 7.3 below along with the emission Limit Values (ELVs as defined in the discharge license). There were no exceedances with regard the discharge license ELVs.

The installation the new settlement pond will further enhance the treatment of the final discharge of surface water from the site. Results outlined in the table below confirm that the existing settlement ponds are working efficiently, however in the interest of further protecting the surface water and groundwater the new settlement pond has been intentionally oversized to facilitate the works the next 20 years.

Table 7.3: Summary Quarry Discharge Water Quality Results (2020, 2021 & 2022)

Parameter	Emission Limit Value	Sample Result						No. of Exceedances
		08/02/20	06/05/20	02/08/20	05/11/20	10/02/21	02/02/22	
pH	6 – 9 pH Units	7.4	7.2	7.8	7.8	7.9	7.3	0
BOD	3 mg/l	2.3	1.8	2.7	1.9	2.4	2.2	0
Suspended Solids	30mg/l	22	26	20	18	25	21	0
Total Phosphorus	0.05 mg/l	0.01	0.023	0.036	0.015	0.037	0.033	0
Ammonia as N	0.16 mg/l	0.10	0.09	0.02	0.07	0.09	0.10	0
Total Hydrocarbons	1 mg/l	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0

7.3.9 Hydrogeology

Background on Geology

The GSI map indicates that the solid geology underlying the site comprises two different formations:

1. **Rocks of the Red Island Formation (RI)**

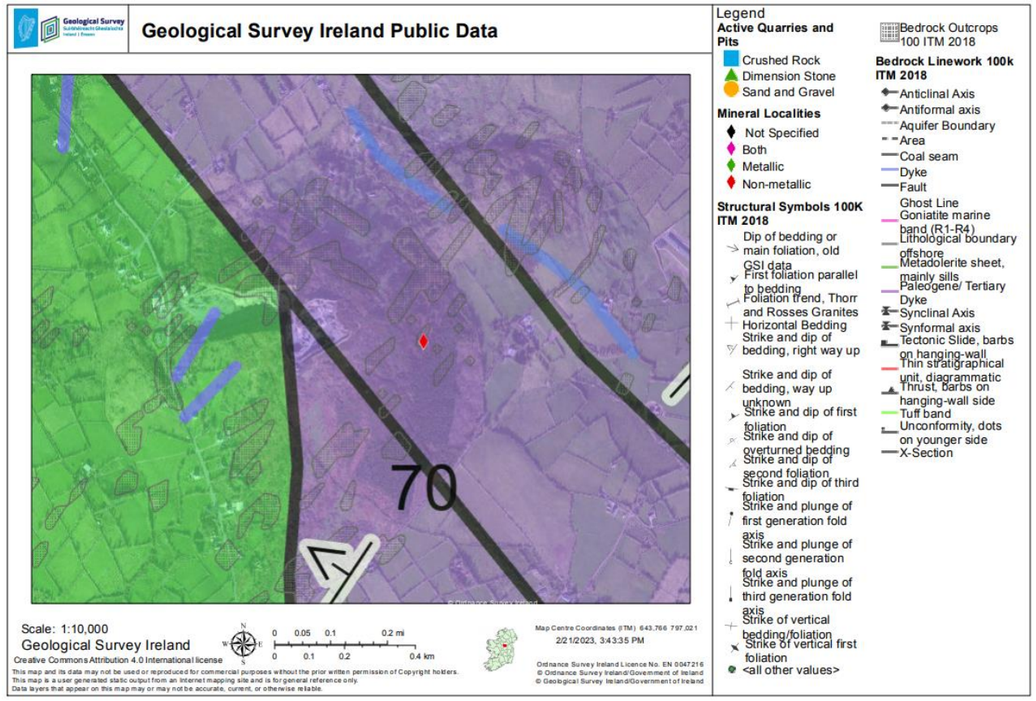
The main mapped bedrock unit in the extraction area of the quarry is Silurian Metasediments and Volcanics. The local bedrock formation in this area of the quarry site is the Slieve Glah Formation which comprises predominantly grey to dark grey slaty siltstone, mudstone and thin bedded, fine to coarse-grained or microconglomeratic greywacke. Southeast/northwest trending faults are mapped through the northwest area of the site that intercept the quarry site.

2 **Strata of the Slieve Glah Formation (SG)**

The bedrock unit to the northwest of the extraction area of the quarry is Ordovician Metasediments. The local bedrock formation in this area of the quarry site is the Red Island Formation which comprises predominantly Green to greenish-grey medium or coarse grained, locally conglomeratic, volcaniclastic greywacke. Also subordinate grey to greyish black shales. Investigation of the groundwater abstraction point was carried in 2021 and 2022 by Nevin Traynor for the purpose identifying ground water level. Ground water level was 148.55mOD. The proposed level of the extraction area is 175 – 237m OD.

The difference in bedrock formation delineated by the fault lines also indicates that there is no hydrological connection between the activities at the quarry and the potable wells in the area.

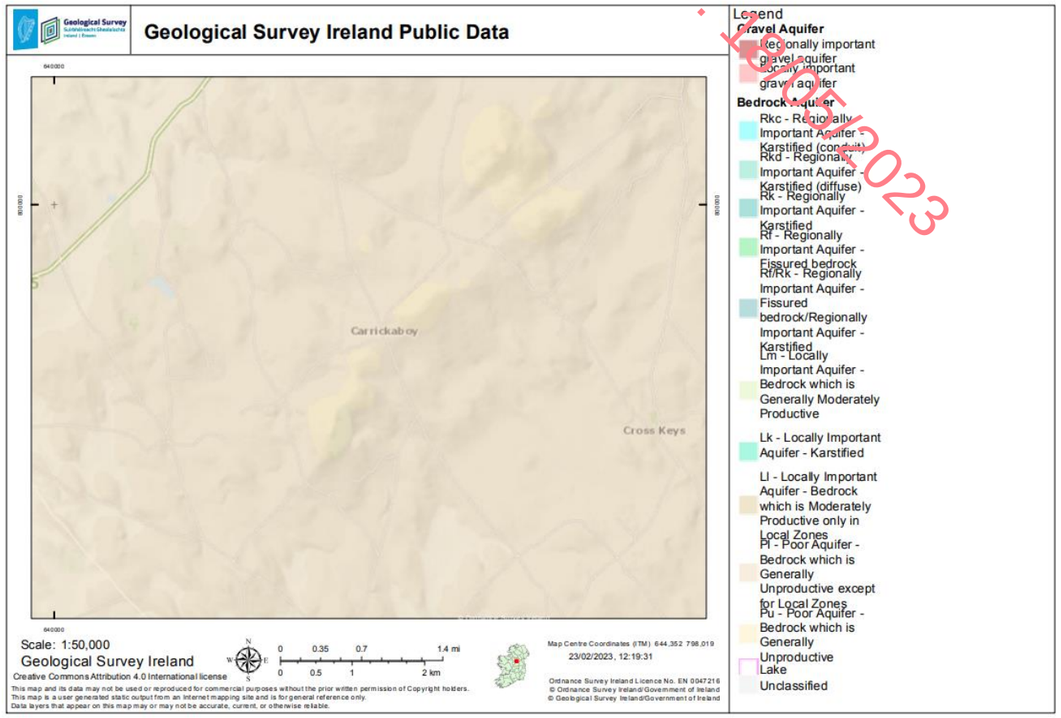
Figure 7.7 Bedrock Map



Regional Hydrogeology

The Geological Survey of Ireland (GSI) has classified the Silurian Metasediments and Volcanics and Ordovician Metasediments in this area as Poor Bedrock Aquifers - Pl (Bedrock which is Generally Unproductive except for Local Zones). Bedrock aquifer types are shown on figure 7.8 below.

Figure 7.8 Aquifer Map

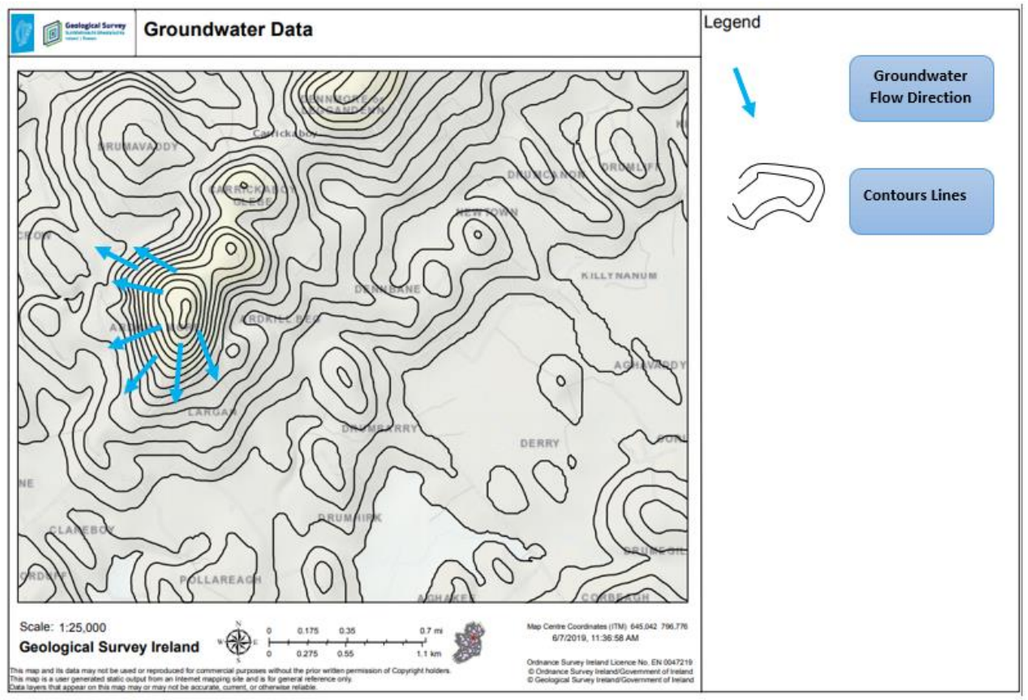


Site Hydrogeology

There is no indication of groundwater inflows into the application extraction area quarry void as the bedrock is elevated. The overall groundwater flow direction in the area of the quarry is to the northwest.

Groundwater flows radially from the topographical peak of Ardkill More to peripheral low-lying lands. In the locality of the site groundwater flow direction is generally from east to west. During previous field visits minor inflows of groundwater were observed emanating from the exposed face on the eastern side of the quarry floor. Groundwater discharge from these rock faces was considered to be low and likely in direct response to rainfall.

Figure 7.9 Regional Groundwater Flow Direction



7.3.10 Groundwater Quality

The groundwater abstraction well was sampled on 15th November 2022 and these results are shown in Table 7.4 below along with relevant groundwater and drinking water regulation and guideline values. There was no exceedance with regard S.I. 122 of 2010 and S.I. 9 of 2010.

The Groundwater Body (GWB) in which the quarry site is located is the Cavan GWB (IE_NW_G_061) and it is assigned an over "Good Status". This relates to the overall quantitative and chemical status. Groundwater quality at the site is of a high standard. Results indicate that current activities at the site have not had a negative impact on groundwater quality.

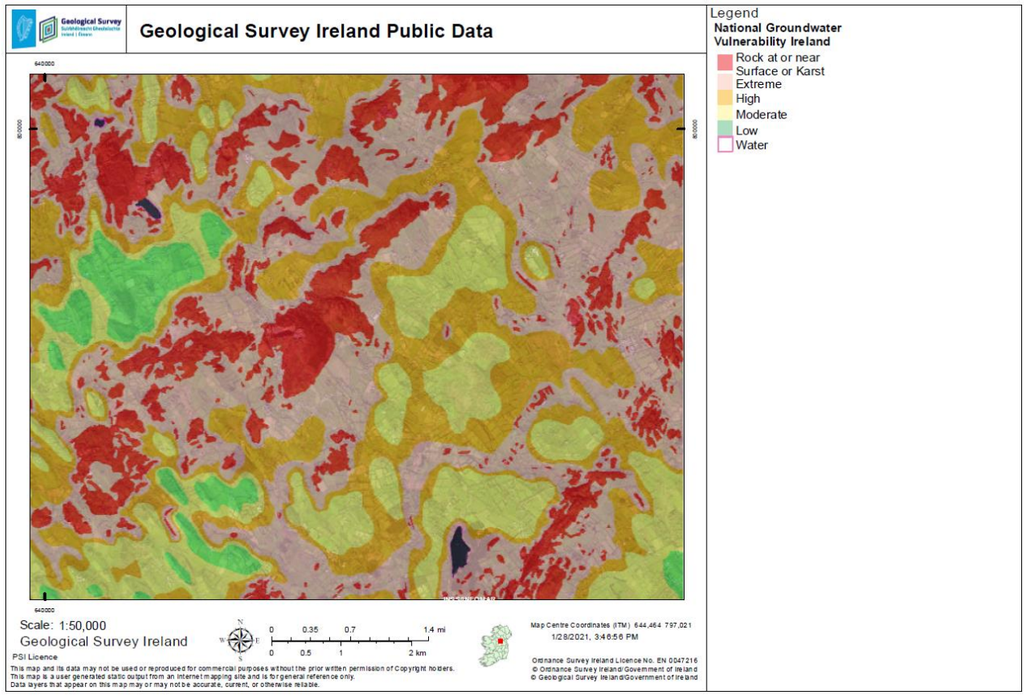
Table 7.4: Groundwater Quality Results for onsite Well

Parameter	Units	Groundwater Regs (2010 as amended 2016) *	On site Well 17.01.18	On site Well 16.01.19	On site Well 16.01.20	On site Well 11.01.21	On site Well 15.01.22	On site Well 15.11.22
Conductivity	µS cm^{-1}	800 — 1875	330	300	295	285	298	295
pH	pH Units	6.5 - 9.5	8.5	7.2	7.5	8.1	7.6	7.8
BOD	mg/l	-	< 1	1.1	1.5	0.95	1.2	1.3
Suspended solids	mg/l	-	< 10	2.2	1.5	3.2	2.8	2.5
Hardness ($CaCO_3$)	mg/l	-	159	145	155	148	149	151
Ammonia	mg/l N	0.175	< 0.03	<0.02	<0.021	<0.01	<0.01	<0.01
Nitrate	mg/l N	8.47	< 0.05	< 0.09	< 0.010	< 0.09	<0.09	<0.09
Nitrite	mg/l N	11.4	< 0.006	< 0.002	< 0.005	< 0.04	<0.006	<0.006
Orthophosphate	mg/l P		<0.03	<0.04	<0.04	<0.05	<0.04	<0.04
Sulphate	mg/l	187.5	18.6	21	24	23	19.6	20.2
Chloride	mg/l Cl	187.5	12.8	10.5	11.8	13.7	10.9	10.9
Arsenic	µg/l As	7.5	4.5	4.3	3.9	3.8	4.0	4.1
Cadmium	µg/l Ca	3.75	<0.03	<0.03	<0.01	<0.02	<0.03	<0.03
Chromium	µg/l Cr	37.5	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Copper	µg/l Cu		<3	2.8	2.7	1.5	2.2	2.6
Iron	µg/l Fe	200	< 4.7	3.5	2.6	4	3.5	2.8
Lead	µg/l Pb	18.75	<0.4	0.2	0.35	0.38	0.32	0.38
Magnesium	mg/l Mg	50	21.8	19	16	14	18	18
Manganese	µg/l Mn	50	5.1	4.3	2.9	3.8	3.9	3.5
Mercury	µg/l Hg	0.75	< 0.5	< 0.5	< 0.5	< 0.5	<0.5	<0.5
Nickel	µg/l Ni	15	1.1	1.0	0.95	2	1.3	1.0
Selenium	µg/l Se	-	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2
Sodium	mg/l Se	150	9.9	8.5	6.3	8.4	8.2	7.8
Zinc	µg/l Zn	-	< 1.5	< 1.5	< 1.5	< 1.5	<1.5	<1.5
EPH	µg/l	-	All < 10	All < 10	All < 10	All < 10	All < 10	All < 10
GRO	µg/l	0.075 µg/l	All < 10	All < 10	All < 10	All < 10	All < 10	All < 10
Total coliforms	mpn/100ml	0	9.7	2.1	2.3	3.1	3.2	2.8
Faecal coliforms	mpn/100ml	0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

7.3.11 Groundwater Vulnerability

The vulnerability rating (www.gsi.ie) of the aquifer underlying the proposed site area is "Extreme (X)". This is consistent with the subsoil mapping where subsoils were mapped to be absent in this area of the site. This would have been the case prior to the existence of the quarry as subsoil cover away from disturbed areas is relatively thin or even absent.

Figure 7.10 Groundwater Vulnerability Map



7.3.12 Private Well Supplies

It is understood that local dwellings in the vicinity of the site are connected to a combination of local group water scheme and private wells.

There is no evidence scientific or otherwise that damage has occurred to the bedrock aquifer or domestic wells in the area as previously speculated by an appellant to John Nulty Ltd. A survey of residents in close proximity (see fig 7.12) to the Quarry site revealed that domestic wells, buildings, and structures have not been affected in any way from activities at the quarry. This was verified by signed letters from the neighbours as part of the previous application. Domestic wells in use for over 40 years directly adjacent to the quarry continue to provide water supplies for locals without issue.

Based on historical maps of the area there are no natural springs on or in the vicinity of the site. The topography of the area is dominated by drumlins which also confirms that wells in the area are drawn from the perch water table trapped within the glacial deposits. It is therefore not feasible that faut lines located at the quarry, with the potential to infiltrate surface water could have any connection with local potable wells. Access to the water in the bedrock aquifer can only be achieved by drilling deep bore holes.

Figure 7.11 Historical OSI Map (Site Located with pin)

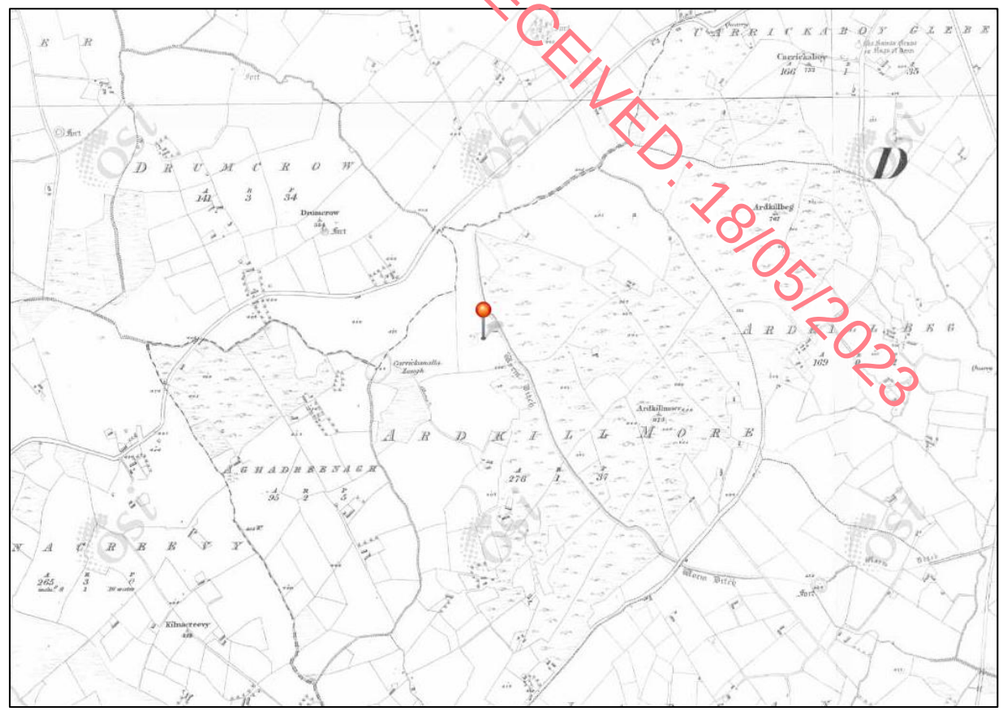


Table 7.4 Dwellings and Distance to the Quarry

House No.	Resident	Distance From the Quarry	Letter of Support
1	Francie and Galligan Family	305m	Yes
2	Michael Galligan	448m	Yes
3	Brian Galligan	350m	Yes
4	Joseph & Kathleen Kermath	310m	Yes
5	Kathleen Reilly	323m	Yes
6	Thomas Boylan	356m	Yes
7	Breffni Air	366m	Yes
8	Pickens	469m	Yes
9	Michael Highland	521m	Yes
10	Tully Family	877m	Yes
11	Marie & Gerard Smith	623m	Yes

As part of the scoping process for the EIAR the residents in the above table were consulted in relation to this planning application for continued extraction. All residents have no hesitation in supporting the continued operation of the quarry at this location.

Figure 7.12 Location map of local residents in support of the Quarry

7.4 Surface Water Management Proposals

The surface water management proposed for the site is as follows:

1. All rainwater falling on the extraction floor of the quarry will be directed to a quarry sump located on the floor of the quarry(application site).

2. Rainwater will then be pumped to a 20m³ (20,000 litre) holding tank from the quarry sump automatically by a high-level float switch.

3. A concrete bunded area for refuelling of vehicles will be located in the southern corner of the application site.

4. Water from the bunded area will also be directed to the holding tank, after a Class 1 oil water separator.

5. Water will then flow by gravity to the Settlement Ponds passing through a 100mm pipe at a controlled rate set by the Hydro Valve.

6. Water will first enter the inlet chamber before flowing into one of the primary settlement sections.

7. The pond has been designed to facilitate maintenance and silt removal. Water will enter the primary settlement area via a diffuser pipe inlet. The pond consists of two primary settlement compartments, followed by a series of interconnected settlement compartments which can be used all together or separately for cleaning and seasonal variations.

8. The settlement pond will have a freeboard of 0.5m. The depth of the pond will be 1m. This will allow sufficient retention time for the solids to settle out of the water.

9. The proposed settlement pond will be divided into interconnecting chambers. The 2 primary settlement compartments will be 30m x 20m x 1m deep(600m³) in size where initial settlement will take place. The water will then flow through consecutive chambers of 30m x 10m x 1m each (3000m³). This will provide for a maximum retention volume in the settlement pond of 3600m³

10. The pond has been designed allowing for a climate change factor of 20%.

11. The settlement pond will be lined with an impermeable material.

12. The estimated maximum discharge per day from the proposed extraction area is (24.204 l/s) equivalent to 2052m³ leaving the pond. In conjunction with QY7 this will comply with a maximum of 4000m³ as per the existing discharge licence.

13. The existing discharge licence has allowed for QY7, and Quarry approved under 05/1081. The maximum flow will not exceed 4000m³ per day as per the discharge licence SS/W004/18.

14. The volume of water being discharged will be recorded on a daily basis by installing a flow meter at the point of discharge.

15. The settlement pond will be cleaned and maintained on a regular basis to ensure that they continue to operate efficiently. (Every 3 – 6 months)

16. Surface water sampling will be undertaken as per the existing discharge licence limits.

17. All flow rate calculations are included in Appendix of this chapter.

Figure 7.13 Showing Sump, Holding Tank and Concrete bunded refuelling area.

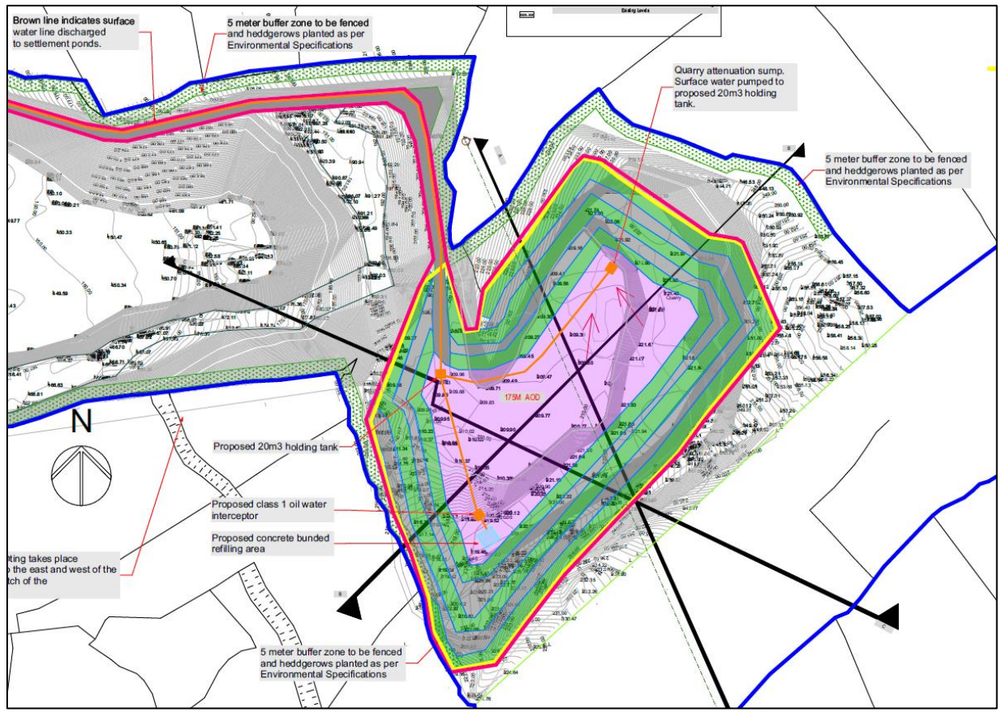
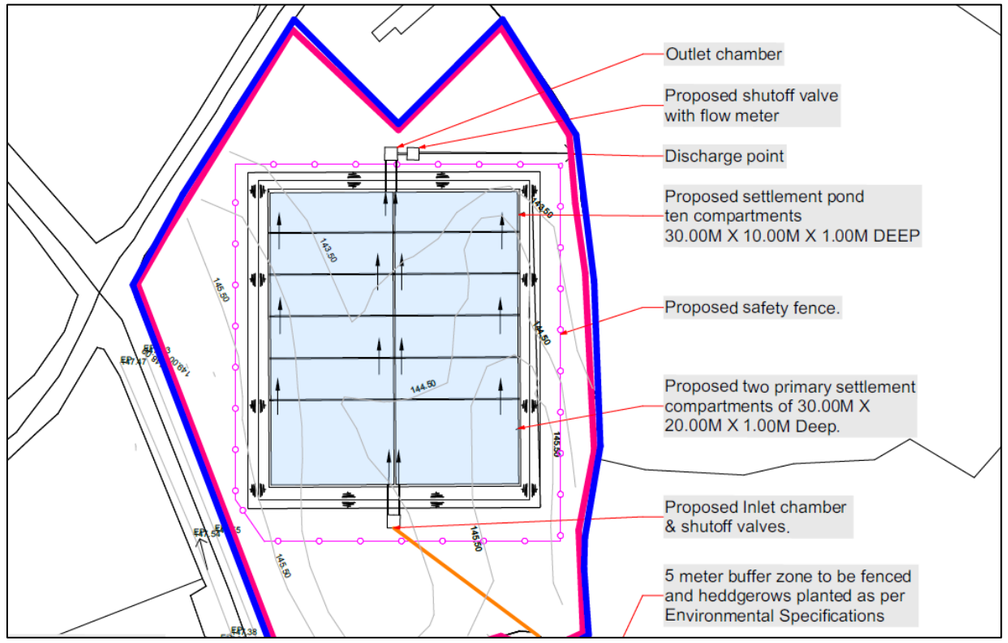


Figure 7.14 Showing the Settlement Pond (Plan view).



7.4.1 Maintenance of Surface water Infrastructure/mitigation

- No untreated water will discharge directly to the watercourse. All such water will pass through the settlement pond followed by discharge to the nearby watercourse.
- A sampling and analysis programme of the discharge from the settlement pond prior to discharge to the watercourse will be in place.
- John Nulty Ltd. will inform the Cavan County Council of any exceedances.
- A logbook will be maintained, noting all transactions associated with the proposed oil/water separator, settlement pond and other details as required.
- Weekly visual examination of the oil/water separator, settlement pond and the receiving watercourse will be carried out. All inspection findings will be recorded in the logbook.
- The competent person appointed on site to be responsible for the daily maintenance and orderly running of the oil/water separator and settlement pond including desludging as required is Gareth Nulty.
- Routine servicing and maintenance of the oil/water separator and settlement ponds will be carried out. A record of all service and maintenance will be maintained in the logbook. This will include the frequency of the work and the name of the person and or company carrying out the work.
- John Nulty Ltd. will provide and maintain a sampling location prior to discharge to the watercourse and direct access to the sampling location will be available at all reasonable times to personnel authorised by Cavan County Council.
- All sludges generated at the oil/water separator and settlement pond will be disposed of taking cognisance of the relevant Waste Management Regulations. A record of all sludges removed from the oil/water separator and silt in the settlement pond will be kept in the logbook noting the date, volumes removed and name of waste contractor involved.

7.5 Impacts and Mitigation Measures

Overview of the Impact Assessment Process

The conventional source-pathway-receptor model for groundwater / surface water protection was applied to assess impacts on groundwater and surface water specifically on downstream sensitive ecological receptors and local groundwater supplies. In the case of the subject site the primary potential hazards are suspended solids, leaching and spillages, and accidental discharges of potential pollutants to the local surface waters and groundwater causing a deterioration in water quality. Possible sources of potential pollutants are confined to plant and machinery.

The pathway in terms of groundwater flow is via the underlying aquifer which is classified as Pl - Poor - Bedrock which is Generally Unproductive except for Local Zones. The potential pathway for surface water is via potential surface water runoff (if any) that might ultimately enter local streams. Due to the contained nature of the site, bedrock permeability, proposed new settlement pond, new concrete bunded area and all associated mitigation measures, however this is not expected to arise.

7.5.1 Construction Phase – Likely and Significant Effects

The effects of the proposed development of the settlement pond, concrete bunded area and mitigation measures that will be put in place to remediate them are presented below.

Pre-Development

- Prior to the commencement of any site works, the applicant and the contactors must be made aware of the overall sensitivity of this site. They must be made familiar with the overall content of this NIS and they must be made aware of the mitigation measures contained in this NIS and accompanying EIAR.
- Site preparation and construction should be confined to the development site only and should adhere to the particulars laid out in the plan for submissions, and all the mitigation measures outlined in this NIS and the accompanying EIAR.
- Work areas must be kept to the minimum area required to carry out the proposed works and the area must be clearly marked out in advance of the proposed works.

Effects & Mitigation Measures

1. **Downstream Surface Water Quality Effects in the field drain and Ballinagh Stream from Suspended Sediments during Soil Stripping /Removal**

There will be a requirement to strip and store soil/subsoil from the proposed settlement pond area. Soil removal will be an intermittent operation but will be completed in the early stages of the work, This material will be retained and used during restoration activities such as vegetating the upper benches of the quarry.

Pathways - Runoff, quarry discharge and local drainage routes.
Receptors – Downstream surface waters (field drain and Ballinagh Stream)
Pre-mitigation effects – Negative, reversible, slight, indirect, likely, temporary effect on surface water quality within the field drain and Ballinagh Stream.

Mitigation Measures:

- Prior to the commencement of soil excavation to facilitate the new settlement pond, silt fencing will be placed down-slope of the proposed area; These will be embedded into the local soils to ensure all site water is captured and filtered;
- Daily monitoring of the soil stripping/landscaping earthworks will be completed by a suitably qualified person.
- All necessary preventative measures will be implemented to ensure no entrained sediment, or deleterious matter will enter the downstream receiving waters;
- Soil stripping and landscaping works will be scheduled for periods of low rainfall (summer months) to reduce run-off and potential siltation;
- The Construction Industry Research and Information Association (CIRIA) provide guidance on the control and management of water pollution from construction sites (Control of Water Pollution from Construction Sites, guidance for consultants and contractors, CIRIA, 2001), which provides information on these issues. This will ensure that surface water arising during the course of soil stripping and landscaping activities will contain minimum sediment

Residual Effect - All construction drainage/runoff water will be treated to a high standard as per the ongoing quarry water management and discharge license requirements; therefore the residual effects will be -imperceptible, indirect, reversible, unlikely, temporary effect on surface water quality within the downstream field drain and Ballinagh Stream.

7.5.2 Extractive / Operational Phase Effects

The likely and significant effects of the proposed development and mitigation measures that will be put in place during the extractive/operational phase are shown below.

Effects & Mitigation Measures

1. **Increased Groundwater Vulnerability & Potential for Groundwater Contamination**

The proposed mitigation will not result in an increase of the quarry size from that previously approved. It will involve the extraction of material granted within existing quarry envelope planning (Ref No.051801)

This will not increase groundwater vulnerability and potential for groundwater contamination.

Pathways - Recharge to groundwater and groundwater flow within and from the bedrock aquifer.
Receptors – Groundwater (Cavan GWB).
Pre-mitigation effects – Indirect, negative, moderate, long term, likely effect on the underlying aquifer within the Cavan GWB.

Mitigation Measures:

The main mitigation with respect increased groundwater vulnerability during the extraction phase will be employment of ongoing best practice measures with respect to oil usage and refueling (refer to Section 3 below). Post extraction phase a landscape and restoration plan will be implemented.

This will involve previously stripped soil being placed on the upper quarry benches to establish grassland which will provide a level of protection to groundwater.

2. **Surface water Quality Effects to the field drain and Ballinagh Stream from Surface water Discharges.**

The surface water run-off component generated from the proposed development will have the potential to contain elevated levels of suspended solids.

Pathways - Surface water discharge routes and overland flow.
Receptors - Down-gradient field drain and Ballinagh Stream
Pre-mitigation effect - Indirect, negative, slight, long term, likely water quality effect on down-gradient field drains and Ballinagh Stream.

Discharge water quality data show no contamination or no exceedances above the discharge license ELV.

In 2020, 2021 & 2022, there was no exceedances of any of the monitoring parameters as specified in the discharge license.

Mitigation Measures:

It is proposed to construct a new impermeable lined settlement pond and install attenuation sump in the application extraction area.

- Maximum discharge volume from the application extraction area site is 24.204l/s. Additional water settlement will be provided by the proposed settlement pond and attenuation sump.
- The discharge water quality is monitored on an annual basis, and this is to continue at the quarry. Discharge volumes will be continuously monitored at the discharge point location.

Residual Effect - the residual effects will be -imperceptible, indirect, reversible, unlikely, temporary effect on surface water quality within the downstream field drain and Ballinagh Stream.

3. Leakages and Spillages from Oil / diesel Refueling

On-site refuelling and leaks pose risks to the groundwater and surface water.

Pathways – Groundwater Recharge, Groundwater Flow paths and quarry pumping. **Receptors** – Groundwater (Cavan GWB) & downstream surface water (field drain and Ballinagh Stream)
Pre-mitigation Effects – Indirect, negative, slight, long term, likely effect on groundwater (Cavan GWB) and surface water (field drain and Ballinagh Stream).

Mitigation Measures:

- Sources of hydrocarbons are and will be located within safely bunded areas that safely contain all spillages and prevent the migration of contaminants into the underlying bedrock aquifer.
- Refueling of quarry plant will only take place in designated bunded refueling area which drains to an oil water separator.

All discharge from the development area will pass through the proposed impermeable lined settlement pond, to be being released into the receiving surface water drain.

Residual Effect – The use and storage of hydrocarbons and small volumes of chemicals is a standard risk associated with all quarry sites. Proven and effective measures to mitigate the risk of spills and leaks have been proposed above and will break the pathway between the potential source and the receptor. The residual effects will be – Negative, indirect, imperceptible, medium term, unlikely impact on groundwater (Cavan GWB) and surface water quality in the field drain and Ballinagh Stream.

4. Discharge of Treated water to Groundwater

In unsuitable site conditions discharge of wastewater effluent to groundwater has the potential to impact on groundwater and surface water quality.

Pathway – Groundwater flow paths and Surface water drainage routes.
Receptor – Groundwater (Cavan GWB) & downstream surface water (field drain and Ballinagh Stream)
Pre-mitigation effect – Indirect, negative, slight, long term, likely on groundwater (Cavan GWB) and surface water in the field drain and Ballinagh Stream.

Mitigation Measures

- The domestic wastewater from the site will continue to be discharged via the existing on site-septic tank and percolation area which complies with the EPA guidelines 2021.

Residual Impact –
Proven and effective measures for the septic tank and percolation area will break the pathway between the potential source and the receptor. The residual effects will be – Negative, indirect, imperceptible, medium term, likely effect on groundwater (Cavan GWB) and surface water quality in the field drain and Ballinagh Stream.

5. Effect on Local Groundwater Levels

The creation of a deeper quarry void down to 175m OD has the potential to impact on local groundwater levels in the vicinity of the quarry.

Pathway – Groundwater flow paths & gradients
Receptor – Local groundwater regime (Cavan GWB)
Pre-mitigation Effect – Direct, negative, slight, permanent, likely effect on groundwater levels within the Cavan GWB.

- Due to the overall low permeability of the bedrock, groundwater inflows into existing extraction area are negligible.
- Groundwater level monitoring undertaken at the groundwater abstraction well indicates groundwater level of 148.55m OD. The proposed level of the extraction area is 175 – 237 m OD.
- The proposed level of the application extraction area under this planning application is approximately 26.45m above the quarry groundwater level.
- The proposed settlement pond requires an impermeable liner to adequately stop contact between the water in the settlement pond and groundwater.
- Trial holes show no bedrock or groundwater.

Therefore, the potential to effect on the wider hydrological regime outside of the quarry site from the proposed continuation and extraction is negligible.

Mitigation Measures:

- It is proposed to construct a new impermeable lined settlement pond and concrete bunded area followed by an oil water interceptor for the application area.
- Due to the low permeability of the proposed bedrock for extraction and localised groundwater catchment to the quarry, further significant effects as a result of the proposed development are not expected to occur.

Residual Effect - Direct, negative, slight, permanent, Likely effect on groundwater levels within the Cavan GWB.

6. Effects on Local Well Supplies (Quality and Quantity)

The creation of a deeper quarry void and quarry operations have the potential to effect on local well supplies in terms of quantity (i.e. impacts on groundwater levels) and quality (i.e. hydrochemistry).

Pathway – Groundwater flow paths & gradients.
Receptor – Local well supplies.
Pre-mitigation effect – Indirect, negative, slight, long term, likely effect on local well supplies in terms of quantity (i.e. impacts on groundwater levels) and quality (i.e. hydrochemistry).

Mitigation Measures:

- Due to the low permeability of the rock for continued extraction along with the localised groundwater catchment to the quarry, further significant effects on groundwater levels or quality are not anticipated and therefore significant effects on local well supplies is not anticipated.

- Groundwater level monitoring undertaken at the groundwater abstraction well indicates groundwater level of 148.55m OD. The proposed level of the extraction area is 175 – 237 m OD.
- The proposed level of the application extraction area under this planning application is approximately 26.45m above the quarry groundwater level. This provides an adequate freeboard.

Also, as stated above, sources of hydrocarbons and will be located within safely bunded areas that safely contain all spillages and prevent the migration of contaminants into the underlying bedrock aquifer. Refuelling of quarry plant has and will only take place in designated bunded refuelling areas or by mobile bowser with availability of suitable spill kits.

Residual Effect - Indirect, negative, imperceptible, long term, likely effect on local well supplies in terms of quantity (i.e. impacts on groundwater levels) and quality (i.e. hydrochemistry).

7. Effects on Groundwater and Surface Water WFD Status

The quarry site is located in the Ballinagh_010 river waterbody which is currently assigned at risk status. The local groundwater body is the Cavan GWB which is assigned Good Status and not to be at risk.

Effects on surface water and groundwater quality as a result of the proposed development have the potential to negatively affect the WFD status.

8. Effects on Downstream Designated Sites

Designated sites potentially downstream of the development include Lough Oughter SPA and Lough Oughter and Associated Loughs SAC/pNHA.

Pathway – Surface water flow paths
Receptor – Lough Oughter SPA and Lough Oughter and Associated Loughs SAC/pNHA.
Pre-mitigation Effect – Indirect, negative, imperceptible, long term, likely effect on downstream designated sites.

Discharge water quality data is available for the existing quarry as presented in the above baseline assessment. There were no exceedances with regard the discharge license ELVs in 2020, 2021 & 2022.

Suspended solids, which is the main parameter of concern in relation to surface water discharge, was on average 22.6mg/L over that period 2020, 2021 & 2022.

- It is proposed to construct a new impermeable lined settlement pond, oil water separator and flow meter for the application area.(As detailed above)
- A review of the discharge license.

The discharge water quality is monitored on an annual basis, and this is to continue at the quarry (based on reviewed discharge licence).

Residual Effect – No effect on downstream designated sites (Lough Oughter SPA and Lough Oughter and Associated Loughs SAC/pNHA).

7.5.3 Significant Effects on the Water Environment

No significant effects on the surface water or groundwater environment as a result of the proposed development will occur. Monitoring of quarry discharge will continue to ensure no significant effects are occurring on downstream waters.

7.5.4 Human Health Effects

Potential health effects arise mainly through the potential for groundwater contamination and impacts on local wells. Hydrocarbons, in the form of fuels and oils, will be used on-site during aggregate extraction.

Best practice controls are in place to ensure any potential sources of contamination on the site are managed appropriately and the volumes present will be small in the context of the scale of the project. The potential imperceptible residual effects associated with groundwater contamination and subsequent health effects are negligible.

7.5.5 Cumulative Impacts

It is proposed to amend the existing discharge license and therefore no additional potential impacts are anticipated on downstream waters in terms of surface water quality or flows. Therefore, the proposed development is not anticipated to contribute to hydrological cumulative impacts in the field drain and Ballinagh Stream and then the River Erne.

7.6 'Do Nothing' Scenario

If the proposed development does not go ahead, there would be no potential impacts on the hydrology and hydrogeology underlying the subject site. This would have no impact on the underlying substrate, and there would be no change to the environmental profile of the site in relating to Hydrology, Hydrogeology and Drainage.

7.7 Worst Case Scenario

The worst-case scenario for the environmental profile of Hydrology, Hydrogeology and Drainage arising from the development occurs during the operation phase. Contamination of the surface water could be activated by high level of suspended solids and oil and fuel spillages during operation activities. With the mitigation measures proposed the magnitude of impact resulting from the ultimate development is considered to be Negligible.

7.8 Difficulties in Compiling Information

There were no difficulties encountered in compiling this section of the EIAR.

7.9 References

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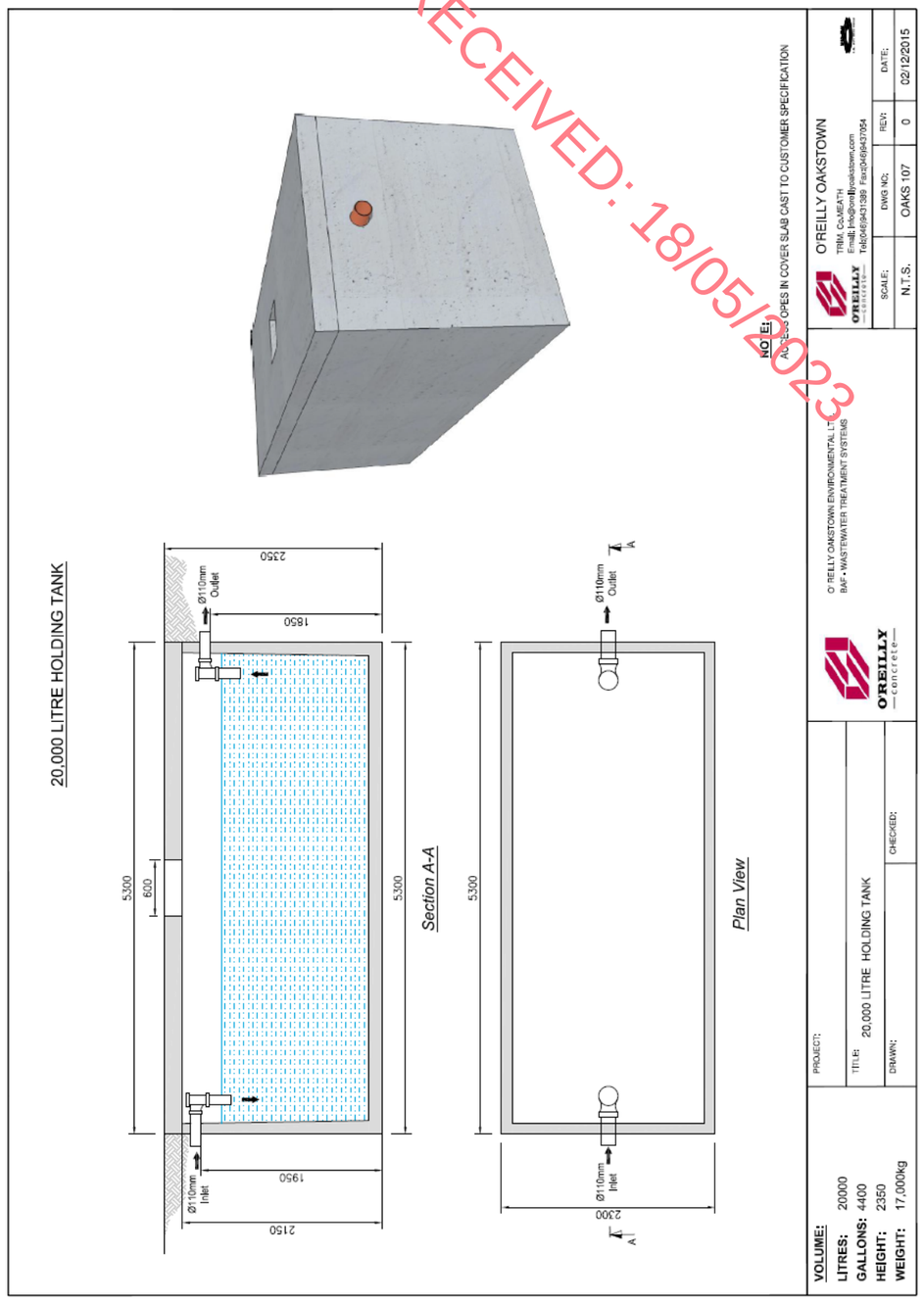
APPENDIX 7.A – DESIGN OF 20m³ O REILLY OAKSTOWN



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APPENDIX 7.B – CALCULATIONS FOR NEW SETTLEMENT PONDS

Calculation of Settling Velocity for Particles (Stokes Law)

Settlement is possible when the impelling force of a particle is equal to the drag force. The Impelling Force is calculated thus= F1 = (Vs - Vw) Vol
Where:
Vs= psg and Vw = Pwg
Ps = density of the particle, which is assumed as 2.65 g/cm3 (the density of Calcite, the primary mineral in limestone is 2.71, and assuming a relatively low porosity, then a figure of 2.65 is a good average density of the aggregate generally used in the production of concrete)
Pw = density of fluid, which is assumed as water at 1.00 g/cm3
g = acceleration due to gravity = 9.81 m/s2
Vol = Volume of particles (assumed spherical)= 4/3 πr3 or πd3/6

The Drag Force is calculated thus = Fd = Cd As ps (Vs2/2)

Cd = Drag Co-efficient = 24v/Vsd = 0.4 for spheres
v = Kinematic Viscosity = μ/p
As= Sectional area of a sphere= πr2 or πd2/6
Vs = Settling velocity 'Stokes'

By equating the impelling force and the drag force (such that particles will start to settle when these forces are equal) then:

F1 = Fd = (Vs - Vw) Vol = Cd As ps (Vs2/2)

The above equation can be solved for Vs (the settling velocity of a spherical particle of density 2.65) thus:
(Vs - Vw) Vol = Cd As Ps (Vs2/2)
(psg - pwg) πd3/6 = (24 v/Vs d) (πd2/4) pw(Vs2/2)
g(ps - pw) πd3/6 = (24 v/Vs d) (πd2/4) pw(Vs2/2)
g πd3/6 (ps - pw) = 24 v π d2 pw Vs2
8Vsd

Vs = g π d3/6 (ps - pw)
18v

g π d3/6 (ps - pw) = v π d pw Vs

Vs = (ps - pw) d2
18 v π d pw

Vs = (ps - pw) d2
18 v pw

Vs = Uw
pw

Vs = g(ps - pw) d2
18v uw

Then to calculate the settlement velocity of particles we may use the following equation:
Vs = g/18 uw(ps - pw) d2

As previously established:
g = Acceleration due to gravity is 9.81 m/s2
ps = density of the particle = 2.65 g/cm3 or 2.65 x 103 kg/m3
pw = density of fluid = 1.00 g/cm3 or 1 x 103 kg/m3

μw = dynamic viscosity of water = 1.002 x 10-3 kg/ms @ 20°C (or 1.519 x 10-3 @ 5°C and 0.797 x 10-3@ 30°C)
d = particle diameter in m

Calculations

Stokes Law applies for particles where the Reynolds Number is less than 1, in all the below cases Stokes Law is applicable, since the Reynolds Number is less than 1. The settlement velocity of particles 0.02mm, 0.025 and 0.03mm in diameter (assumed spherical) in water can be calculated for variable particle densities and variable water temperatures using the above equation. These are tabulated in Table 1.

Table 1: Settlement Velocities for Particles at Various Temperatures

Particle Size		0.02mm		0.025mm		0.03mm	
Water Temperature	Particle Density						
		Vs	SOR	Vs	SOR	Vs	SOR
C	g/cm3	m/s	m3/m2/day	m/s	m3/m2/day	m/s	m3/m2/day
5	2	1.43E-04	12.4	2.24E-04	19.4	3.23E-04	27.9
5	2.3	1.86E-04	16.1	2.91E-04	25.2	4.20E-04	36.2
5	2.65	2.37E-04	20.4	3.70E-04	31.9	5.32E-04	46
10	2	1.67E-04	14.4	2.G0E-04	22.5	3.75E-04	32.4
10	2.3	2.17E-04	18.7	3.39E-04	29.3	4.88E-04	42.1
10	2.65	2.75E-04	23.8	4.30E-04	37.1	6.19E-04	53.5
20	2	2.18E-04	18.8	3.40E-04	29.4	4.90E-04	42.3
20	2.3	2.83E-04	24.4	4.42E-04	38.2	6.36E-04	55
20	2.65	3.59E-04	31	5.61E-04	48.5	8.08E-04	69.8

In the worst-case scenario to ensure all particles of 0.02 mm and above are settled under cold conditions the best settlement velocity will be that which allows 0.02 mm particles of density 2 x 10-3 kg/m3 in a water temperature of 5°C to settle out of suspension. A settlement velocity of 1.43 x 10-4 m/s will achieve this. This represents a Surface after Overflow Rate (SOR) of 12.4m3/m2/day.
Therefore, the maximum allowable flow rate through the settlement pond is 12.4m3/m2/day.

Rainfall and Evapotranspiration calculations:

1. Catchment Area: 19,600m^2 (continuation of the extraction area)
2. Standard Annual Rainfall at Quarry (SAAR): 1026.84mm/yr
3. Mean Annual Potential Evaporation: 509.46mm/yr
4. Actual Evaporation = 698.1mm/yr
5. Annual Average Rainfall is = 1026.84 - 698.1 = 328.74mm/yr
6. Annual Average Daily Rainfall is:

$$= \frac{19{,}600 \times 0.32874}{365}$$

$$= 17.65288767 \text{ m}^3/\text{day}$$

$$= 17.653\text{m}^3/\text{day (0.204 lt/sec)}$$

Rainfall and Evapotranspiration calculations:

1. Catchment Area: 19,600m^2 (continuation of the extraction area)
2. Standard Annual Rainfall at Quarry (SAAR): 1026.84mm/yr
3. Mean Annual Potential Evaporation: 509.46mm/yr
4. Actual Evaporation = 698.1mm/yr
5. Annual Average Rainfall is = 1026.84 - 698.1 = 328.74mm/yr
6. Annual Average Daily Rainfall is:

$$= \frac{19{,}600 \times 0.32874}{365}$$

$$= 17.65288767 \text{ m}^3/\text{day}$$

$$= 17.653\text{m}^3/\text{day (0.204 lt/sec)}$$

Maximum Greenfield discharge

The following calculations are derived from the Dublin Corporation Storm Water Management Policy for developers.

Area of site = 19,600 = 1.96Hectures

QBAR = 0.00108 x (AREA)0.89 x (SAAR)1.17 x (SOIL)2.17

Where QBAR = permissible Outflow (m^3/s)

Area = (Catchment Area (km^2)

SAAR = Standard Annual Average Rainfall (mm) (from Met Eireann)

SOIL = Soil index (Values Range from 0.15 - 0.5)

SAAR and SOIL values are ascertained from the Flood Studies Report (FSR) and Met Eireann Extreme Rainfall Return Periods.

Therefore:

$$\text{QBar} = (0.00108) \times (0.0196)^{0.89} \times (1{,}027)^{1.17} \times (0.5)^{2.17}$$

QBar = 24.201 l/s

Therefore, the maximum allowable greenfield outflow from the quarry development is:

24.204 l/s (2,091.22m^3/day)

Settlement Pond Size

As the maximum discharge from the settlement pond will be designed with a surface area that will allow a retention time of 12.4 m^3/ m^2/day, the area of the settlement pond will be as follows:

Min surface area required = 2,091.226 m^3 per day/12.4 m^3 per m^2 per day

Min Settlement pond surface area to allow settlement of suspended solids= 168.647m^2

It is proposed to construct a two primary chambers & ten compartment settlement pond of approximately 3,000m^2 as part of the application for a discharge licence. This will provide the required settlement.

In this design the flow through the settlement was determined as **12.4m^3/m^2/day**

The area of the proposed settlement pond = 3000m^2

We will use a Maximum Discharge Rate of 24.204 l/s

Flow Control

To ensure that the outlet from the settlement pond is appropriately sized to restrict the outflow to the required volume we refer to the "WAVIN Storm Water Management - Design and Installation Manual"

Hydraulic Equation Q = Cd x A0√ (2gH)

Where:	Value:
Q = Flowrate	24.204 l/s (0.024204m3/sec)
C_d = Coefficient of Discharge	0.62
A_o= Orifice Area	πD2/4
G = Acceleration due to Gravity	9.81 m/S^{-1}
H = Head	1.0m

Therefore

$$A_o = Q/(Cd.\sqrt{(2gH)})$$

$$A_o = (0.024204) / (0.62 \times \sqrt{(2(9.81 \times 1.0\text{m}))})$$

$$A_o = 0.00881\text{m}^2$$

$$Ao = \pi D^2/4$$

$$D = \sqrt{(4 \times Ao/\pi)}$$

$$D = \sqrt{(4 \times 0.00881/ 3.14)}$$

D = 0.105m

= 105mm pipe

An Orifice with a diameter of >105mm will be fitted to the outflow pipe from the settlement pond.

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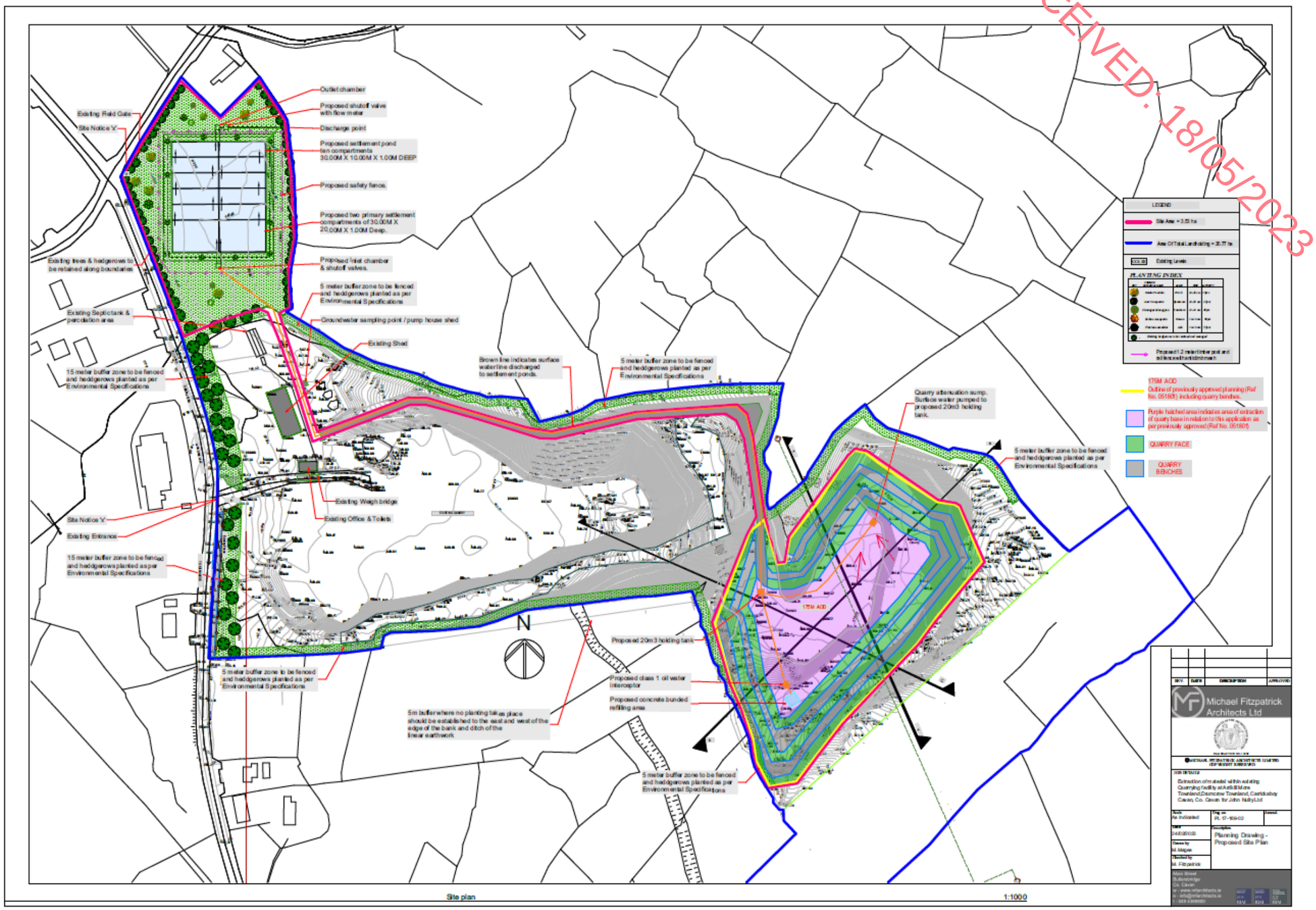
APPENDIX 7.B – PROPOSED SITE LAYOUT



CHAPTER 8

AIR QUALITY

CHAPTER EIGHT | AIR QUALITY

Traynor Environmental Ltd.

FIGURES

TABLES

8 AIR QUALITY

8.1 Introduction

This chapter of the EIAR completed by Traynor Environmental Ltd. provides supporting information to accompany a planning application for a 20 year permission for quarrying and extraction of rock that will include drilling, blasting, crushing and screening along with alterations to boundaries & all associated site works on lands at Ardkill More Townland and Drumcrow Townland, Carrickaboy, County Cavan.

Works will also include for the provision of new settlement ponds and installation of associated site drainage infrastructure and surface water pump to proposed new settlement ponds along with provision of discharge outlet via a Klargester Interceptor.

Ancillary site works to include for landscape works, planting restoration of the quarry perimeter and reprofiling of overburden as required to facilitate development of the quarry and restoration of the associated site area.

8.2 Background

John Nulty Ltd intends to complete extraction of material granted within existing quarry envelope as per previously approved planning (Ref No.051801) alterations to boundaries & all associated site works at Ardkill More and Drumcrow, Carrickaboy, Cavan, Co.Cavan. The Site to which this planning application relates, measures ca 3.53hectares (ha) in total.

Figure 8.1 – Site Location Map (Site Pinned)

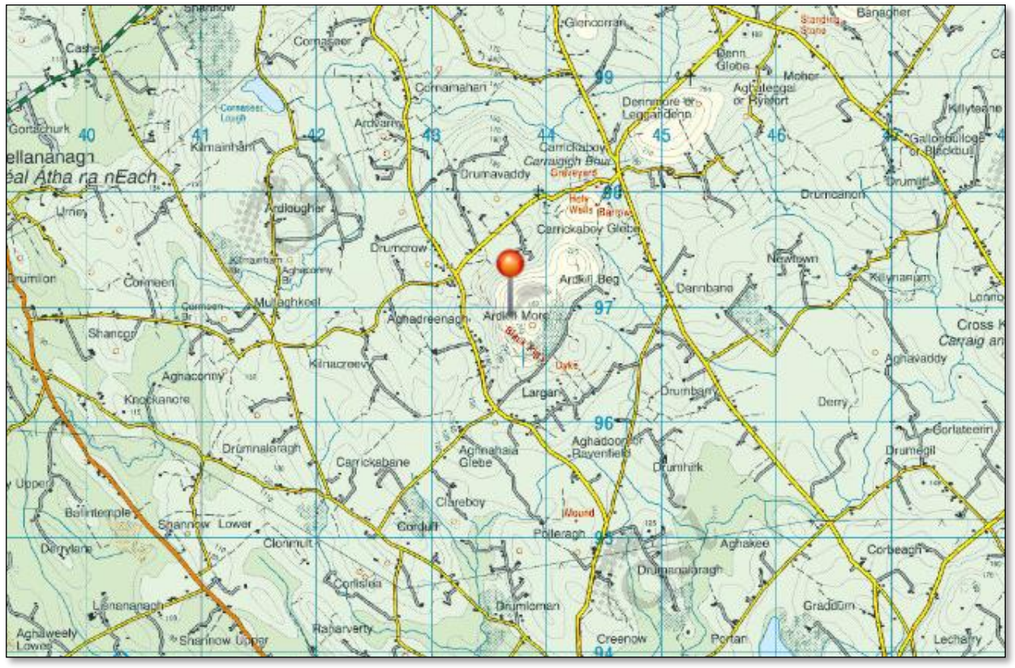


Figure 8.2 – Site Location Map (Site Outlined in Red)

Figure 8.3 - Site Location Map (Area outlined in Green approved previously under QY7)

8.3 Methodology

This assessment of the air quality & dust impact has been undertaken as follows:

- Reference to historical quarterly dust deposition surveys at boundary locations, to establish the current dust deposition rates in the area.
- A comparison of the measured dust deposition rates at the boundary locations against relevant guidelines.
- An assessment of the air quality & dust impact at the surrounding residential properties from the existing and proposed quarrying activities at Nulty's Quarry site.

The Quarries and Ancillary Activities, Guidelines for Planning Authorities states that following with regard to the control of dust.

"There are currently no Irish statutory standards or EPA guidelines relating specifically to dust deposition thresholds for inert mineral/aggregate dust. (See, however, the Air Quality Standards Regulations 2002 for measurement standards). There are a number of methods to measure dust deposition (such as the Frisbee method) but only the German TA Luft Air Quality Standard relates a specific method (i.e. Bergerhoff) of measuring dust deposition with dust nuisance. On this basis it is recommended that the following TA Luft dust deposition limit value be adopted at site boundaries near quarry developments:

Total dust deposition (soluble and insoluble): 350 milligram per square metre per day (when averaged over a 30-day period).
Best practice dust control measures should be proposed by the applicant."

On the basis of the above, the following limits in table 8.1 apply to the operation of the quarry and will continue to apply during the proposed development.

Table 8.1 - Dust Limit Values

Procedures	Monitoring Frequency	Standard
Dust Emissions	Annually	<350 mg/m2/day, Bergerhoff Method

Four dust monitoring points (D1, D2, D3, and D4) have been established at the Application Site to assess the current baseline conditions (Figure 8.3). The locations are at the site boundaries and will assess any impacts of deposition related activities on the existing site and on the local environs.

8.4 Receiving Environment

8.4.1 Study Area

The application site is located in the townland of Ardkill More and Drumcrow, County Cavan approximately 7km south west of the development boundaries of Cavan town on the Cavan to Kilnaleck Road. The land is an existing quarry. The quarry operations comprise extraction of limestone using blasting techniques; processing (crushing and screening) of the fragmented rock to produce aggregates for road construction and site development works. Dwellings within the vicinity of the site generally comprise one-off housing along the local road network.

8.4.2 Baseline Study Methodology

The application site and surrounding area fall into Air Quality Zone D, categorised as rural Ireland. The air quality in each zone is assessed and classified with respect to upper and lower assessment thresholds based on measurements over the previous five years. Upper and lower assessment thresholds are prescribed in legislation for each pollutant. The number of monitoring locations required is dependent on population size and whether ambient air quality concentrations exceed the upper assessment threshold, are between the upper and lower assessment thresholds, or are below the lower assessment threshold.

The closest air quality monitoring locations to the proposed application site, and in a similar Zone D rural area, is located at Kilkitt, Co. Monaghan. As such, it is considered the most appropriate datasets available for assessment of air quality baseline concentrations in the study area around the proposed development site at Ardkill More and Drumcrow, County Cavan.

Dust monitoring was conducted at and around the application site using the 'Bergerhoff method' referred to in the TA Luft Air Quality Standard. The deposition gauge used in the survey was the 'Bergerhoff' dust gauge, which comprises a glass collection bottle and a post with protective basket, set at 1500mm above ground level.

The input of the atmospheric material into the bottle is determined over a planned period measurement (usually one month) by exposing the glass collection bottle to the environment. The total dust collected in the bottle is expressed as deposition of insoluble particulate matter (mg/m2/day) arising from fugitive actions in the area surrounding the application site.

8.4.3 Sources of Information

A desk study was carried out to examine all relevant information relating to air quality conditions around the application site. Met Eireann, the National Meteorological Service, was consulted in relation to the climate / weather data in respect of the study area (http://www.met.ie/climate-ireland/1981-2010/dublin.html). The EPA website was examined to note information on baseline air monitoring data around the application site (http://www.epa.ie/air/quality/data/).

Information published on its website by the National Parks and Wildlife Service (NPWS) (http://webgis.npws.ie/npwsviewer/), (part of the Department of the Environment, Community and Local Government, DoECLG), in respect of designated ecological sites, protected habitats and species was also reviewed, together with Ordnance Survey maps and aerial photography (http://map.geohive.ie/mapviewer.html).

8.5 Legislation

8.5.1 Air Quality Standards

The Government's policy on air quality within Ireland is set out in the Air Quality Standards (AQS) Regulations 2011. The CAFE Directive was transposed into Irish legislation by the Air Quality Standards Regulations 2011 (S.I. No. 180 of 2011). It replaces the Air Quality Standards Regulations 2002 (S.I. No. 271 of 2002), the Ozone in Ambient Air Regulations 2004 (S.I. No. 53 of 2004) and the EPA Act 1992 (Ambient Air Quality Assessment and Management) Regulations 1999 (S.I. No. 33 of 1999). The 4th Daughter Directive was transposed by the Arsenic, Cadmium, Mercury, Nickel, and Polycyclic Aromatic Hydrocarbons in Ambient Air Regulations 2009 (S.I.no. 58 of 2009).

The AQS sets out a framework for reducing hazards to health from air pollution and ensuring that international commitments are met in Ireland.

The AQS sets standards and objectives for ten priority pollutants. Standards establish concentrations of pollutants in the atmosphere which can broadly be taken to provide a certain level of environmental quality. Objectives are policy targets, often expressed as maximum concentrations, not to be exceeded (either without exception, or with a limited number of exceedances within a specified timescale).

Under the AQS, the following pollutants are monitored and controlled:

- Nitrogen Oxides.
- Sulphur Dioxide.
- Carbon Monoxide.
- Ozone.
- Particulate Matter (Pm10, Pm2.5 And Black Smoke).
- Benzene And Volatile Organic Compounds.
- Heavy Metals And
- Polycyclic Aromatic Hydrocarbons

These pollutants are monitored at 32 stations across the country and together they form the national ambient air quality network. A summary of relevant air quality limit values in relation to human health are presented in Table 8.2. Air quality limit values in relation to vegetation protection are presented separately in Table 8.3.

The air quality monitoring network is coordinated and managed by the EPA, as the National Reference Laboratory for air quality. The results of the monitoring are compared to limit values set out in EU and national legislation on ambient air quality. As was recommended in the 2011 Review of the Environmental Protection Agency, map-based assessments are prepared and published by the EPA.

Table 8.2: Relevant Air Quality Limit Values for Protection of Human Health

Pollutant	Regulation	Limit Criteria	Tolerance	Limit Value
Nitrogen Dioxide	2008/50/EC	Hourly limit for the protection of human health not to be exceeded more than 18 times/year. Annual limit for the protection of human health Annual limit for the protection of vegetation	40% until 2003 reducing linearly to 0% by 2010. 40% until 2003 reducing linearly to 0% by 2010. None	200 µg/m³ 40 µg/m³ 400 µg/m³ NO & NO_2
Particulate Matter PM_{10}	2008/50/EC	24-hour limit for protection of human health not to be exceeded more than 35 times/year Annual limit for the protection of human health	50% 20%	50 µg/m³ 40 µg/m³
Particulate Matter $PM_{2.5}$ Stage 1	2008/50/EC	Annual limit for the protection of human health	20% from June 2008. Decreasing linearly to 0% by 2015	25 µg/m³
Particulate Matter $PM_{2.5}$ Stage 2	2008/50/EC	Annual limit for the protection of human health	None	20 µg/m³

Table 8.3: Summary of Air Quality Limit Values: Protection of Vegetation

Pollutant	Regulation	Limit Criteria	Limit Value
Nitrogen Oxide	2008/50/EC	Annual limit for the protection of vegetation	30 µg/m³
Sulphur Dioxide	2008/50/EC	Annual and Winter limit for the protection of ecosystems	20 µg/m³

8.6 Characteristics of the Proposed Development

The proposed development provides for extraction of material i.e., 25,000 tonnes of rock per year over 20 years. However, it is expected that the extraction rates will vary depending on market demand up to a maximum of 50,000 tonnes. The quarry will use the existing established access and traffic routes. The following activities associated with the proposed development are the most likely dust generating sources:

- Movement of full and empty trucks along haul roads.
- Movement of material to dump areas.
- Tipping of materials; and
- Wind erosion at dump areas and exposed soil.

8.7 Climate Change

Ireland's greenhouse gas emissions per person are amongst the highest on the planet and the fourth highest of the EU 28 countries. The reduction in greenhouse gas emissions in Ireland and other parts of the globe, which is primarily due to the global financial crisis, has shown that there is still a strong link between economic growth and emissions (EPA, 2011). The most recent emissions figures compiled show that in Ireland agriculture is the single largest contributor to the overall emissions, at 33.0% of the national total, followed by transport at 19.8 and energy at 19.7%. The remainder is made up by the residential sector at 10.1%, manufacturing and combustion at 7.6%, and industrial processes at 3.3% (DCCAE, 2017). Ireland is a party to both the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol, which together provide an international legal framework for addressing climate change. In December 2015, an ambitious new legally binding, global agreement on climate change was agreed in Paris. The Paris Agreement aims to restrict global temperature rise to well below 2°C above pre-industrial levels, and to pursue efforts to limit the temperature increase to 1.5°C. The EPA's 2020 Vision strategy sets out our vision for Ireland's environment over the coming decade and beyond. The strategy aims to achieve results in a number of critical areas, including climate change, and is set within the framework of sustainable development. The EPA recognises that social, economic, and environmental issues are interconnected, and that good decisions and policy should encompass these three elements in a balanced and harmonious way. The 2020 Vision outlines six environmental goals, reflecting the main challenges identified by the EPA for Ireland as well as key issues at global and EU levels (EPA, 2011).

These goals are:

- Limiting and adapting to climate change.
- Clean air.
- Protected waters.
- Protected soil and biodiversity (native plants and animals).
- Sustainable use of natural resources (water, energy, and materials); and
- Integration and enforcement.

8.8 John Nulty Ltd and Climate Change

John Nulty Ltd acknowledges the challenges that climate change presents to humanity and their business and are committed to developing pragmatic and sustainable solutions. John Nulty Ltd strive for compliance with all relevant legislation, prevention of pollution and continuous improvement in all areas of environmental management in all of their operations and activities. The operations at the quarry have a dedicated Environmental Management System (EMS) to govern day-to-day operations and employ professionals in Environmental & Planning to ensure full compliance.

8.9 Assessment

8.9.1 Dust Monitoring Locations

In order to establish potential impacts from existing quarry activities at the Site in its environs to ensure compliance with the existing permission conditions, four dust monitoring locations were established. Descriptions of the dust monitoring locations are located as per Table 8.4 below.

Table 8.4: Description of Dust Monitoring Locations - Upper Section (planning ref 051801)

Location	Description
D1	Western Boundary of the site.
D2	Northern Boundary of the site.
D3	Southern boundary beside.
D4	Eastern Boundary of the site.

Table 8.5: Description of Dust Monitoring Locations - Lower Section (planning ref 1162) (QY7)

Location	Description
D1	Along the Western Boundary of the site near the road.
D2	On the Southern Boundary of the site. (Upper level)
D3	On the site boundary beside the loading area. (Upper level)
D4	Along the Northern Boundary of the site beside the access road.

Dust deposition surveys were undertaken at and around the application site. The results are presented in Table No.s 8.6 - 8.16. The dust samples were placed for a period of 30 days, +/- 2 days.

8.9.2 Dust Deposition Monitoring

The dust deposition monitoring results are presented in Table 8.6 – 8.16 and Figure 8.3 - 8.4 below.

Figure 8.4 – Dust Deposition Monitoring Location - Upper Section (planning ref 051801)

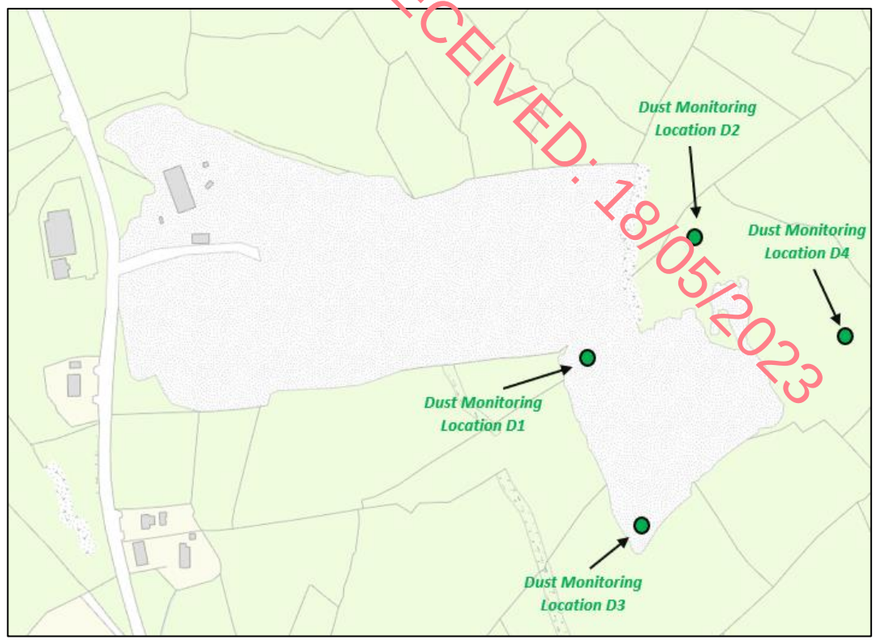


Table 8.6 : Dust Deposition Monitoring - Upper Section (planning ref 051801) - 2017

2017 (02/05/17 to 02/06/17)		
SAMPLING LOCATION	**DUST DEPOSITION RATE mg/m²/day**	**DUST DEPOSITION LIMIT mg/m²/day**
D1	133 mg/m²/day	350
D2	105 mg/m²/day	350
D3	120 mg/m²/day	350
D4	98 mg/m²/day	350

Table 8.7 : Dust Deposition Monitoring - Upper Section (planning ref 051801) - 2018

2018 (04/05/18 to 04/06/18)		
SAMPLING LOCATION	**DUST DEPOSITION RATE mg/m²/day**	**DUST DEPOSITION LIMIT mg/m²/day**
D1	122 mg/m²/day	350
D2	118 mg/m²/day	350
D3	131 mg/m²/day	350
D4	110 mg/m²/day	350

Table 8.8 : Dust Deposition Monitoring - Upper Section (planning ref 051801) - 2019

2019 (01/05/19 to 31/05/19)		
SAMPLING LOCATION	DUST DEPOSITION RATE mg/m²/day	DUST DEPOSITION LIMIT mg/m²/day
D1	179 mg/m²/day	350
D2	153 mg/m²/day	350
D3	184 mg/m²/day	350
D4	201 mg/m²/day	350

Table 8.9 : Dust Deposition Monitoring - Upper Section (planning ref 051801) – 2020 (No Activity in this Area)

2020 (05/05/20 to 05/06/20)		
SAMPLING LOCATION	DUST DEPOSITION RATE mg/m²/day	DUST DEPOSITION LIMIT mg/m²/day
D1	142 mg/m²/day	350
D2	121 mg/m²/day	350
D3	156 mg/m²/day	350
D4	191 mg/m²/day	350

Table 8.10 : Dust Deposition Monitoring - Upper Section (planning ref 051801) – 2021 (No Activity in this Area)

2021 (05/05/21 to 05/06/21)		
SAMPLING LOCATION	DUST DEPOSITION RATE mg/m²/day	DUST DEPOSITION LIMIT mg/m²/day
D1	155 mg/m²/day	350
D2	133 mg/m²/day	350
D3	164 mg/m²/day	350
D4	142 mg/m²/day	350

Table 8.11 : Dust Deposition Monitoring - Upper Section (planning ref 051801) – 2022 (No Activity in this Area)

2022 (08/05/22 to 08/06/22)		
SAMPLING LOCATION	DUST DEPOSITION RATE mg/m²/day	DUST DEPOSITION LIMIT mg/m²/day
D1	150 mg/m²/day	350
D2	142 mg/m²/day	350
D3	148 mg/m²/day	350
D4	129 mg/m²/day	350

Figure 8.5 – Dust Deposition Monitoring Location - Lower section (planning ref 1162) (QY7)

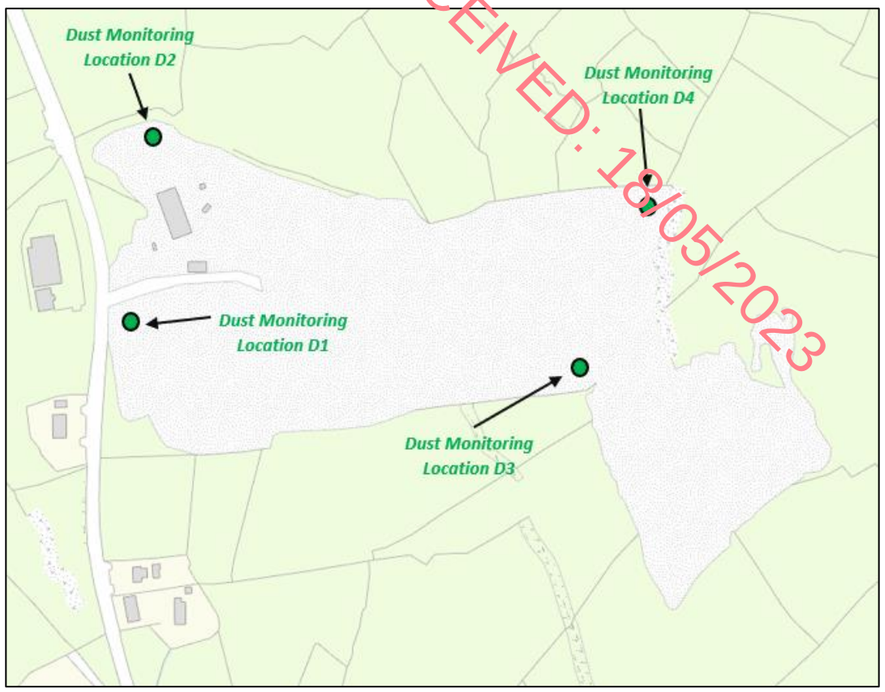


Table 8.12 : Dust Deposition Monitoring - Lower Section (planning ref 1162) (QY7) - 2017

2017 (02/05/17 to 02/06/17)		
SAMPLING LOCATION	DUST DEPOSITION RATE mg/m²/day	DUST DEPOSITION LIMIT mg/m²/day
D1	118 mg/m²/day	350
D2	88 mg/m²/day	350
D3	95 mg/m²/day	350
D4	105 mg/m²/day	350

Table 8.13 : Dust Deposition Monitoring - Lower Section (planning ref 1162) (QY7) - 2018

2018 (04/05/18 to 04/06/18).		
SAMPLING LOCATION	DUST DEPOSITION RATE mg/m²/day	DUST DEPOSITION LIMIT mg/m²/day
D1	115 mg/m²/day	350
D2	98 mg/m²/day	350
D3	106 mg/m²/day	350
D4	122 mg/m²/day	350

Table 8.14 : Dust Deposition Monitoring - Lower Section (planning ref 1162) (QY7) - 2019

2019 (01/05/19 to 31/05/19)		
SAMPLING LOCATION	DUST DEPOSITION RATE mg/m²/day	DUST DEPOSITION LIMIT mg/m²/day
D1	100 mg/m²/day	350
D2	89 mg/m²/day	350
D3	97 mg/m²/day	350
D4	95 mg/m²/day	350

Table 8.15 : Dust Deposition Monitoring - Lower Section (planning ref 1162) (QY7) - 2020

2020 (05/05/20 to 05/06/20)		
SAMPLING LOCATION	DUST DEPOSITION RATE mg/m²/day	DUST DEPOSITION LIMIT mg/m²/day
D1	110 mg/m²/day	350
D2	90 mg/m²/day	350
D3	136 mg/m²/day	350
D4	152 mg/m²/day	350

Table 8.16 : Dust Deposition Monitoring - Lower Section (planning ref 1162) (QY7) - 2021

2021 (05/05/21 to 05/06/21)		
SAMPLING LOCATION	DUST DEPOSITION RATE mg/m²/day	DUST DEPOSITION LIMIT mg/m²/day
D1	102 mg/m²/day	350
D2	95 mg/m²/day	350
D3	132 mg/m²/day	350
D4	147 mg/m²/day	350

Table 8.17 : Dust Deposition Monitoring - Lower Section (planning ref 1162) (QY7) - 2022

2022 (08/05/22 to 08/06/22)		
SAMPLING LOCATION	DUST DEPOSITION RATE mg/m²/day	DUST DEPOSITION LIMIT mg/m²/day
D1	95 mg/m²/day	350
D2	82 mg/m²/day	350
D3	119 mg/m²/day	350
D4	138 mg/m²/day	350

The records from the dust deposition monitoring results show no exceedances of the 350 mg/m²/day recommend dust deposition limit value. This is reflective of the baseline environment at the Site. Works to construct the settlement pond is temporary and will not generate dust emissions.

8.10 Sensitive Receptors

8.10.1 Ecological Receptors

The application site is not subject to any statutory nature conservation designation; There are two Natura 2000 designated sites within 10km of the development site, Lough Oughter and Associated Loughs SAC 000007 and Lough Oughter Complex SPA 004049. Based on the nature, size, and scale of the development, it is considered that the maximum distance for which the project should be evaluated in terms of Natura 2000 sites is up to a maximum radius of 2km from the application site unless there are any potential source-pathway-receptor links between the proposed development site and any Natura 2000 site(s) beyond this distance.

At a distance greater than 2km, and in the absence of any potential source-pathway-receptor links, it is considered that no Natura 2000 sites would be affected by any direct loss of habitat or impacted upon by the effects of dust.

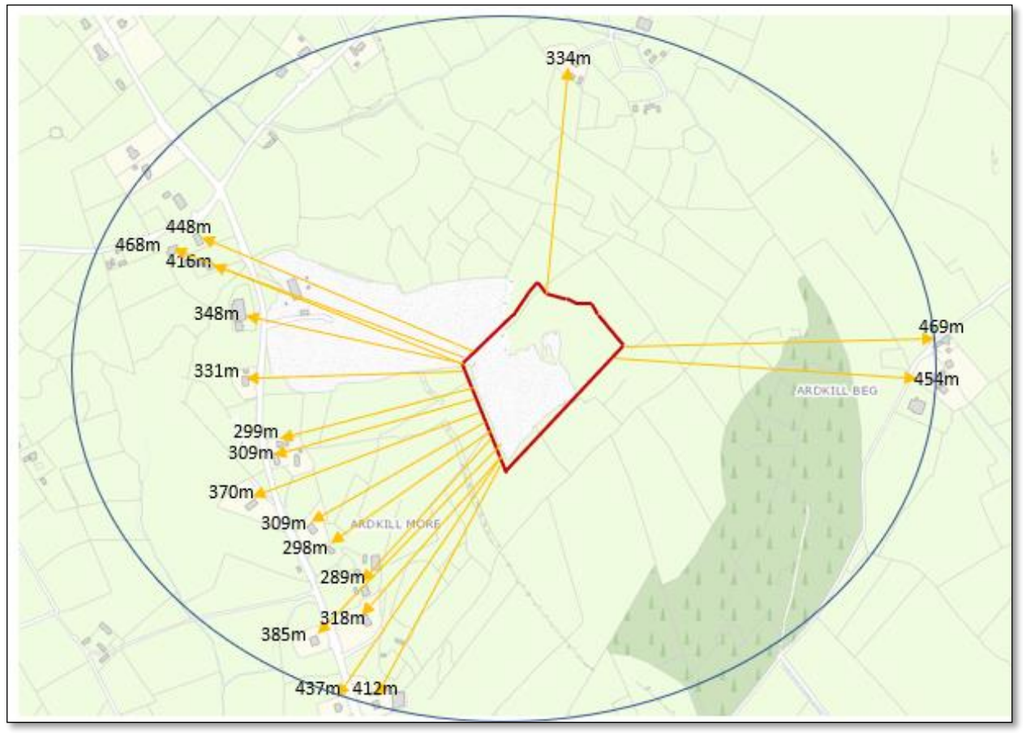
8.10.2 Human Receptors

Sensitive locations are those where people may be exposed to dust from the existing or planned activities. Locations with a high sensitivity to dust include hospitals and clinics, hi-tech industries, painting and furnishing and food processing. Locations classed as being moderately sensitive include schools, residential areas, and food retailers. Receptors have been identified within a 500m distance of the application site boundary. (refer to Figure 8.5). The relevant receptors are listed in Table 8.18 and their locations are shown in Figure 8.5. As residences are clustered in some areas, receptors have been identified at the nearest location to the application site boundary. There are 18 sensitive receptors identified within the 500m study area of the application site with the closest location 289m from the boundary of the site.

Table 8.18: Receptors within 500m

Receptor Reference	Receptor	Sensitivity	Distance (m) / Direction from Site Application Boundary (approx.)
R1	Residential	Low	469(E)
R2	Residential	Low	454(E)
R3	Residential	Low	412(SW)
R4	Residential	Low	437(SW)
R5	Residential	Low	318(SW)
R6	Residential	Low	385(SW)
R7	Residential	Low	289(SW)
R8	Residential	Low	298(SW)
R9	Residential	Low	309(SW)
R10	Residential	Low	370(SW)
R11	Residential	Low	309(SW)
R12	Residential	Low	299(SW)
R13	Residential	Low	331(W)
R14	Residential	Low	348(W)
R15	Residential	Low	416(W)
R16	Residential	Low	468(NW)
R17	Residential	Low	448(NW)
R18	Residential	Low	334(N)

Figure 8.6 - Sensitive Receptors



8.11 Assessment of Impacts

Table 8.19: Particulate Emission Mitigation Measures

Source	Emission Potential	Recommended Mitigation Measures	Effectiveness
Excavators/HGV	High – dry or fine material during strong windy weather	Minimise drop heights when handling materials. Avoid working in adverse/ windy conditions.	High
Onsite Vehicles	High when travelling over un-surfaced and dry site roads.	Minimise distances of onsite haul routes.	High
		Use of water sprays / tractor & bowser to moisten surfaces during dry weather.	High
		Restrict vehicle speeds through signage / staff training.	High
		Location of haul routes away from sensitive receptors.	High
Road Vehicles (transfer offsite)	Low / Moderate on paved road surfaces	Use of road sweeper to reduce the amount of available material for re-suspension on paved roads.	High
Rig Dust Emissions	High – during dry and strong windy weather	Avoid working in adverse weather conditions.	High
Stockpiles	High when dry or fine material being stored. or handled during strong windy weather	Seed surfaces of completed mounds / bunds of topsoil.	High
		Limit mechanical disturbance.	High
Processing Plant	High – during dry and strong windy weather	Retention of hedgerows	High
		Proposed perimeter berms	High
		Avoid working in adverse weather conditions	High
		Locate plant within quarry void	High

8.12 Mitigation Measures

A range of mitigation measures are recommended as listed below.

8.12.1 Mitigation

The main potential impact during blasting and excavation of aggregates will be due to airborne dust and potential dust deposition outside the Application Site boundaries. During long spells of dry weather, dust emissions can potentially be more elevated, however dust nuisance from the proposed operation is expected to be unlikely once mitigation measures are implemented during excavation and restoration. Details of mitigation measures that will be employed at the Application Site are summarised below:

- Retention and enhancement of existing vegetation at the Site perimeter.

- Dust monitoring will continue to be carried out at the designated monitoring locations.
- The timing of operations will be optimised in relation to meteorological conditions.
- Material in outdoor stockpiling will be conditioned with water to minimise dust during dry and windy conditions. In addition, stockpiles will be sited to take advantage of shelter from wind.
- Overburden mounds will be grass-seeded and planted to eliminate wind-blown dust;
- Plant will be regularly maintained.
- Internal haul road will be compacted and maintained.
- A water bowser/sprayer will be available at all times to minimise dust during dry and windy conditions.
- On site speed restrictions (<25 kph) will be maintained in order to limit the generation of fugitive dust emissions; and All vehicles exiting the Site will exit through the wheel wash.

8.12.2 Air quality – Vehicle Emissions

Emissions of CO_2 from vehicle exhaust during the development can add to the receiving air environment. As it is a key gas linked to climate change, the following mitigation measures will be put in place to limit vehicle and plant emissions:

- No vehicles or plant will be left idling unnecessarily.
- Vehicles and plant will be well maintained. Should any emissions of dark smoke occur (except during start up) then the relevant machinery will be stopped immediately, and any problem rectified before being used; and
- Engines and exhaust systems will be regularly serviced according to the manufacturer's recommendations and maintained to meet statutory limits/opacity tests.

The adoption of these mitigation measures will ensure that the resulting impact significance is no greater than slight.

8.12.3 Assessment of Impacts and Mitigation Measures

Table 8.20 assess the potential impacts from the proposed development on the air quality both with and without the establishment of appropriate mitigation measures. Definitions of effect significance is as defined in the EPA's 2022 'Guidelines on the Information to be contained in Environmental Impact Assessment Reports'.

It is considered that the impact from vehicle emissions will have an imperceptible effect in the medium term whilst excavation works are been carried out. An 'imperceptible effect' is defined as An 'effect capable of measurement but without noticeable consequences'. Without mitigation measures it is considered that dust impacts from deposition activities may not affect the character of an environment but would have noticeable changes. Through the implementation of mitigation measures it has been demonstrated that the dust from various activities has an effect capable of measurement but without noticeable consequences to the environment.

Upon restoration and the establishment of natural habitat of the Application Site there will be a permanent effect of carbon sequestration, resulting in a positive effect on the microclimate.

Table 8.20: Assessment of Impacts to Air Quality and Mitigation Measures Employed

Impact	With / Without Mitigation Measures	Type of Effect	Quality of Effects	Significance of Effects	Duration of Effects
Vehicle emissions	Without	Direct	Negative	Imperceptible	M-T
Vehicle emissions	With	Direct	Negative	Imperceptible	M-T
Dust	Without	Direct	Negative	Slight	M-T
Dust	With	Direct	Negative	Imperceptible	M-T
Dust from transfer on haul roads	Without	Direct	Negative	Slight	M-T
Dust from transfer on haul roads	With	Direct	Negative	Imperceptible	M-T
Dust from transfer on public roads	Without	Direct	Negative	Slight	M-T
Dust from transfer on public roads	With	Direct	Negative	Imperceptible	M-T

Notes:

- Type of Effect – Direct and Indirect
- Quality of Effects – Positive; Neutral and Negative
- Significance of Effects – Imperceptible; Not significant; Slight Effects; Moderate Effects; Significant Effects; Very Significant; and Profound Effects
- Duration of Effects – Momentary Effects (Seconds to minutes); Brief Effects (Less than a day); Temporary Effects (Less than a year); Short-term Effects (1 to 7 years); Medium-term Effects (7 to 15 years); Long-term Effects (15 to 60 years); and Permanent Effects (Lasting over 60 years)

8.13 Residual Impacts

Residual impacts of the development on air quality are considered to be imperceptible. During long spells of dry weather, dust emissions can potentially be more elevated, however dust nuisance from the operation is expected to be unlikely if the above mitigation measures are implemented during excavation works. The overall impact from the proposed excavation of material is **not significant** to **imperceptible** to the air environment.

Upon completion of the site excavation, the concentration of airborne dust would expect to be reduced from operational levels as the result of covering and seeding of exposed, un-vegetated soil surfaces. This will most likely constitute a minor **positive impact** for the local environment.

8.14 Cumulative Impacts

Research has shown that the greatest proportion of dust predominately deposits within the first 100 m away from the source as they have a higher deposition velocity than finer particles (i.e., PM_{10} and $PM_{2.5}$). The finer particles of less than 10 microns aerodynamic diameter may remain airborne for longer and therefore travel larger distances, although a large proportion may still deposit within 200m

of the source. With the implementation of the mitigation measures proposed in Section 8.12 cumulative impacts related to air quality are not envisaged as a result of the activities at the Application Site at Ardkill More and Drumcrow, Carrickaboy, Cavan, Co Cavan.

8.15 Predicted Impacts from the Proposed Development

The proposed deepening of the previously approved site is in line with the environmental parameters previously assessed, would continue to be environmentally acceptable similar to Cavan County Council Planning Ref 051801 and An Bord Pleanála (Ref PL 02.219928) which were granted with conditions.

The continuation of extraction of material from an area of 3.53ha using blasting techniques and processing (crushing and screening) is likely to result in similar dust deposition rates in proximity to the quarry site. If anything, it is reasonable to expect that future dust deposition rates should be lower as the development descends to lower depths allowing for increased attenuation of windblown dusts by higher quarry walls.
Wind speed and direction have the greatest potential impact on dust deposition impacts in proximity to the site. The predominant wind direction is from the south-west quarter, with winds from the south to west direction occurring most frequently. The properties to the north-east of the site, i.e. downwind of the prevailing wind direction are in excess of 1 km away from the quarry void and therefore, highly unlikely to experience a dust nuisance impact at such distances.

It is considered that the increase in risk of elevated dust impacts in the vicinity of the proposed extraction area will be negligible for all receptors. An increased risk of dust impacts is unlikely due to the deepening of the proposed quarrying operations and hence the increased mitigating effects of the existing quarry walls, screening bunds and surrounding vegetation. Therefore, the risk of nuisance dust impacts occurring is considered unlikely.

The cumulative dust deposition impacts from the proposed extraction operations have been assessed. The dust deposition impacts will not result in an exceedance of the 350 mg/m2/day limit at John Nulty's Quarry boundary locations.

8.16 'Do Nothing' Scenario

The Do-Nothing scenario includes retention of the current site without the proposed development in place. In this scenario, ambient air quality at the site will remain as per the baseline and will change in accordance withtrends within the wider area (including influences from potential new developments in the surrounding area, changes in road traffic, etc).

8.17 Worst Case Scenario

The main potential for adverse impact on local air quality will occur during the operation phase. The worst-case scenario therefore corresponds to the situation where the mitigation measures for operation activities fail or are not implemented. Should dust mitigation measures not be implemented during the operation phase. Given the distance to sensitive receptors dust nuisance is not considered to be a significant issue providing mitigation measures are carried out.

8.18 Difficulties In Compiling Information

There were no difficulties encountered in compiling this section of the EIAR.

8.19 References

- Environmental Protection Agency (2011) The EPA & Climate Change: Responsibilities, challenges, and opportunities 2011 Update.
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  TA Luft (1986) Technical Instructions on Air Quality Control – TA Luft in accordance with Article 48 of the Federal Emission Control Law (BImSchG) dated 15th March 1974 (BGBI, I p. 721). Federal Ministry for Environment, Bonn 1986, and amendments.
- Climate Action and Low Carbon Development Act 2015
- The Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes (2011)
- Directive 2011/92/EU of the European Parliament and Council of the 13th of December 2011 on the assessment of the effects of certain public and private projects on the environment (codification) as amended by Directive 2014/52/EU of the European Parliament and Council of the 16th of April 2014.

CHAPTER 9 CLIMATE

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FIGURES

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Traynor Environmental Ltd.

9 CLIMATE

9.1 Introduction

John Nulty Ltd intends to apply for a 20 year permission for quarrying and extraction of rock that will include drilling, blasting, crushing and screening along with alterations to boundaries & all associated site works on lands at Ardkill More Townland and Drumcrow Townland, Carrickaboy, County Cavan.

Works will also include for the provision of new settlement ponds and installation of associated site drainage infrastructure and surface water pump to proposed new settlement ponds along with provision of discharge outlet via a Klargester Interceptor.

Ancillary site works to include for landscape works, planting restoration of the quarry perimeter and reprofiling of overburden as required to facilitate development of the quarry and restoration of the associated site area. The Site to which this planning application relates, measures ca 3.53hectares (ha) in total.

9.1.1 Scope of Work

The following sections of this Chapter describe the potential climate change impacts associated with the proposed development. The following issues are addressed separately:

- Climate change legislative framework/policy context.
- Analysis of evolving environmental baseline trends.
- Identifying climate change concerns in relation to proposed development.
- Assessing effects (cumulative effects and uncertainty).
- Identifying alternatives and mitigation measures.
- Identifying monitoring and adaptive management.

9.1.2 Contributors / Author(s)

Traynor Environmental Ltd. undertook the impact assessment presented in this chapter on behalf of John Nulty Ltd.

9.1.3 Limitations / Difficulties Encountered

No published guidelines and established methodology for assessment in Ireland for extractive industry sector.

9.2 Legislative Framework/ Policy Context

9.2.1 Adaptation to Climate Change

The DECLG published a National Adaptation Framework (NAF) in December 2018. the National Adaptation Framework outlines the national strategy for the application of adaptation measures in different sectors as well as local authorities. These adaptation measures will aim to reduce vulnerability to the negative impacts of climate change and to avail of positive effects that may occur.

The policy in relation to climate adaptation, first set out in the NCCAF, was subsequently restated in the National Policy Position on Climate Change. The National Policy Position provides a high-level policy direction for the adoption and implementation of plans to pursue the transition to a low carbon, climate resilient and environmentally sustainable economy by 2050 (known as the "national transition objective").

On the 10th December 2015, the Climate Action and Low Carbon Development Act 2015 was enactment; the 2015 Act identified and provided for the development and submission to Government of national mitigation and adaptation plans. It also established the institutional and governance framework within which these plans can be developed and implemented on a cyclical basis.
Under section 5 of the 2015 Act, the Minister for Communications, Climate Action and Environment must submit to Government for approval (not later than 10th December 2017), a National Adaptation Framework (NAF), which must be reviewed not less than once in every five-year period. The NAF must specify the national strategy for the application of adaptation measures in different sectors and by local authorities in their administrative areas in order to reduce the vulnerability of the State to the negative effects of climate change and to avail of any positive effects that may occur. The 2015 Act also provides that relevant Ministers will be required to develop sectoral adaptation plans which will specify the adaptation policy measures the Minister in question proposes to adopt.

The Climate Change Advisory Council (CCAC) was established by Ministerial Order on 18 January 2016 under section 8 of the Climate Action and Low Carbon Development Act 2015. The Council, which is independent in the performance of its functions, provides advice and recommendations to, inter alia, the Minister for Communications, Climate Action and Environment in relation to the preparation of the NAF; the making by a relevant Minister of a sectoral adaptation plan; and the approval by the Government of a NAF. In addition, the Council has a number of reporting obligations, including with regard to 'Annual' and 'Periodic Reviews' of progress towards meeting the national transition objective; it also established an Adaptation Committee in 2016 to focus specifically on adaptation related matters. Table 9.1 summarises the adaptation actions to climate change in Ireland.

9.2.2 Cavan County Council Climate Change Adaptation Strategy 2019-2024

The Cavan County Council Adaptation Strategy forms part of the National Adaptation Framework (NAF) which was given statutory authority by the provisions of the Climate Action and Low Carbon Development Act 2015.

As the level of government closest to local communities and enterprise and as first responders in many emergencies, we here in Cavan County Council are uniquely placed to effect real positive change with respect to delivery of the national transition objective to low carbon and a climate resilience future. The local authority adaptation strategy takes on the role as the primary instrument at local level to:

(i) ensure a proper comprehension of the key risks and vulnerabilities of climate change
(ii) bring forward the implementation of climate resilient actions in a planned and proactive manner
(iii) ensure that climate adaptation considerations are mainstreamed into all plans and policies and integrated into all operations and functions of the local authority

The adaptation strategy serves Cavan County Council in its two capacities namely:

- As an organisation with an obligation towards customer service, a focus on effectiveness in business, improving efficiencies and maintaining staff welfare and
- In the delivery of services and functions across the administrative and geographical area of County Cavan In accordance with the provisions of the Climate Action and Low Carbon Development Act 2015 this adaptation strategy is required to be adopted by members of Cavan County Council before the 30th September 2019.

The Cavan County Development Plan 2022-2028 considers Climate Change in Chapter 5 'Climate Change'. It is a development objective of Cavan County Council to:

CC 01 Support the implementation and achievement of European, national, regional and local objectives for climate adaptation and mitigation as detailed in the following documents, taking into account other provisions of the Plan (including those relating to land use

planning, energy, sustainable mobility, flood risk management and drainage) and having regard to the Climate mitigation and adaptation measures which have been outlined through the policy objectives in this Development Plan:

- Climate Action Plan (2019 and any subsequent versions).
- National Climate Change Adaptation Framework (2018 and any subsequent versions).
- Any Regional Decarbonisation Plan prepared on foot of commitments included in the NWRA RSES;
- Relevant provisions of any Sectoral Adaptation Plans prepared to comply the requirements of the Climate Action and Low Carbon Development Act 2015, including those seeking to contribute towards the National Transition Objective, to pursue, and achieve, the transition to a low carbon, climate resilient and environmentally sustainable economy by the end of the year 2050; and
- Cavan County Council Climate Change Adaptation Strategy 2019-2024.

9.2.2 John Nulty Ltd and Climate Change

John Nulty Ltd acknowledges the challenges that climate change presents to humanity and their business and are committed to developing pragmatic and sustainable solutions. John Nulty Ltd strive for compliance with all relevant legislation, prevention of pollution and continuous improvement in all areas of environmental management in all of their operations and activities. The operations at the quarry have a dedicated Environmental Management System (EMS) to govern day-to-day operations and employ professionals in Environmental & Planning to ensure full compliance.

Table 9.1 Summary of Adaptation to Climate Change Actions in Ireland

Item	Status	Programs
National Climate Adaptation Strategy	Non-Statutory Framework adopted. Legislation enacted. Statutory Framework in development.	National Climate Change Adaptation Framework Climate Action and Low Carbon Development Act 2015 Consultation on development of statutory National Adaptation Framework
Action Plans	Sectoral Adaptation Plans in development. Local authority plans in development.	Local Authority Adaptation Strategy Development Guidelines (2016) Local Authority Adaptation Support Tool
Impacts, Vulnerability and Adaptation Assessments	National Vulnerability Assessment	2012 National Climate Change Vulnerability Scoping Study Climate Change Impacts on Biodiversity in Ireland (2013) Climate change Impacts on Phenology in Ireland (2013) COCOADAPT (2013) 2013 Hydro Detect Project Robust Adaptation to Climate Change in the Water Sector in Ireland (2013) Ensemble of Regional Climate Projections for Ireland (2015) Urb-ADAPT
Research Programs	EPA Research Programme (Climate Pillar)	http://www.epa.ie
Climate services / Met Office	Established	http://www.met.ie
Web Portal	Established	http://www.climateireland.ie
Monitoring, Indicators, Methodologies	In development	
Training, Education	Ongoing / in development	http://www.climateireland.ie

9.2.2 Green House Gas Emissions

Ireland is a party to both the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol, which together provide an international legal framework for addressing climate change.

9.2.2.1 Paris Agreement

In December 2015, an ambitious global agreement on climate change was agreed in Paris. The Paris Agreement aims to restrict global temperature rise to well below 2°C above pre-industrial levels, and to pursue efforts to limit the temperature increase to 1.5°C. It aims to increase global ability to adapt to the adverse impacts of climate change and to foster climate resilience and low GHG emissions development, in a manner that does not threaten sustainable food production. It also seeks to achieve a balance between anthropogenic emissions by sources and removals by sinks of greenhouse gases in the second half of this century. The Paris Agreement entered into force on 4th November 2016.

The Paris Agreement aims to tackle 95% of global emissions through 188 Nationally Determined Contributions (NDCs) which will increase in ambition over time. Ireland's contribution to the Paris Agreement will be via the NDC tabled by the EU on behalf of its Member States. This is a binding EU target of an overall EU reduction of at least 40% in greenhouse gas emissions by 2030 compared to 1990 levels. The target will be delivered collectively by the EU with reductions in the Emissions Trading Scheme (ETS) and non-ETS sectors amounting to 43% and 30% by 2030 compared to 2005 respectively.

9.2.2.2 Kyoto Protocol (2008 – 2012)

The EPA has overall responsibility for the national greenhouse gas inventory in Ireland's national system, which was established in 2007 under Article 5 of the Kyoto Protocol. The EPA's OCLR performs the role of inventory agency in Ireland and undertakes all aspects of inventory preparation and management as well as the reporting of Ireland's submissions annually in accordance with the requirements of Decision 280/2004/EC and the UNFCCC.
Under the Kyoto Protocol, Ireland currently accounts for GHG emissions. Under the Kyoto Protocol, Ireland is required to limit total national greenhouse gas emissions to 314.2 M tonnes of CO2eq over the five-year period 2008 – 2012 which is equivalent to 62.8 M tonnes of CO2eq per annum. The Kyoto Protocol limit is calculated as 13% above Ireland's 1990 baseline value which was established and fixed at 55.61Mtonnes of CO2eq following an in-depth review of Ireland's 2006 greenhouse gas inventory submission to the UNFCCC.

9.2.2.3 EU 2020 Targets for non-ETS sector emissions

Under the EU Commission's Climate and Energy Package, Ireland is required to deliver a 20% reduction in non-ETS greenhouse gas emissions by 2020 (relative to 2005 levels). In addition, Ireland also has binding annual emission limits for the period 2013-2020 to ensure a gradual move towards the 2020 target. The non-ETS sectors cover those sectors that are outside the EU Emissions Trading Scheme and includes agriculture, transport, built environment (residential, commercial/institutional), waste and non-energy intensive industry. Member States are permitted to meet their annual targets through a number of mechanisms which include carry forward of a quantity of its annual emission allocation from the following year, use of transfers from other Member States and the limited use of international credits from project activities as long as certain criteria are met.

9.2.3 Catchment Flood Risk Assessment and Management (CFRAM) Programme

The current Catchment Flood Risk Assessment and Management (CFRAM) Programme (see www.cfram.ie) is the mechanism through which many of the adaptation to climate change actions will be implemented, including embedding adaptation into the development of capital projects and the long-term of flood risk management in Ireland. The future scenario flood maps produced under the CFRAM Programme will facilitate this approach, inform other sectors, and provide a valuable resource for local adaptation planning and sustainable land use management and planning.

9.2.4 EIA Directive 2014/52/EU on the Assessment of the Effects of Certain Public and Private Projects on the Environment

Directive 2014/52/EU11 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. The Directive requires to be transposed by 16 May 2017, necessitating changes in laws, regulations, and administrative provisions across a number of legislative codes. Key Changes introduced by the 2014 Directive in Annex IV (information referred to in article 5(1) – Information for the Environmental Impact Assessment Report) include information on the impact of the project on climate (for example the nature and magnitude of greenhouse gas emissions) and the vulnerability of the project to climate change to be included in the Environmental Impact Assessment Report.

9.2.5 Operational Impact Assessment Criteria

Climate has implications for many aspects of the environment from soils to biodiversity and land use practices. The proposed development may impact on both the macro-climate and micro-climate. The macro-climate is the climate of a large geographic area such as Ireland. The micro-climate refers to the climate in the immediate area.

The impact of the proposed scheme upon the macro-climate is assessed through the consideration of the change in CO2 emissions. Ireland ratified the United Nations Framework Convention on Climate Change (UNFCCC) in April 1994 and the Kyoto Protocol in 1997 (FCCC 1997, 1999). For the purposes of the EU burden sharing agreement under Article 4 of the Kyoto Protocol, Ireland agreed to limit the net anthropogenic growth of the six GHGs under the Kyoto Protocol to 13% above the 1990 level over the period 2008 to 2012 (ERM 1998). The UNFCCC is continuing detailed negotiations in relation to GHGs reductions and in relation to technical issues such as Emission Trading and burden sharing. Contributions to greenhouse gas emissions will be based on Intended Nationally Determined Contributions (INDCs) which will form the foundation for climate action post 2020.

The EU, on the 23/24th of October 2014, agreed the "2030 Climate and Energy Policy Framework" (EU 2014). The European Council endorsed a binding EU target of at least a 40% domestic reduction in greenhouse gas emissions by 2030 compared to 1990. The target will be delivered collectively by the EU in the most cost-effective manner possible, with the reductions in the ETS and non-ETS sectors amounting to 43% and 30% by 2030 compared to 2005, respectively. Secondly, it was agreed that all Member States will participate in this effort, balancing considerations of fairness and solidarity. The policy also outlines, under "Renewables and Energy Efficiency," an EU binding target of at least 27% for the share of renewable energy consumed in the EU in 2030.

In 1999, Ireland signed the Gothenburg Protocol to the 1979 UN Convention on Long Range Transboundary Air Pollution. The initial objective of the Protocol was to control and reduce emissions of Sulphur Dioxide (SO2), Nitrogen Oxides (NOX), Volatile Organic Compounds (VOCs) and Ammonia (NH3). To achieve the initial targets Ireland was obliged, by 2010, to meet national emission ceilings of 42 kt for SO2 (67% below 2001 levels), 65 kt for NOX (52% reduction), 55 kt for VOCs (37% reduction) and 116 kt for NH3 (6% reduction). In 2012, the Gothenburg Protocol was revised to include national emission reduction commitments for the main air pollutants to be achieved in 2020 and beyond and to include emission reduction commitments for PM2.5. In relation to Ireland, 2020 emission targets are 25 kt for SO2 (65% below 2005 levels), 65 kt for NOX (49% reduction), 43 kt for VOCs (25% reduction), 108 kt for NH3 (1% reduction) and 10 kt for PM2.5 (18% reduction). COM (2013) 917 Final is the "Proposal for a Council Decision for the acceptance of the Amendment to the 1999 Protocol to the 1979 Convention on Long-Range Transboundary Air Pollution to Abate Acidification, Eutrophication and Ground level Ozone".

European Commission Directive 2001/81/EC, the National Emissions Ceiling Directive (NECD), prescribes the same emission limits as the 1999 Gothenburg Protocol. A National Programme for the progressive reduction of emissions of these four transboundary pollutants has been in place since April 2005 (DEHLG 2004, 2007). The most recent data available from the EU in 2010 indicated that Ireland complied with the emissions ceilings for SO2, VOCs and NH3 but failed to comply with the ceiling for NOX (EEA 2011). COM (2013) 920 Final is the "Proposal for a Directive on the reduction of national emissions of certain atmospheric pollutants and amending Directive 2003/35/EC". The proposal will apply the 2010 NECD limits until 2020 and establish new national emission reduction commitments which will be applicable from 2020 and 2030 for SO2, NOX, NMVOC, NH3, PM2.5 and CH4. In relation to Ireland, 2020-29 emission targets are for SO2 (65% below 2005 levels), for NOX (49% reduction), for VOCs (25% reduction), for NH3 (1% reduction) and for PM2.5 (18% reduction). In relation to 2030, Ireland's emission targets are for SO2 (83% below 2005 levels), for NOX (75% reduction), for VOCs (32% reduction), for NH3 (7% reduction), for PM2.5 (35% reduction) and for CH4 (7% reduction).

Guidance issued by the European Commission in 2013 entitled Guidance on "Integrating Climate Change and Biodiversity into Environmental Impact Assessment" has been applied to this assessment in order to determine the potential impacts the proposed developments may have a climate change and biodiversity.

9.2.5 Guidelines

9.2.5.1 Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment (EC, 2012)

Guidelines give recommendations how to integrate climate change and biodiversity in Environmental Impact Assessment (EIA). The need for action on climate change and biodiversity loss is recognised across Europe and around the world. Guidelines contain explanation why climate change and biodiversity are so important in EIA and present the relevant EU-level policy background, provide advice on how to integrate climate change and biodiversity into selected stages of the EIA process. The annexes provide sources of further reading and links to other relevant information, data, and tools.

9.2.5.2 Assessing Greenhouse Gas Emissions and Evaluating their Significance (IEMA, 2017)

This Guidance provides information to assist practitioners with addressing greenhouse gas (GHG) emissions assessment and mitigation in statutory and no statutory Environmental Impact Assessment (EIA). It complements IEMA's earlier guide on Climate Change Resilience and Adaptation and builds on the Climate Change Mitigation and EIA overarching principles. The requirement to consider this topic has resulted from the 2014 amendment to the EIA Directive.

9.2.5.3 Climate Change and Major Projects (EC, 2016)

Guidance for assessing vulnerability and risk from Climate Change for major projects funded by the European Regional Development Fund (ERDF) and the Cohesion Fund and listed in the concerned operational programmes.

9.3 RECEIVING ENVIRONMENT

9.3.1 Climate Environmental Baseline

9.3.1.1 Regional Context

Observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising sea level are unequivocal evidence of warming of the climate system globally. Global mean temperature has increased by 0.8°C compared with pre-industrial times for land and oceans, and by 1.0°C for land alone. Most of the observed increase in global average temperatures is very likely due to increases in anthropogenic greenhouse gas concentrations.

Landmasses are expected to warm more than the oceans, and northern, middle, and high latitudes. Despite possible reductions in average summer precipitation over much of Europe, precipitation amounts exceeding the 95th percentile are very likely in many areas; thus, episodes of severe flooding may become more frequent despite the general trend towards drier summer conditions. In an ensemble-based approach using outputs from 20 global climate models (GCMs), the Mediterranean, northeast and northwest Europe are identified as warming hot spots but with regional and seasonal variations in the pattern and amplitude of warming. Regional climate models (RCMs) also project rising temperatures for Europe until the end of the 21st century, with an accelerated increase in the second half of the century. For precipitation, the larger-scale summer pattern shows a gradient from increases in Northern Scandinavia to decreases in the Mediterranean region.

Ireland has a typical maritime climate, with relatively mild and moist winters and cool, cloudy summers. The prevailing winds are south-westerly in direction. The climate is influenced by warm maritime air associated with the Gulf Stream which has the effect of moderating the climate, and results in high average annual humidity across the country. The area of least precipitation is along the eastern seaboard of the country.

Mean seasonal temperature will change across Ireland. A number of studies have applied selected IPCC Special Reports on Emissions Scenarios (SRESs) to model climatic changes across Ireland at a regional scale. Despite the different methods and scenario combinations used, there is agreement in projected changes in temperature for Ireland. However, there are more disparities in the magnitude and sign for the precipitation changes projected for the island.

Table 9.2 summarises climate impact projections for Ireland, estimates of projections confidence are derived from published projection data from the Local Authority Adaptation Strategy Development Guidelines.

Table 9.2 Climate Impacts Projections:30-Years Overview

Variable	Summary	Confidence	Projected Changes
Sea Levels Rise	Strong increase	High	Projections of sea level rise to 2100 suggest a global increase in the range of 0.09-0.88m with a mean value of 0.48. For 2050, it is reasonable to assume a sea level rise in the region of 25 cm above present levels. It should be noted that due to an as yet limited understanding of some of the important effects that contribute to rates of increase, these estimates of sea level rise may prover optimistic, and estimates of up to 4-6 m have been projected by some models.
Storm surge	Strong increase	Medium	An increase in the numbers of intense cyclones and associated strong winds are expected over the north - east Atlantic. By the 2050s, storm surge heights in the range of 50-100cm are expected to increase in frequency for all coastal areas with exception of the southern coast.
Costal Erosion	Moderate increase	Low	Currently approximately 20% of Ireland's coastline is at risk of costal erosion, particularly areas of the south and east coast and also in isolated areas on the west coast. Rates of increase will be determined by local circumstances; however, it is expected that areas of the south-west are likely to experience the largest increase.
Cold Snaps/ Frost	Moderate decrease (winter/night)	High	By mid-century, minimum temperatures during winter are projected to increase by ~20C in the southeast and ~2.90C in the north. This change will result in fewer frost days and milder nigh-time temperatures.
Heatwaves	Strong increase (summer)	High	Seven significant heatwaves (defined as 5+ days@>250C) have been recorded in Ireland over the past 30 years, resulting in approximately 300 excess deaths. By mid-century, a projected increase in summer maximum daily temperature of approximately 20C will likely intensify heatwaves, with maximum temperatures increasing and heatwave duration lengthening.
Dry Spells	Strong increase (summer)	Medium	There have been seven periods of insignificant rainfall in Ireland in the past 40 years. Of these, the events of 1976 and 1995 were the most severe, averaging 52 and 40 days in duration respectively across Irish rainfall stations. An approximate 20% decrease in summer precipitation receipts in many areas is strongly indicated under a high emissions scenario. This decrease is likely to results in progressively longer periods without significant rainfall, posing potentially severe challenges to water sensitive sectors and regions.
Extreme Rainfall	Strong increase (winter)	Low	Heavy precipitation days (in which more than 20mm of rainfalls) are likely to increase in frequency in winter. By the 2050s an increase in the number of heavy precipitation days of around 20% above the level of 1981-2000 is projected under both low, medium, and high emissions scenarios. This may have serious consequences for flood risk in sensitive catchments.
Flooding	Moderate increase (winter)	Low	An Irish Reference Network of hydrometric stations has been established to assess signals of climate charge in Irish hydrology. This network has detected an increasing trend in high river flows since 2000. Projections of future flows are beset by uncertainty at the catchment scale, but a broad signal of wetter winters and drier summers is evident across a number of independent studies.
Wind Speed	Minor increase (winter)	Medium	Observed wind speed over Ireland has not changed significantly in recent times, but it is anticipated that the distribution of wind will alter slightly in future, with winters marginally winder and summers marginally less so. Though the average wind speed is anticipated to change in only a minor way over the coming decades, the frequency of extreme windstorms is expected to increase due to alternations in the origin and track of tropical cyclones.

9.3.2 Local Context

The weather station at Ballyhaise which is located approximately 16.5km to the north of the application site is considered representative of conditions experienced at the application site.

Ballyhaise Automatic Weather Station (AWS) was opened in 2003 and is situated in the grounds of the Ballyhaise Agricultural College, Co. Cavan (54.051°N 7.31° W) and is 67 m above mean sea level. This AWS replaced an existing climate station which was opened in 1931. Since April 2009, the station has replaced the synoptic station at Clones, Co Monaghan. The prevailing wind direction in the region is between south and west. The mean annual rainfall from 2020 - 2022 is 1047.80 mm. The moderating influence of the Atlantic Ocean is felt throughout Ireland. The annual mean temperature for different areas in Ireland varies between mountainous regions, lowlands, and the coast. The maximum average and maximum monthly air temperature reported at the Ballyhaise climatological station over the 3 years 2020,2021 & 2022 give an average temperature range of 4.9 to 15.5 °C over the 3 year period (Table 9.3). The annual average temperature for these 3 years is 9.6 °C with a maximum temperature recorded of 17.2 °C in July 2021. A similar pattern in air temperature would be likely at the quarry.

Table 9.3 2020,2021 & 2022 Temperature Averages

Temperature (degrees Celsius)													
	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Annual**
Average Temperature	4.9	4.9	6.5	8.2	11.0	13.6	15.5	14.9	12.9	10.1	7.2	5.0	9.6
Max Temperature	5.9	6.2	7.3	9.3	12.1	13.7	17.2	15.6	14.4	11.4	8.4	6.6	10.7

Source: Met Eireann: Ballyhaise, Co. Cavan Monthly Climatological Records

Results from the meteorological station at Ballyhaise of overall annual wind speed is 6.3 Knots which is typical of long-term wind conditions experienced in the Cavan area. High wind speeds, with speeds in excess of 18 m/s are typically associated with Atlantic stormy conditions from the west during the winter months.

A windrose for the wind data recorded at Ballyhaise station is presented in Figure 9.1 for the period 2016 - 2021 inclusive.
Long-term rainfall records from a climatological station located at Ballyhaise for the period 2020,2021and 2022 gives an annual precipitation rate of 1047.80mm (Table 9.4). The monthly total during the winter months (October-March) accounts for about 60% of the annual total, with a maximum monthly rate of 212.80 mm in February 2022. During the winter months, the rainfall will be commonly associated with Atlantic frontal depressions whereas during the summer months high rainfall amounts will tend to be associated with intense thundery showers.

Table 9.4 Average Monthly Precipitation Ballyhaise (mm) 2020,2021 & 2022

Rainfall (mm)													
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2020	43.7	122.9	32.7	62.6	76.0	76.2	39.5	52.0	135.8	205.2	118.1	84.2	1048.9
2021	107.4	89.5	83.9	19.5	84.9	20.8	44.8	133.4	71.8	120.3	46.3	110.0	932.6
2022	59.2	212.8	77.8	32.8	26.2	99.5	129.7	138.4	60.4	113.3	100.7	111.0	1161.8
Average	70.1	141.7	64.8	38.3	62.4	65.5	71.3	107.9	89.3	146.3	88.4	101.7	1047.8

9.4 IMPACT ASSESSMENT

9.4.1 Methodology

In Ireland, some sectors have independently begun the process of identifying key vulnerabilities for their activities. The report by the Irish Academy of Engineering, Ireland at Risk Critical Infrastructure – Adaptation for Climate Change (The Irish Academy of Engineering, 2009) and the report by the Heritage Council and Failte Ireland (the National Tourism Development Authority), Climate Change, Heritage and Tourism, Implications for Ireland's Coast, and Inland Waterways (ed. Kelly and Stack, 2009) are examples of initiatives of this kind.

Other research work on adaptation in specific sectors has been carried out or commissioned by other Government Departments/bodies such as the OPW, CoFoRD (programme of competitive forest research for development research programme, etc. (e.g. CLIMADAPT).

A National Climate Change Vulnerability Scoping Study (Sweeney and Coll, 2012) was undertaken to identify first generation vulnerabilities for Ireland based on a sensitivity analysis across key sectors. The analysis identified a clustering of impacts and their importance in relation to an assessment of likely resilience by sector. The assessment methodology used was an impacts-first, science-first classical approach. The priority sectors identified are biodiversity and fisheries; water resources and the built coastal environment; forestry and agriculture. As each sector develops its sectoral adaptation plan (under the Climate Action and Low Carbon Development Act 2015), detailed vulnerability and risk analysis will be required. Some preliminary work has been undertaken on costing the impacts of climate change in Ireland. This is now being supported by more detailed analysis of the current and future costs of flood risk management.

The implementation of adaptation is being supported by the development of a suite of guidelines, tools, and approaches. These include the Local Authority Adaptation Strategy Development Guideline; and the Irish climate information platform "Climate Ireland", which includes data, information, tools, and approaches for local level adaptation decision making. Work is ongoing to develop sectoral decision-making tools and supports.

The EPA is currently funding a research project called Urb-Adapt which aims to identify the impact of climate change on Dublin city and surrounding towns within the greater Dublin region. The project aims to identify possible risks to the population living in that area and future risks posed to it by the changing climate.
There are no specific tools developed for assessing climate change for extraction industry. The Climate Change and Major Project guideline on how to make vulnerable investments resilient to climate change provides methodology for undertaking a vulnerability and risk assessment.

Climate change adaptation and mitigation shall be integrated in the preparation and approval of proposed development. Adaptation seeks to ensure adequate resilience of proposed development to the adverse impacts of climate change based on Vulnerability. Mitigation seeks to reduce the emissions greenhouse.

9.4.2 Development Vulnerability

The aim of the vulnerability assessment is to identify the relevant climate hazards for the development at the foreseen location. Main steps include identifying and combining the sensitivity and exposure of the project which will describe the vulnerability, the risk will be defined as like hood and impact. Adaptation through project options, appraisal, and planning will depend on the assessed project vulnerability and risk. Timescale for the project vulnerability and risk assessment shall correspond to the lifespan of the project. During the lifespan, there could be significant changes in frequency and intensity of weather events due to climate change, which should be taken into account.

9.4.3 Greenhouse Gases Emissions

All projects have the potential to emit greenhouse gas (GHG) emissions to atmosphere during the operational phase of the development. Direct GHG emissions may be caused by operational activities, and project decommissioning. Indirect GHG emissions may be due to increased demand for energy and indirect GHG activities. The significance of project's GHG emissions should be based on its net impact, which may be positive or negative. Where GHG emissions cannot be avoided, significance of project's emissions shall be reduced by mitigation or project design. Where GHG emissions remain significant but cannot be reduced further approaches to compensate project emissions should be considered.

Currently in Ireland, there is no set methodology to evaluate significance criteria or a defined threshold for GHG emissions for mineral extraction industry. Due to the inconsistences between the different methods and their assumptions for assessment, there is no single agreed method by which to assess a project carbon budget. The method of assessment varies according to the type and scale of the development.
Due to a lack of guidelines and an established methodology, the assessment of significance of the GHG emissions is based on whether the development's GHG emissions cumulatively represent a considerable contribution to the global atmosphere and whether the development as continued or extended will replace existing development that would have a higher GHG profile. Where the GHG emissions cannot be avoided, the mitigation should aim to reduce the development emissions at all stages.

9.5 Vulnerability Assessment

9.5.1 Development Vulnerability

The aim of the vulnerability assessment is to identify the relevant climate hazards for the project at the foreseen location. Based on the development vulnerability assessment, measures to improve the resilience of the project to extreme rainfall, flood, flash flood, storms, and winds are required.

9.5.2 Greenhouse Gas Emissions

The quarrying sector in Ireland contributed an estimated 0.2 million tonnes of Carbon Dioxide equivalent (CO_2eq) emissions of a National total of 58.2 million CO_2eq in 2014(2). This volume of greenhouse gas emissions is about 0.3% of the National total. As an industrial activity the quarrying sector have a responsibility to control and reduce greenhouse gas emissions.

The quantity of emissions from a quarry depend on the size and activities taking place within the site. Operation of large plant machinery, onsite asphalt, plant equipment and traffic all contribute to the carbon footprint for the site. The size of the quarry is approximately 3.53ha. The existing quarry has a permitted extraction rate of 25,000 tonnes per annum. However, the extraction rate will not change with the proposed continuation. Although Greenhouse gas emissions will be small as a percentage of the National total from the extractive industrial sector, the site management for the quarry will include measures aimed at reducing the carbon footprint as part of the Environmental Management Plan for the whole site.

Rock extraction from the quarry will be the same process as existing undertaken with no significant change in the quantity of emissions from trucks and other machinery associated with transporting and processing of the material. Any change in the carbon footprint of the quarry site related to rock recovery, truck transfer and operating the aggregate production plant will be insignificant.

Based on the scale and extent of proposed activities, GHG emissions are assessed as not making a significant contribution to the global atmosphere.

9.6 Mitigation

Mitigation is designed to increase the resilience of the development, or wider environmental receptors, to climate change and should focus on increasing its capacity to absorb climate related shocks.

9.6.1 Project Adaptation against Expected Climate Change Effects

In the context of climate change adaptation to increase adaptive capacity of the quarry, disaster risk reduction strategies shall be developed with a view to reducing vulnerability and increase resilience of the development. Significant incidents related to the climate change that have affected operation of the quarry shall be recorded for future analysis. Based on the development vulnerability assessment, measures to improve the resilience of the project to extreme rainfall, flood, flash flood, storms, and winds are required. Table 9.5 details specific mitigation measures for the quarry related to climate change adaptation.

Table 9.5 Mitigation Measures Related to Climate Change Adaptation

Main Concerns Related to:	Proposed Alternatives or Mitigation Measures
Extreme Rainfall, Flood, Flash Flood	Consider design that allows for rising water levels and ground water levels.
	Design adequate project's drainage.
Storms and Winds	Ensure the project design that can withstand increases high winds and storms
	Ensure the choice of equipment working at the project is weather efficient.
Risk Reduction Mechanism	Secure insurance for damage of assets / incidences.

9.6.2 Proposed Reduction of GHG Emissions

John Nulty Ltd. quarry shall adopt a GHG monitoring programme at the quarry at Ardkill More and Drumcrow, Carrickaboy, Co. Cavan.

Table 9.6 details specific mitigation measures for the quarry related to GHG reduction programme.

Table 9.6 Mitigation Measures Related to GHG Reduction Programme

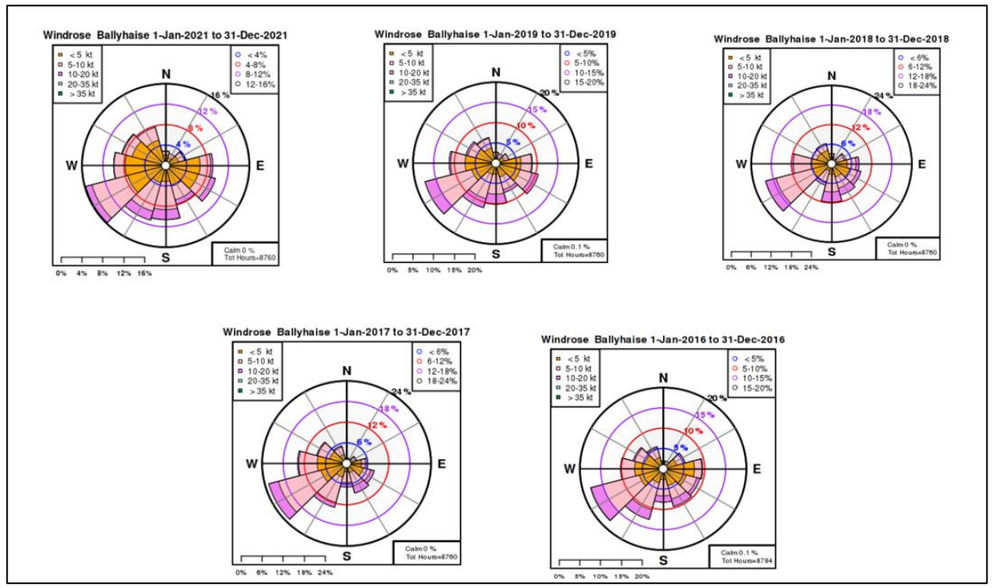
Main Concerns Related to:	Proposed Alternatives or Mitigation Measures
Increased demand for energy	Consider using renewable energy sources/ suppliers.
Direct GHG emissions	Use energy efficient machinery/ energy.
GHG emissions related to transport	Unnecessary equipment/ transport journeys should be avoided by management of transport and travel demands. Equipment should not be left idling.

9.7 Monitoring

9.7.1 Project Adaptation against Expected Climate Change Effects

A framework and set of indicators shall be developed to assess project preparedness for adaptation against climate change. Provision shall be made for a periodic review of plans and the allocation of reporting responsibilities for a regime to measure and evaluate progress on adaptation. This process shall include updates from implementation the adaptation plans on regular basis. Enhancement and monitoring related to projects' predicted impacts with climate change should be set out in an Environmental Management Plan.

Figure 9.1 Windrose for Ballyhaise Meteorology Station 2016-2021



9.8 'Do Nothing' Scenario

The Do-Nothing scenario includes retention of the current site without the proposed development in place. In this scenario, the climate in the area will remain and will change in accordance withtrends within the wider area.

9.9 Worst Case Scenario

The main potential for adverse impact on climate will occur during the operation phase. The worst-case scenario therefore corresponds to the situation where the mitigation measures for operation activities fail or are not implemented.

9.10 Difficulties in Compiling Information

There were no difficulties encountered in compiling this section of the EIAR.

APPENDIX 9A DEVELOPMENT VULNERABILITY ASSESSMENT METHODOLOGY

The scale for assessing the likelihood of a climate hazard is presented in table 9A.1. The output of the likelihood analysis is an estimation of the likelihood for each of the essential climate variables and hazards.

Table 9A.1 Scale of Likelihood of Climate Hazard

Term	Qualitative	Quantitative
Rare	Highly unlikely to occur	5%
Unlikely	Unlikely to occur	20%
Moderate	As likely to Occur	50%
Likely	Likely to Occur	80%
Almost certain	Very likely to occur	95%

The scale for assessing the potential impact of a climate hazard is presented in Table 9A-2. The impact analysis provides an assessment of the potential impact of each of the essential climate variables and hazards.

Table 9A.2 Example Table for Climate Hazard Impact Analysis

Risk Areas	Insignificant	Minor	Moderate	Major	Catastrophic
Asset damage, engineering, operational					
Safety and Health					
Environment					
Social					
Financial					
Reputation					

The matrix for assessing the sensitivity of project to climate hazards is presented in Table 9A-3. The sensitivity is summarised, along with the ranking of the relevant climate variables and hazards relating to the project.

Table 9A.3 Example Table for Project to Climate Hazards

	Extreme Rainfall, Flood, Flash flood	Heat	Drought	Wildlife Fires	Storms and Winds	Landslide	Cold Spells and Snow	Freeze – Thaw Damage	Rising Sea Level
On Site Assets									
Inputs – Water									
Inputs – Energy									
Outputs – Product									

Transport Links									

The matrix for assessing exposure of a project to climate hazards is presented in Table 9A-4. The exposure analysis ranks climate variables and hazards as low, medium, or high based on current and future climate.

Table 9A.4 Example Table of Exposure of the Project to Climate Hazards

	Extreme Rainfall, Flood, Flash Flood	Heat	Drought	Wildlife Fires	Storms and Winds	Landslides	Cold Spells and Snow	Freeze – Thaw Damage	Rising Sea Level
Current Climate									
Future Climate									

An example of the vulnerability of a project to climate hazards is presented in Table 9A-5. The vulnerability combines the sensitivity and the exposure analysis.

Table 9A.5 Example Table for Vulnerability Analysis of Project to Climate Hazards

Sensitivity	Exposure (Current & Future Climate)		
	Low	Medium	High
Low			
Medium			
High			

APPENDIX 9B DEVELOPMENT VULNERABILITY ASSESSMENT

The likelihood analysis of the proposed development to climate hazards is presented in Table 9B.1.

The proposed development has been assessed to be moderate affected by extreme rainfall, flood, flash flood, storms, and winds. The proposed development would be unlikely affected to cold spells and snow. The proposed development would not be affected by heat, drought, wildlife fires, landslides, and freeze –thaw damage. The proposed development will not be affected by rising sea level.

Table 9B.1 Analysis of Likelihood of Climate Hazards at Quarry

	Extreme Rainfall, Flood, Flash Flood	Heat	Drought	Wildlife Fires	Storms and Winds	Landslides	Cold Spells and Snow	Freeze – Thaw Damage	Rising Sea Level
Rare		√	√	√		√		√	√
Unlikely							√		
Moderate	√				√				
Likely									
Almost Certain									

Table 9B-2 shows the climate hazard impact analysis of the proposed development. It was assessed that climate hazards will have major impacts on health and safety, the environment and financial areas and climate hazards will have moderate impacts on asset damage and engineering, operational, social and reputation areas.

Table 9B.2 Climate Hazard Impact Analysis

Risk Areas	Insignificant	Minor	Moderate	Major	Catastrophic
Asset damage, engineering, operational			√		
Safety and Health				√	
Environment				√	
Social			√		
Financial				√	
Reputation			√		

Table 9B-3 below assesses the sensitivity of the project to climate hazard. It was assessed that site assets, energy inputs and transport links are of high sensitivity to extreme rainfall, flood, flash floods, storms, and winds; water inputs will be highly sensitive to droughts. On site assets will be medium sensitive to cold spells and snow and freeze – thaw damage. Transport links will be medium sensitive to cold spells and snow.

Table 9B.3 Sensitivity Project to Climate Hazards

	Extreme Rainfall, Flood, flash Flood	Heat	Drought	Wildlife Fires	Storms and Winds	Landslides	Cold Spells and Snow	Freeze – Thaw Damage	Rising Sea Level
On Site Assets	High	Low	Low	Low	High	Low	Medium	Medium	Low
Inputs – Water	Low	Low	High	Low	Low	Low	Low	Low	Low
Inputs – Energy	High	Low	Low	Low	High	Low	Low	Low	Low
Outputs – Product	Low	Low	Low	Low	Low	Low	Low	Low	Low
Transport Links	High	Low	Low	Low	High	Low	Medium	Low	Low

In Table 9B-4, the exposure of the project to climate hazards was assessed. In the current climate, the exposure of the project extreme rainfall, flood, flash flood, storms and winds has been assessed to be medium. The project was assessed to have high exposure to rainfall, flood, flash flood, storms, and winds.

Table 9B.4 Example Table of Exposure of the Project to Climate Hazards

	Extreme Rainfall, Flood, flash Flood	Heat	Drought	Wildlife Fires	Storms and Winds	Landslides	Cold Spells and Snow	Freeze – Thaw Damage	Rising Sea Level
Current Climate	Medium	Low	Low	Low	Medium	Low	Low	Low	Low
Future Climate	High	Low	Low	Low	High	Low	Low	Low	Low

Table 9B-5 shows the vulnerability analysis of the project to climate hazards; it combines the sensitivity and the exposure analysis. The project was assessed to be most sensitive to extreme rainfall, flood, flash flood, storms, and winds.

Table 9B.5 Vulnerability Analysis of Project to Climate Hazards

Sensitivity	Exposure (Current & Future Climate)		
	Low	Medium	High
Low	Rising sea levels, Freeze – thaw damage,		
	Landslides, Drought, Heat, Wildlife Fires		
Medium		Cold Spells and Snow	
High			Extreme rainfall, flood flash flood, Storms and winds

CHAPTER 10

NOISE AND VIBRATION

CHAPTER TEN – NOISE AND VIBRATION

Tables

Figures

10 NOISE & VIBRATION

10.1 Introduction

This section of the EIAR has been prepared by Traynor Environmental Ltd to identify and assess the potential noise impacts associated with the proposed development at Ardkill More and Drumcrow, Carrickaboy, Co Cavan during the continued extraction of material.

This chapter includes:

- A description of the receiving ambient noise climate in the vicinity of the subject site.
- An assessment of the potential noise and vibration impact associated with the proposed development on its surrounding environment.
- The assessment of direct, indirect, and cumulative noise and vibration impacts on the surrounding environment have been considered as part of the assessment.

Mitigation measures are included, where relevant, to ensure the proposed development is operated in an environmentally sustainable manner in order to ensure minimal impact on the receiving environment.

10.1.1 Proposed Development Site Location and Brief Description

Planning permission is sought for a 20-year permission for quarrying and extraction of rock that will include drilling, blasting, crushing and screening along with alterations to boundaries & all associated site works on lands at Ardkill More Townland and Drumcrow Townland, Carrickaboy, County Cavan.

Works will also include for the provision of new settlement ponds and installation of associated site drainage infrastructure and surface water pump to proposed new settlement ponds along with provision of discharge outlet via a Klargester Interceptor.

Ancillary site works to include for landscape works, planting restoration of the quarry perimeter and reprofiling of overburden as required to facilitate development of the quarry and restoration of the associated site area.

10.1.2 Statement of Competence

In accordance with Article 5(3)(a) of the EU Directive, by appointing Traynor Environmental, the applicant has ensured that this chapter has been prepared by "Competent experts".

In accordance with Environmental Protection Agency (EPA) guidance "All competent persons must possess a combination of technical knowledge, experience, and skills, and must be able to demonstrate both practical and theoretical competence and should participate in continual professional development. Competence may be demonstrated through reference to an appropriate qualification and/or professional membership of a recognised acoustic organisation (e.g., the Institute of Acoustics) and/or appropriate experience".

The monitoring and analysis of the data was conducted by Nevin Traynor of Traynor Environmental deemed to be a "competent person" as per criteria outlined by the EPA. The monitoring programme, data and report was carried out by Nevin Traynor who is certified as been competent in Environmental Noise Measurement by the Institute of Acoustics (IOA) with over 20 years' experience in Environmental and Acoustic Consultancy.

10.2 Methodology

10.2.1 Impact Assessment Methodology

The assessment of the noise and vibration impacts has been undertaken as follows:

- Reference to historical noise and vibration surveys at the nearest noise sensitive locations, to establish the noise levels in the area.
- Noise levels have been recorded on the existing Quarry site QY7 to the quarrying activities. Subsequently, an accurate sound power level for these sources has been determined to allow for accurate noise prediction modelling.
- A prediction of the specific noise levels at the surrounding residential properties for the existing and proposed quarrying activities at the site using SoundPLAN noise prediction software.
- A comparison of the measured existing noise levels at NM1, NM2 & NM3 and the predicted noise levels at the surrounding residential properties (Noise Sensitive Locations [NSL's]) against relevant guidelines.

The noise survey results are presented in terms of the following parameters:

dB	Decibel - The scale in which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the **RMS** pressure of the sound field and the reference pressure of 20 micro-pascals (20 μPa).
L_{Aeq}	This is the equivalent continuous sound level. It is a type of average and is used to describe a fluctuating noise in terms of a single noise level over the sample period (T). The closer the L_{Aeq} value is to either the L_{AF10} or L_{AF90} value indicates the relative impact of the intermittent sources and their contribution. The relative spread between the values determines the impact of intermittent sources, such as transport noise, on the background.
L_{AF90}	Refers to those A-weighted noise levels in the lower 90 percentile of the sampling interval; it is the level which is exceeded for 90% of the measurement period. It will therefore exclude the intermittent features of traffic and is used to describe a background level. Measured using the "Fast" time weighting.
L_{AF10}	Refers to those A-weighted noise levels in the top 10 percentile of the sampling interval; it is the level which is exceeded for 10% of the measurement period. It is used to determine the intermittent high noise level features of locally generated noise and usually gives an indicator of the level of trains. Measured using the "Fast" time weighting.
L_{AFmax}	The maximum RMS A-weighted sound pressure level occurring within a specified time period. Measured using the "Fast" time weighting.
L_{den}	The Lden (Day Evening Night Sound Level) is the average sound level over a 24-hour period, with a penalty of 5 dB added for the evening hours or 19:00 to 22:00, and a penalty of 10 dB added for the night-time hours of 22:00 to 07:00
L_{day}	is the A-weighted long-term average sound level as defined in ISO 1996-2, determined over all day periods of a year.
$L_{evening}$	is the A-weighted long-term average sound level as defined in ISO 1996-2, determined over all the evening periods of a year.

10.2.2 Relevant Guidelines & Standards

10.2.2.1 Operation Phase

The noise and vibration impact assessment has been undertaken with regard to the following established standards and guidelines to determine the impact of the proposed Quarry site activities on the surrounding noise environment and assess for potential noise disturbance at existing NSL's in the locality:

- Quarries and Ancillary Activities, Guidelines for Planning Authorities, April 2004, Department of the Environment, Heritage, and Local Government. (DoEHLG Guidance)
- Environmental Management Guidelines Environmental Management in the Extractive Industry (Non-Scheduled Minerals), Environmental Protection Agency (2006).
- EPA – Guidelines on the Information to be Contained in Environmental Impact Assessment Reports - Draft August 2017
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (May 2022)

The Quarries and Ancillary Activities, Guidelines for Planning Authorities states that following with regard to the control of noise and blasting.

'Control of noise: Noise-sensitive uses in the vicinity of a quarry, such as dwellings, schools, hospitals, places of worship or areas of high amenity, require that the amount of noise be minimised. The sensitivity to noise is usually greater at night-time (20.00 to 08.00) than during the day, by about 10 dB(A). Many quarries are situated in areas of low background noise, and it is appropriate to consider this when setting noise limits. In general, it can be expected that complaints will result where the noise from quarrying and associated activities are between 5 to 10 dB above the background noise levels. In areas of higher background noise levels, the EPA recommends that ideally, if the total noise level from all sources is taken into account, the noise level at sensitive locations should not exceed a LAeq (1 hour) of 55 dB(A) by daytime and a LAeq (15 minutes) of 45 dB(A) by night-time. Audible tonal or impulsive components in noise emissions (e.g., the reversing siren on a lorry, required for safety reasons) can be particularly intrusive, and such components should be minimised at any noise-sensitive location.

It may be necessary to raise the noise limits to allow temporary but exceptionally noisy phases in the extraction process, or for short-term construction activity which cannot meet the limits set for routine operations, e.g., the construction of baffle mounds, which bring long-term environmental benefits.

The developer may be required to carry out noise surveys to measure noise levels at the site boundary near sensitive locations, as agreed in advance with the planning authority. Surveys should be carried out in accordance with the EPA's "Environmental Noise Survey – Guidance Document" (2003). Noise monitoring should be carried out on a quarterly basis (or as otherwise agreed) and commenced prior to the commencement of development. The results should be reported to the planning authority within 3 weeks (or as agreed). 95% of all noise measured shall comply with the specified limit values. No individual noise measurement should exceed the limit values by more than 2 dB(A).

Control of blasting: Nearby residents (e.g., within 500 meters) need to be given advance notice when blasting operations are due to take place, which should only be carried out between 09.00 and 18.00 hours, Monday to Friday (except in emergencies or for health and safety reasons beyond the control of the developer). Similarly, such residents should be given the "all clear" signal by means of sirens or other agreed measures when blasting has been completed.

The EPA recommends that to avoid any risk of damage to properties in the vicinity of a quarry, the vibration levels from blasting should not exceed a peak particle velocity of 12 millimetres per second as measured at a receiving location when blasting occurs at a frequency of once per week or less. In the rare event of more frequent blasting, the peak particle velocity should not exceed 8 millimetres per second. The nature of the underlying rock can influence the way blast vibrations are transmitted through the ground to locations outside the site, so it is important that such information (including predicted vibration levels in adjacent noise-sensitive receptors) be submitted with the planning application where relevant.

Blast noise is characterised by containing a large proportion of its energy within a frequency that is below the normal hearing range and is therefore termed "air overpressure." The EPA recommends that blasting should not give rise to air overpressure values at the nearest occupied dwelling in excess of 125 dB(Lin)$_{max. peak}$ with a 95% confidence limit.

The developer should carry out blast monitoring (ground borne vibration and air overpressure) for each blast. The monitoring locations should be as agreed within the planning authority and shall be established prior to the commencement of blasting. The results should be reported to the planning authority on a regular agreed basis. Ground borne vibration levels measured at the nearest occupied dwelling should not exceed the specified limit values. 95% of all air overpressure levels measured at the nearest occupied dwelling shall conform to the specified limit value. No individual air overpressure value should exceed the limit value by more than 5 dB(Lin)'.

As outlined in the Environmental Management Guidelines for the Extractive Industry (Non-Scheduled Minerals), Environmental Protection Agency, the Environmental Protection Agency (EPA) has produced a Guidance Note for Noise in Relation to Scheduled Activities (EPA, 1996). It deals in general terms with the approach to be taken in the measurement and control of noise and provides advice in relation to the setting of noise Emission Limit Values (ELV) and compliance monitoring. In relation to quarry developments and ancillary activities, it is recommended that noise from the activities on site shall not exceed the following noise ELVs at the nearest noise-sensitive receptor:

- Daytime: 07:00–19:00 h LAeq (1 h) = 55 dB(A)
- Evening: 19:00 – 23:00 h LAeq (1 h) = 50 dB(A)
- Night-time: 20:00–07:00 h LAeq (1 h) = 45 dB(A)

Note:

- 95% of all noise levels shall comply with the specified limit value(s). No noise level shall exceed the limit value by more than 2 dB(A).
- On-site activities should be permitted during night-time hours where they comply with the noise ELVs (e.g., heating up of asphalt plants, loading of materials).
- Where existing background noise levels are very low, lower noise ELVs may be appropriate.
- Audible tones or impulsive noise should be avoided at night.
- It is also appropriate to permit higher noise ELVs for short-term temporary activities such as construction of screening bunds, etc., where these activities will result in a considerable environmental benefit.
- In relation to blasting activities within the quarry development, it is recommended that the following vibration and air overpressure ELVs are adopted and applied at the nearest vibration and air overpressure sensitive location (e.g., a residential property):
- Ground-borne vibration: Peak particle velocity = 12 mm/s, measured in any of the three mutually orthogonal directions at the receiving location (for vibration with a frequency of less than 40 Hz)
- Air overpressure: 125 dB (linear maximum peak value), with a 95% confidence limit.
- Normal hours of blasting should be defined (e.g., 09:00–18:00 h Monday to Friday), and provision should be included to permit blasting outside these hours for emergency or safety reasons beyond the control of the quarry operator.
- It is recommended that quarry operators provide advance notification of blasting to nearby residents through use of written notes, signage at site entrance, telephone, or warning sirens (or a combination of these methods).

On the basis of the above, the following noise limits are suggested to be retained for the further operation of the quarry site, including the extraction of rock from an area of 3.53Ha using conventional drilling and blasting techniques and mineral reduction using mobile crushing and screening as well as noise from the associated structures.

The equivalent sound levels attributable to all on-site operations associated with the development shall not exceed 55 dB(A) Leq over a continuous one-hour period between 0700 hours and 1900 hours on Monday to Friday inclusive, and 0700 hours and 1400 hours on Saturday, when measured at any noise sensitive receptor. Sound levels shall not exceed 45 dB(A) at any other time.

10.2.2.2 Construction Phase

There is no published statutory Irish guidance relating to the maximum permissible noise level that may be generated during the construction phase of a project. Cavan County Council (CCC) typically controls construction activities by imposing limits on the hours of operation and consider noise limits at their discretion.

In order to set appropriate construction noise limits for the development site, reference has been made to *BS 5228 -1:2009 +A1 2014 Code of practice for noise and vibration control on construction and open sites- Noise*. Part 1 of this document Noise provides guidance on selecting appropriate noise criteria relating to construction works.
BS 5228-1:2009+A 1:2014 gives several examples of acceptable limits of construction noise, the most simplistic being based on upon the exceedance of fixed noise limits. For example, paragraph E.2 states:
'noise from construction and demolition sites should not exceed the level at which conversation in the nearest building would be difficult with windows shut.'
Paragraph E.2 goes on to state:
'noise levels, between 07:00 and 19:00 hours; outside the nearest window of the occupied room closest to the site boundary should not exceed:
70 decibels (dBA) in rural, suburban areas away from the main road traffic and industrial noise.
75 decibels (dBA) in urban areas near main roads in heavy industrial areas.'

Note that a typical planning condition in relation to construction noise issued by Local Authorities refer also to the compliance with BS 5228 part 1 as a means of controlling impacts to the surrounding environment. BS 5228 has therefore been used to inform the assessment approach for construction noise in line with Local Authorities requirements.

The TII published the 'Good Practice Guidance for the Treatment of Noise and Vibration in National Road Schemes'. These guidelines proposed design goals for noise related to construction and recommends a maximum noise level of 65 - 75 dB L_{Aeq} at noise sensitive receptors base on their baseline noise. Predicted noise levels have initially been assessed against these limits.
In addition to the TII criteria, based upon the analysis and summary of the results of the existing noise surveys undertaken for the Proposed Development. Table 10.1 sets out the BS 5228 'ABC' noise threshold categories.

Table 10.1: 'ABC' Assessment Category for Construction.

'ABC' Assessment Category for Construction	
ABC Category	**Construction Noise Limit**
A	65
B	70
C	75

A. Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are less than these values.

B. Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are the same as category A values.

C. Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are higher than category A values.

For the appropriate assessment period (i.e., daytime in this instance) the ambient noise level is determined and rounded to the nearest 5dB. If the construction noise exceeds the appropriate category value, then a significant effect is deemed to occur.

Vibration

In terms of vibration, *British Standard BS 5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Vibration* recommends that, for soundly constructed residential property and similar structures that are generally in good repair, a threshold for minor or cosmetic (i.e. non-structural) damage should be taken as a peak component particle velocity (in frequency range of predominant pulse) of 15mm/s at 4Hz increasing to 20mm/s at 15Hz and 50mm/s at 40Hz and above. The standard also notes that below 12.5 mm/s PPV the risk of damage tends to zero. It is therefore common, on a cautious basis to use this lower value. Taking the above into consideration the vibration criteria in Table 10.2 are recommended.

Table 10.2 Recommended Vibration Criteria During Construction Phase

Allowable vibration (in terms of peak particle velocity) at the closest part of sensitive property to the source of vibration, at a frequency of:		
Less than 15Hz	**15 to 40Hz**	**40Hz and above**
12 mm/s	20 mm/s	50 mm/s

10.2.3 Sound PLAN Noise Prediction Modelling Methodology

Sound PLAN has been developed to allow detailed noise predictions to be undertaken in accordance with:

- ISO 9613-2:1996 Acoustics – Attenuation of sound during propagation outdoors – Part 2 General methods of calculation.

The Sound PLAN noise prediction model allows for noise from all sources entered into the model to be undertaken simultaneously. The noise model can take topographical effects, ground absorption, screening effects, reflections and focusing effects, among others, into consideration. The modelling software calculates noise levels based on the emission parameters and spatial settings that are entered. The model calculates the propagation of the sound from each noise source and produces a noise level contour map and graphics in proximity to a facility with colour coded noise level contours. Model parameters, sources, and settings have been incorporated into the model as detailed in Table 10.3. The noise model has been produced to verify the noise readings taken on the existing Quarry site and confirms that the model is representative of the current onsite operations and provides an accurate verifiable prediction at all NSL's in the vicinity of the existing Quarry site. Thus, the noise prediction model provides an appropriate level of confidence when assessing specific noise impact from the proposed development of the Quarry site.

On 8th February 2022, a site noise survey was undertaken with source specific noise level readings taken in close proximity to the main noise sources on the Quarry subject to this planning application site. This allowed for the generation of accurate sound power levels for all main noise sources on the site. For the purposes of noise impact assessment, the Sound Power level (Lw) was determined by measuring

the Sound Pressure Level (LP) at a specific distance from the noise source and assuming a Directivity Index (Q) of 2, i.e., hemispherical propagation, using the following equation.

$$L_W = L_p + |10 \cdot \log\left(\frac{Q}{4\pi \cdot r^2}\right)|$$

Table 10.3: Modelling Parameters, Sources and Assumptions

Parameter	Source	Details
Horizontal distances – Quarry and surrounding area	Michael Fitzpatrick Architects	Scaled drawings in AutoCAD format.
Quarry Dimensions	Michael Fitzpatrick Architects	Scaled drawings in AutoCAD format.
Receiver Locations	Traynor Environmental	In outdoor amenity areas adjacent to nearest residential properties @ 1.5m height.
Plant types, location & Sound Power Level	Site operator	Source noise measurements were undertaken in close proximity to plant and equipment on site. This allowed for an accurate Sound Power Level L_w to be assigned to active plant.
Ground Absorption	Traynor Environmental	A Ground Absorption Rate – G = 0.5 has been used in the model, which is appropriate for the surrounding land type.

10.3 Assessment of Baseline Noise & Vibration Conditions

10.3.1 On-going Noise Compliance Monitoring

Table 10.4 summarises the noise monitoring surveys that have been undertaken from 2018 up to and including 2022 by Traynor Environmental. The noise monitoring surveys were carried out to record and assess the noise impacts that the quarry site activities have on the local receiving noise environment and to assess compliance with relevant Planning Conditions (Planning Permission Ref. no.051801 condition 12 & 14). The noise monitoring surveys have been conducted in accordance with ISO 1996-2, 2017 Acoustics – Description, Measurement and Assessment of Environmental Noise and with reference to the 2016 EPA publication, "Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4).

The Quarry site is located in the townland of Ardkill More and Drumcrow approximately 7km south west of the development boundaries of Cavan town and set back from the Cavan to Kilnaleck road (L2517). The surrounding lands can be characterised as rural in nature with land uses in the area identified as agricultural, extractive, and single dwelling houses (residential). The extractive industry is an established land use in the surrounding area dominated by the subject site.

Conditions 12 and 14 of planning granted under Ref No.051801 states that.

Condition 12

"During the operational phase of the proposed development, the noise level from within the premises, measured at noise sensitive locations in the vicinity shall not exceed: (a) an L_{Arl} value of 55dB(A) during the period 0800 hours to 1800 hours, Monday to Friday inclusive and 0800 hours to 1600 hours on Saturday, and (b) an L_{AeqT} value of 45dB(A) at any other time."

Condition 14

"There shall be no tonal component or impulsive component in the noise emission measured at any residence."

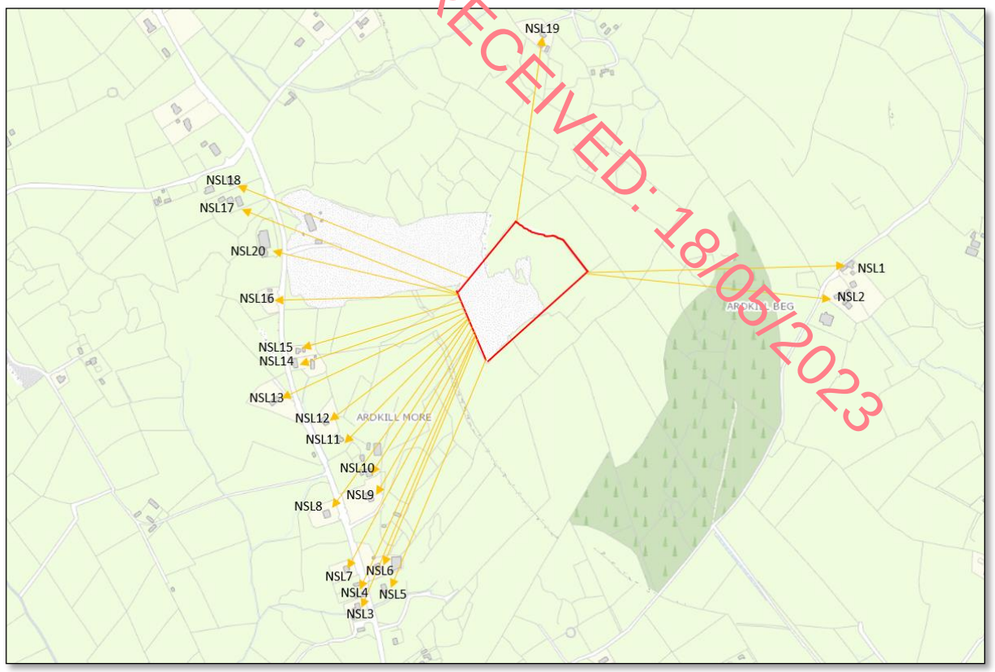
The recorded LAeq,T values at NM1,NM2 and NM3 at the boundary of the Quarry site from 2018 until 2022 consistently comply with the specified limit value and are consistent with previous noise survey results. Typically, at NM1, NM2 and NM3, the subjective commentary states either 'Quarry noise faintly audible' or 'Quarry noise not audible' at NM1, NM2 and NM3. Therefore, it is confirmed that the existing quarrying and operations at the Quarry have not a significant noise impact at the nearest residential properties to the site. The noise monitoring at NM1 & NM2 location is inclusive of the cumulative noise impacts from the Quarry site and Cavan to Kilnaleck road (L2517) adjacent to the Quarry site as presented below.

Table 10.4: Noise monitoring survey results from 2018 to 2022 at Nulty Quarry

Year	Location	Date	Time	$L_{Aeq, 30min}$	$L_{A90, 30min}$	$L_{A10, 30min}$	Notes
2018	NM1	12/02/2018	10.30	49	37	50	Quarry not audible
	NM2	12/02/2018	11.15	40	35	43	Quarry noise faintly audible
	NM3	12/02/2018	12.00	49	39	51	Quarry noise faintly audible
2019	NM1	07/02/2019	14.00	52	48	53	Quarry not audibles
	NM2	07/02/2019	14.45	40	36	44	Quarry noise faintly audible
	NM3	07/02/2019	15.30	50	41	53	Quarry noise faintly audible
2020	NM1	07/02/2020	09.30	50	40	52	Quarry not audible
	NM2	07/02/2020	10.15	42	37	45	Quarry noise faintly audible
	NM3	07/02/2020	11.00	50	40	53	Quarry noise faintly audible
2021	NM1	11/02/2021	14.30	49	38	51	Quarry not audible
	NM2	11/02/2021	15.00	41	36	44	Quarry noise faintly audible
	NM3	11/02/2021	15.45	51	41	54	Quarry noise faintly audible
2022	NM1	08/02/2022	10:00	46	36	50	Quarry not audible
	NM2	08/02/2022	10:45	44	35	48	Quarry noise faintly audible
	NM3	08/02/2022	11:30	48	42	51	Quarry noise faintly audible

Figure 10.1: Noise monitoring locations at Quarry site in Ardkill More and Drumcrow, Carrickaboy Co. Cavan.

Figure 10.2: Noise Sensitive Locations (NSLs) in proximity to the nearest residential properties to the Quarry site in Ardkill More and Drumcrow, Carrickaboy Co. Cavan.



10.3.2 Vibration Compliance Monitoring

In accordance with best practice, vibration monitoring with the use of a vibrograph has been undertaken for a blasts from 2017 - 2019 at the office beside the quarry entrance. The vibration monitoring results are provided in Table 10.5. The blast monitoring location relate to the most proximate structure to the extraction operations.

The DoEHLG Guidance provides a limit for ground-borne vibration: Peak particle velocity = 12 mm/s, measured in any of the three mutually orthogonal directions at the receiving location (for vibration with a frequency of less than 40 Hz). The DoEHLG Guidance provides a limit for Air overpressure: 125 dB (linear maximum peak value), with a 95% confidence limit. These limits are not exceeded by current blast practices.

Table 10.5 Blast Monitoring Result at John Nulty Ltd

Location	Date	PPV (mm/sec)	Air Overpressure (dBL)
Office at the quarry site	08th February 2019	1.03	106
Office at the quarry site	21st November 2018	1.10	120
Office at the quarry site	13th March 2018	1.08	112
Office at the quarry site	10th November 2017	1.12	116

10.4 Existing Noise & Vibration Impacts

The existing noise and vibration impacts outlined below have been prepared to accompany this Environmental Impact Assessment Report at the Quarry. Given that the proposal does not seek to introduce any additional operations then these are considered to be representative of the impacts that can be anticipated.

10.4.1 Existing Quarry Noise Impacts

A noise prediction model has been prepared to address the existing extraction operations and are presented in Table 10.6. Traynor Environmental undertook a noise survey on the 11th of February 2021 & 08th of February 2022 of the noise source on the existing quarry site QY7 for the purpose of generating a noise model. The noise sources are included in the noise prediction model. Table 10.6 below summaries the noise on site. Figure 10.3

Table 10.6 Noise sources on site.

Noise Sources	Noise level at 10m Distance (dB LAeq)
Loading Shovel (Komatsu)	83
Crusher/Screening 1 (Terex)	87
Crusher/Screening 2	88
Conveyor Belt (Barford TR6536)	76
HGV Being Loaded	75
Rock Breaker	89
Excavator (Komatsu)	76
Excavator (Doosan)	74

Figure 10.3: Location of Potential Noise Sources in the proposed Quarry area

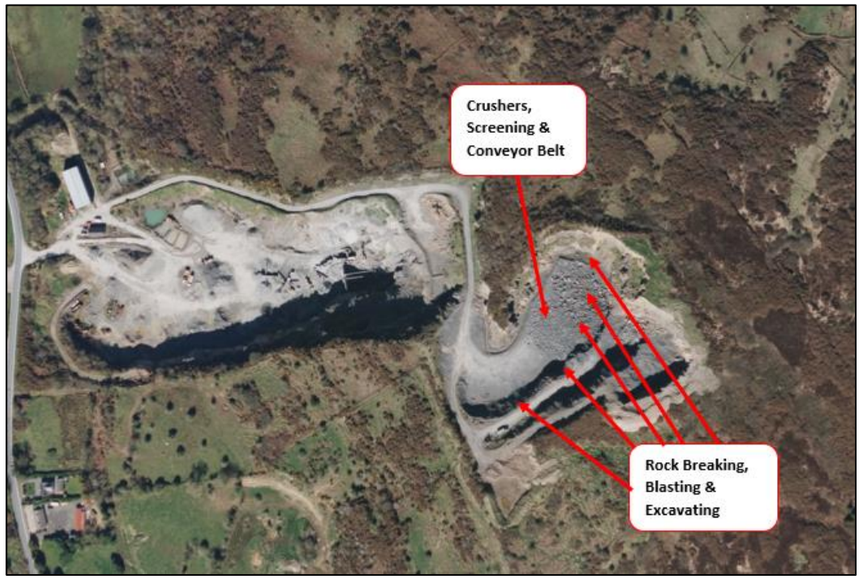


Table 10.7 Predicted noise levels from the operations in the Quarry site. (See Appendix 10A)

NSLs	Predicted Noise Level dB(A)	Receptor	Comment	Distance (m)/Direction from site activities
1	37.0	Residential	Within Limit	469(E)
2	33.4	Residential	Within Limit	454(E)
3	58.7	Residential	Local Road Noise	520(SW)
4	60.9	Residential	Road Noise	508(SW)
5	38.9	Residential	Within Limit	505(SW)
6	39.2	Residential	Within Limit	412(SW)
7	60.0	Residential	Local Road Noise	437(SW)
8	60.0	Residential	Local Road Noise	385(SW)
9	37.9	Residential	Within Limit	318(SW)
10	36.4	Residential	Within Limit	289(SW)
11	42.0	Residential	Within Limit	298(SW)
12	42.8	Residential	Within Limit	309(SW)
13	56.7	Residential	Local Road Noise	370(W)
14	48.9	Residential	Within Limit	309(W)
15	46.4	Residential	Within Limit	299(W)
16	59.6	Residential	Local Road Noise	331(NW)
17	53.5	Residential	Within Limit	348(NW)
18	53.5	Residential	Within Limit	416(NW)
19	35.5	Residential	Within Limit	448(N)
20	57.7	Commercial	Local Road Noise	334(NW)

The predicted daytime noise level of 42.0 dB(A) at NSL 11 indicates that the quarrying noise sources are not having a significant noise impact at the closest properties to the Quarry site relative to the quarry noise limits during daytime.

10.4.2 Existing Vibration Impacts

The drill rig operations and blasting for the quarrying process take place as required. The drilling using an air drill and compressor operates for approximately two days every six months. During the noise survey on 7th February 2019, the drill rig was in operation on the quarry floor, with a noise level of approximately 97 dB(A) at 1m from source.

Blasting of the rock results in an instantaneous noise impact. However, this is a very short – term noise impact and results in an instantaneous increase in noise levels during daytime hours with immediate reversion back to preceding noise levels. Blasting parameters including PPV and Air Overpressure have been set by the EPA for all quarrying proposed operations in Ireland. A typical sound level from blasting, measured at 15m from the source is 94 dB(A).

Table 10.8 outlines the predicted noise levels at the NSL's during blasting. The accepted reduction in noise levels with distance from a blast is based on the SoundPLAN Noise model in Appendix 10B. Table 10.8 summaries the noise from blasting at the NSL's.

Table 10.8 Predicted Noise Levels at the NSL's During Blasting. (See Appendix 10B)

NSLs	Predicted Noise Level dB(A)	Receptor	Comment	Distance (m)/Direction from site activities
1	42.0	Residential	Within Limit	469(E)

2	40.8	Residential	Within Limit	454(E)
3	58.7	Residential	Local Road Noise	520(SW)
4	60.9	Residential	Road Noise	508(SW)
5	42.4	Residential	Within Limit	505(SW)
6	42.5	Residential	Within Limit	412(SW)
7	60.0	Residential	Local Road Noise	437(SW)
8	60.0	Residential	Local Road Noise	385(SW)
9	42.0	Residential	Within Limit	318(SW)
10	41.7	Residential	Within Limit	289(SW)
11	44.1	Residential	Within Limit	298(SW)
12	44.6	Residential	Within Limit	309(SW)
13	56.7	Residential	Local Road Noise	370(W)
14	49.4	Residential	Within Limit	309(W)
15	47.4	Residential	Within Limit	299(W)
16	60.5	Residential	Local Road Noise	331(NW)
17	55.8	Residential	Within Limit	348(NW)
18	55.6	Residential	Within Limit	416(NW)
19	37.4	Residential	Within Limit	448(N)
20	59.1	Commercial	Local Road Noise	334(NW)

As indicated in Table 10.8, sensitive receivers within close proximity of the blasting site could be exposed to instantaneous noise levels increase of approximately 0-7 dB compared to the existing extraction operations at QY7. However, these blasts result in very short – term instantaneous noise impact in the vicinity of the proposed quarry extraction area and do not constitute a significant noise impact.

It is considered that the proposed deepening and continuation activities will replicate those that have already taken place previously, the levels of vibration likely to be experienced at the receptor properties will not to be significant in environmental terms. The most recent blast monitoring information has been provided in table 10.5. Accordingly, it is considered reasonable to assume that as the levels are within acceptable parameters throughout this period, then it is likely that this will continue to be achieved. Therefore, it is considered that there any potential vibration impact in relation to the on-going blasting is negligible.

The following general blast design control measures are to be followed to ensure compliance with recommended standards.

- The optimum blast ratio is maintained, and the maximum instantaneous charge is optimised.
- Explosive charges are properly and adequately confined by a sufficient amount and quality, of stemming.
- Accurate face surveys (profiling) are undertaken to assist with blast design and specification.
- No blasting is carried out outside 10:00 – 17.00 hours on working days (Monday to Friday). There is no blasting carried out on Saturdays, Sundays, or public holidays.
- All nearby dwellings are given advance notice of blasting.

10.5 Operation Phase

10.5.1 Predicted Noise Impacts

Noise prediction modelling has been undertaken for the application for the proposed extraction at the quarry site to assess specific future quarrying noise impacts.

The future proposed extraction is likely to be in accordance with noise level predictions assessed for existing extraction at the quarry site, and if anything, future noise levels should be lower/similar as development moves deeper into the Quarry void.

Noise levels have been predicted during periods of extraction when the excavation, crushing, screening and the drill rig operations are on-going in the quarry development. The predicted noise levels are indicative of worst-case continuous on-site activity.

Outlined in Table 10.9 are the predicted noise levels that will occur at the noise sensitive receivers from the worst case assumption from the Extraction Area.

Table 10.9 Predicted noise levels from the proposed quarrying activities (See Appendix 10C) Previously approved planning

NSLs	Predicted Noise Level dB(A)	Receptor	Comment	Distance (m)/Direction from site activities
1	37.0	Residential	Within Limit	469(E)
2	33.3	Residential	Within Limit	454(E)
3	58.7	Residential	Local Road Noise	520(SW)
4	60.9	Residential	Road Noise	508(SW)
5	38.8	Residential	Within Limit	505(SW)
6	39.1	Residential	Within Limit	412(SW)
7	60.0	Residential	Local Road Noise	437(SW)
8	60.0	Residential	Local Road Noise	385(SW)
9	37.9	Residential	Within Limit	318(SW)
10	36.4	Residential	Within Limit	289(SW)
11	42.0	Residential	Within Limit	298(SW)
12	42.8	Residential	Within Limit	309(SW)
13	56.7	Residential	Local Road Noise	370(W)
14	48.9	Residential	Within Limit	309(W)
15	46.4	Residential	Within Limit	299(W)
16	59.6	Residential	Local Road Noise	331(NW)

17	53.5	Residential	Within Limit	348(NW)
18	53.5	Residential	Within Limit	416(NW)
19	35.5	Residential	Within Limit	448(N)
20	57.7	Commercial	Local Road Noise	334(NW)

As shown in Table 10.9, the predicted noise levels at the NSLs due to the proposed quarrying activities are in accordance with suggested noise limit of 55 dB(A) during the worst-case period. The predicted noise levels are in line with noise levels which are presently experienced when similar quarrying operations are in operation.

10.5.2 Restoration Impacts

Subject to planning and when the proposed quarrying on the site cease, noise will be generated from the restoration works, de-commissioning of plant and equipment.

10.6 Predicted Noise When Quarry is Not in Operation

Prediction noise LAeq when quarry is not in operation was also modelled. The result at each NSL's. Results are presented in Table 10.10 below.

Table 10.10 Predicted Noise When Quarry is Not in Operation (See Appendix 10D)

NSLs	Predicted Noise Level dB(A)	Receptor	Comment	Distance (m)/Direction from site activities
1	37.0	Residential	Within Limit	469(E)
2	33.0	Residential	Within Limit	454(E)
3	58.7	Residential	Local Road Noise	520(SW)
4	60.9	Residential	Road Noise	508(SW)
5	38.8	Residential	Within Limit	505(SW)
6	39.1	Residential	Within Limit	412(SW)
7	60.0	Residential	Local Road Noise	437(SW)
8	60.0	Residential	Local Road Noise	385(SW)
9	37.9	Residential	Within Limit	318(SW)
10	36.4	Residential	Within Limit	289(SW)
11	41.9	Residential	Within Limit	298(SW)
12	42.8	Residential	Within Limit	309(SW)
13	56.7	Residential	Local Road Noise	370(W)
14	48.9	Residential	Within Limit	309(W)
15	46.3	Residential	Within Limit	299(W)
16	59.5	Residential	Local Road Noise	331(NW)
17	53.5	Residential	Within Limit	348(NW)
18	53.5	Residential	Within Limit	416(NW)
19	35.5	Residential	Within Limit	448(N)
20	57.7	Commercial	Local Road Noise	334(NW)

10.7 NSL's Summary

The following summaries the noise sources that have been considered in the noise assessment for the stone extraction:

- Existing noise
- Blasting noise
- Proposed noise.
- Not in Operation noise

Results are presented in Table 10.11 below.

Table 10.11 Existing, Blasting, Proposed Noise and Not in Operation Noise for Each NSL from the Quarry Extraction Area

NSLs	Period	Existing	Blasting	Proposed Noise	Not in Operation	Noise Limit L_{Aeq}	Comment
1	Daytime	37.0	42.0	37.0	37.0	55.00	Within Limit
2	Daytime	33.4	40.8	33.3	33.0	55.00	Within Limit
3	Daytime	58.7	58.7	58.7	58.7	55.00	Local Road Noise
4	Daytime	60.9	60.9	60.9	60.9	55.00	Road Noise
5	Daytime	38.9	42.4	38.8	38.8	55.00	Within Limit
6	Daytime	39.2	42.5	39.1	39.1	55.00	Within Limit
7	Daytime	60.0	60.0	60.0	60.0	55.00	Local Road Noise
8	Daytime	60.0	60.0	60.0	60.0	55.00	Local Road Noise
9	Daytime	37.9	42.0	37.9	37.9	55.00	Within Limit
10	Daytime	36.4	41.7	36.4	36.4	55.00	Within Limit
11	Daytime	42.0	44.1	42.0	41.9	55.00	Within Limit
12	Daytime	42.8	44.6	42.8	42.8	55.00	Within Limit
13	Daytime	56.7	56.7	56.7	56.7	55.00	Local Road Noise
14	Daytime	48.9	49.4	48.9	48.9	55.00	Within Limit
15	Daytime	46.4	47.4	46.4	46.3	55.00	Within Limit
16	Daytime	59.6	60.5	59.6	59.5	55.00	Local Road Noise

17	Daytime	53.5	55.8	53.5	53.5	55.00	Within Limit
18	Daytime	53.5	55.6	53.5	53.5	55.00	Within Limit
19	Daytime	35.5	37.4	35.5	35.5	55.00	Within Limit
20	Daytime	57.7	59.1	57.7	57.7	55.00	Local Road Noise

It can be seen from the above figures that the daytime noise criterion limits arising specifically from site operations at the sensitive receptors are met at all noise sensitive locations during site operations. The main source of noise at majority of the NSLs is the road noise from the L2517.

With reference to the Guidelines for Noise Impact Assessment produced by the Institute of Environmental Management and Assessment (IEMA), the cumulative short-term noise impact within the application area from plant associated with the rock extraction at all NSLs is negligible; long term associated noise effects are Negligible at all NSLs. In review of the finding's appendixes A B,C & D, it is considered that mitigation measures to reduce the noise impacts of plant associated with the planned development are not required.

10.8 Monitoring

Yearly noise monitoring surveys have been undertaken by Traynor Environmental at the overall Quarry site will continue. The noise monitoring surveys will continue to be carried out to evaluate and assess the noise impacts that the quarry site activities have on the local receiving noise environment and to assess compliance with standards contained within the former Planning Conditions. The noise monitoring survey will continue to be conducted according to ISO 1996-2, 2017 Acoustics – Description, Measurement and Assessment of Environmental Noise and with reference to the 2016 EPA publication, "Guidance Note for Noise: License Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4).

10.9 Construction Phase

The potential noise impacts associated with the construction of the proposed settlement pond are discussed in the following sections.

10.9.1 Noise

10.9.1.1 Noise Sensitive locations

A review of the noise survey and the threshold values detailed in Table 10.1 indicates that the daytime noise guidance limit for construction noise ranges from 65-75dB L_{Aeq}. It is assumed that construction works will be undertaken between 07:00-18:00 Monday to Friday, 08:00-14:00 on Saturdays, with no working on Sundays or bank holidays. However, where emergency work is required, out of hours work will be subject to approval from CCC. During the construction phase of the development works, a variety of items of plant will be in use, such as excavators and dumper trucks.

Noise levels experienced by noise sensitive locations (NSLs) during such works depend upon a number of variables, the most significant of which are:

- The noise generated by plant or equipment used on Site, generally expressed as Sound Power Levels (Lw) or the vibration generated by the plant.
- The periods of use of the plant on Site, known as its on-time.
- The distance between the noise/ vibration source and the NSL.
- The noise attenuation due to ground absorption, air absorption and barrier effects and
- The time of day or night the works are undertaken.

The closest NSLs have been identified as shown in Figure 10.4 and described below in Table 10.12. Table 10.12 also shows the L_{Aeq} at these locations. Figure 10.4 details the locations from the nearest façade of the neighbouring building to the proposed development.

Table 10.12: Description of NSLs and Noise Levels

Noise Sensitive Locations	Description	L_{Aeq}dB
Location NSL1	This represents a residential dwelling located along the local road to the west of the site approximately 121m from the potential nearest significant site work.	51
Location NSL2	This represents a residential dwelling located along the local road to the west of the site approximately 65m from the potential nearest significant site work.	50
Location NSL3	This represents a residential dwelling located along the local road to the west of the site approximately 59m from the potential nearest significant site work.	50
Location NSL4	This represents a residential dwelling located along the local road to the west of the site approximately 63m from the potential nearest significant site work.	49
Location NSL5	This represents a residential dwelling located along the local road to the west of the site approximately 116m from the potential nearest significant site work.	50
Location NSL6	This represents a residential dwelling located along the local road to the west of the site approximately 145m from the potential nearest significant site work.	50
Location NSL7	This represents a residential dwelling located along the local road to the northeast of the site approximately 129m from the potential nearest significant site work.	48
Location NSL8	This represents a residential dwelling located along the local road to the northeast of the site approximately 165m from the potential nearest significant site work.	48
Location NSL9	This represents a residential dwelling located along the local road to the northeast of the site approximately 194m from the potential nearest significant site work.	47

Figure 10.4: Site Context & Noise Assessment Locations

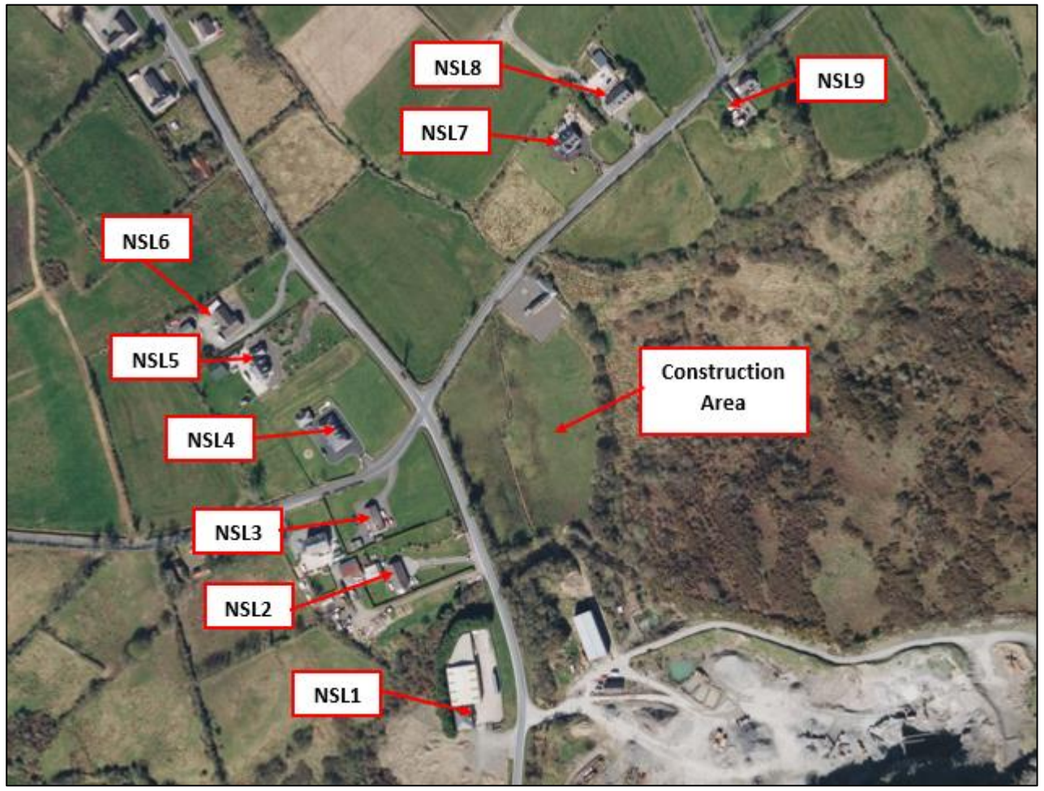


Table 10.13 sets out the BS 5228 'ABC' noise threshold categories at each NSL.

Table 10.13: Construction Phase L_{Aeq},T noise levels and associated 'ABC' assessment category At Each NSL

NSL	General Construction Phase Survey L_{Aeq}dB	ABC Category	Construction Noise Limit L_{Aeq},T dB
1	64	A	65
2	67	A	65
3	67	A	65
4	67	A	65
5	64	A	65
6	63	A	65
7	63	A	65
8	62	A	65
9	61	A	65

10.9.1.2 Predicted Construction Noise Levels

Predicted noise levels for construction of the proposed settlement pond have been based upon construction methods used for other similar developments. As a conservative approach, it is assumed that all plant and activities will be taking place at the closest approach to each NSLs, whereas in reality this will not always be the case and, in any event, activities are unlikely to occur for any significant duration. It is possible to predict typical noise levels using guidance set out in BS 5228-1:2009+A1:2014. Table 10.14 outlines typical plant items and associated noise levels that are anticipated for various phases of the construction.

Table 10.14: Predicted Noise Levels from Key Pieces of Equipment

Activity	Item of Plant (BS5228 Ref)	Noise level at 10m Distance (dB $L_{Aeq\ (1hour)}$)
General Construction	Dump Truck (C2.30)	79
	Tracked excavator (02.21)	71
	Telescopic Handler (C4.54)	79
	Hand Held Circular Saw (C4.72)	79
	Diesel Generator (C4.76)	61
	Cumulative General Construction	84

The calculations also assume that the equipment will operate for 66% of the 12-hour working day (i.e., 8 hours). It is assumed that construction works will take place during normal working hours only.

Predicted Noise Level at Various Locations

Table 10.15 below presents the predicted daytime noise levels from an indicative construction period at the NSLs.

Table 10.15: Indicative Construction Noise Levels at Nearest Noise Sensitive Locations

Construction Phase	Item of Plant (BS5228-1 Ref)	L_{Aeq} at distance (m)								
		NSL1	NSL2	NSL3	NSL4	NSL5	NSL6	NSL7	NSL8	NSL9
		121m	65m	59m	63m	116m	145m	129m	165m	194m
		dB	dB	dB	dB	dB	dB	dB	dB	dB
General Construction	Dump Truck (C2.30)	59	62	62	62	59	58	58	57	56
	Tracked excavator (02.21)	51	54	54	54	51	50	50	49	48
	Telescopic Handler (C4.54)	59	62	62	62	59	58	58	57	56
	Hand Held Circular Saw (C4.72)	59	62	62	62	59	58	58	57	56
	Diesel Generator (C4.76)	41	44	44	44	41	40	40	39	38
	Cumulative General Construction	**64**	**67**	**67**	**67**	**64**	**63**	**63**	**62**	**61**

A comparison of the predicted noise levels at NSLs with the BS 5228 ABC threshold values is provided in Table 10.16.

Table 10.16: Predicted construction noise level above threshold value.

NSL	Limits	Construction Phase
1	Construction Limit	65
	Level above limit	-1
	Magnitude of Impact	Low
2	Construction Limit	65
	Level above limit	+2
	Magnitude of Impact	Low
3	Construction Limit	65
	Level above limit	+2
	Magnitude of Impact	Low
4	Construction Limit	65
	Level above limit	+2
	Magnitude of Impact	Low
5	Construction Limit	65
	Level above limit	-1
	Magnitude of Impact	Low
6	Construction Limit	65
	Level above limit	-2
	Magnitude of Impact	Low
7	Construction Limit	65
	Level above limit	-2
	Magnitude of Impact	Low
8	Construction Limit	65
	Level above limit	-3
	Magnitude of Impact	Low
9	Construction Limit	65
	Level above limit	-4
	Magnitude of Impact	Low

The effects of the predicted daytime construction noise levels on NSLs have been classified by considering the daytime ABC noise threshold values.

At NSL1 (commercial), predicted noise levels did not exceed the TII limit of 65 dB LAeq during all the construction phase, Using the ABC method in BS 5228, the magnitude of impact during activities is low, resulting in a significance of effect of low in the absents of mitigation.

At NSL2 (residential), predicted noise level exceeded the TII limit of 65 dB LAeq during the construction phase, Using the ABC method in BS 5228, the magnitude of impact during activities is low, resulting in a significance of effect of low in the absents of mitigation.

At NSL3 (residential). predicted noise level exceeded the TII limit of 65 dB LAeq during the construction phase, Using the ABC method in BS 5228, the magnitude of impact during activities is low, resulting in a significance of effect of low in the absents of mitigation.

At NSL4 (residential), predicted noise level exceeded the TII limit of 65 dB LAeq during the construction phase, Using the ABC method in BS 5228, the magnitude of impact during activities is low, resulting in a significance of effect of low in the absents of mitigation.

At NSL5 (residential), predicted noise levels did not exceed the TII limit of 65 dB LAeq during all the construction phase, Using the ABC method in BS 5228, the magnitude of impact during activities is low, resulting in a significance of effect of low in the absents of mitigation.

At NSL6 (residential). predicted noise levels did not exceed the TII limit of 65 dB LAeq during all the construction phase, Using the ABC method in BS 5228, the magnitude of impact during activities is low, resulting in a significance of effect of low in the absents of mitigation.

At NSL7 (residential), predicted noise levels did not exceed the TII limit of 65 dB LAeq during all the construction phase, Using the ABC method in BS 5228, the magnitude of impact during activities is low, resulting in a significance of effect of low in the absents of mitigation.

At NSL8 (residential), predicted noise levels did not exceed the TII limit of 65 dB LAeq during all the construction phase, Using the ABC method in BS 5228, the magnitude of impact during activities is low, resulting in a significance of effect of low in the absents of mitigation.

At NSL9 (residential). predicted noise levels did not exceed the TII limit of 65 dB LAeq during all the construction phase, Using the ABC method in BS 5228, the magnitude of impact during activities is low, resulting in a significance of effect of low in the absents of mitigation.

10.9.2 Vibration

The main potential source of vibration during the construction phase is associated with ground-breaking activities. Empirical data for this activity is not provided in the BS 5228-2 standard, however the likely levels of vibration from this activity is expected to be significantly below the lower adopted criteria for building damage on experience from other sites.

10.10 Mitigation Measures

The mitigation measures associated with the construction & operational phases of the proposed development are discussed in the following sections.

10.10.1 Operation Phase

Noise Control at Source

If replacing a noisy item of plant is not a viable or practical option, consideration will be given to noise control "at source". This refers to the modification of an item of plant or the application of improved sound reduction methods in consultation with the supplier.

Referring to the potential noise generating sources for the works under consideration, the following best practice mitigation measures should be considered:

- For mobile plant items such as dump trucks, excavators and loaders, the installation of an acoustic exhaust and/or maintaining enclosure panels closed during operation can reduce noise levels by up to 10dB. Mobile plant should be switched off when not in use and not left idling.
- For steady continuous noise, such as that generated by diesel engines, it may be possible to reduce the noise emitted by fitting a more effective exhaust silencer system or utilising an acoustic canopy to replace the normal engine cover.
- All items of plant should be subject to regular maintenance. Such maintenance can prevent unnecessary increases in plant noise and can serve to prolong the effectiveness of noise control measures.

10.10.2 Construction Phase - Noise

With regard to construction activities, best practice control measures for noise and vibration from construction sites are found within BS 5228 (2009 +A1 2014) *Code of Practice for Noise and Vibration Control on Construction and Open Sites Parts 1 and* 2. Whilst construction noise and vibration impacts are expected to vary during the construction phase depending on the distance between the activities and noise sensitive buildings, the contractor will ensure that all best practice noise and vibration control methods will be used, as necessary in order to ensure impacts at off-site noise sensitive locations are minimised.

The best practice measures set out in BS 5228 (2009) Parts 1 and 2 includes guidance on several aspects of construction site mitigation measures, including, but not limited to:

- Selection of quiet plant.
- Noise control at source.
- Screening.
- Liaison with the public
- Monitoring

A detailed comment is offered on these items in the following paragraphs. Noise control measures that will be considered include the selection of quiet plant, enclosures, and screens around noise sources, limiting the hours of work and noise and vibration monitoring, where required.

Selection of Quiet Plant

This practice is recommended in relation to static plant such as generators. It is recommended that these units be supplied with manufacturers' proprietary acoustic enclosures. The potential for any item of plant to generate noise will be assessed prior to the item being brought onto the site. The least noisy item should be selected wherever possible. Should a particular item of plant already on the site be found to generate high noise levels, the first action should be to identify whether or not said item can be replaced with a quieter alternative.

Noise Control at Source

If replacing a noisy item of plant is not a viable or practical option, consideration will be given to noise control "at source". This refers to the modification of an item of plant or the application of improved sound reduction methods in consultation with the supplier. For example, resonance effects in panel work or cover plates can be reduced through stiffening or application of damping compounds; rattling and grinding noises can often be controlled by fixing resilient materials in between the surfaces in contact.

Referring to the potential noise generating sources for the works under consideration, the following best practice mitigation measures should be considered:

- For mobile plant items such as dump trucks, excavators and loaders, the installation of an acoustic exhaust and/or maintaining enclosure panels closed during operation can reduce noise levels by up to 10dB. Mobile plant should be switched off when not in use and not left idling.
- For steady continuous noise, such as that generated by diesel engines, it may be possible to reduce the noise emitted by fitting a more effective exhaust silencer system or utilising an acoustic canopy to replace the normal engine cover.
- For compressors, generators, and pumps, these can be surrounded by acoustic lagging or enclosed with in acoustic enclosures providing air ventilation.
- All items of plant should be subject to regular maintenance. Such maintenance can prevent unnecessary increases in plant noise and can serve to prolong the effectiveness of noise control measures.

Screening

Screening is an effective method of reducing the noise level at a receiver location and can be used successfully as an additional measure to all other forms of noise control. Construction site hoarding will be constructed around the proposed settlement pond. The hoarding will be constructed of a material with a mass per unit of surface area greater than 7 kg/m^2 to provide adequate sound insulation.

Liaison with the Public

A designated environmental liaison officer will be appointed to site during construction works. Any noise complaints should be logged and followed up in a prompt fashion by the liaison officer. In addition, where a particularly noisy construction activity is planned or other works with the potential to generate high levels of noise, or where noisy works are expected to operate outside of normal working hours etc., the liaison officer will inform the nearest noise sensitive locations of the time and expected duration of the noisy works.

Monitoring

Where required, construction noise monitoring will be undertaken at periodic sample periods at the nearest noise sensitive locations to the development works to check compliance with the construction noise criterion.

Noise monitoring should be conducted in accordance with the International Standard ISO 1996: 2017: *Acoustics - Description, measurement, and assessment of environmental noise*.

10.10.3 Construction Phase - Vibration

The vibration from construction activities will be limited to the values set out in table 10.2 above. Magnitudes of vibration slightly greater than those in the table are normally unlikely to cause cosmetic damage, but construction work creating such magnitudes should proceed with caution. Limit values have been provided for soundly constructed residential and commercial properties.

10.11 Conclusions

Traynor Environmental Limited was commissioned to undertake a noise assessment to accompany an EIAR for the proposed deepening and extraction at Nulty's Quarry, Ardkill More and Drumcrow, Carrickaboy, Co. Cavan.

Existing noise levels were measured at locations representing noise-sensitive locations within the vicinity of the site.

A series of noise level predictions associated with proposed activities at the site have been made to the identified noise-sensitive locations and these have been assessed against criteria outlined within EPA Guidelines.

All predictions have been calculated with the combinations of plant working at the closest point to each assessment location. They are therefore worst-case scenarios which may be of relatively short duration. However, they indicate the maximum LAeq,1h (free-field) noise level to which a particular property or group of properties may be exposed during the working of the site. By definition, the worst-case situation may occur intermittently over the lifetime of the site, but longer term noise levels perceived outside of the site boundary would normally be significantly less.

The results of the assessment demonstrate that the proposed development can be implemented by the operator whilst adhering to the noise standards contained within current Guidance for mineral sites.

It is therefore considered that there will be no significant or unacceptable adverse impacts at noise-sensitive premises in the vicinity of the proposed operations. A range of recommendations have been made to minimise potential noise emissions associated with the operation of the site.

The overall potential noise impact of the development is considered to be in line with national and local planning policy which seeks to prevent and avoid any significant or unacceptable adverse impacts and, where necessary, mitigate and reduce to a minimum potential adverse impact.

10.12 Residual Impacts

10.12.1 Construction Phase

During the construction phase of the project there is the potential for low impacts on nearby noise sensitive properties due to noise emissions from site activities.

This stage of construction will generate low levels of noise generated principally as a result of works involving machinery. As these works will be short term, there will not be a significant noise impact from these activities.

The application of binding noise limits, hours of operation, along with implementation of appropriate noise and vibration control measures, will ensure that noise and vibration impact will have a negative, moderate, and short-term impact on the surrounding environment.

10.13 'Do-Nothing' Scenario

Should the project not proceed there would be no increase in noise emanating from the site.

10.14 'Worst-Case' Scenario

The 'worst case' scenario is that the development is not constructed as per the drawings and details provided in the planning application. While one would expect the development is required to be constructed in accordance with the planning documents.

10.15 Difficulties In Compiling Information

No difficulties were encountered during the preparation of the EIAR chapter.

10.16 Reference

- BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites - Part 1 - Noise.
- BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites - Part 2 -Vibration.
- BS 6841 (1987): Measurement and evaluation of human exposure to whole-body mechanical vibration and repeated shock
- BS 4142: 2014: Methods for Rating and Assessing Industrial and Commercial Sound.
- Design Manual for Roads and Bridges, 2011
- EPA Advice Notes for Preparing Environmental Impact Statements, (Draft, September 2015).
- EPA Advice Notes on Current Practice (in the preparation of Environmental Impact Statements), (EPA, 2003);
- EPA Guidelines on the Information to be contained in Environmental Impact Statements, (EPA, 2002);
- EPA Guidelines on the Information to be contained in Environmental Impact Assessment Reports, (Draft August 2017)
- ISO 1996: 2017: Acoustics - Description, measurement and assessment of environmental noise.
- The Transport Infrastructure Ireland (TII, formerly NRA) Good Practice Guidance for the Treatment of Noise during the Planning of National Road Schemes (TII, 2014), the Guidelines for the Treatment of Noise and Vibration in National Road Schemes (TII, 2004) was also considered in the preparation of the assessment. This document sets out noise and vibration limits for the construction phase which are generally applied by planning authorities to all construction projects.
- The Professional Guidance on Planning & Noise (ProPG), May 2017
- EPA's Guidelines on the Information to be Contained in Environmental Impact Assessment Reports' (2022).

APPENDIX 10A - PREDICTED NOISE LEVELS FROM THE PROPOSED DEEPENING AND EXTRACTION OPERATIONS IN THE QUARRY SITE

Figure 10 A.1 Single Point Map

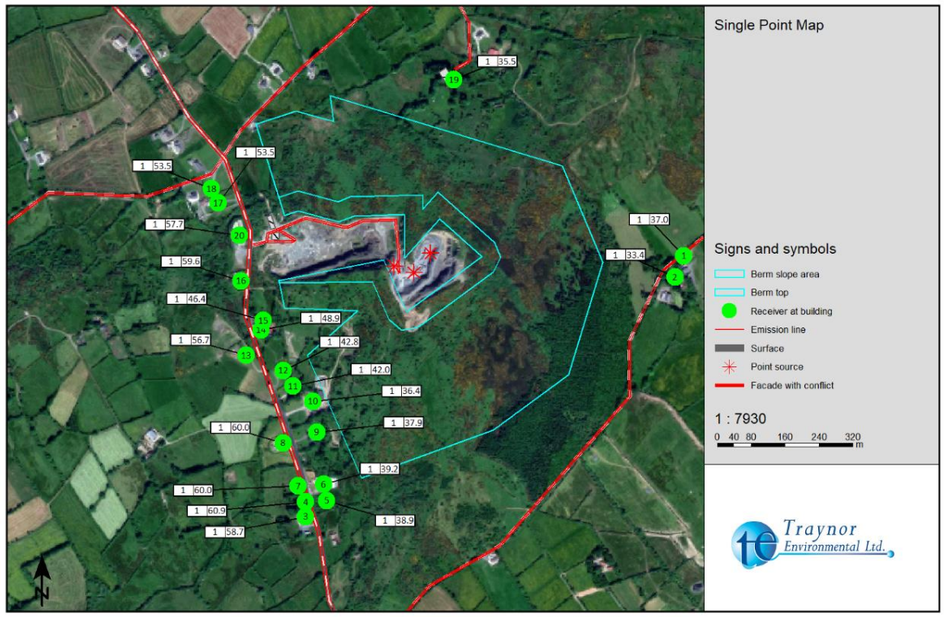
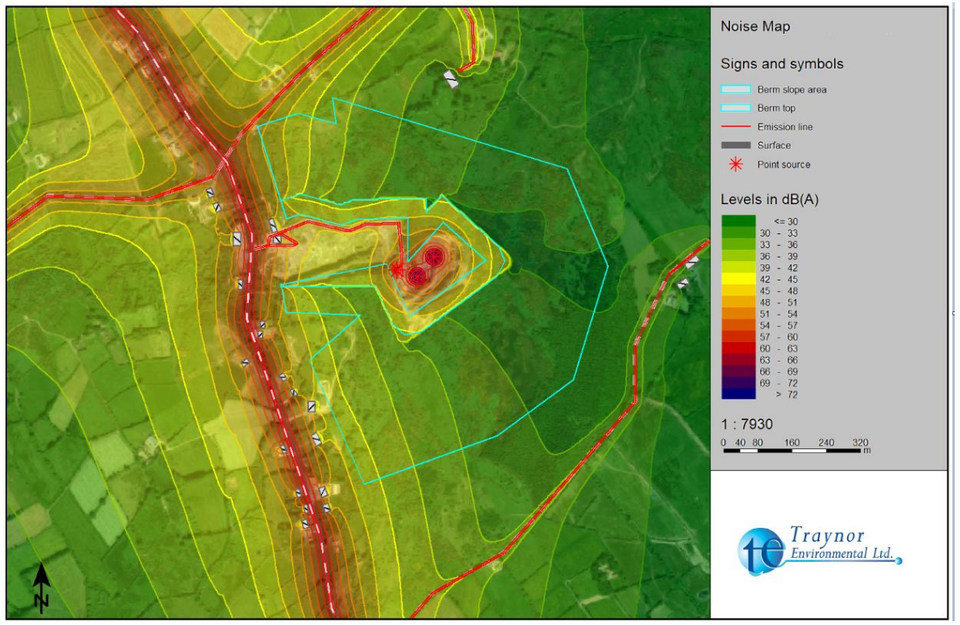


Figure 10 A.2 Noise Map Day From proposed quarry operations



APPENDIX 10B - Predicted Noise Levels at the NSL's During Proposed Blasting

Figure 10 B.1 Single Point Map

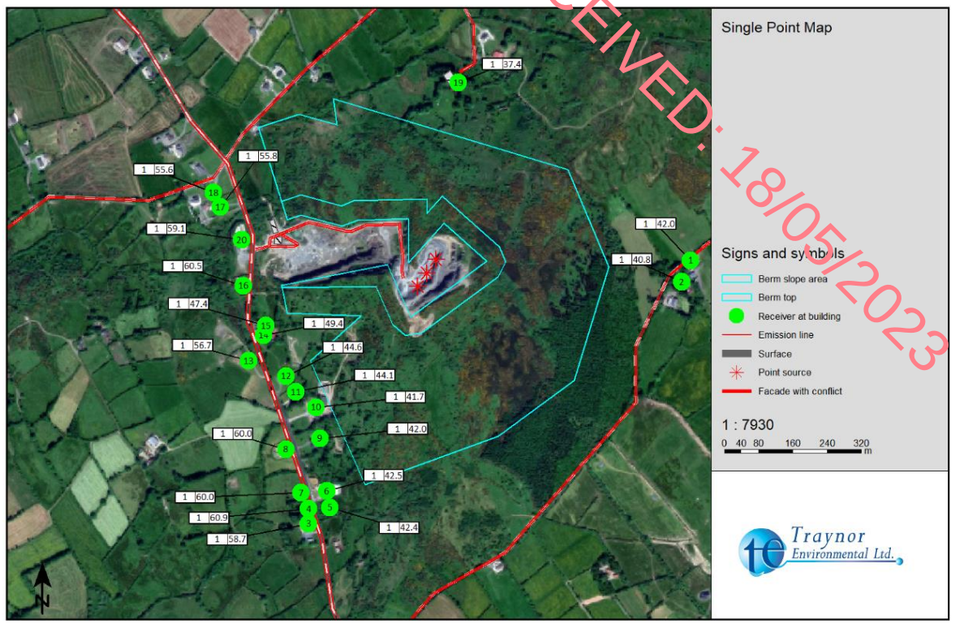
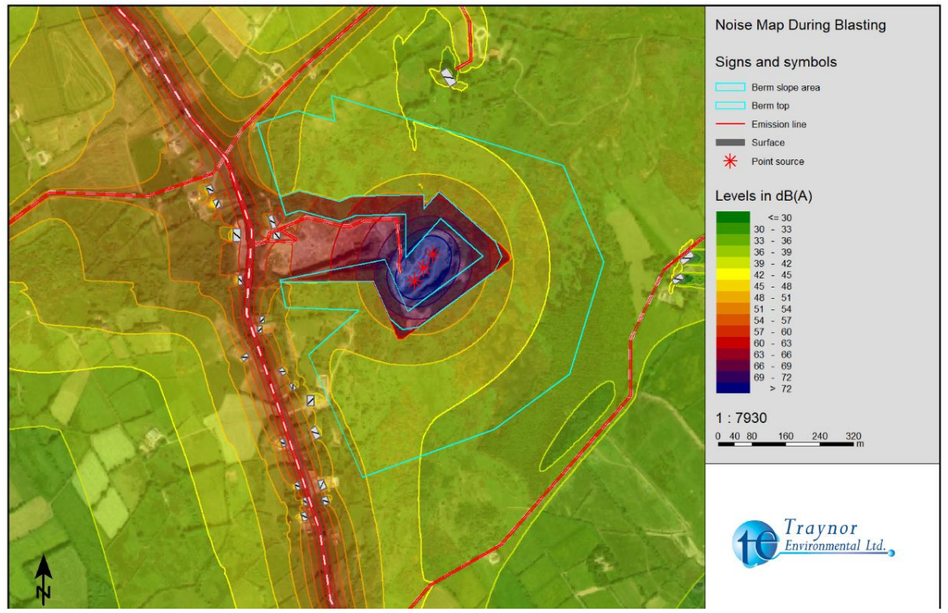


Figure 10 B.2 Noise Map During Proposed Blasting



APPENDIX 10C Predicted Noise Levels from The Proposed Quarrying Activities

Figure 10 C.1 Single Point Map

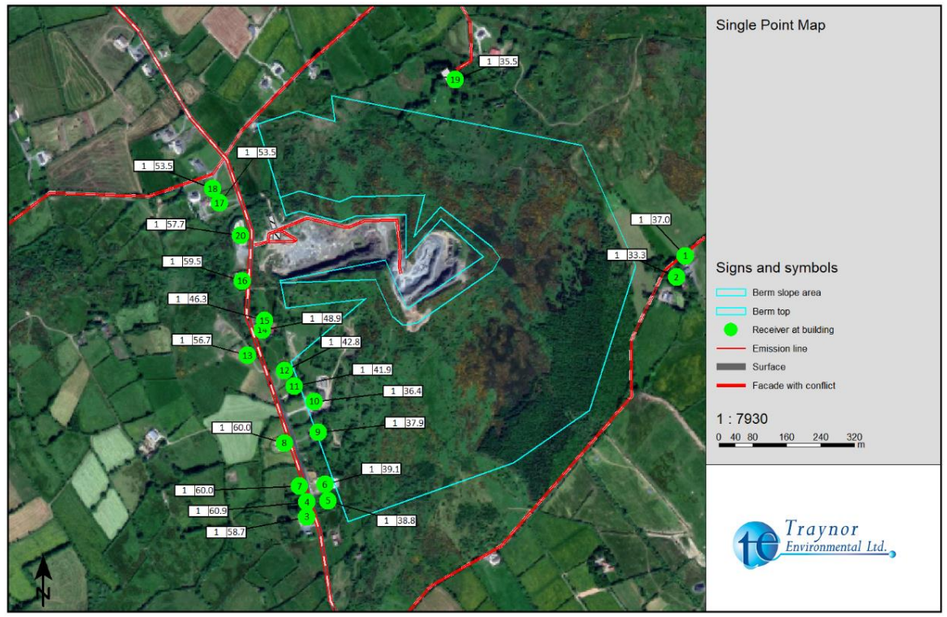
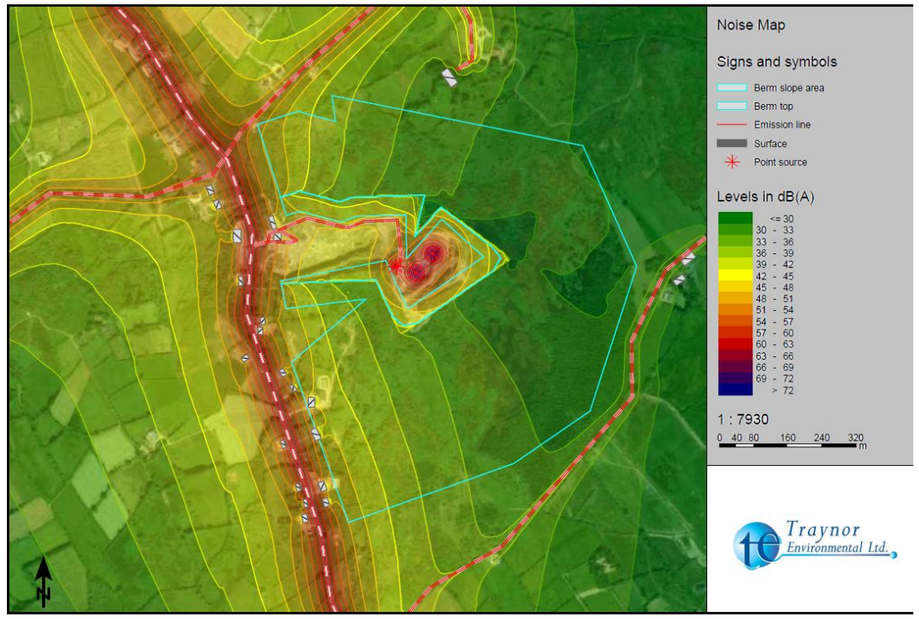


Figure 10 C.2 Noise Map Day



APPENDIX 10D Predicted Noise When Quarry is Not in Operation

Figure 10 D.1 Single Point Map

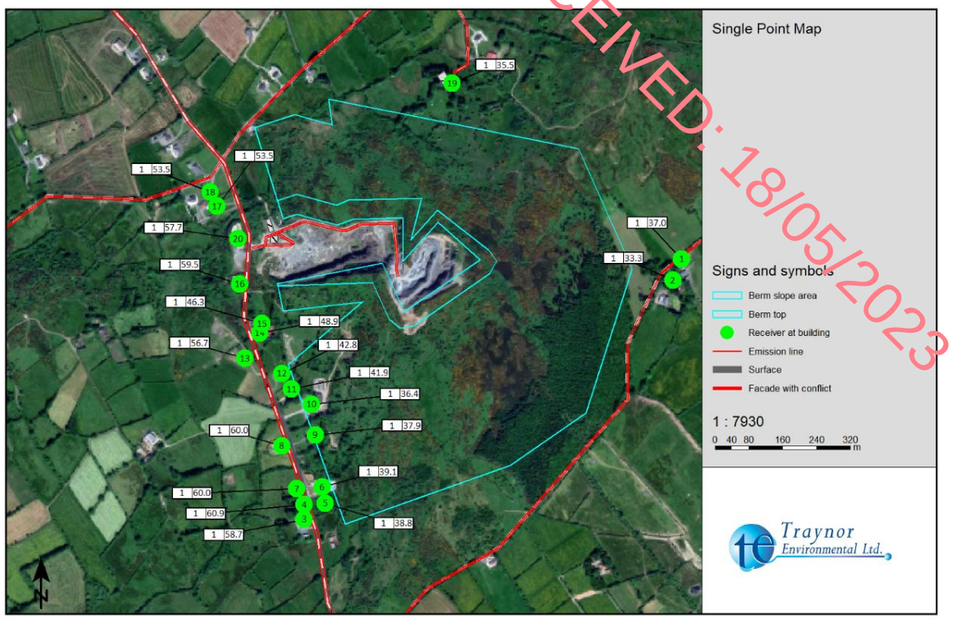
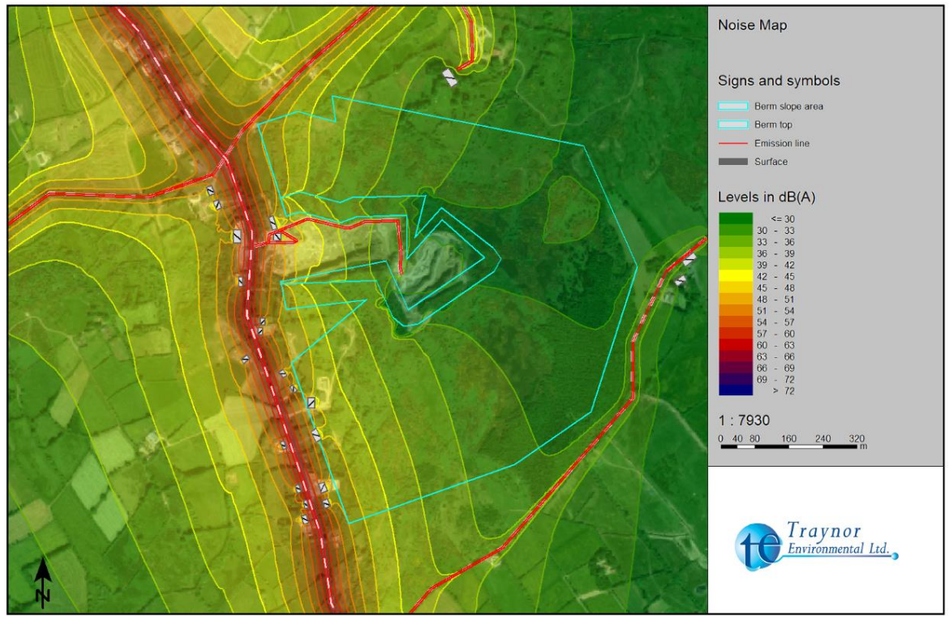


Figure 10 D.2 Noise Map Day



APPENDIX 10E CALIBRATION CERTIFICATE

MTS Calibration Ltd,
The Grange Business Centre,
Belasis Avenue,
Billingham TS23 1LG,
England
Telephone: 01642 876 410

CERTIFICATE OF CALIBRATION

Page 1 of 12 pages

Issued by: MTS Calibration Ltd

Approved Signatory:

Tony Sherris

Date of Issue: 02 September 2022 Certificate Number: 37332

Sound Level Meter

Sound Level Meter Periodic Tests to EN 61672-3: 2013 Class 1

Client: Traynor Environmental Ltd

Instrument Make: Larson Davis
Instrument Model: 831
Serial Number: 0003913

Associated Equipment	Make	Model	Serial number
Preamplifier	Larson Davis	PRM831	036768
Microphone	PCB	377B02	302020
Calibrator	Cirrus	CR:515	44501
Calibrator supplied by	the Client, with the SLM		

The measurements were performed at The Grange Business Centre, Belasis Avenue, TS23 1LD. The results only apply to the items tested.

Periodic tests were performed in accordance with procedures from IEC 61672-3:2013 Class 1

Test results summary, detailed results are shown on subsequent pages.

Tests performed	Section	Results of test	Page	Comments
Calibration Certificate	22		1	
Additional information			2	
Indication with Calibrator Supplied	10	No Limit	3	
Self-Generated Noise	11	No Limit	3	
Frequency and Time-weightings at 1kHz	14	Complies	3	
Long term stability	15	Complies	3	
High stability	21	Complies	3	
Acoustic Tests	12	Complies	4	
Frequency Weighting A	13	Complies	5	
Frequency Weighting C	13	Complies	6	
Frequency Weighting Z	13	Complies	7	
Level Linearity	16	Complies	8	
Level Linearity Range Control	17	Complies	9	0
Tone-burst Response	18	Complies	10	
Peak C sound level	19	Complies	11	
Overload indication	20	Complies	12	

The instrument was within the above specification as received - no modifications were made

The sound level meter submitted for testing has successfully completed the periodic tests of IEC 61672-3: 2013 for the environmental conditions under which the tests were performed. As evidence was publicly available, from an independent testing organisation responsible for approving the results of pattern evaluation tests performed in accordance with IEC 61672-2: 2013, to demonstrate that the model of sound level meter fully conformed to the Class 1 specifications in IEC 61672-1: 2013, the sound level meter submitted for testing conforms to the Class 1 specifications of IEC 61672-1: 2013

Additional tests performed	Reference	
Microphone full frequency response	37334	See additional certificate
Filter calibration, third octave or octave	37332F	See additional certificate
Calibrator calibration	37335U	See additional UKAS certificate

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CERTIFICATE OF CALIBRATION

Page 1 of 3 pages

Issued by: MTS Calibration Ltd

Approved Signatory:

Tony Sherris

Date of Issue: 02 September 2022 Certificate Number: 37332F

Third Octave Band Filter

Third-Octave Band Filter verification to BS EN 61260:1996

Client: Traynor Environmental Ltd

Instrument Make: Larson Davis
Instrument Model: LxT1
Serial Number: 0003913

Associated Sound Level Meter		Associated Preamplifier	
Instrument Make:	Larson Davis	Instrument Make:	Larson Davis
Instrument Model:	LxT1	Instrument Model:	PRM831
Serial Number:	0003913	Serial Number:	036768
Calibrated by:	MTS Calibration		
Certificate Number:	37332		
Date of SLM calibration	02 August 2022		
Date of receipt	11 August 2022		

The measurements were performed at The Grange Business Centre, Belasis Avenue, TS23 1LD. The results only apply to the item(s) tested.

Third-Octave Band Filter Compliance with BS EN 61260: 1996 Class 1

Test results summary. Detailed results are shown on subsequent pages.

		Comments
- Tabular Data		See Page 2
- Graphic Data for 125Hz filter	Complies	See Page 3
- Graphic Data for 1kHz filter	Complies	See Page 3
- Graphic Data for 8kHz filter	Complies	See Page 3

Because each digital filter will have the same amplitude characteristic relative to its centre frequency, only three filters were measured at each of the test frequencies specified by BS EN 61260:1996 for exact base 10 distribution. The measurements made were relative to the attenuation of the 1kHz filter at 1kHz input frequency and input level 7 V. Because the measurements include a linearity contribution from the sound level meter, and could be variable with frequency, the assessment is valid only for this pairing. The sound level meter was set for "Linear" frequency response on the lowest range setting which did not give overload at any test frequency or test level. Its compliance with the standard was assessed by referring the measurements to the tolerances specified.

Agreed and reported Decision Rule:

"Complies" indicates that the instrument conforms with the relevant accuracy requirements of the testing standard AND the expanded measurement uncertainty (k = 2 for approximately 95 % coverage probability) is no greater in magnitude than the accuracy requirements defined in BS EN 61260:1996.

Comments

The sound level meter and preamplifier were calibrated as a unit.
The input level used is selected to produce a sound level at 1kHz that is close to but not exceeding the maximum level on the reference range.
The centre frequency sequence of this filter set follows the exact base 10 midband frequency sequence of IEC 61260 and the measurements have been made accordingly.

Measurement Conditions:			
Temperature	23.6	°C	± 1 °C
Atmospheric Pressure	1014.2	mBar	± 2 mBar
Relative Humidity	55.1	%	± 5 %

Uncertainties of measurements:		
Within Passband (0.89 to 1.12 of centre frequency)	0.42	dB
Outside Passband	2.49	dB

Test Equipment:

Equipment	Manufacturer	Model	Serial No.	Traceability Ref.	Cal. Due
Signal Generator (set 3)	HP	33120A	US34007158	TE 163	Sep-22

Certificate of Calibration

MTS Calibration

Certificate Number: 37334

Measurement Microphone
Half-Inch diameter – Free-Field, 0 degree incidence response

Client: Traynor Environmental Ltd

Instrument Make: Larson Davis
Instrument Model: 377B02
Serial Number: 302020

Sensitivity is calculated by the Insert Voltage method. The frequency response calibration is one of three independent measurements of the pressure response of the Object Microphone obtained by the Electrostatic Actuator measurement method. Microphone Capacitance is the polarised capacitance of the test microphone measured on a capacitance bridge relative to a reference microphone.

The frequency response, capacitance, and sensitivity of the microphone are shown graphically on Page 2
Uncertainties of these measurements are:

31.5 Hz to 4kHz	0.41 dB (k = 2.04)
5kHz to 10 kHz	0.87 dB (k = 2.17)
12.5 kHz to 40 kHz	1.81 dB (k = 2.17)
Sensitivity at 250Hz	0.16 dB (k = 2.0)

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k (as above) to provide a level of confidence of approximately 95%. The uncertainty evaluation has been calculated in accordance with UKAS publication M 3003 (December 1997).

Measurement Conditions:

Polarisation Voltage	0V +/- 0.5V
Temperature	23.6 °C
Atmospheric Pressure	1016 mBar **
Relative Humidity	45.6 %

** Note that the computer-produced Certificate shows a Pressure of 1040.6 mbar this is in error. The above measurement is traceable

Test Equipment:

Equipment	Manufacturer	Model	Serial No.	Traceability Ref.	Cal. Due
Condenser Microphone	Larson Davis	2541	7300	TE 157	November 2022
Acoustic Calibrator 250Hz	Larson Davis	CA250	2807	TE 104	November 2023
Real-Time Frequency Analyser	Larson Davis	2900	0492	TE 108	July 2023
Signal Generator	Hewlett Packard	33120A	US36016577	TE 111	September 2022
Digital Multimeter	Hewlett Packard	34401A	3146A63804	TE 105	September 2022

Date of Receipt : 11th August 2022
Date of Calibration : 17th August 2022
Date of Certificate: 17th August 2022

Authorised Signatory: .....
Tony Sherris
Page 1 of 2

This Certificate provides traceability of measurement to recognised national standards, and to units of measurement realised at the National Physical Laboratory or other recognised national standards laboratories. This Certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory

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MTS Calibration

MTS Calibration Ltd
The Grange Business Centre,
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Billingham TS23 1LG,
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Telephone: 01642 876 410

CERTIFICATE OF CALIBRATION

Page 1 of 11 pages

Issued by: MTS Calibration Ltd

Approved Signatory:

Tony Sherris

Date of Issue: 02 September 2022 Certificate Number: 37321

Sound Level Meter
Sound Level Meter Periodic Tests to EN 61672-3: 2013 Class 1

Client: Environmental Measurements
Unit 12, Tallaght Business Centre
Whitestown Business Park
Co.Dublin 24, Ireland

Instrument Make: Larson Davis
Instrument Model: LxT1L
Serial Number: 0005901

Associated Equipment	Make	Model	Serial number
Preamplifier	Larson Davis	PRMLxT1L	055773
Microphone	PCB	377B02	325451
Calibrator	Larson Davis	CAL200	9175
Calibrator supplied by	MTS for this calibration		

The measurements were performed at The Grange Business Centre, Belasis Avenue, TS23 1LD. The results only apply to the items tested.

Periodic tests were performed in accordance with procedures from IEC 61672-3:2013 Class 1

Test results summary, detailed results are shown on subsequent pages.

Tests performed	Section	Results of test	Page	Comments
Calibration Certificate	22		1	
Additional information			2	
Indication with Calibrator Supplied	10	No Limit	3	
Self-Generated Noise	11	No Limit	3	
Frequency and Time-weightings at 1kHz	14	Complies	3	
Long term stability	15	Complies	3	
High stability	21	Complies	3	
Acoustic Tests	12	Complies	4	
Frequency Weighting A	13	Complies	5	
Frequency Weighting C	13	Complies	6	
Frequency Weighting Z	13	Complies	7	
Level Linearity	16	Complies	8	
Level Linearity Range Control	17		n/a	SLM only has one range
Tone-burst Response	18	Complies	9	
Peak C sound level	19	Complies	10	
Overload indication	20	Complies	11	

The instrument was within the above specification as received - no modifications were made

The sound level meter submitted for testing has successfully completed the periodic tests of IEC 61672-3: 2013 for the environmental conditions under which the tests were performed. As evidence was publicly available, from an independent testing organisation responsible for approving the results of pattern evaluation tests performed in accordance with IEC 61672-2: 2013, to demonstrate that the model of sound level meter fully conformed to the Class 1 specifications in IEC 61672-1: 2013, the sound level meter submitted for testing conforms to the Class 1 specifications of IEC 61672-1: 2013

Additional tests performed	Reference	
Microphone full frequency response	37323	See additional certificate
Filter calibration, third octave or octave	37321F	See additional certificate

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

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Telephone: 01642 876 410

CERTIFICATE OF CALIBRATION

Page 1 of 3 pages

Approved Signatory: Tony Sherris

Issued by: MTS Calibration Ltd

Date of Issue: 05 September 2022 Certificate Number: 37321F

Third Octave Band Filter

Third-Octave Band Filter verification to BS EN 61260:1996

Client: Traynor Enviranmental Ltd

Instrument Make: Larson Davis
Instrument Model: LxT1
Serial Number: 0005901

Associated Sound Level Meter		*Associated Preamplifier*	
Instrument Make:	Larson Davis	*Instrument Make:*	Larson Davis
Instrument Model:	LxT1	*Instrument Model:*	PRMLxT1L
Serial Number:	0005901	*Serial Number:*	055773
Calibrated by:	MTS Calibration		
Certificate Number:	37321		
Date: of SLM calibration	02 September 2022		
Date: of receipt	11 August 2022		

The measurements were performed at The Grange Business Centre, Belasis Avenue, TS23 1LD. The results only apply to the item(s) tested.

Third-Octave Band Filter Compliance with BS EN 61260: 1996 Class 1

Test results summary. Detailed results are shown on subsequent pages.

		Comments
- Tabular Data		See Page 2
- Graphic Data for 125Hz filter	Complies	See Page 3
- Graphic Data for 1kHz filter	Complies	See Page 3
- Graphic Data for 8kHz filter	Complies	See Page 3

Because each digital filter will have the same amplitude characteristic relative to its centre frequency, only three filters were measured at each of the test frequencies specified by BS EN 61260:1996 for exact base 10 distribution. The measurements made were relative to the attenuation of the 1kHz filter at 1kHz input frequency and input level V. Because the measurements include a linearity contribution from the sound level meter, and could be variable with frequency, the assessment is valid only for this pairing. The sound level meter was set for "Linear" frequency response on the lowest range setting which did not give overload at any test frequency or test level. Its compliance with the standard was assessed by referring the measurements to the tolerances specified.

Agreed and reported Decision Rule:

"Complies" indicates that the instrument conforms with the relevant accuracy requirements of the testing standard AND the expanded measurement uncertainty (k = 2 for approximately 95 % coverage probability) is no greater in magnitude than the accuracy requirements defined in BS EN 61260:1996.

Comments

The sound level meter and preamplifier were calibrated as a unit.
The input level used is selected to produce a sound level at 1kHz that is close to but not exceeding the maximum level on the reference range.
The centre frequency sequence of this filter set follows the exact base 10 midband frequency sequence of IEC 61260 and the measurements have been made accordingly.

Measurement Conditions:			Uncertainties of measurements:		
Temperature	22.3 °C	± 1 °C	Within Passband (0.88 to 1.12 of centre frequency)	0.42	dB
Atmospheric Pressure	1013.8 mBar	± 2 mBar	Outside Passband	2.46	dB
Relative Humidity	58.6 %	± 5 %			

Test Equipment:

Equipment	Manufacturer	Model	Serial No.	Traceability Ref.	Cal. Due
Signal Generator (set 3)	HP	33120A	US34007158	TE 163	Sep-22

This certificate is issued in accordance with the laboratories work procedures.
It provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

Certificate of Calibration

Certificate Number: 37323

Measurement Microphone
Half-Inch diameter – Free-Field, 0 degree incidence response

Client: Traynor Environmental Ltd

Instrument Make: Larson Davis
Instrument Model: 377B02
Serial Number: 325451

Sensitivity is calculated by the Insert Voltage method. The frequency response calibration is one of three independent measurements of the pressure response of the Object Microphone obtained by the Electrostatic Actuator measurement method. Microphone Capacitance is the polarised capacitance of the test microphone measured on a capacitance bridge relative to a reference microphone.

The frequency response, capacitance, and sensitivity of the microphone are shown graphically on Page 2
Uncertainties of these measurements are:

31.5 Hz to 4kHz	0.41 dB (k = 2.04)
5kHz to 10 kHz	0.87 dB (k = 2.17)
12.5 kHz to 40 kHz	1.81 dB (k = 2.17)
Sensitivity at 250Hz	0.16 dB (k = 2.0)

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k (as above) to provide a level of confidence of approximately 95%. The uncertainty evaluation has been calculated in accordance with UKAS publication M 3003 (December 1997).

Measurement Conditions:

Polarisation Voltage	0V +/- 0.5V
Temperature	23.7 °C
Atmospheric Pressure	1016 mBar **
Relative Humidity	45.9 %

** Note that the computer-produced Certificate shows a Pressure of 1043.5 mbar - this is in error. The above measurement is traceable

Test Equipment:

Equipment	Manufacturer	Model	Serial No.	Traceability Ref.	Cal. Due
Condenser Microphone	Larson Davis	2541	7300	TE 157	November 2022
Acoustic Calibrator 250Hz	Larson Davis	CA250	2807	TE 104	November 2023
Real-Time Frequency Analyser	Larson Davis	2900	0492	TE 108	July 2023
Signal Generator	Hewlett Packard	33120A	US36016577	TE 111	September 2022
Digital Multimeter	Hewlett Packard	34401A	3146A63804	TE 105	September 2022

Date of Receipt : 11th August 2022
Date of Calibration : 17th August 2022
Date of Certificate: 17th August 2022

Authorised Signatory: .....
Tony Sherris

Page 1 of 2

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CERTIFICATE OF CALIBRATION

Approved Signatory:

Tony Sherris

Issued by: MTS Calibration Ltd

Date of Issue: 01 September 2022 **Certificate Number:** 37324

Sound Level Meter

Sound Level Meter Periodic Tests to EN 61672-3: 2013 Class 1

Client: Traynor Enviranmental Ltd

Instrument Make: Larson Davis
Instrument Model: LxT1L
Serial Number: 0005595

Associated Equipment	Make	Model	Serial number
Preamplifier	Larson Davis	PRMLxT1L	055665
Microphone	PCB	377B02	305480
Calibrator	Larson Davis	CAL200	9175
Calibrator supplied by	MTS for this calibration		

The measurements were performed at The Grange Business Centre, Belasis Avenue, TS23 1LD. The results only apply to the items tested.

Periodic tests were performed in accordance with procedures from IEC 61672-3:2013 Class 1

Test results summary, detailed results are shown on subsequent pages.

Tests performed	Section	Results of test	Page	Comments
Calibration Certificate	22		1	
Additional Information			2	
Indication with Calibrator Supplied	10	No Limit	3	
Self-Generated Noise	11	No Limit	3	
Frequency and Time-weightings at 1kHz	14	Complies	3	
Long term stability	15	Complies	3	
High stability	21	Complies	3	
Acoustic Tests	12	Complies	4	
Frequency Weighting A	13	Complies	5	
Frequency Weighting C	13	Complies	6	
Frequency Weighting Z	13	Complies	7	
Level Linearity	16	Complies	8	
Level Linearity Range Control	17		n/a	SLM only has one range
Tone-burst Response	18	Complies	9	
Peak C sound level	19	Complies	10	
Overload Indication	20	Complies	11	

The instrument was within the above specification as received - no modifications were made

The sound level meter submitted for testing has successfully completed the periodic tests of IEC 61672-3: 2013 for the environmental conditions under which the tests were performed. As evidence was publicly available, from an independent testing organisation responsible for approving the results of pattern evaluation tests performed in accordance with IEC 61672-2: 2013, to demonstrate that the model of sound level meter fully conformed to the Class 1 specifications in IEC 61672-1: 2013, the sound level meter submitted for testing conforms to the Class 1 specifications of IEC 61672-1: 2013

Additional tests performed	Reference	
Microphone full frequency response	37326	See additional certificate
Filter calibration, third octave or octave	37324F	See additional certificate

Certificate of Calibration

Certificate Number: 37326

Measurement Microphone
Half-Inch diameter – Free-Field, 0 degree incidence response

Client: Traynor Environmental Ltd

Instrument Make: Larson Davis
Instrument Model: 377B02
Serial Number: 305480

Sensitivity is calculated by the Insert Voltage method. The frequency response calibration is one of three independent measurements of the pressure response of the Object Microphone obtained by the Electrostatic Actuator measurement method. Microphone Capacitance is the polarised capacitance of the test microphone measured on a capacitance bridge relative to a reference microphone.

The frequency response, capacitance, and sensitivity of the microphone are shown graphically on Page 2

Uncertainties of these measurements are:

31.5 Hz to 4kHz	0.41 dB (k = 2.04)
5kHz to 10 kHz	0.87 dB (k = 2.17)
12.5 kHz to 40 kHz	1.81 dB (k = 2.17)
Sensitivity at 250Hz	0.16 dB (k = 2.0)

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k (as above) to provide a level of confidence of approximately 95%. The uncertainty evaluation has been calculated in accordance with UKAS publication M 3003 (December 1997).

Measurement Conditions:

Polarisation Voltage	0V +/- 0.5V
Temperature	23.6 °C
Atmospheric Pressure	1016 mBar **
Relative Humidity	45.5 %

** Note that the computer-produced Certificate shows a Pressure of 1040.5 mbar - this is in error. The above measurement is traceable

Test Equipment:

Equipment	Manufacturer	Model	Serial No.	Traceability Ref.	Cal. Due
Condenser Microphone	Larson Davis	2541	7300	TE 157	November 2022
Acoustic Calibrator 250Hz	Larson Davis	CA250	2807	TE 104	November 2023
Real-Time Frequency Analyser	Larson Davis	2900	0492	TE 108	July 2023
Signal Generator	Hewlett Packard	33120A	US36016577	TE 111	September 2022
Digital Multimeter	Hewlett Packard	34401A	3146A63804	TE 105	September 2022

Date of Receipt : 11th August 2022
Date of Calibration : 17th August 2022
Date of Certificate: 17th August 2022

Authorised Signatory: .....

Tony Sherris

Page 1 of 2

MTS Calibration Ltd
Company Registration Number: 06598525 England and Wales
The Grange Business Centre, Belasis Avenue, Billingham TS23 1LG, England
Telephone: +44 (0)1642 876410 E-Mail: jsherris@slmcal.co.uk or tsherris@slmcal.co.uk http\\www.slmcal.co.uk

MTS Calibration Ltd,
The Grange Business Centre,
Belasis Avenue,
Billingham TS23 1LG,
England
Telephone: 01642 876 410

CERTIFICATE OF CALIBRATION

Page 1 of 3 pages

Approved Signatory: Tony Sherris

Issued by: MTS Calibration Ltd

Date of Issue: 02 September 2022 Certificate Number: 37324F

Third Octave Band Filter

Third-Octave Band Filter verification to BS EN 61260:1996

Client: Traynor Environmental Ltd

Instrument Make: Larson Davis
Instrument Model: LxT1
Serial Number: 0005595

Associated Sound Level Meter		Associated Preamplifier	
Instrument Make:	Larson Davis	Instrument Make:	Larson Davis
Instrument Model:	LxT1	Instrument Model:	PRMLxT1L
Serial Number:	0005595	Serial Number:	055665
Calibrated by:	MTS Calibration		
Certificate Number:	37324		
Date of SLM calibration	01 September 2022		
Date of receipt	11 August 2022		

The measurements were performed at The Grange Business Centre, Belasis Avenue, TS23 1LD. The results only apply to the item(s) tested.

Third-Octave Band Filter Compliance with BS EN 61260: 1996 Class 1

Test results summary. Detailed results are shown on subsequent pages.

Comments		
- Tabular Data		See Page 2
- Graphic Data for 125Hz filter	Complies	See Page 3
- Graphic Data for 1kHz filter	Complies	See Page 3
- Graphic Data for 8kHz filter	Complies	See Page 3

Because each digital filter will have the same amplitude characteristic relative to its centre frequency, only three filters were measured at each of the test frequencies specified by BS EN 61260:1996 for exact base 10 distribution. The measurements made were relative to the attenuation of the 1kHz filter at 1kHz input frequency and input level 0.8 V. Because the measurements include a linearity contribution from the sound level meter, and could be variable with frequency, the assessment is valid only for this pairing. The sound level meter was set for "Linear" frequency response on the lowest range setting which did not give overload at any test frequency or test level. Its compliance with the standard was assessed by referring the measurements to the tolerances specified.

Agreed and reported Decision Rule:
"Complies" indicates that the instrument conforms with the relevant accuracy requirements of the testing standard
AND the expanded measurement uncertainty (k = 2 for approximately 95 % coverage probability) is no greater in magnitude than the accuracy requirements defined in BS EN 61260:1996.

Comments
The sound level meter and preamplifier were calibrated as a unit.
The input level used is selected to produce a sound level at 1kHz that is close to but not exceeding the maximum level on the reference range.
The centre frequency sequence of this filter set follows the exact base 10 midband frequency sequence of IEC 61260 and the measurements have been made accordingly.

Measurement Conditions:			
Temperature	21.9	°C	± 1 °C
Atmospheric Pressure	1016.0	mBar	± 2 mBar
Relative Humidity	56.0	%	± 5 %

Uncertainties of measurements:		
Within Passband (0.88 to 1.12 of centre frequency)	0.42	dB
Outside Passband	2.40	dB

Test Equipment:

Equipment	Manufacturer	Model	Serial No.	Traceability Ref.	Cal. Due
Signal Generator (set 3)	HP	3812A	US34007158	TE 163	Sep-22

This certificate is issued in accordance with the laboratories work procedures.
It provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

RECEIVED: 18/05/2023

MTS Calibration Ltd,
The Grange Business Centre,
Belasis Avenue,
Billingham TS23 1LG,
England
Telephone: 01642 876 410

0607

CERTIFICATE OF CALIBRATION

Page 1 of 1

Approved Signatory: Tony Sherris

Issued by: MTS Calibration Ltd
Performed by Nick Box
Date of Issue: 23 August 2022 Certificate Number: 37335U

Sound Calibrator

Client: Traynor Environmental Ltd

The Device calibrated was:

Cirrus Model CR:515 Serial Number 44501

The measurements were performed at Elvington Close, Billingham, TS23 3YSand the measured values were as follows:

Output Level 1:	94.04 dB re 20µPa	± 0.15 dB (k= 2)
Fundamental Frequency 1:	1000.04 Hz	± 0.11 Hz (k= 2)
Total Harmonic Distortion 1:	0.12 %	± 0.004 % (k= 2)

This measurement is valid only for the above device configured for calibration of a WS-2 microphone under the stated environmental conditions. For deviation of prevailing conditions, the manufacturer's literature for the calibrator should be referred to.

Date of Measurements: 23 August 2022 Date of Receipt: 11 August 2022

Method of calibration

A Reference Calibrator was used to establish the sensitivity of the measurement chain. The same measurement chain is then used to determine the output level of the Object Calibrator by the difference between its output and that of the nominated Reference Calibrator. Four independent measurements of the third-octave band sound pressure levels produced by the Reference Calibrators and the Object Calibrator are averaged to minimise uncertainties of the calibration. The measurement chain consists of a calibrated, Reference Microphone, Reference Preamplifier and Reference Analyser.

As well as providing a traceable measurement of the sound pressure level in the cavity of the Object Calibrator, the Calibrator's frequency and total harmonic distortion are also measured. Frequency is determined from the average of four independent measurements using a multimeter. The total harmonic distortion is measured from the average of three independent measurements by third octave analysis, subtracting the level of the fundamental frequency from the sum of the combined harmonics in the frequency band to 20kHz. The complete procedure is detailed in the MTS Calibration Ltd work procedure WP01.

The sound pressure level generated by the calibrator in its WS2 configuration was measured by reference to the reference Sound Calibrator as shown in the Test Equipment section below.

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor k (individually calculated as above), providing a coverage probability of approximately 95%. The uncertainty evaluation has been calculated in accordance with the current version of UKAS publication M3003. The uncertainty quoted for the Distortion Measurement is the Distortion Percentage as measured, multiplied by our Uncertainty as calculated for the individual measurement or our CMC, whichever is the larger.

Measurement Conditions:			
Temperature	23.1	°C	± 1 °C
Atmospheric Pressure	1010	mBar	± 2 mBar
Relative Humidity	49.8	%	± 5 %

Test Equipment used during this calibration:

Equipment	Manufacturer	Model	Serial No.	Traceability Ref.	Calibration Due
Reference Calibrator	Brüel & Kjær	4231	3014620	TE 133	Apr-25
Multimeter	HP	34401A	36146A63804	TE 105	Sep-22
Microphone	B&K	4133	810486	TE 155	Aug-22
Real-Time Analyser (set 1)	Larson Davis	2900	0492	TE 108	Jul-23

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

End of Certificate

APPENDIX 10F COMPETENCY CERTIFICATE FROM INSTITUTE OF ACOUSTICS

Institute of Acoustics

Certificate of Competence in Environmental Noise Measurement

This is to certify that

Nevin Traynor

has completed a course of instruction approved by the Institute of Acoustics and designed to enable the candidate to undertake environmental noise measurements in a competent manner and has achieved a satisfactory performance in the written and practical examinations thereof and that this fact has been recorded in a Register kept by the Institute for this purpose.

Education Committee Chairman

Institute Secretary

Date 11/10/2019

Centre Maloney & Associates

Reference Number M0111

For the purposes of Credit Transfer or Professional Development this Certificate may be considered to be equivalent to 25 points or hours

CHAPTER 11

MATERIAL ASSETS

CHAPTER ELEVEN - MATERIAL ASSETS

Traynor Environmental Ltd.

11 MATERIAL ASSETS

11.1 Introduction

This Chapter of the EIAR addresses the impacts of the proposed extraction activities at the Application Site. Material assets comprise the physical resources in the environment, which may be of human or natural origin. The objective of the assessment contained in the following sections is to ensure that these assets have been used in a sustainable manner with respect to operations at the Application Site.

11.2 Methodology

The information for the assessment of the impacts of the Application Site was obtained from:

- Site visits to the area; and
- Cavan County Council Development Plan (2022 – 2028).

During the assessment, due regard has been given to aspects such as infrastructure and economic activities in the vicinity of the Application Site, and the impacts of restoration activities. The study has also had regard to the EPA publication 'Guidelines on the Information to be contained in Environmental Impact Assessment Reports' (May 2022). The material assets, which have been identified as being within and adjacent to the Application Site and which may be directly affected by the Application activities are addressed in the following sections in terms of existing environment, impacts and mitigation measures.

11.3 Existing Environment

The material assets that have been identified within the Application Site and in the surrounding landscape are listed below:

- Geological Resource and Local Economy.
- Land Resource, Water Resources and Local Agriculture.
- Road Network and Access.
- Scenic Routes.
- Geological Heritage.
- Property Values; and
- Public Utilities.

The road network is addressed in detail within this EIAR in Chapter 14 (Traffic and Transportation) and is not considered further here.

11.3.1 Geological Resource and Local Economy

The geology of the Application Site is described in detail in Chapter 6.0 (Land, Soils and Geology). As outlined previously, the activities currently undertaken at the Application Site include extraction of rock as per previously approved planning (Ref No. 051801. and An Bord Pleanála Grant (Ref PL 02.219928)).

11.3.2 Land Resource, Water Resources and Local Agriculture

The Application Site is described in detail in Chapter 2 (Project Description), Chapter 5 (Biodiversity) And Chapter 7 (Hydrology and Hydrogeology). The Application Site comprises approximately 3.53 ha. The predominant land-use surrounding the site natural habitats include wet and dry heaths, scrub, improved agricultural grassland, wet grassland, treelines, and hedgerows. The quarry is surrounded by poor quality scrubby or rocky farmland.

11.3.3 Road Network and Access

The proposed development is accessed via an existing hard-surfaced haul route to the west which links to the Local County Road L2517. A wheel-wash facility is located within the site.

The road network and access to the Site are fully described in Chapter 14.0 (Traffic and Transportation).

11.3.4 Scenic Routes

The scenic quality of the rural landscape is reduced by ever present manmade structures, such as roads, buildings, electricity poles, walls, and fences.

While the abundant roadside hedgerows reduce the scale of the landscape in many locations, they also provide ample screening for development located in nearby fields. As with the scenic quality, the scale of the landscape increases, when viewed from an elevated position.

11.3.5 Geological Heritage

A review of the NPWS (NPWS, 2020) and the GSI Geological Heritage Database (GSI, 2020) indicates that there is no geological heritage site located within a 9km radius of the Site. The closest geological heritage sites are, Lough Oughter and Associated Loughs SAC 000007) and Lough Oughter Complex SPA 004049. Located approximately 9km north-west of the site.

11.3.6 Property Values

Property values reflect current local market trends.

11.3.7 Public Utilities

Electrical power is currently provided to the application site via mains supply. Electricity provides the principal source of energy for office lighting and heating.

Site based staff at the application site are contactable by mobile phone, landline, and email. Broadband connections to the site office are provided via a mobile network. An existing EN Certified septic tank is located in the ancillary area to the west of the application area adjacent to the site entrance.

11.4 Impact Assessment

The impacts of the Application Site are discussed below with regard to material assets. This assessment also takes into account a review of all relevant literature and professional judgement in relation to the impacts on current built services and waste.

11.4.1 Geological Resource and Local Economy

Provided the design and mitigation measures outlined in Chapter 2.0 (Project Description), Chapter 5.0 (Biodiversity), Chapter 6.0 (Soils and Geology) and Chapter 13.0 (Landscape), there is no anticipated long-term deleterious effects caused by the activities on-Site. The proposed development will contribute to local and regional economies. Thereby contributing to the direct employment of five people at the Site and creating indirect employment in a number of service areas and industries.

11.4.2 Land Resource, Water Resources and Local Agriculture

Given the prevalence of agricultural land in the area, the final plan has been proposed to return the Site to a natural habitat. Which is one of the beneficial after uses listed in the EPA Guidelines: 'Environmental Management in the Extractive Industry' (2006). This will be achieved by the following measures:

- The application area will be left for natural recolonisation by locally occurring grass and shrub/scrub species.
- All existing boundary fences and hedgerows will be retained to ensure that the site is secure.
- All plant and machinery will be removed from the quarry void.

The design and mitigation measures outlined in Chapter 2.0 (Project Description), Chapter 6.0 (Soils and Geology) and Chapter 7.0 (Hydrology and hydrogeology) there will be no impact of site activities on groundwater and surface water environment; nor will there be any impact to local water supplies.

11.4.3 Built Services

Construction Stage

Given that there are no built services within or adjacent to the proposed quarry extraction area and no changes are proposed to the use of utilities, it is considered that the proposed development would not have any significant, adverse, direct or indirect effects on water supply, wastewater, telecommunications or electricity supply.

As the proposed development relates to an existing quarry, there is no requirement for the provision of any additional temporary plant or structures (such as canteen, office or processing equipment) as part of this proposed development, as these facilities are already provided for within the existing permitted site.

Operational Stage

During the operational phase, the quarry faces will be advanced in a easterly and north-easterly direction.

The proposed quarry rock extraction operations will be the same as the extraction activities that are currently being carried out on the existing quarry (west of the application site). The proposed depth of extraction will be to a final depth of c. 175mOD. Rock material will be extracted using conventional blasting techniques.

The fragmented rock will be processed using the existing crushing and screening plant located within the facilities of the wider landholding. Following this, the aggregates will be kept or transportation directly off site.

Given that there are no built services within the proposed quarry extraction area and no changes are proposed to the use of utilities, it is considered that the operational development phase would not have any significant, adverse, direct or indirect effects on water supply, wastewater, telecommunications or electricity supply infrastructure.

Restoration Stage

No activities that would have the potential to effect any built services In the vicinity would be undertaken during this stage. It is not anticipated that there would be any significant direct or indirect effects on built services during this phase of the development.

During the post-operational stage, no further rock will be extracted, and the site **area** will be restored to a natural habitat.

11.4.4 Road Network and Access

Impacts to the road network have been discussed in Chapter 14.0 (traffic and transportation).

11.4.5 Property Values

Property in the locality of the Site largely consist of agricultural land and ribbon development on local roads. There will be no significant adverse impact on the property values of the adjacent holdings due to the proposed activities. Impacts from the proposed restoration works are predicted to be not significant.

11.4.6 Waste

Construction Stage

Given that there are no built services within the proposed quarry extraction area, it is considered that the proposed development would not have any significant, adverse, direct or indirect effects on water supply, wastewater, telecommunications or electricity supply.

As the proposed development is a continued extraction of an established quarry site, there is no requirement for the provision of any additional temporary plant or structures. As there is no construction stage and no associated impacts, there will be no significant effects on the environment.

Operational Stage

There are exiting waste management arrangements in place in relation to general waste that would be generated by activities and staff working at the site. These arrangements will remain in place for the duration of the operational stage.

The volume of solid waste to be generated by the development will be relatively small and will principally comprise domestic/ canteen waste. Wastewater from the toilet facilities will be treated by the on-site waste water treatment unit.

All solid and liquid wastes (scrap metals, waste oils, etc.) will be collected and handled by appropriately authorised waste contractors at appropriately authorised waste facilities. It is considered therefore that the impact of waste generation during this stage will be medium-term, temporary and slight.

Post-Operational Stage

Any waste generated on the site will be limited to general waste produced by any employees that engaged in aftercare on an intermittent basis. Any such waste will be handled in accordance with the established practices on site and will be removed by a licenced contractor.

It is considered, therefore, that the generation of waste during this period will be short-term, - temporary and slight in its effects.

11.5 Mitigation

Mitigation measures currently implemented during the extraction works as part of QY7 on site involve minimising any impacts on surrounding sensitive receptors. These measures are discussed in respective Chapters of this EIAR, and relevant measures relating to material assets, including the road network, geological and land resources are summarised below:

- Measures to minimise Groundwater, Air Quality and Noise impacts at nearby residences will continue to be implemented as per Chapters 7.0, 8.0,9.0 and 10.0.
- Mitigation measures for environmental indicators are already in place at the Site and included in an Environmental Management Plan (EMP). The effective implementation of these mitigation measures will continue to be monitored.
- Any plant and / or mobile plant on the Site be regularly maintained and kept in good working order.
- Utilise only uncontaminated materials.

11.6 Residual Impacts

Mitigation measures have been undertaken to minimise any impacts associated with the land resource / material assets at the Application Site, such as planned restoration to land use and topography sympathetic to the surrounding landscape and use of only uncontaminated materials.

As a result of the mitigation measures at the proposed development, it is considered that any impacts associated with extraction and continuing works undertaken at the Application Site will not contribute to any residual impacts on material assets in the surrounding environs.

11.7 Cumulative Impacts

As no significant impacts on material assets were identified, there is no potential for cumulative impacts as a result of other activities being undertaken within the vicinity of Site.

CHAPTER 12

CULTURAL HERITAGE

FIGURES

Traynor Environmental Ltd.

12 CULTURAL HERITAGE

12.1 INTRODUCTION

Traynor Environmental have commissioned Wolfhound Archaeology to undertake an archaeological assessment of the potential impact of an extension to planning on the current area of extraction of the John Nulty Quarry, Co. Cavan on features of Cultural Heritage significance on, or adjacent to, the site.

This assessment briefly discusses the archaeological and historical background of the area of the quarry site and vicinity and provides an assessment of potential impacts on remains of cultural heritage and archaeological significance. Mitigation measures are identified.

This report was prepared by Mick Ó Droma and Marcella Loughman. Mick is a licenced archaeologist with over 20 years' experience in the fields of archaeology and cultural heritage management. Mick graduated from UCD with a BA degree in Archaeology and History in 1999 and gained his excavation licence qualification in 2006. Mick graduated from Sligo IT in 2016 with a BSc in Environmental Management and holds a PGD and MSc in Environmental Protection from the same institution. Mick has over a decade of experience in leading archaeological excavations and other cultural heritage management projects and is a full member of the Institute of Archaeologists of Ireland. Marcella graduated from UL with a BSc in 1998 and a HDip Arch from UCC in 2006. Marcella has 15 years' experience in the fields of archaeology and cultural heritage management. Marcella has worked at supervisor and assistant director level on a range of archaeological excavations since 2006 and currently works as the post-excavation manager for Wolfhound Archaeology.

A desktop study of archaeological, architectural and cultural heritage sites within the area of the proposed development site was carried out (there was a particular emphasis in the research process on identification of relevant heritage resources in Ardkill More/ Drumcrow and the surrounding townlands of Ardkill Beg, Aghadreenagh, Aghnahaia Glebe, Drumavaddy, and Largan; (Figure 1). The entire footprint of the existing quarry/ proposed development is situated within the townland of Ardkill More and Drumcrow.

The Sites and Monuments Record (SMR), the Record of Monuments and Places (RMP) for County Cavan (published by the Archaeological Survey of Ireland) and the databases of the National Monuments Service were the principal sources consulted to identify archaeological constraints. All editions of Ordnance Survey mapping both current and historic were examined. All orthostatic aerial photography (1995, 2000 and 2005) held on the databases of the Ordnance Survey of Ireland (OSI) and the more recent Digital Globe imagery were consulted as was available satellite imagery and other aerial photography (Google Earth, Bing, CUCAP). Various books, articles published in local and national journals and periodicals and the topographical files held in the archives of the National Museum of Ireland (NMI) were also consulted.

12.1.1 Site visit and visual assessment

A site visit and a visual assessment were conducted on Friday 31st December 2020 by the author of this report, Mick Ó'Droma, a licensed archaeologist. The physical area of the entire existing quarry, elements of the Ardkill More upland and relevant cultural heritage sites including adjacent sections of the Black Pig's Dyke linear earthwork were examined (Plates 1-8). The visual setting of the development was examined from a range of locations and distances to the west.

The proposed development comprises the continued extraction within the footprint of the active quarry envelope. The proposed development will largely entail the continued removal of rock from 3.53ha.

12.2 Site Location, Toponmy, Topography and Environment

The site of the proposed development is located in the townland of Ardkill More and Drumcrow , Civil Parish and Electoral District of Denn (Deinn), Barony of Loughtee Upper (Lucht Tí Uachtarach) in the County of Cavan (An Cabhán)1. The proposed development is located in a rural area roughly equidistant from the villages of Ballinagh, Crosskeys and Kilnaleck. The centre of the proposed development is situated at National Grid XY co-ordinates 243561/297058, latitude/ longitude co-ordinates 53°55'13''/ 07°20'03'' and is situated between c. 160 and 249 m OD (Figure 1). The proposed development is in an upland area with wide views to the west, south and east.

The townland name Ardkill More is a translation of the original Gaelic placename (Ard Choill Mhór) meaning "The big high wood". The first recorded reference to the placename of Ardkill More dates to AD1637 where the placename is recorded as Ardkilmore. The validated placename Ardkill More is used in this report however the placename is also rendered Ardkilmore, Ardkillmor and Ardkillmore in various sources. Drumcrow is suggested to derive its name from the Irish Droim Cró, meaning "bloody ridge". This is based upon the context of earlier forms of the name, which suggested the use of the noun cró, which means "blood, gore".

The landscape context of the proposed development is entirely within the site boundary of an active quarry. All of the overburden from the original ground surface within this area has been removed during previous quarry works granted under planning application 051801. It is possible that small areas of undisturbed ground remain in particular around the perimeter of the quarry above the active working faces and internal to the site boundary. These will done be disturbed as part of the application.

The landscape character of the area surrounding the quarry is predominantly agricultural. The quarry is located at the western edge of a small upland area that extends to the north-east for several kilometres and low lying flatter terrain extending to the north, west and south. The highest ground in this upland area is located at Ardkill More (257m) located to the south-west of the quarry. Significant growth of scrub vegetation has taken place on the Ardkill More upland in the period between when the CUCAP aerial photograph was taken in the 1960's and the time of the site visit (Figure 13). In the early 20th century, the national folklore collection documents a land management practice where the vegetation on the mountain was set alight annually. The discontinuation of this practice in recent years has contributed to much of the Ardkill More upland becoming covered in scrub.

Rock outcropping occurs intermittently throughout the northern area of the proposed development and is suggestive of thin soil cover (Plate 5). The Ardkill More upland rises to a maximum height of c. 257m OD some 250m to the south-east of the proposed development. The areas of surviving original ground surface within the proposed development have extensive views over the landscape to the north, west and south (Plate 3).

12.3 Archaeological and Historical Background

12.3.1 Previous Archaeological Assessments

An archaeological investigation has taken place in the vicinity of the proposed development. This investigation, carried out by Kieran Campbell, revealed the sub- surface remains of the subsoil cut ditch associated with the linear earthwork (Figure 11 and 12). There is currently no surface trace of the linear earthwork in the lands to the north of the quarry (Campbell, 1997). However, this excavation clearly demonstrates the potential for sub- surface survival of archaeological remains.

Archaeological monitoring of topsoil removal within the footprint of the quarry was stipulated in condition 24 of the planning permission 05/1810. The National Monuments Service was contacted by the author of this assessment by email on 4.2.21 to ascertain if licensed archaeological works was been carried out on the site in order fulfil condition 24 of planning. The NMS response comprised the following-

"The National Monuments Service is not in a position to verify whether a planning permission condition did or did not lead to any particular excavation licence being issued. It isn't clear from the planning permission condition cited that an excavation licence would have to have issued." (Dave Farrell, NMS).

No record of any archaeological works can be found on the excavation.ie database. As such no determination on the nature of previous archaeological works within the existing quarry envelope relating to planning permission 05/0801 can be made. An examination of the Topographic files of the NMI revealed that there were no objects recorded from Adkill More/ Drumcrow or the adjacent townlands held in the archives of the NMI.

Other archaeological assessments previously carried out in relation to the John Nulty Quarry comprise Cultural Heritage chapters in EIA prepared by Northern Archaeological Consultancy in 2005 relating to the current area of extraction and Wolfhound Archaeology in 2018/ 2020 relating to an application for a proposed extension to the area of extraction. Both consultancies recommended that pre-development archaeological monitoring of all topsoil removal take place prior to commencement of extraction.

12.3.2 Overview of archaeology and cultural heritage sites in vicinity of proposed development.

A cluster of megalithic structures are located c. 3.5 km to the north-east of the proposed development in Banagher townland on the south-west slopes of Slieve Glah. Within this townland are situated the remains of a Passage Tomb (CV0026-004004), a Court Tomb (CV0026-004005) and a Portal Tomb (CV0026-004006). There are two unclassified megalithic structures in the wider vicinity of Ardkill More located in Cornaseer townland (CV025-027) 2.5km NE of the proposed development and Pollareagh Townland (CV031-054) 1.8km to the SSE of the proposed development. These and many additional sites indicate, a fairly widespread density, of Neolithic settlement throughout south Cavan.

Bronze Age (BC 2300 - 800) The Bronze Age saw the arrival of new technologies, the development of new settlement patterns and a widespread change in material culture across Ireland. New technological advances such as the ability to manufacture bronze tools may have facilitated an increase in the agricultural and economic capacity of society at this time. In contrast with the relatively low density of Neolithic sites, Bronze Age remains are both very numerous and geographically widespread. High densities of Bronze Age wedge tombs are known throughout Ulster and the presence of these monuments are seen as indicators of settlement. Numerous Bronze Age objects have been retrieved from Co. Cavan and demonstrate the presence of complex societies with the technological capacity to produce high status jewellery and weaponry. Several hoards of gold objects have been identified in the county. An early Bronze Age hoard of five gold bands was retrieved from Bellville and a hoard of late Bronze Age gold objects comprising two dress fasteners, two bracelets and disc of fine gold foil were retrieved from a bog in Lattoon. Two large Bronze spearheads were retrieved from the River Erne during dredging works near Belturbet in the early 20th century. Despite the recovery of these and many more Bronze Age objects and artefacts, to date very few Bronze Age settlement sites have been identified in the county.

Recent archaeological investigations in advance of infrastructural development have revealed a small number of new settlement, burial and industrial sites in close proximity to known monuments and the find spots of Bronze Age artefacts. On the route of the Belturbet bypass a Bronze Age structure that had no surface trace prior to commencement of earth removal was found within 1.5km of the location of a number of Fulachtaí fia and the find spot of a pair of Bronze spearheads (Kelleher, 2008). A cist containing cremated remains of unknown, but possible Bronze Age date, (CV025-025) was uncovered in Cornaseer townland located c. 6km NW of the proposed development. Stone circles have been shown to frequently date from the Bronze Age. Two Stone circles (CV0026-0004001) and (CV0026-0004003) are situated in a cluster of monuments that also include three Megalithic tombs in Banagher townland located c. 3.7km to the north-east. These sites are visible from the top of the Ardkill More upland.

Iron Age (BC800- 450AD) Substantial Iron Age settlement evidence is known in the South Ulster region (Raftery, 1994). The Iron Age 'Royal' site of Emain Macha/ Navan Fort and the extensive sections of linear earthworks known as the Black Pigs Dyke attest to considerable complexity of social organisation and delineation of landscapes and identity through the construction of monumental earthworks at this time (Cooney et al, 2009).

One section of these large linear earthworks, locally known as the "Worms Ditch" and with a regional identity as The Black Pig's Dyke, is situated within 50m of the site. (Figure 3-13). The site was previously granted permission by An Bord Pleanála for the same 3.53ha of the quarry envelope. The western part of the quarry, cut through a section of the Black Pig's Dyke linear earthwork prior to 1995 (Figure 11 and 12). The surviving earthworks are best preserved in the sections located >50m to the south of the proposed development in Ardkill More townland (Plate 7 and 8). A regional study of the linear earthworks collectively known as the Black Pig's Dyke was recently carried out in Counties Donegal, Leitrim, Cavan, Longford, Roscommon and Monaghan (Ó'Drisceoill et al, 2014). The linear earthwork that runs close to the proposed development site was assessed during this project with the full description presented below;

Figure 12.1 (a) – Distance to The Black Pig's Dyke linear earthwork from Quarry Extraction Area

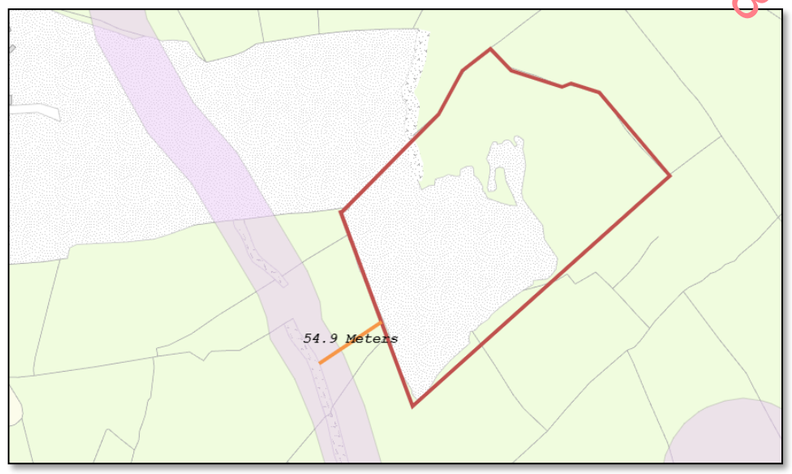

Figure 12.1 (b) – Distance to The Black Pig's Dyke linear earthwork from Quarry Extraction Area

> The surviving earthworks measure 1.36km in length (out of a total of 2.15km) and commence at a stream at the south-west base of a high, steep-sided drumlin in the Ardkill More townland. From here it runs approximately northwest-southeast along the west and south of the hillside. The land here is uncultivated and patches of bedrock are exposed in places. A stretch *c*.150m long has been removed by a modern quarry at Ardkill More. On the aerial photography the line of an upstanding bank which runs into field boundaries to the south of the quarry is visible. An archaeological investigation at the quarry by Kieran Campbell in 1997 represents the only archaeological excavations to have occurred on this section of the dyke (Campbell 1997). Cross sections of the ditch of the monument were exposed in the section faces of the quarry in the northern and southern boundaries of the site. Clear denuded earthworks that are visible in a pasture field in the southern portion of the monument make up an additional 265m of its length. Directly to the north of the Ardkill More quarry 330m of the bank was levelled during land reclamation in the early 1980s (Campbell 1997, 4). It has subsequently become overgrown with furze and bracken and no trace of the earthwork is visible from the aerial photographs. At the base of the hill in Largan townland the dyke changes direction and runs approximately east-west for 750m across relatively flat pastureland, before terminating at the east side of a north-south orientated stream on the border between Largan and Drumbarry townlands. An additional section stretches to the north for a further 190m; this was not shown on the first edition map.

(Ó'Drisceoill *et al*. 2014)

The scale of the monument in Ardkill More townlands demonstrates that its immediate environs were the site of very extensive Iron Age activity. It is likely that archaeological remains associated with the construction phase of this monument and other contemporary remains are situated in its vicinity. The linear earthwork can be seen to curve around the southern slope of the Ardkill More upland. When viewed from the terrain to the south-east the linear earthwork would have appeared to define the base of this upland area. The circular enclosure located on the Ardkill More upland located c. 200m east of the proposed development is also visible from this viewpoint. However it is noted that the date of this enclosure and any potential relationship with the linear earthwork is unknown.

Many reasons for the construction of monumental linear earthworks have been stated including, defence, stock management and the physical delineation of political boundaries. Other theories posit that the construction of linear earthworks was a ritual act that symbolised the power of a leader to rule through their ability to manifest large scale manipulation of the landscape and the community. The practical use of these earthworks as defensive military features or effective stock control was not of fundamental importance, rather it was the event of construction that mattered (Squattri, 2002). The presence of the linear earthwork and the undated enclosure are suggestive of both intense and prolonged activity in the Iron Age/ Early Medieval period in the immediate vicinity of the proposed development site.

Widespread Iron Age settlement of the northern half of Ireland is indirectly confirmed by the hundreds of known artefacts distributed across the northern half of the island. The identification of domestic and industrial sites through recent archaeological excavation has helped to significantly add to the knowledge of the "mundane" aspects of society at this time that had been previously dominated by prestige metalwork, royal sites like Emain Macha and monumental bog roads and linear earthworks (Becker, 2009). Numerous Iron Age artefacts have been retrieved from County Cavan indicating widespread settlement in this period. The Corleck stone head thought to be Iron Age in date was retrieved from Drumeague townland in the late 19th century. The Ralaghan idol, a wooden anthropomorphic object retrieved from Ralaghan bog near Shercock, is also thought to date from the Iron Age. From the discovery of these and several other objects of Iron Age date in the wider vicinity and the presence of the large linear earthworks at Ardkill More and to the south near Granard it is clear that there was extensive Iron Age activity in the Cavan and South Ulster area.

Early Medieval (450-1169AD) From the 5th to the 12th centuries Ireland experienced a significant change in settlement patterns. The introduction of Christianity and several technological and agricultural innovations from the late Roman world had a profound effect on Irish society. Dispersed rural settlement in enclosed habitation sites commonly referred to as ringforts or ráths became the norm throughout the island of Ireland. The term ringfort describes a wide range of circular and non-circular enclosures constructed and occupied in the 5th to 9th centuries. There are approximately 45,000 ringforts known throughout the island of Ireland. The remains of some 1,032 ringforts and 132 crannogs, a contemporary wetland site, have been identified to date in County Cavan. A further 186 unclassified enclosure sites that may represent the remains of ringforts have also been identified in the county.

Although there is some debate over the primary function of ringforts, it is most widely accepted that their primary role was as a protective/ defensive farmstead. Several earthen enclosures are situated in the vicinity of the proposed development site including examples in Ardkill More (CV031-060) and the surrounding townlands of Drumcrow (CV025-048 & CV031-025), Drumavaddy (CV025-037 & CV025-038), Largan

(CV031-047 & CV031-048). The presence of these sites indicates that the area was moderately well settled in the early medieval period. Drumlin tops are a favoured location for ringforts in the region. The proposed development is situated in an area of high ringfort density with an average of 0.8-1.2 ringforts per km² (Stout, 1997).

The area of the proposed development is situated in the Barony of Loughtee. The name is derived from the Gaelic words Lucht Ti meaning the household. These lands were the heartland of the area controlled and occupied by the O'Reilly clan. The O'Reilly kings were inaugurated on Shantemon Hill located c. 6km outside Cavan town. Cavan town was to emerge as the later seat of power of the O'Reilly from the 11th century onwards. The proposed development site is situated close to the southern borders of the barony of Loughtee representing the frontier of the O'Reilly lands and both the County of Cavan and the province of Ulster.

There are no known sites in Ardkill More/Drumcrow or the neighbouring townlands dating to the period c.AD1200-1750. The eighteenth century saw levels of economic development accelerate and Irish exports to Britain and the new world colonies dramatically increase. Revolutionary changes had taken place in rural Ireland with the majority of land entering private ownership and the gradual erosion of collective land management practices. By AD1703 only 14% of land in Ireland was owned by Catholics. By the 1780's, 5000 landlord families controlled around 95% of all productive land in Ireland (Smyth, 2006). The 18th century saw new developments extend into rural many areas with the construction of many types of water powered mills, bridges and roads. The Enclosure Acts dramatically altered the appearance of the landscape which had previously been largely unenclosed. By the mid-18th century, the open countryside had been replaced by networks of fields bounded by banks, walls, and hedgerows. A number of linear agricultural boundary features are depicted on the historic mapping on the area of the current quarry site. The current appearance of the landscape in the vicinity of the proposed development owes much to the practices implemented in this period. By the nineteenth century the majority of the population were tenants who worked on lands owned by the landed gentry. These tenants for the most part lived in simple vernacular houses. The term "vernacular" in Irish archaeology generally refers to buildings constructed using local materials and built to local traditions. In Ireland's case, in the eighteenth and nineteenth centuries, local materials usually consisted of stone, tempered clay or in the poorest cases sod. This palette of materials is due to the fact that much of Ireland's forest cover was clear cut in 16th & 17th centuries (Ó'Dannachair, 1975). These tempered clay and sod structures are prone to weathering and erosion once unroofed and the remains are difficult to recognise archaeologically. There are nineteenth century references to mud walled dwellings in Ardkill More townland and they are noted as "very warm" in the Ardkill School entries in the National Folklore Collection (UCD). There are very few surviving rural vernacular structures located within 1.5km of the proposed development and the majority of these are 19th and 20th century in date. Numerous rural vernacular

structures were depicted on the historic mapping of the study area including at least 16 structures within Ardkill More townland. The majority of these structures are thought to be domestic residential structures occupied by tenant farmers or agricultural labourers who worked on the farms owned by the landed gentry. Survival rates for these structures are very low with over 90% of these structures having no surface trace at the time of the desk based study and site visit. Fifty seven persons are recorded as resident in the 1901 census for Ardkill More townland with the same number of persons noted in the 1911 census.

The landscape in the region of the proposed development in this period was, as was typical elsewhere in Ireland, one where agriculture was the primary economic activity. Small scale mixed agriculture by tenant farmers with surpluses traded at local markets was the economic paradigm throughout the period. Attempts were made at this time to increase production by technological and other means. The application of lime to the soil was one such widespread, and at least in the short term, successful method of increasing the yield of these small holdings. There are several Lime Kilns depicted on the historic mapping including two examples in the near vicinity in Drumcrow and Largan townlands and are indicative of the widespread use of lime as a fertiliser. The small number of industrial sites includes in addition to the Lime Kilns, a Quarry, and Gravel Pits locally known as "Coyos" quarry producing material for local consumption rather than export. The quarries primary function may have been to supply the crushed limestone used to produce fertiliser in the Lime Kilns in addition to building and construction materials. It is noted that there have been active extractive industry sites in Ardkill More since at least the mid-19th century. A creamery is depicted in Drumcrow townland on the 2nd Edition OS mapping and indicates that the production of milk for export to non-local markets had become established in the area by the early 20th century.

During the site visit and visual assessment no trace of any of the structures or boundaries depicted on the historic mapping were identified. Sub-surface survival of remains associated with these structures is possible.

12.3.3 Folklore associated with Ardkill More townland.

The online resource of the National Folklore Collection (NFC) at UCD available at the www.duchas.ie website and the placename database website www.logainm.ie were examined for references to the vicinity of the proposed development. The schools collection for Ardkill More School is 23% transcribed but the entire entry for the school can be viewed online. There are several references the Ardkill More upland referred to ubiquitously as "The Mountain" by the locals. Several places of interest are referenced on the Mountain including the "Black Pigs Race" and the "Cats Cradles" described as "Huge crags about 40ft high containing little caves and crags. They were the home of wild cats long ago" and "The Holy Well" and the "Graveyard". The Holy Well is described as being situated near the Cats Cradles but neither location is depicted on the historic mapping. The account also describes a graveyard near the top of the hill where "about a rood of ground is covered with mounds of clay. These are believed to be graves". The location on the Ardkill More upland this description refers to is not known.

The logainm database lists the following folk description relating to the linear earthwork in Ardkill More townland "The worm ditch, the traditional story is as follows, goes through this townland. It is asserted that ditch has been dug by a worm passing through this townland untill [sic] [i.] entered a small lake on the western side where it was drowned. The lake is called Loch na Paísta which is Loughnapaista, meaning either a worm or a beast." [Desc. Rem.];".

12.4 Assessment of Impacts of Proposed Development

12.4.1 Assessment of direct Impacts

No surface traces of archaeological remains or deposits were identified in any part of the proposed development site during the site visit and visual assessment. An area of extraction situated close to the southern boundary of the proposed development is located >50m from the nearest section of the Black Pig's Dyke linear earthwork monument. Mitigation measures to prevent any impacts on this monument are outlined in section 5 of this report.

There are several known archaeological sites and monuments and structures of architectural significance listed on the SMR, RMP, and RPS in the vicinity of the proposed development site. The proposed development will have no direct impact on any archaeological site or monument including the Black Pi's Dyke linear earthwork. A small number of cultural heritage sites not recorded on these databases were noted within and in the areas adjoining the area of the proposed development and comprise post-medieval/ modern features including vernacular structures, wells, field boundaries, ditches, quarries, lime kilns, roads, bridges, and trigonometric station. These have been described in the Cultural Heritage chapter in an EIAR submitted in relation to a proposed extension to (Ó'Droma and Loughman, 2020) (Figure 4-7). The proposed development will have no direct impact on any known features of cultural heritage significance.

12.4.2 Assessment of Indirect Impacts

There will be no significant additional indirect impacts on features of archaeological and/ or cultural heritage significance. The proposed development will not further impact on the visual amenity or landscape setting of the Black Pig's Dyke Linear Earthwork. As the proposed development will comprise the continued extraction of material granted by An Bord Pleanála previously, the integrity of the profile and visual amenity of the Ardkill More upland will be unaffected.

12.5 Proposed Mitigation Measures

12.5.1 Monitoring of removal of areas of original ground level

Given the scale and permanent nature of the proposed development and the potential for sub-surface remains of archaeological significance to be present within the footprint of the proposed development site it is recommended that archaeological monitoring of all remaining topsoil removal be carried out prior to any groundworks, site clearance and/or further extraction, or slope stabilisation commencing.

The locations where archaeological remains may survive within the existing quarry footprint are limited. Primarily but not exclusively limited to areas between the edge of the upper working quarry face and the site boundary all areas where original topsoil cover/ ground surface has not been removed is considered to have high archaeological potential for the presence of sub-surface archaeological remains.

Although the proposed development does not involve the removal of overburden, it is recommended that the developer engage a suitably qualified archaeologist to conduct licensed archaeological monitoring of all earth removal in areas where the original ground surface survives as necessary. This measure is considered the absolute minimum to enable a determination be made of the archaeological impact, if any, of the proposed development.

Should archaeological remains be identified the NMS will be consulted to determine the appropriate mitigation measures. Such measures may include refusal, preservation in- site and/ or preservation by record (excavation). Subject to operational requirements these works could be carried out on a phased basis.

The proposed development will require removal of material located <50m from the closest surviving section of the Black Pig's Dyke linear earthwork. No removal of material between the existing working face and the site boundary which impacts on any areas of surviving should take place. Extreme care should be taken in this area to ensure that the extraction of material does not undermine or destabilise the integrity of the surviving sections of the monument that are situated within the site boundary and abut the upper edge of the working face.

12.5.2 Alteration of Proposed Perimeter Planning in area of Black Pig's Dyke

It is recommended that the proposed 5 m buffer zone situated around the perimeter of the site to be fenced and hedgerow planted as per environmental specifications be amended in two locations. These locations are where the Black Pigs' Dyke linear earthwork abuts the northern and southern site boundary. It is recommended that the fencing take place but that a hedgerow is not established in these locations. A c.5m buffer where no hedgerow planting takes place should be established to the east and west of the edge of the bank and ditch of the linear earthwork. This will ensure that over time as the hedgerow trees become established that the any sub-surface remains associated with the monument are not disturbed or damaged or destabilised by root growth.

It is considered that the break in the proposed boundary planting will visually enhance the perception of the surviving sections of the Black Pigs Dyke linear earthwork as a landscape feature from all distances.

12.6 References

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Plate 1 Front entrance of existing quarry. Looking east towards Ardkill More upland.

Plate 2 Looking north-west showing haul road within quarry.

Plate 3 View within quarry showing scrub/ natural vegetation above working faces.

Plate 4 Rock outcropping on Ardkill More upland located at east of and above working face of current area of extraction.

Plate 5 Working faces within quarry. Looking east

Plate 6 View of preserved section of Linear earthwork "Black Pig's Dyke" (CV031-004) located c. 50m south of proposed development. Looking SE. Scale = 1m.

Plate 7 View of preserved section of Linear earthwork "Black Pig's Dyke" (CV031-004) to south of quarry. Field entrance inserted through bank of monument. Looking N. Scale = 1m

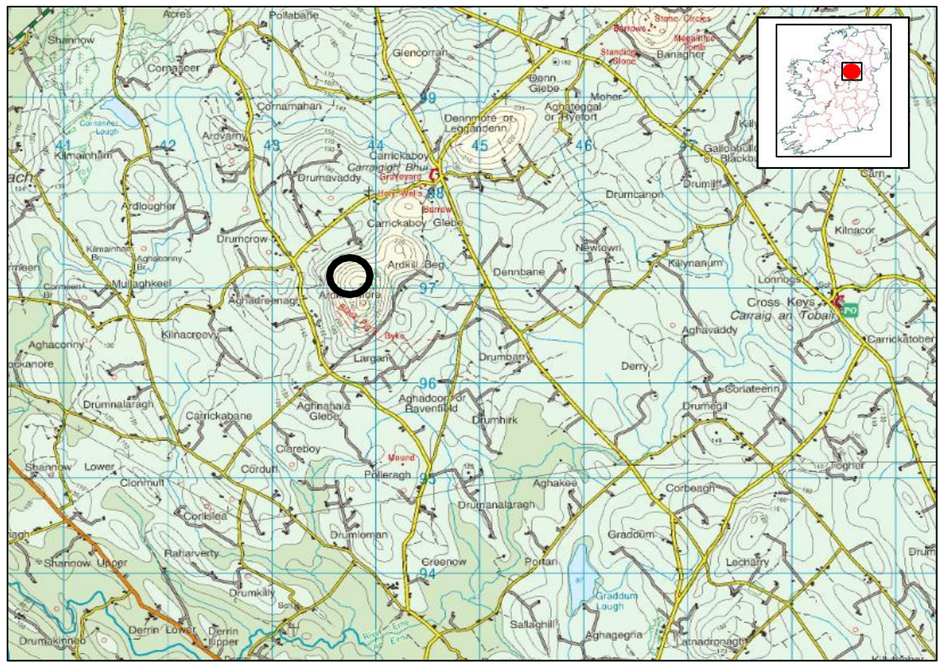


Figure 12.2 OS 1:50,000 Discovery Series map. Showing location of proposed development.

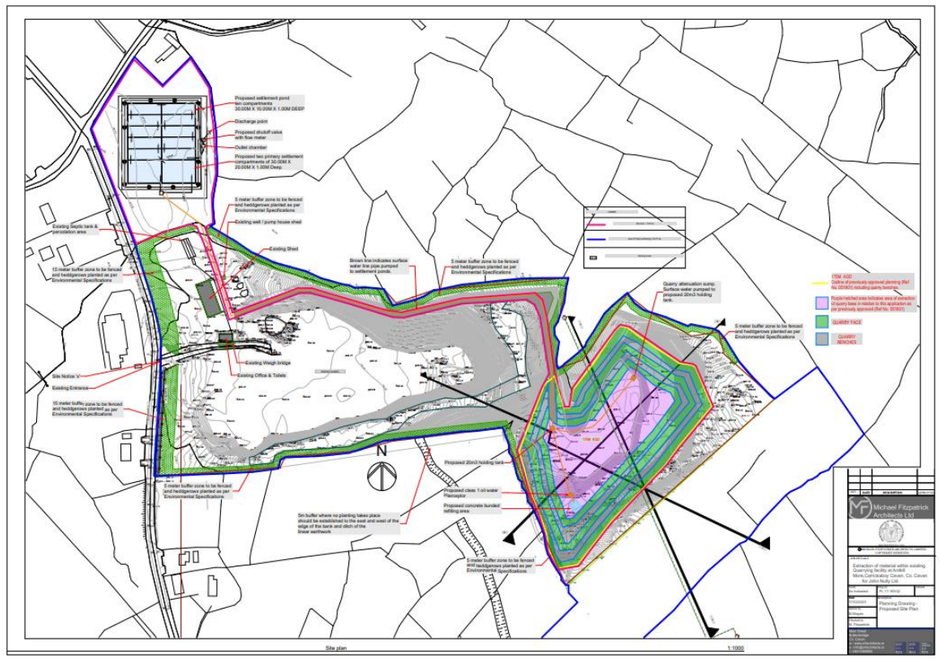


Figure 12.3 Site layout drawing showing location of existing quarry and proposed extension to area of extraction.

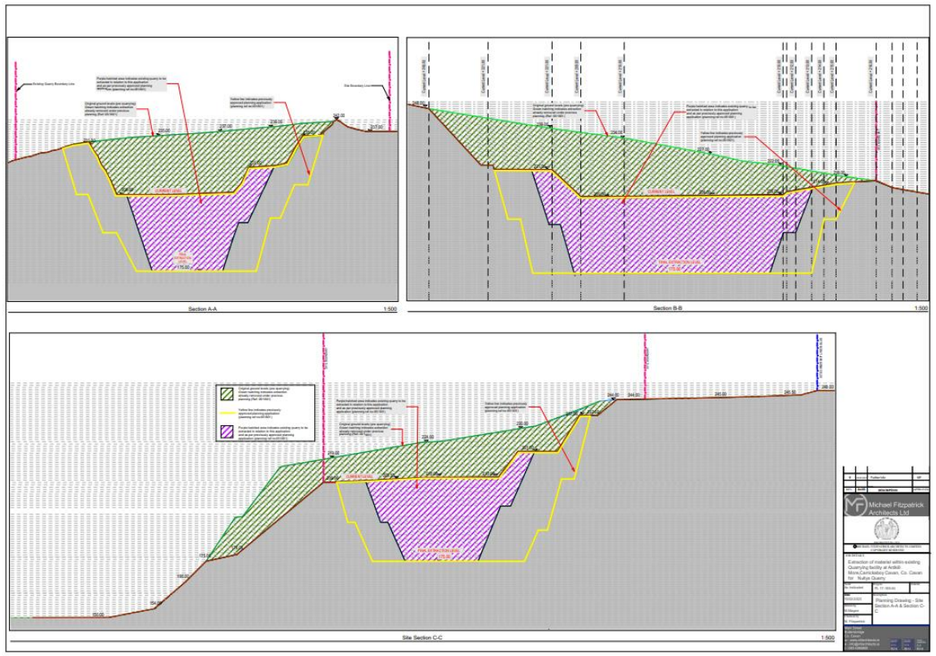


Figure 12.4 Site Section showing location of proposed extraction and area requiring archaeological monitoring.

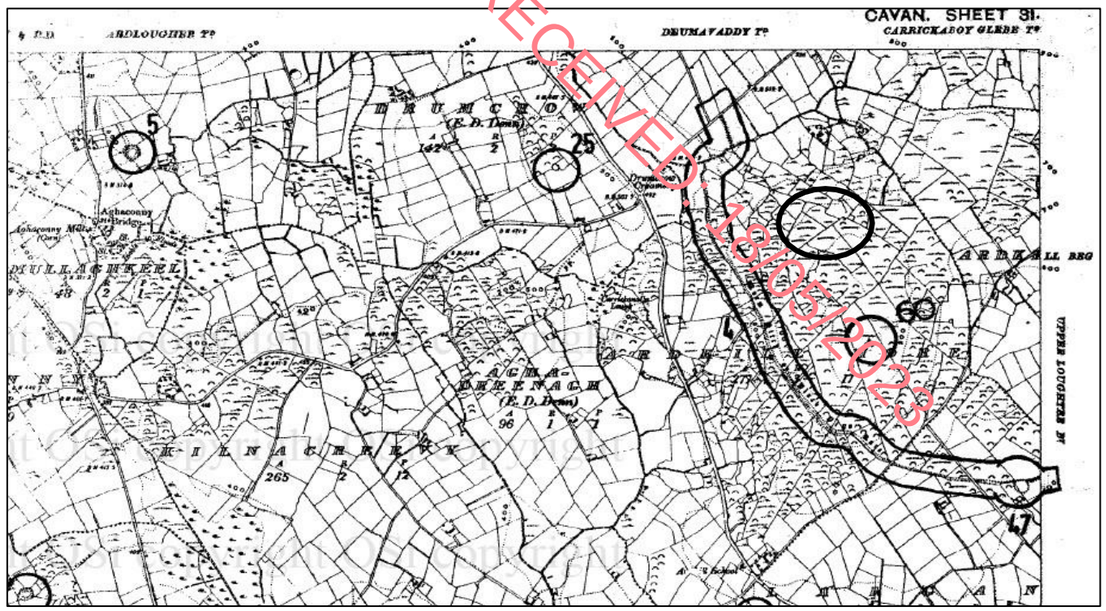


Figure 12.5 RMP Map County Cavan in vicinity of proposed development (Sheet 31).

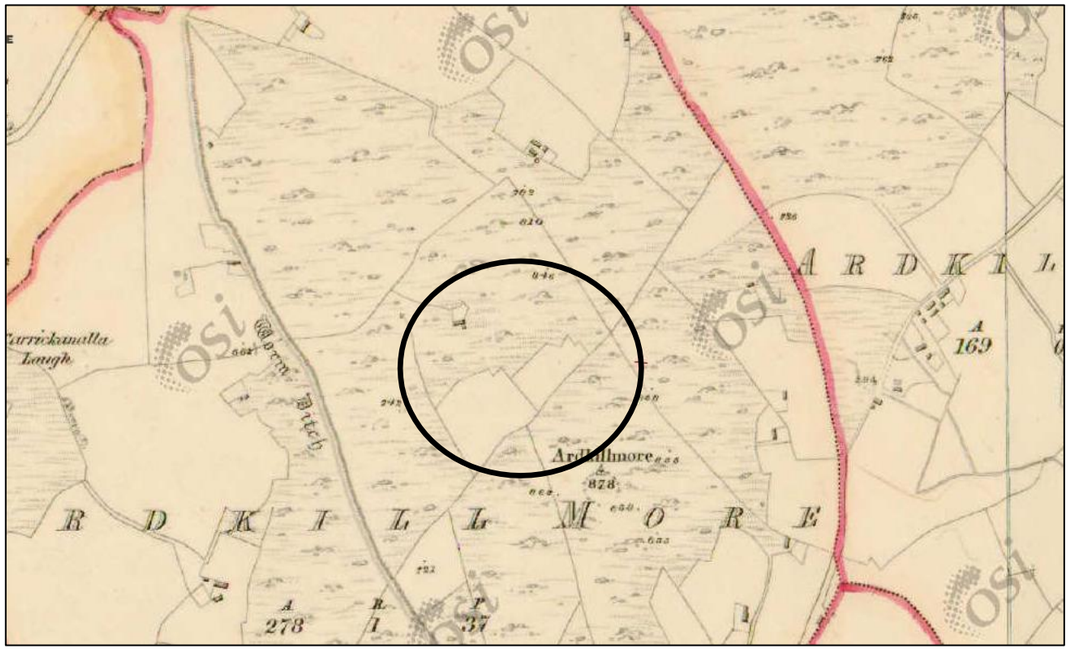


Figure 12.6 Detail of 1st ed. OS map showing location of proposed development.

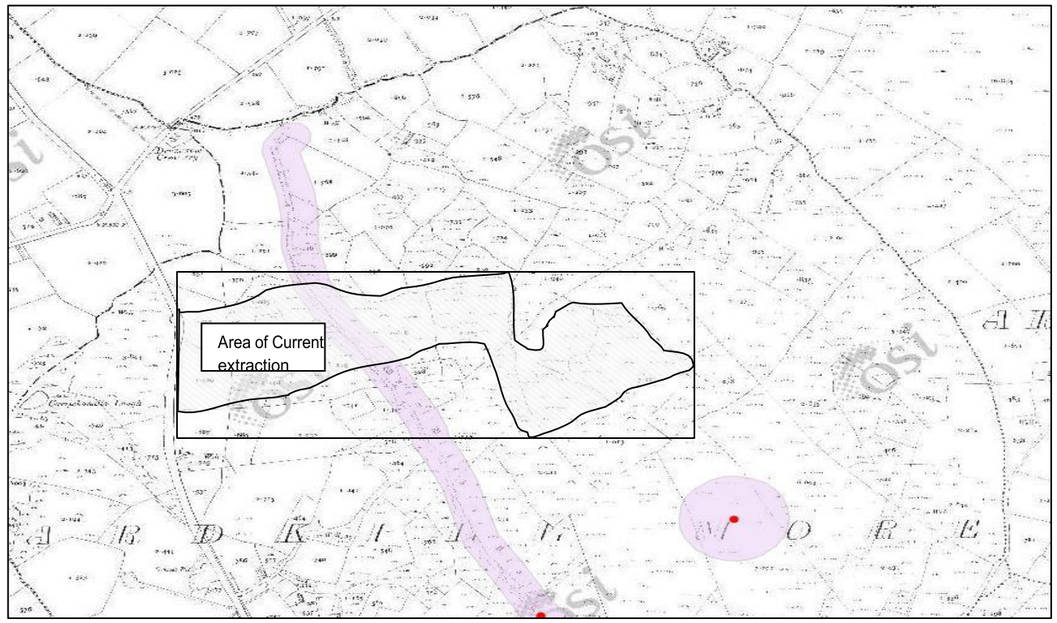


Figure 12.7 CHC map study area north showing location of proposed development. Based on 25" ed. OS map.

Figure 12.8 OSI orthostatic image of proposed development site (1995).

Figure 12.9 OSI orthostatic image of proposed development site (2000).

Figure 12.10 OSI orthostatic image of proposed development site (2005).

Figure 12.11 Google Earth imagery of proposed development site (2018).

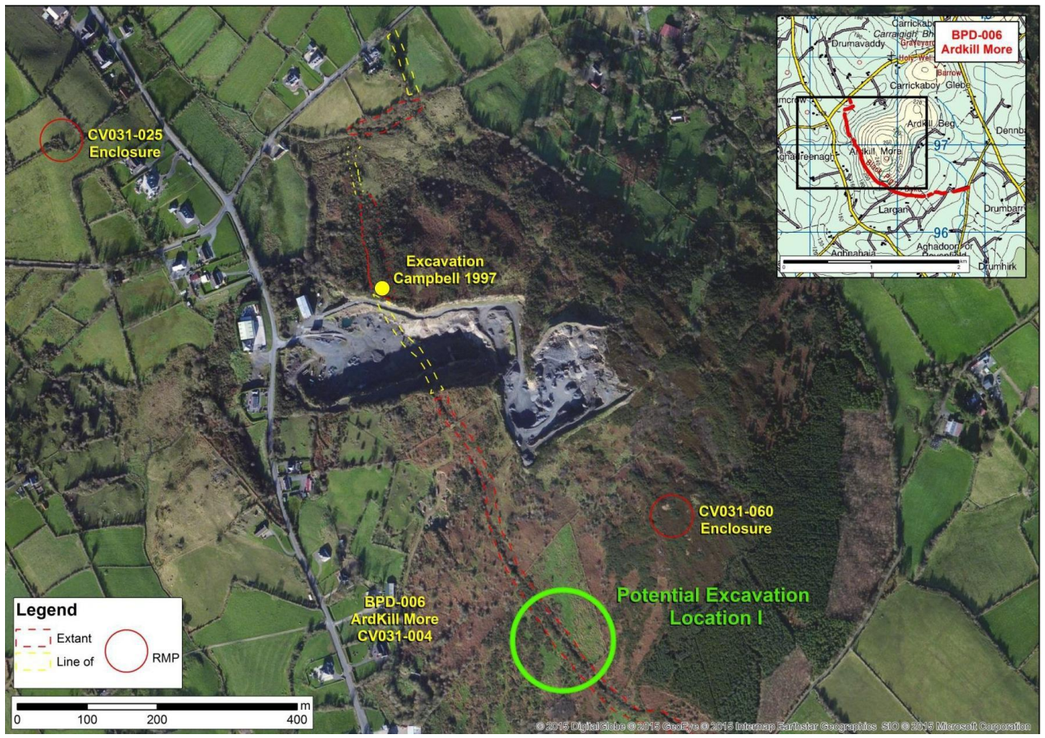


Figure 12.12 Location map of linear earthwork, existing quarry and 1997 excavation by Campbell (Ó'Drisceoill, 2014).

Figure 12.13 Section of ditch through BPD in Ardkill More by Kieran Campbell, 1997.

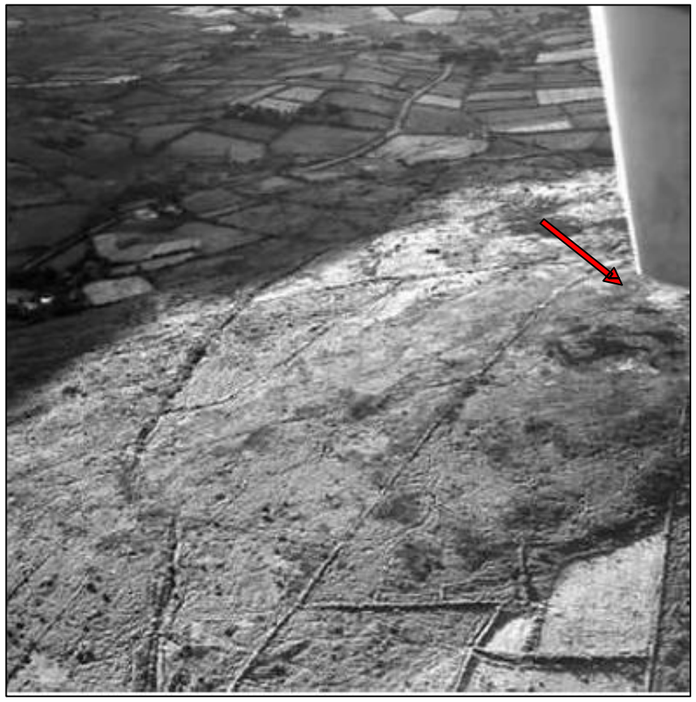


Figure 12.14 CUCAP Aerial image of Ardkill More with location of proposed development indicated.

CHAPTER 13

LANDSCAPE AND VISUAL

Figure

Tables

Traynor Environmental Ltd.

13 LANDSCAPE AND VISUAL

13.1 Introduction

13.1.1 Background

This document summarises the assessment of landscape and visual effects arising from the proposal to complete extraction of material within the existing quarry envelope and all related ancillary site works at Ardkill more and Drumcrow, Carrickaboy, Co. Cavan.

The quarry site is associated within an extant quarry at Ardkill townland which is located between Cavan Town and Kilnaleck on a main 'primary' County road. The quarry's planning application is thus associated with the existing quarry complex, and it intends to utilise the established infrastructure, equipment and facilities servicing the existing quarry. The application is motivated by the need to maintain and provide continuity in the production and supply of crushed stone to contractors operating in the area. It is to provide assurance to the Company of long term availability of raw material to underpin the established business.

Landscape and visual effects are independent but related issues. Landscape effects are concerned with changes to the landscape, its character and quality, while visual effects relate to the appearance of these changes and the resulting effect on visual amenity. Wherever possible, identified effects are quantified, however the nature of landscape and visual impact assessment requires interpretation by professional judgement. In order to provide a level of consistency to the assessment, the appraisal of sensitivity and the prediction of magnitude of change and significance of effects have been assessed with reference to criteria defined in the methodology preceding the baseline and impact assessment sections of this report.

13.1.2 Scope of Work/EIA Scoping

The scope of the landscape and Visual impact assessment is set out as follows.

- Regulatory Background / Planning policy (e.g., landscape policies, designated landscapes, sites of nature conservation importance).
- Receiving Environment — definition of the study area and description of the landscape and visual baseline.
- Impact Assessment — a description of the aspects of the development which are likely to cause landscape and/or visual effects, including the methodology for and an assessment of landscape and visual receptor sensitivity, as well as the magnitude and significance of the landscape and visual effects.
- Mitigation Measures — a description of the measures which will be integrated to mitigate any landscape and visual effects of the proposed development.
- Residual Impact Assessment — a summary of the landscape and visual effects with mitigation measures in place; and
- Conclusions.

13.2 Regulatory Background

13.2.1 Planning Policy

There are five main Landscape Character Areas within County Cavan. These areas have been chosen mainly due to their physical geological and geomorphological features which make them distinctive in the County.

1. Cuilcagh-Anierin Uplands of West Cavan.
2. The Lakelands; 3. Lake Catchments of South Cavan.
3. Drumlin Belt and Uplands of East Cavan.
4. Highlands of East Cavan.

The quarry site is located in the Drumlin Belt and Uplands of East Cavan. This area stretches from Redhill's to Cootehill in north-east Cavan through the county taking in east of Cavan Town, Stradone and Crosskeys to Killydoon and Kilcogy in south-west Cavan. This area is typical of the Drumlin landscape with many inter-drumlin lakes distributed throughout the region.

The landscape surrounding the proposed development area retains a positive character and sense of place largely due to the integrity of its landform, the strongest characteristics of which are the steeply sloping contours of Ardkill More falling to areas of pasture with hedgerow grid broken up by the local roads limited plantations and a limited number of small loughs. It is through this landscape that the Erne River flows. The landscape value of this general area is thus considered to be moderate.

13.2.2 Landscape Characterisation Objectives

The Cavan County Development contains a number of relevant objectives with regard to the extractive industry as follows.

LC1 Ensure the preservation of the unique landscape character type by having regard to the character, value and sensitivity of a landscape when determining a planning application.

LC2 Ensure development reflects and reinforces the distinctiveness and sense of place of the landscape character areas. This should include the retention of important features or characteristics which contribute to their distinctiveness such as geology and landform, habitats, settlement patterns, historic and vernacular heritage.

LC3 Resist development such as houses, forestry, masts, extractive operations, landfills, caravan parks and large agricultural /horticulture units which would interfere with the character of highly sensitive areas or with a view or prospect of special amenity value.

LC4 Ensure that new development does not impinge in any significant way on the character, integrity and distinctiveness of highly sensitive areas and does not detract from the scenic value of the area such as visual harm, not in keeping elements of the landscape, causes loss or disturbance of the landscape elements contributing to the local distinctiveness, historic elements that contribute to landscape character and quality, vegetation which is characteristic of a particular landscape and visual conditions of a landscape.

LC5 Ensure new development meets high standards of siting and design.

LC6 Protect skylines and ridgelines from development.

LC7 Ensure necessary assessments including visual impact assessments are prepared prior to approving development in highly sensitive areas.

LC8 Commence the preparation of a Landscape Character Assessment within 6 months of the adoption of the development plan.

13.2.3 Sites of nature conservation importance

The 'Black Pig's Race' / Worm Ditch' passes within 50m of the proposed quarry site.

13.2.4 Quarry Industry Policies & Objectives

Section 12.0 of the CDP contains a number of relevant policies and objectives with regard to the quarry industry as follows.

Q 01: Safeguard for future extraction all identified locations of major mineral deposits in the County.

Q 02: Promote development involving the extraction of mineral reserves and their associated processes, where Cavan County Council is satisfied that any such development will be carried out in a sustainable manner, that does not adversely impact on the environment or on other land uses. Consideration in this regard shall be given to the impact of the development on the local economy.

Q 03: Facilitate adequate supplies of aggregate resources to meet the future growth needs of the County and the wider region while addressing key environmental, traffic and social impacts and details of rehabilitation.

Q 04: Ensure that projects associated with the extractive industry carry out screening for Appropriate Assessment in accordance with Article 6(3) of the E.C. Habitats Directive and comply with all relevant Environmental Legislation as required.

Q 05: Facilitate the exploitation of the County's natural resources and to exercise appropriate control over the types of development, including rural housing, taking place in areas containing proven deposits, whilst also ensuring that such developments are carried out in a manner which would not unduly impinge on the visual amenity or environmental quality of the area.

Q 06: Support the extractive industry where it would not compromise the environmental quality of the County and where detailed rehabilitation proposals are provided.

Q 07: Seek to ensure that the extraction of minerals and aggregates minimise the detraction from visual quality of the landscape and does not adversely affect the environment or adjoining land uses.

Q 08: Ensure that development for aggregates/mineral extraction, processing and associated processes does not significantly impact on the following

- Existing and proposed Special Area of Conservation and Special Protection Areas
- Existing and proposed Natural Heritage Areas.
- Areas of importance for the conservation of fauna
- Areas of significant archaeological potential
- Recorded Monuments
- Sensitive landscapes
- Public Rights of Way, Walking/Cycling Routes
- Drinking Water Supplies
- County Geological Sites

Q 09: Ensure that all quarrying activities and projects associated with the extractive industry comply with all relevant Planning and Environmental Legislation including the Geological Heritage Guidelines for the Extractive Industry.

Q 10: To encourage the rehabilitation of disused quarries and extractive sites to possible uses including habitat restoration, agriculture, recreation/amenities, commercial, industrial, and residential or a combination of same, subject to normal planning and environmental considerations.

13.2.5 Guidelines

The landscape and visual impact assessment was undertaken in accordance with the published guidance entitled Guidelines for Landscape and Visual Impact Assessment, Landscape Institute and Institute of Environmental Management & Assessment, Third Edition, 2013, hereafter referred to as GLVIA 3.

13.3 RECEIVING ENVIRONMENT

13.3.1 Study Area

A study area measuring within 1km from the centre of the Quarry was identified following a desktop study and field-based assessment. It should however be noted that the visual envelope, i.e., the area from where the planning application site is actually visible, was found to be smaller than the 1km radius study area, due largely to the visual screening afforded by existing topography and vegetation.

13.3.2 Baseline Study Methodology

The landscape and visual baseline study involved a desktop study, field work, data processing and analysis. The aim of the landscape baseline study is to provide an understanding of the landscape in the area that may be affected, including its constituent elements, landscape character and its geographic extent.

Establish the area in which the development will be visible the different groups of people who may experience views of the development, the places where they will be affected and the nature of the views and visual amenity at those points. Representative and illustrative viewpoints were selected for inclusion in the assessment in respect of the following parameters:

- types of receptor: to include residents of settlements and dwellings, road users, recreational users of footpaths, cycle paths, promoted viewpoints, picnic areas, beauty spots and other recreational locations where landscape is an important part of the experience.
- different distances from the development.
- different directions from the development with the aim of achieving a distribution of viewpoints from different compass points around the site; and
- different elevations.

13.3.3 Sources of Information

The desktop study and field work were supported, inter alia, by information available on the internet, digital as well as paper (Ordnance Survey) maps at different scales and the Cavan CDP 2022-2028.

13.3.4 Field Survey / Monitoring / Inspection Works

A site survey was carried out in bright weather conditions with good visibility. The assessment concentrated on the publicly accessible areas along the public roadway.

13.3.5 Landscape Baseline

13.3.5.1 Landscape Character of the Application Site and its surroundings

The proposed application is to complete extraction of material granted within existing quarry envelope as per previously approved planning (Ref No.051801) to the existing quarry, which has been established in this hillock portion of the landscape for over 40 years. The relatively confined scale of the proposed excavation gives rise to a minor long-term impact on the local landscape but only of a slightly negative nature due to the already established land use of mineral extraction.

13.3.5.2 Landscape Character of the Study Area

The landscape immediately surrounding the site undulating farmland with a variable field pattern which is well defined by hedgerows with individual mature trees. The study area is still largely in agricultural use, however within the visual envelope the land use is dominated by one-off dwelling houses. Some industrial activity has also developed within the immediate vicinity. To the north, the suburban edge of the town of Cavan, featuring residential areas and some larger scale buildings associated with industrial or commercial uses are present.

13.3.6 Visual Baseline

13.3.6.1 General Visibility

The visibility of the application area was initially assessed by a desktop study of ordnance survey mapping. The site is located upon the west facing slopes of Ardkill More, a small hill with a summit elevation of some 260 m OD.

13.3.6.2 Visual Receptors

The visual receptors with existing and/or potential views of the application area consist of residents of dwellings, road users. The location of each of the viewpoints is indicated Figures 1.4 and described in Table 1 below. The table lists the viewer types at each viewpoint and describes the nature of existing views. Photographs depicting the existing visual amenity at the selected viewpoint locations are presented in Viewports 1 – 6 below.

Table 13.1 Viewpoints and Existing Visual Amenity

Location			Viewer Types Existing views / Visual amenity
1	Local County Road L442 west of the proposed site.	Residents of Dwellings Road Users.	Open views are available of undulating pastoral farmland with hedgerow vegetation and occasional mature trees. Existing dwellings / farmsteads are located along roadway in close proximity to the quarry site along local county road L442.
2	Local County Road L442 west of the proposed site.	Residents of Dwellings Road Users	Open views are available of undulating pastoral farmland with hedgerow vegetation and occasional mature trees. Existing dwellings / farmsteads are located along roadway in close proximity to the quarry site along local county road L442.

13.4 IMPACT ASSESSMENT

13.4.1 Evaluation Methodology

In order to arrive at conclusions about the significance of landscape/visual effects, this LVIA links judgements about the sensitivity of a receptor with the magnitude of change. According to GLVIA 3, section 3.28, the sensitivity (or 'nature') of a receptor is "made up of judgements about:

- The susceptibility of the receptor to the type of change arising for the specific proposal; and
- The value attached to the receptor".

The magnitude (or 'nature') of change is "made up of judgements about:

- The size and scale of the change - for example whether there is complete loss of a particular element of the landscape or a minor change.
- The geographical extent of the area that will be affected; and
- The duration of the change and its reversibility." Duration is described in GLVIA 3 with reference to three categories, short term lasting up to 5 years, medium term lasting between 5 and 10 years and long term lasting between 10 and 25 years.

The judgements about the sensitivity and magnitude are supported by a number of pre-defined parameters, where possible, as described in more detail below. They are then summarised using word scales and combined using a matrix to arrive at the overall significance of the effects.

13.4.2 Landscape Sensitivity

The sensitivity of the landscape is made up from a combination of judgements about the susceptibility of the landscape to change and the value attached to the landscape.

Susceptibility to change means the degree to which a landscape type/area/element is able to accommodate change (arising from a particular development) without detrimental effects on its character. Depending on the type of development proposed, this varies, inter alia, with the existing land use, the pattern and scale of the landscape, the visual enclosure/openness of views and the scope for appropriate mitigation. The value attached to the landscape can be judged, inter alia, by way of existing designations, landscape/scenic quality, rarity, recreation value. For the purpose of this report landscape sensitivity is defined as HIGH, MEDIUM, LOW or NEGLIGIBLE, based on professional interpretation of the findings with regard to the susceptibility and value.

13.4.3 Visual Sensitivity

Viewpoint sensitivity is made up from a combination of judgements about the susceptibility of visual receptors to changes in views/visual amenity and the value attached to views.

Table 13.2 Susceptibility of Visual Receptor to change.

Susceptibility	Visual Receptor Types
High	Users of outdoor recreational facilities including strategic recreational footpaths, cycle routes or rights of way, whose attention may be focused on the landscape; important landscape features with physical, cultural, or historic attributes; principal views from residential buildings, beauty spots or picnic areas; communities where views contribute to the landscape setting enjoyed by residents in the areas.
Medium	Other footpaths; secondary views from residential properties, people travelling through the landscape on roads, trains, or other transport routes.
Low	People engaged in outdoor sports or recreation (other than appreciation of the landscape), commercial buildings, and other locations where people's attention may be focused on their work or activity.

The overall sensitivity of the visual receptors is summarised on a scale of HIGH, MEDIUM, LOW or NEGLIGIBLE based on the criteria and professional judgement.

13.4.4 Magnitude of Landscape/Visual Change

The judgements of the size or scale, geographical extent, and duration/reversibility of the changes in the landscape are based on guidance contained in GLVIA 3, sections 5.49-5.52 including:

- "The extent of existing landscape elements that will be lost.
- The extent to which aesthetic or perceptual aspects of the landscape are altered.
- Whether the effect changes the key characteristics of the landscape.
- Scale at which effects may have influence (e.g., site level, immediate setting, landscape type/character area).
- Duration of the effect (i.e., short term = 0-5 years, medium term = 5-10 years, long term = IO- 20 years, 20+ years = permanent); and
- Whether full/partial reversibility is possible.

The judgements of the size or scale, geographical extent and duration/reversibility of visual effects are based on information including:

"The scale of the change in the view with respect to the loss or addition of features in the view and changes in its composition.

- The degree of contrast or integration of any new features or changes in the landscape with the existing or remaining landscape elements and characteristics in terms of form, scale and mass, line, height, colour, and texture.
- The nature of the view of the proposed development, in terms of the relative amount of time over which it will be experienced and whether views will be full, partial or glimpses.
- The angle of view in relation to main activity of the receptor.
- The distance of the viewpoint from the proposed development.
- The extent of the area over which the changes would be visible.
- Duration of the effect (i.e., short term = 0-5 years, medium term = 5-10 years, long term = 10 20 years, 20+ years permanent); and
- Whether full/partial reversibility is possible.

The overall magnitude of change on the landscape and visual amenity is summarised on a scale of 'substantial', 'medium', 'slight' or 'negligible', based on professional interpretation of the findings with regard to size or scale, geographical extent, and duration/reversibility. In order to assist the assessment, brief definitions of each level of magnitude are provided in Table 3, below.

Table 13.3 Magnitude of Change

Category	Description
Substantial	Total loss or major alteration of key elements/features/characteristics of the baseline conditions such that post development, landscape character or view composition attributes of the baseline would be fundamentally changed.
Medium	Partial loss or alteration to one or more key elements/features/characteristics of the baseline conditions such that post development, landscape character or view composition attributes would be partially changed.
Slight	Minor loss or alteration to one or more key elements/features/characteristics of the baseline conditions. Change arising from the loss/alteration would be discernible, but the underlying landscape character or view composition attributes would be similar to the baseline.
Negligible	Very minor loss or alteration to one or more key elements/features/ characteristics of the baseline conditions. Change would be barely distinguishable, approximating to 'no change'.

13.4.5 Significance of Effects

The significance of any identified landscape or visual impact has been assessed in terms of 'major' 'moderate', 'minor' or 'none'. These categories have been based on combining the overall sensitivity of landscape/visual receptors and overall magnitude of effects, as shown in Table 4 below. This process is not a quantitative process; there is not an absolute scoring system. Instead, the correlation of the two factors, although reflecting recognised features and methods, is in the end a matter of professional judgement.

Table 13.4 Significance of Landscape and Visual Effects

	Magnitude Substantial	**Magnitude Medium**	**Magnitude Slight**	**Magnitude Negligible**
Sensitivity - High	Major	Major/Moderate	Moderate	Moderate/Minor
Sensitivity - Medium	Major/Moderate	Moderate	Moderate/Minor	Minor
Sensitivity - Low	Moderate	Moderate/Minor	Minor	Minor/None
Sensitivity - Negligible	Moderate/Minor	Minor	Minor/None	None

The above matrix is not used as a prescriptive tool and the methodology and analysis of potential effects at any particular location must allow for the exercise of professional judgement. Thus, in some instances a particular parameter may be considered as having a determining effect on the analysis.

Table 5, below, provides a brief definition of the full range of significance criteria. For the purpose of this report, it is considered that Major and Major/Moderate effects are significant.

Table 13.5 Definition of Significance Criteria for Landscape and Visual Effects

Category	Description
None	The proposed scheme is appropriate in its context. It may be difficult to differentiate from its surroundings and would affect very few or no receptors.
Minor	The proposed scheme would cause a barely perceptible impact and would affect few receptors.
Moderate	The proposed scheme would cause a noticeable difference to the landscape, and would affect several receptors.
Major	The proposed scheme would completely change the character and/or appearance of the landscape for a long period of time or permanently. It would affect many receptors.

13.4.5.1 Construction Stage Impacts

The proposed development concerns the continuation of use and deepening of the quarry within the application area. In the context of this, effects on landscape and visual amenity are documented as operational stage effects.

13.4.5.2 Operational Stage Impacts

Impacts during operation are discussed below in terms of the sensitivity of each landscape and visual receptor and the magnitude of change that would arise. The proposed development constitutes the continuation of the existing permitted quarry development.

Aggregate extracted would be partially processed within the quarry void and transported by HGVs to the processing area located on the eastern side of the minor road for further processing.

Some very small and beneficial changes would be associated with the proposed mitigation measures comprising boundary hedgerow and woodland planting introduced to enhance and augment existing areas of hedgerow and woodland planting. This would provide further visual screening of the quarry during operation.

13.4.5.3 Direct Impacts on Landscape

Direct impacts would occur to the landscape of the existing quarry facility. These impacts would comprise the continuation of the existing permitted extraction activities and proposed deepening of the existing quarry void. These direct changes are considered to be very limited as they relate to an existing quarry void and would involve no loss of landscape elements of value including farmland and wooded vegetation. The introduction of planting along the site boundaries (excluding areas close to the 'Black Pig's Race' a linear earthworks) would also constitute a direct and beneficial change, proposed to mitigate landscape and visual effects.

13.4.5.4 Visual Effects

Effects on visual amenity at selected viewpoint locations presented in the baseline are documented below. An evaluation of sensitivity at each viewpoint location is presented along with an evaluation of magnitude of change which is determined with reference to the size and scale, geographical extent and duration/reversibility of the proposed change resulting in a judgement of the overall magnitude of visual change.

13.4.5.5 Visual Receptor Sensitivity

Table 6 below summarises the sensitivity of the visual receptors at each of the identified viewpoints, based on the methodology presented above. In terms of susceptibility, this is considered to be high for residents of dwellings due to their continued interest in their surroundings whilst road users are of low susceptibility as the existing view is incidental to the journey. Recreational viewers are considered to be of high susceptibility where their attention is focused on the surrounding landscape.

In terms of value, no landscape designations, scenic routes, or protected views apply at any of the viewpoint locations.

Table 13.6 Magnitude of Change and Significance of Visual Effects

	Susceptibility	Value	Sensitivity
1	Residents of dwellings - high.	No landscape designations, scenic routes, or protected views.	High
	Road users - low.		Low
2	Residents of dwellings - high.		High
	Road users - low.		Low
3	Residents of dwellings - high.		High
	Road users - low.		Low
4	Residents of dwellings - high.		High
	Road users - low.		Low
5	Residents of dwellings - high.		High
	Road users - low.		Low
6	Residents of dwellings - Low		Low
	Road users - low.		Low

The magnitude of change and significance of visual effects at each viewpoint is discussed below. For each viewpoint, the size and scale of the change to the existing view is assessed together with the extent of the view that would be affected by the change and the duration, concluding with an overall magnitude of change. Finally, the significance of visual effects at each viewpoint is documented. From the viewpoints 1 - 6, the viewer would continue to see elements associated with the existing permitted quarry within the application area.

Viewpoint 1

At viewpoint 1, residents of dwellings and road users would experience some small changes to existing views, and these relate to the introduction of woodland planting along the fence boundary introduced to mitigate landscape and visual effects. The scale of the proposed change is considered to be relatively small, and a small proportion of the view would be affected. This would result in a slight beneficial magnitude of change as the proposed woodland would represent an enhancement to local landscape character as observed from this location.

Viewpoint 2

At viewpoint 2, residents of dwellings and road users would experience some small changes to existing views, and these relate to the introduction of woodland planting along the fence boundary introduced to mitigate landscape and visual effects. The scale of the proposed change is considered to be relatively small, and a small proportion of the view would be affected. This would result in a

slight beneficial magnitude of change as the proposed woodland would represent an enhancement to local landscape character as observed from this location.

Viewpoint 3

At viewpoint 3, along county road L442 at entrance to the quarry site. Existing image and proposed photomontage illustrating new trees and hedgerow to be planted along east boundary of the site.

Viewpoint 4

At Viewpoint 4, along county road L442 North of the site. The existing quarry can be viewed, and road users would experience some small changes to existing views, and these relate to the introduction of woodland planting along the fence boundary introduced to mitigate landscape and visual effects. The scale of the proposed change is considered to be relatively small, and a small proportion of the view would be affected. This would result in a slight beneficial magnitude of change as the proposed woodland would represent an enhancement to local landscape character as observed from this location.

Viewpoint 5

At Viewpoint 5, along Cavan/ Kilnaleck road North of the site. The quarry cannot be viewed from this location, but the road users would experience some small changes to existing views, and these relate to the introduction of woodland planting along the fence boundary introduced to mitigate landscape and visual effects.

Viewpoint 6

At Viewpoint 6, along Cavan/ Kilnaleck road North of the site. The existing quarry cannot be viewed from this location at Drumavaddy community centre & church.

Extractive Industry and Building Materials Production

A Landscape Mitigation and Restoration Plan is provided, detailing the restoration of the lands to an after use which would support future habitats and would result in ecological enhancement of the area. The proposed landscape mitigation and restoration plan is shown on Figure 1.5.

13.4.6 Post-Operational Stage Impacts

During the Post operational stage, the quarry would cease to operate. Plant and machinery would be removed, and the site would be restored in accordance with the Mitigation and Restoration Plan illustrated in Figure 1.5. This would result in some beneficial effects on surrounding landscape and visual amenity compared with the current baseline.

13.4.7 'Do-nothing Scenario'

If no further works within the planning application area were carried out, the existing quarry, would continue to be present in the landscape. The restoration of the site would result in improvements to existing landscape and visual amenity compared with the current baseline.

13.5 MITIGATION MEASURES

13.5.1 Construction Phase - Mitigation Measures

The development shall be carried out in an organised manor, thus reducing the visual impact upon the environment. Site hoarding will be appropriately scaled, finished, and maintained for the period of construction of the new settlement pond. To reduce the potential negative impacts during the construction phase, good site management and housekeeping practices will be adhered to. The visual impact of the site compound and scaffolding visible during the construction phase are of a temporary to short term nature only and therefore it is expected that this will require no remedial action other than as already stated.

13.5.2 Operational Stage

Hedgerow and woodland planting using native species would be introduced in advance of operations along the boundaries (excluding areas close to the 'Black Pig's Race' a linear earthworks) of the application area which, along with vegetation to be retained would mitigate landscape and visual effects.

13.5.3 Post — Operational Stage

The post operational stage mitigation comprises a restoration plan to be implemented at the end of the life of the quarry. The restoration plan includes a range of measures to restore the quarry site to an after use which would be more sympathetic with the surrounding landscape. Details of the restoration plan are presented in Figure 1.5.

13.6 RESIDUAL IMPACT ASSESSMENT

13.6.1 Operational Stage

The effects during operation take account of the mitigation measures, namely the proposed planting at the site boundaries. In this regard, the residual effects are anticipated to be similar to that documented under operational stage impacts.

13.6.2 Direct Impacts on Landscape

At this stage, extraction activities would have ceased, and measures associated with the restoration of the site would be implemented as indicated in Figure 13.4. This would result in beneficial effects on landscape and visual amenity compared with the current baseline.

13.6.3 Landscape and Restoration Plan

Detailed cross sections, profiles of restored areas and volume calculations of materials proposed to be used. Plans need to be integrated into the overall restoration of the site.

13.7 REFERENCES

The Landscape Institute with the Institute of Environmental Management and Assessment (2013)

Guidelines for Landscape and Visual Impact Assessment, Third Edition, Routledge

The Landscape Institute (March 2011) Advice Note 01/11 — Photography and photomontage in landscape and visual assessment, The Landscape Institute.

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

Figure. 13.1 – Site location indicated in red

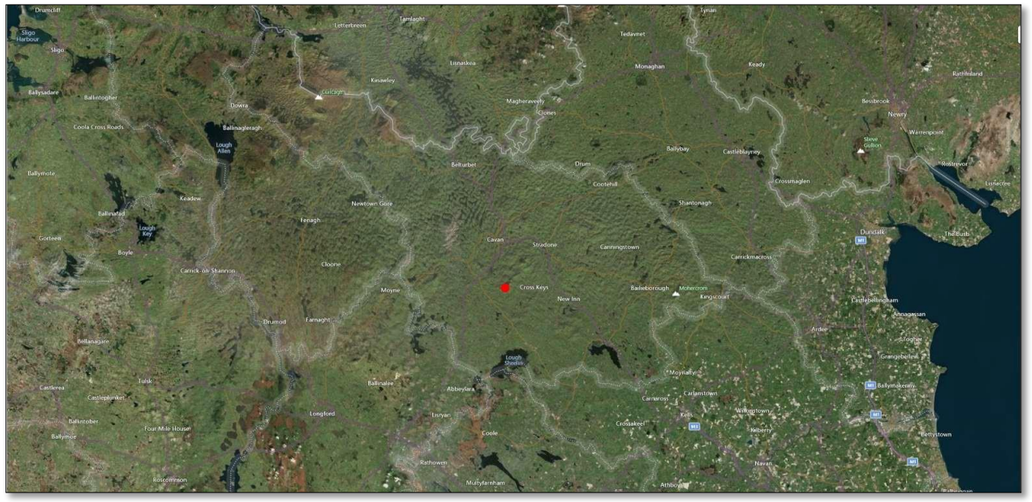


Figure 13.2 – Site Location

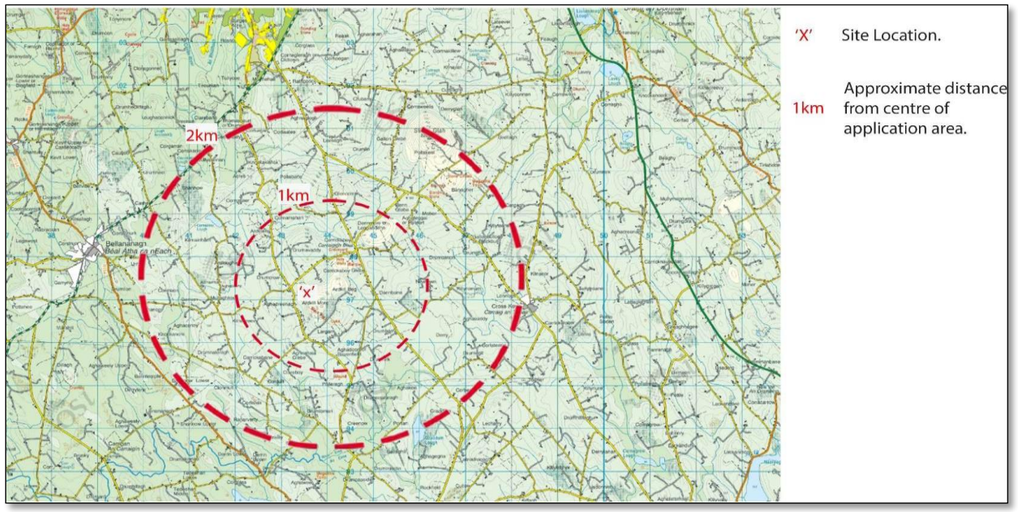
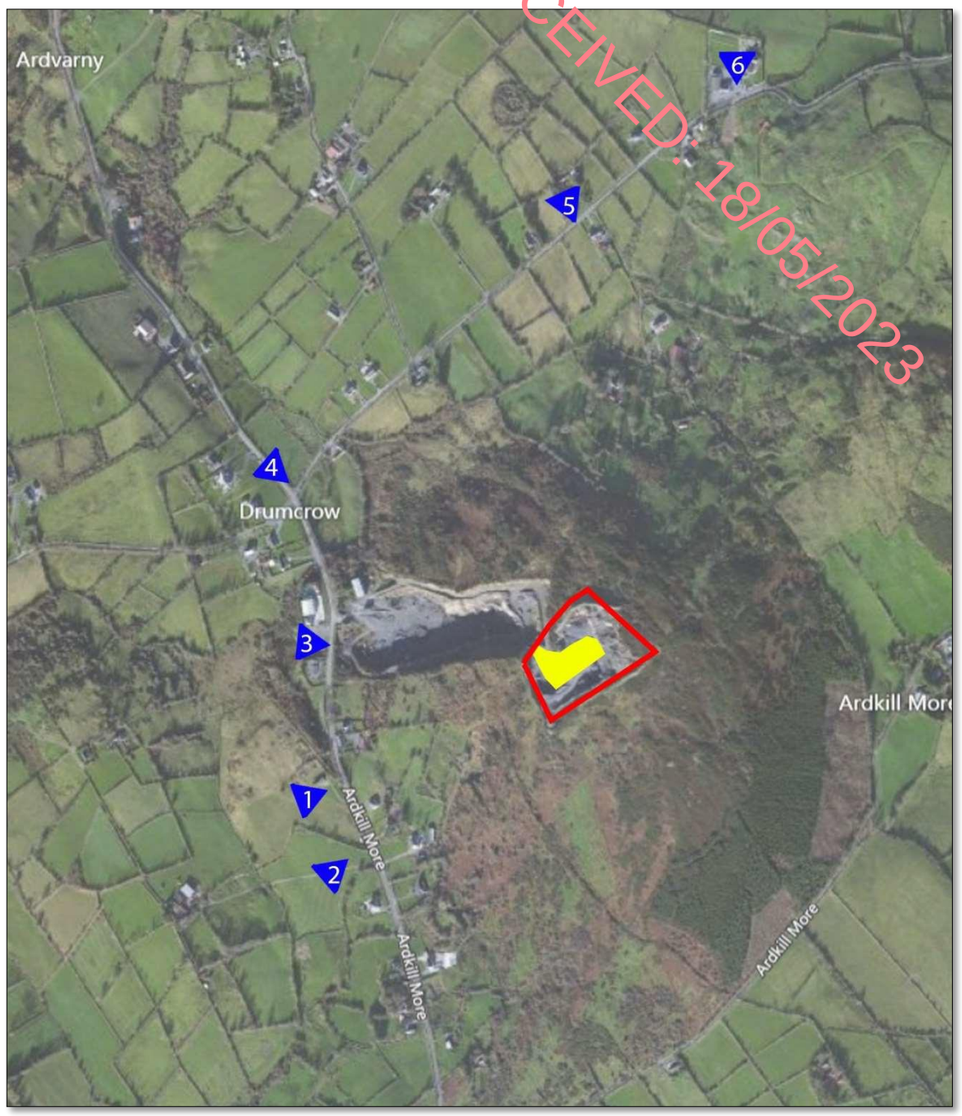


Figure 13.3 – Viewpoint location map (site boundary in red & proposed Quarry extraction in yellow)



Viewpoint 1: Ardkill Moore Local County Road L442

Viewpoint 2: Ardkill Moore Local County Road L442

Viewpoint 3: Existing Quarry Site Entrance Ardkill Moore Local County Road L442

Viewpoint 3: Photomontage illustrating proposed trees / hedgerow at Quarry Site Entrance Ardkill Moore Local County Road L442

Viewpoint 4: Ardkill Moore Local County Road L442

Viewpoint 5: The quarry cannot be viewed from this location.

Viewpoint 6: Existing quarry cannot be viewed from Drumlaveddy community Centre & church.

CHAPTER 14

TRAFFIC & TRANSPORT

CHAPTER FOURTEEN | TRAFFIC & TRANSPORT

Figures

Tables

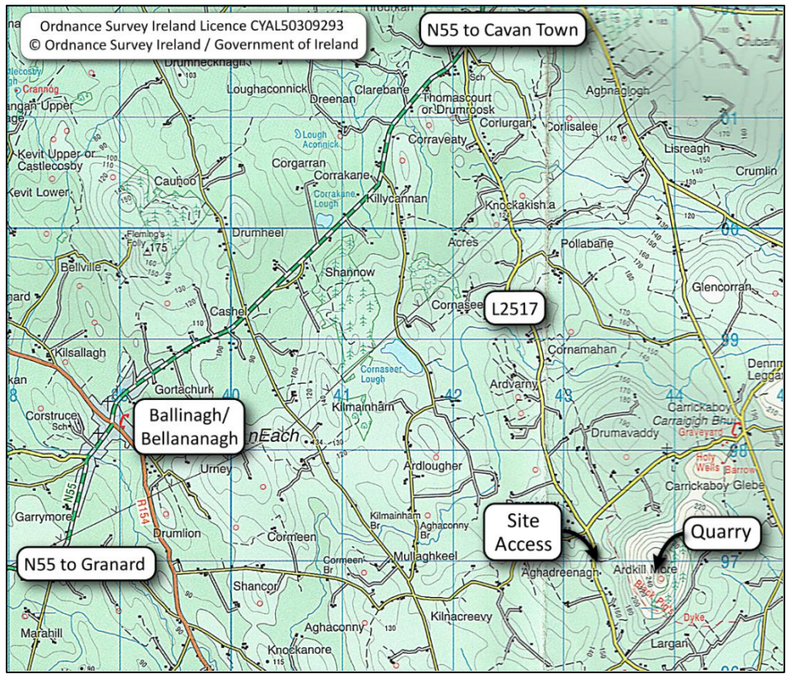
Appendix

14.0 TRAFFIC AND TRANSPORT

14.1 Introduction

This chapter of the EIAR, has been compiled by Matthew Steele BA (Hons) MSc FCILT FRGS MCIHT and Pamela Townley BSc (Hons), both Directors of Traffic Transport and Road Safety Associates Ltd. (TTRSA) with over twenty years' experience of assessing the traffic and transport related impacts of development The chapter provides an assessment of the traffic and transport related impacts of the proposed development. The development (quarry) site is accessed off the L2517 Local Road at Ardkill More and Drumcrow, Carrickaboy, Co. Cavan, approximately 7km to the south of Cavan Town (Figure 14.1).

Figure 14.1 – Site Location



14.1.1 Background to the Existing Development

A number of previous planning applications have been granted for the quarry site, including: Cavan County Council Planning Reference Number 97/166 for development including offices, mobile crushers, a materials testing laboratory, canteen, toilets, store, machinery workshop, wheel-wash and weighbridge; Cavan County Council Planning Reference Number 05/1801 for an extension to the area being quarried and a new site access; and, Cavan County Council Planning Reference Number 11/62 for retention of quarry related infrastructure.

14.1.2 Overview of Development Proposals

The proposed development seeks for a 20 year permission for quarrying and extraction of rock that will include drilling, blasting, crushing and screening along with alterations to boundaries & all associated site works on lands at Ardkill More Townland and Drumcrow Townland, Carrickaboy, County Cavan. Approximately 500,000 tonnes of material will be extracted over a twenty-year period, resulting in an average extraction rate of 25,000 tonnes per year up to a maximum of 50,000 tonnes per annum.

Whilst the site layout plan accompanying planning reference Number 11/62 suggested that the site entrance had been relocated in accordance with the granted Planning Reference Number 05/1801, this is not the case. The current site entrance, verified on Friday January 2021, and being the pre 2005 arrangement. A functioning wheel wash – wash is present, location in the immediate vicinity of the weighbridge. The traffic assessment contained within this chapter is based on the geometry of the current site entrance.

Whilst the site layout plan accompanying Planning Reference Number 11/62 suggested that the site entrance had been relocated in accordance with the granted Planning Reference Number 05/1801, this is not the case. The current site entrance, verified on Friday 22nd January 2021, and being the pre 2005 arrangement. A functioning wheel-wash is present, location in the immediate vicinity of the weighbridge. The traffic assessment contained within this Chapter is based on the geometry of the current site entrance.

14.1.2 Overview of Development Proposals

The proposed development seeks 'a 20 year permission to complete extraction of material granted within existing quarry envelope as per previously approved planning (Ref No.051801) alterations to boundaries & all associated site works at Ardkill More and Drumcrow, Carrickaboy, Cavan, Co. Cavan. TTRSA have been informed that should permission be granted, extraction of the material will commence in 2024, and that approximately 500,000 tonnes of material will be extracted, with an annual extraction rate of between 25,000 tonnes and 50,000 tonnes per year.

14.2 Methodology

The methodology adopted for the production of this Chapter is detailed below.

14.2.1 Legislation and Guidance

Relevant guidance on assessing the impact of a development on roads, traffic and transport is contained within the TTA guidelines produced by Transport Infrastructure Ireland (TII); and, the Environmental Protection Agency (EPA) Guidelines on the information to be contained in Environmental Impact Assessment Reports. The latter states that traffic impact should be assessed for the construction phase, operational phase, and for unplanned events such as traffic collisions. As the proposed development related to the continuation of material extraction at an existing quarry site, a construction phase is not included within this assessment.

14.2.2 Approach to Assessment

The roads, traffic and transport impacts of the proposed development have been assessed by utilising the following approach based on the prevailing (TII) guidelines on Traffic and Transport Assessment (TTA) (May 2014). The assessment combines:

- desktop study, for example of traffic collisions.
- site based field work, for example traffic counts and on-site geometric measurement;
- traffic modelling, including:
    - the factoring of traffic count data, for example to future assessment years, in this case an opening year of 2024 and future assessment years of 2034 and 2044, reflecting the anticipated duration of the development;
    - predicting the number of daily and peak hour trips during the operational phase of the development;
    - using this information to model the site access junction using the PICADY modelling package;
- reviewing the environmental impact of traffic related to the operation and decommissioning of the proposed development, including road safety; and,
- developing a mitigation strategy to ensure that any potential roads, traffic and transport effects are kept to a minimum.

4.2.3 Consultations

This Chapter updates that prepared as part of planning application ref. no. 19/227 (ABP Ref. 306803). The content of this Chapter was scoped with Mr John Wilson, then of the Roads Section of Cavan County Council, as part of the aforementioned planning application. The items raised as part of the scoping, communicated by e-mail on 10th April 2018, are covered within this Chapter.

14.3 The Existing Environment

The development site is accessed off the eastern side of the L2517 Local Road at Ardkill More and Drumcrow.

14.3.1 Characteristics of the Existing Road Network

In the vicinity of the site, the L2517 is formed of a 5.4m wide single carriageway. When visited on Friday 22nd January 2021, yellow edge-lining and a solid centreline were observed to be present. The access to the development site is located on the outside of a northbound left-hand horizontal curve. The vertical profile of the L2517 falls from south to north. The carriageway is bounded by a verge and hedge to the north and vegetated berm to the south. This section of the L2517 is typified by a number of agricultural, commercial and residential accesses. There is no formal highway drainage or street lighting. The posted speed limit is the Rural Speed Limit (80km/h).

14.3.2 Traffic Volumes

TTRSA undertook Manual Classified Traffic Counts (MCC) at the L2517/Site Access junction on Thursday 8th February 2018. Traffic count data covering the AM and PM peak periods is included in Appendix 14-1, and trip generation data for the proposed development is also included in Section 12.5.1.1. For the purpose of analysis, the traffic count data has been converted into Passenger Car Units (PCUs) using factors of: 0.2 for pedal cycles; 0.4 for motorcycles; 1.0 for cars and light goods vehicles (LGV) including those towing trailers; and 2.3 for buses and all types of rigid and articulated Medium and Heavy Commercial Vehicle (HCVs).

14.3.3 Peak Hours

Based on the traffic data, for the purpose of the capacity assessment contained within this Chapter, the AM peak hour is 07:45-08:44 and the PM peak hour is 16:45-17:44, both inclusive.

14.3.4 Annual Average Daily Traffic (AADT)

Based on the traffic count data, the current AADT on the L2517 is forecast to be within the range of 1310-1350 vehicles

14.3.5 Access/Egress

TTRSA have been informed that access to the quarry site by vehicles collecting stone is predominantly to and from the north (towards Cavan Town) on the L2517. This route provides connectivity to both the N55 and N4 National Roads.

14.3.6 Internal Layout and Parking

The weighbridge and a cluster of quarry related buildings are located immediately to the east of the current site entrance. An internal road formed of unbound gravel connects the entrance to the current quarry face. Lorries collecting stone from the site utilise this internal road. Cars are currently parked in an ad-hoc manner in the vicinity of the weighbridge and other buildings.

14.4 Likely Significant Impacts

The main significance criteria when assessing traffic impact is the performance of affected junctions. Other criteria include, for example: any increase in road traffic collisions (which may result in environmental impacts due to spillage); likely damage to the road structure; and measurable increases in noise and atmospheric pollutants.

14.4.1 Traffic Impact

Traffic impact is typically assessed in terms of the impact of the traffic generated by a development on the operation of the local road network. Threshold levels for an increase in traffic volumes requiring assessment are typically ten percent for local roads, although it is usual to assess the performance of any access junction as the point of maximum impact to ensure that the junction is capable of operating with the traffic from the development. Modelling software is used to facilitate this assessment. The assessment results in a Ratio of Flow to Capacity (RFC) which is a measure of junction performance in terms of saturation. A value of 1.00, which can also be considered as 100% saturation, represents an arm of the junction operating at maximum capacity, in that any increase in the rate of vehicles arriving on the link will result in significant additional queue lengths. Traditionally a figure of 0.85 or 85% is the maximum acceptable degree of saturation when assessing priority junctions, with anything above this level considered to be congested. The assessment also takes account of queue lengths (measured in PCUs) which are primarily used to check for blocking back through, and therefore impact on, adjacent junctions.

14.4.2 Road Structure Impact

Road structure impact is initially assessed by a simple visual inspection for cracking, deformation, and disintegration in the vicinity of the site. If following this visual assessment and taking account of the types and volumes of traffic likely to be generated from a proposed development, the structural ability of the road to carry the traffic is in question, tests can be undertaken to determine the structural strength of the carriageway. Current guidance for such testing is detailed in the TII publication 'Pavement Assessment, Repair and Renewal Principles Ref. AM-PAV-06050 published in March 2020.

14.4.3 Road Safety Impact

Road safety impact is typically assessed in terms of the collision record on the local road network in the vicinity of a development. Safety related geometrical measurements are also assessed, for example, visibility to and from access points. In certain circumstances, such as a new access point, a Road Safety Audit can also be undertaken. Current guidance is detailed in the TII publication 'Road Safety Audit' (standard) Ref. GE-STY-01024.

14.4.4 Traffic Noise Impact

The environmental impact of traffic noise is assessed in terms of Lden and Lnight. Lden is the equivalent continuous noise level over a whole 24-hour period, but with noise in the evening (19:00 to 23:00) increased by 5 dB(A) and noise at night (23:00 to 07:00) increased by 10 dB(A) to reflect the greater noise-sensitivity of people at those times. Lnight is the equivalent continuous noise level over the night-time period (23:00 to 07:00). Lnight does not contain any night-time noise weighting. Traffic noise is generated by a combination of noise sources including vehicle engines and the interactions between vehicles and the road surface. Traffic noise is therefore a factor of the number and type of vehicles using a particular route. Whilst a noise source such as a HCV passing a noise receptor such as house is likely to generate a momentary noise at a level approximating 85dBA, when averaged over an extended period, such as a day, the impact of an individual vehicle in terms of a change in the averaged noise levels is negligible.

14.4.5 Traffic Related Atmospheric Pollutant Impact

Traffic related atmospheric pollutant emissions cause impacts at both the local and national/international level. At the local level the principal pollutants are nitrogen dioxide (NO2) and fine particulate matter (bothPM10andPM2.5). TII state in their publication 'Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes that 'empirical evidence has shown that there is no risk of emissions from road traffic leading to exceedances of the relevant air quality standards for any other pollutants, at even the most heavily-trafficked locations'. At the national/international level emissions can lead to: nitrogen deposition; the formation of ozone; and, climate change. Air quality standards have been defined by EU Directive and transposed into national legislation.

Nitrous oxide emissions increased nationally as a result of the introduction of catalytic converters to the vehicle fleet, but will decrease as an increasing proportion of the vehicle fleet becomes fully electric. The impact of nitrous oxide deposition on flora and fauna is covered in considerable detail in Chapter 11 of the 'WHO Air Quality Guidelines – Second Edition' (Effects of nitrogen containing air pollutants: critical levels). The guidelines propose that the 'critical level for NOx (NO + NO2, expressed as NO2 in µg/m3) is 30 µg/m3 as an annual mean and 75 µg/m3 as a 24-hour mean'. Evidential monitoring has shown that to exceed the annual mean critical level in close proximity to a road (<10m from the road edge) requires an annual average daily traffic (AADT) flow of between 50,000 and 60,000 vehicles.

14.5 Do Something Impact – Operational Phase

14.5.1 Operational Phase Traffic Impact

The operational phase traffic impact of the proposed development is detailed in the following sub-sections covering trip generation; trip distribution; background traffic growth and highway capacity modelling.

14.5.1.1 Development Trip Generation

The proposed development is an existing development, and the intention of the proposed development is primarily to extend the operational lifespan of the existing development rather than to significantly increase the rate of production. TTRSA have been informed that extraction rates for the period 2016-2018, including that related to the traffic count detailed in Section 14.3.3, were 40,000 tonnes per year. This equates to approximately 2,000 lorry loads per year, or an average of approximately 6.5 lorry loads per working day, although demand is seasonal. As detailed in Section 14.1.2, the annual extraction rate for the currently proposed development is between 25,000 tonnes and 50,000 tonnes per year. The trip generation for the proposed development has therefore been calculated from the traffic survey detailed in Section 14.3.3, by applying a factor of 1.25 to HGV movements, and has been applied to the future year assessments, equating to the trip generation resulting from extraction of 50,000 tonnes in a year. The trip generation for the peak hours is included as movements: A-B; B-A; B-C; and, C-B in Appendix 14-1. Table 14.1 below provides a snapshot of the proposed trip generation over an operational day of the site.

Table 14.1: Proposed Hourly Trip Generation

Time Period	Entry			Exit		
	Car/LGV	HGV	PCU	Car/LGV	HGV	PCU
08:00-08:59	2	6	16	0	1	3
09:00-09:59	0	1	3	0	6	14
10:00-10:59	0	4	9	0	3	6
11:00-11:59	0	5	12	0	4	9
12:00-12:59	1	3	7	0	3	6
13:00-13:59	0	1	3	0	4	9
14:00-14:59	0	3	6	0	1	3
15:00-15:59	0	4	9	0	5	12
16:00-16:59	0	1	3	2	1	5
17:00-17:59	0	0	0	1	0	1
Total Daily	3	28	66	3	28	66

HGVs and PCUs rounded to the nearest whole number.

14.5.1.2 Trip Distribution

As the proposed development is an existing development, the trip distribution for the peak hours is included as movements: A-B; B-A; B-C; and C-B in Appendix 14-1.

14.5.1.3 Background Traffic Growth

As noted in section 14.2.2, subject to planning being granted, it is assumed for the purpose of this assessment that the opening year will be 2024 and future assessment years will be 2034 and 2044, the latter reflecting the anticipated duration of the development. To factor traffic from the opening year to future assessment years composite growth factors have been applied to through traffic on the L2517, these factors based on the TII Project Appraisal Guidelines link based central growth rates for County Cavan (TII PE-PAG-02017 issued October 2021), taking into account the percentage of HCV traffic (5.1%). The growth factors applied are detailed below and the impact of this growth is shown in Appendix 14-2:

- From 2018 to 2024 a factor of 1.076
- From 2018 to 2034 a factor of 1.171; and,
- From 2018 to 2044 a factor of 1.221.

14.5.1.4 Highway Capacity Modelling

Based on the operational phase peak hour movements contained within Appendix 14-2, the L2517/Site Access junction has been assessed using the industry standard PICADY modelling software package for the operational years of 2024, 2034 and 2044. The results of the PICADY analysis are summarised in Table 14.2 and detailed in Appendix 14-3. The traffic modelling shows that the junction is forecast to operate with at least 99% spare capacity during the operational phase of the development, in all of the scenarios tested. Therefore minor changes to the operational phase trip generation and/or distribution will not affect the validity of this assessment.

Table 14.2 –Summary of PICADY modelling output for operational phase.

	AM					PM				
	Set ID	Queue (PCU)	Delay (s)	RFC	LOS	Set ID	Queue (PCU)	Delay (s)	RFC	LOS
	2024 Peak Hour									
Stream B-AC	D1	0.0	0.00	0.00	A	D4	0.0	0.00	0.00	A
Stream C-AB		0.0	5.71	0.01	A		0.0	0.00	0.00	A
	2034 Peak Hour									
Stream B-AC	D2	0.0	0.00	0.00	A	D5	0.0	0.00	0.00	A
Stream C-AB		0.0	5.69	0.01	A		0.0	0.00	0.00	A
	2044 Peak Hour									
Stream B-AC	D3	0.0	0.00	0.00	A	**D6**	**0.0**	**0.00**	**0.00**	**A**
Stream C-AB		0.0	5.67	0.01	A		**0.0**	**0.00**	**0.00**	**A**

Health Atlas Ireland[1] online collision data has been consulted for the period currently available (2005 to 2016 inclusive). This database indicates that no collisions resulting in injury have occurred on the L2517 in the vicinity of the proposed development. Sight distances to and from the existing site access do not conform to current design standards and mitigation measures are proposed, however, due to the low traffic volumes on the L2517 and low number of vehicle movements generated by the development, the risk of a collision occurring at the site access is very low.

14.5.2 Operational Phase Road Safety Impact

The L2517 was resurfaced with an overlay in 2018. No specific road structure impact is anticipated to result from the continued use of the quarry site, vehicle weights being controlled through the use of an on-site weighbridge.

14.5.3 Operational Phase Road Structure Impact

Due to the low traffic flow generated by the development in the operational phase, and the hours of operation of the development, no measurable traffic noise impact is predicted.

14.5.4 Operational Phase Noise Impact (Traffic)

Due to the low traffic flow generated by the development in the operational phase, and the hours of operation of the development, no measurable traffic noise impact is predicted.

14.5.5 Operational Phase Traffic Related Atmospheric Pollutant Impact

Due to the low traffic flow on the L2517, and the relatively low number of vehicle movements associated with the development, no measurable impact in terms of local air pollution related to development related traffic is anticipated.

14.6 Do Nothing Impact - Operational Phase

The continued operation of the quarry with sub-standard egress visibility from the site entrance to the south along the L2517, combined with substandard stopping sight distances for northbound road users on the L2517 increases the risk of a collision occurring on the L2517 in the vicinity of the site. Such a collision is likely to result in injury to vulnerable road users and/or vehicle occupants and environmental impacts including the uncontrolled release of pollutants into the local environment from vehicles involved in the collisions. Mitigation measures are proposed to reduce this risk.

14.7 Mitigation Measures - Operational Phase

The following mitigation measures are proposed to improve road safety in the vicinity of the site entrance:

- Provide stop signing and road markings, visible to those egressing from the site.
- Set back and lower the existing roadside verge on the eastern side of the L2157 to the south of the site entrance to provide an appropriate egress visibility splay; and,
- Re-profile the existing entrance to raise the topographical level of egressing road users further improve egress visibility. Ensure that the revised profile and gradient do not result in surface water entering the L2157 carriageway from the site.

14.8 Residual Impacts - Operational Phase

Whilst there is always a risk associated with accesses onto roads, if the proposed mitigation measures are implemented, the traffic related environmental risks associated with the proposed development will be reduced below current levels.

14.9 Traffic Related Impacts - Rehabilitation/Restoration Phase

TTRSA have been informed that the rehabilitation/restoration of the site following the completion of quarrying will primarily involve the movement of material such as overburden and topsoil that is currently stored on site, rather than for example, the importation of material from off-site. On this basis, the traffic impact during the rehabilitation/restoration phase of the development would be anticipated to be less than the traffic impact stated for the operational phase of the development.

1 https://public.healthatlasireland.ie/rsa2/index.html

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APPENDIX 14.1 : TRAFFIC COUNT

TTRSA
Traffic : Transport : Road Safety

Video Based MCC – Thursday 8th February 2018
L2517 / Quarry Access, Ardkill More, Co. Cavan

Arm A = L2517 (to/from North)
Arm B = Quarry Access
Arm C = L2517 (to/from South)

Incidents: *None*
Weather: *Showers*

Cycle	A-B	A-C	B-A	B-C	C-A	C-B
07:45-08:59	0	0	0	0	0	0
08:00-08:14	0	0	0	0	0	0
08:15-08:29	0	0	0	0	0	0
08:30-08:44	0	0	0	0	0	0
08:45-08:59	0	0	0	0	0	0
09:00-09:14	0	0	0	0	0	0
16:45-16:59	0	0	0	0	0	0
17:00-17:14	0	0	0	0	0	0
17:15-17:29	0	0	0	0	0	0
17:30-17:44	0	0	0	0	0	0
17:45-17:59	0	0	0	0	0	0
18:00-18:14	0	0	0	0	0	0

Motorcycle	A-B	A-C	B-A	B-C	C-A	C-B
07:45-08:59	0	0	0	0	0	0
08:00-08:14	0	0	0	0	0	0
08:15-08:29	0	0	0	0	0	0
08:30-08:44	0	0	0	0	0	0
08:45-08:59	0	0	0	0	0	0
09:00-09:14	0	0	0	0	0	0
16:45-16:59	0	0	0	0	0	0
17:00-17:14	0	0	0	0	0	0
17:15-17:29	0	0	0	0	0	0
17:30-17:44	0	0	0	0	0	0
17:45-17:59	0	0	0	0	0	0
18:00-18:14	0	0	0	0	0	0

Car / LGV	A-B	A-C	B-A	B-C	C-A	C-B
07:45-08:59	0	9	0	0	14	0
08:00-08:14	1	5	0	0	19	0
08:15-08:29	0	6	0	0	22	0
08:30-08:44	0	4	0	0	11	0
08:45-08:59	1	10	0	0	14	0
09:00-09:14	0	6	0	0	14	0
16:45-16:59	0	22	1	0	7	0
17:00-17:14	0	20	1	0	11	0
17:15-17:29	0	20	0	0	16	0
17:30-17:44	0	19	0	0	11	0
17:45-17:59	0	19	0	0	8	0
18:00-18:14	0	17	0	0	8	0

HGV/PSV	A-B	A-C	B-A	B-C	C-A	C-B
07:45-08:59	0	1	0	0	2	0
08:00-08:14	1	0	0	0	2	0
08:15-08:29	1	0	0	0	0	1
08:30-08:44	1	0	1	0	1	0
08:45-08:59	1	0	0	0	0	0
09:00-09:14	1	0	0	0	1	0
16:45-16:59	0	0	0	0	1	0
17:00-17:14	0	0	0	0	0	0
17:15-17:29	0	0	0	0	0	0
17:30-17:44	0	0	0	0	0	0
17:45-17:59	0	1	0	0	1	0
18:00-18:14	0	0	0	0	0	0

Total Vehicles	A-B	A-C	B-A	B-C	C-A	C-B
07:45-08:59	0	10	0	0	16	0
08:00-08:14	2	5	0	0	21	0
08:15-08:29	1	6	0	0	22	1
08:30-08:44	1	4	1	0	12	0
08:45-08:59	2	10	0	0	14	0
09:00-09:14	1	6	0	0	15	0
16:45-16:59	0	22	1	0	8	0
17:00-17:14	0	20	1	0	11	0
17:15-17:29	0	20	0	0	16	0
17:30-17:44	0	19	0	0	11	0
17:45-17:59	0	20	0	0	9	0
18:00-18:14	0	17	0	0	8	0

PCUS	A-B	A-C	B-A	B-C	C-A	C-B
07:45-08:59	0	11	0	0	19	0
08:00-08:14	3	5	0	0	24	0
08:15-08:29	2	6	0	0	22	2
08:30-08:44	2	4	2	0	13	0
08:45-08:59	3	10	0	0	14	0
09:00-09:14	2	6	0	0	16	0
16:45-16:59	0	22	1	0	9	0
17:00-17:14	0	20	1	0	11	0
17:15-17:29	0	20	0	0	16	0
17:30-17:44	0	19	0	0	11	0
17:45-17:59	0	21	0	0	10	0
18:00-18:14	0	17	0	0	8	0

PCU Factors

Cycle	0.2
Motorcycle	0.4
Car/LGV	1
HGV/PSV	2.3

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APPENDIX 14.2 : TRAFFIC CALCULATIONS

TTRSA
Traffic : Transport : Road Safety

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APPENDIX 14.3: MODELING OUTPUT

Traffic Calculations Summary
L2517 / Quarry Access, Ardkill More, Co. Cavan
Existing Priority Junction

Arm A = L2517 (to/from North)
Arm B = Quarry Access
Arm C = L2517 (to/from South)

Scenario	A-B	A-C	B-A	B-C	C-A	C-B
2018 AM Peak Hour (07:45-08:44)	8	26	2	0	78	2
2024 AM Peak Hour (Through Traffic Factor 1.076)	8	28	2	0	83	2
2034 AM Peak Hour (Through Traffic Factor 1.171)	8	31	2	0	91	2
2044 AM Peak Hour (Through Traffic Factor 1.221)	8	32	2	0	95	2
AM Peak Additional Development Related HGV Movements	1	0	0	0	0	0
2024 AM Peak Hour with Development	**9**	**28**	**3**	**0**	**83**	**3**
2034 AM Peak Hour with Development	**9**	**31**	**3**	**0**	**91**	**3**
2044 AM Peak Hour with Development	**9**	**32**	**3**	**0**	**95**	**3**
2018 PM Peak Hour (16:45-17:44)	0	81	2	0	47	0
2024 PM Peak Hour (Through Traffic Factor 1.076)	0	87	2	0	51	0
2034 PM Peak Hour (Through Traffic Factor 1.171)	0	95	2	0	55	0
2044 PM Peak Hour (Through Traffic Factor 1.221)	0	99	2	0	58	0
PM Peak Additional Development Related HGV Movements	0	0	0	0	0	0
2024 PM Peak Hour with Development	**0**	**87**	**2**	**0**	**51**	**0**
2034 PM Peak Hour with Development	**0**	**95**	**2**	**0**	**55**	**0**
2044 PM Peak Hour with Development	**0**	**99**	**2**	**0**	**58**	**0**

Data is presented in PCUs rounded to nearest whole number and therefore rows do not necessarily sum.

TRL THE FUTURE OF TRANSPORT

Generated on 17/02/2023 11:18:46 using Junctions 9 (9.5.1.7462)

Junctions 9

PICADY 9 - Priority Intersection Module

Version: 9.5.1.7462

Filename: nultys_2023_update.j9
Path: \\192.168.1.33\ttrsa\projects\P210101-003_Nultys_Quarry_EIAR_Future_Years\picady
Report generation date: 17/02/2023 11:18:24

Summary of junction performance

	AM					PM				
	Set ID	Queue (PCU)	Delay (s)	RFC	LOS	Set ID	Queue (PCU)	Delay (s)	RFC	LOS
	2024 Peak Hour									
Stream B-AC	D1	0.0	0.00	0.00	A	D4	0.0	0.00	0.00	A
Stream C-AB		0.0	5.71	0.01	A		0.0	0.00	0.00	A
	2034 Peak Hour									
Stream B-AC	D2	0.0	0.00	0.00	A	D5	0.0	0.00	0.00	A
Stream C-AB		0.0	5.69	0.01	A		0.0	0.00	0.00	A
	2044 Peak Hour									
Stream B-AC	D3	0.0	0.00	0.00	A	D6	0.0	0.00	0.00	A
Stream C-AB		0.0	5.67	0.01	A		0.0	0.00	0.00	A

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle.

File summary

File Description

Title	McNulty's Quarry Access
Location	Ardkill More, Co. Cavan
Site number	
Date	17/02/2023
Version	2023 Update
Status	EIAR
Identifier	
Client	McNulty's Quarry
Jobnumber	210101-003
Enumerator	TTRSA
Description	Modelling in PCUs

TRL THE FUTURE OF TRANSPORT

Generated on 17/02/2023 11:18:46 using Junctions 9 (9.5.1.7462)

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	PCU	PCU	perHour	s	-h	perMin

Analysis Options

Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
5.75				0.85	36.00	20.00

Demand Set Summary

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	2024 Peak Hour	AM	ONE HOUR	07:30	09:00	15	✓
D2	2034 Peak Hour	AM	ONE HOUR	07:30	09:00	15	✓
D3	2044 Peak Hour	AM	ONE HOUR	07:30	09:00	15	✓
D4	2024 Peak Hour	PM	ONE HOUR	16:30	18:00	15	✓
D5	2034 Peak Hour	PM	ONE HOUR	16:30	18:00	15	✓
D6	2044 Peak Hour	PM	ONE HOUR	16:30	18:00	15	✓

Analysis Set Details

ID	Include in report	Network flow scaling factor (%)	Network capacity scaling factor (%)
A1	✓	100.000	100.000

2024 Peak Hour, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	Site Access Junction	T-Junction	Two-way		0.16	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description	Arm type
A	L2517 to/from North		Major
B	Quarry Access		Minor
C	L2517 to/from South		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Has right turn bay	Visibility for right turn (m)	Blocks?	Blocking queue (PCU)
C	6.00			115.0	✓	0.00

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor arm type	Lane width (m)	Visibility to left (m)	Visibility to right (m)
B	One lane	3.60	22	33

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Stream	Intercept (PCU/hr)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
B-A	531	0.097	0.244	0.154	0.349
B-C	683	0.105	0.265	-	-
C-B	641	0.248	0.248	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D1	2024 Peak Hour	AM	ONE HOUR	07:30	09:00	15	✓

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.30

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		ONE HOUR	✓	37	100.000
B		ONE HOUR	✓	3	100.000
C		ONE HOUR	✓	86	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	9	28
	B	3	0	0
	C	83	3	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	5	5	5
	B	5	5	5
	C	5	5	5

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
B-AC	0.00	0.00	0.0	A	0	0
C-AB	0.01	5.71	0.0	A	3	5
C-A					76	114
A-B					8	12
A-C					26	39

Main Results for each time segment

07:30 - 07:45

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	0	0	585	0.000	0	0.0	0.0	0.000	A
C-AB	2	0.62	674	0.004	2	0.0	0.0	5.713	A
C-A	62	16			62				
A-B	6	2			6				
A-C	21	5			21				

07:45 - 08:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	0	0	582	0.000	0	0.0	0.0	0.000	A
C-AB	3	0.76	681	0.004	3	0.0	0.0	5.662	A
C-A	74	19			74				
A-B	8	2			8				
A-C	25	6			25				

08:00 - 08:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	0	0	579	0.000	0	0.0	0.0	0.000	A
C-AB	4	0.95	690	0.006	4	0.0	0.0	5.594	A
C-A	91	23			91				
A-B	9	2			9				
A-C	31	8			31				

08:15 - 08:30

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	0	0	579	0.000	0	0.0	0.0	0.000	A
C-AB	4	0.95	690	0.006	4	0.0	0.0	5.594	A
C-A	91	23			91				
A-B	9	2			9				
A-C	31	8			31				

08:30 - 08:45

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	0	0	582	0.000	0	0.0	0.0	0.000	A
C-AB	3	0.76	681	0.004	3	0.0	0.0	5.663	A
C-A	74	19			74				
A-B	8	2			8				
A-C	25	6			25				

08:45 - 09:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	0	0	585	0.000	0	0.0	0.0	0.000	A
C-AB	2	0.62	674	0.004	2	0.0	0.0	5.714	A
C-A	62	16			62				
A-B	6	2			6				
A-C	21	5			21				

2034 Peak Hour, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	Site Access Junction	T-Junction	Two-way		0.15	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D2	2034 Peak Hour	AM	ONE HOUR	07:30	09:00	15	✓

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.30

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		ONE HOUR	✓	40	100.000
B		ONE HOUR	✓	3	100.000
C		ONE HOUR	✓	94	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	9	31
	B	3	0	0
	C	91	3	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	5	5	5
	B	5	5	5
	C	5	5	5

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
B-AC	0.00	0.00	0.0	A	0	0
C-AB	0.01	5.69	0.0	A	3	5
C-A					83	125
A-B					8	12
A-C					28	43

Main Results for each time segment

07:30 - 07:45

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	0	0	584	0.000	0	0.0	0.0	0.000	A
C-AB	3	0.63	678	0.004	2	0.0	0.0	5.685	A
C-A	68	17			68				
A-B	6	2			6				
A-C	23	6			23				

07:45 - 08:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	0	0	581	0.000	0	0.0	0.0	0.000	A
C-AB	3	0.77	685	0.004	3	0.0	0.0	5.629	A
C-A	81	20			81				
A-B	8	2			8				
A-C	28	7			28				

08:00 - 08:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	0	0	577	0.000	0	0.0	0.0	0.000	A
C-AB	4	0.97	695	0.006	4	0.0	0.0	5.554	A
C-A	100	25			100				
A-B	9	2			9				
A-C	34	9			34				

08:15 - 08:30

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	0	0	577	0.000	0	0.0	0.0	0.000	A
C-AB	4	0.97	695	0.006	4	0.0	0.0	5.556	A
C-A	100	25			100				
A-B	9	2			9				
A-C	34	9			34				

08:30 - 08:45

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	0	0	581	0.000	0	0.0	0.0	0.000	A
C-AB	3	0.77	685	0.004	3	0.0	0.0	5.629	A
C-A	81	20			81				
A-B	8	2			8				
A-C	28	7			28				

08:45 - 09:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	0	0	584	0.000	0	0.0	0.0	0.000	A
C-AB	3	0.63	678	0.004	3	0.0	0.0	5.685	A
C-A	68	17			68				
A-B	6	2			6				
A-C	23	6			23				

TRL THE FUTURE OF TRANSPORT

Generated on 17/02/2023 11:18:46 using Junctions 9 (9.5.1.7462)

2044 Peak Hour, AM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	Site Access Junction	T-Junction	Two-way		0.14	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D3	2044 Peak Hour	AM	ONE HOUR	07:30	09:00	15	✓

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.30

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		ONE HOUR	✓	41	100.000
B		ONE HOUR	✓	3	100.000
C		ONE HOUR	✓	98	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	9	32
	B	3	0	0
	C	95	3	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	5	5	5
	B	5	5	5
	C	5	5	5

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
B-AC	0.00	0.00	0.0	A	0	0
C-AB	0.01	5.67	0.0	A	3	5
C-A					87	130
A-B					8	12
A-C					29	44

Main Results for each time segment

07:30 - 07:45

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	0	0	583	0.000	0	0.0	0.0	0.000	A
C-AB	3	0.63	679	0.004	3	0.0	0.0	5.670	A
C-A	71	18			71				
A-B	6	2			6				
A-C	24	6			24				

07:45 - 08:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	0	0	580	0.000	0	0.0	0.0	0.000	A
C-AB	3	0.77	687	0.004	3	0.0	0.0	5.612	A
C-A	85	21			85				
A-B	8	2			8				
A-C	29	7			29				

08:00 - 08:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	0	0	577	0.000	0	0.0	0.0	0.000	A
C-AB	4	0.97	698	0.006	4	0.0	0.0	5.533	A
C-A	104	26			104				
A-B	9	2			9				
A-C	35	9			35				

08:15 - 08:30

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	0	0	577	0.000	0	0.0	0.0	0.000	A
C-AB	4	0.97	698	0.006	4	0.0	0.0	5.533	A
C-A	104	26			104				
A-B	9	2			9				
A-C	35	9			35				

08:30 - 08:45

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	0	0	580	0.000	0	0.0	0.0	0.000	A
C-AB	3	0.77	687	0.004	3	0.0	0.0	5.614	A
C-A	85	21			85				
A-B	8	2			8				
A-C	29	7			29				

08:45 - 09:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	0	0	583	0.000	0	0.0	0.0	0.000	A
C-AB	3	0.63	679	0.004	3	0.0	0.0	5.673	A
C-A	71	18			71				
A-B	6	2			6				
A-C	24	6			24				

2024 Peak Hour, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	Site Access Junction	T-Junction	Two-way		0.00	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D4	2024 Peak Hour	PM	ONE HOUR	16:30	18:00	15	✓

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.30

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		ONE HOUR	✓	87	100.000
B		ONE HOUR	✓	2	100.000
C		ONE HOUR	✓	51	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	0	87
	B	2	0	0
	C	51	0	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	5	5	5
	B	5	5	5
	C	5	5	5

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
B-AC	0.00	0.00	0.0	A	0	0
C-AB	0.00	0.00	0.0	A	0	0
C-A					47	70
A-B					0	0
A-C					80	120

Main Results for each time segment

16:30 - 16:45

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	0	0	577	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	624	0.000	0	0.0	0.0	0.000	A
C-A	38	10			38				
A-B	0	0			0				
A-C	65	16			65				

16:45 - 17:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	0	0	573	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	621	0.000	0	0.0	0.0	0.000	A
C-A	46	11			46				
A-B	0	0			0				
A-C	78	20			78				

17:00 - 17:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	0	0	568	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	617	0.000	0	0.0	0.0	0.000	A
C-A	56	14			56				
A-B	0	0			0				
A-C	96	24			96				

17:15 - 17:30

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	0	0	568	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	617	0.000	0	0.0	0.0	0.000	A
C-A	56	14			56				
A-B	0	0			0				
A-C	96	24			96				

17:30 - 17:45

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	0	0	573	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	621	0.000	0	0.0	0.0	0.000	A
C-A	46	11			46				
A-B	0	0			0				
A-C	78	20			78				

17:45 - 18:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	0	0	577	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	624	0.000	0	0.0	0.0	0.000	A
C-A	38	10			38				
A-B	0	0			0				
A-C	65	16			65				

2034 Peak Hour, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	Site Access Junction	T-Junction	Two-way		0.00	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D5	2034 Peak Hour	PM	ONE HOUR	16:30	18:00	15	✓

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.30

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		ONE HOUR	✓	95	100.000
B		ONE HOUR	✓	2	100.000
C		ONE HOUR	✓	55	100.000

Origin-Destination Data

Demand (PCU/hr)

From \ To	A	B	C
A	0	0	95
B	2	0	0
C	55	0	0

Vehicle Mix

Heavy Vehicle Percentages

From \ To	A	B	C
A	5	5	5
B	5	5	5
C	5	5	5

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
B-AC	0.00	0.00	0.0	A	0	0
C-AB	0.00	0.00	0.0	A	0	0
C-A					50	76
A-B					0	0
A-C					87	131

Main Results for each time segment

16:30 - 16:45

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	0	0	575	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	623	0.000	0	0.0	0.0	0.000	A
C-A	41	10			41				
A-B	0	0			0				
A-C	72	18			72				

16:45 - 17:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	0	0	571	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	619	0.000	0	0.0	0.0	0.000	A
C-A	49	12			49				
A-B	0	0			0				
A-C	85	21			85				

17:00 - 17:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	0	0	565	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	615	0.000	0	0.0	0.0	0.000	A
C-A	61	15			61				
A-B	0	0			0				
A-C	105	26			105				

17:15 - 17:30

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	0	0	565	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	615	0.000	0	0.0	0.0	0.000	A
C-A	61	15			61				
A-B	0	0			0				
A-C	105	26			105				

17:30 - 17:45

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	0	0	571	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	619	0.000	0	0.0	0.0	0.000	A
C-A	49	12			49				
A-B	0	0			0				
A-C	85	21			85				

17:45 - 18:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	0	0	575	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	623	0.000	0	0.0	0.0	0.000	A
C-A	41	10			41				
A-B	0	0			0				
A-C	72	18			72				

TRL THE FUTURE OF TRANSPORT

Generated on 17/02/2023 11:18:46 using Junctions 9 (9.5.1.7462)

2044 Peak Hour, PM

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	Site Access Junction	T-Junction	Two-way		0.00	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Traffic Demand

Demand Set Details

ID	Scenario name	Time Period name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time segment length (min)	Run automatically
D6	2044 Peak Hour	PM	ONE HOUR	16:30	18:00	15	✓

Vehicle mix source	PCU Factor for a HV (PCU)
HV Percentages	2.30

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Average Demand (PCU/hr)	Scaling Factor (%)
A		ONE HOUR	✓	99	100.000
B		ONE HOUR	✓	2	100.000
C		ONE HOUR	✓	58	100.000

Origin-Destination Data

Demand (PCU/hr)

		To		
		A	B	C
From	A	0	0	99
	B	2	0	0
	C	58	0	0

Vehicle Mix

Heavy Vehicle Percentages

		To		
		A	B	C
From	A	5	5	5
	B	5	5	5
	C	5	5	5

TRL THE FUTURE OF TRANSPORT

Generated on 17/02/2023 11:18:46 using Junctions 9 (9.5.1.7462)

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (PCU)	Max LOS	Average Demand (PCU/hr)	Total Junction Arrivals (PCU)
B-AC	0.00	0.00	0.0	A	0	0
C-AB	0.00	0.00	0.0	A	0	0
C-A					53	80
A-B					0	0
A-C					91	136

Main Results for each time segment

16:30 - 16:45

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	0	0	574	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	622	0.000	0	0.0	0.0	0.000	A
C-A	44	11			44				
A-B	0	0			0				
A-C	75	19			75				

16:45 - 17:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	0	0	570	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	618	0.000	0	0.0	0.0	0.000	A
C-A	52	13			52				
A-B	0	0			0				
A-C	89	22			89				

17:00 - 17:15

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	0	0	563	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	614	0.000	0	0.0	0.0	0.000	A
C-A	64	16			64				
A-B	0	0			0				
A-C	109	27			109				

17:15 - 17:30

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	0	0	563	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	614	0.000	0	0.0	0.0	0.000	A
C-A	64	16			64				
A-B	0	0			0				
A-C	109	27			109				

TRL THE FUTURE OF TRANSPORT

Generated on 17/02/2023 11:18:46 using Junctions 9 (9.5.1.7462)

17:30 - 17:45

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	0	0	570	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	618	0.000	0	0.0	0.0	0.000	A
C-A	52	13			52				
A-B	0	0			0				
A-C	89	22			89				

17:45 - 18:00

Stream	Total Demand (PCU/hr)	Junction Arrivals (PCU)	Capacity (PCU/hr)	RFC	Throughput (PCU/hr)	Start queue (PCU)	End queue (PCU)	Delay (s)	Unsignalised level of service
B-AC	0	0	574	0.000	0	0.0	0.0	0.000	A
C-AB	0	0	622	0.000	0	0.0	0.0	0.000	A
C-A	44	11			44				
A-B	0	0			0				
A-C	75	19			75				

CHAPTER 15

RISK MANAGEMENT

Traynor Environmental Ltd.

Tables

15 RISK MANAGMENT

15.1 Introduction

This chapter of the EIAR has been prepared by Traynor Environmental Ltd in consultation with other members of the EIAR Team.

The 2014 EIA Directive (2014/52/EU) has updated the list of topics to be addressed in an EIAR and has included 'Risk Management' as a new chapter to be addressed. Article 3 of the new EIA Directive requires that the EIA shall identify, describe, and assess in the appropriate manner, the direct and indirect significant effects on population and human health, biodiversity, land, soil, water, air and climate, material assets, cultural heritage, and landscape deriving from (amongst other things) the "vulnerability of the project to risks of major accidents and/or disasters that are relevant to the project concerned".

The Planning and Development Regulations 2001, as amended, Schedule 6 paragraph 2(h) indicate that it may be appropriate to furnish additional information in relation to the following – (h) A description of the expected significant adverse effects on the environment of the proposed development deriving from its vulnerability to risks of major accidents and/or disasters which are relevant to it. Relevant information available and obtained through risk assessments pursuant to European Union legislation such as the Seveso III Directive or the Nuclear Safety Directive or relevant assessments carried out pursuant to national legislation may be used for this purpose, provided that the requirements of the Environmental Impact Assessment Directive are met.

Where appropriate, this description should include measures envisaged to prevent or mitigate the significant adverse effects of such events on the environment and details of the preparedness for, and proposed response to, emergencies arising from such events. This Chapter identifies and considers the likelihood and potential significant adverse effects on the environment arising from the vulnerability of the proposed development to risks of major accidents and/ or natural disasters.

To address unforeseen or unplanned effects Directive 2014/52/EU requires that an EIAR takes account of the vulnerability of the project to risk of major accidents and / or disasters relevant to the project concerned and that the EIAR therefore explicitly addresses this issue. The extent to which the effects of major accidents and / or disasters are examined in the EIAR should be guided by an assessment of the likelihood of their occurrence (risk). This may be supported by general risk assessment methods or by systematic risk assessments required under other regulations e.g., a COMAH (Control of Major Accident Hazards involving Dangerous Substances) assessment.

15.2 Study Methodology

The scope and methodology of this Chapter is based on the amended EIA Directive, the draft EPA Guidelines – Guidelines on the Information to be contained in Environmental Impact Assessment Reports (May 2022), other published risk assessment guidance and on professional judgement.

A risk-analysis-based methodology, which covers the identification, likelihood and consequence of major accidents/ natural disasters has been used for the assessment.

With regard to the assessment of major accidents and natural disasters Directive 2014/52/EU is relevant as follows:

Recital 7 states that over the last decade, environmental issues, such as resource efficiency and sustainability, biodiversity protection, climate change, and risks of accidents and disasters, have become more important in policy making. They should therefore also constitute important elements in assessment and decision-making processes.
Recital 15 states:

"In order to ensure a high level of protection of the environment, precautionary actions need to be taken for certain projects which, because of their vulnerability to major accidents, and/or natural disasters (such as flooding, sea level rise, or earthquakes) are likely to have significant adverse effects on the environment. For such projects, it is important to consider their vulnerability (exposure and resilience) to major accidents and/or disasters, the risk of those accidents and/or disasters occurring and the implications for the likelihood of significant adverse effects on the environment. In order to avoid duplications, it should be possible to use any relevant information available and obtained through risk assessments carried out pursuant to Union legislation, such as Directive 2012/18/EU of the European Parliament and the Council (4) and Council Directive 2009/71/Euratom (5), or through relevant assessments carried out pursuant to national legislation provided that the requirements of this Directive are met".

Article 3 states that 1- The environmental impact assessment shall identify, describe, and assess in an appropriate manner, in the light of each individual case, the direct and indirect significant effects of a project on the following factors:
(a) Population and human health.
(b) Biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC.
(c) Land, soil, water, air, and climate.
(d) Material assets, cultural heritage, and the landscape.
(e) The interaction between the factors referred to in points (a) to (d).
And 2- The effects referred to in paragraph 1 on the factors set out there in shall include the expected effects deriving from the vulnerability of the project to risks of major accidents and/or disasters that are relevant to the project concerned.
Annex IV of the Directive sets out the information relevant to major accidents and/or natural disasters to be included in the EIA report. Part 8 states:

> *"A description of the expected significant adverse effects of the project on the environment deriving from the vulnerability of the project to risks of major accidents and/or disasters which are relevant to the project concerned. Relevant information available and obtained through risk assessments pursuant to Union legislation such as Directive 2012/18/EU of the European Parliament and of the Council or Council Directive 2009/71/Euratom2 or relevant assessments carried out pursuant to national legislation may be used for this purpose provided that the requirements of this Directive are met. Where appropriate, this description should include measures envisaged to prevent or mitigate the significant adverse effects of such events on the environment and details of the preparedness for and proposed response to such emergencies".*

The EPA Guidelines on the Information to be contained in an EIAR refer to major accidents and/ or disasters in a number of sections. The Guidelines note that the key amendment introduced by the 2014 Directive include the refinement of environment factors to be considered in the assessment process – resource efficiency, climate change, population and human health, biodiversity and disaster risk prevention and management.

The Guidelines state that an EIA must include the expected effects arising from the vulnerability of the project to risks of major accidents and/or disasters that are relevant to the project and where appropriate, the description of expected significant effects should include details of the preparedness for and proposed response to such emergencies.

It is noted that there are two key considerations, namely:

- The potential of the project to cause accidents and/or disasters, including implications for human health, cultural heritage, and the environment.
- The vulnerability of the project to potential disasters/accidents, including the risk to the project of both natural disasters (e.g. flooding) and man-made disasters (e.g. technological disasters).

The Guidelines states that the project characteristics should include a description of the risk of accidents having regard to substances or technologies used. They also state that the impact assessment should include the risks to human health, cultural heritage, or the environment (for example due to accidents or disasters).

The EPA Guidance on Environmental Liabilities and Financial Provision 2019 has also been consulted. This guidance presents a systematic approach for assessing and costing environmental liabilities associated with closure and restoration/ aftercare and incidents.

15.3 Site Specific Risk Assessment Methodology

The Site-Specific Risk Assessment identifies and quantifies risks associated with the continuing extraction and operation of the development. It focuses on unplanned but possible events that could occur. The impact ratings used in this assessment are taken from the Guide to Risk Assessment in Major Emergency Management (Department of the Environment, Heritage and Local Government, 2010).

15.3.1 Risk Identification, Likelihood and Consequence

The following steps were undertaken in this site-specific risk assessment:

- Risk identification
- Risk classicisation – likelihood and impact
- Risk evaluation

Risk Identification

Risks were identified through the consideration of risks that are abnormal but plausible in consultation with the relevant specialists within the design team.

Risk Classification – Likelihood

Risk classification relates to the likelihood of the risk occurring. The relevant safety procedures and environmental controls were considered when estimating the likelihood of the identified risks occurring. The impact and likelihood criteria in Table 15.1 are taken from the Guide to Risk Assessment in Major Emergency Management (Department of the Environment, Heritage, and Local Government, 2010).

Table 15.1 - Classification of Likelihood

Ranking	Classification	Likelihood
1	Extremely Unlikely	May occur only in exceptional circumstances; Once every 500 or more years
2	Very Unlikely	Is not expected to occur; and/or no recorded incidents. or anecdotal evidence; and/or very few incidents in associated organisations, facilities or communicates. and / or little opportunity, reason or means to occur; May occur once every 100-500 years.
3	Unlikely	May occur at some time; and /or few, infrequent, random recorded incidents or little anecdotal evidence; some incidents in associated or comparable organisations worldwide; some opportunity, reason or means to occur, may occur once per 10-100 years.
4	Likely	Likely to or may occur, regular recorded incidents and strong anecdotal evidence and will probably occur once per 1-10 years
5	Very Likely	Very likely to occur, high level of recorded incidents. and/ or strong anecdotal evidence. Will probably occur more than once a year.

Risk Classification – Impact

In considering the potential impact, it is relevant to consider two factors – the type or nature of the impact and the scale. The type or nature of the impact may be considered in three fields as follows:

- Impact on life, health, and residual welfare of a community
- Social/environmental impact. Social impact may be thought of in terms of disruption/displacement of people affected by the event, while environmental impact is the impact on the physical area.
- Economic impact in terms of costs of property/ infrastructure damage as well as recovery costs or loss of economic production.

It should be noted that when categorising the consequence rating, the rating assigned assumes that all proposed mitigation measures and safety procedures have failed to prevent the major accident/ or disaster. The classification of impact has been determined using Table 15.2.

In addition, Cavan County Council have a Major Emergency Plan in place – *Cavan County Council Major Emergency Plan.* The major emergency plan is the combined and coordinated plans of Cavan County Council, the Health Service Executive and An Garda Siochána in the event of a major emergency occurring within Cavan County Council functional area.

The plan outlines generally the procedure to be followed and the functions to be undertaken by Cavan County Council and to coordinate the procedures to be followed and functions to be undertaken by Cavan County Council with those of the Health Service Executive, An Garda Siochána and other agencies responding to the emergency. The objective of the plan is to protect life and property, to minimise disruption to the area, and to provide immediate support for those affected.

Table 15.2 - Classification of Impact

Ranking	Classification	Impact	Description
1	Minor	Life, Health, Welfare, Environment, Infrastructure, Social	Small number of people affected, no fatalities. and small number of minor injuries with first aid treatment. No contamination, localised effects Infrastructure <0.5M Euros Minor localised disruption to community services or infrastructure (<6 hours).
2	Limited	Life, Health, Welfare, Environment, Infrastructure, Social	Single fatality: limited number of people affected; a few serious injuries with hospitalisation and medical treatment required. Localised displacement of a small number of people for 6-24 hours. Personal support satisfied through local arrangements. Simple contamination, localised effects of short duration 0.5-3M Euros Normal community functioning with some inconvenience.
3	Serious	Life, Health, Welfare, Environment, Infrastructure, Social	Significant number of people in affected area impacted with multiple fatalities (<5), multiple serious or extensive injuries (20), significant hospitalisation. Large number of people displaced for 6-24 hours or possibly beyond; up to 500 evacuated. External resources required for personal support. Simple contamination, widespread effects or extended duration 3-10M Euros Community only partially functioning, some services available.
4	Very serious	Life, Health, Welfare Environment, Infrastructure, Social	5 to 50 fatalities, up to 100 serious injuries, up to 2000 evacuated. Heavy contamination, localised effects, or extended duration 10-25M Euros Community functioning poorly, minimal services available
5	Catastrophic	Life, Health, Welfare, Environment, Infrastructure, Social	Large numbers of people impacted with significant numbers of fatalities (>50), injuries in the hundreds, more than 2000 evacuated. Very heavy contamination, widespread effects of extended duration. >25M Euros Serious damage to infrastructure causing. significant disruption to, or loss of, key services for prolonged period. Community unable to function without significant support.

Risk Evaluation

The likelihood and consequence ratings are multiplied to form a risk score for risk evaluation. A risk matrix can be prepared against which the proposed development can be tested. An example of a risk matrix is shown at Table 15.3.

Table 15.3 - Risk Matrix

Likelihood	**V Likely**	**5**		R8			
	Likely	**4**			R1	R2	
	Unlikely	**3**	R3/R9		R11	R10	
	V unlikely	**2**		R4/R6	R7		
	Extremely Unlikely	**1**		R12/R13			
			Minor	**Limited**	**Serious**	**Very Serious**	**Catastrophic**
			1	**2**	**3**	**4**	**5**
			Consequence Rating				

Risk Identification

The site is not in an area prone to natural disasters. Risk registers have been developed which contain the most relevant risks that have been identified for the proposed development. There are set out below.

15.4 Receiving Environment.

The surrounding site context consists of a mix of residential and agricultural development. Ireland's geographical location means that it is generally less vulnerable to natural disasters such as earthquakes and hurricanes which pose risks in other countries. There has however been an increase in more severe weather events in recent years which have resulted in severe weather conditions. Examples include Storm Ophelia in 2017, Storm Emma in 2018 and heatwaves/drought summer 2018.

The European Communities (Control of Major Accident Hazards involving Dangerous Substances) Regulations, 2015 (SI 209 of 2015) implement the requirements of the Council Directive 2012/18/EU on the control of major accident hazards involving quantities to take all measures necessary to prevent and mitigate the effects of major accidents to man and the environment. Establishments which fall under the remit of the Seveso III Regulations are classified as either "lower tier" or "upper tier" sites.

Farragh Proteins site (Lower Tier Seveso site) at Monnery Upper, Crossdoney, Co. Cavan is the closest notified Seveso establishment to the proposed development and is located 8.8 km to the south of the site. The next closest is Lakeland Dairies Co-Operative Society Ltd in Killeshandra. Due to the proposed development falling 8.8km from the closest Seveso site, the site will not form a constraint to the proposed development at this location.

It is a development objective of Cavan County Council to:

MA 01 Have regard to the provision of the 'Major Accident Directive' (Seveso III) (European Council Directive 2012/18/EU) and impose restrictions in consultation with the HSA, on developments abutting or within proximity of a Seveso site. The extent of restrictions on development will be dependent on the type of risk present and the quantity and form of the dangerous substance present or likely to be present.

MA 02 Permit new Seveso development only in low-risk locations away from vulnerable residential, retail, and commercial development. In areas where Seveso sites exist in appropriate locations with low population densities, ensure that proposed uses in adjacent sites do not compromise the potential for expansion of the existing Seveso use, and in particular the exclusion of developments with the potential to attract large numbers of the public.

MA 03 Have regard to the advice of the Health and Safety Authority when proposals for new Seveso sites are considered.

MA 04 Require developers to submit a detailed consequence and risk assessment with all Environmental Impact Statements and/or legislative licence applications for all Seveso sites.

15.5 Potential Impact of the Proposed Development

15.5.1 Do Nothing Scenario

In the do-nothing scenario, any significant adverse effects the proposed development would have on the environment due to its vulnerability to major accidents and/or disaster would be eliminated, and the site would remain the same as it is currently.

15.5.2 Extraction Phase

It is considered that the main risks associated with the proposed development will arise during the extraction phase. The potential direct and indirect risks associated with the extraction stage of the proposed development are contained in the risk register in Table 15.4. A Risk Assessment has been prepared as part of the design process, with the aim of reducing risk through design, for the proposed scheme. The findings of this assessment have informed the works and will be updated as required.

Table 15.4 - Extraction Stage Risk Register

Category	Risk Factor Type	Likelihood
Weather	Extreme weather events including storms, snow affecting extraction activities.	4
Truck Delivery accident	Truck vehicle collision with car, pedestrian/cyclist; accident when working, all site associated risks both to workers and the general public during delivery or exiting the site	3
Industrial accident	Not proximate to Seveso site	1
Fire / explosion	Construction vehicle or machinery collision; ignition of fuel or other substances on site; strike to underground or over ground services.	3
Structural damage	Caused by vibrations from machinery/ works on site.	3
Pollution / hazardous substance escape	Surface or ground water pollution due to accidental spillages or fuel leaks from delivery vehicles	3

15.5.3 Operational Phase

The direct and indirect risks associated with the operation stage of the proposed development are contained in the risk register in Table 15.5.

Table 15.5 - Operational Stage Risk Register

Category	Risk Factor Type	Likelihood
Weather	Risk to life due to extreme weather events including storms, snow	4
Road accident	Collision with car, pedestrian/cyclist	1
Industrial accident	Not proximate to Seveso site	1
Fire / explosion	Electrical faults/ use of flammable/ combustible materials	1
Accidents on site	Extraction Accident on site.	2
Structural failure	Structure collapse/road damage	1
Pollution of watercourses	Equipment failure or uncontrolled discharge to a watercourse	3

Table 15.6 - Risk Assessment

Extraction Risk ID/ Potential Risk	Likelihood Rating	Consequence Rating	Risk Score
A. Extreme weather events including storms, snow affecting construction/ infrastructure	4	2	8
B. Construction vehicle collision with car, pedestrian/cyclist; accident when working	3	2	6
C. Industrial accident during works	1	1	1
D. Construction vehicle or machinery collision; ignition of fuel	3	3	9
E. Structural damage caused by vibrations from machinery/ works on site	1	2	2
F. Surface or ground water pollution due to accidental spillages or fuel leaks	3	2	6
Operational Risk ID/ Potential Risk	**Likelihood Rating**	**Consequence Rating**	**Risk Score**
G. Risk to life due to extreme weather events resulting in flooding	4	2	8
H. Collision with car, pedestrian/cyclist	1	2	2
I. Industrial accident once operational	1	1	1
J. Electrical faults/ use of flammable/ combustible materials	1	2	2
K. Maintenance related incidents	2	2	4
M. structure collapse	1	2	4
N. Equipment failure or leading to uncontrolled discharge to surface water	3	3	9

15.6 Risk Assessment

Table 15.6 categorises each of the identified potential risks by their risk score. A corresponding risk matrix is provided below, which is colour coded, the red zone represents 'high risk scenarios', the amber zone represents 'medium risk scenarios and green represents 'low risk scenarios.

Table 15.7 - Risk Matrix

Likelihood							
	V Likely	5					
	Likely	4		A, G			
	Unlikely	3		B, F, L	D, N		
	V unlikely	2		K			
	Extremely Unlikely	1	C, I	M, J, H, E			
			Minor	Limited	Serious	Very Serious	Catastrophic
			1	2	3	4	5
			Consequence Rating				

15.7 Mitigation Measures

15.7.1 Extraction Stage

Mitigation is proposed in the completed Chapters of the EIAR. The extraction process will be carried out in accordance with work practices, management, mitigation, and monitoring strategies to ensure the project is carried out in accordance with best practice, with the minimum impact on the surrounding environment and maximum safety throughout the duration of the scheme.

15.7.2 Operation Stage

The proposed development will be completed in accordance with best practice guidelines and as such mitigation against the risk of major accidents and or disasters will be embedded throughout the extraction and operational stages.

15.8 Monitoring

Aside from the monitoring measures to be carried out by the Applicant, as outlined in the EIAR, no additional monitoring is considered necessary during the extraction phase of the development. No additional monitoring is considered necessary during the operational phase of the development.

15.9 Residual Impacts

Through the implementation of mitigation measures, there are no identified major accidents and or natural disasters that present a sufficient combination of risk and consequence that would lead to significant residual impacts or environmental effects.

15.10 Cumulative Impacts

The potential for the accident scenarios considered in this chapter affecting other projects in the vicinity was considered, and the overall conclusions regarding risk and consequence remains as described in the detailed risk score tables.

15.11 References

- Directive 2014/52/EU of the European Parliament and 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.
- Department of Defence *A National Risk Assessment for Ireland* 2017
- DHPLG: *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment* 2018
- DOELG: *A Framework for Major Emergency Management Guidance Document 1: A Guide to Risk Assessment in Major Emergency Management* 2010
- Department of the Taoiseach *National Risk Assessment Overview of Strategic Risks* 2017
- EPA: *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* 2022
- EPA: *Guidance on Assessing and Costing Environmental Liabilities* 2014
- The Chemicals Act (Control of Major Accident Hazards involving Dangerous Substances) Regulations 2015 (S.I. No. 209 of 2015) (the "COMAH Regulations
- Cavan County Council Major Emergency Plan
- Cavan County Development Plan 2022-2028

CHAPTER 16

INTERACTION OF IMPACTS

16 INTERACTIONS OF IMPACTS

16.1 Introduction

This section of the EIAR describes interactions/inter-relationships between various aspects of the environmental impact assessment for a 20-year permission to complete extraction of material granted within existing quarry envelope as per previously approved planning (Ref No.051801) & all associated site works at Ardkill More and Drumcrow, Carrickaboy, Cavan, Co. Cavan. Table 16.1 identifies specific topics within the EIAR where the impacts or environmental effects of the specific topics interact/inter-relate with each other.

Table 16.1 - Impact Interaction and Interrelationships Matrix

	Pop & Human Heath	Biodiversity	Land Soil & Geology	Hydrology and Hydrogeology	Climate	Air Quality	Noise & Vibration	Landscape & Visual	Traffic	Cultural Heritage	Material Assets
Pop & Human Heath											
Biodiversity											
Land Soil & Geology											
Water											
Climate											
Air Quality											
Noise & Vibration											
Landscape & Visual											
Traffic											
Cultural Heritage											
Material Assets											

16.2 Population & Human Health and Climate

Ireland's greenhouse gas emissions per person are amongst the highest on the planet and fourth highest of the EU 28 countries. John Nulty Ltd strive for compliance with all relevant legislation, prevention of pollution and continuous improvement in all areas of environmental management in their operations. Through the restoration of the site and the establishment of natural habitat, it is expected that there will be a permanent positive effect on climate.

16.3 Population & Human Health and Air

Extraction activities can generate elevated dust levels, particularly during long spells of dry weather or periods of windy weather. Chapter 8.0 of the EIAR (Air Quality Chapter) shows that dust deposition rates recorded at the site were below the guideline level of 350 mg/m^2/day. The overall impact from the proposed extraction activities, in terms of dust emissions is expected not to be significant to the air environment once the mitigation measures outlined in Section 8.12 are implemented.

16.4 Population & Human Health and Noise and Vibration

Baseline levels, noise monitoring data from the site was reviewed. At present the noise environment at the QY7 site is indicative of an existing quarry in a rural setting with slight influences of local roads noted. Through the implementation of the mitigation measures detailed in Chapter 10, Section 10.7, it is considered that the extraction activities will have no significant impacts at nearby sensitive receptors and will have imperceptible residual impacts.

16.5 Population & Human Health and Landscape

In terms of visual impacts, six viewpoints were selected within the study area to represent a range of viewing distances, angles, and receptor types. The primary means of mitigation for this project is the progressive restoration of the site as phased works are completed.

The significance of restoration phase landscape and visual effects is considered to be Slight-imperceptible in this robust landscape context. Visual impacts have been assessed from representative viewpoints using photomontages. In all instances, the effect on extraction and restoring the existing site to natural habitat is deemed to result in an Imperceptible / Positive significance of impact.

16.6 Population & Human Health and Archaeology & Cultural Heritage

Archaeological artefacts are part of our national heritage. The proposed development is situated in an area that has been granted and approved permission by An Board Pleanála (PL 02.219928) subject to condition which have all been complied with. The application site is located in close proximity to two archaeological monuments: a linear earthwork (CHC No. 21) and an enclosure of unknown date (CHC No.27).

Wolfhound Archaeology have completed the EIAR archaeology Chapter 12 for the above. The assessment of the Application Site, using documentary and aerial photographic sources as well as a field survey, indicate that the proposed development previously approved and will have no direct or indirect impact on any known items of archaeology, cultural heritage, or buildings of heritage interest in the application area.

16.7 Population & Human Health and Traffic

The main significance criterion when assessing traffic impact is the performance of the road network, particularly affected junctions. Other criteria include, for example: any increase in road traffic collisions (which may result in environmental impacts due to spillage); and measurable increases in noise and atmospheric pollutants. The roads, traffic and transport impacts of the proposed continued

extraction have been assessed by utilising an approach based on the prevailing Transport Infrastructure Ireland (TII) guidelines on Traffic and Transport Assessment (TTA) (May 2014). The assessment also takes account of relevant guidance produced by Environmental Protection Agency (EPA). The assessment has taken account of the cumulative traffic and transport impact of the proposed development and existing uses in the immediate vicinity of the development.

16.8 Biodiversity and Air

Activities on the Site may create dust which can have an impact on biodiversity. Dust deposition rates recorded at the Site were below the recommended guidelines level of 350 mg/m²/day. Mitigation measures outlined in Chapter 8 will be adhered to and it is expected that the impact to air quality at the Site will not be significant.

16.9 Biodiversity and Noise

Noise will be generated from the continuing activities at the Site. The noise levels at the Site may affect some birds and mammals particularly those sensitive to noise. As previously outlined, in the long term, habitats on site will transition toward a predominantly terrestrial environment and it is expected that some species will re-settle in the vicinity of the Site. Flora and fauna are expected to recover to conditions prior to excavation or re-adjust once activities have ceased and restoration has taken place.

16.10 Soils / Geology and Water

The proposed extraction activities can have an impact on the water environment. The proposed development will involve the continuation of extraction of an existing quarry site. Mitigation measures will be adhered to which will reduce any potential impacts on the receiving environment, and it is expected that there will be no long-term deleterious impacts on bedrock or groundwater at the Site. A new settlement pond will be constructed on site subject to planning approval to protect the surface water and groundwater on site.

16.11 Soils / Geology and Landscape

There will be negligible impact on the local landscape character compared to the existing landscape currently due to the deepening of a drawing

16.12 Soils / Geology and Material Assets

The Application Site is planning to continue extracting, this is perceived as providing a net gain to the local area and contribute to the direct employment of five people at the Site and create indirect employment in a number of service areas and industries.

16.13 Hydrology & Hydrogeology and Material Assets

The activities at the Application Site will see the continued extraction of rock . Once the extraction of works are completed, there will be no direct pathway to groundwater on the Site and there will be no deteoriation with the water environment once new settlement ponds are installed and the appropriate mitigation measures are employed. The proposed settlement ponds will only improve the already compliant discharges.

16.14 Landscape and Material Assets

Extraction activities at the Application Site will result in an Imperceptible landscape impact due to the deepening of the quarry void previously granted planning. Visual impacts during the active restoration phase have been considered to result in a Slight imperceptible significance of landscape impact. Once the restoration is complete, there will be little or no discernible impact on the local landscape character other than a positive one.

Photograph 16.1 – Application area for continued extraction.

16.15 Material Assets and Archaeology & Cultural Heritage

The application site is situated in an area previously approved planning by Cavan County Council and An Bord Pleanála. The proposed development is located in close proximity to two archaeological monuments: a linear earthwork (CHC No. 21) and an enclosure of unknown date (CHC No.27), but a buffer will be maintained as per previously approved conditions.

CHAPTER 17

SUMMARY OF MITIGATION MEASURES

Traynor Environmental Ltd.

17.0 SUMMARY OF MITIGATION MEASURES

17.1 Introduction

17.1.2 Chapter Context

The 2022 EPA Guidelines regarding the information to be contained in EIAR's identifies the following strategies for the mitigation of effects.

Mitigation by Avoidance: Avoidance, usually referring to strategic issues – such as site selection, site configuration or selection of process technology - is generally the fastest, cheapest, and most effective form of effect mitigation. In many cases mitigation by avoidance may also be considered as part of the "consideration of alternatives".

Mitigation by Prevention: This usually refers to technical measures. Where a potential exists for unacceptable significant effects to occur (such as noise or emissions) then measures are put in place to limit the source of effects to a permissible and acceptable level.

Mitigation by Reduction: This is a very common strategy for dealing with effects which cannot be avoided. It tends to concentrate on the emissions and effects and seeks to limit the exposure of the receptor. This is regarded as a less sustainable, though still effective, approach. Strategies utilised are 'Reducing the Effect' or 'Reducing the Exposure to the Effects'/

Offsetting: This is a strategy used for dealing with adverse effects which cannot avoided. It includes measures to compensate for adverse effects. Examples include restoration of buildings, walls, or features to compensate for loss of similar features, planting of new vegetation elsewhere to replace unavoidable loss of similar vegetation and Provision of a new amenity area to replace amenity lost as a result of a project.

17.2 MITIGATION MEASURES PROPOSED

Paragraph 2(d) of Schedule 6 to the Planning and Development Regulations 2001 (as amended), provides that the following information must be contained in an EIAR: "a description of the measures envisaged to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment and, where appropriate, of any proposed monitoring arrangements (for example the preparation of an analysis after completion of the development), explaining the extent to which significant adverse effects on the environment are avoided, prevented, reduced or offset during both the construction and operational phases of the development;"

17.3 POPULATION AND HUMAN HEALTH

Mitigation measures for air quality, noise and visual impacts are described in Chapter 8.0 (Air Quality), Chapter 9.0 (Climate), Chapter 10.0 (Noise and Vibration), Chapter 13.0 (Landscape) and Chapter 11.0 (Material Assets). Once the appropriate measures have been implemented, it is considered that no significant effects on the socio-economic and human being environment in the vicinity of the Application Site will occur.

17.4 BIODIVERSITY

In order to protect the existing ecological features on site and surrounding area, the following mitigation measures are recommended:

17.4.1 Construction Phase

- All works associated with the development should be confined to the proposed development site. There should be no encroachment of activities into the heathland habitats to the east of the existing quarry.
- All quarrying activities on site should follow current best practice guidelines, including the Geological Heritage Guidelines for the Extractive Industry produced by Geological Survey of Ireland and Environmental Management in the Extractive Industry produced by the EPA.
- To avoid disturbances to local bird species and their suitable nesting habitats, including shrubs and ground nesting vegetation, it is recommended that areas of scrub are removed and stripped from the application site outside of the bird nesting season, i.e., between October and February.
- Machinery and gravel / stone storage areas should only occur within the boundaries of the current application site or the previous boundaries. There must be no disturbances to the heath habitats outside of the application boundaries.
- Where possible, only native shrubs and trees should be planted for screening purposes. Suitable native screening could be provided with the further planting of native stocks of gorse.
- Any excavated topsoil will be retained for future reinstatement of the quarry, either on a phased basis or at the end of its operational phase. Measures must be taken to minimise sediment generation during the storage of these soils. The exposed surfaces should be minimised, and any exposed surfaces should be reinstated or re-vegetated as soon as possible.
- Following cessation of all quarrying activities on the site, it is recommended that a landscape architect engage to devise a restoration plan which is cognisant of achieving a high level of biodiversity on the site in the future.

17.5 LAND, SOILS AND GEOLOGY

The significant potential impacts identified in Table 6.4 are resolved under the mitigation measures set out under Table 6.6.

Table 17.1 – Summary of Mitigation Measures

Activity	Attribute	Character of Potential Impact	Mitigation Measure	Predicted Impact
Enabling phase				
Stripping of soil necessary to expose the bedrock resource	Soil	Excavation and removal of topsoil	There will be no overburden removal associated with the continued extraction of rock. Over burden from the application area was removed already a number of years ago. Movement of material should be minimised in order to reduce degradation of soil structure and generation of dust.	None
Handling of soils, subsoils	Soil, subsoil	Potential for soil erosion and dust generation	A silt fence will be erected around the area where the new settlement pond will be constructed.	Neutral

Use of fuels/hydrocarbons	Soil, subsoil, bedrock	Potential for contamination of exposed subsoils and/or bedrock as a result of spillages/leakages.	Fuelling, lubrication, and storage areas will be in a designated area, not within 30 m of drainage ditches or surface waters. All waste containers will 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. There will be minimal storage of fuels on site. Refuelling shall be carried out by an external fuel supplier at the new concrete bunded area which will drain to an oil water separator. An adequate supply of spill kits and hydrocarbon absorbent will be maintained on site.	Neutral
Operational Phase				
Slope blasting and excavation	Soil, subsoil	Rock face stability	Conventional side slopes will be adopted during bench formation (blasting and excavation). Bench slopes are blasted at an angle of about 15 degrees. Slopes should be protected by netting. A narrow exclusion area at the base of the excavation is recommended. Slope stability to be assessed by suitably qualified engineer.	Neutral
Use of fuels/hydrocarbons	Soil, subsoil, bedrock	Potential for contamination of subsoils as a result of spillages/leakages.	In order to minimise any impact on the underlying subsurface strata and groundwater, all oils, solvents, and chemicals used on site shall be stored within labelled, sealed containers in suitable bunded lockable storage containers.	Negligible
			Refuelling of quarry plant will only take place in designated bunded refuelling area which drains to an oil water separator. All discharge from the development area will pass through the proposed impermeable lined settlement pond, to be being released into the receiving surface water drain. Sources of hydrocarbons are and will be located within safely bunded areas that safely contain all spillages and prevent the migration of contaminants into the underlying bedrock aquifer.	
Discharge Point	Surface water	Potential for contamination of surface water	No untreated water will discharge directly to the watercourse. All such water will pass through the settlement pond followed by discharge to the nearby watercourse. The discharge water quality from the settlement pond will be monitored on an annual basis. Discharge volumes will be continuously monitored at the discharge point location as per the current Discharge License requirements (Ref: SS/WW004/18).	Neutral
Settlement Pond	Surface water	Potential for contamination of surface water	A sampling and analysis programme of the discharge from the settlement pond prior to discharge to the watercourse will be in place. John Nulty Ltd. will inform the Cavan County Council of any exceedances.	Negligible
Oil/Water Separator	Surface water, Soil, Subsoil	Potential for contamination of surface water	A logbook will be maintained, noting all transactions associated with the proposed oil/water separator, settlement pond and other details as required. Weekly visual examination of the oil/water separator, settlement pond and the receiving watercourse will be carried out by a competent person. All inspection findings will be recorded in the logbook.	Negligible
Oil/Water Separator	Surface water, Soil, Subsoil	Potential for contamination of surface water, soil, subsoil	Routine servicing and maintenance of the oil/water separator and settlement ponds will be carried out. A record of all service and maintenance will be maintained in the logbook. This will include the frequency of the work and the name of the person and or company carrying out the work.	Neutral
Discharge License	Surface water	Potential for contamination of surface water	John Nulty Ltd. will provide and maintain a sampling location prior to discharge to the watercourse and direct access to the sampling location will be available at all reasonable times to personnel authorised by Cavan County Council.	Negligible
domestic wastewater	Surface water, Soil, Subsoil, Bedrock	Potential for contamination of surface water, soil, subsoil, bedrock	The domestic wastewater from the site will continue to be discharged via the existing on site-septic tank and percolation area which complies with the EPA guidelines 2021.	None

17.6 HYDROLOGY AND HYDROGEOLOGY

17.6.1 Construction Phase

1. Downstream Surface Water Quality Effects in the field drain and Ballinagh Stream from Suspended Sediments during Soil Stripping /Removal

Mitigation Measures:

- Prior to the commencement of soil excavation to facilitate the new settlement pond, silt fencing will be placed down-slope of the proposed area; These will be embedded into the local soils to ensure all site water is captured and filtered;
- Daily monitoring of the soil stripping/landscaping earthworks will be completed by a suitably qualified person.
- All necessary preventative measures will be implemented to ensure no entrained sediment, or deleterious matter will enter the downstream receiving waters;
- Soil stripping and landscaping works will be scheduled for periods of low rainfall (summer months) to reduce run-off and potential siltation;
- The Construction Industry Research and Information Association (CIRIA) provide guidance on the control and management of water pollution from construction sites (Control of Water Pollution from Construction Sites, guidance for consultants and contractors, CIRIA, 2001), which provides information on these issues. This will ensure that surface water arising during the course of soil stripping and landscaping activities will contain minimum sediment.

17.6.2 Extractive / Operational Phase

1. Increased Groundwater Vulnerability & Potential for Groundwater Contamination

Mitigation Measures:

The main mitigation with respect to increased groundwater vulnerability during the extraction phase will be employment of ongoing best practice measures with respect to oil usage and refueling (refer to Section 3 below). Post extraction phase a landscape and restoration plan will be implemented.

This will involve previously stripped soil being placed on the upper quarry benches to establish grassland which will provide a level of protection to groundwater.

2. Surface water Quality Effects to the field drain and Ballinagh Stream from Surface water Discharges

Mitigation Measures:

It is proposed to construct a new impermeable lined settlement pond and install attenuation sump in the application extraction area.

- Maximum discharge from the application extraction area site is 24.204l/s. Additional water settlement will be provided by the proposed settlement pond and attenuation sump.
- The discharge water quality is monitored on an annual basis, and this is to continue at the quarry. Discharge volumes will be continuously monitored at the discharge point location.

Information on the proposed attenuation sump, settlement pond, oil water interceptor and flow meter can be found in the Waste Management Plan Report.

3. Leakages and Spillages

Mitigation Measures:

- Sources of hydrocarbons (such as oil-based substances or other hazardous chemicals) are and will be located within safely bunded areas that safely contain all spillages and prevent the migration of contaminants into the underlying bedrock aquifer.
- Refuelling of quarry plant has and will only take place in designated bunded refuelling areas with availability of suitable spill kits.

All discharge from the quarry extraction area will pass through the proposed impermeable lined settlement pond, oil water interceptor prior to be being released into the receiving water.

4. Discharge of Treated water to Groundwater

Mitigation Measures

- The wastewater from the site will continue be discharged through the existing on-septic tank and percolation area which are located outside the red line boundary pf this application.

5. Effect on Local Groundwater Levels

Mitigation Measures:

- It is proposed to construct a new impermeable lined settlement pond and oil water interceptor for the application extraction area.

Due to the low permeability of the proposed bedrock for extraction and localised groundwater catchment to the quarry, further significant effects as a result of the proposed extension will not occur.

6. Effects on Local Well Supplies (Quality and Quantity)

Mitigation Measures:

- Due to the low permeability of the rock for continued extraction along with the localised groundwater catchment to the quarry, further significant effects on groundwater levels or quality are not anticipated and therefore significant effects on local well supplies is not anticipated.
- Groundwater level monitoring undertaken at the groundwater abstraction well indicates groundwater level of 148.55m OD. The proposed level of the extraction area is 175 – 237 m OD.
- The proposed level of the application extraction area under this planning application is approximately 26.45m above the quarry groundwater level. This provides an adequate freeboard.

Also, as stated above, sources of hydrocarbons (such as oil-based substances or other hazardous chemicals) and will be located within safely bunded areas that safely contain all spillages and prevent the migration of contaminants into the underlying bedrock aquifer. Refuelling of quarry plant has and will only take place in designated bunded refuelling areas or by mobile bowser with availability of suitable spill kits.

17.7 AIR QUALITY

17.7.1 Mitigation Measures

The main potential impact during blasting and excavation of aggregates will be due to airborne dust and potential dust deposition outside the Application Site boundaries. During long spells of dry weather, dust emissions can potentially be more elevated, however dust nuisance from the proposed operation is expected to be unlikely once mitigation measures are implemented during excavation and restoration. Details of mitigation measures that will be employed at the Application Site are summarised below:

- Retention and enhancement of existing vegetation at the Site perimeter.
- Dust monitoring will continue to be carried out at the designated monitoring locations;
- The timing of operations will be optimised in relation to meteorological conditions;
- Material in outdoor stockpiling will be conditioned with water to minimise dust during dry and windy conditions. In addition, stockpiles will be sited to take advantage of shelter from wind;
- Overburden mounds will be grass-seeded and planted to eliminate wind-blown dust.
- Plant will be regularly maintained.
- Internal haul road will be maintained in good condition.
- A water bowser/sprayer will be available at all times to minimise dust during dry and windy conditions.
- On site speed restrictions (<25 kph) will be maintained in order to limit the generation of fugitive dust emissions; and All vehicles exiting the Site will exit through the wheel wash.

Emissions of CO2 from vehicle exhaust during the development can add to the receiving air environment. As it is a key gas linked to climate change, the following mitigation measures will be put in place to limit vehicle and plant emissions:

- No vehicles or plant will be left idling unnecessarily.
- Vehicles and plant will be well maintained. Should any emissions of dark smoke occur (except during start up) then the relevant machinery will be stopped immediately, and any problem rectified before being used; and
- Engines and exhaust systems will be regularly serviced according to the manufacturer's recommendations and maintained to meet statutory limits/opacity tests.

The adoption of these mitigation measures will ensure that the resulting impact significance is no greater than slight.

17.8 CLIMATE

Mitigation is designed to increase the resilience of the development, or wider environmental receptors, to climate change and should focus on increasing its capacity to absorb climate related shocks.

17.8.1 Project Adaptation against Expected Climate Change Effects

Table 17.2 below details specific mitigation measures for the quarry related to climate change adaptation.

Table 17.2 Mitigation Measures Related to Climate Change Adaptation

Main Concerns Related to:	Proposed Alternatives or Mitigation Measures
Extreme Rainfall, Flood, Flash Flood	Design adequate project's drainage.
Storms and Winds	Ensure the project design that can withstand increases high winds and storms
	Ensure the choice of equipment working at the project is weather efficient.
Risk Reduction Mechanism	Secure insurance for damage of assets / incidences.

17.8.2 Proposed Reduction of GHG Emissions

John Nulty Ltd. quarry shall adopt a GHG monitoring programme at the quarry at Ardkill More Drumcrow, Carrickaboy, Co. Cavan. Table 17.3 below details specific mitigation measures for the quarry related to GHG reduction programme.

Table 17.3 Mitigation Measures Related to GHG Reduction Programme

Main Concerns Related to:	Proposed Alternatives or Mitigation Measures
Increased demand for energy	Consider using renewable energy sources/ suppliers.
Direct GHG emissions	Use energy efficient machinery/ energy. (Electric diggers)
GHG emissions related to transport	Unnecessary equipment/ transport journeys should be avoided by management of transport and travel demands. Equipment should not be left idling.

17.9 NOISE AND VIBRATION

17.9.1 Construction/Demolition Phase - Mitigation Measures

Construction Phase Noise

Hoarding will be in place therefore, construction noise thresholds are not expected to be exceeded during the construction of the settlement pond. However, best practice in accordance with BS 5228 should be adhered to. Site is currently operating under QY7 without incidents.

Construction Phase Vibration

Hoarding will be in place therefore, there will be no significant vibration from the construction works at the development site.

17.9.2 Operational Phase - Mitigation Measures

Operational Noise

Additional Traffic on Adjacent Roads

During the operational phase of the development, noise mitigation measures with respect to the traffic from the development are not deemed necessary.

Mechanical Services Plant & Internal traffic movements

Noise levels associated with operational plant are expected to be well within the adopted day time noise limits at the nearest noise sensitive properties considering the site layout, the nature and type of units proposed and distances to nearest residences. Assuming the operational noise levels do not exceed the adopted design goals, the resultant residual noise effect from this source will be of negative, imperceptible, long-term effect. The existing quarry does not operate during night-time hours, this will continue.

Operational Vibration

It is considered that as the proposed activities will replicate those that have already taken place previously, the levels of vibration likely to be experienced at the receptor properties will not to be significant in environmental terms. It is considered reasonable to assume that as the previous vibration levels are within acceptable parameters, then it is likely that this will continue to be achieved. Therefore, it is considered that any potential vibration impact in relation to the on-going blasting is negligible.

17.10 MATERIAL ASSETS

Mitigation measures currently implemented during the extraction works as part of QY7 on site involve minimising any impacts on surrounding sensitive receptors. These measures are discussed in respective Chapters of this EIAR, and relevant measures relating to material assets, including the road network, geological and land resources are summarised below:

- Measures to minimise Groundwater, Air Quality and Noise impacts at nearby residences will continue to be implemented as per Chapters 7.0, 8.0,9.0 and 10.0.
- Mitigation measures for environmental indicators are already in place at the Site and included in an Environmental Management Plan (EMP). The effective implementation of these mitigation measures will continue to be monitored.
- Any plant and / or mobile plant on the Site be regularly maintained and kept in good working order.
- Utilise only uncontaminated materials.

17.11 ARCHAEOLOGY

17.11.1 Monitoring of removal of areas of original ground level

Given the scale and permanent nature of the proposed development and the potential for sub-surface remains of archaeological significance to be present within the footprint of the proposed development site it is recommended that archaeological monitoring of all remaining topsoil removal be carried out prior to any groundworks, site clearance and/or further extraction, or slope stabilisation commencing.

The locations where archaeological remains may survive within the existing quarry footprint are limited. Primarily but not exclusively limited to areas between the edge of the upper working quarry face and the site boundary all areas where original topsoil cover/ ground surface has not been removed is considered to have high archaeological potential for the presence of sub-surface archaeological remains.

It is recommended that the applicant engage a suitably qualified archaeologist to conduct licensed archaeological monitoring of all earth removal in areas where the original ground surface survives as necessary namely e.g., where the new settlement pond will be constructed. This measure is considered the absolute minimum to enable a determination be made of the archaeological impact, if any, of the proposed development.

Should archaeological remains be identified the National Monument Service (NMS) will be consulted to determine the appropriate mitigation measures. Such measures may include refusal, preservation in- site and/ or preservation by record (excavation). Subject to operational requirements these works could be carried out on a phased basis.

The proposed development will require removal of material located >50m from the closest surviving section of the Black Pig's Dyke linear earthwork. No removal of material between the existing working face and the site boundary which impacts on any areas of surviving should take place. Extreme care should be taken in this area to ensure that the extraction of material does not undermine or destabilise the integrity of the surviving sections of the monument that are situated within the site boundary and abut the upper edge of the working face.

17.11.2 Alteration of Proposed Perimeter Planning in area of Black Pig's Dyke

It is recommended that the proposed 5 m buffer zone situated around the perimeter of the site be fenced and hedgerow planted as per environmental specifications be amended in two locations. These locations are where the Black Pigs' Dyke linear earthwork abuts the northern and southern site boundary. It is recommended that the fencing take place but that a hedgerow is not established in these locations. A c.5m buffer where no hedgerow planting takes place should be established to the east and west of the edge of the bank and ditch of the linear earthwork. This will ensure that over time as the hedgerow trees become established that the any sub-surface remains associated with the monument are not disturbed or damaged or destabilised by root growth.

It is considered that the break in the proposed boundary planting will visually enhance the perception of the surviving sections of the Black Pigs Dyke linear earthwork as a landscape feature from all distances.

17.12 LANDSCAPE AND VISUAL

17.12.1 Construction Phase - Mitigation Measures

The development shall be carried out in an organised maner, thus reducing the visual impact upon the environment. Site hoarding will be appropriately scaled, finished, and maintained for the period of construction of the new settlement pond. To reduce the potential negative impacts during the construction phase, good site management and housekeeping practices will be adhered to.

17.12.2 Operational Phase - Mitigation Measures

Hedgerow and woodland planting using native species would be introduced in advance of operations along the boundaries (excluding areas close to the 'Black Pig's Race' a linear earthworks) of the application area which, along with vegetation to be retained would mitigate landscape and visual effects.

17.12.3 Post — Operational Stage

The post operational stage mitigation comprises a restoration plan to be implemented at the end of the life of the quarry. The restoration plan includes a range of measures to restore the quarry site to an after use which would be more sympathetic with the surrounding landscape.

17.13 TRAFFIC AND TRANSPORTATION

17.13.1 Construction Phase – Mitigation

The proposed development is forecast not to have a significant impact on traffic as part of the construction of the settlement pond. Any soil removed will be reused on site.

17.13.2 Operational Phase – Mitigation Measures

The following mitigation measures are proposed to improve road safety in the vicinity of the site entrance:

- Provide stop signing and road markings, visible to those egressing from the site.
- Set back and lower the existing roadside verge on the eastern side of the L2157 to the south of the site entrance to provide an appropriate egress visibility splay; and,
- Re-profile the existing entrance to raise the topographical level of egressing road users further improve egress visibility. Ensure that the revised profile and gradient do not result in surface water entering the L2157 carriageway from the site.

17.14 INTERACTIONS

17.14.1 Mitigation and Monitoring Measures

It is not proposed that any mitigation or monitoring will be undertaken specifically in relation to cumulative impacts.