Murray Brothers Tarmacadam Ltd

ARDCAHAN QUARRY SECTION 37L ENVIRONMENTAL IMPACT ASSESSMENT REPORT (EIAR)

VOLUME II

MAIN STATEMENT

April 2026

Murray Brothers Tarmacadam Ltd

VOLUME II – MAIN STATEMENT

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Murray Brothers Tarmacadam Ltd

CHAPTER 1
INTRODUCTION

VOLUME II
MAIN STATEMENT

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1 Introduction

1.1 Preamble

This Environmental Impact Assessment Report (EIAR) has been prepared to accompany an application to An Coimisiún Pleanála (ACP) under Section 37L of the Planning and Development Act 2000, as amended (the Act), for proposed development at Ardcahan Quarry, Dunmanway, Co. Cork.

In brief, the proposed development involves an extension to the existing quarry, which ceased operating in 2014, to facilitate future extraction of quartzitic sandstone and siltstone bedrock; it includes the continued use of the existing quarry floor for access/processing, establishment of settlement ponds, and stormwater attenuation wetlands. A 20-year permission is being sought for proposed quarrying activities that is estimated to produce between 175,000 to 200,000 tonnes of aggregate per annum, with an upper annual output of 225,000 tonnes. A detailed description of the application site and proposed project is provided in Chapter 2 of this EIAR.

The 37L application will be made concurrently with an application under Section 177E of the Act for substitute consent. The substitute consent process provides a procedural pathway for developers to obtain permission for developments which should have been subject to EIA and/or Appropriate Assessment (AA) but were not, due to exceptional circumstances.

The substitute consent application seeks permission to regularise extraction and associated quarrying activities undertaken at the site between 1990 and 2014. It is accompanied by a remedial EIAR (rEIAR) and a remedial Natura Impact Statement (rNIS).

This EIAR sets out the results of the environmental assessments which have been completed for the proposed development, subject of the 37L application, to inform the planning consent process. The following chapters set out the expert reports completed by competent experts in each area. An NIS has also been prepared and submitted with this S37L application.

This chapter outlines the background and describes the scope and methodology of the EIA process. Information regarding consultation is also provided, together with details of the environmental assessment team.

1.2 The Applicant

This EIAR has been prepared on behalf of Murray Brothers Tarmacadam Ltd (Murray Bros.), a business which was established in 1972 and over 50 years later, is still run by the same family. The company is well-established in the Dunmanway area and currently employs thirteen people.

Murray Bros. acquired Ardcahan Quarry and then established the macadam plant at Ardcahan in 1999. Prior to this, the quarry was owned by Cork County Council and leased to Mid Cork Quarries until it was acquired by Murray Bros in 1999. The quarry was established by the Council prior to October 1964, and operations had continued up until Cork County Council issued a notice to cease quarrying activities in 2014 following their review of all quarries in Cork under Section 261A of the Planning and Development Act 2000, as amended, in 2012. This was on the foot of a failure to register the ongoing operational pre-1963 site under Section 261 in 2005.

1.3 The Application Site

The overall Ardcahan Quarry landholding has a total area of approx. 25 hectares. The 37L application relates to lands within the landholding measuring 10.4 ha. It incorporates proposed extraction areas measuring 5.01 ha, principally along the north of the application site, and the balance of the lands comprises ancillary areas, as shown in Figure 1-1, primarily the existing quarry floor area and quarry access. Consequently, the latter area substantially overlaps with the area of the aforementioned substitute consent application.

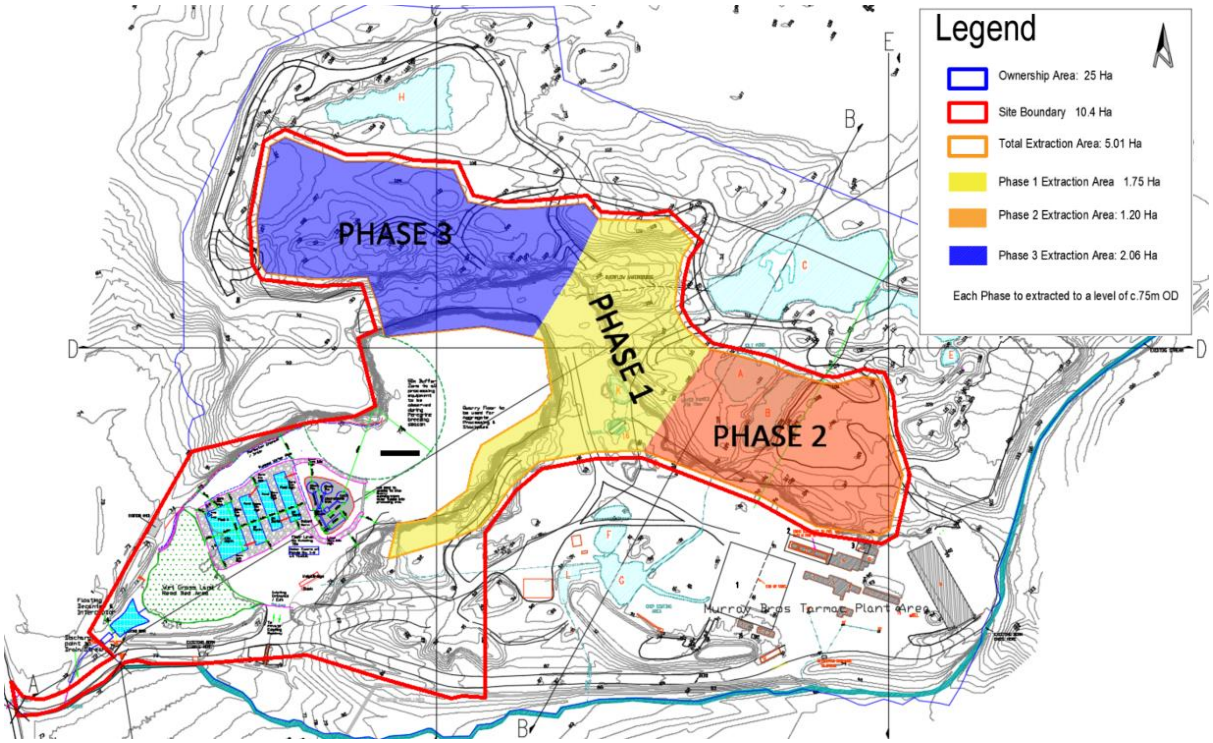


Figure 1-1 Site Layout Plan

The site boundary was determined having regard to the definition of quarry in Section 2 of the Act, as follows:

"quarry" means an excavation or system of excavations made for the purpose of, or in connection with, the getting of minerals (whether in their natural state or in solution or suspension) or products of minerals, being neither a mine nor merely a well or bore-hole or a well and bore-hole combined, and shall be deemed to include—

> *(i) any place on the surface surrounding or adjacent to the quarry occupied together with the quarry for the storage or removal of the minerals or for the purposes of a process ancillary to the getting of minerals, including the breaking, crushing, grinding, screening, washing or dressing of such minerals but, subject thereto, does not include any place at which any manufacturing process is carried on;*
>
> *(ii) any place occupied by the owner of a quarry and used for depositing refuse from it but any place so used in connection with two or more quarries, and occupied by the owner of one of them, or by the owners of any two or more in common, shall be deemed to form part of such one of those quarries as the Minister may direct;*

(iii) any line or siding (not being part of a railway) serving a quarry but, if serving two or more quarries shall be deemed to form part of such one of them as the Minister may direct;

(iv) a conveyor or aerial ropeway provided for the removal from a quarry of minerals or refuse.

In accordance with the definition of quarry, the application site captures the proposed extraction area and adjoining areas within the wider landholding which will be used for ancillary purposes such as access roads, aggregate processing plant, and stockpiling of topsoil and quarried material.

As stated above, there is overlap between the project site and lands included in the substitute consent application to accommodate the ancillary aggregate processing, stockpiling and access activities associated with the proposed future quarrying.

1.4 Requirement for EIAR

Environmental Impact Assessment (EIA) requirements derive from EU Directives. Council Directive 2014/52/EU amended Directive 2011/92/EU and is transposed into Irish Law by the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018.

Proposed development which falls within one of the categories of development specified in Schedule 5 of the Planning and Development Regulations 2001, as amended, which equals or exceeds, a limit, quantity, or threshold prescribed for that class of development must be accompanied by an EIAR.

Part 1 of Schedule 5

Paragraph 19 of Part 1 of Schedule 5 states that the following form of development requires an EIA:

19. Quarries and open-cast mining where the surface of the site exceeds 25 hectares.

The subject development does fall within the development class 'Quarry' set out in Part 1 of Schedule 5. The development site area of 19.1 hectares does not trigger the 25-hectare threshold. Therefore, EIA is not mandatory under Part 1 of Schedule 5. It is noted that the overall landholding/ownership area (including the macadam plant) measures 25ha, but the extraction and associated/ancillary areas included in this S37 application is less than that (i.e. the red line planning application boundary is 10.4).

Part 2 of Schedule 5

Paragraph 2 of Part 2 of Schedule 5 refers to 'Extractive Industry' and part (b) of that section states that the following requires an EIA:

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

The development for which permission is sought under Section 37L of the Act comprises an extraction area of 5.01 ha, within the wider application site boundary measuring 10.4 ha. The extraction area excludes the adjoining areas within the wider landholding which shall be used for ancillary purposes such as access roads, plant, and stockpiling of topsoil and quarried material, which are contained within the balance (5.39ha) of the application area.

Having regard to the above, it may be concluded that an EIAR is required in respect of the proposed

development as it satisfies the preconditions in Part 2 of Schedule 5, under paragraph 2 (b).

1.5 Purpose of Environmental Impact Assessment

The objective of the Directive (Directive 2011/92/EU), as amended by Directive 2014/52/EU, is to ensure a high level of protection of the environment and human health, through the establishment of minimum requirements for environmental impact assessment (EIA).

The 2014 Directive, for the first time, provides a definition of EIA and this is now defined by section 171A of the Planning and Development Act, 2000 (as inserted by Regulation 16 of the 2018 Regulations).

It is defined as a process consisting of:

a) the preparation of an EIAR by the developer;
b) the carrying out of consultations with the public, prescribed bodies (and, where relevant, any affected Member States);
c) the examination by the competent authority of the EIAR, any supplementary information provided, where necessary, by the developer and relevant information received through the consultation process;
d) the reasoned conclusion of the competent authority on the significant effects of the project on the environment; and
e) the integration of the competent authority's reasoned conclusion into any development consent decision.

The definition of EIA thus provides a clear distinction between the process of environmental impact assessment to be carried out by the competent authority and the preparation of an EIAR by the developer.

Section 2 of the 2000 Act has been amended to define an EIAR as 'a report of the effects, if any, which proposed development, if carried out, would have on the environment and shall include the information specified in Annex IV of the Environmental Impact Assessment Directive'.

The EIAR presents the information necessary for the competent authority to identify, describe and assess the direct and indirect significant effects of the project on the environment.

1.6 Content of Environmental Impact Assessment Report

Article 3 of the amended EIA Directive prescribes a range of environmental factors that must be addressed in the EIAR, and requires consideration of risks to the project from major accidents and disasters, as follows:

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).*

2. *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*.

Article 5(1) (a-f) of the amended Directive addresses the information that is required to be included in an EIAR, as set out below:

The information to be provided by the developer 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 project on the environment;*

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

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.*

The EIAR presents the results by reference to the prescribed environmental factors and information requirements in the amended EIA Directive, which enables the potential environmental effects to be systematically identified and evaluated, and where likely significant effects are identified, scope for modifying or mitigating these effects, to be properly evaluated.

1.7 Legislation, Guidance & Other Information Sources

This EIAR has been prepared in accordance with the relevant provisions of Directive 2011/92/EU, as amended by Directive 2014/52/EU. All the factors prescribed in Article 3 of the amended EIA Directive are addressed, and the information required under Article 5(1) and Annex IV is provided.

The Planning and Development Act 2000 and Planning and Development Regulations 2001 have been amended by the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (SI No. 296 of 2018) to take account of the requirements of the Directive (Directive 2014/52/EU).

The amended Directive sets the fundamental framework which has informed preparation of this EIAR. Additional relevant requirements arising from the transposing legislation have also been adhered to.

Preparation of this EIAR was also informed by consideration of the following guidance:

- Environmental Impact Assessment of Projects Guidance on the preparation of the Environmental Impact Assessment Reports (European Commission, 2017)
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (Environmental Protection Agency, May 2022).
- Guidelines on Information to be Contained in Environmental Impact Statements (EIS) (Environmental Protection Agency, 2002)
- Environmental Management in the Extractive Industry (Non-scheduled Minerals (Environmental Protection Agency, 2006)
- Quarries and Ancillary Activities (Department of Heritage, Heritage and Local Government, 2004).
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Planning and Local Government, 2018).

Where relevant, contributors have had regard to other discipline-specific guidelines, details of which are set out in individual chapters of the EIAR.

1.8 Consultation

On behalf of the applicant, McCutcheon Halley Planning engaged in pre-application consultation with statutory authorities to inform the EIAR preparation process.

Consultation letters containing information about the project (including the development subject of the Substitute Consent application and the proposed extension under Section 37L) were issued to the prescribed bodies listed below on 29 November 2024.

The prescribed bodies were invited to respond within a seven-week period, up to 17 January 2025. Input was sought regarding any specific environmental receptors, sensitive areas or key issues that should be addressed, as well as any relevant data sources and recommended methodologies to inform the assessments. Prescribed bodies shown in bold text provided a response. Where the response included comments or recommendations, these have been considered by the EIAR contributors and are addressed in the relevant chapters, as appropriate.

1. **Cork County Council**
2. Department of Housing, Local Government and Heritage (Development Applications Unit)
   a. National Monuments Service
   b. **National Parks and Wildlife Service**
   c. The Heritage Council
3. Department of Environment, Climate and Communications
4. Department of Rural and Community Development
5. Department of Agriculture, Food and the Marine
6. An Chomhairle Ealaíon - The Arts Council
7. Environmental Protection Agency
8. **Geological Survey Ireland**
9. **Transport Infrastructure Ireland**

10. An Taisce - The National Trust for Ireland
11. The Health and Safety Authority
12. **The Health Service Executive**
13. Birdwatch Ireland
14. Bat Conservation Ireland
15. **Uisce Eireann**
16. Department of Education
17. **Inland Fisheries Ireland**
18. **Failte Ireland**

In addition to the above, the required information has been issued for the Department of Housing, Planning, and Local Government's EIA Portal. This tool informs the public in a timely manner of applications accompanied by an EIAR.

1.9 Competency

1.9.1 EIAR Team

It is a requirement that the EIAR must be prepared by competent experts. For the preparation of this EIAR, the Applicant engaged McCutcheon Halley Chartered Planning Consultants to direct and coordinate the preparation of the rEIAR and a team of qualified specialists was engaged to prepare individual chapters. The consultant firms and lead authors for each chapter are listed in Table 1-3.

Details of the competency, qualifications, and experience of the lead author for each environmental factor is outlined in the relevant chapters.

1.9.2 Author Information & Competency

This chapter was prepared by Martina Keenan Rivero of McCutcheon Halley Chartered Planning Consultants.

Martina holds a BSc (Hons) in Spatial Planning from Technological University Dublin and an Advanced Diploma in Planning and Environmental Law from Kings Inns. She has 10 years of professional experience, working in NSW, Australia with a Local Authority and as a planning and environmental consultant in Ireland. Martina has prepared AA screening reports, Environmental Impact Assessment screening reports and coordinated and contributed to Environmental Impact Assessment Reports for a range of project types.

1.10 Study Area

A study area has been defined for each environmental topic to inform the related technical assessments. This study area has been determined by reference to relevant guidance and the geographic scope of potential impacts. The potential impacts may be temporary or permanent and may be positive or negative. All types of impact are considered when defining the study area.

The individual chapters provide details of the study area, including a description of baseline conditions, for each discipline.

1.11 Impact Assessment Methodology

Each chapter of this EIAR assesses the direct, indirect, cumulative, and residual impact of the development.

Having regard to the nature of this development, there is no traditional 'construction phase'. Rather there is an initial development phase that includes stripping of the topsoil and placement in berms to screen the active area. For the purpose of this EIAR, this phase is referred to as the Construction Phase.

The identified quality, significance, and duration of effects for each aspect is primarily based on the terminology set out in the EPAs Guidelines on the information to be contained in Environmental Impact Assessment Reports (2022) as summarised in Table 1-1.

Table 1.1 Impact Rating Terminology

Quality of Effect	
Positive	A change which improves the quality of the environment (for example, by increasing species diversity; or the improving reproductive capacity of and ecosystem, or by removing nuisances or improving amenities.
Neutral	No effects of effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
Negative/Adverse Effects	A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem; or damaging health or property or by causing nuisance).
Significance of Effect	
Imperceptible	An effect capable of measurement but without significant consequences.
Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences
Slight Effects	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate Effects	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
Significant Effects	An effect which, by its character, magnitude, duration, or intensity alters a sensitive aspect of the environment.
Very Significant	An effect which, by its character, magnitude, duration, or intensity significantly alters most of a sensitive aspect of the environment.
Profound Effects	An effect which obliterates sensitive characteristics.
Extent and Context of Effects	

Quality of Effect	
Extent	Describe the size of the area, the number of sites, and the proportion of a population affected by an effect.
Context	Describe whether the extent, duration, or frequency will conform or contrast with established (baseline) conditions (is it the biggest, longest effect ever?).
Probability of Effects	
Likely	The effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented.
Unlikely	The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.
Duration of Effects	
Momentary Effects	Seconds to minutes
Brief Effects	Less than 1 day
Temporary Effects	Less than 1 year
Short-term Effects	1-7 years
Medium-term Effects	7-15 years
Long-term Effects	15-60 years
Permanent Effects	Over 60 years
Reversible Effects	Effects that can be undone, for example through remediation or restoration.
Frequency of Effects	Describe how often the effect will occur (once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annually).
Types of Effects	
Indirect Effects	Impacts on the environment, which are not a direct result of the project, often produced away from the project site or because of a complex pathway.
Cumulative Effects	The addition of many minor or significant effects, including effects of other projects, to create larger, more significant effects.
'Do-nothing Effects'	The environment as it would be in the future should the subject project not be carried out.
'Worst Case' Effects	The effects arising from a project in the case where mitigation measures substantially fail.
Indeterminable Effects	When the full consequences of a change in the environment cannot be described.
Irreversible Effects	When the character, distinctiveness, diversity or reproductive capacity of an environment is permanently lost.
Residual Effects	The degree of environmental change that will occur after the proposed mitigation measures have taken effect.

Quality of Effect	
Synergistic Effects	Where the resultant effect is of greater significance than the sum of its constituents, (e.g. combination of SOx and NOx to produce smog).

1.12 Scoping

The purpose of scoping is to identify the information to be contained in an EIAR and the methodology to be used in gathering and assessing that information.

The scope of this EIAR is informed by the requirements of the Directive 2014/52/EU and the transposing Regulations together with the Guidelines set out above. Applicants are not required to seek a formal scoping opinion.

The scope of individual assessments is informed by discipline-specific guidelines and, where this is the case, they are referenced in each chapter.

1.13 Scope of Cumulative Effects

Directive 2014/52/EU substituted a new Annex IV into Directive 2011/92/EU. Annex IV of the EIA Directive is to be read in conjunction with article 5(1) and sets out the information to be included in an EIAR. Annex IV was transposed into national law via article 97 of the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (the "2018 Regulations") which substituted a new Schedule 6 into the Planning and Development Regulations 2000, as amended.

The Directive requires that the EIAR describes the cumulation of effects with other existing and/or approved projects.

Cumulative effects may arise from:

- *The interaction between the various impacts within a single project;*
- *The interaction between all the differing* existing and / or approved projects *in the same areas as the proposed project.* [1]

In August 2018, the Department of Housing, Planning and Local Government issued Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment. The Guidelines summarise "cumulative effects" in the following way on page 40;

> *Effects are not to be considered in isolation but cumulatively i.e., when they are added to other effects. A single effect on its own may not be significant in terms of impact on the environment but, when considered together with other effects, may have a significant impact on the environment. Also, a single effect which may, on its own, have a significant effect, may have a reduced and insignificant impact when combined with other effects.*

[1] Department of Housing, Planning and Local Government, "Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment" (August 2018), page 40.

Paragraph 2(e)(i)(V) of Schedule 6 (paragraph 5(e) of Annex IV) provides as follows;

> *...the cumulation of effects with other **existing or approved developments, or both**, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources.* (Emphasis added).

A review of the permitted and proposed developments within 2km of the application site in the last five years has been undertaken to inform the assessment of cumulative effects. Only one approved development that has not yet been implemented was identified, involving a dwelling and detached garage (Reg. Ref. 23751). It has been considered in conjunction with existing development and land uses for the purpose of the cumulative assessment.

Each EIAR contributor has adopted an approach to the assessment of cumulative impacts that is appropriate to their discipline based on relevant technical guidance and best practice, and having regard to the nature, magnitude and geographical extent of the predicted impacts, as well as the sensitivity of the receiving environment.

Table 1.2 Permitted and Proposed Developments in the vicinity of the site

Planning Ref.	Description	Location	Application Type	Decision
CCC 23751	Construction of dwelling, detached garage and all associated site works	Gurteennasowna Dunmanway Co. Cork	S.34 Application	Granted 17th June 2024

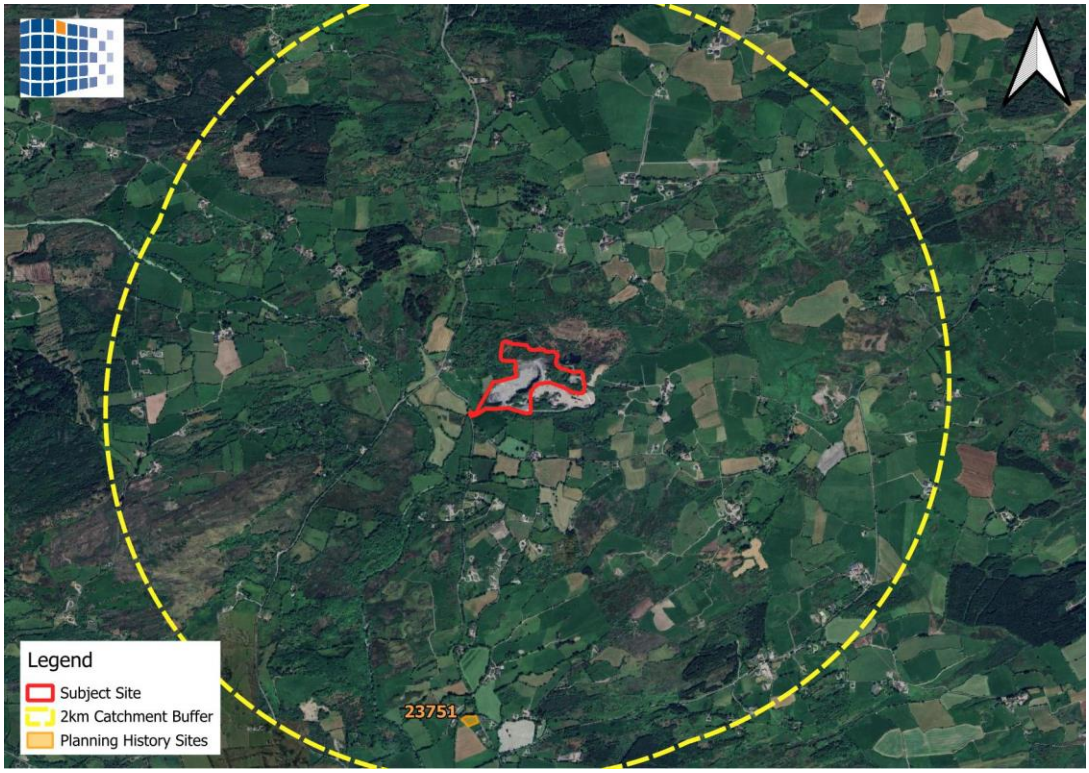


Figure 1-2 Permitted and Proposed Developments in the vicinity of Ardcahan Quarry

Cumulative effects are not limited to projects, and relevant plans must also be considered. According

to the Environmental Protection Agency (2020), in Ireland, key cumulative effects—where environmental receptors are at or near their thresholds or their capacity to assimilate more change—include climate change, water management, including flood risk management, air quality, and biodiversity, including peatlands and wetlands.

For the purpose of this EIAR, the following Plans have been considered in relation to potential cumulative effects:

- **Project Ireland 2040** - comprises the Revised National Planning Framework (NPF), which sets the overarching spatial strategy that will shape the future growth and development of Ireland to the year 2040, along with the National Development Plan (NDP), which sets out the ten year investment strategy. As a strategic development framework, Project Ireland 2040 sets the long-term context for our country's physical development and associated progress in social, economic and environmental terms, in a national and European context. The NPF sets the context for the Regional Spatial Economic Strategies (RSES) through 10 National Strategic Outcomes (NSOs) including Strengthened Rural Economies and Communities, and Enhanced Amenities and Heritage.
- **Regional Spatial and Economic Strategy (RSES) for the Southern Region** - the RSES provides a long-term, strategic development framework for the future physical, economic and social development of the Southern Region. The RSES primarily aims to support the delivery of the programme for change set out in Project Ireland 2040 and recognises the strategic role played by all areas, urban and rural, in achieving the set regional and national targets and objectives.
- **Cork County Development Plan 2022-2028** - sets out an overall strategy for the proper planning and sustainable development of the functional area of Cork County Council. The Plan has a key role in protecting the environment, heritage, and amenities of the county and in mitigating against the impacts of climate change. It includes policies and objectives for all aspects included in this EIAR. Accordingly, each chapter of the EIAR has been prepared having regard to the cumulative effects of the proposed development and relevant Development Plan policies and objectives.
- **The Climate Action Plan 2025** - climate change is the ultimate cumulative effect, nationally and internationally. The Climate Action Plan provides a roadmap of actions which will ultimately lead Ireland to meet its national climate objective of pursuing and achieving the transition to a climate resilient, biodiversity rich, environmentally sustainable and climate neutral economy, by no later than 2050. It aligns with the legally binding economy-wide carbon budgets and sectoral emissions ceilings that were agreed by Government in July 2022.
- **National Biodiversity Action Plan 2023-2030** - The Plan sets out actions for a "Whole-of-Government, Whole-of Society" approach to the governance and conservation of biodiversity. It has been developed to align with EU and International Biodiversity strategies and policies, as well as National plans and policies focussed on environmental protection and climate action that influence biodiversity. The cumulative effects of this Plan and the development are considered in the Biodiversity chapter.
- **EU Habitats Directive** - provides the legislative framework for the protection of habitats and

species across Europe through the establishment of a network of designated conservation areas known as the Natura 2000 network. The Natura 2000 network includes sites designated as Special Areas of Conservation (SACs), under the EU Habitats Directive and Special Protection Areas (SPAs) designated under the EU Birds Directive. The cumulative effects of this Plan and the project are addressed in the Biodiversity chapter.

- **EU Birds Directive** - requires that important concentrations of migratory waterfowl and internationally important wetlands be protected in the same way as Annex 1 and Annex II habitats and species under the Habitats Directive. The cumulative effects of this Plan, together with the development, are considered in the Biodiversity chapter.
- **Standards in the EU Air Quality Directive and 'daughter' directives** - establish the levels of air pollutants that have no significant impacts on human health or the environment. The cumulative effects of the Directive, together with the development, are considered in the Population & Human Health chapter and the Air Quality & Climate chapter.

In addition, each of the specialist chapters (4-14) considers the cumulative effects of projects and plans relevant to the zone of influence and discipline-specific factors.

1.14 Format & Structure of the rEIAR

This rEIAR has been prepared according to the 'Grouped Format Structure' as described in the Guidelines on information to be contained in Environmental Impact Statements (EPA, 2022). This means that each topic is considered as a separate section. The advantages of using this format are that it is easy to investigate a single topic and it facilitates easy cross-reference to specialist studies.

The EIAR is subdivided into 3 volumes as follows:

- **Volume I** Non-Technical Summary;
- **Volume II** Environmental Impact Assessment Report; and
- **Volume III** Appendices to Environmental Impact Assessment Report.

Volume II is presented as 16 chapters, outlined in Table 1-2.

Table 1.3 EIAR Chapters & Contributors

Chapter	Aspect	Consultant	Lead Author
1	Introduction	McCutcheon Halley Planning	Martina Keenan Rivero
2	Planning Policy	McCutcheon Halley Planning	Martina Keenan Rivero
3	Project Location and Description	McCutcheon Halley Planning	Martina Keenan Rivero
4	Project Need and Reasonable Alternatives	McCutcheon Halley Planning	Martina Keenan Rivero
5	Population and Human Health	McCutcheon Halley Planning	Martina Keenan Rivero
6	Land, Soils & Geology	Viridus Consulting Ltd	Darragh Musgrave

Chapter	Aspect	Consultant	Lead Author
7	Hydrology and Hydrogeology	Viridus Consulting Ltd	Darragh Musgrave
8	Air Quality	AWN Consulting	Ciara Nolan
9	Climate	AWN Consulting	Ciara Nolan
10	Noise and Vibration	CLV Consulting	Brian Johnson
11	Landscape and Visual Impact	Cathal O'Meara Landscape Architects	Cathal O'Meara
12	Traffic and Transport	MHL Consulting Engineers	Shane Moriarty
13	Material Assets – Services, Infrastructure, Waste, and Utilities	McCutcheon Halley Planning	Martina Keenan Rivero
14	Biodiversity	Malone O'Regan Environmental	Dyfrig Hubble
15	Cultural Heritage and Archaeology	Lane Purcell Archaeology	Avril Purcell
16	Significant Interactions of Impacts	McCutcheon Halley Planning	Martina Keenan Rivero
17	Screening for Major Accidents and Disasters	McCutcheon Halley Planning	Martina Keenan Rivero
18	Summary of Mitigation Measures and Monitoring	McCutcheon Halley Planning	Martina Keenan Rivero

Murray Brothers Tarmacadam Ltd

CHAPTER 2
PLANNING POLICY

VOLUME II
MAIN STATEMENT

APRIL 2026

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2 Planning Policy

2.1 Introduction

2.1.1 Overview

This chapter sets out the planning and development context relating to quarry development and reviews the national, regional and local planning policy.

In recent years, there has been a conscious move in Ireland towards strategic planning with various policy documents and plans introduced to support strategic planning and development.

Policies and objectives of the Government filter down from the national level to regional plans and to the local authority level in County Development Plans and Local Area Plans.

The Planning Statement prepared by McCutcheon Halley Planning, which accompanies this application, addresses the principal planning issues of relevance to this 37L application. It should be referred to for a full assessment of the proposed development, having regard to the relevant national, regional and local policy objectives.

2.1.2 Author Information and Competency

This chapter was prepared by Martina Keenan Rivero of McCutcheon Halley Chartered Planning Consultants. Martina holds a BSc (Hons) in Spatial Planning from Technological University Dublin and an Advanced Diploma in Planning and Environmental Law from Kings Inns. She has 10 years of professional experience, working in NSW, Australia with a Local Authority and as a planning and environmental consultant in Ireland. Martina has prepared AA screening reports, Environmental Impact Assessment screening reports and coordinated and contributed to Environmental Impact Assessment Reports for a range of development projects. Relevant project experience includes large housing developments, mixed-use schemes, industrial and commercial projects.

Martina was involved in the coordination and preparation of EIARs to accompany planning applications for the following projects that received permission:

- Southwest Gate – A mixed-use scheme across 13 blocks comprising 1,123 residential units with supporting amenities, retail units, office accommodation, a primary healthcare centre, gym, cultural centre, childcare facility, hotel and a series of public open spaces.

- Primark Distribution Centre – Construction of a Distribution Centre incorporating office floor space and ancillary buildings with a cumulative gross floor area of approx. 64,550 sq.m and associated site works.

- Oscar Traynor Road – Construction of 853 residential units (social, affordable and cost rental homes), together with a creche, retail unit/café, community facilities and a new public park.

2.2 National Planning Framework: First Revision (2025)

The First Revision of the National Planning Framework (NPF) approved in April 2025, provides a strategic framework for Ireland's social, economic, and cultural development up to 2040, targeting. It

sets a target to accommodate a population increase of 950,000 while promoting balanced regional development through the revitalisation of rural and urban areas.

As part of this vision, the Revised NPF places particular emphasis on strengthening regional cores such as Cork and its hinterlands, recognising its potential to act as a key driver of economic growth and innovation outside of Dublin. The plan supports the diversification of Cork's employment base and the creation of conditions that attract and retain talent, enhancing the region's competitiveness and appeal to investors.

As part of its broader strategy, as per National Policy Objective (NPO) 30, the plan aims to:

> *Facilitate the development of the rural economy, in a manner consistent with the national climate objective, 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 biodiversity and the natural landscape and built heritage which are vital to rural tourism.*

This objective underscores the importance of supporting traditional and emerging rural industries while safeguarding environmental and cultural assets that underpin rural tourism and community identity.

Further reinforcing this commitment, Section 9.2 of the NPF addresses resource efficiency and the transition to a carbon-neutral economy. It highlights the strategic importance of extractive industries in supplying essential materials for construction and export and supports the identification and protection of key mineral reserves from conflicting land uses to ensure their sustainable use.

> *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.*

In accordance with the Revised NPF, extraction activities are supported where they meet environmental standards, including those related to noise, air and water quality, and the protection of natural and cultural heritage, as well as the quality of life for nearby communities. Additionally, it places strong emphasis on site rehabilitation and encourages nature restoration in line with EU initiatives such as the Nature Restoration Law, the EU Green Deal, and the EU Biodiversity Strategy 2020.

2.3 Quarries and Ancillary Activities Guidelines for Planning Authorities (2004)

The Guidelines for Planning Authorities, 'Quarries and Ancillary Activities', April 2004 notes that aggregates are a significant natural resource and that the extraction industry makes an important contribution to economic development in Ireland.

The Guidelines also note that, by their nature, aggregates can only be worked where they occur, and that sand and stone/gravel have a low value-to-weight ratio. It is therefore generally neither economically nor environmentally sustainable to transport aggregates any great distance to their market due to freight costs.

The guidelines highlight that there will be a continuing need for some new or expanded aggregates quarrying operations on land to meet regional and local requirements and that the planning system should ensure an adequate supply to meet construction demands, while at the same time protecting Irelands natural and cultural heritage.

2.4 Regional Spatial and Economic Strategy for the Southern Region 2020-2032

The Regional Spatial and Economic Strategy (RSES) for the Southern Region of Ireland is a strategic framework to guide spatial planning and economic development over a 12-year period, aligning with the broader goals of Project Ireland 2040 and the National Planning Framework.

The RSES aims to foster sustainable development, promote economic growth, and ensure the efficient use of resources across the Southern Region, which covers over 40% of Ireland's landmass and supports one-third of its population. It focuses on enhancing infrastructure, fostering innovation, and supporting key industries to ensure that both urban and rural areas thrive.

2.5 Cork County Development Plan 2022-2028

The Cork County Development Plan (CCDP) 2022-2028 which came into effect on 6 June 2022, serves as a strategic framework to guide the sustainable development of County Cork until 2028, with a focus on balancing economic growth, environmental protection, and community well-being.

The CCDP 2022-2028 serves as a strategic framework to guide the sustainable development of County Cork until 2028, with a focus on balancing economic growth, environmental protection, and community well-being.

Under the CCDP, the application site is situated within lands designated as a greenbelt ('Greenbelt1') surrounding Dunmanyway, subject to the objectives shown below.

> ***County Development Plan Objective***
> ***RP 5-16: Long Established Uses***
>
> *Recognise the requirements of long established commercial or institutional uses located entirely within the Greenbelt which may make proposals for expansion / intensification of existing uses. Such expansion proposals of an appropriate scale will be considered on their merits having regard to the overall function and open character of the Greenbelt and where development would be in accordance with normal proper planning and sustainable development considerations*.
>
> ***County Development Plan Objective***
> ***RP 5-19: Greenbelts around Settlements***
>
> *(a) Retain the identity of towns, to prevent sprawl, and to ensure a distinction in character between built up areas and the open countryside by maintaining a Greenbelt around all individual towns.*
>
> *(b) Reserve generally for use as agriculture, open space or recreation uses those lands that lie in the immediate surroundings of towns. Where Natura 2000 sites, Natural Heritage Areas, proposed Natural Heritage Areas and other areas of biodiversity value occur within Greenbelts, these shall be reserved for uses compatible with their nature conservation designation and biodiversity value.*

(c) *Prevent linear roadside frontage development on the roads leading out of towns and villages.*

Section 8.17 of the CCDP addresses Mineral Extraction, acknowledging the economic importance of extractive industries as a source of raw materials for the construction sector and infrastructure development.

The Plan provides policy support for the protection of existing quarries and proven aggregate resources and the continued viability of extractive industries in the County, as set out below.

8.17 Mineral Extraction

8.17.1 It is important to protect important reserves of aggregates and minerals from development that might prejudice their utilisation. In line with this Cork County Council recognises the economic value and significance of the aggregate and mineral sector to the local, regional and national economy in terms of employment generation and providing raw materials for the construction industry. The Council therefore aims to protect and safeguard the operations of working quarries and proven aggregate resources from incompatible developments to ensure the continued viability of the extractive industry, whilst also ensuring that environmental, rural, scenic and residential amenities are protected.

8.17.2 In 2020 the ICF published a document 'Essential Aggregates: Providing for Irelands Needs to 2040' which is an industry led call for Government to ensure that Ireland's future supply of aggregates (crushed rock, sand and gravel) is planned, monitored and managed in a sustainable manner, to provide for Ireland's future infrastructure development. The document calls for a National Planning Policy for Aggregates which will underpin local and regional planning policy. The Planning Authority recognises the essential role of Aggregates and the need for the preparation of a County Minerals Strategy which will support a sustainable extractive industry during the lifetime of the County Development Plan.

8.17.3 There are 230 quarries registered under Section 261 of the Planning and Development Act 2000, as amended, operating within the County, primarily engaged in Sand and Gravel and stone quarrying. There are distinct clusters at locations near Carrigtwohill, Midleton, Ovens, along the Bandon River from Dunmanway to Innishannon and to the east of Kanturk around Cecilstown.

County Development Plan Objective
EC: 8-16 Safeguarding Mineral Reserves

a) *Protect and safeguard the county's natural mineral resources from inappropriate development, by seeking to prevent incompatible land uses that could be located elsewhere, from being located in the vicinity of the resource, since the extraction of minerals and aggregates is resource based.*

b) *Prepare a Minerals Strategy Plan to support a sustainable extractive industry during the lifetime of the plan. This strategy will be prepared taking account of*

environmental, nature, conservation, heritage, landscape, and other planning considerations.

2.6 Conclusion

It is considered that the subject development is consistent with national level guidelines for the provision of aggregates to meet local construction requirements and Cork County Council policies for the provision of sustainable locally sourced aggregates. Our clients' quarry at Ardcahan has long been recognised as being of significant value containing high quality resource and has for a very long period of time provided material to a significant number of clients, including Cork County Council.

Extraction from the Ardcahan Quarry provides a sustainable option for the provision of aggregates for local road construction projects in Counties Cork and Kerry. The proposed development is consistent with national level guidelines for the provision of aggregates to meet regional and local construction requirements and county policy for the provision of sustainable locally sourced aggregates. Murray Brothers Tarmacadam Ltd. are a substantial employer in the context of the rural location and the proposed development will help to sustain the company and support the local economy. Overall, the subject development is consistent with national level guidelines as well as County and local planning policy.

Murray Brothers Tarmacadam Ltd

CHAPTER 3
PROJECT LOCATION AND DESCRIPTION

VOLUME II
MAIN STATEMENT

APRIL 2026

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3 Project Location & Description

3.1 Introduction

This chapter of the Environmental Impact Assessment Report (EIAR) provides a description of the project for which substitute consent is sought, as required by the EIA Directive;

> "*a description of the project comprising information on the site, design, size and other relevant features of the project*".

The information contained herein is informed by the Environmental Protection Agency (EPA) Guidelines on the information to be contained in Environmental Impact Assessment Reports (May 2022) which provides guidance as follows:

"it is appropriate for most EIARs to include (to varying degrees of detail) a description of:

- *The **location** of the project.*
- *The **physical characteristics** of the whole project, including, where relevant, demolition works, the land-use requirements during construction and operation and other works that are integral to the project.*
- *The **main characteristics of the operational phase** of the project (production and maintenance processes in particular), for example energy demand, energy used, nature and quantity of materials and natural resources (including water, land, soil, biodiversity etc.) use.*
- *An estimate, by **type and quantity of expected residues and emissions** (such as water, air, soil and subsoil pollution, noise, vibration, light, heat, radiation and quantities and types of waste produced during the construction and operational phases)''.*

The Guidelines state that the typical categories for describing the physical characteristics of a project are:

- *the site location.*
- *the size, design and appearance of the proposed project.*
- *the cumulation with other proposed projects.*
- *the use of natural resources.*
- *the production of waste.*
- *emissions and nuisances.*
- *a description of the risk of accidents – having regard to substances or technologies used.*

This chapter was prepared by Martina Keenan Rivero of McCutcheon Halley Planning (MHP) Consultants in conjunction with the Applicant and relevant members of the Design Team. It should be referred to in conjunction with the suite of drawings and supporting information which accompany the application.

3.2 Project Site

3.2.1 Site Location & Description

Ardcahan Quarry is in the townland of Ardcahan, approximately 3.5km north-east of Dunmanway in West Cork. The site is situated off the L4621-9 local road ('Hospital Road'), approximately 300m east of its junction with the R587 regional road, which links Dunmanway and Macroom (see Figure 2.1).

The site is located in a rural setting characterised by undulating topography, irregularly shaped fields and clusters of mixed woodland. The land immediately around the quarry consists of scrub, woodland and agricultural grassland. Land uses in the surrounding area primarily comprise livestock farming and rural housing.

The nearest dwellings to the quarry site (red line boundary) are located approximately 300m south; 275m west; 450m north and 400m east of the site. There are no commercial premises or community facilities in the immediate environs.

The junction of the Caha and Bandon Rivers is located approximately 400m west of the site. A small watercourse that flows into the Bandon River extends along the eastern and southern boundaries of the landholding.

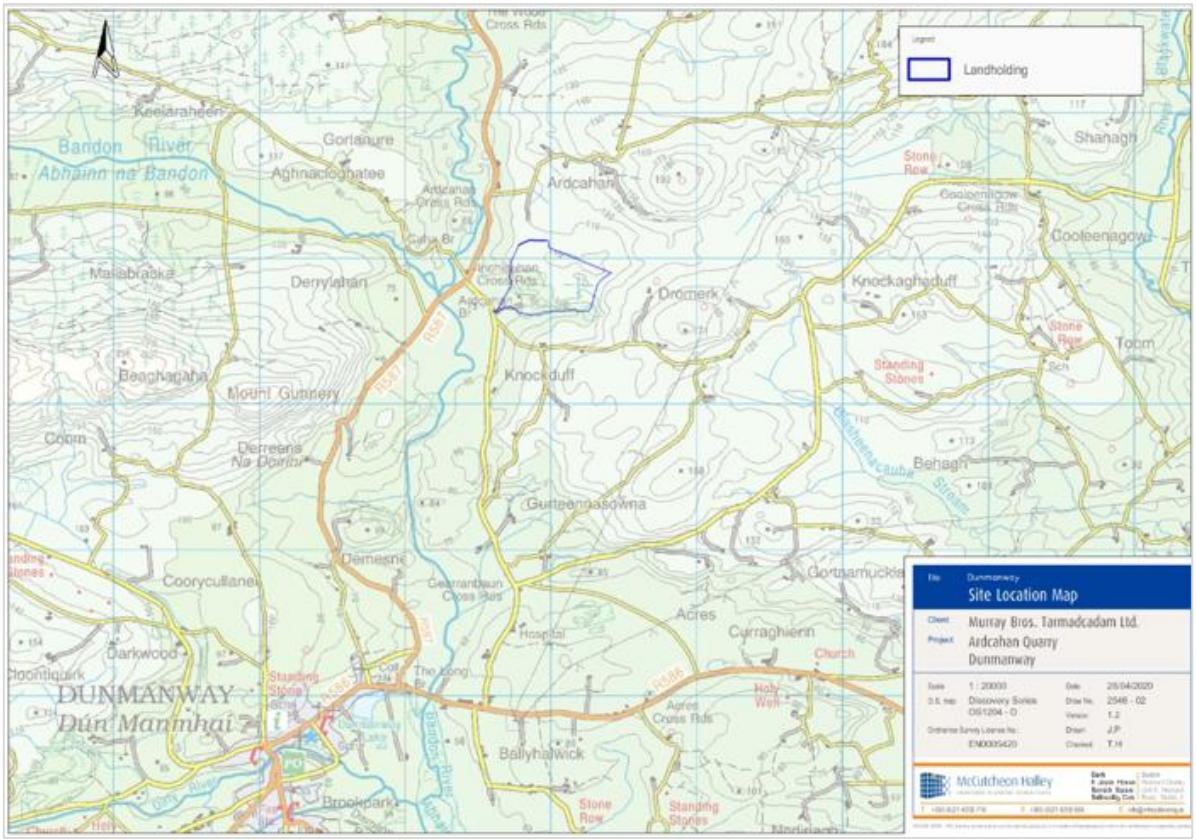


Figure 3-1 Site Location (Applicant's landholding outlined in blue)

The area within the overall landholding measures approx. 25 hectares (ha). The lands are sloped with

lower ground levels in the south-west (~72 to 75 MOD[1]) rising to the north (118 MOD).

A quarry has existed on the landholding since pre-1963 and was operated by Cork County Council up until it was acquired by the applicant in the 1990's. The former extraction areas are located within the southern half of the site (as seen in Figure 3-2).

The south-east of the site was quarried prior to 1990 and includes a macadam production plant and buildings used for administration, welfare, production and storage purposes, which were granted planning permission under Reg. Ref. 98/294.

The south-west of the site was quarried between 1990-2014 and is subject to a concurrent substitute consent application (SC) and remedial EIAR.

The northern part of the landholding has not previously been used for extraction, but portions of it were used for ancillary uses such as storing crushed product, settling ponds, access tracks and for backfilling. These were developed when the quarry was previously active and have been included within the concurrent SC planning application. There are no new access roads/tracks or settlement ponds proposed as part of this S37L application as the intention is to avail of the existing access routes and ponds throughout the site.

Figure 3.2 shows the overall landholding (blue) and area subject to the concurrent substitute consent (SC) application (dashed orange), and the proposed area subject to this S37L application (red).

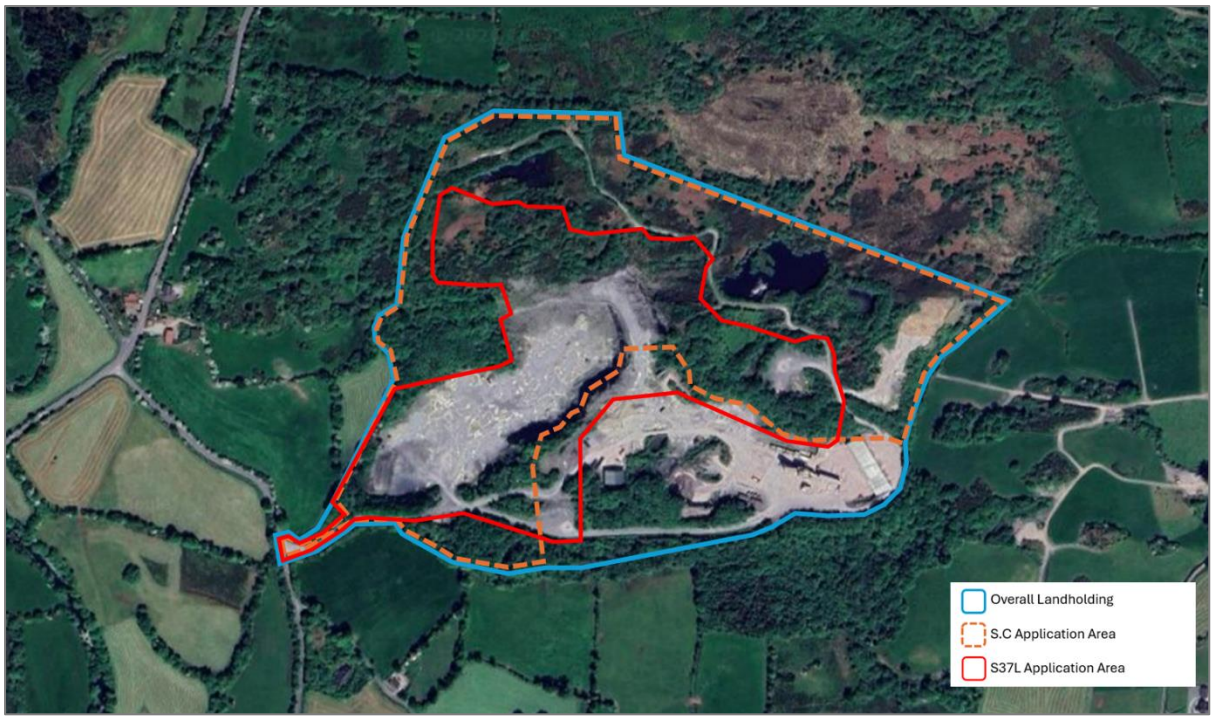


Figure 3-2 Aerial image of Ardcahan Quarry showing an indicative outline of the landholding (blue), the substitute consent area (dashed orange), and the S37L area (red)

[1] Metres over Ordnance Datum



Figure 3-3 Viewpoint 3, From Knockduff, Looking Northwest

3.2.2 Extent of Project Site

The subject site measures 10.4 ha in area. It incorporates proposed extraction areas measuring 5.01 ha, principally along the north of the application site, and the balance of the application lands comprises ancillary areas including the existing quarry floor, which is proposed to be used for aggregate processing, settling ponds, stockpiling etc, associated with the proposed future quarrying, and stormwater wetland/attenuation ponds.

The project site overlaps with lands under consideration for Substitute Consent by way of a concurrent planning application[2]. The former post 1990 extraction area (now quarry floor) overlaps with this prospective application and will accommodate ancillary quarry activities, internal roads, aggregate processing including crushing, screening and washing, settling ponds, stockpiling etc, associated with the proposed future quarrying.

The application site does not include or propose any works within the southeast part of the landholding occupied by the macadam plant, administration buildings and associated development permitted under Reg. Ref. 98/294.

[2] An application for Substitute Consent under Section 177E of the Planning and Development Act 2000, as amended, has been submitted to An Coimisiún Pleanála to regularise extraction and ancillary quarrying activities which took place at Ardcahan Quarry between 1990 and 2014.

3.3 Project Need

Aggregates are an essential building material for the construction industry. The supply of aggregates facilitates the construction of buildings and infrastructure, which are vital for sustaining economic growth and development, and will also feed macadam plant on the adjacent site which is the most sustainable way of feeding this existing plant. Therefore, quarrying is necessary to satisfy societal need and to ensure the timely and sustainable delivery of housing and public infrastructure.

Crushed and screened aggregates, and associated downstream products such as concrete and bituminous macadam, are the most used products by volume/weight in the construction industry, second only to water for societal use.

The quarried aggregates also contribute towards the construction and ongoing maintenance of the road network which is crucial for moving goods and people efficiently.

Ardcahan Quarry will contribute to meeting the needs of the construction sector, supplying aggregates to local road projects in Counties Cork and Kerry. The quarry is strategically located within West Cork to serve a substantial area of west Cork and mid to south-east Kerry.

3.4 Project Description

3.4.1 Scale of Development

This proposed development involves quarrying of quartzitic sandstone, thereby extending the existing quarry and extraction area. Reserves at the quarry are estimated to equate to be 3.7 million tonnes of aggregate. The proposed extraction area measures 5.01 ha, and the stone will be extracted from the existing levels down to a level resembling the existing quarry floor i.e. approximately 75 metres over Ordnance Datum (MOD).

The rock will be extracted using industry-standard blasting methods to produce broken rock by creating a variable bench depth of 15-20m. The number of benches will vary depending on the existing ground level and depth of overburden; however, the final quarry floor level across the site will be approximately 75 MOD.

Depending on demand and market conditions, it is anticipated that the proposed quarrying activities will generally produce between 175,000 to 200,000 tonnes of aggregate per annum, with an anticipated upper annual output of 225,000 tonnes.

Recognising that the scale of output may fluctuate during the lifetime of the quarry due to commercial, economic and/or operational factors, this application seeks permission for a 20-year duration. A 20-year lifespan is considered appropriate and commensurate with the facilitate extraction of the estimated known reserves and implementation of the proposed remediation plan, while factoring in potential fluctuations in quarrying activity over the period.

This approach is in line with the *Quarries and Ancillary Activities Guidelines for Planning Authorities* (2004) which note that in deciding the length of planning permission for quarries, planning authorities should have regard to the expected life of the reserves within the site.

3.4.2 Development Phasing

Works associated with the proposed development can be broadly grouped into three distinct types of activity, as follows:

- Construction;
- Operational; and
- Decommissioning and Remediation.

The impacts of each activity type are assessed for each environmental topic.

For the purpose of this EIAR, the construction phase comprises the initial development phase, which involves stripping of any overburden and preparing for rock extraction activities.

3.4.3 Construction Activity

Due to the nature of quarrying activity, there is no traditional 'construction phase'. There is an initial development phase involving stripping of any overburden soils and preparation for rock extraction activities. For the purpose of this EIAR, this phase is referred to as the Construction Phase.

To facilitate the excavation of stone, any vegetation and soil cover will be removed to reveal the underlying rock; it is estimated that an average depth of approximately one metre of soil is to be removed at this site. The majority of vegetation will be mulched and retained on site.

All excavated soil will remain on site and utilised for cover to denuded areas and for placement in berms to screen the active area and to cultivate (two) new native woodland pockets in the east and west of the proposed quarried area (refer to Chapter 10 of this EIAR and Regeneration Plan by Cathal O'Meara Landscape Architects).

Excavators and dump trucks will be the main type of machinery/plant used during this phase to remove overburden and construct berms.

3.4.4 Operational Phase

3.4.4.1 Quarrying Process

Following the removal of the existing overburden, the exposed rock will be drilled and blasted through the use of industrial explosives to a pre-determined design. Blasting will be undertaken by a specialist company experienced in blast design and preparation of quarry faces to maximise efficiency, safety, and minimise blast emissions. By this method, blasted material will be released in close proximity to the receding quarry face. Blast events are generally expected to occur a maximum of monthly but will occur more frequently when quarry faces are under initial development, and small design blasts are required. It is anticipated that drilling would generally occur one week prior to blasting and that blasting would be required up to 12 times per year (up to twice in any given 30 day period), depending on stock levels, demand, commercial and blast design considerations.

Excavated material will generally be processed on-site by primary and secondary crushing with more limited tertiary crushing and processing, including washing, for specialist products. The aggregate processing area is to be situated in the southwest of the existing quarry void, with the blast pile being fed into the existing mobile primary jaw crusher, using a loading shovel. The crushing will be located

within the upper area of the existing void, possibly advancing with the quarry face, while the washing will be located towards the centre of south-west of the existing quarry floor which primary comprises the reed/attenuation pond.

Blasted rock will be loaded into a crushers and screeners to reduce the size of the rock fragments in to both crusher run of various nominal sizes, single sized material, and finer crushed sand. Product is stored in stockpiles and storage bays on site. Some of the product, such as single sized aggregates and crushed sand, will be washed for specialist use.

The main plant and machinery used during processing will include:

- Track mounted drill rig to drill blast holes;
- Excavator used to load crusher;
- Mobile jaw crushers and cone crushers to crush the stone
- Screening units used to size and separate blasted rock;
- Washing plant and associated conveyors and settlement lagoons;
- Wheel loader used to stockpile products and load customer road trucks; and
- Other machinery including loading shovels, excavators and haulage vehicles.

3.4.4.2 Products and Markets

This will include all quarry products, including Aggregates for Civil Engineering (IS EN 13242), such as 100-50mm, 150-100mm, 100-0mm, 50- 0mm, 0-25mm, 40-63mm, clause 806, SR21 Annex E, 0-4mm dust/sand, cable dust, 6F2 Capping, 6N Fill to structures, 10/20mm aggregate, 4/10mm aggregate, 6.3/14mm aggregate, and rock armour. Aggregates for concrete (IS EN 12620) requires single sized aggregates as well as washed sand. Aggregates for use in macadam to IS EN 13043 will also be produced.

The main markets will be to supply the local construction/civile engineering industry, including local authorities, aggregate to regional concrete and block making facilities, supply to the existing macadam plant, external sales to building sites, as well as the local agricultural sector.

3.4.4.3 Phasing Strategy for Extraction

Extraction activity is planned to be undertaken over three phases. The indicative phasing strategy for the total extraction area is shown in Figure 3-5.

The first phase will take place to the northeast of the former extraction area and will be extended to the east in the second phase, and to the west in the third phase. This approach will concentrate Phase 1 and 2 extraction activities in proximity to the existing macadam plant, access road and the established facilities (car parking, administration buildings and welfare facilities) in the southeast of the site. Phase 3 is located to the northwest of the application area.

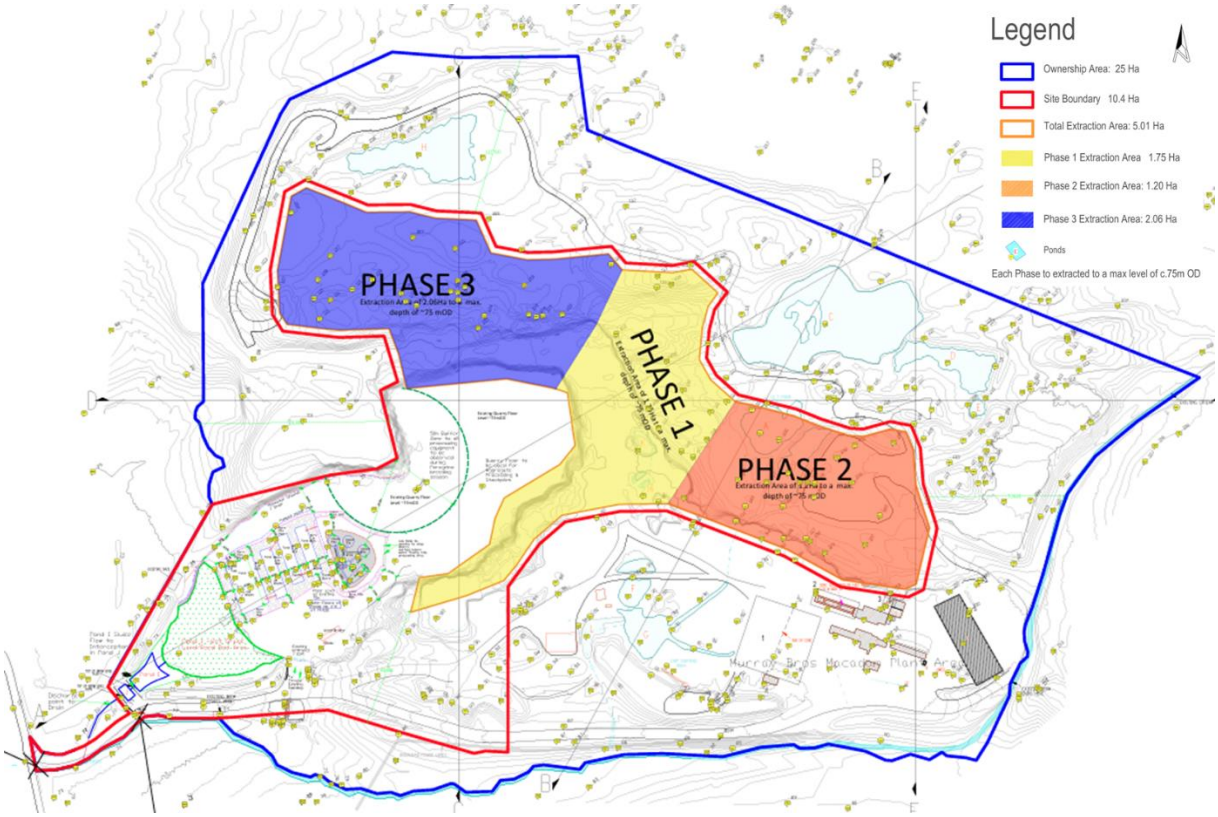


Figure 3-4 Proposed Extraction Area Phasing

The size of the extraction area and approximate duration of each phase are set out in Table 3-1. The phasing strategy is indicative and may be subject to change over the lifetime of the quarry in response to market conditions or other factors.

Phase No.	Extraction Area	Average Depth of Extraction Area (Metres)	Volume (M^3) Est.	Tonnes (millions)	Approx. Duration
Phase 1	1.75ha	25	437,500	1.14	6-7 yrs
Phase 2	1.2ha	30	360,000	0.94	5-6 yrs
Phase 3	2.06ha	30	618,000	1.61	6-7 yrs
Totals	**5.01ha**	**20 to 30m**	**1,415,500**	**3.68**	**17-20 yrs**

Table 3.1 Indicative Phasing Strategy for Extraction

3.4.4.4 Water Management

Management of water at the site falls into two categories: (i) surface water collection and discharge; and (ii) process water recycling and top up.

(i) Surface water collection and discharge

The natural topography of the site area means that, except for part of the northwestern area, all the sites surface water flows from the upland areas in the north to the lower ground in the south and southwest. This flow direction has generally been maintained during the period that the quarry has been operating but with some local changes to the sites drainage pattern and discharge locations, especially with the evolution of a number of ponds (Ponds A to L) and surface water management catchment areas (areas A1 to A6) – refer to Chapter 7: Hydrology & Hydrogeology.

Surface water is prevented from directly entering the adjacent boundary stream as the fall of the ground is generally away for the eastern boundary stream and sloping back into the quarry site in most areas. In addition, the presence of a continuous earth berm along the eastern and southern edge of the access road of the quarry works to prevent surface water run-off entering the stream.

Damping down of the roadways and stockpiles using water bowsers and mist sprayers will be used during dry periods to reduce the potential for dust generation around the site and on the tarred access road to the site.

(ii) Process water recycling and top up

Process water on this site is generated by way of the aggregate washing facility, whereby fine dust/clayey material is removed from products, generally single sized aggregates and crushed sand, with the washwater recycled through three settlement lagoons in series which then run to a deeper clean water lagoon for re-use in a closed loop system. Unwashed material is stockpiled for washing and/or brought directly from the main stockpile area. Washed product is stored in various stockpiles, based on product type, in proximity to the washing plant, for loading and despatch.

The need for washing of product is limited and tends to be seasonal in scale. Water loss from the system is to the washed product, and this is primarily to be topped up from groundwater ingress into the deeper clean water lagoon; this ingress is estimated as a likely maximum of 60 cubic metres per day, which is regarded as a small scale abstraction when in operation.

The sealed/lined settlement lagoons are sized to be shallow, relatively long and narrow, in line with best design guidance, including that contained in the EPA Guidelines (2006), to promote settlement of fine material out of suspension. The lagoons will provide approximately 24 hours retention of washwater, before release to the clean water pond. The clean water pond will provide approximately two days of water supply, to ensure continuity in drier periods. As before, top up will primarily be by ingress into the final deeper clean water pond, with a further option of rainwater harvesting from a nearby stormwater channel in drier periods.

There is no reasonable potential for impact from this closed system, and there is no discharge as maximum water levels are self-regulating, based on up to 5 hours of product washing in any day. The washing facility is designed to capture and use stormwater originating in this area, and to positively obstruct the ingress of stormwater from the rest of the site outside the immediate washing facility area.

Lagoons are to be cleaned out by mechanical shovel as and when required, based on visual inspection. Silt from these lagoons will be stored and used in site restoration works.

3.4.4.5 Access

Vehicles will use the existing site entrance at the L4621-9 (‘Hospital Road’) in the southwest of the site. Quarry-related HGV traffic will travel to and from the site via the R587 situated 300m to the west.

Traffic will be managed to allow for staggered vehicular movements distributed as evenly as practical across the day, including during local traffic peak hours.

3.4.4.6 Staff and Hours of Operation

It is intended that the quarrying operations will employ five to six full-time staff and up to six part-time staff. Haulage will generally be carried out using personnel directly employed by Ardcahan Quarry and additional haulage services provided by specialist haulage and logistic companies, as required.

General hours of operation will be as follows:

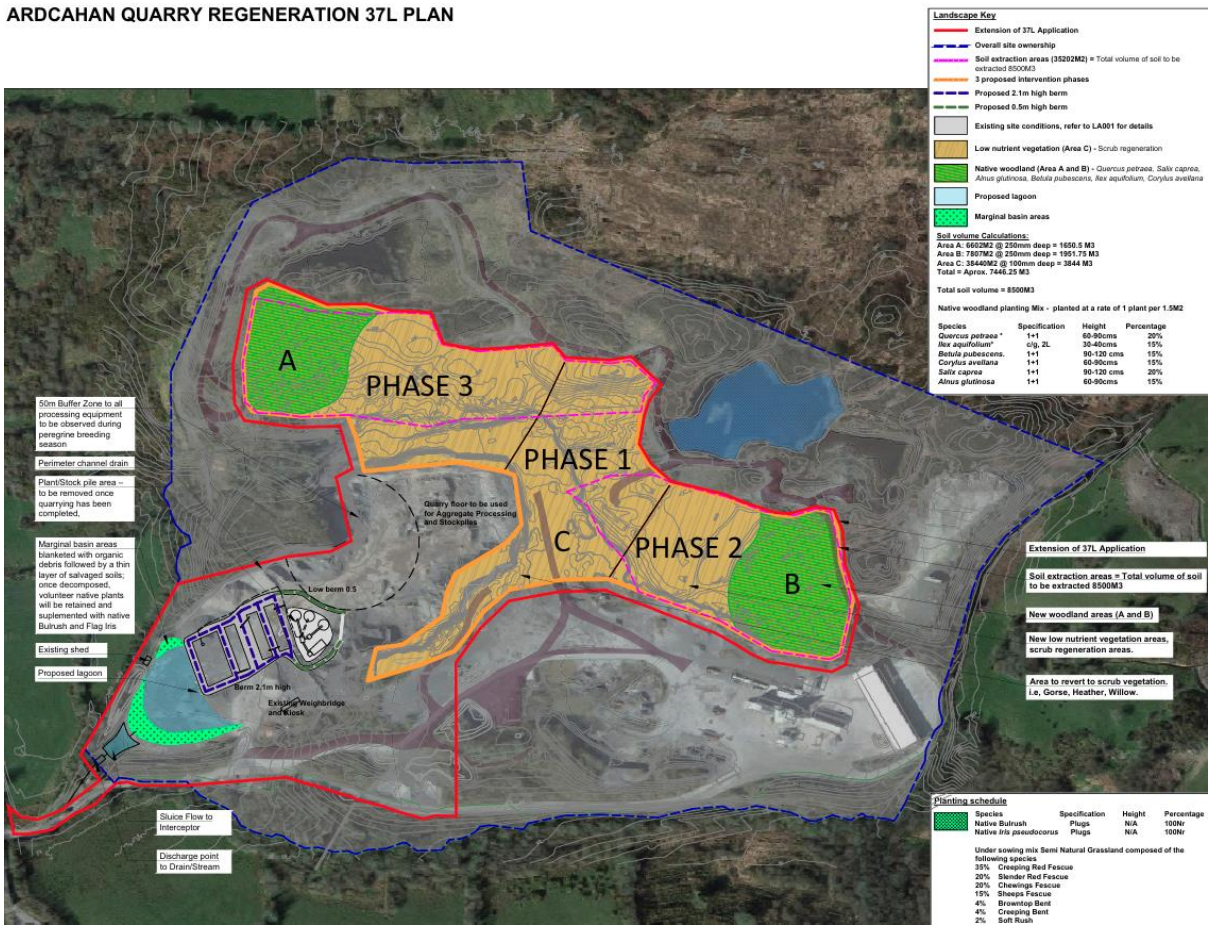
- Loading of vehicles between 7 am and 7 pm, Monday to Friday;
- Quarry processing operations from 8 am to 6 pm, Monday to Friday;
- Saturday quarry processing operations from 8 am to 2.30 pm (loading from 7am);

Blasting operations within 10 am – 4 pm, Monday to Friday, save for emergencies where holes are already loaded.

3.4.5 Decommissioning

Restoration works on site cannot practically include reinstatement to previous ground levels, and the quarry void is to be left open. As part of the decommissioning phase all stockpiles, plant and equipment will be removed and will include the cultivation of two native woodland pockets in the east and west of the proposed quarried area. See Figure 3-5 Diagram of Phasing and Regeneration Plan proposed as part of 37L application. In addition, the settlement ponds on the southwest of the site, will form a seasonal lagoon(s) which will be planted in its margins with native wetland plugs.

Figure 3-5 Diagram of Phasing and Regeneration Plan proposed as part of 37L application



3.5 Project Need

Aggregates are an essential building material for the construction industry. The supply of aggregates facilitates the construction of buildings and infrastructure, which are vital for sustaining economic growth and development. Therefore, quarrying is necessary to satisfy societal need.

Crushed and screened aggregates and associated downstream products such as concrete and bituminous macadam are the most used products by volume/weight in the construction industry, second only to water for societal use.

The strategic location of the quarry serves a substantial area of West Cork and mid-to-south east Kerry. The proposed expansion will ensure that the quarry will contribute to meeting the needs of the construction sector, supplying aggregates to local road, housing, and public infrastructure projects in Cork and Kerry.

Murray Brothers Tarmacadam Ltd

CHAPTER 4
ALTERNATIVES CONSIDERED

VOLUME II
MAIN STATEMENT

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4 Alternatives Considered

4.1 Introduction

Annex IV (2) of the amended EIA Directive requires that an EIAR contain:

'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.'* (Emphasis added)

The EC Environmental Impact Assessment of Projects - Guidance on the preparation of the Environmental Impact Assessment Report (2017) provides an explanation for the term 'Alternatives' stating:

'*Different ways of carrying out the Project in order to meet the agreed objective. Alternatives can take diverse forms and may range from minor adjustments to the Project, to a complete reimagining of the Project*.'

The EPA Guidelines on the information to be contained in Environmental Impact Assessment Reports (May 2022) provide further guidance, defining 'Alternatives' as follows:

'Description of other options that may have been considered during the conception of a project; these include alternative locations, alternative designs and alternative processes.'

4.2 Need for the Project

Murray Brothers Tarmacadam Ltd. is a well-established company local to the Dunmanway area, operating for over 50 years. It has owned the quarry and macadam plant at Ardcahan since 1999. The quarry was previously owned by Cork County Council.

The Quarries and Ancillary Activities Guidelines for Planning Authorities (2004) recognise that aggregates are a significant natural resource and acknowledge the important contribution extractive industries make to economic development in Ireland. The Guidelines also rightly highlight that, by their nature, aggregates can only be worked where they occur, and that sand and stone have a low value-to-weight ratio. It is, therefore, generally more economically viable and environmentally sustainable to limit the distance aggregates must be transported to market.

The National Planning Framework (NPF) is the Government's high-level strategic plan for shaping Ireland's future growth and development until 2040. It provides a framework to guide public and private investment, to create and promote opportunities for people, and to protect and enhance the environment. The first revision of the NPF was published in 2025.

The NPF recognises the national importance of aggregate and mineral extraction and states that these industries are important for the supply of aggregates, construction materials, and minerals to a variety of sectors, for both domestic requirements and export. The NPF notes that aggregates and mineral extractions will continue to be enables where this is compatible with the protection of the environment.

The NPF also recognises the role that sustainable development, including extractive industries, plays in supporting the rural economy, specifically National Policy Objective 30 states the following:

> *Facilitate the development of the rural economy, in a manner consistent with the national climate objective, 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 biodiversity and the natural landscape and built heritage which are vital to rural tourism.*

The NPF includes ambitious targets for housing and enabling infrastructure to meet future demand arising from the roughly one million extra people who will live in Ireland between 2022 and 2040.

Responding to this projected growth will require substantial quantities of raw materials, including aggregates, which are key building materials for the construction sector. Ardcahan Quarry is well-placed to contribute to the supply of essential building materials. It is an established quarry site with an identified reserve of high-quality quartzitic sandstone, adjacent to an existing macadam plant.

Following a grant of permission, it is anticipated the extended quarry will produce up to 5,000,000 tonnes of aggregate (an average of 175,000-200,000 tonnes per annum) over a 20-year period. During its lifetime, operation of the quarry will provide economic benefits to the area by generating direct employment opportunities and indirectly through the appointment of contractors to provide additional services such as haulage and blasting.

The proposed extension to the quarry will enable supply of high-quality aggregate material to construction/building sites, agriculture, and local authorities for the maintenance and construction of new roads, and to the existing macadam plant. The project will therefore contribute to the delivery of new housing, development and infrastructure, all of which are critical to meet the needs of our growing population and ensure Ireland's continued economic competitiveness.

With the economic viability of quarries largely dependent on limiting travel distance to market, a grant of permission for the proposed quarry extension would increase the availability of high-quality locally sourced aggregates, contributing to the future affordable supply of building materials in Cork and neighbouring Counties.

Increased availability of locally sourced aggregates in County Cork will also be beneficial for climate, reducing the distance that would otherwise be travelled by HGVs delivering to construction sites and building suppliers in the surrounding area, thereby reducing the greenhouse gas emissions associated with the sourcing aggregates in Cork.

This reduction in greenhouse gas emissions is critical as Ireland works towards meeting its legally binding carbon budget and sectoral emissions targets. The 2025 Climate Action Plan includes a target of 20% reduction in total vehicle kilometres travelled relative to business-as-usual and a 50% reduction in fuel usage. Thus, the need for this project is further established by virtue of its location and the economic and environmental imperative to limit the distance which must be travelled to deliver aggregates to market.

This project is therefore considered compatible with national policy objectives aimed at supporting

sustainable growth and the rural economy.

4.3 Consideration of Alternatives

4.3.1 Do Nothing Alternative

A Do-Nothing Alternative would result in the quarry remaining in its current state, not operational and not extracting any additional aggregates from the area.

The existing steep quarry faces, and open excavated areas would remain as they are, and there would be no further extraction of the large accessible bedrock. Construction activities in the surrounding area would need to source materials from an alternative quarry, likely resulting in longer distances travelled and increased traffic.

In time a Do-Nothing Scenario may result in recolonisation of the land by vegetation and resulting in a long-term improvement on the current biodiversity on the land. However, without the proposed regeneration landscape plan being implemented, the natural recolonization would take longer and may result in the invasive species on site negatively impacting the native ecology. It is noted that the concurrent substitute consent (SC) application includes a remediation plan to manage and improve the biodiversity on the site, which will be implemented if the SC application is granted.

4.3.2 Alternative Locations

The proposed development consists of an expansion of an existing quarry and therefore the potential for alternative locations is not as relevant as a greenfield site.

The location of quarries is limited by the proximity to sensitive receptors, the availability of material for extraction, and the surrounding transport network. These factors reduce the possibility of relocating a quarry or establishing new quarries. The 2004 Quarries and Ancillary Activities Guidelines notes that there will be a continuing need for some need or expanded aggregate quarrying operations to meet regional and local requirements.

The existing Ardcahan quarry is strategically located within West Cork, to the north of Dunmanway. As shown in Figure 4-1, the quarry location is approximately 20km of Macroom, Clonakilty, Rosscarbery, Bandon, Skibbereen, and Bantry and is located 40km from Cork City.

Therefore, the quarry location, combined with the existing road network, provides clear access to quarried aggregates for construction within these main towns and key villages in West Cork and the wider Cork area. This ensures that any construction within the area has access within a relatively short distance for key construction materials to support the ongoing construction and development of the city, towns and villages.

This strategic location will allow the sustainable transport of aggregates/materials to construction sites within the West Cork and wider area, which will contribute towards Ireland meeting the carbon budget and emissions targets by reducing the distance required to travel between quarries and construction sites.

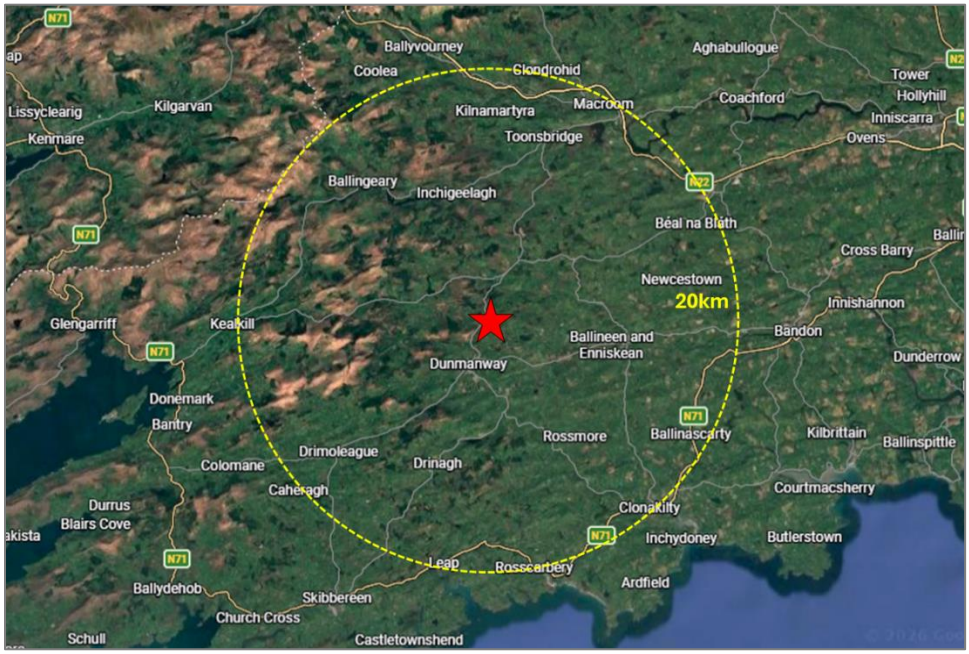


Figure 4-1 Location of site (red star) within West Cork

4.3.3 Alternative Expansion and Alternative Layout

Several alternative expansions and layout options were considered while preparing this application. The layout and proposed expansion options have been informed by the existing site topography, the location of resources on site, the existing vegetation (e.g. heath) and woodland areas, ponds/lagoons, the watercourse to the south, and the existing macadam plant on the site.

These elements have all been carefully assessed and it is considered that the final chosen layout represents the most appropriate layout/expansion of the quarry which provides a balance between access to aggregates and the protection of habitats and biodiversity.

4.3.3.1 Alternative Layout 1 – December 2023

The first alternative layout included 4 phases, as set out in Figure 4-1, with a total of 7.01ha of extraction area was included across the following 4 phases as follows:

- Phase 1 =2.67ha
- Phase 2 = 1.56ha
- Phase 3 =1.55ha
- Phase 4 = 1.23ha

This layout included an average depth of 30m across phases 1-3 and approx. 15m in phase 1.

The proposed expansion of the extraction area was designed to connect with the existing quarry floor in the south-west corner of the site, and the existing macadam plant in the south-east corner.

The proposed extraction area avoided the existing ponds to the north of the site (which were proposed to be maintained to promote biodiversity) and also included a minimum 10m buffer/separation distance to these ponds. The land between the larger ponds to the north was identified for natural regeneration.

The extraction area also avoided the existing lagoons to the south (adjoining and used as part of the macadam plant) and the watercourse and woodland along the southern boundary. The lands along the eastern and western boundaries were also excluded from the proposed extraction area to ensure access around the extraction area remained possible within the site boundary. This also allowed these areas to be identified for natural regeneration.

This first layout took into account the site constraints and the survey detail available at the time. Further survey work completed as part of this EIAR, resulted in further refinement of the expansion layout. The western part of the proposed Phase 1 included the removal of rock outcrop which was later found to host peregrine. This area was excluded from the further iterations of the layout.

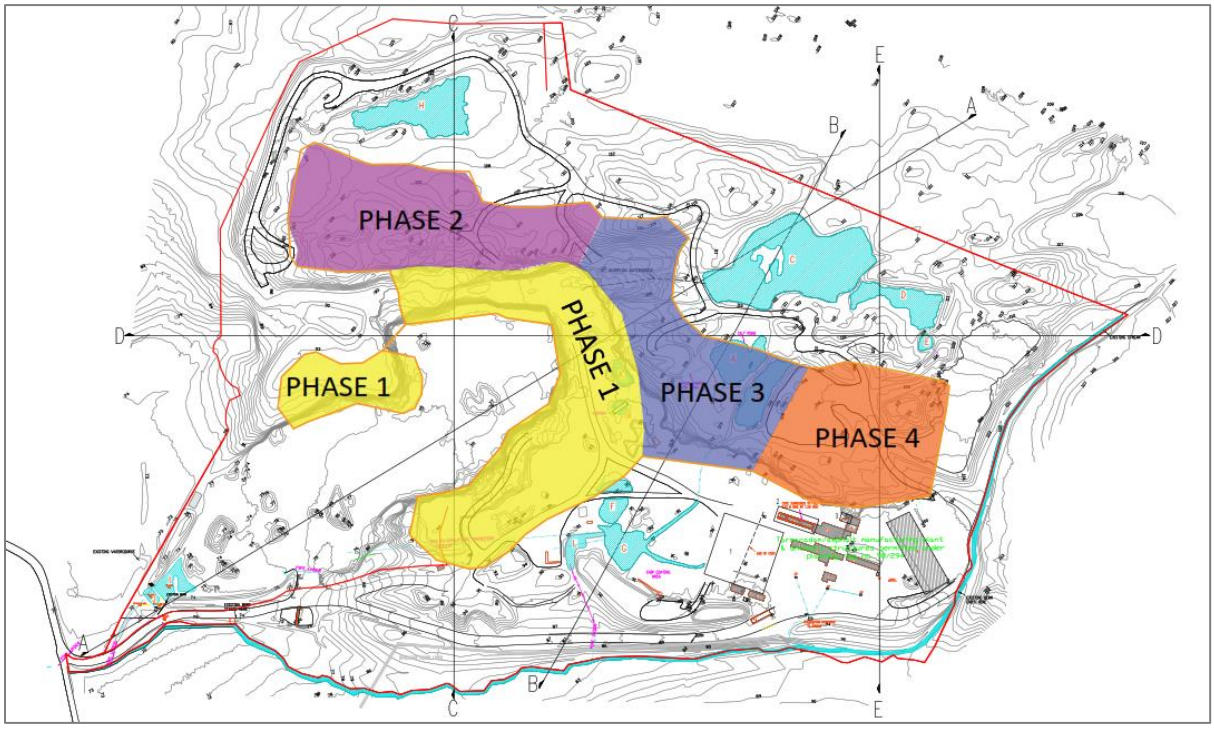


Figure 4-2 Layout Option 1 (December 2023)

4.3.3.2 Alternative Layout 2 – February 2025

The second alternative layout, shown in Figure 4-2, developed from Alternative Layout 1, following and informed by further survey work completed by the project ecologists and additional detailed review by the design team. This layout included a reduced extraction area of 5.36ha in 3 phases as follows:

- Phase 1 =1.75ha
- Phase 2 = 1.55ha
- Phase 3 =2.06ha

Phase 1 was amended from the Alternative Layout 1 and included a reduced area, focused on the central part of the proposed extraction area.

The part of Phase 1 which was located to the west of the quarry floor in Alternative Layout 1 has been removed in this second alternative layout. This area was removed from the proposed extraction area

to allow a 50m buffer to be provided to all processing plant and equipment associated with the existing macadam plant. In addition, further surveys identified that the Phase 1 area in Alternative 1 was found to host peregrine and historic woodland. The revised phasing in this Alternative 2 avoids these areas.

Phase 2 was proposed to the east of the site, and the extent of the extraction area was further reduced to provide additional space for regeneration in this area.

The western part of the extraction area included Phase 3 and the extent of the extraction on this site of the site has also been amended slightly to retain additional areas of existing woodland and provide additional regeneration areas.

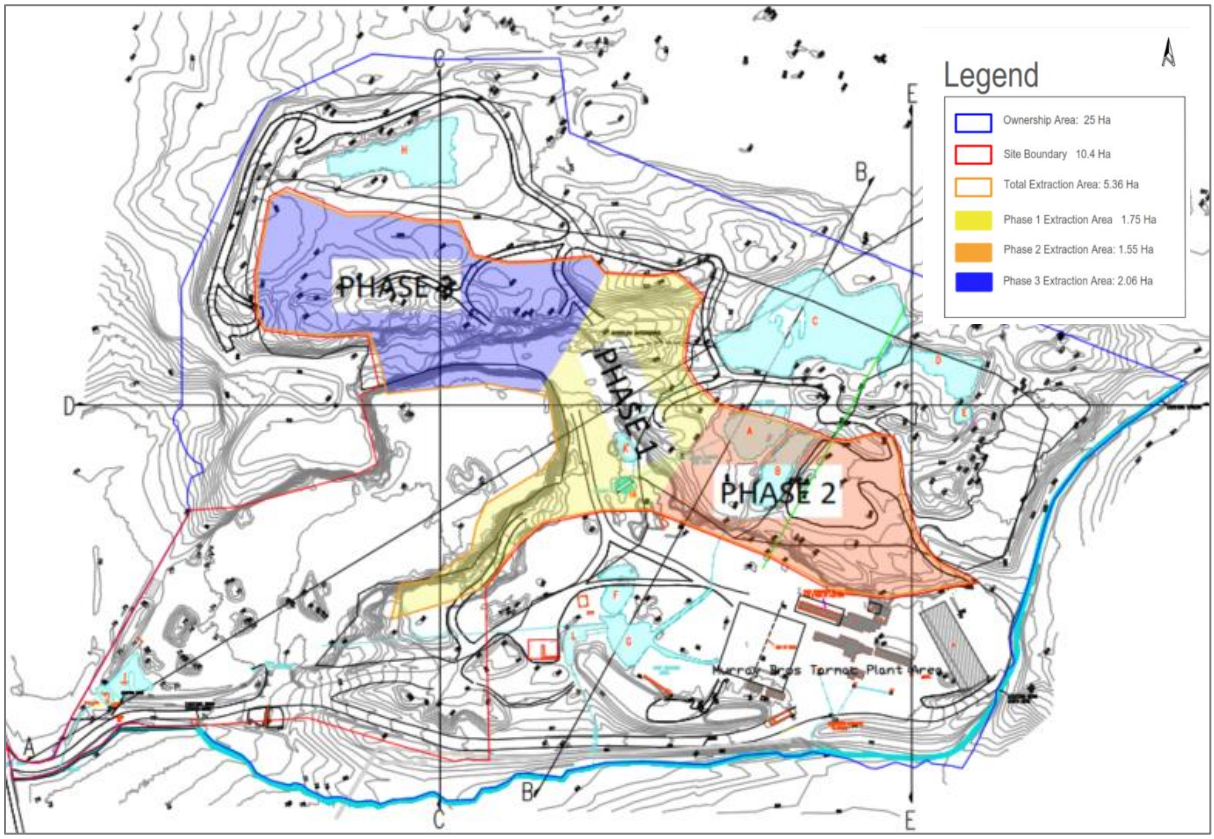


Figure 4-3 Layout Option 2 (Feb 2025)

4.3.3.3 Alternative Layout 3 – Chosen Layout

Following additional detailed design and surveys, the extraction area was amended to provide Alternative Layout 3 – the chosen layout and extraction area – which is considered to be appropriate to the planning term of 20 years.

This layout includes three phases, similar to Alternative Layout 2, with phase 2 reduced from 1.55ha to 1.20ha. Phases 1 and 3 largely remain the same as in Alternative Layout 2.

The total extraction area in this layout is 5.01ha, as follows:

- Phase 1 =1.75ha
- Phase 2 = 1.20ha
- Phase 3 =2.06ha

The reduction in Phase 2 (compared to Alternative Layout 2), provides further separation distances to the macadam plant to provide space for regeneration areas to the east of the site and provides appropriate buffers to the vegetation there.

The final layout includes generous separation distances to the areas of heath, forestry and larger ponds/lagoons to the north. A 50 metre buffer zone is also provided to the peregrine nesting site on the western part of the site with the existing quarry floor utilised for aggregate processing, stockpiles and man-made ponds/lagoons for water management/recycling.

This final layout also corresponds better than the previous alternatives with the 20 year planning permission period.

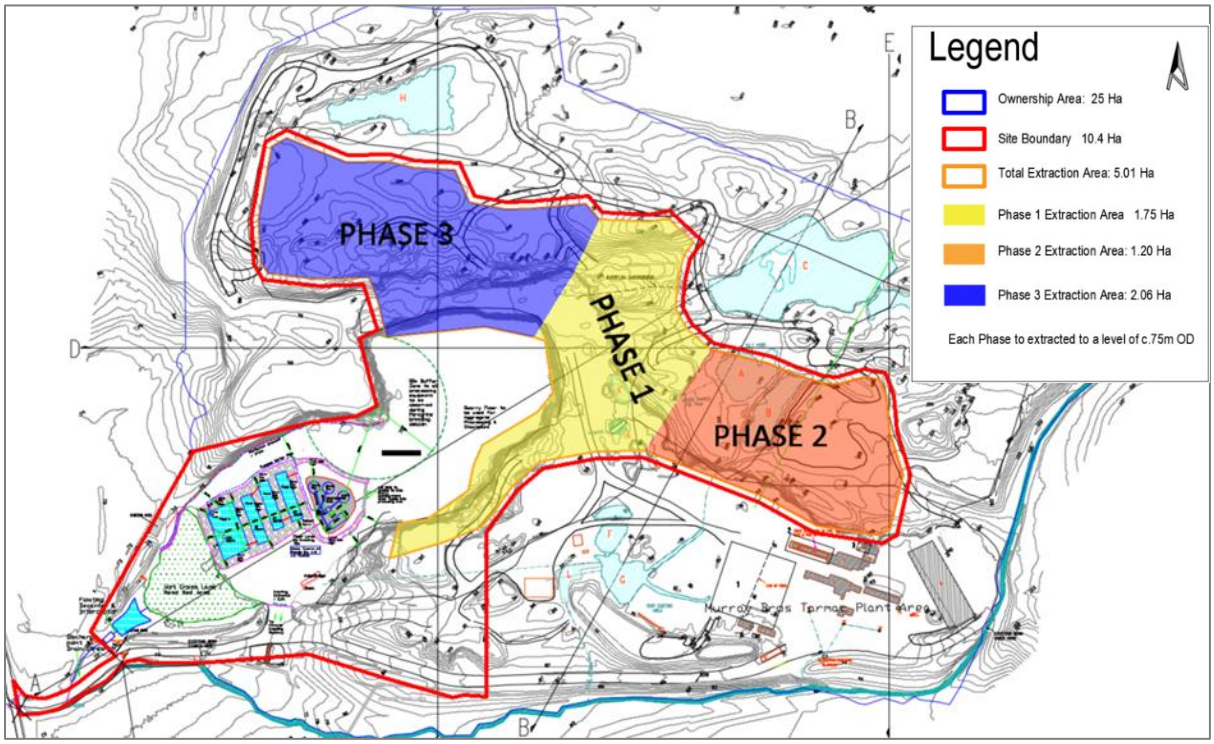


Figure 4-4 Layout Option 3 - Proposed Extraction Area and Phasing

4.3.4 Alternative Uses

Once no longer operational, quarries can be repurposed for other uses including adventure centres, walking trails, and habitats for wildlife. The Ballyhass Adventure Centres in Mallow and Coachford, Co. Cork and the Carrigfoyle Quarry Trail in Co. Wexford are two examples where disused quarries were repurposed once they were no longer operational and viable.

Although a similar alternative use(s) may be implemented on the site in time, it is not appropriate for the site to be repurposed while there are still valuable aggregates on the site that can be extracted and used for construction purposes.

4.4 Difficulties Encountered

There have been no difficulties encountered as part of the preparation of this EIAR chapter. However,

it is noted that the nature of the proposed development limits the scope for alternatives to be considered.

Murray Brothers Tarmacadam Ltd

CHAPTER 5
POPULATION AND HUMAN HEALTH

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5 Population & Human Health

5.1 Introduction

The Environmental Protection Agency (EPA) Guidelines on the Information to be contained in Environmental Impact Assessment Reports (2022) advise that "in an EIAR, the assessment of impacts on population and human health should refer to the assessments of those factors under which human health effects might occur, as addressed elsewhere in this EIAR e.g. under the environmental factors of air, water, soil etc."

This chapter addresses the likely significant environmental impacts of the proposed development on population and human health. It is noted that other chapters of the EIAR also deal with likely significant environmental effects on population and human health arising from traffic and transportation, air quality and climate, noise and vibration, landscape and visual, material assets: utilities and the risk of major accidents and/or disasters and those chapters should be referenced in conjunction with this chapter of the EIAR.

5.2 Author Information and Competency

This chapter was prepared by Martina Keenan Rivero of McCutcheon Halley Chartered Planning Consultants. Martina holds a BSc (Hons) in Spatial Planning from Technological University Dublin and an Advanced Diploma in Planning and Environmental Law from Kings Inns. She has 10 years of professional experience in both the public and private sector. Martina has coordinated the preparation of Environmental Impact Assessment Reports for a range of project types. Relevant experience includes large housing developments, mixed-use schemes, commercial and tourism projects, including the following developments that received permission:

- Southwest Gate – A mixed-use scheme across 13 blocks comprising 1,123 residential units with supporting amenities, retail units, office accommodation, a primary healthcare centre, gym, cultural centre, childcare facility, hotel and a series of public open spaces.
- Primark Distribution Centre – Construction of a Distribution Centre incorporating office floor space and ancillary buildings with a cumulative gross floor area of approx. 64,550 sq.m and associated site works.
- Oscar Traynor Road – Construction of 853 residential units (social, affordable and cost rental homes), together with a creche, retail unit/café, community facilities and a new public park.
- Inis Cealtra Visitor Experience - Proposed Visitor Centre and associated visitor facilities at Inis Cealtra (Holy Island) and Mountshannon Village, Co Clare.

5.3 Proposed Development

A full description of the proposed development is provided in Chapter 3 of this EIAR. The Planning Statement prepared by McCutcheon Halley Planning should also be referred to for further details.

In brief, the proposed development involves extending the extraction area of the existing quarry by 5.01 hectares to facilitate extraction of quartzitic sandstone and siltstone. A 20-year permission is sought with the aim of producing an estimated annual output of 175,000 to 200,000 tonnes of

aggregates, up to a maximum of 225,000 tonnes depending on market demand.

5.3.1 Aspects Relevant to this Assessment

Aspects of the proposed development relevant to this chapter include the potential impacts on human beings (the population), economy and employment, tourism, and human health.

5.4 Methodology

The Guidelines on the Information to be contained in Environmental Impact Assessment Reports (EPA, 2022) state that:

'... in an EIAR, the assessment of impacts on population and human health should refer to the assessments of those factors under which human health effects might occur, as addressed elsewhere in the EIAR e.g. under the environmental factors of air, water, soil etc.'

Recital 22 to the EIA Directive provides that;

"In order to ensure a high level of protection of the environment and human health, screening procedures and environmental impact assessments should take account of the impact of the whole project in question, including, where relevant, its subsurface and underground, during the construction, operational and, where relevant, demolition phases".

The EPA advice notes (2003 and 2015) recommend consideration of the following issues when assessing the potential impacts and effects of a development on population and human health;

- Economic Activity likely to lead to projects - will the development stimulate additional development and/or reduce economic activity, and if either, what type, how much and where?
- Social Consideration - will the development change the intensity of patterns and types of activity and land use?
- Land-use - will there be severance, loss of rights of way or amenities, conflicts, or other changes likely to ultimately alter the character and use of the surroundings?
- Tourism – will the development affect the tourism profile of the area?
- Health – have the vectors through which human health impacts could be caused been assessed, including adequate consideration of interrelationships between those assessments.

The site does not have any intrinsic tourism value and is not in proximity to any important tourism or amenity resources. Potential impacts on tourism will therefore be assessed under Economic Activity.

Consultations with both the local authority and statutory bodies were also used to ensure that environmental issues, including socio-economic, recreational and amenity issues relating to the development were addressed.

5.4.1 Guidelines & Legislation Relevant to Discipline

This chapter has been prepared having regard to the following guidelines:

- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (Environmental Protection Agency, 2022);

- Advice Notes for Preparing Environmental Impact Statements (EPA, draft September 2015);
- Guidelines on the Information to be Contained in Environmental Impact Statements (EPA, 2002);
- Advice Notes on Current Practice in the Preparation of Environmental Impact Statements (EPA, 2003).

The general EIA legislation and guidance documents are listed in Chapter 1 Introduction and impacts of potential significant environmental effects are assessed in accordance with the rating criteria set out in the Chapter.

To inform this specific Chapter, a number of publications and other data sources were consulted, including:

- National Planning Framework First Revision (2025)
- Southern Regional Spatial and Economic Strategy 2020-2032
- Cork County Development Plan 2022-2028
- Central Statistics Office (CSO) website (cso.ie)
- GeoDirectory-GeoFindIT App
- EPAs Air Quality Mapping Tool at www.airquality.ie
- Pobal website https://maps.pobal.ie/
- Health and Safety Authority website (hsa.ie)

5.5 Study Area

A study area has been identified within which data has been collected to inform this assessment. There are no guidelines that stipulate the zone of influence of the study area. Professional judgement is used and the rationale for the selection of the study area is based upon identifying a suitably large area to understand the population profile in the local area and other factors such as economy and employment.

The study area incorporates the Electoral Division (ED) in which the proposed development site is located (Aultagh ED), and the 3 bordering EDs. The furthest distance between the centrepoint of the site and an external ED boundary (Coolmountain ED) is approximately 9.7km. The size of the study area has been informed by the character of the surrounding area which is characterised predominantly by agricultural and rural lands and one-off residential development (i.e. it is not a densely populated area).

The 3 EDs adjoining the Aultagh ED are shown in the Figure below, which include: Coolmountain, Dunmanway and Manch ED.

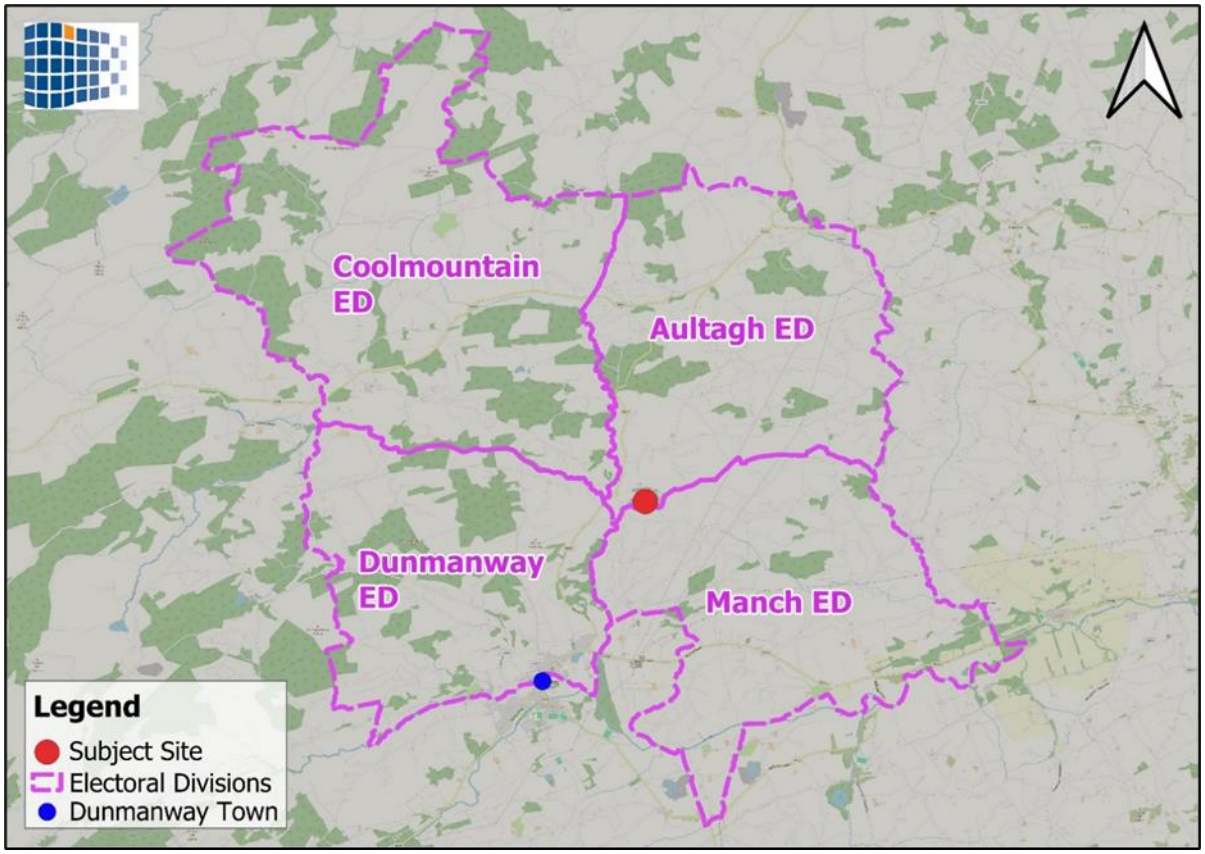


Figure 5-1 Study Area: Electoral Divisions surrounding the quarry at Ardcahan (Source: MHP GIS Team)

5.6 Difficulties Encountered

No difficulties were encountered accessing information during the preparation of this chapter.

5.7 Description of Receiving Environment

The following provides a description of the receiving environment, with a focus on demographics, land use, and local amenities. A detailed description of the project is provided in Chapter 3.

The assessment of the effects on population and human health refers to those environmental topics under which human health effects may occur (e.g., noise, water quality, air quality, etc.). Specific sections of this EIAR provide the baseline scenario relevant to the environmental effect being assessed.

5.7.1 Population and Settlement Patterns

The site is located in a rural landscape, characterized by a dispersed settlement pattern and relatively low population density. The nearest dwellings are located approximately 370m south, 275m west, 540m north, and 680m east of the proposed development. Figure 5-2 shows the locations of the site in the rural landscape.

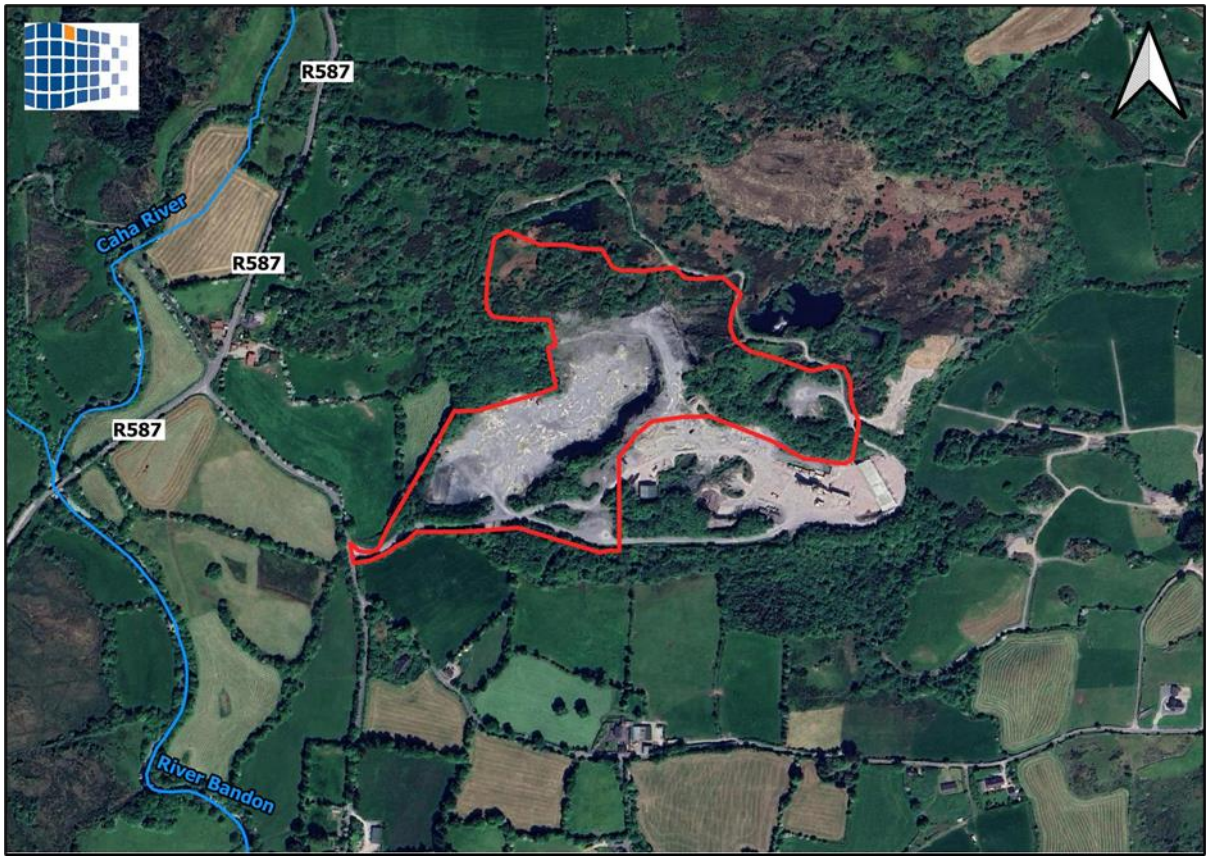


Figure 5-2 Site Context (Source: MHP GIS Team)

The site is located within the Dunmanway Town Greenbelt which has been established to prevent sprawl and control linear roadside (mainly residential) development. Therefore, it is expected that there will be limited additional residential development within the vicinity of the subject site.

The nearest town centre is Dunmanway which is 4.6km from the proposed development and is limited in terms of its service and employment provisions. The current employment trends nationally show that workers in the tertiary sector are migrating to larger urban centres for employment, and the trend would be expected to be similar in West Cork.

5.7.2 Land Use

The majority of the proposed development site is zoned 'Greenbelt 1', in accordance with the Cork County Development Plan 2022-2028 (CCDP), see Figure below. The objective of this zoning is to discourage new individual housing within the greenbelts around the main towns. Restriction is relaxed in principle for some individuals in accordance with objectives of the plan - RP 5-4, RP 5-16 and RP 5-17 etc.

The northern portion of the site is located outside the greenbelt.

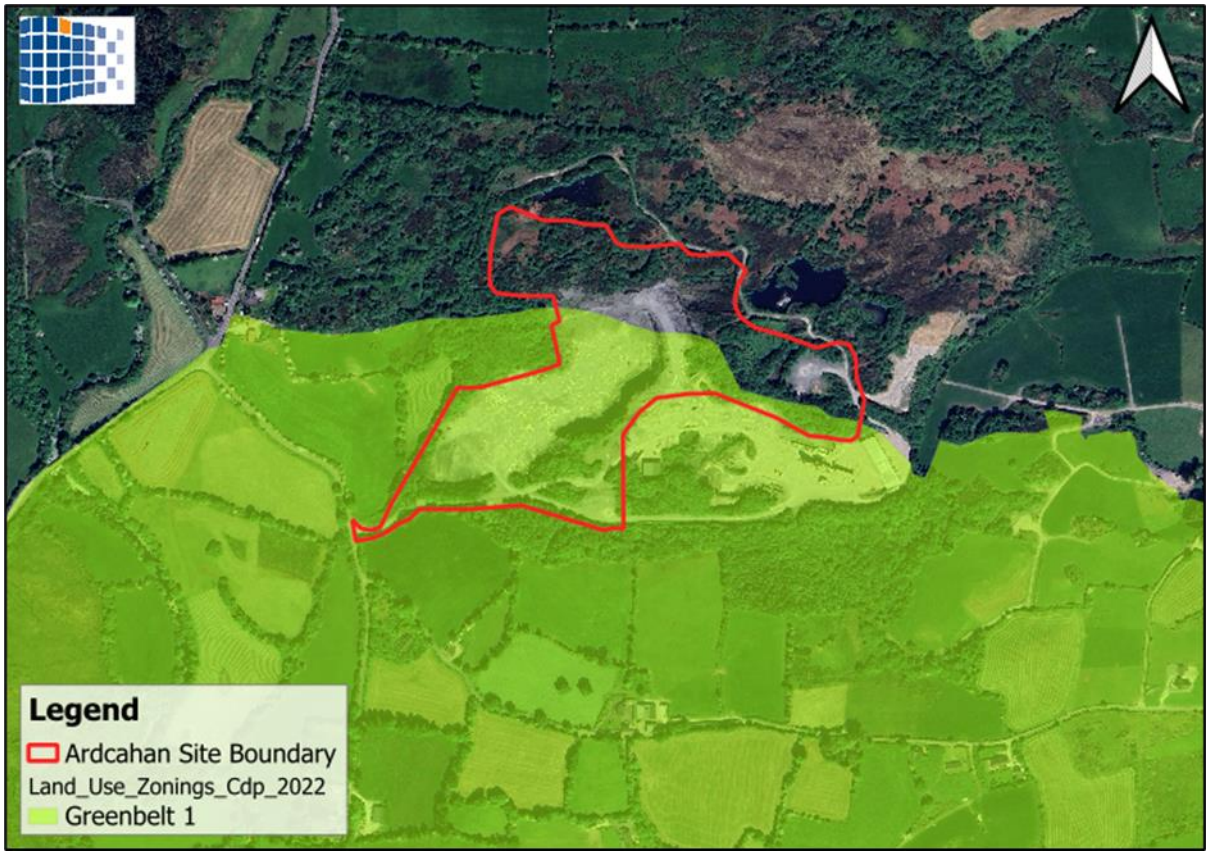


Figure 5-3 Site Zoning from Development Plan. Site Outlined in Red.

5.7.3 Surrounding Land Uses

The subject site is situated in a rural landscape, characterised by a dispersed settlement pattern and relatively low population density. Lands immediately surrounding the site are characterised predominantly by agricultural lands, residential uses in the form of single, one-off dwellings, and mature vegetation. The nearest dwellings are located approximately 370 m south; 275 m west; 540 m north and 680 m east of the proposed development. Figure 5-4 contextualises the application area in terms of its proximity to relevant receptors surrounding the subject site.

In terms of amenities, the study area is relatively secluded and offers minimal services or community facilities. The closest service is the Bluebell Cottage/Waterfall Guesthouse which is located 1.6km from the subject site. The other two services in the vicinity are Funmanway Adventure Land and Dunmanway Community Hospital which are 4.6km and 2.4km respectively. There are a number of walking and cycling trails[1] located to the west of the Quarry, which are concentrated around Nowen Hill (c. 10km to the west) and Pipe Hill (c. 10km to the north-west).

[1] https://explorewestcork.ie/walking/dunmanway-hill-walking-trails/



Figure 5-4 Aerial image displaying the amenities in the vicinity of Ardcahan Quarry. Source: Google maps, accessed January 2022

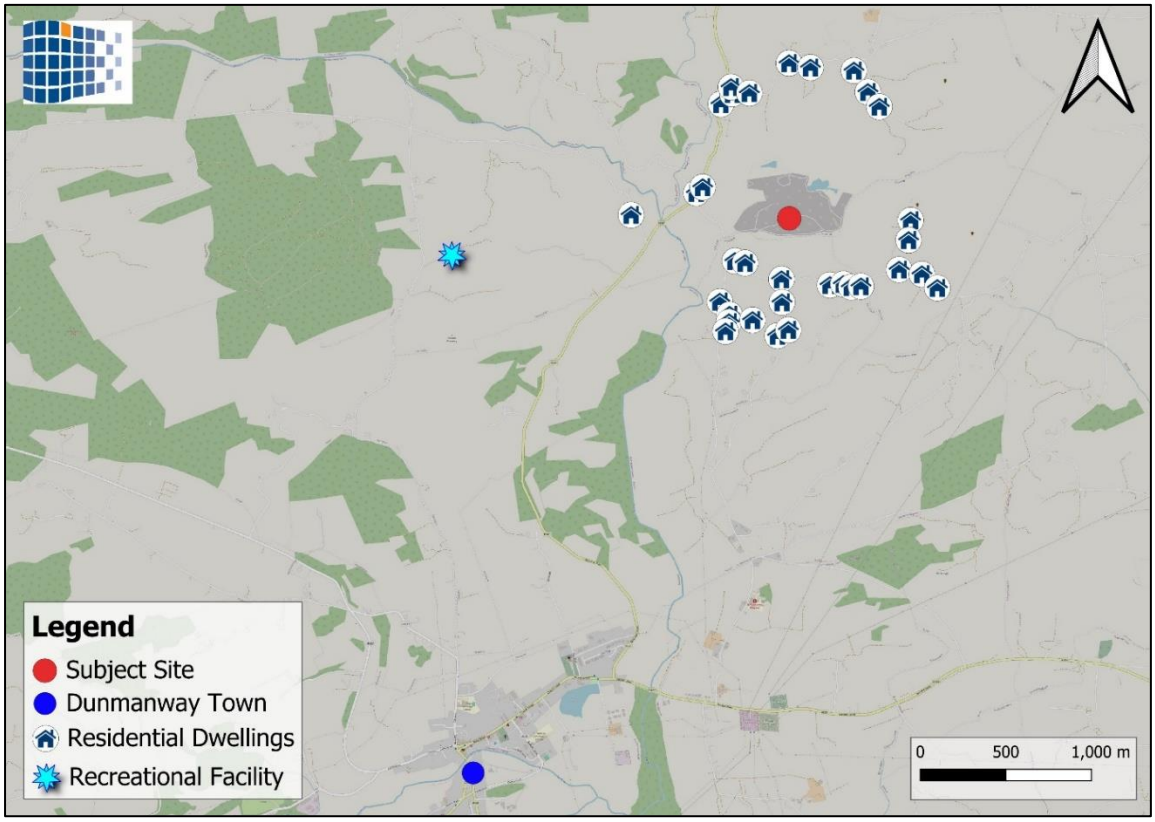


Figure 5-5 Locations of residential properties and activities in proximity to the Ardcahan Quarry.

5.7.4 Population

The CSO data shows that population of the study area (i.e. all 4 EDs combined) was 2,678 persons in 2022. This represents an increase of 258 (approx. 10.66%) from the 2016 Census, higher than the increase in County Cork and the State in the same period (8% and 8.13% respectively).

Table 5-1 Electoral Divisions, County Cork & Wider Area Population (Source: CSO)

ED Name	2011 Population	2016 Population	2022 Population	Change 2016-2022	% Change 2016-2022
Aultagh ED	335	357	381	24	6.5%
Coolmountain ED	429	430	435	5	1.16%
Dunmanway North ED	1087	1050	1264	214	18.49%
Manch ED	596	583	598	15	2.57%
Total (Study Area)	**2447**	**2420**	**2678**	**258**	**10.66%**
County Cork (Excludes Cork City)	399,802	333,460	360,152	26,692	8%
Ireland	4,588,252	4,761,865	5,149,139	387,274	8.13%

Table 5-2 provides an indication of the population density of the study area between 2011 and 2022. The density for Coolmountain and Manch has remained roughly the same between 2011 to 2022, while Aultagh and Dunmanway North has experienced a steady increase in population density over time. The figures for Dunmanway North are consistently higher as the ED overlaps with the north-west of Dunmanway town.

The average population density for the state decreased from 65.2 per sq. km in 2011 to 52 in 2022. The average population density for the total study area of c. 107 sq. km was 28. Overall, the figures for Aultagh, Coolmountain and Manch indicate a sparse population. This aligns with characteristics of rural areas where population densities are typically lower due to larger land areas and less urban development.

Table 5-2 Population density – persons per square kilometre

ED	2011	2016	2022
Aultagh (Area = c. 24sq km)	13.4	14.3	16
Coolmountain (Area = c. 36sq km)	11.9	11.9	12
Dunmanway North (Area = c. 22sq km)	49.4	47.7	57
Manch (Area = c. 25sq km)	23.8	23.7	24
Total (Area = c. 107 sq. km)	**22.2**	**22.0**	**28**
Co. Cork (Area = c. 7,500sq km)	53.3	55.6	48[2]
Ireland (Area = 70,265 sq. km)	65.2	70	73

5.7.5 Housing and Households

Between 2011 and 2022, average household sizes across Aultagh, Coolmountain, Dunmanway North, Manch, County Cork, and Ireland remained relatively stable, ranging from 2.5 to 3.2 persons per household, with slight variations.

Manch consistently had the largest average household size, maintaining 3.2 persons in 2011 and 2016, before a marginal decline to 3.1 in 2022.

Aultagh also had larger households, dipping to 2.8 in 2011 but increasing to 3.0 in 2016 and 2022.

Coolmountain and Dunmanway North had smaller households, with Coolmountain stable at 2.7–2.8 and Dunmanway North ranging from 2.5–2.6, the lowest among the areas.

County Cork and Ireland both saw stable averages of 2.8 from 2011 to 2016, with Ireland slightly declining to 2.7 in 2022, aligning with expected national trends of gradual household size reduction.

The study area's total average household size remained steady at 2.8 across all three years, reflecting limited overall change in settlement patterns.

[2] This drop is density in the 2022 census, is due to sections of the northern and southern environs of Cork City being subsumed as part of the City's administrative (and census) area in 2019.

Table 5-3 Changes in average household size for EDs, Cork County and State between 2011 and 2022 (figures rounded)

Area	Average Household Size (%)		
	2011	**2016**	**2022**
Aultagh	2.8	3.0	3.0
Coolmountain	2.7	2.7	2.8
Dunmanway North	2.6	2.5	2.6
Manch	3.2	3.2	3.1
Total	**2.8**	**2.8**	**2.8**
Co. Cork	2.8	2.8	2.8
Ireland	2.8	2.8	2.7

5.7.6 Affluence and Deprivation

The Pobal Deprivation Index is Ireland's most widely used social gradient metric, which scores each Small Area (SA comprises 50 – 200 households) in terms of affluence or disadvantage. The EDs typically overlap the SAs, and an Electoral Division may incorporate a number of SAs. Information is available at ED level for 2011, 2016 and 2022. The index uses information from Ireland's census, such as employment, age profile and educational attainment, to calculate this score.

Table 5-4 Pobal Deprivation Indices and Description for the study area for 2011 to 2022.

Area	Indices and Categorisation		
	2011	**2016**	**2022**
Aultagh	Marginally Below Average (-0.07)	Marginally Below Average (-0.58)	Marginally Below Average (-0.86)
Coolmountain	Marginally Below Average (-5.73)	Marginally Below Average (-6.81)	Marginally Below Average (-5.12)
Dunmanway North	Marginally Below Average (-2.67)	Marginally Below Average (-5.49)	Marginally Below Average (-3.54)
Manch	Marginally Below Average (-2.07)	Marginally Above Average (0.18)	Marginally Below Average (-1.01)

Figure 5-5 below shows the level of affluence and deprivation at the ED level, according to the Pobal Haase Relative Deprivation Index. Scores range from -35 (Extremely Disadvantaged) to +35 (Extremely Affluent).

The overall score for the ED's of Aultagh, Coolmountain, Manch and Dunmanway North following the 2022 census was classed as being 'marginally below average.'

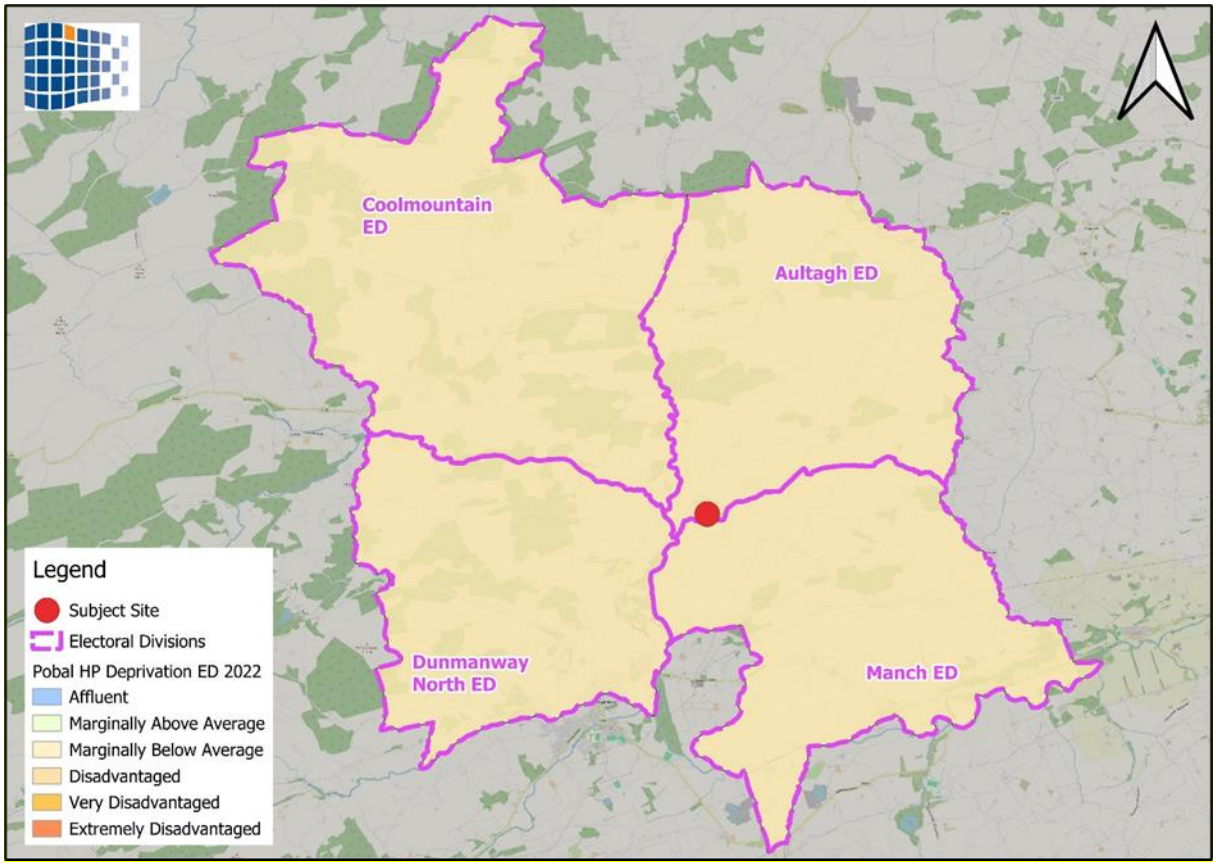


Figure 5-6 Deprivation Index (Source: MHP GIS Team)

5.7.7 Economic Activity

The nearest town centre is Dunmanway, which is 4.6km from the development and is limited in terms of its service and employment provisions. Current employment trends nationally show that workers in the tertiary sector are migrating to larger urban centres for employment, and the trend is expected to be similar in West Cork.

5.7.7.1 Principle Status

'Principal Status' indicates the percentage of the total population (of working age) in an area categorized as at work, unemployed, looking for their first job, retired, unable to work, student, looking after family, or other.

Between 2011 and 2022, Aultagh recorded the highest employment rate among the electoral divisions (EDs), County Cork, and Ireland at 57.70%, while Coolmountain and Manch had the lowest at 51.50%.

The study area in 2022 had an employment rate of 54.60%, slightly below Co. Cork's 56.20% and the national average of 56%. The employment rate of the study area in 2016 (50.80%) and 2011 (49%) was also below Cork and the national average.

In 2022, unemployment was lowest in Aultagh (3.40%) and Manch (3.30%) compared to the total ED's rate of 4.60%, with Co. Cork (4.10%) and Ireland (5.10%) showing slightly higher rates. In comparison,

unemployment was lowest in Manch (4.30%) in 2016 compared to the total ED's rate of 7.40% with Co. Cork (5.10%) and Ireland (10.80%) also showing higher rates. In 2011, unemployment was lowest in Aultagh (6%) in comparison to the total ED's (9%), with Cork (9%) and Ireland (12%) significantly higher.

Manch had the highest proportion of students in 2022 among the EDs at 14.20%, surpassing the total ED's average (10.30%), Co. Cork (11.60%), and Ireland (11.10%) which was the same for 2016 and 2011.

In 2022, Aultagh reported the highest proportion of individuals looking after home (12.60%) among the EDs, well above the national average of 6.70% and Co. Cork's 6.90%. In comparison, Manch reported the highest proportion of individuals look after the home in 2016 with 12% which was well above to the Co. Cork average of 8.70% and the national average of 9.40%. In 2011, Coolmountain reported the highest at 12% with the Co. Cork at 10% and the national average at 9%.

Both Aultagh and Manch had a low percentage of individuals unable to work (3.10%), compared to the total EDs (5.20%), Co. Cork (4.90%), and Ireland (4.60%) in 2022. Manch had the lowest percentage of individuals unable to work in 2016 at 12.50% which was below the total ED's (15%), Co. Cork (14.20%) and the national average (12.70%). In 2011 Aultagh had the lowest percentage at 2% which was below the total ED's (5%) and Co. Cork and the national average of 4%.

In 2022, Dunmanway North had the highest retirement rate among the EDs at 17.60%, slightly above the total EDs (16.40%), Co. Cork (15.70%), and Ireland (15.90%). In comparison, Coolmountain had the highest retirement rate among the ED's in 2016 with 6.20% which was higher than Co. Cork (4%) and the national average (4.40%). In 2011, Aultagh had the highest retirement rate at 16%, which was above the total ED's (14%), Co. Cork (12%) and the national average (13%).

The 'Other' category was most prominent in Dunmanway North (1.20%) among the EDs, compared to the total EDs (0.90%), Co. Cork (0.70%), and Ireland (0.70%) in 2022. Earlier census years show lower levels with the highest percentage in 2016 observed in Aultagh (0.4%) compared with the total ED's (0.1%), Co. Cork (0.3%) and Ireland (0.4%) while in 2011, Dunmanway North again recorded the highest proportion (0.2%) compared to the total EDs (0.1%), Co. Cork (0.3%) and Ireland (0.4%).

Table 5-5 Census Results 2022: Principle Economic Status for the EDs of Aultagh, Coolmountain, Dunmanway and Manch and overall percentage change. Statistics for County Cork and Ireland are included for comparison.

Principle Economic Status 2022															
Area	**At Work**		**Unemployed**		**Student**		**Looking after home**		**Unable to Work**		**Retired**		**Other**		**Total Aged 15+**
		%		**%**		**%**		**%**		**%**		**%**		**%**	
Aultagh	169	57.7%	10	3.4%	37	12.6%	23	7.9%	9	3.1%	42	14.3%	3	1%	293
Coolmountain	178	51.5%	19	5.5%	34	9.8%	32	9.3%	22	6.4%	60	17.3%	1	0.3%	346
Dunmanway North	546	53.6%	55	5.4%	81	8%	80	7.9%	65	6.4%	179	17.6%	12	1.2%	1,018
Manch	274	51.5%	16	3.3%	68	14.2%	34	7.1%	15	3.1%	70	14.6%	3	0.6%	480
Total EDs	**1167**	**54.6%**	**100**	**4.6%**	**220**	**10.3%**	**169**	**7.9%**	**111**	**5.2%**	**351**	**16.4%**	**19**	**0.9%**	**2,137**
Co. Cork	264,423	56.2%	19,443	4.1%	54,387	11.6%	32,425	6.9%	22,874	4.9%	73,811	15.7%	3,126	0.7%	470,489
Ireland	2,317,449	56%	210,802	5.1%	459,275	11.1%	275,438	6.7%	189,308	4.6%	657,790	15.9%	27,062	0.7%	4,136,852

Table 5-6 Census Results 2016: Principle Economic Status for the EDs of Aultagh, Coolmountain, Dunmanway and Manch and overall percentage change. Statistics for County Cork and Ireland are included for comparison

Principle Economic Status 2016															
Area	**At Work**		**Unemployed**		**Student**		**Looking after home**		**Unable to Work**		**Retired**		**Other**		**Total Aged 15+**
		%		**%**		**%**		**%**		**%**		**%**		**%**	
Aultagh	146	55%	14	5.3%	31	11.7%	27	10.2%	40	15.1%	6	2.3%	1	0.4%	265
Coolmountain	155	45.9%	41	12.1%	37	10.9%	37	10.9%	47	13.9%	21	6.2%	0	0%	338
Dunmanway North	427	50.4%	65	7.7%	74	8.7%	94	11.1%	142	16.8%	44	5.2%	1	0.1%	847
Manch	231	52.6%	19	4.3%	68	15.5%	53	12%	55	12.5%	13	3%	0	0%	439
Total EDs	**959**	**50.8%**	**139**	**7.4%**	**210**	**11.1%**	**211**	**11.2%**	**284**	**15%**	**84**	**4.4%**	**2**	**0.1%**	**1,889**
Co. Cork	181,717	56.5%	16,460	5.1%	35,933	11.2%	27,965	8.7%	45,612	14.2%	12,926	4%	1007	0.3%	321,620
Ireland	1,841,526	51%	390,677	10.8%	408,838	11.3%	339,918	9.4%	457,394	12.7%	156,993	4.4%	13,316	0.4%	3,608,662

Table 5-7 Census Results 2011: Principle Economic Status for the EDs of Aultagh, Coolmountain, Dunmanway and Manch and overall percentage change. Statistics for County Cork and Ireland are included for comparison.

Principle Economic Status 2011															
Area	**At Work**		**Unemployed**		**Student**		**Looking after home**		**Unable to Work**		**Retired**		**Other**		**Total Aged 15+**
		%		**%**		**%**		**%**		**%**		**%**		**%**	
Aultagh	152	61%	14	6%	20	8%	21	8.4%	5	2%	39	16%	0	0%	251
Coolmountain	141	43%	37	11%	38	12%	40	12%	23	7%	48	15%	0	0%	327
Dunmanway North	402	47%	80	9%	100	12%	93	11%	62	7%	123	14%	2	0.2%	862
Manch	220	50%	38	9%	61	14%	50	11%	11	3%	59	13%	0	0%	439
Total EDs	**915**	**49%**	**169**	**9%**	**219**	**12%**	**204**	**11%**	**101**	**5%**	**269**	**14%**	**2**	**0.1%**	**1879**
Co. Cork	164,441	53%	28,603	9%	32,611	11%	31,071	10%	12,390	4%	37,612	12%	1068	0.3%	307,796
Ireland	1,807,360	50%	424,843	12%	408,838	11%	339,918	9%	156,993	4%	457,394	13%	13,316	0.4%	3,608,662

5.7.7.2 Occupations

Across the study area in 2022, 9.80% were in the agriculture, forestry & fishing industry and 7.90% were in the building and construction industry. These occupations have declined since 2016 and 2011 which saw 15.80% in the Agriculture, Forestry & Fishing industry and 7.90% in the building and construction industry in 2016 and 18% in the Agriculture, Forestry & Fishing industry and 9% in the building and construction industry in 2011.

Overall, the study area has a significantly higher percentage of workers in the agriculture, forestry & fishing industry and the building and construction industry than that of the Co. Cork average and national average across 2022, 2016 and 2011.

Table 5-8 Census results showing the number of persons at work by occupation in 2022 for the EDs of Aultagh, Coolmountain, Dunmanway and Manch.

Persons at Work by Occupation 2022																	
	Agriculture, Forestry & Fishing		Building & Construction		Manufacturing Industries		Commerce & Trade		Transport & Communications		Public Administration		Professional Services		Other		Total
Area		**%**		**%**		**%**		**%**		**%**		**%**		**%**		**%**	
Aultagh	35	20.7%	12	7.1%	38	22.5%	30	17.8%	7	4.1%	7	4.1%	27	16%	13	7.7%	169
Coolmountain	25	14%	17	9.6%	18	10.1%	33	18.5%	10	5.6%	5	2.8%	39	21.9%	31	17.4%	178
Dunmanway North	29	5.3%	44	8.1%	87	16%	107	19.6%	25	4.6%	25	4.6%	107	19.6%	122	22.3%	546
Manch	38	13.9%	28	10.2%	41	15%	56	20.4%	9	3.3%	10	3.7%	55	20.1%	37	13.5%	274
Total EDs	**127**	**9.8%**	**101**	**7.9%**	**184**	**10.6%**	**226**	**10.5%**	**51**	**3.1%**	**47**	**2.2%**	**228**	**19.5%**	**203**	**9.1%**	**1,167**
Co. Cork	10,861	4.1%	15,012	5.7%	46,395	17.6%	57,401	21.7%	20,125	7.6%	12,535	4.7%	64,710	24.5%	37,384	14.1%	264,423
State	82,228	3.5%	134,482	5.8%	273,102	11.8%	552,642	23.8%	212,383	9.2%	131,633	5.7%	568,105	24.5%	365,716	15.8%	2,320,297

Table 5-9 Census results showing the number of persons at work by occupation in 2016 for the EDs of Aultagh, Coolmountain, Dunmanway and Manch.

Persons at Work by Occupation 2016																	
	Agriculture, Forestry & Fishing		Building & Construction		Manufacturing Industries		Commerce & Trade		Transport & Communications		Public Administration		Professional Services		Other		Total
Area		**%**		**%**		**%**		**%**		**%**		**%**		**%**		**%**	
Aultagh	36	24.8%	12	8.3%	29	20%	13	9%	6	4.1%	5	3.4%	32	22%	12	8.3%	145
Coolmountain	41	26.6%	11	7.1%	16	10.4%	29	18.8%	5	3.2%	2	1.3%	31	20.1%	19	12.3%	154
Dunmanway North	27	6.4%	34	8.1%	56	13.4%	87	20.8%	29	6.9%	17	4.1%	103	24.6%	66	15.8%	419
Manch	46	20%	18	7.8%	32	13.9%	49	21.3%	15	6.5%	7	3%	50	21.7%	13	5.7%	230
Total EDs	**150**	**15.8%**	**75**	**7.9%**	**133**	**14%**	**178**	**18.8%**	**55**	**5.8%**	**31**	**3.3%**	**216**	**22.8%**	**110**	**11.6%**	**948**
Co. Cork	11,946	6.6%	10,035	5.6%	29,307	16.3%	39,716	22%	13,343	7.4%	8,409	4.7%	41,819	23.2%	25,315	14%	179,890
State	91,526	5%	87,371	4.8%	209,803	11.6%	456,289	25.2%	146,530	8.1%	113,860	6.3%	425,349	23.5%	276,632	15.3%	1,807,360

Table 5-10 Census results showing the number of persons at work by occupation in 2011 for the EDs of Aultagh, Coolmountain, Dunmanway and Manch.

Persons at Work by Occupation 2011																	
	Agriculture, Forestry & Fishing		Building & Construction		Manufacturing Industries		Commerce & Trade		Transport & Communications		Public Administration		Professional Services		Other		Total
Area		**%**		**%**		**%**		**%**		**%**		**%**		**%**		**%**	
Aultagh	41	27%	14	9%	28	18%	18	12%	10	7%	6	4%	27	18%	8	5%	220
Coolmountain	35	25%	15	11%	17	12%	23	16%	2	1%	4	3%	29	21%	16	11%	141
Dunmanway North	39	10%	37	9%	54	13%	63	16%	24	6%	21	5%	103	26%	61	15%	402
Manch	46	21%	16	7%	24	11%	53	24%	10	5%	9	4%	46	21%	16	7%	220
Total EDs	**161**	**18%**	**82**	**9%**	**123**	**13%**	**157**	**17%**	**46**	**5%**	**40**	**4%**	**205**	**22%**	**101**	**11%**	**915**
Co. Cork	12,424	8%	9,227	6%	26,066	16%	37,600	23%	10,647	6%	8,877	5%	37,754	23%	21,846	13%	164,441
State	91,526	5%	87,371	5%	209,803	12%	456,289	25%	146,530	8%	113,860	6%	425,349	24%	276,632	15%	1,807,360

5.7.8 Health

In 2022, the majority of the population across the study area reported "very good" health and "good" health with similar trends seen in 2016 and 2011.

In Cork County, 55.2% reported "very good" health and 29.5% reported "good" health, slightly above the state average.

Overall, the percentage of the population identifying as being in "bad" or 'very bad' health in 2022 for the entire study area, the county and the state is extremely low, staying under 2.3%.

Table 5-11 General Health of the study area population based on results of 2022 Census.

General Health	State	Cork County	Aultagh ED	Coolmountain ED	Dunmanway North ED	Manch ED
Very Good	53.2%	55.2%	61.9%	52.2%	48.1%	56%
Good	29.7%	29.5%	25.2%	27.4%	25.2%	26.9%
Fair	8.6%	8.2%	7.1%	7.6%	8.8%	8.2%
Bad	1.4%	1.3%	0.5%	2.3%	1.2%	0.3%
Very Bad	0.3%	0.3%	0.5%	0.5%	0.2%	0.0%
Not stated	6.7%	5.6%	4.7%	10.1%	16.5%	8.5%

Table 5-12 General Health of the study area population based on results of 2016 Census.

General Health	State	Cork County	Aultagh ED	Coolmountain ED	Dunmanway North ED	Manch ED
Very Good	60.3%	63.8%	56.4%	58.0%	56.0%	63.3%
Good	28.0%	26.5%	35.2%	24.2%	29.9%	28.0%
Fair	8.0%	6.8%	5.1%	10.5%	10.2%	7.4%
Bad	1.2%	0.9%	0.9%	3.5%	1.0%	0.3%
Very Bad	0.3%	0.2%	0%	0.7%	0.3%	0.2%
Not stated	2.2%	1.8%	2.4%	3.0%	2.7%	0.8%

Table 5-13 General Health of the study area population based on results of 2011 Census.

General Health	State	Cork County	Aultagh ED	Coolmountain ED	Dunmanway North ED	Manch ED
Very Good	59.4%	61%	63.6%	55.3%	55.2%	62.3%
Good	27.6%	27.5%	24.4%	29.5%	30.7%	27.8%
Fair	8.0%	7.9%	9.0%	8.4%	10.6%	7.0%
Bad	1.3%	1.2%	0.6%	1.9%	1.0%	0.9%
Very Bad	0.3%	0.3%	0%	0.7%	0.5%	0.2%
Not stated	3.3%	2.1%	2.5%	4.2%	2.0%	1.9%

5.8 Impact Assessment

The potential impacts of the proposed redevelopment on human beings are assessed under the following headings:

- Economic Activity
- Population and Settlement Patterns
- Land Use and amenity
- Health and Safety

Potential impacts are assessed for the Construction and Operational Phases which can include the following:

Construction Activities are defined as;

- Excavation and removal of topsoil and vegetation;
- Construction of settlement ponds;
- Construction of berm;

Operational Activities are identified as;

- Blasting and drilling;
- Crushing and Screening;
- Stockpiling of overburden;
- Discharge of water to settlement ponds;
- Transportation of aggregates from the site.

Consideration is also given to the 'Do Nothing Scenario' i.e. assuming that the development did not proceed and that the current status of the Ardcahan Quarry was maintained.

According to the Advice Notes on Current Practice in the Preparation of Environmental Impact Statements (EPA, 2003), quarrying has the potential to create significant environmental impacts during operation in terms of traffic, noise, dust, vibration, water pollution, visual intrusion and loss of

groundwater supplies. It can also pose a safety hazard to workers, the public and fauna (farm and wild stock). The impact can be permanent, even after closure and decommissioning, unless carefully planned rehabilitation is undertaken. The potential impacts of these factors are assessed by other disciplines within this EIAR.

5.8.1 Do Nothing Scenario

The 'Do Nothing Scenario' would mean no resumption of quarrying activities, leaving the quarry inactive, with operations having ceased since 2014. The site would continue to host the macadam plant, which is assumed to remain operational. However, the long-term viability of Murray Brothers as a business could be at risk without the quarry's aggregate supply, potentially undermining its sustainability.

Currently, the macadam plant employs 13 staff. Under the 'Do Nothing Scenario' the absence of quarrying activity will likely limit future employment opportunities at the site, as well as the potential economic contribution of this former quarry to the region from this proven source of aggregates.

The impact on aggregate supply under this scenario is challenging to assess without projections for future demand and data on alternative sources. However, maintaining the quarry's inactivity would likely place increased pressure on nearby quarries to meet regional aggregate needs over the medium to long term. These quarries would need to compensate for Ardcahan's lack of output, potentially straining local supply chains. The effect on land use is considered neutral to be indeterminable.

Economically, the 'Do Nothing Scenario' could result in a moderately negative long-term impact on the local area by restricting job growth, reducing business activity, and limiting the quarry's contribution to the regional economy.

5.8.2 Construction and Operational Phase

5.8.2.1 Population

During both the construction and operational phase of the proposed development, the quarry will have no impact on the population of the study area with regards to population demographics or trends.

No significant impact on population in this regard is identified.

5.8.2.2 Employment and Economics

The planned development will sustain direct employment for up to five to six full-time staff and up to six part-time staff. It will also support a range of indirect jobs, including roles for haulage operators, subcontractors, suppliers of materials, and maintenance personnel. Furthermore, by ensuring a steady supply of construction aggregates, the project will indirectly bolster the local and regional economy, contributing to its stability and growth.

The existing operations contribute to local employment, and the proposed development will ensure that existing direct and indirect employment is maintained during its lifetime. Workers employed directly by the Applicant are predominantly members of the local community, and so any revenue generated from this employment is in large part returned to the local economy in the form of

purchasing goods and services.

This represents **a positively significant, medium-term impact** that would primarily be local, with some **regional** benefits due to the supply of aggregates.

5.8.2.3 Health

The operation of heavy machinery during the Construction and Operational Phases may present health and safety risks to workers. Additionally, the presence and operation of plant and heavy machinery, working faces and open pit edges at the site can also pose a potential risk to members of the public who might access the site from the main site entrance to the site. However, access by the public would be considered trespassing on private property.

However, the Applicant is an experienced operator who managed this type of operation for over 40 years, and during this period no major accidents or fatalities have occurred. The proposed development will be accessed only via the private vehicular access to the site, and the quarry cannot be freely accessed by members of the public.

In the absence of mitigation, the effect would likely be **significant,** with an effect that might range from **slight to profound**, depending on the magnitude of the incident, but is **unlikely** to occur.

The Impact of the proposed development on dust and air quality is assessed in Chapter 8 of the EIAR.

Chapter 10 of the EIAR assessed the impact of the proposed development on noise and vibration.

5.8.2.4 Land Use

The proposed extraction area is currently an inactive quarry, having ceased operations in 2014. During the construction and operational phases, the site will continue to function as a quarry, representing a continuation of similar operations that previously occurred on site. Therefore, the surrounding amenities will not be worsened by the proposed continuation of the existing quarry.

Thus, the impact associated with a change in land-use will be neutral.

5.8.2.5 Local Amenity

During the Construction and Operational Phases, aggregate extraction may produce dust, noise, and vibrations. Additionally, vehicle movements related to the quarry operations and alterations to the landscape could occur.

Additionally, alterations to the landscape due to quarry operations could affect the aesthetic and functional characteristics of the surrounding area. However, the potential for these impacts to adversely affect local amenities is minimized due to the site's specific location and the absence of sensitive receptors in close proximity.

5.8.2.6 Cumulative Impacts

A review of the planning application history in the vicinity of the proposed development was undertaken to establish any planning applications that were recently approved, pending a decision or awaiting development.

The review identified only one approved application within a 2km radius in the last 5 years, which

remains unimplemented (CCC Ref. 23/751) involving a single one-off dwelling.

5.9 Mitigation Measures

5.9.1 Incorporated Design

The layout and direction of the proposed extension have been designed to maximise resources available within the area whilst being cognisant of the nearest sensitive receptors. In this instance, the nearest receptors are those residences' location immediately west, east and south of the proposed development site.

Quarry extraction differs from many forms of development as it is an operational use and therefore does not always, as in this instance, include a requirement for built structures and therefore the usual scope available to the Applicant, for variations in design and construction, is limited.

5.9.2 Construction and Operational Phase Mitigation

In order to ensure there are no potential impacts associated with the health and safety, the following measures will be applied:

- A site-specific Health and Safety Plan will be in place for the site. All site staff will be made aware of and adhere to the company Health and Safety Plan.
- Only appropriately qualified and trained personnel will be permitted to operate machinery onsite.
- Appropriate barriers/gates and signage will be used.
- The proposed development site will not be accessible to members of the public.
- The site will also be secure (existing gates) to prevent the risk of trespass through signage and provision of barriers/gates.

The impacts of noise and vibration have been assessed in Chapter 10 of the EIAR.

5.9.3 Decommissioning and Restoration Phase Mitigation

The health and safety measures set out above for the construction and operational phases of development shall also be implemented during the Decommissioning and Restoration phase to ensure that no accidents occur.

The impact of the dust and air quality have been assessed in Chapter 8 of the EIAR.

5.10 Residual Impacts

This section assesses potential significant environmental impacts which remain after mitigation measures are implemented.

There will be **no residual, adverse, significant effects** on population and human health during the Construction, Operational, or Decommissioning and Restoration Phase(s).

5.11 Risk of Major Accidents or Disasters

There is limited potential for significant natural disasters to occur at the proposed site. Ireland is a geologically stable county with a mild temperature climate. The potential natural disasters that may occur are therefore limited to flooding and fire. As described in Chapter 7 Water & Hydrology, a review of the OPW Flood Maps do not show any record of flooding within the proposed development site and do not identify the site as being at risk of flooding.

It is considered the risk of significant fire occurring, affecting the proposed development and causing the works to have significant environmental effects is limited. There are no significant sources of pollution associated with the works with the potential to cause environmental or health effects.

Major industrial accidents involving dangerous substances post a significant threat to humans and the environment; such accidents can give rise to serious injury to people or serious damage to the environment, both on and off the site of the accident. The proposed development is not regulated or connected to or close to any site regulated under the Control of Major Accident Hazards Involving Dangerous Substances Regulations i.e. SEVESVO sites and there are no potential impacts from this source.

5.12 Worst Case Scenario

The worst-case scenario is that there is an accident at the quarry during any phase of the development which would have a significant, adverse impact on human health. As stated above in this Chapter, the Applicant is an experienced quarry operator who has been in operation for over 40 years, and during this period no serious injuries or fatalities have occurred on pits under their control.

The Health & Safety Authority statistics indicate that in the 10-year period from 2013 to 2023, a total of 3 no. fatalities occurred related to mining and quarrying operations in Ireland, i.e. the likelihood of fatality is low.[3]

Relevant aspects of the Safety, Health and Welfare at Work (Quarries) Regulations 2008 and the Safe Quarry Guidance provided by the HSA shall be adhered to. This guidance was developed with the assistance and advice of a working group on safety, representative of a wide range of interests in the industry. Adherence to this guidance in conjunction with other health and safety measures set out in this EIAR will ensure that risk of fatality is highly unlikely.

5.13 Conclusion

There are no significant adverse effects with respect to socio-economic factors, land use, or the amenity value potential of the area. Issues which may cause risks and hazards during the construction and operational phase of the development are given due consideration. All necessary mitigation measures will be put in place to ensure the health and safety of all site personnel and neighbouring properties. All other environmental aspects relating to the human environment which could have an adverse effect on the local population such as soils, geology & hydrogeology, water and ecology have

[3] Annual Review of Workplace Injuries, Illnesses and Fatalities, Available at: annual_review_of_workplace_injuries_illnesses_and_fatalities_20222023.pdf

been addressed in the relevant chapters of this EIAR.

5.14 References

- National Planning Framework First Revision (2025) (Government of Ireland, 2018)
- Southern Regional Spatial and Economic Strategy 2020-2032
- Cork County Development Plan 2022-2028
- Central Statistics Office (CSO) website (cso.ie)
- GeoDirectory-GeoFindIT App
- EPAs Air Quality Mapping Tool at www.airquality.ie
- Pobal website https://maps.pobal.ie/
- Health and Safety Authority website (hsa.ie)

Murray Brothers Tarmacadam Ltd

CHAPTER 6
LAND, SOILS & GEOLOGY

VOLUME II
MAIN STATEMENT

APRIL 2026

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6 Land Use & Soils (Geology)

6.1 Introduction

Viridus Consulting Ltd., (VCL) were appointed by Murray Brothers Tarmacadam Ltd., to complete the Land Use and Soils, (Geology), Chapter of the Ardcahan Quarry Expansion, Environmental Impact Assessment Report (EIAR).

The EIAR is part of the planning application for future development of the existing sandstone quarry located at Ardcahan, near Dunmanway Co. Cork. The EIAR is being completed in parallel with a Substitute Application for works completed at the quarry between 1990 and 2014 including a remedial EIAR. Section 37L of the Planning and Development Act 2000 which allows simultaneous applications to be submitted to the relevant planning authority.

The work was completed by Mr. Darragh Musgrave, a qualified Earth Scientist, and experienced, Senior Geo-Environmental Scientist working with Viridus Consulting Ltd., (VCL).

It should be read in conjunction with Chapter 1 - Introduction, Chapter 3 – Project Description, Chapter 7 - Hydrology/Hydrogeology, Chapter 11 - Landscape & Visual Impact, Chapter 14 - Biodiversity and Chapter 16 – Significant Interactions of Impacts.

6.1.1 Author Information and Competency

This chapter of the EIAR has been prepared by Mr. Darragh Musgrave, a senior Geo-Environmental Consultant with VCL. Darragh has an honours degree in Geology (Earth Science) from the National University of Ireland Galway, (NUIG 1992) and a Higher Diploma in Environmental Protection from the Institute of Technology Sligo (ITS 2006).

He has over 30 years of experience working in the environmental, geological, geotechnical, hydrogeological and hydrological sector and has completed numerous environmental assessment and associated EIAR for many quarry, infrastructure, commercial and residential developments over the years, including more recently,

- DUCON Sand & Gravel Quarry, Dripsey, Co. Cork, EIAR for Quarry Consulting Ltd., (2025),
- Rooskagh Quarry, Athlone, New Quarry Development EIAR – for Mr. E. Harney (2021/2023),
- O'Regan's Quarry, Co. Cork & Harringtons Carrowscoltia Quarry, Co. Mayo, Env Assessments,
- Bellacorrick Hydrogen Plant, Co. Mayo, Development EIAR, Quarry Consulting Ltd., (2022),
- Ballinglanna, Lake View, Dunkettle & Maglin Residential Development EIARs – O'Flynn Group,
- Maryborough Ridge, Cork & The Paddocks, Waterford, Residential EIARs – Glenveagh Homes

Darragh has been appointed to assess, as per Annex IV of Directive 2014/52/EU, the Land Use and Soils (Geological) elements of the EIAR for the proposed expansion development works proposed to be completed at the existing Ardcahan Quarry. He has also completed the rEIAR Land Use and Soil (Geology) Chapter.

VCL completed the Land/Soil (Geology) and Water Chapters as part of an Environmental Impact Assessment (EIA) Report for a former planning application at the same study site in 2014, (compiled by McCutcheon Halley Walsh 2014 under CCC reference 14/00616 and ABP reference PL 88.245174).

6.1.2 Guidelines & Legislation Relevant to Discipline

The Land Use and Soils Chapter for the EIAR follows the guidelines outlined by the EPA guidance document, "Guidelines on the information to be contained within an EIAR", from May 2022, in

Directive 2014/52/EU and Annex IV amendments, as well as European Union (Planning and Development) (EIA) Regulations 2018, (S.I No. 296/2018).

The work also is cognisant of the previous EPA Draft EIAR Guidelines (2017) and the Environmental Impact Statement (EIS), EPA Draft guidelines, from September 2015, which outline the process of preparation and the content required for an EIS.

The assessment work also follows the Institute of Geologists of Ireland (IGI) "Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of EISs", (IGI April 2013), and National Roads Authority (NRA) Guidelines on Procedures for the Assessment and Treatment of Geology, Hydrology & Hydrogeology for National Road Schemes, (NRA 2009).

Other related guidelines include the 'Environmental Management in the Extractive Industry' (EPA 2006) and the Irish Concrete Federation (ICF) 'Environmental Code', (2nd Edition, 2005).

6.1.3 Methodology

The methodology and scope of the assessment involved the completion of an initial Desk Study that included the collation and review of any available information pertaining to the quarry site including any geological studies or databases relevant to the proposed development site area, such as the previous 2014 EIA, and on-line Tailte Eireann, EPA, Geological Survey of Ireland (GSI) and Teagasc/Cranfield mapping data.

This was followed by a number of Site Walkovers which included a number of recognisance visual surveys, completed by VCL during periodic site visits in 2014, 2015, 2020, 2024 and 2025 that enabled the physical examination of the geological, geomorphological, hydrological and land use characteristics of the site and its setting in the locality.

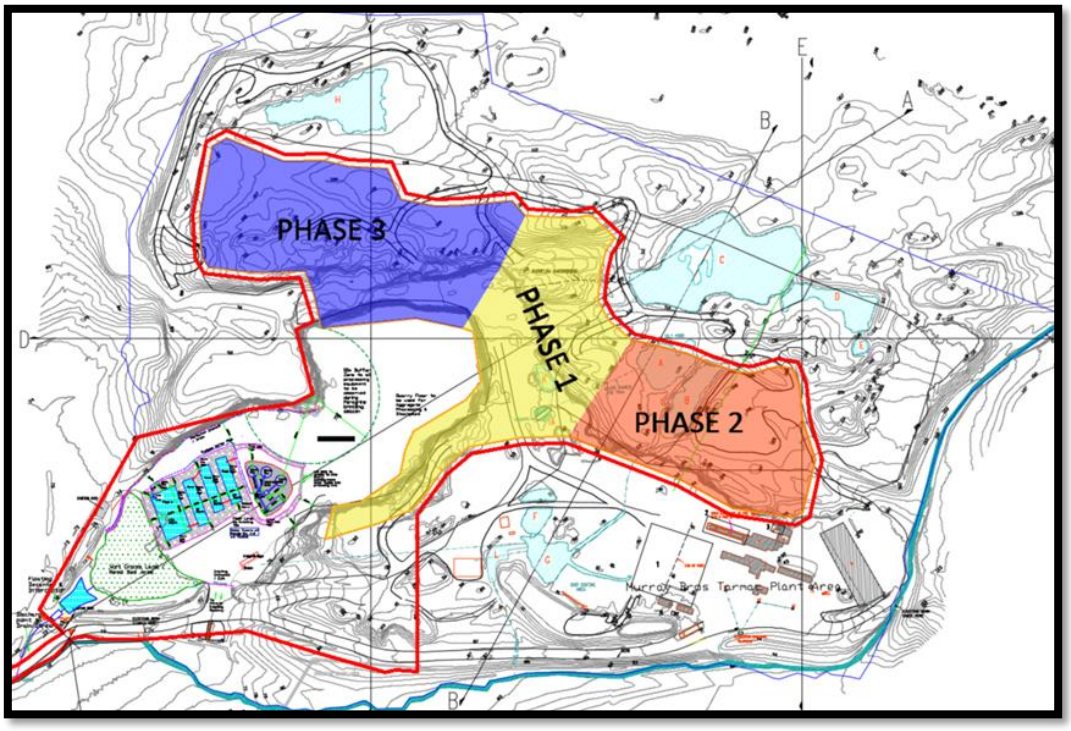
Additional groundwater monitoring sampling points were established by the completion of five new boreholes around the site in October 2024 and these were sampled in January 2025.

The future expansion development relates to the quarrying of quartz rich sandstone and siltstone bedrock in three phases, primarily in the central (Phase 1), northeastern (Phase 2), and northwestern (Phase 3), areas of the existing quarry site. While natural soil cover is generally absent or thin (<1m) there are some areas of subsoil berms and old settlement ponds in the proposed expansion area which will require removal.

The overall landholding is ~25 hectares (ha) while the footprint of the proposed extraction/expansion areas are about 1.75 ha (Phase 1), 1.2 ha (Phase 2) and 2.06 ha (Phase 3) with a total extraction area of 5.01 ha. The quarrying period is anticipated to be completed over a duration of about 20 years.

Refer to the quarry areas and information outlined in the quarry expansion EIAR Chapter 3 - Project Description and shown in Figure 6.1 and Table 6.1 of this chapter.

Figure 6.1 Proposed Ardcahan Quarry Extraction Areas Phasing.



In this chapter the historic baseline conditions and character of the geological characteristics of the site are presented and the potential impacts anticipated from the future expansion of the quarry are identified and discussed. Mitigation measures are considered, and potential residual impacts are assessed.

It should be read in conjunction with Chapter 1 - Introduction, Chapter 3 – Project Description, Chapter 7 - Hydrology/Hydrogeology, Chapter 11 - Landscape & Visual Impact, Chapter 14 - Biodiversity and Chapter 16 – Significant Interactions of Impacts.

Consultation was carried out with the relevant bodies by the project planning co-ordinator, including An Coimisiún Pleanála (ACP), the GSI, Cork Co. Co., and EPA. A summary of the third-party responses received are presented in Chapter 1 and Appendix 1.1 of the EIAR.

6.1.3.1 Potential Effects Assessment Methodology

The methodology used for the analysis of the predicted effects/impacts of the proposed quarrying on the geological attributes during and after the quarry expansion works, is consignment of Annex IV of Directive 2014/52/EU, and primarily follows the EPA EIAR Guidance Documents, (EPA 2022 and 2017), NRA Guidance (2008/9) and Appendix C of the IGI EIS Preparation Guidelines (IGI 2013).

The guidelines provide criteria for ranking of the identified geological features within the study area and the rating of potential impacts from the project on the geological environment is assessed by,

(1) Classifying the importance of the relevant attributes,

(2) Quantifying the likely magnitude of any impact on these attributes,

(3) Determining the resultant significance of the effects on the attribute.

The impact assessment is presented in detail in Section 6.4.1 of this document.

6.1.4 Site Surveys and Investigations

Noting the pre-1963 origins of the site the Ardcahan Quarry has been an important source of aggregate stone in this area of West Cork. The high Polished Stone Value (PSV) of the crushed bedrock makes it an ideal road stone and product from the quarry was used in the maintenance and upgrade of the regions roads. The results of some PSV rock tests from Ardcahan Quarry are presented in Appendix 6.3.

Given the quarrying history of the site there is a lot of bedrock exposure visible along the exposed quarry faces at the old quarry floor and northern extent of quarrying across the site.

Notes on eight open boreholes drilled in two parallel rows to test for rock quality in 2006 were available. While no detailed geological logs were recorded the driller notes identified the time it took to drill 20m and the quality of the returns. These notes show variable rock quality in the northern area of the site with generally more weathered, (less hard 'gritty' sandstone chip returns), to the west and fresher, (more 'gritty' sandstone chip returns), to the east. No notes on groundwater were made and quarry staff who recalled the drilling did not think that much water was encountered. A rough location map was drawn and this is included in Appendix 6.4.

More recently a site specific geophysical survey, using 2D resistivity and seismic refraction profiles and associated reporting, (apex geophysics, January 2023), was completed for 3.5 Ha of the proposed expansion areas and northern portion of the site. This identified thin or absent soils, except for stockpiles/backfilled areas, over weathered/fractured sandstone with minor siltstone and slightly weathered to fresh sandstone with minor siltstone. A potential resource of over two million tonnes (m.t.) of slightly weathered/fresh bedrock and over 0.6 m.t. of slightly weathered fractured bedrock is identified. The full report is included in Appendix 6.5.

In October 2024 five new boreholes were drilled around the site by specialist contractor Southern Pumps, in order to assess the nature of the bedrock and provide long term groundwater monitoring points. Generally good quality weathered to fresh interbedded sandstone and siltstones were encountered. The drilling logs are included as Appendix 6.6.

Some VCL Site Photos from the completed site walkovers are included in Appendix 6.7.

6.1.5 Difficulties Encountered in Compiling Information

No difficulties were encountered in the preparation and data assessment for this EIAR chapter.

6.2 Proposed Development

This proposed development involves extending the old Ardcahan quarry by the extraction of quartzitic sandstone and siltstone bedrock, in three phases, over an area of 5.01 Ha from the old quarry floor.

Based on the site survey/contours and the fact that there is a bench already partially extracted in parts of Phases 1 and 3, an average extraction depth of 25 metres is estimated for Phase 1 and 30 metres for Phases 2 and 3 are applied.

This gives an estimated extractable rock volume of 1,415,500m^3, and with a conversion rate of 1m^3 = 2.6 tonnes of aggregate, then reserves in the proposed quarry expansion area are estimated to equate to approximately 3,680,000 tonnes. See Figure 6.1 in Section 6.1.3 and Table 6.1 below.

Table 6.1 Estimates of Quarry Reserves, Extraction Phases and Tonnages.

Phase No.	Extraction Area	Average Depth of Extraction Area (Metres)	Volume (M^3) Est.	Tonnes (millions)	Approx. Duration	Ave Tonnes Per Year
Phase 1	1.75ha	25	437,500	1.14	6-7 yrs	175,000
Phase 2	1.2ha	30	360,000	0.94	5-6 yrs	172,000
Phase 3	2.06ha	30	618,000	1.61	6-7 yrs	250,000
Totals	**5.01ha**	**20 to 30m**	**1,415,500**	**3.68**	**17-20 yrs**	**200,250**

The rock will be extracted using industry-standard blasting methods to produce broken rock by creating a series of benches generally of the order of 15m to 20m high. The number of benches will vary depending on the existing ground level and depth of overburden. The final quarry floor level across the site is, proposed to be at a maximum depth of ~75 mOD, which is an extension of the existing final floor level of the old quarry in the southwestern portion of the site. It is anticipated that the proposed quarrying activities will generally produce between 172,000 to 250,000 tonnes of aggregate per annum. Depending on the quarry phase, product demand and market conditions, the extended quarry is estimated to have an annual average output of about 200,000 tonnes.

The project site overlaps with lands under consideration for Substitute Consent by way of a concurrent planning application.[1] The former post 1990 extraction area and adjoining lands in the south for which substitute consent is being sought are included in this prospective application to accommodate ancillary quarry activities (internal roads, aggregate processing, chip washing, settling ponds, stockpiling etc) associated with the proposed future extraction.

The application site does not include the southeast part of the landholding occupied by the tarmacadam plant, admin buildings and associated works permitted under Reg. Ref. 98/294.

6.3 Description of Existing Environment

Information on the land use/soils and geological conditions for the proposed development site and local area was acquired from existing literature and previous reports including;

- Geology of West Cork, (Map Sheet 24 & Booklet, Geological Survey of Ireland (GSI), 2002).
- General Soil Map of Ireland (An Foras Talúntais, 2nd Edition,1980)
- GSI & EPA On-line Databases for Soil, Geology & Hydrogeology/Aquifer Information, (www.gsi.ie),
- Tailte Eireann, (TE) Old OSI On-line Maps/Historic Maps & Aerial Photographs
- Previous reports, drilling notes and PSV lab results from the Ardcahan administration files.
- Apex Geophysical Survey for the proposed Ardcahan Quarry expansion, January 2023,
- Southern Pumps Borehole Drilling Logs from 2024.

In addition to the available desk study information a number of walkovers of the proposed site area was undertaken by VCL in 2014, 2015, 2020, 2024 and 2025. Some representative site photographs are presented in Appendix 6.6.

[1] An application for Substitute Consent under Section 177E of the Planning and Development Act 2000, as amended, has been submitted to An Bord Pleanála to regularise extraction and ancillary quarrying activities which took place at Ardcahan Quarry between 1990 and 2014.

6.3.1 Site Location and Setting

The Ardcahan Quarry is located in a rural setting about 3.5km northeast of Dunmanway Town in West Cork. The history of the site is one of rural hilly woodland and scrub with little agricultural use, as can be seen on the old OSI 1840's 6" and early 1900's 25" Map Surveys for the locality. Refer to the old ordnance survey (TE) mapping presented in Appendix 6.1.

The land immediately around the quarry consists of scrub, woodland and agricultural grass land. The site is accessed from the public road (R587) via a third-class road from the Inchicuhan Crossroads and has its entrance in the south-western corner of the site. Refer to the Site Location Description in Chapter 3.

The site is located on a broad ridge or hill with the lower ground levels (~72 to 75 MOD) in the southwestern area, with the natural topography rising to the north and east. The northern area of the site forms the top of the ridge which has the higher ground levels (~110 mOD) which is on the western side of an area of higher undulating topography and hills which form the eastern part of the Caha River catchment. The lower topography of the Bandon River Valley is located to the west/southwest.

See the Tailte Eireann 1:50,000 scale topographical map included in Figure 6.2.

Figure 6.2 Site location with local topography rising from W-SW to NE, (From GSI on-line maps).



The macadam production plant, which received planning and commenced operation in 1998, is located in a previously quarried area (pre 1990) in the south-eastern part of the site. The macadam plant site office, administration buildings and toilet facilities, including percolation area, drainage (including an interceptor), and the sites groundwater well are also located in this area. The bitumen batching and preparation area is located to the west of the admin building in the old quarry area in the south central part of the site. There are a number of shallow ponds for retaining wash and cooling water in this part of the site.

The main (post 1990) quarry extraction area was established in the southwestern portion of the site, which was also used as the main rock crushing and product stockpile area. The quarry had a permanent settlement pond system situated in the SW corner downgradient of this area.

The northern part of the site has not been quarried but portions of it were used for stockpiling subsoils and crushed rock, for settling ponds and for backfilling areas with surplus soil and sludge material from bitumen production.

A number of shallow ponds/lakes have also evolved in the northern part of the site by the placement of berms around the natural depressions and lower-lying areas. The settlement ponds were used for water storage and use in the quarry and macadam plant areas as necessary.

6.3.2 Land Use

The primary, original, land use in the total land holding area, which is ~25 hectare (ha), was native woodland and scrub in the southwestern area of the site, with scrub-heath land in the northern and north-eastern portion of the site. There is evidence on the old maps of a small agricultural holding in the low-lying area in the southwestern part of the site. See the old OSI (TE) maps in Appendix 6.1.

The historic quarry area, recorded on the site before 1964, was along the exposed rock face on the eastern side of the small field situated in the southwestern corner of the site. This quarrying area was extended into the southwestern and central area of the site after 1990.

The proposed expansion of the quarry is into about 5.1 Ha of land used for the historic quarry activity and laydown areas for subsoils which has overgrown with rough scrub vegetation.

It is envisaged that in the future the land use would revert to a mix of woodland, scrub, heath, surface water ponds and possibly some other land uses/development in the older quarry floor.

6.3.3 Soils and Subsoils

Topsoils and Subsoils (Quaternary sediments) were deposited during or after the last ice age, (the Midlandian), which was at its maximum extent about 22,000 years ago, and essentially comprise the unconsolidated materials overlying the solid bedrock. Subsoils in Ireland are dominated by poorly sorted materials in glacial tills or boulder clays and outwash deposits of sands and gravels with deposits of peat, river alluvial and coastal sediments occurring in particular environmental settings.

The An Foras Talúntais soils mapping for the Soil Map of Ireland, (1980), indicates that this part of West Cork is defined by Rolling Lowland Physiography. The Ardcahan site area is identified to be underlain by Brown Podzolics of Acid Brown Earths with sandstone and shale parent material in the western and southern area and by areas of rock outcrop and peat to the east and northern area.

The Geological Survey of Ireland (GSI) soil mapping data, available from the GSI On-line Database, indicates that the site comprises of non-calcareous Rock Outcrop (RckNCa) at or near surface with any soils comprising of shallow rocky, peaty and non-peaty mineral complexes (Mainly Acidic) (AdminSRPT) derived chiefly from non-calcareous rock. Refer to the GSI On-Line Mapping Database Topsoil Map presented as Map 1 and the Subsoil Map presented as Map 2 in Appendix 6.2.

Similarly soil mapping presented in the online EPA/Teagasc/Cranfield On-Line Database identify that the site is primarily occupied by Rock and Peat material. There is soil shown in most south westerly corner of the site which is identified as the Ross Carbery (0900RO) Soil Association. This is described as “coarse loamy compact drift with siliceous stones”. These soils reportedly occupy the agricultural land to the south and east of the site and, like the Rock and Peat material, is very widespread in the West Cork area. The Teagasc Soil Mapping for the locality is presented as Map 3 in Appendix 6.2.

The Apex Geophysical survey indicates that rock is more or less at the surface around the majority of the quarry site with overburden being generally very thin or absent. Two areas of deeper backfilled subsoils were identified by the survey in the eastern and central northern areas of the site. The full Apex geophysical survey report is included as Appendix 6.5.

6.3.4 Made Ground

A review of the old maps and earliest aerial photographs of the locality from 1995 shows the quarry area in the southwestern and south-central part of the Ardcahan Quarry site. The footprint of the quarry works is limited to the work area and there is no evidence of the movement of subsoils, waste rock or the creation of made ground in other parts of the site.

As the quarry work progressed, removed soils and weathered non-commercially viable rock were used in berms placed around the boundary of the site and forming the berms around the surface water ponds in the northern area of the site. These berms have created some of the deeper subsoil areas.

Following the commencement of the macadam production plant in 1998 fine particulate mud like material from that process has been deposited in an area in the northeastern part of the site. This material has solidified over time and forms an area of deep backfill as identified by geophysical survey.

6.3.5 Bedrock

The area of the proposed future quarry extraction is identified by the regional 1:100,000 scale GSI Bedrock Geology Map Sheet 24 and GSI on-line bedrock mapping to be underlain by the Upper Devonian Caha Mountain Formation (CH). This geological bedrock unit reportedly consists of 'purple siltstones and fine-grained parallel and cross laminated sandstones'. The southern boundary area of the site is identified by the GSI as being underlain by the Gun Point Formation (GP) which is described as 'green-grey to purple medium to course grained sandstones, inter-bedded with thick sequences of purple siltstones and fine grained purple, parallel and cross laminated red sandstones'. The two formations are separated by an east-west orientated geological fault which is along the line of the quarries internal access road and small stream on the southern boundary. A second north-south orientated geological fault is identified between these units to the southwest of the site. Refer to the GSI On-Line Mapping Database Bedrock Map presented in Map 3 in Appendix 6.2.

As the site was an established quarry there is extensive bedrock outcrop exposed along the exposed excavated rock face especially in the central and southwestern areas of the facility. Bedrock outcrop consisting of northward dipping, inter-bedded purple grey sandstone and siltstone sequences. Occasional thicker sandstone units are very distinctive in the generally thinly inter-bedded sediments. Some variation in the bedrock and orientation of the bedding is evident in the high wall of the exposed quarry in the northwest corner of the site indicating the potential for some local faulting and/or folding structures within the bedrock in this area.

As well as some bedrock outcropping in the northern area of the site notes on eight open boreholes drilled in two parallel rows to test for rock quality in 2006 were available. While no detailed geological logs were recorded the driller notes identified the time it took to drill 20m and the quality of the returns. These notes show variable rock quality in the northern area of the site with generally weathered, (less hard 'gritty' sandstone chip returns), to the west and fresh, (more 'gritty' sandstone chip returns), to the east. No record of encountering groundwater was made. A rough location map of the boreholes was drawn and this is presented in Appendix 6.4.

An assessment of the rock reserves in the northern and western part of the quarry land holding area was completed by PD Lane Associates Architects & Engineers in 2006. Estimates based on excavating to a floor level of between 78 to 94 MOD in these areas identified rock reserves of between 1.0 to 3.5 million tonnes. The current proposal is to extract a total of 5.1 ha in three phases of the northwestern, central and eastern areas of the site to a ground level of ~75 MOD, in order to extract up to 3.6 million tonnes of the available bedrock resource. See Figure 6.1 in Section 6.1.3 and Table 6.1 in Section 6.2.

6.3.6 Soft or Unstable Ground and Geohazards

It is generally accepted that peat, lacustrine and alluvial deposits do not make for stable ground conditions of which there are no significant quantities present on the proposed development site.

The GSI have completed Landslide Susceptibility Mapping for the country which is based on the local topography. For the Ardcahan area Low to Moderate Landslide Risk is identified with the higher risk associated with the naturally occurring steeper slopes. The site-specific quarrying activity is not considered by this assessment. The GSI has also developed a database of historical landslides in Ireland and none of the recorded events lie within the study area. The landslide susceptibility mapping for the area is presented in Appendix 6.8.

Naturally an active quarry has steep rock faces which if not properly managed could pose a rock slope stability risk, especially after fresh blasting and/or during active rock removal from the exposed quarry face. The Ardcahan Quarry has a number of steep quarry faces around the site from previous extraction works but these have not posed a fall risk in the past.

6.3.7 Landfills and Contaminated Sites

In 1996 the Environmental Protection Agency (EPA) began licensing certain activities in the waste sector. These include landfills, transfer stations, hazardous waste disposal and other significant waste disposal and recovery activities. It has been determined from the EPA website that there are no waste licensed facilities within the study area or within the general locality around the site. Data from Cork Co. Co. indicates that there are no 'Legacy Landfills' or contaminated sites situated within the study area or in the general locality of the site.

There is no evidence that soil or foreign waste materials have been imported to the site and there is no record of backfilling or waste being brought to the site during any period of its operation. No waste material was observed on the site during the walkover assessments.

6.3.8 Industrial Emission Licencing (IEL)

The EPA has been licensing certain large-scale industrial and agriculture activities since 1994 and this is currently being done under the Industrial Emission Licencing (IEL) system. A review of the EPA On-line mapping resource shows that there are no IEL facilities in the general locality. The nearest facility identified was the Carbury Milk Products site which is about 10km from the site.

6.3.9 Economic Geology and Geological Heritage Sites

A review of the on-line GSI and EPA web mapping indicates that apart from the Ardcahan Quarry there are no other active or historical quarries or mines in the locality (within 5km) and there are no Geological Heritage Sites identified in this part of Co. Cork, (within 20km, from GSI Web Mapping).

The Ardcahan Quarry has been in operation since the 1960's and was an important source of aggregate stone in Counties Cork and Kerry. The sandstone and siltstone bedrock is quartz rich and has a high Polished Stone Value (PSV) and the crushed bedrock makes it an ideal macadam and road stone. This type of bedrock is an economically important resource.

6.3.10 Groundwater

The bedrock is classified by the GSI as a Poor Aquifer and initial tests indicate that the rock extraction will lower the groundwater table in the immediate quarry area but won't affect the local water table. The limited permeability of the rock means that groundwater flows into the excavations will be low and the perched water in the northern ponds should not be impacted.

Ultimately the site will be operated as a 'dry' quarry as the final floor levels will not below the permanently saturated bedrock and no pumping of groundwater is proposed to enable quarrying to proceed. The groundwater (hydrogeology) assessment of the site is included with the Water (Hydrology) Assessment in Chapter 7.

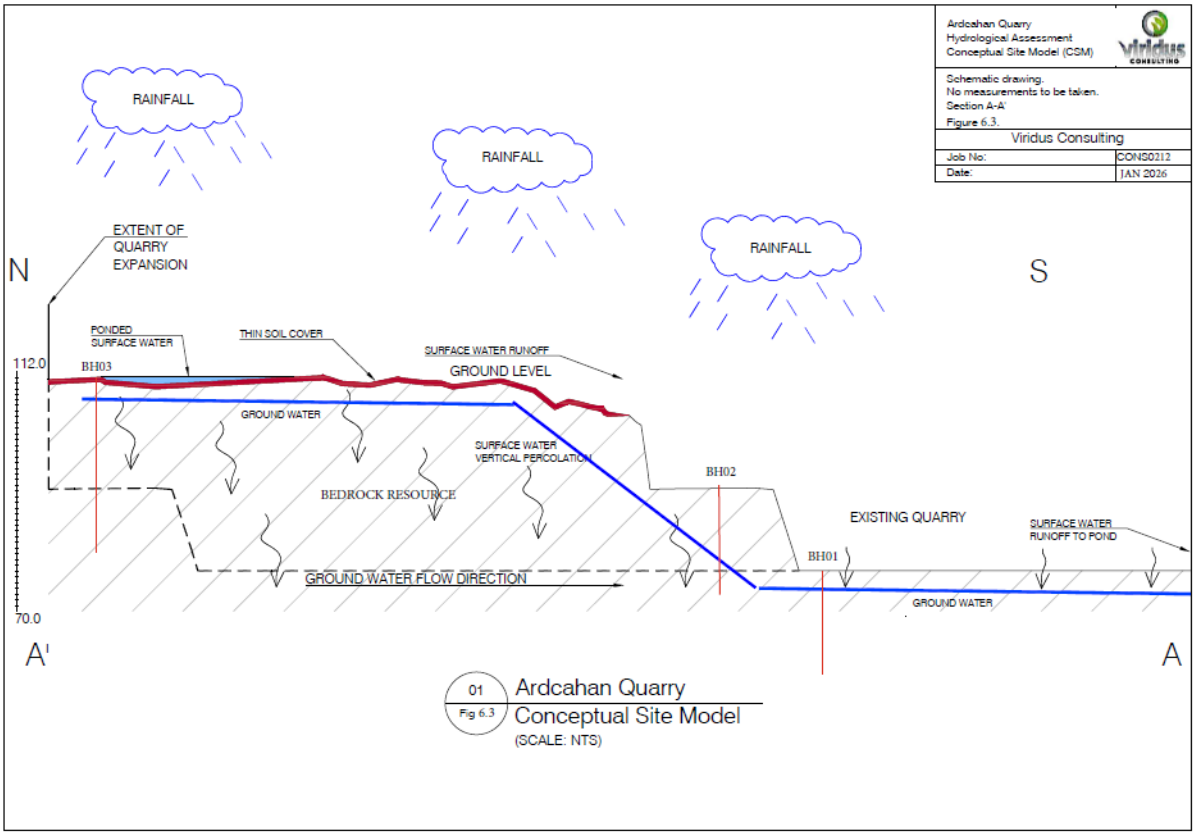
6.3.11 Conceptual Site Model

As per the IGI Guidance recommendations a Conceptual Site Model (CSM) has been conceived for the site examining the interaction of the project with the water environment. The diagrammatic cross section, (as presented in Figure 5.3), forms an important part of the 'Conceptual Site Model (CSM) for the site. The recent borehole drilling and instillation of standpipes has enabled the local water table to be measured. The water table follows the local ground height and as the bedrock is a Poor Aquifer it does not have a high transmissivity or a high capacity to hold large water volumes.

Excavations into the more elevated areas in the northern part of the site will lower the water table as the works progress, however based on the drilling and initial groundwater assessment works, low volumes of groundwater are anticipated to be encountered and the steep hydraulic gradient created by the low permeability bedrock will ensure that the excavation works will not create a significant lowering of the water table beyond the edge of the quarried area. Refer to the Hydrology and Hydrogeology Assessment included in Chapter 7 Water.

The dip orientation of the bedrock to the north means that stable steep and vertical rock faces can be established as the natural fractures in the rock tend to dip back into the ross mass. The bedrock is made up of interbedded siltstones and sandstones that consistently have a high quartz content that makes a very good commercial aggregate product. An interpreted cross section of the site showing the context of the geological and hydrogeological regimes for the quarry are presented in Figure 6.3.

Figure 6.3 Conceptual Site Model – Diagrammatic Quarry Cross Section



6.3.12 Type of Land and Soil/Geological Environment

As per Step 3 (page 14 of the IGI EIA Guidelines) the baseline information and CSM enables the type of soil/geological and hydrogeological environment to be determined. From the range of generic environments outlined in the IGI document (Types A to E) the Ardcahan Quarry site is interpreted to have a:

Type A - Passive geological/hydrogeological environment.

This is based on the fact that the study area is underlain by a poor aquifer which is dominantly a recharge area with a historically stable geological environment.

The site does not represent any aspect of a Type B groundwater discharge area with a regionally important aquifer, Type C Man-Made Dynamic Hydrogeological Environment with mining or quarrying below the water table, or with nearby waste discharges to ground or a Type D Sensitive Geological/Hydrogeological environment with karst limestone or water supply SPAs or a Type E Groundwater Dependent Ecosystem or wet land with a nearby river with a high base flow of groundwater

6.3.13 Activities Associated with the Future Quarry Expansion

A range of Generic Activities that can potentially interact and impact with the geological/ hydrogeological environment are presented in the Activities/Environment Matrix identified as Figure 2 in the IGI Guidelines. The IGI Assessment Flow Chart and Activities Matrix, (Figures 1 and 2 from IGI EIA Guidance, 2013) are included in Appendix 6.9 of the Land/Soils/Geology Chapter of the EIAR.

The main activity which is related to the Future Quarry Expansion development is:

EXCAVATION OF BEDROCK MATERIALS ABOVE AND BELOW THE WATER TABLE, (IGI 2013).

The application for the future expansion of the Ardcahan Quarry relates to total area of about 5.01 ha, divided between the central area, Phase 1 (1.75 ha), the eastern area Phase 2, (1.2 ha), and the western area (2.06 ha), that will potentially yield approximately 3.68 million tonnes of aggregate over about a 20 year period, as outlined in EIAR Chapter 3 Project Description.

The stripping of any remaining thin natural soil material or removal of previously stockpiled subsoils will be limited to certain upland areas. All soils and subsoils will be re-used in the future restoration of the quarried areas.

The perched water table identified in the northern part of the site will naturally lower with the rock excavation works but this effect will be in the quarry area and not the wider water table.

6.4 Impact Assessment

The potential impacts of the future Ardcahan quarry expansion on the Land Use and Soils, geological attributes are primarily the removal of the bedrock by blasting, excavation and aggregate preparation works. A long term permanent change in site topography will result from the removal of the bedrock and alterations to the sites drainage pattern.

The blasting, rock crushing, aggregate production and washing increases the potential for dust generation in dry weather and fine suspended sediments in wet weather. If not managed these could impact the local environment and adjacent water course.

Given the amount of bedrock exposure in the established quarry, that a geophysical survey and resource assessment was completed and there are a number of boreholes available for future

groundwater monitoring no further geological site investigations, as outlined in the 2nd Element and summarised in Figure 2 of the IGI Guidelines, are deemed necessary before the potential nature of the impact of the future quarry expansion development can be determined.

6.4.1 Criteria for Rating the Site/Attribute Importance – Geological Features

Based on the NRA 2009 Box 4.1, (Table C2 of the IGI Guidelines), the importance of the land and soil/geological attributes of the Ardcahan Quarry site are rated as Very High to Low. See Table 6.2.

Table 6.2 Rating of Land/Soil – Geological Site Attribute Importance

Attribute	Criteria	Typical Example	Importance
Topsoil/Subsoil	Attribute has low quality significance as the material is thin or absent	Thin, low fertility soils- where present	Low
Bedrock Resource	Attribute has a high to very high quality significance or value on a regional scale	Bedrock aggregate in moderately sized existing quarry with proven economically extractable mineral resource	High to Very High
Geological Heritage	Attribute has a low quality significance or value on a local scale	Common geology with no geological heritage or features of importance	Low

6.4.2 Impact Assessment Methodology

An analysis of the predicted impacts or effect of the completed quarrying on the geological attributes during the quarrying, as per Section 3.7 EPA EIAR Guidelines (2022), Annex IV of Directive 2014/52/EU, EPA EIAR Guidance Document, (2017), NRA Guidance (2008/9) and Appendix C of the IGI EIS Preparation Guidelines (2013), is presented in the following section.

The EPA Guidance (2022) uses the terminology of 'Effect' in preference to 'Impact' and the terms are used interchangeably across the various NRA, IGI and EPA EIAR guidelines. The EIAR impact assessment was undertaken using the following considerations:

- Quality of an Impact: Described as being Positive, Neutral or Negative where:
- Positive Effects = ones which improve the quality of the environment.
- Neutral Effect = represents no effects or effects that are imperceptible.
- Negative/Adverse Effects= change which reduces the quality of the environment.

- Duration of Impacts/Effects: The duration of each impact was considered to be either temporary, short-term, medium-term, long-term or a permanent impact. Temporary impacts are considered to be those which are construction related and last > one year. Short term impacts were seen as lasting 1 to 7 years. Medium-term impacts are those lasting 7 to 15 years. Long-term impacts last 15 to 60 years and permanent impacts are anticipated to last > 60 years. (EPA 2022 Table 3.4 pages 50 & 51.)
- Magnitude of an Impact:

The rating of the potential 'magnitude and significance of impacts' at EIS stage on the Land Use/Soil, Geological Attributes are defined by the NRA Guidelines (2009), with examples, as per Table 6.3.

Table 6.3 Criteria for Rating Land/Soil Impact Magnitude at EIS Stage,**

Impact Magnitude	Criteria	Typical Example
Large Adverse	Results in loss of attribute and/or quality and integrity of attribute	Irreversible loss of high proportion of local high fertility soils Removal of entirety of geological heritage feature Requirement to excavate and replace a high proportion of peat, organic soils and/or soft mineral soils
Moderate Adverse	Results in impact on integrity of attribute or loss of part of attribute	Irreversible loss of moderate proportion of local high fertility soils Removal of part of geological heritage feature Loss of moderate portion of future quarry or pit reserves.
Small Adverse	Results in minor impact on integrity or attribute or loss of small part of attribute	Irreversible loss of small proportion of local high fertility soils and/or high proportion of local low fertility soils. Removal of small part of geological heritage feature Sub-economic extractable mineral or rock resource.
Negligible	Results in an impact on attribute but insignificant magnitude to affect either use or integrity	No measurable changes in attributes.

(Data sourced from Box 5.1 of the NRA 2009 EIA Guidelines Page 103 & IGI Guidelines Table C4).**

The magnitude of each impact is considered from negligible to large. Negligible impacts are effects that result in an impact on an attribute but of insufficient magnitude to affect either its use or integrity. A major impact results in the significant loss of an attribute and/or quality and integrity of an attribute.

The potential impact magnitude of the future quarrying would be considered to be 'Negligible' for the land/soils geological attributes as the bedrock type is regionally extensive while the extractability of the resource has not been diminished. The loss of the thin soil cover in some areas would result in no measurable changes in the soil attribute on a local or regional scale.

- **Significance of an Impact:** The significance of each impact was considered as having an Imperceptible, Not Significant, Slight, Moderate, Significant, Very Significant or Profound effect.

The descriptions of the 'Significance of an Impact' used are as presented in the EPA EIAR Guidelines 2017 – Section 3 Table 3.3 Page 50 as shown in Table 6.4 and also outlined graphically in Figure 3.4 Page 53 of the May 2022 EPA Guidelines.

Table 6.4 Describing the Significance and Quality of Potential Effects for EIARs

Significance of Effect	Criteria	Quality
Imperceptible	An effect capable of measurement but without significant consequences.	Positive/Negative/Neutral
Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.	Positive/Negative/Neutral
Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.	Positive/Negative/Neutral
Moderate	An effect that alters the character of the environment in a manner which is consistent with existing and emerging trends.	Positive or Negative
Significant	An effect which by its character magnitude duration or intensity alters most of a sensitive aspect of the environment.	Positive or Negative
Very Significant	An effect which by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.	Positive or Negative
Profound	An effect which obliterates sensitive characteristics	Negative Only

The rating of potential environmental impacts on the Land Use/Soils, (Geological) environment can also be assessed based on the matrix presented in Table 6.5, which takes account of both the importance of an attribute and the magnitude of the potential environmental impacts of the proposed development on it. The criteria apply to potential impacts during both the development and operational phases of the project.

Table 6.5 Rating of Significant Environmental Impacts at EIA Stage***

		Magnitude of Impact (Table 6.3)			
		Negligible	**Small Adverse**	**Moderate Adverse**	**Large Adverse**
Importance of Attribute (Table 6.2)	**Extremely High**	Imperceptible	Significant	Profound	Profound
	Very High	Imperceptible	Moderate/ Significant	Significant/Profound	Profound
	High	Imperceptible	Slight/Moderate	Moderate/Significant	Significant/Profound
	Medium	Imperceptible	Slight/Not Significant	Moderate	Significant
	Low	Imperceptible	Imperceptible	Slight	Slight/Moderate

(***Based on NRA Guidelines (2009) – Box 5.4 Page 106 and IGI Guidance (2013) Table C6).

For the future subsoil management and rock extraction activity at the Ardcahan Quarry the rating of Significant Environmental Impacts would be considered 'Imperceptible' with Neutral Quality effects regarding the low importance subsoils and the bedrock's low importance for geological heritage but Positive Quality effects regarding the use of the rock aggregate as an economic resource.

- **Type of Impact:** These are described as 'Do Nothing', Construction, Operational, Cumulative, Synergistic or 'Worse Case' scenarios, which look at Major Accident Risks.

6.4.3 Do Nothing Scenario

The 'Doing Nothing' Scenario will result in no further quarrying at the site in the near future and the large accessible bedrock resource of high economic importance in-place.

It is likely that the Macadam Plant will continue to operate on the site.

The supply of road aggregate suitable as road surfacing material to the local county councils and contractors would have to be supplied by other, either existing, or new quarry locations, the development or expansion of which may create more significant environmental impacts at other locations in this part of the county. Haulage of aggregate to the macadam plant will continue.

The proposed remediation and landscaping plans for the existing quarry site are unlikely to progress and the steep quarry faces and open excavated areas will remain as they are.

6.4.4 Site Development/Construction Phase

Development activities will include some site clearance and excavation of the shallow soil cover, the clearance of some of the internal roads in the new quarry areas located primarily in the northern part of the site.

Little soil cover remains on the ground surfaces although there are areas of previous soil stockpiles or berms towards the northern parts of the Phase 2 and Phase 3 areas only some limited site clearance works will be needed in the development Phase.

No agricultural land occurs within the proposed quarry expansion area so there will be little change from the current land use and no agricultural land take is required. Low volumes of soil material will

be generated by the quarry expansion development but volumes of soil created will be small due to its limited depth and extent. Soils will be used to create berms for road edges, ponds or stockpiled for future landscaping use, as necessary.

The impact of the soil removal would be long term to permanent depending on how the site is reinstated but given the type and extent of the soil material in the locality it would be considered to have a neutral quality impact.

With much of the site access and road infrastructure already in place site development and construction phase activities for the Ardcahan quarry expansion will involve the establishment of some administration infrastructure such as a weigh bridge and associated office, as well as the setting up the aggregate processing area including crushers, conveyors and wash plant.

While any soil removal will increase the exposure and vulnerability of the bedrock to surface contamination, the thin nature of the original or reinstated soils means that the increase is not significant and the Extreme Vulnerability classification of the area, as defined by the GSI, will not be changed by the future quarrying activity.

6.4.5 Operational Phase

The main Operational Phase activities will involve drilling and blasting and extraction works including rock breaking, crushing, segregation, screening and washing as necessary.

While the quartz rich interbedded siltstones and sandstones are an important aggregate resource, they are not an unusual geological unit, and no geological importance or heritage value has been attributed to them or occurs locally. The impact of the excavation of the bedrock would be permanent and would be considered to have neutral quality impact on the geology attribute and a positive impact in terms of its use as an economical aggregate resource.

There is the potential occurrence of unstable rock slopes following blasting and/or rock removal from the exposed rock faces which could create a health risk to site users. This would have a temporary negative but long-term neutral impact to the site. Proper quarry face management would negate this rock fall and slope stability risk.

Aggregate material will be stockpiled in the eastern end of the old quarry floor before being moved off site via the weigh bridge and existing roads. Rock chips will also be supplied to the adjacent macadam plant which will reduce the need for transporting aggregate from other sites.

Quarrying activities can pose a risk to soil, bedrock, the underlying aquifer or local watercourses with potential contamination by dust, ammonia, sediments and hydrocarbons.

Elements of the development and operational phase of the proposed quarry expansion will create the following environmental risks:

- Hydrocarbons: accidental spillages or leaks from quarry machinery, equipment and storage depots. Surface water runoff from hard standing trafficked areas is likely to contain mild diffuse contamination in the form of hydrocarbons or silt.
- Quarry traffic and quarry activities can generate dust that can spread onto neighbouring or adjacent areas and be washed into the water courses, creating silt, following rainfall events.
- Ammonia: used in quarry blasting residual ammonia products remaining in the rock mass can leach to ground and surface waters and impact on the chemical balance and water quality.
- Changes in the hydrological regime can occur due to alterations in the site topography and surface water drainage patterns could impact peak flow volumes and contribute to flooding.

- Silt/Clay: elevated fine sediment silt/clay loading in surface water runoff may result from land clearance activity, traffic, aggregate crushing, stock piling and washing activities. Elevated sediment loading can lead to potentially long term damage to aquatic ecosystems.

Most of these pollution sources tend to be short term to temporary 'incident' risks that can be influenced by quarry management, work activities and/or weather conditions.

6.4.6 Decommissioning Phase

The decommissioning plan for the expansion phase areas is to start reinstatement works once the eastern Phase 2 expansion area is completed. Stockpiled subsoil and soil will be spread over the exposed bedrock and planted with native flora such as grasses, wildflowers and trees. As the initial Phase 1 area will be needed for access to the later quarry phases it will be reinstated after the excavation works in the western Phase 3 area are completed.

Once the quarry works are finalized the wash plant, weigh bridge, administration office and related facilities will be decommissioned and removed off site. The wash plant and the lower attenuation ponds and wetland area will be left in-situ in order to enhance the habitat and biodiversity potential for the site.

While there may be some initial short term sediment runoff risk from the reinstatement soil spreading works in the long term the replanting will eliminate this risk and reduce the runoff rate as rainfall will be absorbed and retained by the soil and vegetation cover.

More detail on the Decommissioning Phase works is included in Chapters 14 Biodiversity.

6.4.7 Summary of Significant Effects

The following table summarises the identified likely significant effects during the site establishment, construction and decommissioning phases of the proposed quarry expansion development before mitigation measures are applied.

Table 6.6 Summary of Construction Phase Likely Significant Effects without mitigation.

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Sediment Runoff	Negative	Not Significant to Imperceptible	Local	Medium to Low	Brief to Temporary	Small Adverse to Negligible
Fuel Spills	Negative	Not Significant to Imperceptible	Local	Medium to Low	Brief to Temporary	Small Adverse to Negligible
Groundwater Table Changes	Neutral	Not Significant to Imperceptible	Local	High	Long term	Small Adverse to Negligible

6.4.8 Cumulative Impacts

Other activities that are currently ongoing in the immediate vicinity of the quarry site include the macadam plant and farming. There are no other new quarry residential, forestry or other potential developments or land use activities known about or in the planning system for the local area that could cumulatively impact the geological attributes.

6.5 Mitigation and Monitoring Measures

The construction, operational and restoration phases of the quarry will occur in parallel as the quarry development progressed. Remedial measures for all phases will be applied in tandem as the work progresses and the remedial measures for the different phases is instigated.

6.5.1 Construction and Operational Phase

Strict control of sediment/dust generation and other pollutants such as hydrocarbons associated with the site clearance, rock excavation, blasting, crushing, aggregate washing, stockpiling, traffic and machinery use will be implemented at the site.

The deposition of cleared soils, unsuitable rock or segregated silt materials will be at least 15m away from the watercourse to maintain a suitable buffer area. Vegetation of any stockpiled soils or material used in berms will be commenced as soon as possible after deposition to reduce sediment erosion.

Proper management and use of industrial explosive will reduce the risk of unexploded materials and their residues being left in the ground after blasting.

Environmental controls such as the use of dedicated refuelling areas for quarry plant and the use of dip trays under temporary fuel bowsers and/or crushers and the maintenance of all vehicles and equipment used on site will prevent the release of hydrocarbons around the site.

Bunds sufficiently large to fully contain accidental spills will be provided around all tanks/storage areas containing harmful substances. Bunds are already in place around the fuel storage area established on the macadam site.

Construction traffic will travel along designated internal roads constructed of hard core rock material or on bedrock so that exposed areas of bare ground are not made muddy or soft due to movements of quarry traffic around the site. Machinery will be parked in designated areas.

Damping down of the roadways and stockpiles using water bowsers and mist sprayers will be used during dry periods to reduce the potential for dust generation around the site and on the tarred access road to the site.

Good practice guidelines for the quarry industry will be followed such as; the ICF Environmental Good Management Practices (2nd Edition), EPA Environmental Guidance for the Extractive Industry and the UK Environmental Agency Pollution Prevention Guidelines – PPG1 to PPG8.

6.5.2 Monitoring

Rock quality testing for PSV, pyrite, sulfur, moisture, abrasiveness, hardness and other required commercial aggregate parameters will be undertaken at the regularity required for compliance with the various commercial rock standards.

Visual inspection of high walls and quarry faces immediately after blasting with periodic (bi-annual), inspection of active quarry areas by a specialist geotechnical geologist/engineer is recommended.

The areas of steep quarry rock faces, the shallow earthen berms around some of the surface water ponds and the slopes of the macadam plant sludge waste material area should be visually inspected to ensure that no visual signs of slope instability are occurring in these areas.

Monthly Berger Hoff passive Dust jar air quality monitoring is recommended for the site boundaries.

6.6 Risk of Major Accidents and Disasters

In terms of the geological attributes the 'Worse Case Scenario' Environmental Impact would relate to short term incidents or accidents around fuel losses, which would impact soils and/or bedrock and ultimately create a risk to the underling aquifer and storm water runoff quality to the local watercourse.

Any above ground fuel storage tanks on the site will be fully bunded and refueling with trucks on site will be done in a dedicated area, away from the drainage systems on the site. The potential volume of fuel loss from quarry equipment and machinery would be relatively small in the 10's rather than 100's of liters and the duration of the impact would be considered to be temporary to short term.

In terms of Human Health risks, the unexpected and sudden collapse of a quarry face, (especially after blasting), poses a high risk to machinery operators and workers. There are many records of incidents of death or serious injury due to rock collapse in Irish quarries occurring in the past.

6.7 Significant Interaction of Effects

For any development activity with potential for significant impacts to the geological attributes there is also the potential for interaction with other impacts. The result of these interactions may either exacerbate the magnitude of the impact or ameliorate it. The interaction of impacts on the surrounding environment is required to be addressed as part of the EIAR process.

The most significant interaction of effects would relate to dust from quarrying activities, especially blasting, rock crushing and traffic, interacting with rainfall to create suspended sediment. Ammonia from blasting residues in storm or groundwater could also potentially pose an environmental risk.

Runoff from the work areas, such as crushing, washing and roads could create sediment runoff, while potential for fuel from site machinery could create environmental impacts through fuel spills.

6.8 Residual Impacts

The potential residual impacts are those that will occur after the proposed mitigation measures have taken effect. As presented in Table 6.7 All identified residual effects have an environmental impact rating of Imperceptible.

It is considered that if the recommended remedial and reductive measures are fully implemented and properly maintained and managed, then the proposed development will not give rise to any significant residual adverse impact on the land use, soil (geological), aspects of the site. All identified impacts have a residual environmental impact rating of Imperceptible.

6.9 Conclusion

The sensitivity of an environmental receptor is based on its ability to absorb an impact without perceptible change.

The impacts as outlined can be further negated and maintained as Imperceptible on the basis that the operational mitigation measures outlined in Section 6.5 are fully implemented.

Table 6.7 Potential Land Use/Soil, Geological Impacts for the Ardcahan Quarry Expansion

Feature		Impact Assessment					
Name	**Importance**	**Magnitude of Impact**	**Criteria for Impact Assessment**	**Significance of Impact**	**Duration of Impact**	**Mitigation Measure**	**Residual Impact**
Inert Soil and Subsoil Strata	Low (thin poor acids soils)	Negligible	Removal of unconsolidated soil cover from underlying bedrock.	Imperceptible	Long term to Permanent	Re-use of soil material in bunds and as back fill material around the site. Low volumes of material as soil cover is thin.	Imperceptible
Inert Soil and Subsoil Strata	Low (thin poor acids soils)	Negligible	Potential sediment runoff from excavated soil material	Imperceptible	Temporary	Low angled slopes with vegetation of bunds and positioned ~10m away from water bodies.	Imperceptible
Bedrock Strata	Low (common sequences of sandstone & siltstones)	Negligible	Removal of Devonian sandstone and siltstone bedrock	Imperceptible	Permanent	Effective and efficient use of explosives and excavation and crushing equipment to reduce amount of waste material and potential for contamination to occur.	Imperceptible
Bedrock Strata	Low (common sequences of sandstone & siltstones)	Negligible	Stability of quarry rock face after blasting and rock excavations.	Imperceptible	Temporary	Removal of unstable rock material as part of good quarry face management.	Imperceptible
Bedrock & Aquifer	Low (poor aquifer, moderately productive only in local zones)	Negligible to Small Adverse	Potential for contamination of shallow soils or bedrock and aquifer due to accidental spillages and surface runoff	Imperceptible	Short term	Bunding of fuel storage areas and good operational practices are in place to ensure that the potential for accidental spills and risk of contamination of the ground and groundwater occurring is minimised.	Imperceptible
Bedrock & Aquifer	Low (poor aquifer, moderately productive only in local zones	Negligible	Excavation below the naturally perched groundwater table is proposed but this will drain away and no pumping of groundwater to enable excavations is anticipated.	Imperceptible	Temporary	Depth of excavations to be kept above the permanent groundwater level at existing quarry floor. Five monitoring boreholes to record water levels and water quality in quarry areas have been installed.	Imperceptible

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Murray Brothers Tarmacadam Ltd

CHAPTER 7
HYDROLOGY AND HYDROGEOLOGY

VOLUME II
MAIN STATEMENT

APRIL 2026

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7 Hydrology & Hydrogeology

7.1 Introduction

Viridus Consulting Ltd., (VCL) were appointed by Murray Brothers (Tarmacadam) Ltd., to complete the Water, (Hydrology & Hydrogeology), Chapter of the Ardcahan Quarry Expansion, Environmental Impact Assessment Report (EIAR).

The EIAR is part of the planning application for future development of the existing sandstone quarry located at Ardcahan, near Dunmanway Co. Cork. The work is being completed in parallel with a Substitute Consent Application for works completed at the quarry between 1990 and 2014 including a remedial EIAR. Section 37L of the Planning and Development Act 2000 allows simultaneous applications to be submitted to the relevant planning authority.

7.1.1 Author Information and Competency

This chapter of the EIAR has been prepared by Mr. Darragh Musgrave, a qualified and experienced senior Geo-Environmental Consultant working with Viridus Consulting Ltd., (VCL). He has an honours degree in Geology (Earth Science) from the National University of Ireland Galway, (NUIG 1992) and a Higher Diploma in Environmental Protection from the Institute of Technology Sligo (ITS 2006).

He has over 30 years of experience working in the environmental, geological, geotechnical, hydrogeological and hydrological sector and has completed numerous environmental assessments and associated EIARs for many quarry, infrastructure, commercial and residential developments over the years, including more recently,

- DUCON Sand & Gravel Quarry, Dripsey, Co. Cork, EIAR for Quarry Consulting Ltd., (2025).
- Rooskagh Quarry, Athlone, New Quarry Development EIAR – for Mr. E. Harney (2021/2023).
- O'Regan's Quarry, Co. Cork & Harringtons Carrowscoltia Quarry, Co. Mayo, Env Assessments.
- Bellacorrick Hydrogen Plant, Co. Mayo, Development EIAR, Quarry Consulting Ltd., (2022).
- Ballinglanna, Lake View, Dunkettle & Maglin Residential Development EIARs – O'Flynn Group.
- Maryborough Ridge, Cork & The Paddocks, Waterford, Residential EIARs – Glenveagh Homes.

Darragh has been appointed to assess, as per Annex IV of Directive 2014/52/EU, the Water (Hydrology & Hydrogeology) elements of the EIAR for the proposed expansion development works proposed to be completed at the existing Ardcahan Quarry. He has also completed the rEIAR Water Chapter.

VCL completed the Land/Soil (Geology) and Water Chapters as part of an Environmental Impact Assessment (EIA) Report for a former planning application at the same study site in 2014, (compiled by McCutcheon Halley Walsh 2014 under CCC reference 14/00616 and ABP reference PL 88.245174).

7.1.2 Guidelines & Legislation Relevant to Discipline

The Water Chapter for the EIAR follows the guidelines outlined by the EPA guidance document, "Guidelines on the information to be contained within an EIAR", from May 2022, in Directive 2014/52/EU and Annex IV amendments, as well as European Union (Planning and Development) (Environmental Impact Assessment) (No. 2) Regulations 2018, (S.I No. 404/2018).

The work also is cognisant of the previous EPA Draft EIAR Guidelines (2017) and the Environmental Impact Statement (EIS), EPA Draft guidelines, from September 2015, which outline the process of preparation and the content required for an EIS.

The assessment work also follows the Institute of Geologists of Ireland (IGI) "Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of EISs", (IGI April 2013), and National Roads Authority (NRA) Guidelines on Procedures for the Assessment and Treatment of Geology, Hydrology & Hydrogeology for National Road Schemes, (NRA 2008).

Other related guidelines include the 'Environmental Management in the Extractive Industry' (EPA 2006), the Irish Concrete Federation (ICF) 'Environmental Code' 2nd Edition, (2005) and Quarries and Ancillary Activities - Guideline for Planning Authorities", issued by the Department of Environment, Heritage and Local Government (2004).

As well as the Environmental Impact Assessment requirements there are a number of regulations, acts and directives regarding the Irish legislative context for the assessment of the water attributes of the project, some of which are summarised below.

The main legislation relating to Water in Ireland are grouped under the Water Framework Directive (2000/60/EC) (WFD) which requires all Member States to protect and improve water quality in all waters so that good ecological status can be achieved by 2015 or, at the latest, by 2027. It was given legal effect in Ireland by *inter alia* the European Communities (Water Policy) Regulations 2003 (S.I. No. 722 of 2003) (as amended), European Communities Environmental Objectives (Surface Waters) Regulations (S.I. No. 272 of 2009, amended by S.I. No. 385 of 2015) and Groundwater Regulations (S.I. No. 9 of 2010, amended by S.I No 366 of 2016). It applies to all rivers, lakes, groundwater, and transitional coastal waters.

The Surface Water Regulations set a wide range of environmental standards for Irish surface waters. The Groundwater Regulations establish environmental objectives for groundwater bodies and include groundwater quality standards and threshold values for the classification of groundwater and the protection of groundwater against pollution.

The Directive requires that management plans, based on River Basin Districts (RBD), be prepared on a river basin basis and specifies a structured method for developing these plans. Under the WFD water quality of River Basin Districts is assessed biologically, physically and chemically. Assessment is done using surveys that are predominately conducted by the EPA and local authorities and supported by other government bodies including Inland Fisheries.

The Salmonoid Regulations, (European Communities (Quality of Salmonoid Waters) Regulations SI 293 of 1988), set water quality standards for salmonoid waters, with identification of salmonoid waters, water quality standards, and frequencies of sampling and methods of analysis and inspection.

The Local Government (Water Pollution) Acts 1977 – 1990, is the main legislation for the prevention and control of water pollution, including the general prohibition of discharge of polluting matter to waters, licensing discharges, fines and prosecution, water quality standards and management plans.

7.1.3 Methodology

The methodology and scope of the assessment involved the completion of an initial Desk Study that included the collation and review of any available information pertaining to the quarry site including any hydrological or groundwater studies or databases relevant to the proposed development site and local area, such as the previous 2014 EIA, and on-line Tailte Eireann Maps, EPA, Geological Survey of Ireland (GSI) and Office of Public Work (OPW) databases.

This was followed by a number of recognisance visual Site Walkover surveys, completed by VCL during periodic site visits in 2014, 2015, 2020, 2024 and 2025 that enabled the physical examination of the

geological, geomorphological, hydrological and land use characteristics of the site and its setting in the locality. The study area is about 2km around the site, as recommended by the 2013 IGI Guidelines.

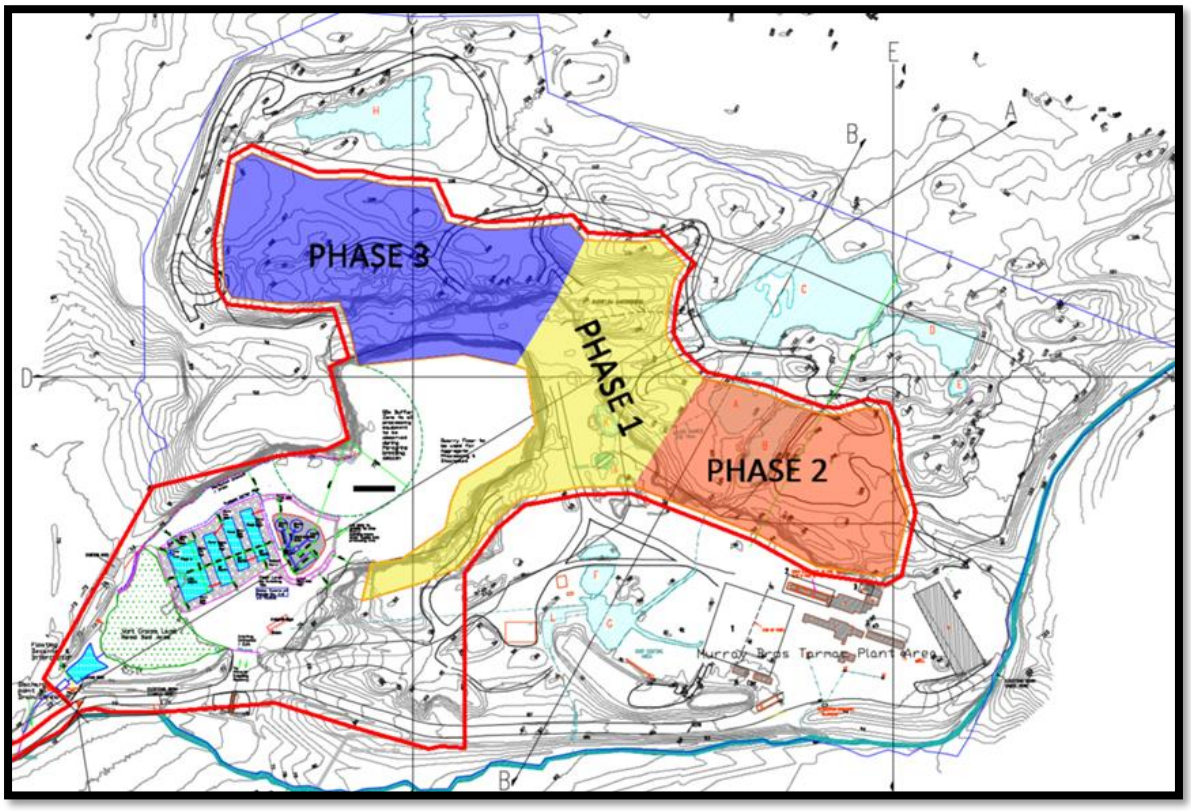
A number of Surface Water and Groundwater Sampling rounds from the stream and existing site well were completed by VCL during site visits in July 2014, May 2020 and July 2023.

Additional groundwater monitoring sampling points were established by the completion of five new boreholes around the site in October 2024 and these were sampled in January 2025.

The future expansion development relates to the quarrying of quartz rich sandstone and siltstone bedrock in three phases, primarily in the central (Phase 1), northeastern (Phase 2), and northwestern (Phase 3), areas of the existing quarry site. While natural soil cover is thin (<1m) there are some areas of subsoil berms and old settlement ponds in the proposed expansion area which will require removal.

The overall landholding is ~25 hectares (ha) while the footprint of the proposed expansion areas are about 1.75 ha (Phase 1), 1.2 ha (Phase 2) and 2.06 ha (Phase 3) with a total extraction area of 5.01 ha. The quarrying period is anticipated to be completed over a duration of about 20 years. Refer to the quarry areas and information outlined in the quarry expansion EIAR Chapter 2 - Project Description and the general setting of the extraction area phases, as shown in Figure 7.1.

Figure 7.1 Proposed Ardcahan Quarry Extraction Area Phasing.



In this chapter the historic baseline conditions and nature of the hydrological and hydrogeological characteristics of the site are presented and the potential impacts anticipated from the future expansion of the quarry are identified and discussed. Mitigation measures are considered, and potential residual impacts are assessed.

This chapter should also be read in conjunction with EIAR Chapter 1 - Introduction, Chapter 3 – Project Description, Chapter 6 - Land Use/Soils, (Geology), Chapter 11 - Landscape & Visual Impact and Restoration, Chapter 14 - Biodiversity and Chapter 16 – Significant Interactions of Impacts.

Consultation was carried out with the relevant bodies by the project planning co-ordinator, including An Coimisiún Pleanála (ACP), the GSI, Cork Co. Co., and EPA. A summary of the third-party responses received are presented in Chapter 1 and Appendix 1.1 of the EIAR.

7.1.3.1 Potential Effects Assessment Methodology

The methodology used for the analysis of the predicted effects/impacts of the proposed quarrying on the water attributes during and after the quarry expansion works, is consignment of Annex IV of Directive 2014/52/EU, and primarily follows the EPA EIAR Guidance Documents, (EPA 2022 and 2017), NRA Guidance (2008/9) and Appendix C of the IGI EIS Preparation Guidelines (IGI 2013).

The guidelines provide criteria for ranking of the identified water features within the study area and the rating of potential impacts from the project on the water environment is assessed by, (1) Classifying the importance of the relevant attributes, (2) Quantifying the likely magnitude of any impact on these attributes, (3) Determining the resultant significance of the effects on the attribute. The impact assessment is presented in detail in Section 7.4.1 of this document.

7.1.4 Site Surveys and Investigations

Given the quarrying history and pre-1963 origin of the site, there is a lot of bedrock exposure visible on the quarry faces, the quarry floor and northern extent of quarrying across the site.

A site specific geophysical survey, (apex geophysics January 2023), was completed for the northern portion of the site where the majority of the expansion works are proposed. This is discussed in more detail in Chapter 6 – Land/Soils/Geology and included in Appendix 6.5.

In October 2024 five new boreholes were drilled around the site by specialist contractor Southern Pumps, in order to assess the nature of the bedrock and provide long term groundwater monitoring points. Permanent 50mm HDPE monitoring standpipe was installed with a gravel pack in each borehole. The borehole drilling logs are presented in Chapter 6 Appendix 6.6.

Sampling of the adjacent surface water stream and existing site well was completed by VCL for the EIAR works in July 2023 and again, with four of the new boreholes in January 2025. Follow up groundwater level monitoring was completed on the site by VCL in May and August 2025. The VCL Site Photos are included in Appendices 7.3 and 7.6, the sampling logs are presented in Appendices 7.4 and 7.7 and lab results from the water sampling are presented in Appendices 7.4 and 7.8.

7.1.5 Difficulties Encountered in Compiling Information

No difficulties were encountered in the preparation and data assessment for this EIAR chapter.

7.2 Proposed Development

This proposed development involves quarrying of quartzitic sandstone and siltstone bedrock, thereby extending the existing old quarry extraction area. Reserves at the quarry are estimated to equate to be approximately 3,680,000 tonnes of aggregate from an area of 5.01 Ha.

The rock will be extracted using industry-standard blasting methods to produce broken rock by creating a series of benches generally of the order of 15m to 25m deep. The number of benches will vary depending on the existing ground level being excavated into. The final quarry floor across the site will be down to a maximum depth of 75mOD which is the existing quarry floor level in the southwestern portion of the site.

It is anticipated that the proposed quarrying activities will generally produce between 155,000 to 230,000 tonnes of aggregate per annum. Depending on the phase being worked, the demand and market conditions, the quarry is estimated to have an upper annual output of 270,000 tonnes.

The project site overlaps with lands under consideration for Substitute Consent by way of a concurrent planning application[1]. The former post 1990 extraction area and adjoining lands in the south for which substitute consent is being sought are included in this prospective application to accommodate ancillary quarry activities (internal roads, aggregate processing, settling ponds, stockpiling etc) associated with the proposed future extraction.

The application site does not include the south-eastern part of the landholding occupied by the adjacent macadam plant, admin buildings and associated works, permitted under Reg. Ref. 98/294.

7.3 Description of Existing Environment

7.3.1 Site Location and Setting

The Ardcahan Quarry is located in a rural setting about 3.5km northeast of Dunmanway Town in West Cork. The history of the site is one of rural hilly woodland and scrub with little agricultural use, as can be seen on the old OSI 1840's 6" and early 1900's 25" Map Surveys for the locality. Refer to the old ordnance survey mapping presented in Appendix 6.1.

The land immediately around the quarry consists of scrub, woodland and agricultural grass land. The site is accessed from the public road (R587) via a third-class road from the Inchicahan Crossroads and has its entrance in the south-western corner of the site. Refer to the Site Location Description in Chapter 2.

The site is located on a broad ridge or hill with the lower ground levels (~72 to 75 MOD) in the southwestern area, with the natural topography rising to the north and east. A small unnamed watercourse, (referred to as the 'boundary stream'), which is a tributary of the River Bandon, forms the southern and eastern boundary of the site and the majority of the site and local area around the site is in the catchment of this watercourse.

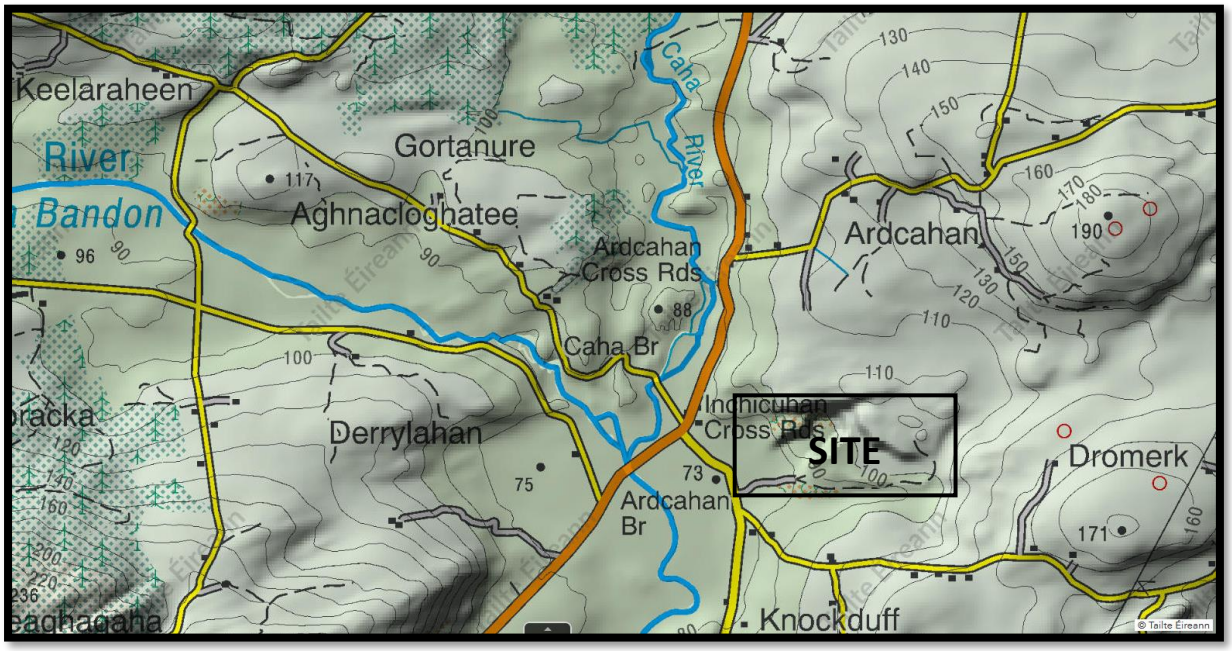
The northern area of the site forms the top of the ridge which has the higher ground levels (110 to 118 mOD) which is on the western side of an area of higher undulating topography and hills which form the eastern part of the Caha River catchment. Refer to Tailte Eireann 1:50,000 scale topographical map included in Figure 7.2.

The junction of the Caha and Bandon Rivers is located about 400m west of the site boundary and the Bandon River then flows southwards in a broad valley towards Dunmanway.

The small 'boundary stream' watercourse near the site enters the River Bandon about 400m to the southwest of the main access gate and western boundary of the quarry site.

[1] An application for Substitute Consent under Section 177E of the Planning and Development Act 2000, as amended, has been submitted to An Bord Pleanála to regularise extraction and ancillary quarrying activities which took place at Ardcahan Quarry between 1990 and 2014.

Figure 7.2 Site Location showing topography and local river systems. (Source GSI on-line maps).



The macadam production plant, which received planning and commenced operation in 1998, is located in a previously quarried area (pre 1990) in the eastern, south-eastern part of the site.

The macadam plant site office, administration buildings and toilet facilities, including percolation area, drainage (including an interceptor), and the sites groundwater well are also located in this area. The bitumen batching and preparation area is located to the west of the admin building in the old quarry area in the south central part of the site. There are a number of shallow ponds for retaining wash and cooling water in this part of the site.

The main (post 1990) quarry extraction area was established in the southwestern portion of the site, which was also used as the main rock crushing and product stockpile area. The quarry had a permanent settlement pond system situated in the SW corner downgradient of this area.

The northern part of the site has not been quarried but portions of it were used for stockpiling subsoils and crushed rock, for the creation of suspended solids settling ponds and one area in the north-eastern area was used for backfilling with excess surplus fines material from the bitumen production.

A number of shallow ponds/lakes have also evolved in the northern part of the site by the placement of soil/subsoil berms around the natural depressions and lower-lying areas. These ponds were used for storing water for use in the quarry and macadam plant areas as necessary.

7.3.2 Regional Hydrological Catchments

The Ardcahan Quarry site is situated in the South Western River Basin District (SWRBD), with all the surrounding river catchments, as defined by the Water Frame Work Directive (WFD), located within Hydrometric Area (HA) No. 20 (Bandon-Ilen ID 20), which covers an area of ~1,800km^2, from Mizen Head to the west, Cork Harbour to the East and Coppeen to the north.

The WFD sub-catchment for the rivers to the northwest of Dunmanway is identified by the EPA as Bandon_SC_010 with the majority of the quarry site located with the Sub Basin Bandon_020 catchment which covers an area of 48.34km^2.

A small section of the northern boundary of the site is located on the southern boundary of the Sub Basin Caha_020 catchment. Refer to the EPA Catchment Maps included in Appendix 7.1.

As mentioned previously, the main hydrological feature near the site is a small unnamed stream that flows along the sites eastern and southern boundaries. This small watercourse, (referred to as the boundary stream), has an estimated catchment area of about one square kilometre (1km^2) of which the site area occupies approximately 25%. The remainder of the catchment is occupied by upland agricultural grassland and scrub vegetation. The stream flows adjacent to the site close to its eastern and southern boundaries and reaches the Bandon River, (Bandon_SC_010), about 400m to the

Figure 7.3 Hydrology features in site locality, with estimated extent of the local stream catchment.



7.3.2.1 Water Framework Directive

The EIAR also provides an assessment of the development's compliance with the WFD.

The EU Water Framework Directive (2000/60/EC), as amended by Directives 2008/105/EC, 2013/39/EU and 2014/101/EU, was signed into law in October 2000. It requires EU member States to achieve water quality of at least *Good Status* in rivers, lakes, groundwater, estuaries and coastal waters by 2027 at the latest. The Directive was transposed into Irish law by the European Communities (Water Policy) Regulations 2003 (S.I. No. 722 of 2003).

The Directive requires that all member states protect and improve water quality in all waters, with the aim of achieving good status by 2027. Any new development must ensure that it doesn't compromise this core requirement of the Directive.

The WFD is implemented through the River Basin Management Plans (RBMP) in 6-year cycles. WFD Cycle 1 covered the period 2010 – 2015; WFD Cycle 2 covered the period 2016 – 2021; and WFD Cycle 3 covers the period 2022 – 2027. Ireland's 31 local authorities coordinate water quality management across a five region structure. As described in Section 7.3.2, the Ardcahan Quarry site is located in the WFD Southwestern River Basin District (WFD Catchment 20 Bandon-Ilen) and the local surface water feature is the River Bandon, (WFD Bandon_SC_010), located about 400m to the west or the site.

As shown by the EPA Mapping included in Appendix 7.1 the current WFD Cycle 3 Quality Status shows both the Bandon_020 and Caha_020 rivers as both have a Moderate Quality Status and both rivers systems are identified as having a High Risk Status.

The EPA High Risk Status represents the risk of a waterbody failing to meet its WFD objectives by 2027.

The EPA map notes reference that, *"the risk of not meeting WFD objectives was determined by assessment of monitoring data, data on the pressures and data on the measures that have been implemented. Waterbodies that are At Risk are prioritised for implementation of measures. This assessment was completed in 2020 by the EPA Catchments Unit in conjunction with other public bodies and was primarily based on monitoring data up the end of 2018*".

For waterbodies that are classified by the EPA as 'At Risk of not meeting their WFD objectives' an evidence-based process was undertaken to identify the significant pressures; once a pressure is designated as 'significant', measures and accompanying resources are needed to mitigate the impact(s) from this pressure. These At Risk waterbodies require not only implementation of the existing measures described in the various regulations, e.g. the Good Agricultural Practices Regulations, but also in many instances more targeted supplementary measures.

The pollution pressures identified by the EPA for the Bandon River are related to Agricultural Risk Pressures. It is not identified to have Extractive Industry and Anthropogenic Risk Pressures.

An assessment of the development's compliance with the requirements of the WFD is included in Section 7.9.

7.3.3 Local Site Hydrology

The natural topography of the site area means that, except for a small portion of the northwestern area, all the sites surface water flows from the upland areas in the north to the lower ground in the south and southwest. This flow direction has generally been maintained during the period that the quarry has been operating, apart from with some local changes to the sites drainage pattern and discharge locations to the local watercourse, especially with the evolution of a number of site ponds and surface water management features and the development of the adjacent macadam plant.

There are a couple of small areas that were used as shallow settlement ponds for wash water in the upper area of the quarry have been named Ponds A and B. These now tend to be dry, except after heavy rainfall, as there has been no quarrying or aggregate washing activity on the site since 2014.

Local depressions on the northern side of the site were bunded with subsoil material which allowed the formation of a number of more permanent pond features. Two, Ponds C and D, are located to the north of the settlement ponds (A & B), while Pond H is located in the north-western part of the site.

Ponds C and D drain eastwards to very small water feature (identified as Pond E), which is reportedly connected to the local stream on the eastern boundary via buried piping, (Location 01). No evidence of these pipes was found during the VCL site walkovers, but access is very restricted and the area is very overgrown, so their exact location couldn't be confirmed.

Other shallow ponds are present in the middle level of the site in the macadam production area that have been identified as Ponds F, G and L. These collect runoff from the eastern side of the macadam plant and are used for retaining wash and cooling water for the bitumen production. While a lot of water is re-used and recycled between these ponds, Pond L has an overflow channel which passes through an interceptor before discharging via an open ditch to the small watercourse flowing along the southern boundary of the site, (Discharge Location 02).

There was a small wash water pond (Pond K) related to the old water treatment system to the north of these ponds, but this has been decommissioned and backfilled since 2014.

In the old quarry floor area surface water pools on the ground and either evaporates, percolates slowly into the fractured bedrock or flows down gradient to the southwestern corner of the site. There is a shallow drain along the northwestern edge of the old quarry floor which drains runoff from the old quarry face area to the southwestern corner of the site.

In the SW corner of the old quarry floor there are two small ponds, (Pond I and J), that were created by shallow berms and acted as seasonal settlement ponds which retained the site discharge water before it either percolated to ground or overtopped to a local drainage ditch and entered the local stream via a pipe going under the main access road to the quarry.

This stream enters the Bandon River about 400m to the south, south-west of the site entrance.

It is important to note that the overall size of the quarry catchment or the general destination of the rainfall runoff to the local boundary stream and ultimately to the Bandon River has not changed due to the quarrying activity.

While some surface water retention in the sites ponds has been established, that would reduce potential peak flows as they fill up, the overall water budget, runoff or recharge characteristics for the site area have not significantly changed due to the historic quarrying activities.

7.3.4 On-site Quarry Surface Water Catchments

A detailed topographical survey of the whole site area, completed by drone survey in 2014, and this, together with observations during the site walkovers the site area, has enabled the identification of six small sub catchments, (named A1 to A6), across the quarry site. This survey map showing theses catchments is presented in Appendix 7.2, a description is given below with risk summary in Table 7.1.

Area A1 is a small bunded area on the eastern side of the site which used to be used for the deposition of surplus fines material which is a by-product of the macadam plant production. While there is no obvious discharge location from Area A1, (with all water percolating to ground), there are reportedly pipes under this area which allow overflow water from the large ponds (Ponds C and D), in catchment Area A6, to discharge to the boundary stream adjacent to the eastern edge of Area A1, (Discharge Location 01).

Area A2 includes the area to the west of A1 and the eastern side of the macadam plant. Water from the upper part of this catchment can runoff to the local stream via a ditch, (Discharge Location 02), while the concrete floor in the macadam plant aggregate storage and processing area drains to the stream via three silt trap manholes and an old interceptor, (Discharge Location 03).

Area A3 occupies the central part of the site which includes the old settlement ponds on the upper level, (Ponds A & B), and the three shallow ponds (Ponds F, G and L), used by the bitumen production facility. The overflow from Pond L, is via an interceptor, through woodland and under the access road via a pipe to the boundary stream, (Discharge Location 04).

Area A4 occupies the southwestern area of the quarry site including the old quarry floor area and adjacent rock faces and benches. The main discharge point for this area is via the settlement ponds (Ponds I and J), to the local stream under the sites access road, (Discharge Location 05).

Area A5 is located in the northwestern area of the site and runoff is either westwards from the low-lying area occupied by Pond H or northwards into the scrub land on the north side of the internal old access track which was created in this area.

Area A6 is located in the northeastern area of the site and includes Ponds C and D, the overflow from which is reportedly piped under Area A1 to the boundary stream (Discharge Location 01) to the east.

A description of the catchment areas, discharge locations and current runoff risk is summarised below in Table 7.1. The current runoff risk is primarily related to the macadam plant activity in Catchment Areas 2 and 3 and when there is occasional vehicular activity around the old Quarry Floor in Area 4.

Table 7.1 Summary of On-Site Surface Water Catchments (See the site map in Appendix 7.2).

Area ID	Description	Discharge to Stream Location	Risk
Area 1 (A1)	Small area on surface of macadam process plant fines deposition site	No direct linkage to a discharge point. (Risk of slippage of fines slope is considered low.)	Low
Area 2 (A2)	Upper area to north of and around the macadam plant process Area.	Upper area runoff can flow to road site ditch (Loc 02) while macadam plant area goes to drains and pipe to stream (Loc 03). Established in late 1990's.	High
Area 3 (A3)	Central part of old quarry area (now used as part of the macadam process area) and up-land area to north.	Ponds A, B, F, G, K and L are in this area which discharge to stream via overflow from Pond L, (Loc 04). Original quarry discharge established pre-1990.	Medium
Area 4 (A4)	Large area covering southwest part of site where main quarrying was done. The area is now only occasionally accessed by quarry vehicles.	Ponds I and J are located in the SW corner – lowest part of the site where water drains to. Connected to stream via overflow ditch, (Loc 05). Likely that original site drainage was in this area but enhanced in 1990's.	Low – to Medium
Area 5 (A5)	North-western part of the site – little development in this area.	Contains Pond H but there is no evidence of connectivity to the active quarry or linkage to a discharge point.	Low
Area 6 (A6)	North-eastern part of site area with freshwater ponds and no quarrying.	Contains Ponds C, D and E which contain clear surface water that overflow to stream via buried pipe (Loc 01). Pipe discharge probably established in late 2000's	Low

The linkage between ponds is shown on the site map in Appendix 7.2 and photos of the ponds and drainage systems in the small quarry site catchments are presented in Appendix 7.3.

It is important to note that despite the quarry's proximity to the adjacent boundary stream the surface water runoff is prevented from directly entering it, except at the discharge locations described previously, as the fall of ground is generally away from the stream and sloping back into the quarry site in most areas and also by the presence of a continuous earthen berm which runs along the eastern and southern edge of the access road of the quarry. The camber of the quarry access road is generally northwards, back into the quarry site, preventing runoff going directly to the watercourse.

The future quarrying related runoff risk for the development's expansion will primarily relate to Catchment Area 4 with all storm water from the Phase 1 to 3 areas flowing towards Discharge Location 05 in the southwestern corner of the site. Other site catchments may be impacted by increased vehicle movement via the established internal track on the northern boundary of the expansion area.

7.3.5 Surface Water Sampling

A couple of rounds of surface water sampling were completed by VCL on the adjacent boundary watercourse up-stream and down-stream of the site in July 2023 and January 2025.

Samples were acquired directly into laboratory containers and delivered to an accredited independent laboratory for analysis for a range of water quality parameters.

The surface water sample logs and sample results are presented in Appendix 7.4.

7.3.6 Hydrogeology

The GSI has devised a system for classifying the aquifers in Ireland based on the hydrogeological characteristics of the bedrock as well as the potential size and productivity of the groundwater resource. Groundwater in Ireland is derived from open fracture or fissures in the bedrock which is identified as secondary permeability rather than groundwater coming from pores or openings in the rock fabric which is identified as primary permeability. The GSI aquifer classification depends on a number of parameters including, the aerial extent (km^2), well yield (m^3/d), specific capacity ($m^3/d/m$), aquifer transmissivity (m^2/d) & groundwater flow.

The three main GSI aquifer classifications are listed as follows:

(1) Regionally Important (R) Aquifers

(i) Karstified aquifers (**Rk**)

(ii) Fissured bedrock aquifers (**Rf**)

(iii) Extensive sand/gravel aquifers **(Rg)**

(2) Locally Important (L) Aquifers

(i) Sand/gravel (**Lg**)

(ii) Bedrock which is Generally Moderately Productive (**Lm**)

(iii) Bedrock which is Moderately Productive only in Local Zones (**Ll**)

(iv) Karstified Bedrock (**Lk**)

(3) **Poor (P) Aquifers**

(i) Bedrock which is Generally Unproductive except for Local Zones (**Pl**)

(ii) Bedrock which is Generally Unproductive (**Pu**)

The GSI classifies the Caha Mountain Formation (CH) bedrock underlying the Ardcahan Quarry area of the site, as a Poor Aquifer which is Generally Unproductive except for local zones (Pl).

The Gunpoint Formation (GP) located to the south of the site is classified by the GSI as a Locally Important Aquifer which is Moderately Productive only on local zones, (Ll).

Refer to the GSI On-Line Mapping Database Aquifer Mapping presented in Appendix 7.5.

7.3.7 Groundwater Vulnerability

The vulnerability of a groundwater body is the term used to describe the ease with which the groundwater in the area can be contaminated by human activities. The vulnerability is determined by many factors including the speed at which the contamination can enter the aquifer, the quantity of contaminants and the capacity of the deposits overlying the bedrock to attenuate contaminants.

These factors in turn are based on the type, thickness and permeability of the subsoils, e.g. groundwater in bedrock which has a thick cover of low permeability clay is less vulnerable than the groundwater in bedrock which is exposed at the surface.

It is important to note that all the bedrock extraction on the Ardcahan quarry site is done above the water table, and the site is operated as a 'dry' quarry in this regard.

The criteria for determining groundwater vulnerability, as developed by the GSI and Department of Environmental and Local Government (DoELG), are shown in Table 7.2.

Table 7.2 GSI Groundwater Vulnerability Mapping Guidelines (DoELG 1999)

Vulnerability Rating	Hydrogeological Conditions				
	Subsoil Permeability (Type) & Thickness			Unsaturated Zone	Karst Features
	High Permeability (sand/gravel)	Moderate permeability (e.g. sandy subsoil)	Low permeability (e.g. clayey subsoil, clay, peat)	(sand/gravel aquifers only)	(<30m radius)
Extreme (E)	0 – 3.0m	0 – 3.0m	0 – 3.0m	0 – 3.0m	-
High (H)	>3.0m	3.0 – 10.0m	3.0 – 5.0m	>3.0m	N/A
Moderate (M)	N/A	>10.0m	5.0 – 10.0m	N/A	N/A
Low (L)	N/A	N/A	>10.0m	N/A	N/A
Notes: (1) N/A = not applicable (2) Precise permeability values cannot be given at present (3) Release point of contaminants is assumed to be 1-2m below ground surface					

Regional Groundwater Vulnerability Maps have been produced for the country by the GSI, and these have six classifications. 'Extreme' and 'Extreme rock near surface' or 'karst' are those areas most at risk from contamination and mitigation measures should be put in place for their protection. Areas classified as having 'High' vulnerability are less vulnerable to contamination; however, they still need a certain measure of protection. 'Moderate' and 'Low' vulnerability areas have natural protection in place and mitigation measures do not usually need to be put in place assuming no reduction in soil thickness. In areas which have been classified as 'High-Low' only an interim study has taken place.

An Extreme Vulnerability (E) rating has been given over the whole Ardcahan study area indicating a consistent subsoil thickness cover of less than 3m. This would be expected for a quarry area and/or an area with naturally thin soil cover as is the case of the quarry site. The GSI Vulnerability Map for the locality is presented from the GSI On-Line Database is presented in Appendix 7.5.

7.3.8 Groundwater Body Classification

Under the Water Framework Directive (WFD), different geological bedrock formations have been grouped into similar 'rock unit groups' (RUGs), of similar hydrogeological characteristics. The RUG in the site area including the Caha and Gun Point Formations identified as is the Devonian Old Red Sandstones, (ORS). The GSI RUGs map is included in Appendix 7.5.

Large areas of RUGs are combined to be defined as 'groundwater bodies', the management unit for groundwater for the purposes of the Water Framework Directive. The site area and local area are

underlined by the Bandon Groundwater Body, (IE_SW_G_086) which is described as 'poorly productive bedrock', that covers an area of 775km^2 in West Cork.

The overall status of each GWB has been assessed as either 'Good' or 'Poor' as part of the WFD implementation work in Ireland. The Under the WFD classification system the quality of the groundwater within the 'Bandon Groundwater Body', which includes the Bandon and Caha River Catchments was classified by the EPA as having "Good Status".

Pressures on groundwater quality generally arise from agricultural practices, septic tanks and industrial development. No risk from quarrying activities was identified in the EPA assessment. The EPA mapping of the Groundwater Body and Status are included in Appendix 7.5.

An assessment of the development's compliance with the requirements of the WFD is included in Section 7.9.

7.3.9 Groundwater On-Site Well & Monitoring Boreholes

The Ardcahan quarry has its own drinking water production supply well (PSW) which was drilled in the macadam plant yard area in the late 1990's. The water is used as a potable supply for the site canteen and wash water in the site's welfare facilities. Water usage is generally low and there have been no water supply or significant quality issues since its instillation.

In October 2024 five new boreholes (BH101 to BH105) were drilled around the site area in order to provide geological and hydrogeological information. Borehole BH101 was drilled on the old quarry floor while BH102 was drilled at the higher ground level on the west side of the macadam plant area. Boreholes BH103, BH104 BH105 were drilled in the high ground along the access track in the northern area of the site, in the NW corner, the central area and NE area, respectively. All were installed with standpipes to allow water level monitoring and sampling.

The well and new borehole locations are shown on the site catchment map in Appendix 7.11. The original borehole drilling logs are included in Appendix 6.6 with some site photographs of the drilling locations, borehole head works included in Appendix 6.7. VCL Photos of the Sampling Works are included in Appendix 7.6. A summary of the borehole information is presented in Table 7.3.

Table 7.3 Summary of GW Monitoring Boreholes drilled on the Ardcahan Quarry Site, (Oct 2024).

BH ID	BH Location	Rock Depth	BH Depth	Water Strikes	Ground Level	Jan GW Level
BH101	Old Quarry Floor	0.0m	18.5m	4m, 11m, 15m	~75m OD	1.13m BGL
BH102	Near bitumen shed	0.6m	22m	None	~91m OD	7.85m BGL
BH103	NE Area	3m	40m	4m, 28m	~110m OD	2.21m BGL
BH104	North Central	2.7m	43m	4m, 11m, 29m	~111m OD	3.23m BGL
BH105	NW Corner	5m	43m	5.4m	~108m OD	2.54m BGL

The sites well and four of the five new boreholes were sampled by VCL in January 2025. Groundwater levels were recorded by VCL from all the boreholes in May and August 2025.

Representative samples were acquired by abstracting a large volume of groundwater from each borehole and these were brought to an independent laboratory for the analysis of a range of water quality parameters. The sampling logs are presented in Appendix 7.7, and the tabulated results are presented in Appendix 7.8.

7.3.10 Groundwater Flow Direction

The direction of groundwater movement is principally influenced by topography, and the groundwater table is generally a subdued reflection of the ground surface. Therefore, for the Ardcahan Quarry site

area the natural groundwater flow direction is expected to flow in a south to south-westerly direction towards the small stream on the southern boundary of the site and/or towards the Caha and Bandon Rivers located to the southwest.

Previous test holes drilled to 20m below ground level in the northern half of the site reportedly did not encounter any groundwater, however no monitoring infrastructure was installed on the site at that time. Refer to the historic drilling logs included in Appendix 6.4.

As shown in Table 7.3 the recent groundwater monitoring boreholes support this groundwater flow direction from the high ground in the north to the low-lying quarry floor in the southwest.

No significant changes to the site groundwater flow direction would be anticipated to have occurred due to the previous quarrying work or would be anticipated to occur in the future.

Similarly given the naturally low permeability soils and rock outcrops which would have been originally present, the GSI recharge value for the site will not be significantly changed by quarrying activities completed and proposed on the site.

7.3.11 Stormwater Runoff

The proposed quarry expansion covers approximately five hectares of the central (Phase 1), eastern (Phase 2) and western (Phase 3) areas of the site. Currently the majority of the proposed extraction is within the local catchment area identified as A4 which represents the old quarry area in the southwestern and central part of the site. The majority of the 1.2 Ha area of Phase 2 is currently within the northern portions of the catchment areas A2 and A3. As excavation works progress the lower topography of the ground will mean that all rainfall precipitation that falls in the expansion area will flow towards the old quarry and low-lying southwestern corner as runoff, with some limited percolation to ground also occurring.

The majority of the proposed future expansion areas have already been stripped of soils and are primarily composed of exposed bedrock with no or just thin soil cover. Therefore, the runoff coefficient, aquifer recharge and stormwater runoff characteristics of the site are not expected to significantly change as the quarry works progress.

The annual rainfall in this part of the Ireland is given by Met Eireann as being between in the order of 1,200 to 1,400 mm and an average annual rainfall (AAR) of 1,243mm/yr is given for the Dunmanway area. Data from the GSI gives an effective evaporation value for the south of Ireland as 486mm/yr giving an effective annual precipitation of 757mm/yr.

Percolation to ground in terms of aquifer recharge of a Poor Bedrock Aquifer (Pl) is given by the GSI as about 50mm to 100mm/yr therefore the majority of the effective rainfall will collect on the site as surface water which will pond on the quarry floor and flow to the existing surface water ponds and discharge locations. In the southwestern corner of the site these are Ponds I & J and Location 05.

The surface water control system that was and is still in place in the southwestern portion of the site is a water settlement and attenuation pond area located down hydraulic gradient of the old quarry floor. This area forms the lowest topographical area of the site with ground heights of 72 to 73m OD.

The main pond (Pond I) is triangular in shape and has a berm on the two down gradient sides and is open to the existing quarry floor on the up-gradient side. Surface water runoff goes to Pond, and the water level and size of the pond is allowed to increase and decrease east wards, towards the old quarry floor, as the amount of runoff changes depending on rainfall duration and intensity.

Pond I over tops its western berm to the small lower pond (Pond J) which allows some further attenuation before overtopping a final berm and flowing to a drainage ditch which flows to the adjacent watercourse via a pipe under the main access road to the site.

It is proposed to improve the control of the sites discharge flow by constructing a discharge chamber in the Pond I berm which will have a moveable sluice system and then installing an interceptor in the Pond J discharge, so that the potential of any residual suspended sediment or hydrocarbons occurring in the site discharge is mitigated. A 24-hour solar powered turbidity probe is to be incorporated in the Sluice Discharge system from Pond I which will enable real time monitoring of water quality.

All the storm water runoff from the southwestern quarry area discharge from Ponds I and J to the drainage ditch and then adjacent watercourse. This is identified as the site's discharge Location 05.

7.3.12 Flooding Risk

The Office of Public Works (OPW) website (www.floodinfo.ie), was reviewed for information on the National Indicative Flood Mapping and the Ardcahan Quarry site area is shown to be outside the map extent of any of the OPW fluvial flood hazard scenarios of, Low and Medium Probability and Mid-Range Future and High-End Future Scenarios. The Ardcahan Quarry does not form any part of the flood plain for the Caha or Bandon River systems and no part of the proposed development is in a flood risk area or has any history of flooding.

Figure 7.4 Image of OPW Flood Risk Hazard Mapping for the Bandon and Caha Rivers at Ardcahan.



As per the OPW Mapping, no parts of the Proposed Development Site are mapped within any fluvial flood zones (Flood Zones A - B). The Ardcahan Quarry Site is located above the mapped 1,000-year flood level and therefore all infrastructure is located in Flood Zone C (Low Risk).

The flooding of the low-lying fields adjacent to the Bandon and Caha Rivers west of the site is shown and two historical flooding events were found to be registered in proximity (<1km distance) to the site. OPW records from Feb 1991 and Feb 2007 show flooding of the road at the Inchacuhan Crossroads and in the Ardcahan Bridge area.

The scale of the site (0.25km^2) and the adjacent stream catchment (~1km^2) with regard to the Caha and Upper Bandon river catchment areas above the Ardcahan Bridge (~100km^2) and the size of the

overall Bandon River catchment area (~400km^2) means that the potential for any site runoff to increase the flooding potential downstream would be considered extremely low to negligible.

The presence of the attenuation ponds and control of the sites discharge rate, which is designed to retain excess stormwater on site in the wet grassland area, will reduce the peak storm water runoff flows from the site and not increase downstream flooding risks.

In relation to climate change, the OPW mapping modelled flood extents for the Mid-Range and High-End Future Scenarios in relation to fluvial flooding. The Mid-Range scenario accounts for a 20% increase in rainfall rates due to climate change in future years while the High-End scenario accounts for a 30% increase. OPW Modelling for both the Mid-End and High-End scenarios indicated flood extents that align with the present day scenario and therefore, future climate change related rainfall is not considered a risk in relation to flooding.

Based on the information provided in the OPW National Indicative Flood Mapping it can be concluded that overall, the proposed development has low vulnerability to current or future flood risk.

7.3.13 Areas of Scientific Interest

A review of the EPA and National Park & Wildlife Service (NPWS) on-line database shows that the local stream from where it goes under the public road near (~40m from the site entrance), is part of the Bandon River Special Area of Conservation (SAC - Ref No. 002721).

The Dunmanway Bandon River Valley southeast of Dunmanway Town is a designated proposed National Heritage Area (NHA) and is located approximately 3km south of the site.

The ecological aspects of the site are discussed in more detail in Chapter 12 – Biodiversity.

7.3.14 Surface Water Quality

Two rounds physico-chemical grab samples were taken by VCL for the EIAR at two locations on the small watercourse adjacent to the site in July 2023 and January 2025.

The upstream sampling location (AQUS) is upstream of the macadam plant area near the site drain identified as Discharge Location 02, while the downstream location (AQDS) is adjacent to the public road at the sites access gate downstream of Discharge Location 05. (Note that for the July 2023 sampling round this location had to be brought slightly upstream near the sites access gate due to livestock having direct access to and impacting the water quality from the field opposite the site access road). Refer to the sampling photos in Appendix 7.3.

The physico-chemical parameters were compared with the surface water standards from the EPA and those in the surface water regulations (SI 77 of 2019). The water quality of the small water course can be described from this sampling suite as in good condition with only minor influence from the surrounding land practices and no evidence of significant impact. Nutrient parameters assessed indicate a good water quality with low levels of Phosphate, BOD, COD, Ammonium and Nitrates and no evidence of suspended solids at either sampling location.

Refer to the Surface Water Sampling Results presented in Appendix 7.4.

7.3.15 Surface Water Abstractions & Licensed Facilities

According to the online EPA database, no portion of the Caha or Bandon Rivers in the vicinity of the site (<10km) are identified as a drinking water abstraction resource.

There is an active IPPC license on the Bandon River granted to Carbery Milk Product Ltd., (EPA Ref PO-390-04) that is located downstream of Dunmanway and over 5km from the site.

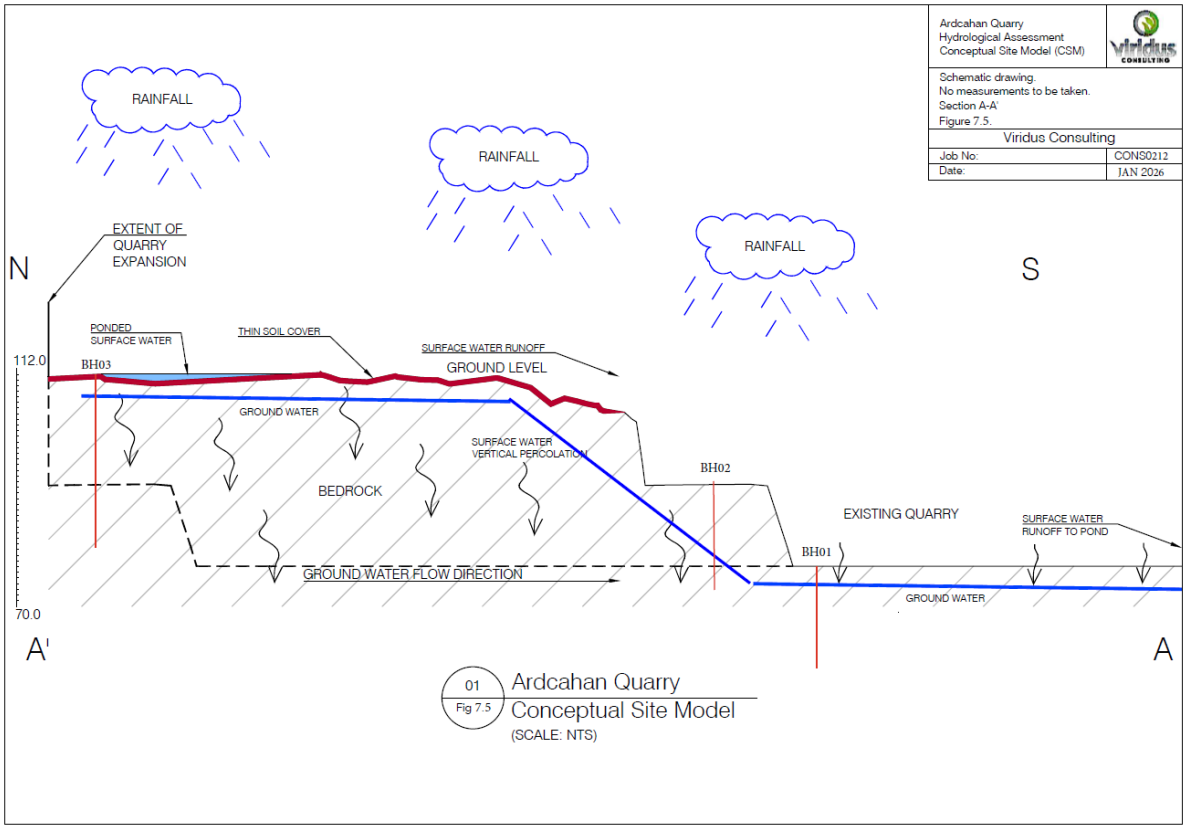
7.3.16 Conceptual Site Model

As per the IGI Guidance recommendations a Conceptual Site Model (CSM) has been conceived for the site examining the interaction of the project with the water environment. The diagrammatic cross section, (as presented in Figure 7.5), forms an important part of the 'Conceptual Site Model (CSM) for the site.

The recent borehole drilling and instillation of standpipes has enabled the local water table to be measured. The water table follows the local ground height and as the bedrock is a Poor Aquifer it does not have a high transmissivity or a high capacity to hold large water volumes.

An interpreted cross section of the site showing the context of the geological and hydrogeological regimes for the quarry are presented in Figure 7.5.

Figure 7.5 Conceptual Site Model – Diagrammatic Quarry Cross Section.



The new boreholes at the north end of the site indicate groundwater levels of 2m to 3.5m below the ground level. This indicates a very steep hydraulic gradient and short zone of influence from the quarried area in the south and natural ground in the north. This is due to the fact that the sandstone/siltstone bedrock has limited capacity to hold and transmit groundwater and the lack of significant permeability results in the short zone of influence and large differences in groundwater heights over short distances. It is anticipated that the groundwater levels will lower as the quarry works progress without impacting the local water table to the north of the site. The old drilling records and the recent boreholes did not intersect any large water strikes and the driller of the 2024 boreholes reported very low potential ground yields in all the new boreholes.

The surface water ponds that have established in the low lying areas of the site in the upper northern area (primarily Ponds C, D and H) and shallow ponds on the quarried area occupied by the macadam plant (Ponds F, G and L) also give evidence to the very low permeability of the underlying bedrock as there is little percolation to ground of ponding surface waters in the areas of rock close to the north or exposed rock in the quarried areas. The dominant hydraulic regime on the site will be surface water runoff via the various small sub-catchments (identified as Areas A1 to A6) and their respective discharge locations off site.

7.3.17 Type of Land and Soil/Geological Environment

As per Step 3 (page 14 of the IGI EIA Guidelines) the baseline information and CSM enables the type of soil/geological and hydrogeological environment to be determined. From the range of generic environments in the IGI document (Types A to E) the Ardcahan Quarry site is interpreted to have a:

Type A - Passive geological/hydrogeological environment.

This is based on the fact that the study area is underlain by a poor aquifer which is dominantly a recharge area with a historically stable geological environment.

7.3.18 Activities Associated with the Future Quarry Expansion

A range of Generic Activities that can potentially interact and impact with the geological/ hydrogeological /environment are presented in the Activities/Environment Matrix identified as Figure 2 in the IGI Guidelines. The IGI Assessment Flow Chart and Activities Matrix, (Figures 1 and 2 from IGI EIA Guidance, 2013), are included in Appendix 6.1 of the Land/Soils/Geology Chapter of the EIAR.

The main activity which is related to the Future Quarry Expansion development is:

EXCAVATION OF BEDROCK MATERIALS ABOVE AND BELOW THE WATER TABLE. (IGI 2003)

The application for the future expansion of the Ardcahan Quarry relates to total area of about 5.01 ha, divided between the central area, Phase 1 (1.75 ha), the eastern area Phase 2, (1.2 ha), and the western area (2.06 ha), that will potentially yield approximately 3.7 million tonnes of aggregate over about a 20 year period, as outlined in EIAR Chapter 2 Project Description.

The stripping of any remaining thin natural soil material or removal of previously stockpiled subsoils will be limited to certain upland areas. All soils and subsoils will be used in the future site restoration. Excavations into the more elevated areas in the northern part of the site will lower the perched water table as the works progress, however based on the site history and recent drilling and groundwater assessment works, low volumes of groundwater are anticipated to be encountered and the steep hydraulic gradient created by the low permeability bedrock will ensure that the excavation works will not create a significant lowering of the water table beyond the edge of the quarried area.

As observed during the previous quarry works, the low transmissivity/permeability of the bedrock will retain surface ponds near the quarry face and will also limit groundwater inflows into the quarry area.

7.4 Impact Assessment

The potential impacts of the future Ardcahan quarry expansion on the hydrological and hydrogeological regime are primarily short-term runoff related pollution risks during site development works and active phase rock blasting, excavation, aggregate preparation and transport works. The longer term changes in site topography and drainage could affect the long-term surface water runoff characteristics and the excavations will lower the 'perched' groundwater table height in the higher ground areas, but no active dewatering is interpreted to be required to achieve the floor level.

The future quarrying will require the removal of some of the thin soil cover, where present, over the site area, however given its natural lack of depth this will not greatly increase the vulnerability of the aquifer to surface contamination or change the vulnerability classification for the site. The blasting, rock crushing, aggregate production and washing increases the potential for dust generation in dry weather and/or fine suspended sediments in wet weather. If not managed these could impact the local environment and adjacent water course.

7.4.1 Criteria for Rating the Site/Attribute Importance – Water Features

For rating the Site Importance of the hydrological attributes, the guidance follows the NRA use of five importance criteria – Extremely High, Very High, High, Medium and Low depending on the attribute quality. (The methodology and rating criteria are as per the NRA EIS Hydrology Assessment guidelines document, (2007). The water attributes that are relevant to Ardcahan Quarry site are the underlying groundwater aquifer, the small watercourse that forms the boundary stream on the eastern and southern boundaries and also the River Bandon, as the boundary stream is a small tributary of it. The site importance criteria, with examples, are applied to the Ardcahan Quarry site in Table 7.4.

Table 7.4 Criteria for rating Site Importance for Water Elements at EIS stage.

Importance	Criteria	Typical Example	Ardcahan Quarry Site
Extremely High	Attribute has a high quality or value on an international scale.	River, wetland or surface water body ecosystem protected by E.U Legislation e.g. Salmonoid River or SAC/SPA	**Yes – the River Bandon SAC**, which is ~50m downstream and in direct hydrological connection to the site via the small stream.
Very High	Attribute has a high quality or value on a regional or national scale.	River, Wetland or Surface Water body ecosystem protected by national legislation e.g. pNHA, Regionally Important Aquifer with multiple wells, Potable Water Supply >2500 homes	River Bandon has an extremely high importance as an SAC with pearl mussel population.
High	Attribute has a high quality or value on a local scale	Salmon Fishery, Regionally Important Aquifer, Potable Water Supplying >1000 homes.	**Yes – Boundary Stream** would support trout with a high water quality River Bandon is a Salmon River System.
Medium	Attribute has a medium quality or value on a local scale	Coarse Fishery, Locally Important Aquifer Local potable water supply to >50 homes.	No – higher surface water values and lower aquifer importance.
Low	Attribute has a low quality or value on a local scale	Poor Bedrock Aquifer Local potable supply <50 home.	**Yes – Poor Bedrock Aquifer**

As per the relevant guidelines for hydrogeological attributes the GSI bedrock aquifer classification of Poor, gives the site a groundwater rating of **Low Importance**.

The small boundary stream would be an attribute of **High Importance** as the stream is likely supporting juvenile trout and other fish species, (such as eel, brook lamprey, etc), and from the bridge at the site entrance, about 40m from the site, it forms part of the River Bandon SAC, a designated area and important salmonoid and pearl mussel river system.

The boundary stream enters the River Bandon about 400m downstream of the quarry site. The River Bandon SAC would have an **Extremely High** importance.

7.4.2 Impact Assessment Methodology

An analysis of the predicted impacts or effect of the completed quarrying on the water attributes during the quarrying, as per Annex IV of Directive 2014/52/EU, EPA EIAR Guidance Document, (2017), NRA Guidance (2008/9) and Appendix C of the IGI EIS Preparation Guidelines (IGI 2013), is presented in the following section.

The impact assessment was undertaken using the following considerations:

- Quality of an Impact: Described as being Positive, Neutral or Negative where:
- Positive Effects = ones which improve the quality of the environment.
- Neutral Effect = represents no effects or effects that are imperceptible.
- Negative/Adverse Effects= change which reduces the quality of the environment.
- Duration of Impacts: The duration of each impact was considered to be either temporary, short-term, medium-term, long-term or a permanent impact. Temporary impacts are considered to be those which are construction related and last less than one year. Short term impacts were seen as lasting one to seven years. Medium-term impacts are those lasting seven to 15 years. Long-term impacts last 15 to 60 years and permanent impacts are anticipated to last over 60 years.
- Magnitude of an Impact:

The rating of the potential magnitude and significance of impacts at EIS stage on the Water Attributes are defined by the NRA Guidelines (2009), with typical examples, as per Table 7.5.

Table 7.5 Criteria for rating Hydrology and Hydrogeology impact magnitude at EIS stage.

Impact Magnitude	Criteria	Typical Examples
Large Adverse	Results in loss of attribute and/or quality and integrity of attribute	Loss or extensive change to a water body or dependent habitat. Increase of predicted flood level >100mm. Removal of large proportion of aquifer, or changes to aquifer resulting in extensive change to existing water supply or river base flow. Extensive loss of fishery or high risk of pollution to surface or groundwater from routine runoff.
Moderate Adverse	Results in impact on integrity of attribute or loss of part of attribute	Moderate loss or change to a water body or dependent habitat. Increase of predicted flood level >50mm. Removal of moderate proportion of aquifer, or changes to aquifer resulting in moderate change to existing water supply systems or river base flow. Moderate loss of fishery or medium risk of pollution to surface or groundwater from routine runoff.
Small Adverse	Results in minor impact on integrity or attribute or loss of small part of attribute	Small loss or change to a water body or water dependent habitat. Increase of predicted flood level >10mm. Removal of small proportion of aquifer, or changes to aquifer resulting in small change to existing water supply systems or river base flow. Minor loss of fishery or potential low risk of pollution to surface or groundwater from routine runoff.
Negligible	Results in an impact on attribute but insignificant magnitude to affect either use or integrity	No measurable changes in attributes. Negligible change in predicted peak flood level. Risk of serious pollution incident <0.5% annually.

(After Table C4 of the IGI 2013 and NRA 2009 Guidelines Boxes 5.2 & 5.3).

The magnitude of each impact is considered from negligible to large. Negligible impacts are effects that result in an impact on an attribute but of insufficient magnitude to affect either its use or integrity. A major impact results in the significant loss of an attribute and/or quality and integrity of an attribute.

- **Significance of an Impact:** The significance of each impact was considered as having an Imperceptible, Not Significant, Slight, Moderate, Significant, Very Significant or Profound effect.

The descriptions of the 'Significance of an Impact' used are as presented in the EPA EIAR Draft Guidelines 2017 – Section 3 Table 3.3 Page 50 as shown in Table 7.6 and also outlined in Figure 3.4 Page 53 of the May 2022 EPA Guidelines.

(Note that the word 'effect' is used interchangeably with the work 'impact' across the various NRA, IGI and EPA EIAR guidelines).

Table 7.6 Describing the Significance and Quality of Potential Effects for EIARs

Significance of Effect	Criteria	Quality
Imperceptible	An effect capable of measurement but without significant consequences.	Positive/Negative/Neutral
Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.	Positive/Negative/Neutral
Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.	Positive/Negative/Neutral
Moderate	An effect that alters the character of the environment in a manner which is consistent with existing and emerging trends.	Positive or Negative
Significant	An effect which by its character magnitude duration or intensity alters most of a sensitive aspect of the environment.	Positive or Negative
Very Significant	An effect which by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.	Positive or Negative
Profound	An effect which obliterates sensitive characteristics from the attribute.	Negative Only

The rating of potential environmental impacts on the hydrological and hydrogeological (Water) environment can also be assessed based on the matrix presented in Table 7.7, which takes account of both the importance of an attribute and the magnitude of the potential environmental impacts of the proposed development on it. The criteria apply to potential impacts during both the development and operational phases of the project.

Table 7.7 Rating of Significant Environmental Impacts at EIA Stage***

		Magnitude of Impact (Table 6.5)			
		Negligible	**Small Adverse**	**Moderate Adverse**	**Large Adverse**
Importance of Attribute (Table 6.4)	**Extremely High**	Imperceptible	Significant	Profound	Profound
	Very High	Imperceptible	Moderate/ Significant	Significant/Profound	Profound
	High	Imperceptible	Slight/Moderate	Moderate/Significant	Significant/Profound
	Medium	Imperceptible	Slight/Not Significant	Moderate	Significant
	Low	Imperceptible	Imperceptible	Slight	Slight/Moderate

(***Based on NRA Guidelines (2009) – Box 5.4 Page 106).

- **Type of Impact:** These are described as 'Do Nothing', Construction, Operational, Cumulative, Synergistic or 'Worse Case' scenarios, which look at Major Accident Risks.

7.4.3 Do Nothing Scenario

The 'Doing Nothing' Scenario will result in no further quarrying at the site in the near future.

It is likely that the macadam plant will continue to operate on the site.

The supply of road aggregate suitable as road surfacing and civil engineering material to the local county councils and contractors would have to be supplied by other, either existing, or new quarry locations, the development or expansion of which may create more significant environmental impacts at other locations in this part of the county. Haulage of aggregate to the macadam plant will continue.

7.4.4 Site Development/Construction Phase

Little soil cover remains on the ground surfaces although there are areas of previous soil stockpiles or berms towards the northern parts of the Phase 2 and Phase 3 areas only some limited site clearance works will be needed in the development Phase.

Internal tracks are already present that allow access to the northern areas, but all quarrying and excavations will commence from the southern side along the old quarry faces. There is an existing shallow storm water drainage channel located along the western boundary that will be retained.

With much of the site access and road infrastructure already in place site development and construction phase activities for the Ardcahan quarry expansion will involve the establishment of some administration infrastructure such as a weigh bridge and associated office, as well as the setting up the aggregate processing area including crushers, conveyors and wash plant.

The wash plant equipment will be positioned on a concreted hard stand wash area that drains off to a series of four settlement ponds that will form a closed loop wash water system. The wash water will enter the first of three 35m long x 8m wide x 2m deep ponds established in the existing quarry floor.

These ponds will have inflow and outflow points at the opposite ends of each system so that silt from the wash water process will be retained and can settle out of suspension as it passes through them. A larger fourth, 35m long x 20m wide x 4.5m deep, size pond will function as a final settlement pond as well as the water supply sump from which process water is recycled for use in the wash plant.

The wash plant area will be bunded to prevent clean surface water runoff on the quarry floor from entering it and berms around the work area will also prevent wash water from draining from it.

Low inflows of groundwater or refilling the fourth pond from other sources will replenish water used in the washing process. Typically, about 20 litres of water is retained in one tonne of washed gravel. The settlement ponds will be accessible for dredging out the settled fines material as and when required, and this material will be used in the site restoration. The wash plant is expected to operate for about five hours per day. The proposed wash water plant layout is presented in Appendix 7.9.

This development infrastructure will all be established on the old quarry floor area in the southwestern part of the site. Mobile rock crushing plant will be positioned relatively close to the quarry expansion face, and moved as necessary, in order to reduce the double handling of rock material.

The stormwater runoff from the whole quarry area, outside the bunded wash plant infrastructure, will naturally drain to the low point of the site, (Ponds I and J), in the SW corner of the old quarry floor area. This will be the case for all phases of the quarry expansion.

7.4.4.1 Stormwater Drainage Control

All the drainage from the expansion area will follow the existing natural and created quarry floor topography and flow downgradient towards the low-lying ground in the SW corner of the site. The established attenuation system in place for the old quarry in the southwestern portion of the site was a dual water settlement and attenuation pond system created behind berms in the corner this area.

Two Attenuation Ponds provided for the retention of storm water running off the western half of the Ardcahan site in the past, identified as Ponds I & J in catchment Area A4, (see the site Map in Appendix 7.2 and 7.11). The remnants of these ponds and their berms still remain and the water from the first pond (Pond I) percolates by overflowing the berm estimated to be at about ~74.5m OD, to the second (Pond J) before it percolates over another berm, at ~73.5m OD, to a shallow drainage ditch that connects to the local stream, via a pipe under the main quarry access road near the site entrance.

The Pond I is triangular in shape and has berms on its existing down gradient sides and is open to the existing quarry floor on the up gradient side. This allows surface water to easily runoff to the pond and also for the size of the pond to increase and decrease as the amount of runoff fluctuates. The area that this attenuation pond services includes the established quarry floor, the future access road and all three excavation phases that will ultimately cover an area which is conservatively estimated to be about 8.5 hectares in size. These ponds will function as a dual water retention and attenuation system.

In order to establish a more controlled discharge system and also increase the retention capacity of the storm water discharge system from this area the two existing pond systems (Ponds I and J) will have the over topping berm system in Pond I replaced by the construction of a discharge chamber with an adjustable water level and flow control overtopping weir type penstock that will overflow to the last pond (Pond J) which will have with a final interceptor in the outflow before off site discharge.

The discharge chamber will be constructed into the down gradient berm of Pond I and this will release surface storm water via a weir type penstock overflow control system. The penstock is a standard way of controlling water releases with the required over topping height controlled and changed manually as necessary. The weir overflow will help ensure that only the 'top' water, with the least risk of having suspended sediments, will be discharged.

In order to increase the size of the attenuation area and to have more control of the potential discharge it is proposed that a water level control, such as adjustable penstock weir described above, would be installed in a discharge chamber in the berm of the first pond that would allow storage capacity of the attenuation pond to be greatly increased for periods of heavy or persistent rainfall. This pond area would be developed as a wet grass and natural wet scrub/woodland which would help enhance the settlement rate of any suspended sediments and increase its biodiversity.

The area up to the 74m contour line in this part of the site covers an area of over 5,000m^2, so by installing an adjustable weir that would over-top at ~74.3mOD, the capacity of the pond would be increased to about the calculated volume of a 100yr storm event occurring over the whole south western portion of the site. A cross section of the southwest corner of the berm and proposed attenuation pond system are included in Appendix 7.11.

The proposed penstock weir system would have about a 1m by 1m adjustable door which would be installed in a constructed concrete chamber located in the existing berm between ponds I and J. The preliminary engineering design for the proposed outlet chamber is presented in Appendix 7.11.

These adjustable penstock weir systems are very common in managing water levels in facilities such as water treatment plants and settlement ponds etc. In the absence of a power supply water level

control is done manually with the pond level usually kept low but the sluice door is lifted or lowered depending on weather and water conditions. A full-time automatic turbidity monitoring logger will be installed at the sluice weir outfall, and this would alert the site operators if turbidity was increasing in the outflow. A typical product brochure for 'off the shelf' adjustable penstocks, interceptors and turbidity monitoring equipment are shown in Appendix 7.11.

It is anticipated that the civil engineering work for the discharge chamber and interceptor would take a few weeks to complete and this work will only be undertaken during a dry summer/autumn period when the water level in the existing ponds and risk of heavy rainfall is low. Any civils work completed in this area of the site will only be done in dry weather to eliminate the risk of runoff from the works area entering the downgradient watercourse.

With regard to the "Handbook of methods for controlling surface waters in and around aggregate quarries" which was published by the UK Mineral Industry Research Organisation (MIRO) and Department for Environment, Food and Rural Affairs (DEFRA) in 2004 the proposed surface water controls and attenuation pond system complies with and follows many of the recommendations of that publication. The quarry operation will include all the measures outlined in Section 2.3 of the Handbook document in the control of contamination and particularly sediments through:

- Segregating runoff from different areas of the site,
- Recycling process water,
- Using constructed settlement ponds,
- Use of vegetation to reduce sediment mobility,

The calculations used in estimating the rainfall and runoff from the site follow the format and formula presented, in particular the use Met Office data, such as rainfall return period information and the use of the Rational Formula for calculating runoff. Input parameters in calculating flow rates are compliant with the Handbook as they include the surface type, surface area, infiltration capacity and slope. It is noted that in Section 4 the Handbook states that complex mathematical approaches to runoff calculations are not appropriate for the majority of quarry applications. The Met Eireann site data is presented in Appendix 7.10.

Some of the methods outlined in the Handbook are not relevant to the Ardcahan Site as it is a small catchment (<0.5Km^2) and therefore not suitable for the 1999 UK Flood Estimation Handbook (FEH) calculations while the 1975 UK Flood Studies Report (FSR) is recognised in the document as not being suitable for hard rock quarries or urban catchments. Some of the surface water flow equations presented in the document are not directly applicable to the Ardcahan Quarry site as diversion channels, culverts and soak-aways are not present.

By coincidence the example in the Handbook (Example 5.2 on page 57) "calculating the required dimensions of an attenuation pond" uses a 6Ha site (with 1ha vegetated), which is the similar to the proposed quarry area with similar 100yr storm rainfall intensities to those applicable at the Ardcahan site. The calculated pond dimensions for the Ardcahan site are about 74m x 74m x 1m depth (~5,475m^3), due to the conservative assumptions used in the Ardcahan calculations, that there is no vegetative effect and that a very low infiltration coefficient of 0.75, equivalent to pavement or light industrial land runoff, is used. Refer to the attenuation calculations discussed below and also included in Appendix 7.10.

The proposed attenuation pond (I) has the dual functions of providing a surface water retention structure that will help avoid flooding by providing adequate storage for runoff during 100yr rainfall

events and also by controlling the potential discharge of elevated concentrations of suspended sediments or other contaminates during the normal operations of the site.

The final discharge pond (J) acts as final small settlement lagoon for the site and the proposed interceptor is proposed to be installed as part of the discharge system from this pond as a final piece of water quality infrastructure for the site. See some generic Interceptor options in Appendix 7.11.

The Rational Formula is recommended in the Handbook, and this formula was used in the Ardcahan EIAR work. The runoff calculations used in the design of the attenuation pond and proposed adjustable weir system are summarised below and also presented in the calculation sheet in Appendix 7.10.

The Rational Formula in the form Q=2.78CiA (National Coal Board, 1982), assumes the flow (Q) is a function of the permeability and slope of the land surface (C), the rainfall intensity (i) and the area of the land (A). The runoff coefficient value (C) is a dimensionless empirical catchment runoff coefficient determined from tables, (such as Table 4.1 in the Handbook) and/or from a Nomogram Graph, (as presented in Appendix 7.10).

In Ardcahan a relatively level quarry floor <1% gradient (<0.01 ground slope) dominates the down gradient portion of the catchment area with a runoff coefficient of between clay and clay/loam which would conservatively represent a surface such as fractured sandstone bedrock is interpreted to have a high runoff coefficient of about 0.75. This conservative value represents reasonably impermeable ground, low rainfall acceptance and high runoff potential, which are all attributes of the bedrock.

The rainfall intensity (i) is taken from the Met Eireann rainfall profiles in the form of a Depth-Duration-Frequency (DDF) model that are available for any location in Ireland. A DDF model allows for the estimation of point rainfall frequencies for a range of durations. The model consists of an index (median) rainfall and a log-logistic growth curve which provides a multiplier of the index rainfall. Rainfall station data were analysed and an index rainfall extracted. Computer applications were written to apply the model and produce outputs of the return period rainfalls, (Fitzgerald, 2007).

Met Eireann were contacted to get the rainfall profile at the site location (Irish Grid: Easting: 124723, Northing: 55805). The DDF table is included in the Appendix 7.10. The rainfall amount (mm) resulting from a six hour storm is listed in Table 7.8 for 1, 30 & 100 years return periods.

It is assumed that, as rock is close to surface, the pre and post development areas would have very similar runoff characteristics. Based on a C Value of 0.75 and a future catchment area of 8.3Ha, the estimated volume of runoff for return period 1 year, 30 year & 100 year is presented in Table 7.8.

Table 7.8 Return Period Rainfall Depth & Volume estimates runoff from 8.3 Ha area.

Return Period (year)	6 hrs T yr Rainfall (mm)	Intensity (mm)	Pre Development		Operational Phase	
			Peak Runoff (l/s)	**Run-off Volume (m^3)**	**Peak Runoff (l/s)**	**Run-off Volume (m^3)**
1	31.1	5.2	90	1938	90	1938
30	59.1	9.9	170	3682	170	3682
100	72.3	21.1	209	4504	209	4504

Table 7.9 presents the size of pond required for runoff from about 8.3 hectares for the different return periods assuming an average pond depth of about 1m.

Table 7.9 Design dimension estimates of attenuation pond for about an 8.5 Ha area.

Return Period (year)	Attenuated Volume (m^3)	Length (m)	Width (m)	Depth (m)
1	1938	44.02	44.02	1
30	3682	60.68	60.68	1
100	4504	67.11	67.11	1

An attenuation pond area of over 5,300m^2 with an average depth of about 1m is located up to the 74m contour, will be established in the southwestern portion of the site, as shown on the drawings included in Appendix 7.11. This large pond area, +15%, above the 100 yr storm capacity, allows additional volume for scenarios where there may already be some water in the pond before an event occurs and for rainfall intensity changes due to climate change.

This is also a very conservative design for the majority of the quarry expansion period as the catchment areas of Phases 1 and 2 will be below the 8.5 Ha total final area that the pond system is designed for.

This storm water attenuation system will also have higher capacity in the drier summer and autumn season and will therefore be able to retain and attenuate the runoff from large rainfall events, when the local watercourses are likely to have lower flow conditions and be more vulnerable to runoff.

During the wetter winter and spring period, when the number of rainfall days is higher and the pond capacity reduced, it may not be possible to retain all the water from a large storm event. However, the local river systems are likely to be in flood or high flow conditions themselves and not vulnerable to the effects of additional runoff.

The establishment of the lower SW corner of the site as a very large attenuation pond and seasonal wet grassland habitat, with a controlled discharge, can be achieved before any quarrying works commence. Most quarry infrastructure will be established in the northern work area from the start and the future development plan includes the creation of a second quarry access in the NW corner of the Phase 1 excavation area within about the second year of the proposed works. This will reduce the amount of machinery traffic on the internal track in the southwestern part of the site near the pond.

It is proposed to establish the surface water attenuation area and introduce more vegetation into the existing pond system at the start of the development and then this 'natural' system can be left mature and develop through the lifetime of the active quarry, into the restoration phase and beyond.

The manual penstock will help control the flow rates to Pond J and the full-time turbidity probe will help ensure the penstock is raised if suspended sediment levels increase at the discharge.

The system of an over-topping berm outlet in Pond J will be replaced by the installation of an interceptor system which will function as a final filter for the stormwater discharge and will further help mitigate any pollution risk.

A detailed map of the I & J ponds is included in Appendix 7.11 together with information on a generic penstock discharge and bypass interceptor.

7.4.5 Operational Phase

The main Operational Phase activities will involve drilling and blasting and extraction works including rock breaking, crushing, segregation, screening, washing and transport, as necessary. Rock material will be stockpiled in the eastern end of the old quarry floor before being moved off site via the weigh

bridge and existing roads. Rock chips will also be supplied to the adjacent macadam plant which will reduce the need for transporting aggregate from other sites.

Quarrying activities can pose a significant risk to watercourses with surface water runoff from quarry activities potentially contaminated with sediments, ammonia and hydrocarbons. Elements of the development and operational phase of the proposed quarry expansion pose risks from the following:

- Silt/Clay: elevated fine sediment silt/clay loading in surface water discharge may result from land clearance activity, aggregate crushing, stock piling and washing activities. Elevated sediment loading can lead to potentially long-term damage to aquatic ecosystems by clogging gravel beds, smothering spawning grounds and pearl mussel habitat and impacting invertebrate biodiversity. Chemical contaminants bind to the organic particles attached to particulates which can lead to increased bioavailability of these contaminants. Fine particulates also stunts aquatic plant growth, limiting dissolved oxygen supplies and reducing the aquatic ecosystems quality. Suspended sediments are a highly visible pollutant.
- Quarry traffic and quarry activities can generate dust that can spread onto neighbouring or adjacent areas and be washed into the water courses following rainfall events.
- Ammonia: used in quarry blasting residual ammonia products remaining in the rock mass can leach to surface waters and impact on the chemical balance and water quality.
- Hydrocarbons: accidental spillages or leaks from quarry machinery, HGV traffic, processing equipment and storage depots. Surface water runoff from hard standing areas with HGV activity can contain mild diffuse contamination in the form of hydrocarbons or silt.
- Excavation that exposure large areas of impermeable clay subsoils or low permeability bedrock can increase runoff rates from a site.
- Changes in the hydrological regime can occur due to alterations in the site topography and surface water drainage patterns could impact peak flow volumes and contribute to flooding.

Most of these pollution sources tend to be short term to temporary 'incident' risks that can be influenced by quarry management, work activities and/or weather conditions.

While any soil removal will increase the exposure and vulnerability of the bedrock to surface contamination, the thin nature of the original or reinstated soils means that the increase is not significant and the Extreme Vulnerability classification of the area, as defined by the GSI, will not be changed by the future quarrying activity.

7.4.6 Decommissioning Phase

The decommissioning plan for the expansion phase areas is to start reinstatement works once the eastern Phase 2 expansion area is completed. Stockpiled subsoil and soil will be spread over the exposed bedrock and planted with native flora such as grasses, wildflowers and trees. As the initial Phase 1 area will be needed for access to the later quarry phases it will be reinstated after the excavation works in the western Phase 3 area are completed.

Once the quarry works are finalized the wash plant, weigh bridge, administration office and related facilities will be decommissioned and removed off site. The two lower attenuation ponds (Ponds I and J) and associated wetland area will be left in-situ in order to enhance the wetland habitat and biodiversity potential for the locality and will help reduce peak flows to the river after heavy rainfall.

While there may be some initial short term sediment runoff risk from the reinstatement soil spreading works in the long term the replanting will eliminate this risk and reduce the runoff rate as rainfall will be absorbed and retained by the soil and vegetation cover. The thin soil will also protect the bedrock.

More detail on the Decommissioning Phase works is included in Chapters 12 Biodiversity.

7.4.7 Summary of Significant Effects

The following table, Table 7.10, summarises the identified likely significant effects during the site establishment, construction and decommissioning phases of the proposed quarry expansion development before mitigation measures are applied.

Table 7.10 Summary of Construction Phase Likely Significant Effects without mitigation

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Sediment Runoff	Negative	Not Significant to Imperceptible	Local	Medium to Low	Brief to Temporary	Small Adverse to Negligible
Fuel Spills	Negative	Not Significant to Imperceptible	Local	Medium to Low	Brief to Temporary	Small Adverse to Negligible
Groundwater Table Changes	Neutral	Not Significant to Imperceptible	Local	High	Long term	Small Adverse to Negligible

7.4.8 Cumulative Impacts

Other activities that are currently ongoing in the immediate vicinity of the quarry site or near the small watercourse include the macadam plant and farming. There are no other new residential, forestry or other potential developments or land use activities known about or in the planning system for the local area or the catchment of the small watercourse.

The macadam plant could contribute sediment or other polluting matter to the adjacent stream if the existing controls, such as silt traps and hydrocarbon interceptors, were to fail.

The intensification of agricultural activity in the lands to the south and east of the site area is likely to pose the greatest risk in contributing potential long-term sediment and nutrient runoff to the small water course. The management of fertilizer applications, clearance of areas of scrub and the vegetated riparian zone adjacent to the stream, done to increase the areas of grass growth for silage and livestock, as well as the access that livestock have to the bed of the stream pose a high risk and potential long term impact on the water quality of the small stream adjacent to the site.

Good environmental management practices and the fencing of the river to prevent livestock access will help mitigate these potential macadam plant and agricultural land use impacts.

7.5 Mitigation and Monitoring Measures

7.5.1 Construction and Operational Phase

Strict control of sediment/dust generation and other pollutants such as hydrocarbons associated with the site clearance, rock excavation, blasting, crushing, aggregate washing, stockpiling, process HGV and transport machinery use will be implemented at the site.

The deposition of cleared soils, unsuitable rock or segregated silt materials will be at least 15m away from the watercourse to maintain a suitable buffer area. Vegetation of any stockpiled soils or material used in berms will be commenced as soon as possible after deposition to reduce sediment erosion.

The existing storm water attenuation pond in the southwestern corner of the site, which is located down gradient of the proposed excavation area, will be enhanced by rising the berm and installing a

weir sluice system, to prevent direct surface water runoff to the adjacent watercourse, thereby offsetting both the potential hydraulic and water quality impacts of the development. This attenuation area will be established at the start of the work and will remain in place for all subsequent quarrying and the decommissioning phases and into the long term.

The attenuation system is designed to cater for a 100yr storm event +15%, for the full 8.3Ha extent of the final Phase 1 to 3 quarry catchment area and will therefore be over sized for the majority of the excavation works when the working catchment will be below 8.3 Ha in area.

Maintenance and management of the pond areas will maintain capacity prevent peak flows going to the local stream which will help mitigate any adverse high river flows and downstream flood risks.

Site activities such as rock crushing, aggregate washing and stockpiling are to be established over 80m from the attenuation pond system.

The large attenuation pond J in the SW corner of the site will allow for an additional reduction in fine sediments, nutrients and toxicants and maintain the existing percolation to ground and runoff characteristics of the site by providing suitable storage for a return period of up to 1 in 100 years.

Environmental controls such as the use of dedicated refuelling areas for quarry plant and the use of dip trays under temporary fuel bowsers and/or crushers and the maintenance of all vehicles and equipment used on site will prevent the release of hydrocarbons around the site.

Bunds sufficiently large to fully contain accidental spills will be provided around all tanks/storage areas containing harmful substances.

Construction traffic will travel along designated internal roads constructed of hardcore rock material or on bedrock so that exposed areas of bare ground are not made muddy or soft due to movements of quarry traffic around the site. Machinery will be parked in designated areas.

Crash barriers with a concrete verge are to be installed in areas of the site where the internal access roads are directly adjacent to the small watercourse. This will reduce the risk of surface waters washing from the road into the stream and prevent vehicles crashing into the stream.

The area of the macadam plant behind the aggregate store (upstream sample location) and the section of the sites access road just inside the main gate (downstream sample location) are locations where such a traffic management mitigation measure would be relevant.

Proper maintenance of the attenuation pond water control and interceptor system will ensure that the installed equipment continues to operate successfully, and this should be undertaken in accordance with CIRIA Guidelines C697. Maintenance will include general examination and cleaning where required of the drainage system, maintenance of attenuation pond sluice weir and interceptor separator.

Damping down of the roadways and stockpiles using water bowsers and mist sprayers will be used during dry periods to reduce the potential for dust generation around the site and on the tarred access road to the site.

Good practice guidelines for the quarry industry will be followed such as; the ICF Environmental Code, (2nd Edition 2005), EPA Environmental Guidance for the Extractive Industry and the UK Environmental Agency Pollution Prevention Guidelines – PPG1 to PPG8.

7.5.2 Monitoring

Very regular, (daily) visual inspections and regular (monthly to quarterly) sampling and chemical monitoring of the small water course for pollution indicator parameters such as pH, total suspended sediments, turbidity, COD, and hydrocarbons will be completed at the sites discharge point as well as locations up gradient and down gradient of the site.

As well as establishing a full-time turbidity probe on the discharge from Pond I a daily visual inspection of the site discharge outflow (Location 05) will be undertaken by site staff.

The proposed stormwater discharge limits that the site will adhere to follow typical Environmental Limit Values (ELVs) issued for Section 4 Discharge Licenses by Cork Co. Council including;

- pH = 6 to 8
- Conductivity - <1,000 mS
- Total Suspended Solids = <30ug/l
- Chemical Oxygen Demand = <50ug/l
- THP/Min oil = <100ug/l

Annual biological monitoring, in the form of Q-Rating Sampling, will be completed by an aquatic ecologist between April to June at dedicated up and down-stream locations on the small water course.

Monthly groundwater levels will be recorded from the monitoring boreholes (BH01 to BH05), established around the site and bi-annual monitoring of the groundwater quality will be completed for a range of water quality indicator parameters, including hydrocarbons from the down gradient borehole (BH01), mid-borehole (BH02) and one of the upgradient boreholes (one of BH03 to BH05).

The environmental monitoring requirements will be included in the sites Environmental Management Plan and results will be reported to the Council in the form of an Annual Environmental Report, (AER).

7.6 Risk of Major Accidents and Disasters

In terms of the water attributes the 'Worse Case Scenario' Environmental Impact would relate to short term incidents or accidents around fuel losses, which would impact soils and/or bedrock and ultimately create a risk to the underling aquifer and storm water runoff quality to the local watercourse.

No above ground fuel storage tanks are proposed for the site, but any fuel storage areas will be fully bunded and refueling of quarry machinery will be done via double-skinned mobile bowsers in a dedicated area(s), away from the drainage systems on the site.

The potential volume of fuel loss from quarry equipment and machinery would be relatively small typically in the 10's rather than 100's of liters and the duration of the impact would be considered to be temporary to short term.

While the bedrock has a low permeability there is a risk of de-watering the upper surface water ponds or adjacent water course on the eastern boundary by drilling, blasting. Lowering the ground level in the northern and eastern sides of the site does create the risk of creating a fracture system that could de-water these surface water retention areas if the quarry face moves too close to them.

In terms of Human Health risks, the creation of the four settlement ponds for the wash plant on the old quarry floor could pose a drowning risk, especially as the final holding pond is 4.5m deep. Proper signage and the provision of boundary berms and life rings will help mitigate this risk.

7.7 Significant Interaction of Effects

For any development activity with potential for significant impacts to the water attributes there is also the potential for interaction with other impacts. The result of these interactions may either exacerbate the magnitude of the impact or ameliorate it. The interaction of impacts on the surrounding environment is required to be addressed as part of the Environmental Impact Assessment process.

The most significant interaction of effects would relate to dust from quarrying activities, especially rock crushing and on-site traffic, interacting with stormwater runoff to create suspended sediment.

Runoff from the work areas, such as the wash plant area, could create sediment runoff, while potential for fuel from site machinery and traffic could create surface and groundwater pollution through fuel spills. Changes to topography due to the excavation of the rock mass will change the local landscape.

7.8 Residual Impacts

The water quality of the small watercourse adjacent to the site was found to be good with no evidence of sediment or pollution related to the quarry site which was in operation on the site from the 1960's to 2014 and the macadam plant which has been operating since 1998.

This is due to the surface water flow direction on the site being generally away from the adjacent watercourse and the exiting environmental management and mitigation measures that have been put in place at macadam plant and the discharge location in the SW corner of the site.

It is considered that if the recommended remedial and reductive measures are fully implemented and properly maintained and managed, then the proposed development will not give rise to any significant residual adverse impact on the hydrological aspects, (flow or water quality), of the adjacent watercourse or Bandon River system located downstream of the site.

7.9 Water Framework Directive

As mentioned in Section 7.3.2.1, the EIAR process enables an assessment of the proposed developments compliance with the Water Framework Directive (WFD) where the River Basin Management Plan (RBMP) objectives are to ensure compliance with relevant EU Legislation, prevent the deterioration of water quality, protect high-status waters and meet the WFD objectives for designated protected areas.

For the current RBMP Cycle, (Cycle 3 covering the period 2022-2027), the River Bandon_020, Quality Status and Risk Status, are identified as 'Moderate Quality' and as 'At Risk' based on identified Agricultural Pressures in the catchment, (as outlined for Surface Water Quality in Section 7.3.2.1).

As outlined in Section 7.3.8 the WFD Bandon Groundwater Body, (IE_SW_G_086), the Quality and Risk Status of the aquifer are determined by the EPA as having 'Good Status' and 'Not at Risk'.

The potential effects on the water environment from the developments, operational and remediation phases have been discussed and outlined previous sections of the EIAR for the proposed quarry expansion. Avoidance and mitigation measures have also been proposed to reduce potential pollution risks to the local surface water regime and underlying groundwater body.

With the implementation of the avoidance and mitigation measures as described, the predicted residual impacts of the proposed development on the water environment are considered as imperceptible, with localised neutral effects, occurring during the operational phase. Any negative impacts are considered to be potentially small scale and brief to short term and no significant effects on surface water quality are predicted to occur in the Bandon River downstream of the site.

The impacts on hydrology or runoff characteristics of the site are predicted to have imperceptible, local, permanent neutral effects for all phases of the development.

The impacts on groundwater and aquifer quality are predicted to be not significant, with the main potential risk being localised brief negative effects occurring during the operational phase due to minor fuel losses. With avoidance and mitigation no significant groundwater quality impact is predicted to occur in the Bandon Groundwater Body under the site.

WFD status for the river waterbodies, ground waterbodies and designated sites hydraulically linked to the proposed quarry expansion have been described previously. Good site management combined with the pollution avoidance, mitigation and monitoring measures, detailed in Section 7.5 above, demonstrate that the proposed development will have no significant impacts on the water quality of the local surface waterbodies or the underlying ground waterbody at and downstream of the site.

It can therefore be concluded that compliance of the requirements of the WFD will be achieved.

As detailed in Section 7.4 the significance of the residual effects on the water environment is determined to be 'Imperceptible'. There will be no change in the WFD status of any hydraulically connected waterbodies resulting from the proposed Ardcahan Quarry Expansion.

7.10 Conclusion

The sensitivity of an environmental receptor is based on its ability to absorb an impact without perceptible change. The hydrological environment of the small watercourse adjacent to the site is considered to have a high sensitivity due to its small scale and being part of the Bandon River Special Area of Conservation (SAC) just below the site boundary. The Bandon River is considered to also have a high sensitivity due to it being designated as part of the Bandon River SAC.

The assessment of the potential magnitude of an impact and the importance of the attribute allows a Rating of Significant Environmental Impacts to be completed prior to the implementation of mitigation measures. As per Table 7.5 a temporary (<1yr) or more continuous short to medium term (1-15 yrs) loss or release of sediment or hydrocarbon pollution from the quarry or macadam plant site would result in Small to Moderate Magnitude of Impact. This is described as a small impact on the integrity of the attribute or loss of a small part or part of an attribute due to measurable changes in the attribute and short to medium changes to the water quality.

Based on the potential magnitude of impacts that have been identified to the adjacent watercourse and Bandon River, which are of a very high to extremely high value the Rating of Significant Environmental Impacts at EIAR stage can be completed, (as per Table 7.7).

The significance of the potential environmental impact can be assessed before and after the proposed mitigation measures are put in place. The potential impact, its duration and environmental impact rating for the small watercourse and Bandon River receptors are outlined in Table 7.11 below.

Table 7.11 Rating of Potential Impacts on Water Attributes, (Before Mitigation).

Potential Impacts	Duration of Impact	Significance Before	Significance After

		Mitigation	Mitigation
Increase in runoff of fine sediment following works that are required as part of the site clearance, soil management, rock extraction, crushing, aggregate washing and site traffic.	Temporary to Short Term	Moderate to Significant	Imperceptible
Changes in drainage characteristics and groundwater level.	Long Term to Permanent	Slight to Moderate	Imperceptible
Pollution due to small hydrocarbon spills from machinery and road runoff	Temporary to Short Term	Moderate to Significant	Imperceptible
Increase in flood risk due to increased peak flow in discharge.	Temporary to Short Term	Imperceptible to Moderate	Imperceptible

The impacts as outlined can be negated and maintained as Imperceptible on the basis that the operational mitigation measures outlined in Section 7.5 are fully implemented.

It can also be concluded that the proposed development is compliant with the requirements of the Water Framework Directive (2000/60/EC).

7.11 References

EPA *"Guidelines on the information to be contained within an EIAR",* (EPA May 2022).

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Murray Brothers Tarmacadam Ltd

CHAPTER 8
AIR QUALITY

VOLUME II
MAIN STATEMENT

APRIL 2026

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8 Air Quality

8.1 Introduction

This chapter assesses the likely air quality impacts associated with the continuation of an existing quarry and a proposed extension of that quarry at a site in the townland of Ardcahan, Co. Cork. A full description of the development can be found in Chapter 2.

Ardcahan Quarry is located approximately 3.5km northeast of Dunmanway in West Cork. The site is situated off the L4621-9 local road ('Hospital Road'), approximately 300m east of its junction with the R587 regional road, which links Dunmanway and Macroom. The area within the overall landholding measures approx. 25.2 hectares (ha).

The subject site measures 10.4 ha in area. It incorporates proposed extraction areas measuring 5.01 ha, principally along the north of the application site, and the balance of the lands comprises ancillary areas.

The project site overlaps with lands under consideration for Substitute Consent by way of a concurrent planning application[1]. The former extraction area and adjoining lands in the south for which substitute consent is being sought are included in this prospective application to accommodate ancillary quarry activities (internal roads, settling ponds, stockpiling, etc.) associated with the proposed future extraction. The application site does not include the southeast part of the landholding occupied by the tarmacadam plant, administration buildings and associated development permitted under Reg. Ref. 98/294. See Chapter 2 for further details.

8.1.1 Author Information and Competency

This chapter was completed by Ciara Nolan. Ciara is a Principal Environmental Consultant in the Air Quality & Climate section of AWN Consulting. She holds a BSc in Energy Systems Engineering from University College Dublin and has also completed an MSc in Applied Environmental Science at UCD. She is a Member of the Institute of Air Quality Management (MIAQM) and the Institution of Environmental Sciences (MIEnvSc). She has over 9 years of experience in undertaking air quality and climate assessments. She has prepared air quality and climate impact assessments as part of EIARs for residential developments including Woodbrook, Shankill (Planning Application Ref. ABP30584419), Ballygossan Park, Skerries (Planning Application Ref. LRD0010/S3), SHD Ratoath (Planning Application Ref. SH305196), SHD Rathmullen, Drogheda (Planning Application Ref. SH305552), commercial and industrial developments by Dublin Airport Authority, Abbvie, Mountpark, Pfizer, Takeda, as well as renewable energy developments such as Crockahenny Windfarm, Upperchurch Windfarm, Knocknamona Windfarm and Keerglen Windfarm. She also specialises in conducting air dispersion modelling assessments of emissions from data centres, energy centres and the chemical industry as part of EPA Industrial Emissions Licences for Echelon DC, AWS, Takeda, MSD and Regeneron. She has undertaken air quality and climate impact assessments for transportation schemes, primarily regional and national road schemes, from constraints, through to route selection and EIAR stage.

8.1.2 Aspects Relevant to this Assessment

Due to the nature of the proposed development as a quarry, there are no specific significant construction works required. The primary impacts to air quality will occur from operational activities such as extraction of materials; screening, crushing, and processing of materials; blasting operations;

[1] An application for Substitute Consent under Section 177E of the Planning and Development Act 2000, as amended, has been submitted to An Coimisiún Pleanála to regularise extraction and ancillary quarrying activities which took place at Ardcahan Quarry between 1990 and 2014.

and movement of vehicles on site which have the potential to release dust and particulate matter (PM_{10} and $PM_{2.5}$) emissions.

Engine emissions from vehicles accessing the site have the potential to impact air quality during the operational phase of the development through the release of nitrogen dioxide (NO_2) and particulate matter (as PM_{10} and $PM_{2.5}$) emissions.

8.1.3 Guidelines & Legislation Relevant to Discipline

The principal guidance and best practice documents used to inform the assessment of potential impacts on air quality are summarised below.

- PE-ENV-01106: Air Quality Assessment of Specified Infrastructure Projects (Transport Infrastructure Ireland [TII], 2022);
- Air Dispersion Modelling from Industrial Installations Guidance Note (AG4) (EPA, 2020); and
- Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition (Periodically Updated) (USEPA, 1986).

In addition to specific air quality guidance documents, the following guidelines were considered and consulted in the preparation of this chapter:

- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2022);
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Planning & Local Government, 2018); and
- Environmental Impact Assessment (EIA) Directive Guidance on the Preparation of the Environmental Impact Assessment Report (European Commission, 2017).

8.1.3.1 Development Plans

Air quality is covered in Section 15.10 of the Cork County Development Plan 2022 – 2028. The plan states that poor air quality is a health risk in both rural and urban environments. Point 15.10.2 states:

> *"Cork County Council will have regard to European Union, National and Regional policy in all matters relating to air quality and, where appropriate, take steps to reduce the effects of air pollution on people and the environment."*

Objective BE 15-12 (c) is of relevance to the assessment and states:

> *"Air emissions associated with all new development are to be in line with Environmental Quality Standards as set out in the Air Quality Standards Regulations 2011, or any updated/superseding documents."*

8.2 Methodology

8.2.1 Criteria for Rating of Impacts

The rating of potential environmental effects of the development on air quality is based on the criteria presented in Table 3.3 of the EPA (2022) document titled *Guidelines on the Information to Be Contained in Environmental Impact Assessment Reports*. These criteria consider the quality, significance, duration and types of effect characteristics identified.

8.2.1.1 Ambient Air Quality Standards

National and European statutory bodies, the Department of the Environment, Heritage and Local Government in Ireland and the European Parliament and Council of the European Union, have set limit values in ambient air for a range of air pollutants to reduce the risk to health from poor air quality. These limit values or *"Air Quality Standards"* are health or environmental-based levels for which additional factors may be considered. For example, natural background levels, environmental conditions and socio-economic factors may all play a part in the limit value which is set.

Air quality significance criteria are assessed on the basis of compliance with the appropriate standards or limit values. The applicable standards in Ireland are set out in Directive (EU) 2024/2881 *of the European Parliament and of the Council of 23 October 2024 on ambient air quality and cleaner air for Europe (recast)*. This directive supersedes EU Directive 2008/50/EC *of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe* (CAFE Directive). It sets out new air quality standards for pollutants to be reached by 2030 which are more closely aligned with the World Health Organisation (WHO) air quality guidelines and also includes limit values applicable until 2030.

The Ambient Air Quality Standards Regulations 2022 (S.I. 739 of 2022) (the Air Quality Standards Regulations 2022) further transposed the CAFE Directive and revoked the Air Quality Standards Regulations 2011, as amended. With the adoption of Directive (EU) 2024/2881, Ireland must similarly transpose this directive into national law, i.e. update the Air Quality Standards Regulations, before December 2026.

The ambient air quality limit values for pollutants are set out in Annex I of Directive (EU) 2024/2881. Table 1 of Annex I in Directive (EU) 2024/2881 sets out the updated air quality limit values for pollutants to be achieved by 1 January 2030, these are more closely aligned with the WHO air quality guidelines. Table 2 of Annex I in Directive (EU) 2024/2881 sets out the limit values for air pollutants which are to be achieved by 11 December 2026 and are also applicable up to 2030. The limit values in Table 2 of Annex I are the same as the limits set under Directive 2008/50/EC and the Air Quality Standards Regulations 2022.

In relation to the proposed development, the applicable limit values are for nitrogen dioxide (NO_2) and particulate matter (PM_{10} and $PM_{2.5}$). Table 8.1 outlines the limit values pre-2030 and post-2030 for the specified pollutants. The limit values stipulated in Table 2 of Annex I of Directive (EU) 2024/2881 and the Air Quality Standards Regulations 2022 are applicable to the proposed development as it will be operational pre-2030.

Table 8.1 Air Quality Limit Values

Pollutant	Directive (EU) 2024/2881 Annex I Table 2		Directive (EU) 2024/2881 Annex I Table 1	
	Limit Type	**Limit Value (to be attained by 2026 and applicable until 2030)**	**Limit Type**	**Limit Value (to be attained by 2030)**
Particulate Matter (as PM_{10})	24-hour limit for protection of human health - not to be exceeded more than 35 times/year	50 µg/m^3	24-hour limit for protection of human health - not to be exceeded more than 18 times/year	45 µg/m^3
	Annual limit for protection of human health	40 µg/m^3	Annual limit for protection of human health	20 µg/m^3
Particulate Matter (as $PM_{2.5}$)	N/A	N/A	24-hour limit for protection of human health - not to be exceeded more than 18 times/year	25 µg/m^3
	Annual limit for protection of human health	25 µg/m^3	Annual limit for protection of human health	10 µg/m^3

8.2.1.2 WHO Air Quality Guidelines and Cleaner Air Strategy

In April 2023, the Government of Ireland published the *Clean Air Strategy for Ireland* (Government of Ireland, 2023), which provides a high-level strategic policy framework needed to reduce air pollution. The strategy commits Ireland to achieving the 2021 WHO Air Quality Guidelines Interim Target 3 (IT3) by 2026, the IT4 targets by 2030 and the final targets by 2040 (Table 8.2). The strategy notes that a

significant number of EPA monitoring stations observed air pollution levels in 2021 above the WHO targets; 80% of these stations would fail to meet the final $PM_{2.5}$ target of 5 µg/m^3. The strategy also acknowledges that "*meeting the WHO targets will be challenging and will require legislative and societal change, especially with regard to both $PM_{2.5}$ and NO_2*".

Annex II of Directive (EU) 2024/2881 gives assessment thresholds which align with the clean air strategy final 2040 WHO targets. Directive (EU) 2024/2881 states that "*Member States shall endeavour to achieve and preserve the best ambient air quality and a high level of protection of human health and the environment, with the aim of achieving a zero-pollution objective as referred to in Article 1(1), in line with WHO recommendations, and below the assessment thresholds laid down in Annex II*."

These assessment thresholds relate to monitoring of ambient air quality by Member States, where "*exceedances of the assessment thresholds specified in Annex II shall be determined on the basis of concentrations during the previous 5 years where sufficient data are available. An assessment threshold shall be deemed to have been exceeded if it has been exceeded during at least 3 separate years out of those previous 5 years*."

Table 8.2 WHO Air Quality Guidelines

Pollutant	Limit Type	IT3 (2026)	IT4 (2030)	Final Target (2040)
NO_2	24-hour limit for protection of human health	-	-	25 µg/m^3
	Annual limit for protection of human health	20 µg/m^3	-	10 µg/m^3
PM (as PM_{10})	24-hour limit for protection of human health	75 µg/m^3	50 µg/m^3	45 µg/m^3
	Annual limit for protection of human health	30 µg/m^3	20 µg/m^3	15 µg/m^3
PM (as $PM_{2.5}$)	24-hour limit for protection of human health	37.5 µg/m^3	25 µg/m^3	15 µg/m^3
	Annual limit for protection of human health	15 µg/m^3	10 µg/m^3	5 µg/m^3

The applicable air quality limit values for the purposes of this assessment are those set out in Table 8.1. The limit values stipulated in Table 2 of Annex I of Directive (EU) 2024/2881 and the Air Quality Standards Regulations 2022 are applicable to the proposed development as it will be operational pre-2030.

8.2.1.3 Dust Deposition Guidelines

The concern from a health perspective is focused on particles of dust that are less than 10 microns (PM_{10}) and less than 2.5 microns ($PM_{2.5}$). The EU ambient air quality standards outlined in Table 8.1 have set ambient air quality limit values for PM_{10} and $PM_{2.5}$.

With regard to larger dust particles that can give rise to nuisance dust through dust deposition, the German TA-Luft standard for dust deposition (non-hazardous dust) (German VDI, 2002) sets a maximum permissible emission level for dust deposition of 350 mg/m^2/day averaged over a one-year period at any receptors outside the site boundary. The TA-Luft standard has been applied for the purpose of this assessment based on recommendations from the EPA in Ireland in the document titled *Environmental Management Guidelines - Environmental Management in the Extractive Industry (Non-Scheduled Minerals)* (EPA, 2006). The document recommends that the TA-Luft limit of 350 mg/m^2/day be applied to the site boundary of quarries. This limit value can be implemented with regard to dust impacts from the operation of the proposed development.

8.2.2 Dispersion Modelling Methodology for Quarrying Operations

The methodology used as part of this assessment involved undertaking a desk-based study to examine all relevant information relating to air quality conditions in the vicinity of the application site.

The air quality assessment has been carried out following procedures described in the publications by the EPA (EPA, 2020, 2022) and using the methodology outlined in the guidance documents published by the USEPA (USEPA, 2017, 2024). The air dispersion modelling input data consisted of information on the physical environment, design details from all emission sources on-site and five full years of meteorological data. Using this input data the model predicted ambient ground level concentrations and deposition rates beyond the land ownership boundary for each hour of the modelled meteorological years. The model post-processed the data to identify the location and maximum of the worst-case ground level concentration. This worst-case concentration and deposition rate was then added to the background concentration and deposition rate to give the worst-case predicted environmental concentration (PEC) and deposition flux. The PEC was then compared with the relevant ambient air quality standard to assess the significance of the releases from the site.

Air dispersion modelling was undertaken in order to assess the dust deposition flux at the land ownership boundary and the PM_{10} and $PM_{2.5}$ concentrations associated with the quarrying activities at sensitive locations beyond the land ownership boundary. Modelling using the United States Environmental Protection Agency (USEPA) new generation dispersion model AERMOD (USEPA, 2024) (version 24142) was used as recommended by the USEPA (2025) and the Irish EPA (2020). The model is a steady-state Gaussian plume model used to assess pollutant concentrations associated with industrial sources. The model has been designated the regulatory model by the USEPA for modelling emissions from industrial sources in both flat and rolling terrain (USEPA, 2025). The AERMET meteorological pre-processor (USEPA, 2024) was used to generate hourly boundary layer parameters for use by AERMOD. Dust generation rates were calculated from factors derived from empirical assessment and detailed in the USEPA database entitled *Compilation of Air Pollution Emission Factors*, Volume 2, AP-42 (1986, updated periodically) (USEPA, 1986). The emission factors have been presented in Appendix 8.1.

8.2.2.1 Process Emissions

Quarrying activities typically emit dust. Dust is characterised as encompassing particulate matter with a particle size of between 1 and 75 microns (1 - 75µm). Deposition typically occurs in close proximity to each site and potential impacts generally occur within 500 metres of the dust generating activity as dust particles fall out of suspension in the air. Larger particles deposit closer to the generating source and deposition rates will decrease with distance from the source. Sensitivity to dust depends on the duration of the dust deposition, the dust generating activity, and the nature of the deposit. Therefore, a higher tolerance of dust deposition is likely to be shown if only short periods of dust deposition are expected and the dust generating activity is either expected to stop or move on.

The potential for dust to be emitted will depend on the type of activity being carried out in conjunction with environmental factors including levels of rainfall, wind speed, wind direction and dust prevention measures in place. This chapter identifies and quantifies the dust sources from the quarry.

The total extraction area will comprise c. 5.01 ha and is part of an overall larger landholding in the ownership of the Applicant. The site is accessed via a c.180 m long access road directly off the L4621-9. The site is an existing quartzitic sandstone quarry.

Permission is being sought to extract up to a maximum of 225,000 tonnes per annum (tpa) of material, and this figure has been used in the Proposed Operations scenario modelling assessment. Full details of the processes involved are set out in Chapter 2 of this EIAR.

For the purposes of this assessment 5 truck (HGV) movements in and out of the site per hour has been assumed, based on the information outlined in Chapter 11 - Traffic & Transport.

The quarrying operational hours are assumed to be: 07:00 – 19:00 Monday to Friday, 07:30 – 14:30 Saturday with no operations on Sundays or bank holidays. The site is assumed to operate for 48 weeks per year or 288 days per year. Extraction activities will be undertaken using mechanical methods as well as blasting and drilling. Blasting is predicted to take place twice per year between 10:00 and 16:00 and approximately 30,000 tonnes of material can be extracted during a blast event, this has been incorporated into the modelling assessment.

The following operations are the main dust generating sources or activities at the quarry:

- Topsoil removal;
- Movement of trucks along paved public roads;
- Movement of trucks along unpaved haul roads;
- Extraction of material;
- Crushing of material;
- Screening of material;
- Transfer of material along conveyors;
- Stockpiling of material;
- Loading of material;
- Blasting and drilling;
- Wind erosion at dump areas, stockpiles and exposed quarry surface;

The formulae and emission rates for the onsite activities are outlined in Appendix 8.1.

Dust Generation Rates

Dust generation rates depend on the site activity, particle size, the moisture content of the material and weather conditions. Dust emissions are dramatically reduced where rainfall has occurred due to the cohesion created between dust particles and water and the removal of suspended dust from the air. It is typical to assume no dust is generated under "wet day" conditions where rainfall greater than 0.2mm has fallen.

Large particle sizes (greater than 75 microns) fall rapidly out of atmospheric suspension and are subsequently deposited in close proximity to the source. Particle sizes of less than 75 microns are of interest as they can remain airborne for greater distances and give rise to the potential dust nuisance at the sensitive receptors. This size range would broadly be described as silt. Emission rates are normally predicted on a site-specific particle size distribution for each dust emission source. In the absence of such information, the particle size distribution outlined in AP-42 Appendix B.2.2 for Category 3 (mechanically generated aggregate) (USEPA, 1986) has been used and is outlined in Table 8.3. The moisture content of the extracted quartzitic sandstone has been estimated at 2%, which is based on information provided by the client.

Table 8.3 Category 3 Mechanically Generated Aggregates (Source: AP-42 (USEPA, 1986.)

Cumulative % ≤ Stated Size	Particle Size, µm	Minimum Value	Maximum Value	Standard Deviation
4	1.0	-	-	-
11	2.0	-	-	-
15	2.5	3	35	7
18	3.0	-	-	-
25	4.0	-	-	-
30	5.0	-	-	-
34	6.0	15	65	13
51	10.0	23	81	14

8.2.3 Air Quality & Road Traffic Emissions

There is the potential for emissions from road vehicles accessing the site to impact air quality. Pollutants such as NO_2, PM_{10} and $PM_{2.5}$ are emitted from road vehicles.

The TII guidance *Air Quality Assessment of Specified Infrastructure Projects – PE-ENV-01106* (TII, 2025), states that road links meeting one or more of the following criteria can be defined as being 'affected' by a proposed development and should be included in the local air quality assessment. While the guidance is specific to infrastructure projects, the approach can be applied to any development that causes a change in traffic.

- Annual average daily traffic (AADT) changes by 1,000 or more;
- Heavy duty vehicle (HDV) AADT changes by 200 or more;
- Daily average speed change by 10 kph or more;
- Peak hour speed change by 20 kph or more;
- A change in road alignment by 5m or greater.

Chapter 11 Traffic & Transport has analysed the predicted increase in traffic volumes based on the proposed quarrying activities. As per Chapter 11, the development is predicted to result in a maximum of increase of 144 vehicle movements to the surrounding road network. Therefore, the development will not result in a greater than 1000 AADT change or greater than 200 HGV AADT change. Thus, a detailed assessment of operational phase traffic emissions has been scoped out and there is no potential for significant impacts to air quality from operational phase traffic emissions.

8.2.4 Difficulties Encountered in Compiling Information

There were no significant difficulties encountered when completing this assessment.

8.3 Proposed Development

A full description is provided in Chapter 3 of this EIAR.

8.4 Description of Existing Environment

8.4.1 Meteorological Conditions

Meteorological conditions significantly affect the level of dust emissions and subsequent deposition downwind of the source. The most significant meteorological elements affecting dust deposition are rainfall and wind-speed. High levels of moisture either retained in soil or as a result of rainfall help suppress the generation of dust due to the cohesive nature of water between dust particles. Rain also assists in removing dust from the atmosphere through washout. Wind can lift particles up into the air and transport the dust downwind as well as drying out the surface. The worst dust deposition conditions typically occur, therefore, during dry conditions with strong winds.

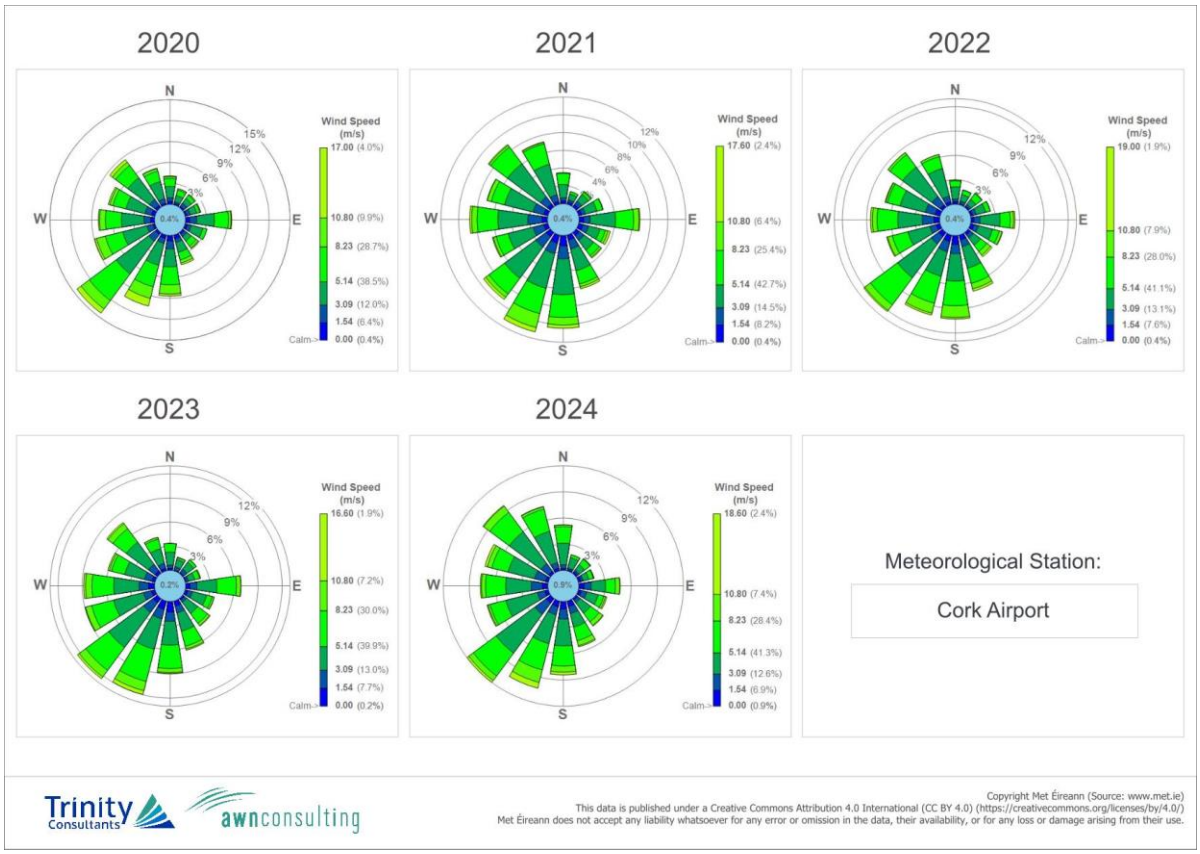
The closest representative Met Éireann synoptic station to the application site is at Cork Airport meteorological station, which is approximately 42 km east of the site. Dust emissions are dramatically reduced where rainfall has occurred due to the cohesion created between dust particles and water and the removal of suspended dust from the air. It is typical to assume no dust is generated under "wet day" conditions where rainfall greater than 0.2 mm has fallen. Historical data collected from Cork Airport Meteorological Station over the period 1991 – 2020 (Met Eireann, 2025) identified that on average 218 days per annum are "wet". Thus, approximately 60% of the time no significant dust generation is likely due to natural meteorological conditions.

Wind frequency is also important as dust can only be dispersed by winds, and deposition of dust is a simple function of particle size, wind speed and distance. The closer the source of dust is to a receptor,

the higher the potential risk of impact from dust blow. According to the data from Cork Airport the prevailing winds in the area are south-westerly, thereby predominantly dispersing any potential dust emissions to the north-east of the site (see Figure 8.1). Wind speeds averaged 6.4 m/s over the period 2020 – 2024. Calm conditions account for only a small fraction of the time in any one year, peaking at 83 hours in 2024 (0.94% of the time). The average wind speed over the 1991 – 2020 period at the Cork Airport meteorological station was 5.0 m/s.

All meteorological data referenced within this report is provided by Met Éireann (source www.met.ie) (Met Eireann, 2025).

Figure 8.1 Wind Roses for Cork Airport Meteorological Station



8.4.2 Background Sources of Dust

The sources of dust arising from the site contribute to background levels of dust. Dust is present naturally in the air from a number of sources including weathering of minerals, and pick-up across open land and dust generated from fires.

Historical dust monitoring data for the site has been reviewed in order to inform background levels of dust deposition in the area of the quarry. Monitoring data of dust soiling for the period 09/06/1999 – 30/06/1999 and 15/06/2000 – 18/07/2000 is available, further monitoring data is not available. Monitoring was carried out using the sticky pad method and took place at 3 no. locations on site in 1999 and 2000. A fourth location was monitored on one occasion in 1999 (Site 4, 23/06/1999 – 30/06/1999)

The average dust soiling level measured at the four locations exceeded the limit value of 3.0% of the effective area coverage (EAC) on one occasion at Site 2 and on three occasions at Site 3 (see Table 8.4). Results ranged from 0.2% - 4.5% over the sample periods. The average result for each location

result for each location is well below the 3% EAC limit. These results would suggest that there is a low level of dust nuisance as a result of soiling occurring within the area of the quarry.

However, as more recent monitoring data is not available and dust deposition data specifically is not available a review of relevant studies has been undertaken in order to inform background levels of dust deposition within the vicinity of the quarry. A study by the UK ODPM (UK ODPM, 1986) gives estimates of likely dust deposition levels in specific types of environments. In open country a level of 39 mg/m^2/day is typical, rising to 59 mg/m^2/day on the outskirts of town and peaking at 127 mg/m^2/day for a purely industrial area. A level of 39 mg/m^2/day can be estimated as the background dust deposition level for the region of the quarry at Ardcahan Co. Cork.

Table 8.4 Dust Soiling Monitoring Results

Sample Date	Site 1 (% EAC / Day)	Site 2 (% EAC / Day)	Site 3 (% EAC / Day)	Site 4 (% EAC / Day)
09/06/1999 - 16/061999	0.6	2.5	3.9	-
16/06/1999 - 23/06/1999	-	3.2	4.5	-
23/06/1999 - 30/06/1999	1.5	0.6	3.8	0.9
15/06/2000 - 22/06/2000	1.2	0.2	1.0	-
22/06/2000 - 29/06/2000	-	0.7	1.0	-
29/06/2000 - 06/07/2000	-	1.0	0.8	-
06/07/2000 - 12/07/2000	0.5	1.1	0.2	-
12/07/2000 - 18/07/2000	0.3	1.0	1.0	-
Average	0.8	1.3	2.0	0.9
Licence Limits (% EAC / Day) Note 2	3.0	3.0	3.0	3.0

Note 1 Site 1 Left of control building
Site 2 Bank alongside office
Site 3 Left hand side of entrance laneway to plant
Site 4 Left of Site 1

Note 2 EAC – Effective Area Coverage

8.4.3 Background Sources of PM_{10} and $PM_{2.5}$

Air quality monitoring programs have been undertaken in recent years by the EPA. The most recent annual report on air quality in Ireland is '*Air Quality in Ireland 2024*' (EPA, 2025). The EPA website details the range and scope of monitoring undertaken throughout Ireland and provides both monitoring data and the results of previous air quality assessments.

As part of the implementation of the Air Quality Standards Regulations 2022 (S.I. No. 739 of 2022), as amended, four air quality zones have been defined in Ireland for air quality management and assessment purposes (EPA, 2025). Dublin is defined as Zone A and Cork as Zone B. Zone C is composed of 23 towns with a population of greater than 15,000. The remainder of the country, which represents rural Ireland but also includes all towns with a population of less than 15,000, is defined as Zone D.

In terms of air monitoring and assessment, the proposed development site is within Zone D (EPA, 2025). The long-term monitoring data has been used to determine background concentrations for the key pollutants in the region of the proposed development. The background concentration accounts for all non-site specific and non-traffic derived emissions (e.g. natural sources, industry, home heating etc.). Representative EPA monitoring stations have been used to determine an estimate of the background air quality in the region of the proposed development.

The subject site is located in a predominantly rural area which would indicate that rural background sites are most representative of the proposed development location.

8.4.3.1 PM_{10}

Continuous PM_{10} monitoring was carried out at a number of representative Zone D rural background locations from 2020 – 2024; Kilkitt, Claremorris and Askeaton. Annual average PM_{10} concentrations across the sites ranged from 7 – 10 µg/m^3 over the 2020 – 2024 period (Table 8.5). The overall annual average concentration for this 5-year period is 8 µg/m^3. There were no exceedances of the daily limit of 50 µg/m^3 over the 2020 – 2024 period. Based on the EPA data, a conservative estimate of the current annual mean background PM_{10} concentration in the region of the proposed development is **8 µg/m^3**.

In relation to the maximum 24-hour averaging period (as a 90.4th%ile), a value of **10 µg/m^3** was employed using the methodology outlined in Appendix E of AG4 (EPA, 2020) based on the 5-year average of the long-term PM_{10} monitoring at the identified Zone D locations over the period 2020 – 2024.

For the dispersion modelling assessment in order to calculate the predicted environmental concentration (PEC) a background concentration is added to the modelled process concentration (PC). In relation to the annual averages, the ambient background concentration is added directly to the process concentration. However, in relation to the short-term peak concentration, concentrations due to emissions from elevated sources cannot be combined in the same way. Guidance from the UK DEFRA (UK DEFRA, 2022) and the EPA (EPA, 2020) advises that for PM_{10} an estimate of the maximum combined pollutant concentration can be obtained as below:

PM_{10} – The 90.4th%ile of total 24-hour mean PM_{10} is equal to the maximum of either A or B below:

a) [90.4th%ile of 24-hour mean background PM_{10}] + [annual mean process contribution PM_{10}].

b) [90.4th%ile 24-hour mean process contribution PM_{10}] + [annual mean background PM_{10}].

Table 8.5 Baseline Air Quality – PM_{10}

Station	Averaging Period	Year				
		2020	2021	2022	2023	2024
Kilkitt, Co. Monaghan	Annual Mean PM_{10} (µg/m^3)	8	8	9	7	7
	24-hr Mean PM_{10} (as 90.4th%ile) (µg/m^3)	14	-	14	-	
	24-hr Mean > 50 µg/m^3 (days)	0	-	0	0	0
Claremorris, Co. Mayo	Annual Mean PM_{10} (µg/m^3)	10	10	8	8	8
	24-hr Mean PM_{10} (as 90.4th%ile) (µg/m^3)	16	13	13	-	
	24-hr Mean > 50 µg/m^3 (days)	0	0	0	0	0
Askeaton, Co. Limerick	Annual Mean PM_{10} (µg/m^3)	7	9	9	-	8
	24-hr Mean PM_{10} (as 90.4th%ile) (µg/m^3)	11	14	15	-	
	24-hr Mean > 50 µg/m^3 (days)	0	0	0	-	0

8.4.3.2 $PM_{2.5}$

Monitoring for $PM_{2.5}$ was conducted at the representative Zone D rural background sites of Claremorris and Shannon Estuary / Askeaton over the 2020 – 2024 period. Average $PM_{2.5}$ levels at these sites over the period 2020 - 2024 ranged from 4 – 8 µg/m^3 (Table 8.6) (EPA, 2025). The overall

annual average concentration for this 5-year period is 6 µg/m^3. Based on this information, an estimate of the background $PM_{2.5}$ concentration in the region of the proposed development is **6 µg/m^3**.

Table 8.6 Baseline Air Quality – $PM_{2.5}$

Station	Averaging Period	Year				
		2020	2021	2022	2023	2024
Claremorris, Co. Mayo	Annual Mean $PM_{2.5}$ (µg/ m^3)	5	8	6	5	5
Shannon Estuary / Askeaton, Co. Limerick	Annual Mean $PM_{2.5}$ (µg/ m^3)	4	6	5	5	5

8.4.4 Sensitive Receptors

8.4.4.1 Operational Phase Quarrying Activities Modelled Receptors

There are varying degrees of dust sensitivity depending on the receptor type. Those of highest sensitivity have the greatest risk of being adversely impacted by increases in ambient dust levels. However, this principle does not always apply and variation from the standard can occur depending on local factors such as rainfall and wind direction and receptor distance from the source.

Receptor sensitivity criteria for quarrying activities has been derived from the Institute of Air Quality Management (IAQM) guidance document *Guidelines on the Assessment of Dust from Demolition and Construction* (2024). The dust generation potential from quarrying activities is similar to construction activities. As per the IAQM guidance (2024) high sensitivity human receptors are regarded as residential properties where people are likely to spend the majority of their time. Commercial properties and places of work are regarded as medium sensitivity while low sensitivity receptors are places where people are present for short periods or do not expect a high level of amenity. Additionally, The TII guidance (2022) defines sensitive receptor locations for the purposes of modelling annual mean pollutant concentrations as: residential housing, schools, hospitals, care homes and short term-accommodation such as hotels, i.e. locations where members of the public are likely to be regularly present for 24 hours.

In addition to sensitive human receptors, dust emissions also have the potential to impact sensitive ecology. Dust can affect vegetation through chemical means such as chemical changes like increased acidity in soils or watercourses. Physical affects include reduced photosynthesis, respiration and transpiration through smothering. These changes are likely to occur only as a result of long-term demolition and construction works adjacent to a sensitive habitat (IAQM, 2024). High sensitivity ecological receptors are those with international or national designation (SPAs, SACs, NHAs) and where the designated feature is dust-sensitive. Effects to ecology can occur up to 50m from the source (IAQM, 2024).

The receptor types in the study area consist of high and low sensitivity receptors consisting mainly of residential areas and farms. There are a limited number of human receptors in the vicinity of the application site in the form of occupied dwellings. The nearest dwellings to the quarry site (red line boundary) are located approximately 300m south; 275m west; 450m north and 400m east of the site. There are no commercial premises or community facilities in the immediate environs.

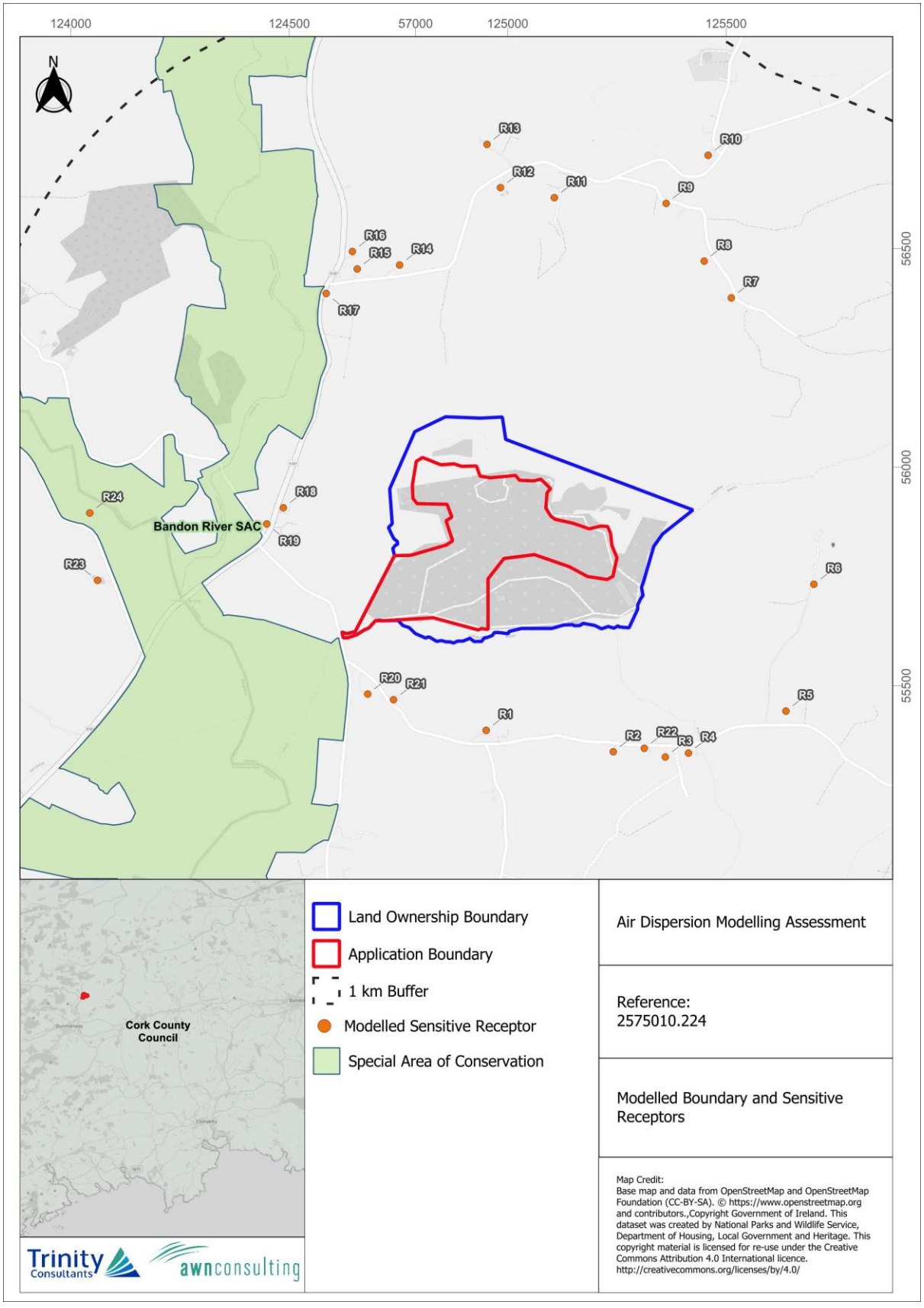
The Bandon River Special Area of Conservation (SAC) (site code 002171) is located c.10 m from the entrance to the proposed development (see Figure 8.2). The Bandon River SAC can be regarded as a high sensitivity receptors according to the IAQM guidance (2024) due to it's international designation and the potentially dust sensitive species present.

The land ownership boundary and sensitive residential receptors used in the modelling assessment are shown in Figure 8.2. Sensitive ecological receptors are also displayed on Figure 8.2.

Dust deposition typically occurs in close proximity to the dust-generating source. Generally, the potential for severe dust impacts is greatest within 100m of dust generating activities, though residual impacts can occur for distances beyond 100m. Vegetation, berms and the natural topography can act as breaks between the sources and the receptor. Tree lines can also act as an efficient dust filter and can be a useful dust control safeguard.

Two receptor grids were created at which concentrations would be modelled. The receptor grids were based on a Cartesian grids with the site at the centre. The outer grid measured 4km x 4km with the site at the centre and concentrations calculated at 200 m intervals, a smaller inner grid measured 1.5km x 1.5km with concentrations calculated at 50m intervals. Boundary receptor locations were also placed along the land ownership boundary of the site, at 50 m intervals. Nearby sensitive residential properties were also added to the model as discrete receptors giving a total of 1,536 calculation points for the model. The modelling has investigated the deposition of dust, and concentrations of PM_{10} and $PM_{2.5}$ for the quarrying activities.

Figure 8.2 Modelled Boundary and Sensitive Receptors



8.5 Impact Assessment

8.5.1 Do Nothing Scenario

The Do Nothing scenario will see the site remain as is with no quarrying operations taking place. There are no predicted impacts to air quality under this scenario. The air quality baseline will continue to develop in line with current trends as per Section 8.4. The Do Nothing scenario is considered neutral in relation to air quality.

8.5.2 Construction Phase

There are no significant construction works associated with the proposed development. Due to the minimal nature of these works significant impacts to air quality are not predicted and they have not been considered further. Overburden for the proposed extension area will be stripped in phases and will be undertaken during the normal day to day operations at the site and has been considered within the operational phase assessment detailed in Section 8.5.3.1.

8.5.3 Operational Phase

8.5.3.1 Quarrying Operations – Dispersion Modelling Results

The primary sources of emissions to air are from plant and machinery undertaking day to day activities such as extraction, onsite processing, transportation of material and dust blow generated during dry, windy conditions. Potential impacts associated with day to day activities have been categorised into dust deposition, PM_{10} and $PM_{2.5}$ emissions.

The results of the dispersion modelling assessment show that dust deposition levels, annual and daily mean concentrations of PM_{10} and annual mean concentrations of $PM_{2.5}$ from the proposed quarrying operations are in compliance with the relevant limit values.

The results indicate that the effect of the operational phase (i.e. Proposed Operations Scenario) on air quality is ***localised, direct, long-term, negative*** and ***not significant***.

Dust Deposition

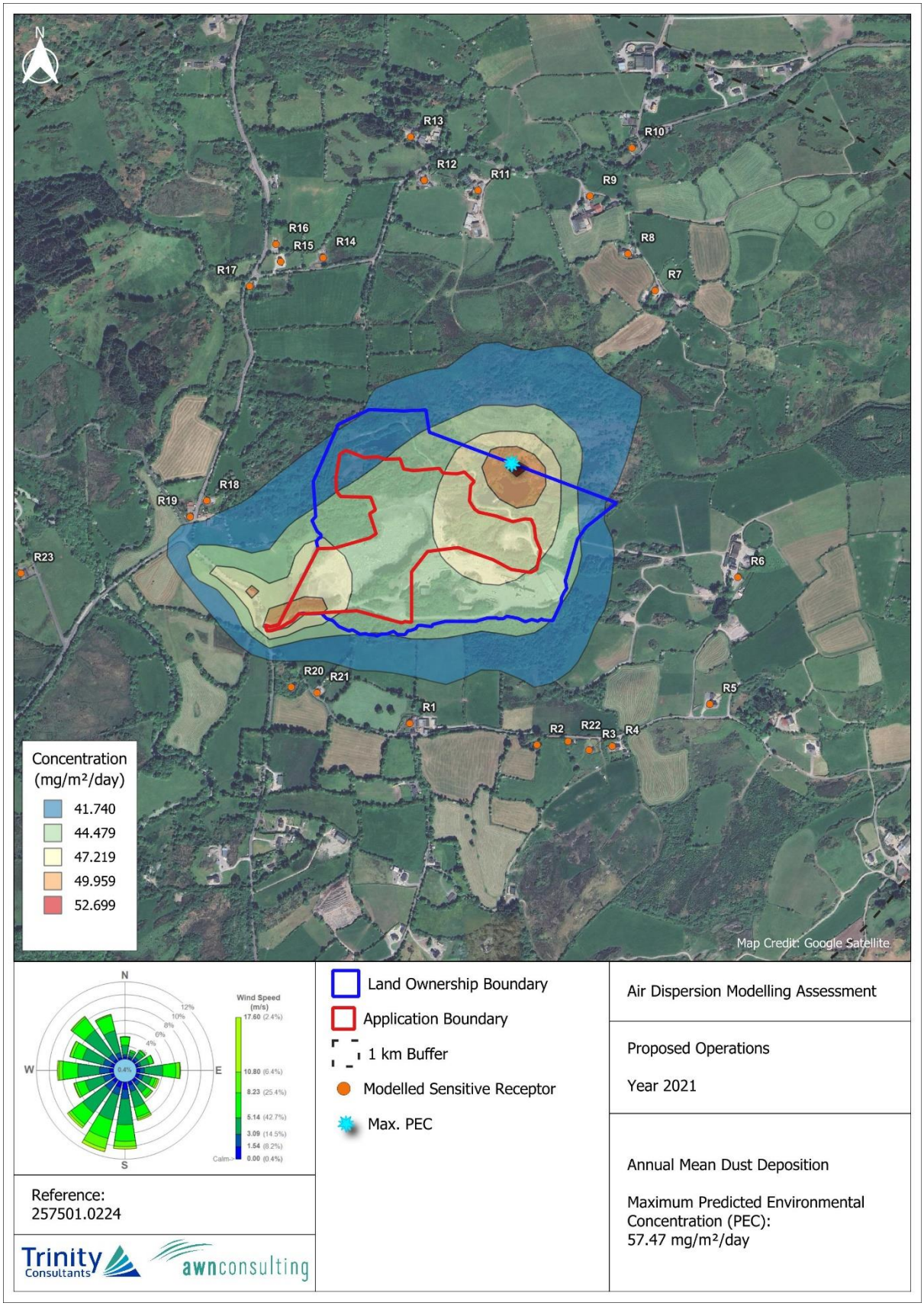
Proposed quarrying operations from the site lead to a dust deposition level, averaged over the full year, of at most 18.5 mg/m^2/day at the land ownership boundary to the quarry (see Table 8.7). Based on a worst case background dust deposition of 39 mg/m^2/day in the region of the site, the combined dust deposition level peaks at 57.5 mg/m^2/day which is 16% of the TA Luft Limit Value of 350 mg/m^2/day.

Figure 8.3 shows the geographical variation in annual dust deposition levels in the region of development. The dust deposition level decreases with increasing distance from the site.

Table 8.7 Dispersion Modelling Results for Dust Deposition at Boundary – Proposed Operations Scenario

Pollutant/ Year	Averaging Period	Worst Case Receptor		Process Contribution (PC) (mg/m²/day)	Background Concentration (mg/m²/day)	Predicted Environmental Concentration (PEC) (mg/m²/day)	Limit Value (mg/m²/day)	PEC as a % of Limit Value
		Type	X,Y (UTM Zone 29 N)					
Dust / 2020	Annual Mean	Boundary	494228, 5733433	17.9	39	56.9	350	16%
Dust / 2021	Annual Mean	Boundary	494181, 5733451	18.5	39	57.5	350	16%
Dust / 2022	Annual Mean	Boundary	494181, 5733451	18.2	39	57.2	350	16%
Dust / 2023	Annual Mean	Boundary	494181, 5733451	18.1	39	57.1	350	16%
Dust / 2024	Annual Mean	Boundary	494228, 5733433	18.4	39	57.4	350	16%

Figure 8.3 Annual Mean Dust Deposition Rate (mg/m²/day) – Proposed Operations Scenario



Particulate Matter (PM_{10})

Predicted PM_{10} concentrations as a result of the proposed quarrying operations are presented in Table 8.8.

The annual mean PM_{10} concentrations (including background concentration) at the worst-case receptor peak at 8.25 µg/m^3. This equates to 21% of the annual PM_{10} limit value of 40 µg/m^3.

The predicted 24-hour PM_{10} concentration (including background) peaks at 10.25 µg/m^3 (based on Method A) which is 21% of the 24-hour limit value of 50 µg/m^3 (measured as a 90.4th%ile).

The geographical variation in the 24-hour mean (90.4th%ile) PM_{10} ground level concentrations are illustrated as concentration contours in Figure 8.4. The geographical variation in annual mean PM_{10} ground level concentrations in the region of the development are illustrated as contours in Figure 8.5. The locations of the maximum concentrations for PM_{10} are close to the boundary of the site with concentrations decreasing with distance from the subject site.

Table 8.8 Dispersion Model Results for PM_{10} – Proposed Operations Scenario

Pollutant/ Year	Averaging Period	Worst Case Receptor		Process Contribution (PC) (µg/m^3)	Background Concentration (µg/m^3)	Predicted Environmental Concentration (PEC) (µg/m^3) Method A	Predicted Environmental Concentration (PEC) (µg/m^3) Method B	Limit Values (µg/Nm^3)	PEC as a % of Limit Value
		Type	X,Y (UTM Zone 29 N)						
PM_{10} / 2020	Annual Mean	Sensitive	493484, 5733366	0.231	8	8.23	8.23	40	21%
	24-hr Mean (as 90.4th%ile)	Sensitive	493484, 5733366	0.719	10	10.23	8.72	50	20%
PM_{10} / 2021	Annual Mean	Sensitive	493484, 5733366	0.214	8	8.21	8.21	40	21%
	24-hr Mean (as 90.4th%ile)	Sensitive	493484, 5733366	0.782	10	10.21	8.78	50	20%
PM_{10} / 2022	Annual Mean	Sensitive	493484, 5733366	0.210	8	8.21	8.21	40	21%
	24-hr Mean (as 90.4th%ile)	Sensitive	493484, 5733366	0.753	10	10.21	8.75	50	20%
PM_{10} / 2023	Annual Mean	Sensitive	493484, 5733366	0.254	8	8.25	8.25	40	21%
	24-hr Mean (as 90.4th%ile)	Sensitive	493484, 5733366	0.805	10	10.25	8.81	50	21%
PM_{10} / 2024	Annual Mean	Sensitive	493484, 5733366	0.213	8	8.21	8.21	40	21%
	24-hr Mean (as 90.4th%ile)	Sensitive	493484, 5733366	0.593	10	10.21	8.59	50	20%

Figure 8.4 Maximum 24-Hr PM_{10} (as a 90.4th%ile) (µg/m^3) – Proposed Operations Scenario

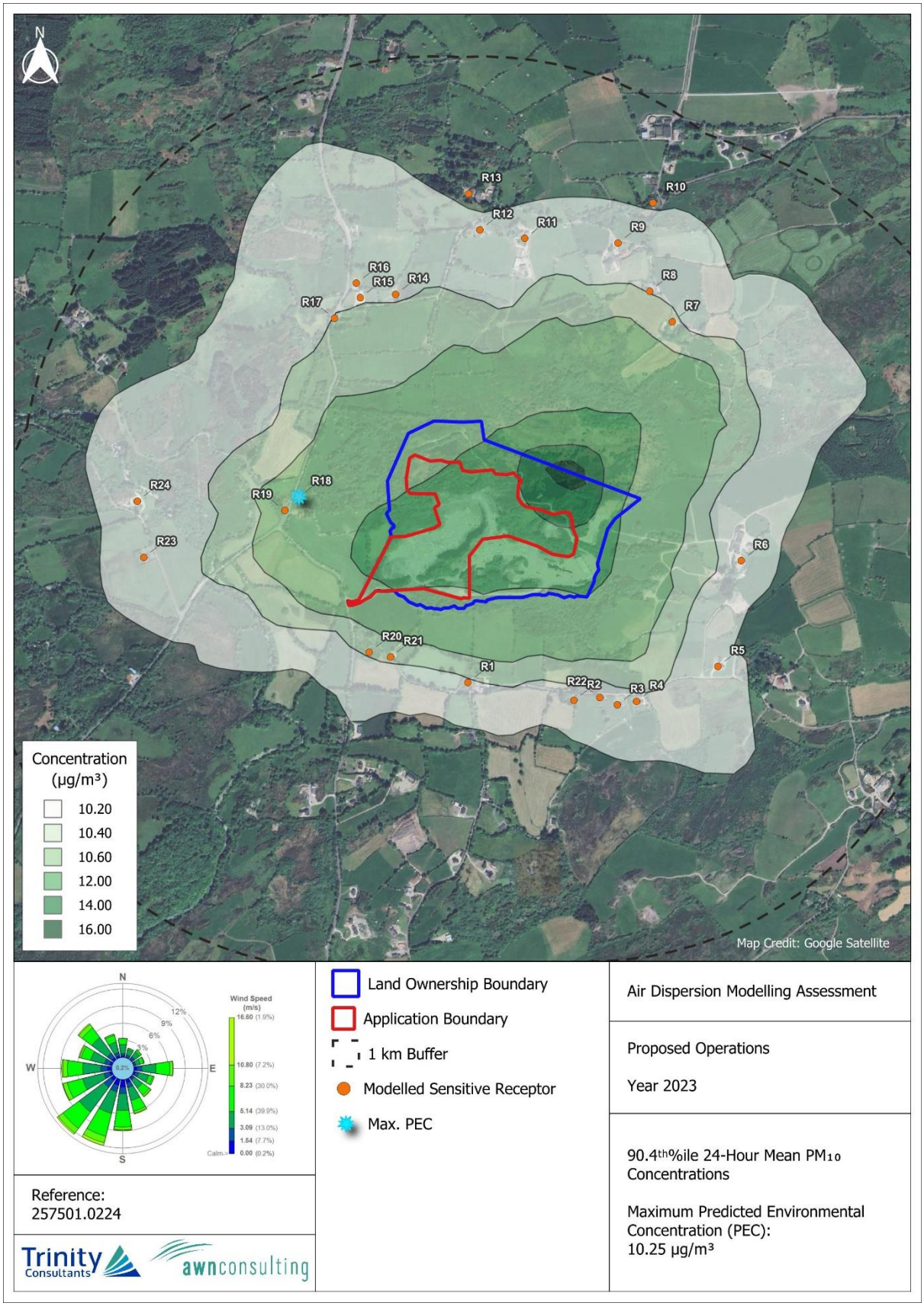
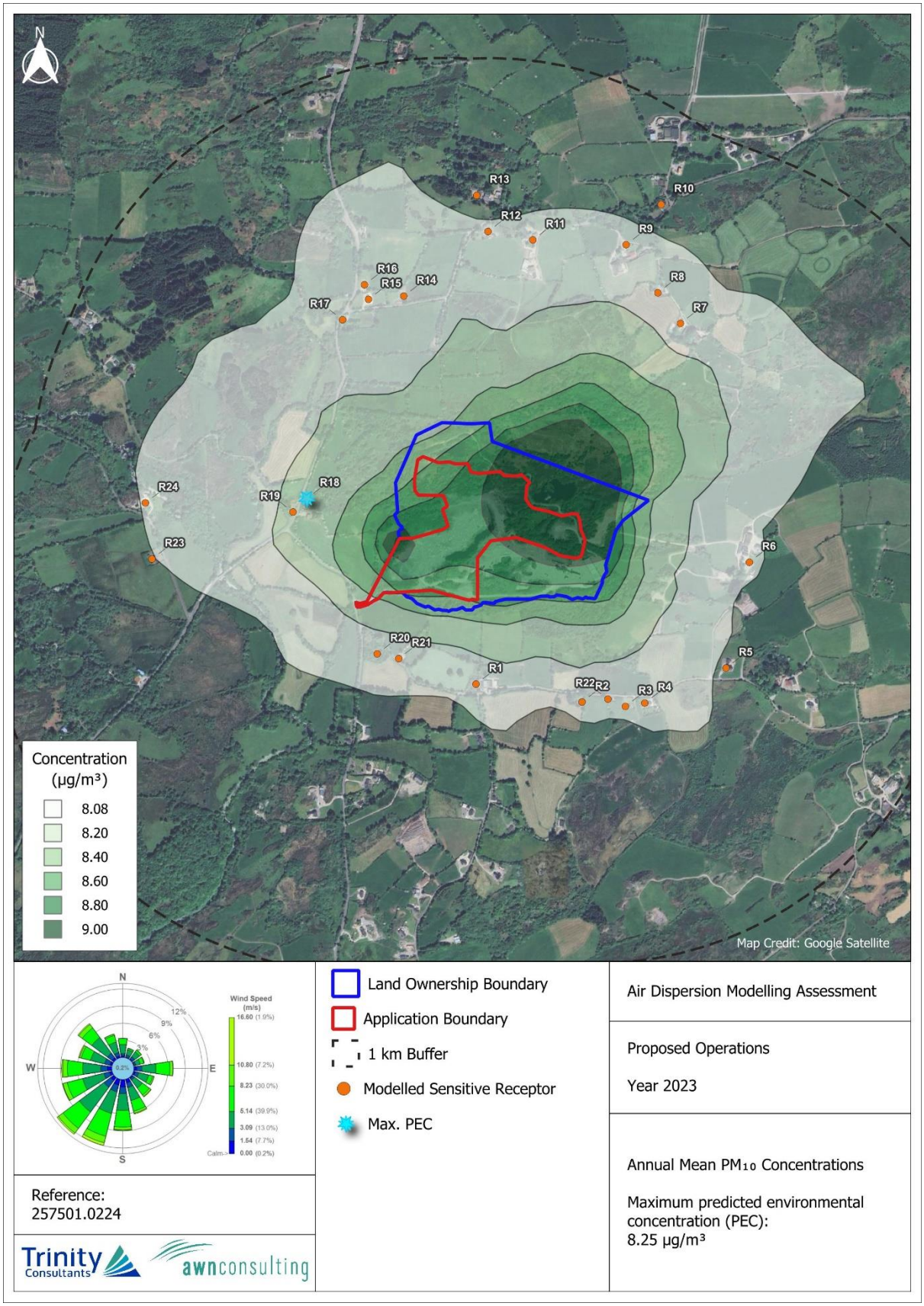


Figure 8.5 Annual Mean PM_{10} Concentration (µg/m^3) – Proposed Operations Scenario



Particulate Matter ($PM_{2.5}$)

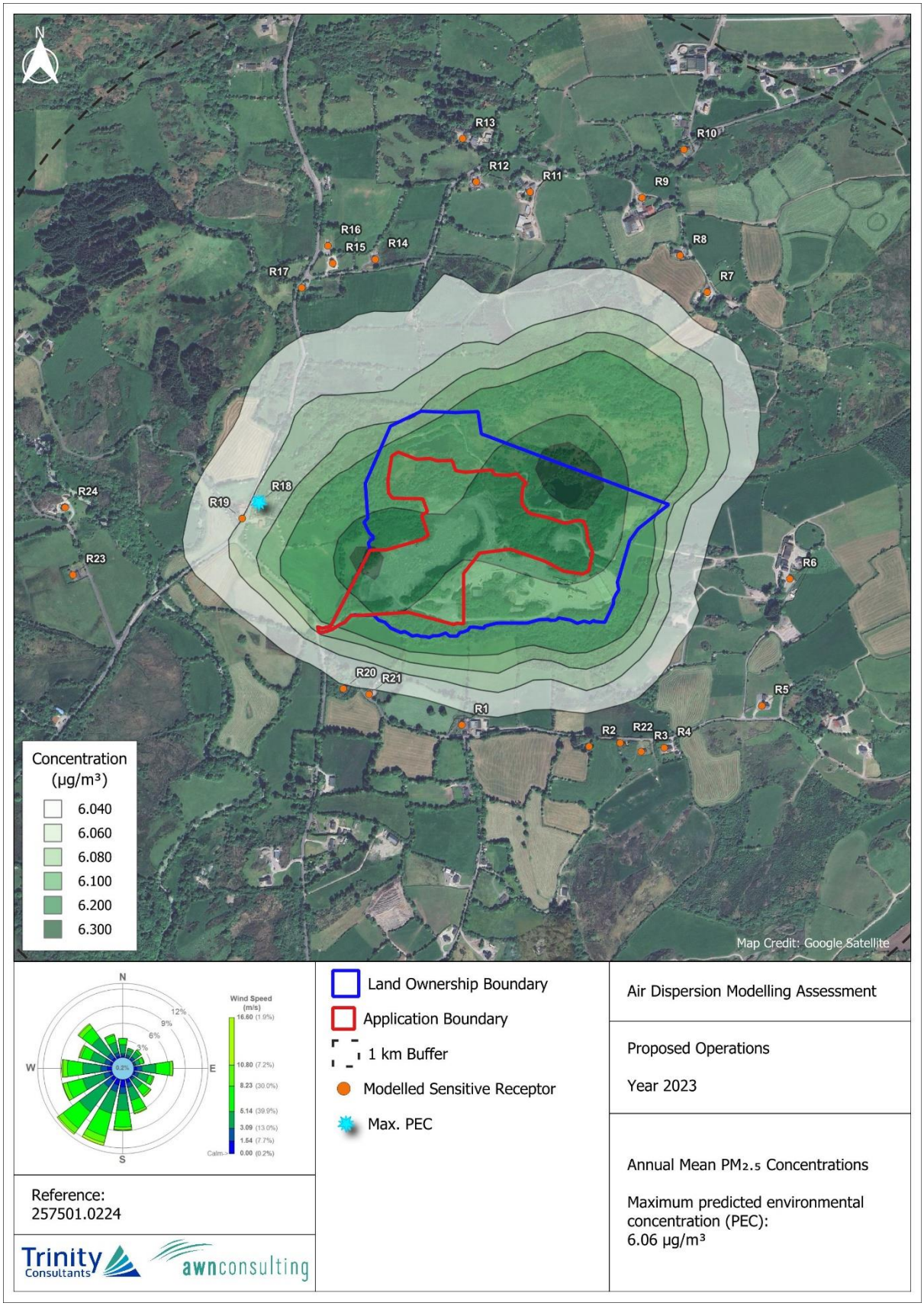
Predicted $PM_{2.5}$ concentrations at the worst-case receptor are below the limit value of 25 µg/m^3 (see Table 8.9). Based on a background $PM_{2.5}$ concentration of 6 µg/m^3 in the region of the site, the annual mean $PM_{2.5}$ concentration including the operations (i.e. PEC) peaks at 6.063 µg/m^3. This peak level equates to 24.25% of the annual limit value for $PM_{2.5}$.

The geographical variation in annual $PM_{2.5}$ ground level concentrations in the region of the development are illustrated as contours in Figure 8.6. The locations of the maximum concentrations for $PM_{2.5}$ are close to the boundary of the site with concentrations decreasing with distance from the subject site.

Table 8.9 Dispersion Model Results for $PM_{2.5}$ – Proposed Operations Scenario

Pollutant/ Year	Averaging Period	Worst Case Receptor		Process Contribution (PC) (µg/m^3)	Background Concentration (µg/m^3)	Predicted Environmental Concentration (PEC) (µg/m^3)	Limit Values (µg/Nm^3)	PEC as a % of Limit Value
		Type	X,Y (UTM Zone 29 N)					
$PM_{2.5}$ / 2020	Annual Mean	Sensitive	493484, 5733366	0.056	6	6.056	25	24.22%
$PM_{2.5}$/ 2021	Annual Mean	Sensitive	493484, 5733366	0.057	6	6.057	25	24.23%
$PM_{2.5}$/ 2022	Annual Mean	Sensitive	493484, 5733366	0.056	6	6.056	25	24.23%
$PM_{2.5}$/ 2023	Annual Mean	Sensitive	493484, 5733366	0.063	6	6.063	25	24.25%
$PM_{2.5}$/ 2024	Annual Mean	Sensitive	493484, 5733366	0.056	6	6.056	25	24.22%

Figure 8.6 Annual Mean $PM_{2.5}$ Concentration (µg/m³) – Proposed Operations Scenario



8.5.4 Decommissioning Phase

Impacts to air quality from decommissioning works are likely to be similar or lesser than those predicted for the operational phase as similar site activities will be undertaken, such as movement of materials, infilling, etc. The impact to air quality will be ***short-term, direct, negative*** and ***not significant***.

8.5.5 Cumulative Impacts

Cumulative effects have been assessed for the proposed development. Background concentrations have been included in the modelling study based on EPA data for PM_{10} and $PM_{2.5.}$ These background concentrations account for non-localised sources of the pollutants of concern. Impacts from the site are localised to the immediate vicinity of the site (see Figure 8.3 - Figure 8.6).

There are no other significant sources of dust, PM_{10}, or $PM_{2.5,}$ within the area of impact from the quarry and therefore no further prediction of cumulative impact is required.

8.6 Mitigation and Monitoring Measures

8.6.1 Construction Phase

There are no significant construction works required for the proposed development, therefore no mitigation is proposed.

8.6.2 Operational Phase

There are a number of mitigation measures proposed to prevent significant dust emissions from on-site activities. These measures include:

- Site roads will be dampened using wet methods during dry periods, particularly during summer months.
- Inspection, sweeping and cleaning of site roads and adjoining public roads will be undertaken on a regular basis, minimum every other day. A road sweeper will be utilised if required.
- All fine materials will be covered when leaving the site to prevent dust escaping.
- Aggregates will be stored in an enclosed shed once processed.
- Speeds restrictions will in place on site. Speeds will be reduced to a maximum of 20 kmph.
- Drop heights will be minimised when handling material.
- The perimeter natural vegetation and screening mounds will be maintained to allow for natural screening of dust from nearby receptors.
- Idle times will be reduced by providing an efficient material handling plan that minimises vehicle wait time.
- Regular maintenance of plant and equipment will be undertaken to ensure they will perform the most efficiently.
- Traffic management measures will be implemented.

These measures have been incorporated into the modelling assessment to determine the impact of the site on levels of dust deposition and ambient levels of particulate matter (PM_{10} / $PM_{2.5}$). With mitigation in place impacts to ambient air quality will be insignificant.

8.6.3 Decommissioning Phase

The mitigation measures proposed for the operational phase shall also be implemented during any decommissioning phase.

8.6.4 Monitoring

Monitoring for dust deposition is proposed using the Bergerhoff Method as per German Standard VDI 2119. This monitoring methodology is best practice for quarry sites. Monitoring is recommended to

occur along the site boundary and compliance with the TA Luft limit value of 350 mg/m^2/day assessed over the monitoring period of 30 days (+/- 2 days). Monitoring will indicate whether dust mitigation measures are working satisfactorily and whether quarrying operations are leading to potential off-site dust impacts.

8.7 Risk of Major Accidents and Disasters

Due to the nature of the proposed development as a quarry, air quality-related major accidents or disasters are unlikely.

8.8 Significant Interaction of Effects

8.8.1 Air Quality and Population & Human Health

8.8.1.1 Construction Phase

An adverse air quality impact can cause health and dust nuisance issues. The dust emissions associated with the operational quarrying activities have been modelled and the results compared to the relevant ambient air quality legislative limits, which are set for the protection of human health. The modelled results indicate that operational phase dust emissions will not have a significant impact on ambient air quality and results are compliant with the relevant limit values.

Best practice mitigation measures will implemented during the operational phase to ensure that the impact of the proposed development complies with all ambient air quality legislative limits. Therefore, the predicted impact is direct, long-term, negative, localised and not significant with respect to Population and Human Health.

8.8.2 Air Quality and Land & Soils

Operational phase activities such as land clearing, material processing, stockpiling of materials etc. have the potential for interactions between Air Quality and Land & Soils in the form of dust emissions. With the appropriate mitigation measures to prevent fugitive dust emissions, it is predicted that there will be no significant interactions between air quality and land and soils during the operational phase.

8.8.3 Air Quality and Biodiversity

Dust generation will occur during the operational phase due to the quarrying works. Dust emissions can coat vegetation leading to a reduction in the photosynthesising ability as well as other effects. Bandon River SAC (site code 002171) is located within 10 m of the proposed development site entrance and is considered a high sensitivity receptor to potential dust impacts. The detailed dispersion modelling exercise assessed dust deposition rates at the site boundary. Based on the results of this assessment, dust deposition rates will reach a maximum of 57.5 mg/m^2/day which is 16% of the TA Luft Limit Value of 350 mg/m^2/day. Dust deposition rates in the region of the Bandon River SAC are predicted to be similar or lesser than at the site boundary due to the increased distance from the site. Additionally, the majority of the SAC is at a significant distance from the site and will experience imperceptible dust effects from the onsite operations.

There are also areas of vegetation located on-site which may be susceptible to dust impacts, these includes areas of dry siliceous heath to the north of the site as well as woodland areas to the west and south of the site.

Dust mitigation measures will be implemented on site as set out in Section 8.6. With the implementation of these mitigation measures dust emissions will be minimised and impacts will be direct, long-term, negative, localised and not significant with respect to biodiversity.

8.8.4 Air Quality and Material Assets – Traffic & Transport

Interactions between Air Quality and Traffic can be significant. With increased traffic movements and reduced engine efficiency, i.e. due to congestion, the emissions of vehicles increase. The impacts of the proposed development on air quality are assessed by reviewing the change in annual average daily traffic on roads close to the site. In this assessment, the impact of the interactions between Traffic and Air Quality are linked but there is no potential for significant impacts from traffic on air quality.

8.9 Residual Impacts

8.9.1 Construction Phase

There are no significant construction works associated with the proposed development. Due to the minimal nature of these works significant impacts to air quality are not predicted.

8.9.2 Operational Phase

The assessment involved modelling emissions from the proposed quarrying operations. Predicted dust deposition rates, and PM_{10} and $PM_{2.5}$ concentrations from the quarrying operations are in compliance with the ambient air quality limit values which are set for the protection of human health and the environment. With proposed mitigation measures in place it can be concluded that the proposed development will have a ***long-term, localised, direct, negative*** and ***not significant*** effect on air quality.

8.9.3 Decommissioning Phase

Impacts to air quality from decommissioning works are likely to be similar or lesser than those predicted for the operational phase as similar site activities will be undertaken, such as movement of materials, infilling, etc. The impact to air quality will be ***short-term, direct, negative*** and ***not significant***.

8.10 Conclusion

This chapter has reviewed and analysed the potential impacts of the proposed development with regards to air quality. These impacts have been considered for all phases of the proposed development.

Provided all mitigation measures as set out in this chapter are implemented, the overall predicted effect of the proposed development is ***not significant***.

8.11 References

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Murray Brothers Tarmacadam Ltd

CHAPTER 9
CLIMATE

VOLUME II
MAIN STATEMENT

APRIL 2026

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9 Climate

9.1 Introduction

This chapter assesses the likely climate impacts associated with the continuation of an existing quarry and a proposed extension of that quarry at a site in the townland of Ardcahan, Co. Cork. A full description of the development can be found in Chapter 2.

Ardcahan Quarry is located approximately 3.5km northeast of Dunmanway in West Cork. The site is situated off the L4621-9 local road ('Hospital Road'), approximately 300m east of its junction with the R587 regional road, which links Dunmanway and Macroom. The area within the overall landholding measures approx. 25.2 hectares (ha).

The subject site measures 10.4 ha in area. It incorporates proposed extraction areas measuring 5.01 ha, principally along the north of the application site, and the balance of the lands comprises ancillary areas.

The project site overlaps with lands under consideration for Substitute Consent by way of a concurrent planning application[1]. The former extraction area and adjoining lands in the south for which substitute consent is being sought are included in this prospective application to accommodate ancillary quarry activities (internal roads, settling ponds, stockpiling, etc.) associated with the proposed future extraction. The application site does not include the southeast part of the landholding occupied by the tarmacadam plant, administration buildings and associated development permitted under Reg. Ref. 98/294. See Chapter 2 for further details.

9.1.1 Author Information and Competency

This chapter was completed by Ciara Nolan. Ciara is a Principal Environmental Consultant in the Air Quality & Climate section of AWN Consulting. She holds a BSc in Energy Systems Engineering from University College Dublin and has also completed an MSc in Applied Environmental Science at UCD. She is a Member of the Institute of Air Quality Management (MIAQM) and the Institution of Environmental Sciences (MIEnvSc). She has over 9 years of experience in undertaking air quality and climate assessments. She has prepared air quality and climate impact assessments as part of EIARs for residential developments including Woodbrook, Shankill (Planning Application Ref. ABP30584419), Ballygossan Park, Skerries (Planning Application Ref. LRD0010/S3), SHD Ratoath (Planning Application Ref. SH305196), SHD Rathmullen, Drogheda (Planning Application Ref. SH305552), commercial and industrial developments by Dublin Airport Authority, Abbvie, Mountpark, Pfizer, Takeda, as well as renewable energy developments such as Crockahenny Windfarm, Upperchurch Windfarm, Knocknamona Windfarm and Keerglen Windfarm. She also specialises in conducting air dispersion modelling assessments of emissions from data centres, energy centres and the chemical industry as part of EPA Industrial Emissions Licences for Echelon DC, AWS, Takeda, MSD and Regeneron. She has undertaken air quality and climate impact assessments for transportation schemes, primarily regional and national road schemes, from constraints, through to route selection and EIAR stage.

9.1.2 Aspects Relevant to this Assessment

The climate assessment is divided into two distinct sections – a greenhouse gas assessment (GHGA) and a climate change risk assessment (CCRA):

- **Greenhouse Gas Emissions Assessment (GHGA)** – Quantifies the GHG emissions from a project over its lifetime. The assessment compares these emissions to relevant carbon budgets, targets and policy to contextualise magnitude.

[1] An application for Substitute Consent under Section 177E of the Planning and Development Act 2000, as amended, has been submitted to An Bord Pleanála to regularise extraction and ancillary quarrying activities which took place at Ardcahan Quarry between 1990 and 2014.

- **Climate Change Risk Assessment (CCRA)** – Identifies the impact of a changing climate on a project and receiving environment. The assessment considers a projects vulnerability to climate change and identifies appropriate adaptation and mitigation measures to increase project resilience.

The greenhouse gas assessment has focussed on GHG emissions associated with site activities and traffic emissions.

The vulnerability of the proposed development in relation to future climate change must be considered during the operational phase. Due to the nature of the proposed development, it is not considered significantly vulnerable to future climate change hazards.

9.2 Guidelines, Legislation & Policy Relevant to Discipline

9.2.1 Guidance

The principal guidance and best practice documents used to inform the assessment of potential impacts on climate are summarised below. In addition to specific climate guidance documents, the following guidelines were considered and consulted in the preparation of this chapter:

- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2022); and
- Environmental Impact Assessment of Projects – Guidance on the preparation of the Environmental Impact Assessment Report (European Commission, 2017).

The assessment has referred to national guidelines where available, in addition to international standards and guidelines relating to the assessment of climate impacts. These are summarised below:

- Transport Infrastructure Ireland (TII) PE-ENV-01104: Climate Guidance for National Roads, Light Rail and Rural Cycleways (Offline & Greenways) – Overarching Technical Document (TII, 2022);
- Transport Infrastructure Ireland (TII) GE-ENV-01106: TII Carbon Assessment Tool for Road and Light Rail Projects and User Guidance Document (TII, 2025);
- The Institute of Sustainability and Environmental Professionals (ISEP) (formerly known as IEMA) Environmental Impact Assessment Guide to: Assessing GHG Emissions and Evaluating their Significance (ISEP, 2022);
- ISEP Environmental Impact Assessment Guide to: Climate Change Resilience and Adaptation (ISEP, 2020a);
- ISEP GHG Management Hierarchy (ISEP, 2020b);
- ISEP Principles Series: Climate Change Mitigation & EIA (ISEP, 2010);
- Carbon Management in Infrastructure and Built Environment - PAS 2080 (BSI, 2023); and
- Technical Guidance on the Climate Proofing of Infrastructure in the Period 2021-2027 (European Commission, 2021a).

9.2.2 Legislation

In 2015, the Climate Action and Low Carbon Development Act 2015 (No. 46 of 2015) (as amended) (Government of Ireland, 2015) was enacted (the 2015 Act). The purpose of the 2015 Act was to enable Ireland *"to pursue, and achieve, the transition to a low carbon, climate resilient and environmentally sustainable economy by the end of the year 2050"* (3.(1) of No. 46 of 2015). This is referred to in the 2015 Act as the 'National Transition Objective'. The 2015 Act made provision for a national mitigation plan, and a national adaptation framework. In addition, the 2015 Act provided for the establishment of the Climate Change Advisory Council with the function to advise and make recommendations on the preparation of the national mitigation and adaptation plans and compliance with existing climate obligations.

The key duty imposed on planning authorities by Section 15 of the Climate Action and Low Carbon Development Act 2015 (as amended) is:

"1) A relevant body [a planning authority] shall, in so far as practicable, perform its functions in a manner consistent with—

(a) the most recent approved climate action plan,

(b) the most recent approved national long term climate action strategy,

(c) the most recent approved national adaptation framework and approved sectoral adaptation plans,

(d) the furtherance of the national climate objective, and

(e) the objective of mitigating greenhouse gas emissions and adapting to the effects of climate change in the State."

The first Climate Action Plan (CAP) was published by the Irish Government in June 2019 (Government of Ireland, 2019). The Climate Action Plan 2019 outlined the current status across key sectors including Electricity, Transport, Built Environment, Industry and Agriculture and outlined the various broadscale measures required for each sector to achieve ambitious decarbonisation targets. The 2019 CAP also detailed the required governance arrangements for implementation including carbon-proofing of policies, establishment of carbon budgets, a strengthened Climate Change Advisory Council and greater accountability to the Oireachtas. The fifth and most recent climate action plan, CAP25, was published in April 2025 (Government of Ireland, 2025).

Following on from Ireland declaring a climate and biodiversity emergency in May 2019, and the European Parliament approving a resolution declaring a climate and environment emergency in Europe in November 2019, the Government approved the publication of the General Scheme in December 2019, followed by the publication of the Climate Action and Low Carbon Development (Amendment) Act 2021 (hereafter referred to as the 2021 Climate Act) in March 2021. The Climate Act was signed into Law on the 23rd of July 2021, giving statutory effect to the core objectives stated within the CAP.

In relation to carbon budgets, the 2015 Act (as amended) states "*a carbon budget, consistent with furthering the achievement of the national climate objective, shall be proposed by the Climate Change Advisory Council, finalised by the Minister and approved by the Government for the period of 5 years commencing on the 1 January 2021 and ending on 31 December 2025 and for each subsequent period of 5 years (in this Act referred to as a 'Budget Period'*)".

A carbon budget is defined as the total amount of greenhouse gas emissions that are permitted during the budget period. The carbon budget is to be produced for 3 sequential budget periods (Table 9.1). The carbon budget can be revised where new obligations are imposed under the law of the European Union or international agreements or where there are significant developments in scientific knowledge in relation to climate change. In relation to the sectoral emissions ceiling, the Minister for the Environment, Climate and Communications (the Minister for the Environment) shall prepare and submit to government the maximum amount of GHG emissions that are permitted in different sectors of the economy during a budget period and different ceilings may apply to different sectors. The sectorial emission ceilings for 2030 are published in the Climate Action Plan 2025 (CAP25) and are reproduced in

Table 9.2.

Table 9.1 5-Year Carbon Budgets

Budget Period	Carbon Budget	Reduction Required
2021-2025	295 Mt CO_2e	Reduction in emissions of 4.8% per annum for the first budget period.
2026-2030	200 Mt CO_2e	Reduction in emissions of 8.3% per annum for the second budget period.
2031-2035	151 Mt CO_2e	Reduction in emissions of 3.5% per annum for the third provisional budget.

Table 9.2 Sectoral Emission Ceilings 2030

Sector	Baseline ($MtCO_2e$)	Carbon Budgets ($MtCO_2e$)		2030 Emissions ($MtCO_2e$)	Indicative Emissions % Reduction in Final Year of 2025 – 2030 Period (Compared to 2018)
	2018	2021-2025	2026-2030		
Electricity	10	40	20	3	75
Transport	12	54	37	6	50
Built Environment – Residential	7	29	23	4	40
Built Environment – Commercial	2	7	5	1	45
Industry	7	30	24	4	35
Agriculture	23	106	96	17.25	25
Other (F-gases, waste, petroleum refining)	2	9	8	1	50
Land Use, Land-use Change and Forestry (LULUCF)	5	Reflecting the continued volatility for LULUCF baseline emissions to 2030 and beyond, a new approach aligned with the EU LULUCF Regulation has been adopted.			
Total	68				
Unallocated Savings	-	-	26	-5.25	-
Legally Binding Carbon Budgets and 2030 Emission Reduction Targets	-	295	200	-	51

9.2.3 Policy

9.2.3.1 National Policy

Greenhouse Gas Policy

In 2024, the Government published its *Long-Term Strategy on Greenhouse Gas Emissions Reductions* (DECC, 2024a). This strategy provides a long-term plan on how Ireland will transition towards net carbon zero by 2050, achieving the interim targets set out in the CAP.

In April 2025, CAP25 was published, establishing key actions to deliver a 51% reduction in GHG emissions by 2030 (compared to 2018 levels) and achieve climate neutrality by 2050 (Government of Ireland, 2025). CAP25 is the fourth plan 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 follows on from CAP23 and CAP24 with the implementation of the carbon budgets and sectoral emissions ceilings and sets out a roadmap for taking decisive action to reach net zero no later than 2050, as committed to in the Programme for Government. CAP25 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.

A key target in CAP25 is to reduce the embodied carbon of construction materials. Section 12 of CAP25 outlines the following target for 2030 in relation to construction materials -

- Decrease by at least 30% embodied carbon for materials produced and used in Ireland.

Quarrying activities directly provide construction materials or provide the raw material to be used in construction materials.

9.2.3.2 Climate Change Vulnerability Policy

The Second National Adaptation Framework (NAF) (Government of Ireland, 2024c), published in June 2024 under the Climate Action and Low Carbon Development Act 2015, outlines a comprehensive, whole-of-government and whole-of-society approach to climate adaptation. Its core objective is to

enhance Ireland's resilience to a wide range of climate risks, including extreme weather events, flooding, drought, biodiversity loss, sea level rise, and rising temperatures.

Building on the principles of a "Just Transition", the NAF introduces the concept of "Just Resilience'', envisioning a climate-resilient Ireland that ensures fairness, equity, and inclusivity in adaptation planning and implementation. It promotes reduced reliance on fossil fuels, the expansion of electrified and accessible public transport, and the integration of sustainability and climate resilience across all sectors. These include energy, water, wastewater, agriculture, transport, health, built environment, and biodiversity, with a strong emphasis on mainstreaming adaptation practices into policy, planning, and operations.

The National Climate Change Risk Assessment Main Report (NCCRA) was published in June 2025 (EPA, 2025c). The NCCRA was required to be developed under Action 457 from the 2021 CAP (Government of Ireland, 2021). Action 457 seeks to *"further develop Ireland's national climate change risk assessment capacity to identify the priority physical risks of climate change to Ireland'.* The NCCRA uses definitions of the risk determinants from the Intergovernmental Panel on Climate Change (IPCC) Risk Framework (IPCC, 2023):

- **Hazard** - the potential occurrence of a natural or human-induced physical event or trend or physical impact that may cause loss of life, injury, or other health impacts, as well as damage and loss to property, infrastructure, livelihoods, service provision, ecosystems, and environmental resources
- **Exposure** - the presence of people, livelihoods, species or ecosystems, environmental functions, services, and resources, infrastructure, or economic, social, or cultural assets in places and settings that could be adversely affected
- **Sensitivity** - refers to the degree to which a system or asset is affected by climate hazards. It reflects how vulnerable something is to changes such as temperature extremes, flooding, or drought, based on its physical, functional, or ecological characteristics.
- **Vulnerability** - the propensity or predisposition to be adversely affected. Vulnerability encompasses a variety of concepts including sensitivity
- **Risk** - the potential for adverse consequences for human or ecological systems.

When considering risk, the NCCRA assess exposure and vulnerability for two future climate change scenarios or Representative Concentration Pathways (RCPs):

- RCP4.5 was selected as it represents a scenario aligned with the global temperature trajectory
- RCP8.5 was selected as it represents a high-emissions scenario and achieves the highest level of modelled temperature increases by the end of the century. Consequently, this scenario will result in the highest level of physical risk for Ireland, and therefore the greatest requirement for adaptation.

These scenarios align with a conservative approach to assess risks to Ireland and assumes global emission reduction targets are not met. This aligns with the principle of precaution as stated in the NAF (Government of Ireland, 2024c). In addition to the future climate scenarios, the NCCRA assesses the risk from the future climate during the following timeframes:

- Present (~2030)
- Medium term (2040-2070) (~ 2050)
- Long term (2070-2100) (~2100)

It is recommended that the Environmental Impact Assessment (EIA) for climate risk and vulnerability evaluates risks across the full lifecycle of the proposed development – construction and operational phases. For this project, future climate risk has been assessed using the 2050s timeframe.

9.2.3.3 Local Policy

Climate action is covered in Section 17 of the *Cork County Development Plan 2022 – 2028*. The plan outlines the objectives of the council to reduce impacts and adapt to climate change within County Cork.

The *Cork County Council Climate Action Plan 2024–2029* (CCC, 2024) sets out a comprehensive framework for climate mitigation and adaptation across Cork County, aiming to reduce greenhouse gas (GHG) emissions by 51% by 2030 (from a 2018 baseline) and to achieve climate neutrality by 2050.

The plan aligns with national and EU climate objectives and is structured around a place-based approach, with a strong emphasis on community engagement and a just transition.

This Climate Action Plan sets a pathway for Cork County Council to actively translate national climate policy to local circumstances with the prioritisation and acceleration of evidence-based measures including to:

- Reduce its direct carbon emissions by 51% by 2030;
- Assist in the delivery of the climate neutrality objective at local and community levels; and
- Identify and support the development of a Decarbonising Zone (DZ) within the local authority area

The plan is built around five key thematic areas: Governance and Leadership; Built Environment and Infrastructure; Transport; Natural Environment, Biodiversity and Land Use; and Circular Economy and Resource Management.

The CCC *Climate Action Plan 2024 - 2029* highlights the risks that climate change poses, with risks mainly associated with extreme weather events. The future risks of climate change hazards as identified and reproduced from the CCC *Climate Action Plan 2024 - 2029* are shown in Figure 9.1.

The risk matrix shows the predicted future (2050) change in risk with the hollow marker showing the current risk and the solid marker the future risk. The dotted line shows the change between the current and future risk. It is important to note that for the purposes of this assessment, hazards have been assessed on an individual basis, but hazards can and often do occur in combination. The risk of existing hazards such as river and coastal flooding and coastal erosion is likely to increase in the future because of changes in both hazard frequency as a result of climate change and impact due to changes in exposure and vulnerability. Heatwaves, droughts, and pluvial flooding, although already experienced in County Cork, are expected to occur more frequently due to climate change and with a greater impact on County Cork in the future. Although the frequency and impact of severe windstorms is thought to be unchanged in the future, these events will remain a risk for County Cork. The future impact and frequency of groundwater flooding is also unchanged, meaning the future risk remains low. The impact of heavy snowfall and cold spells on County Cork remains constant, however, due to the potential decrease in hazard frequency, the overall risk of these hazards is likely to reduce in the future, resulting in less risk.

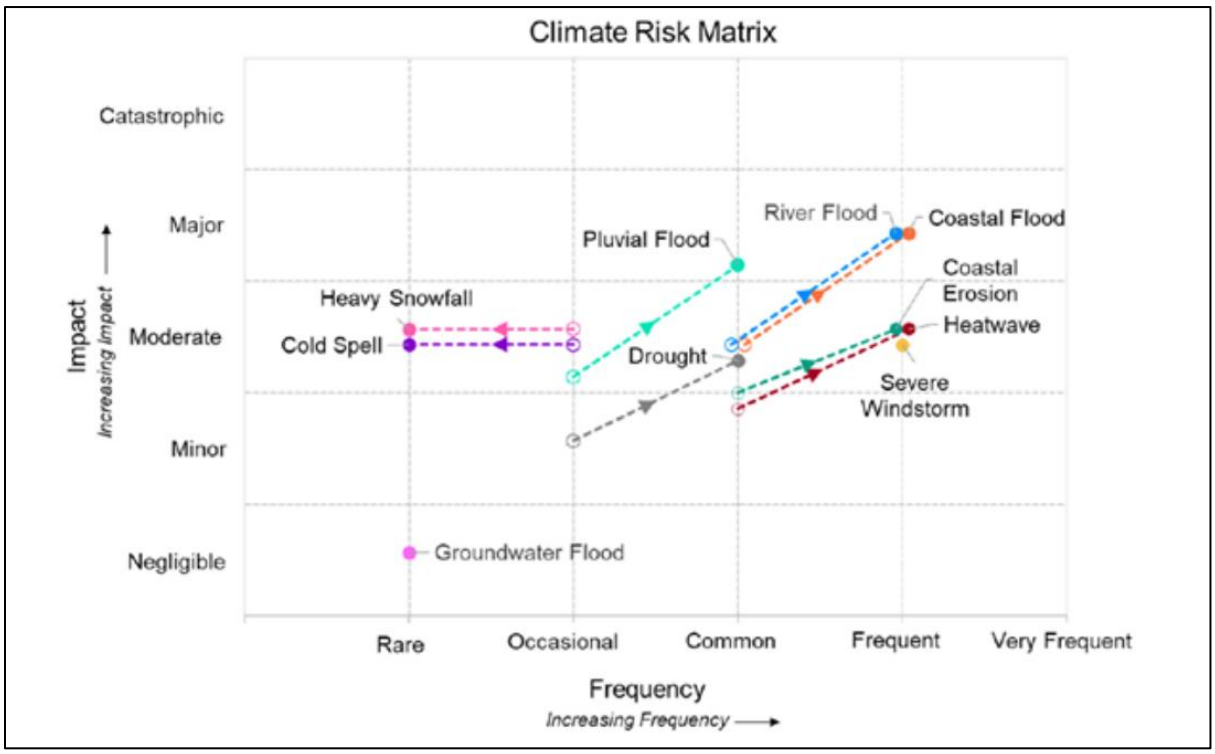


Figure 9.1 Current and Projected Climate Risk Matrix for County Cork (CCC,2024)

9.3 Methodology

9.3.1 Greenhouse Gas Assessment (GHGA)

As per the EU guidance document *Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment* (European Commission, 2013) the climate baseline is first established with reference to EPA data on annual GHG emissions (see Section 9.5.1).

The GHG assessment accounts for various components relating to the project during different life stages to determine the total impact of the development on climate. The proposed operational period in relation to the proposed development is for 20 years. The 20 year total has been used as the assessment period for the purposes of the GHG assessment.

The greenhouse gas assessment has focussed on GHG emissions associated with site activities and traffic emissions.

9.3.1.1 Site Activities

GHG emissions will occur due to on-site plant and machinery use, these have been quantified by calculating the GHG emissions from the predicted annual fuel (diesel) usage on site. GHG emissions from vehicles accessing the site delivering and collecting materials are likely to have been the dominant source of vehicle-related GHG emissions.

The carbon emissions associated with the fuel usage on site have been quantified using the TII Carbon Tool (TII, 2025). The TII Carbon Tool (TII, 2025) uses emission factors from recognised sources including the Civil Engineering Standard Method of Measurement (CESSM) Carbon and Price Book database (CESSM, 2013). The carbon emissions are calculated by multiplying the emission factor by the quantity of the material. The outputs are expressed in terms of tCO_2e (tonnes of carbon dioxide equivalent).

It is estimated that there will be approximately 360,000 litres of diesel used per year for mobile plant and machinery, based on an average of 1,200 litres per day. This annual quantity has been used in the assessment.

9.3.1.2 Traffic Emissions

Emissions from road traffic associated with the proposed development have the potential to emit carbon dioxide (CO_2) which will impact climate.

Information on traffic movements during the operational phase were supplied by the traffic consultants MHL.

As per data from MHL, there is expected to be an annual tonnage of 250,000 material extracted. Assuming 48 working weeks per year and vehicles loading Monday to Friday only between 7am and 7pm, this results in an approximate 110 HGV movements per day. A maximum of 12 no. staff are assumed to be required on site which results in 24 two-way vehicle trips per day. A total of 10 no. two-way vehicle trips per day for visitors has been assumed in the assessment.

For the purposes of this assessment, staff employed at the site are assumed to live locally in Dunmanway and a one-way trip distance of 10 km has been utilised. A one-way distance of 60 km has been used for HGV trips as materials will be supplied to sites within the locality. It is assumed that all staff trips and visitor trips are via private car.

Using the trip generation data above and the distances travelled, an annual average figure of 204,000 km for staff and visitor vehicle trips was used in the assessment and an annual average figure of 3,960,000 km for HGV trips was used in the assessment.

The vehicle trips and assumed distances were multiplied by the relevant emission factors in the TII Carbon Tool in order to quantify the GHG emissions as a tCO_2e.

Further detail on the traffic generated by the development can be found in Chapter 11 – Traffic and Transport.

9.3.1.3 Significance Criteria for GHG Assessment

The Transport Infrastructure Ireland (TII) guidance document entitled *PE-ENV-01104 Climate Guidance for National Roads, Light Rail and Rural Cycleways (Offline & Greenways) – Overarching Technical Documen*t (TII, 2022) outlines a recommended approach for determining the significance of both the construction and operational phases of a development.

The significance of GHG effects set out in PE-ENV-01104 (TII, 2022) is based on ISEP guidance (ISEP, 2022) which is consistent with the terminology contained within Figure 3.4 of the EPA's 'Guidelines on the information to be contained in Environmental Impact Assessment Reports' (EPA, 2022).

The 2022 ISEP Guidance (ISEP, 2022) sets out the following principles for significance:

- When evaluating significance, all new GHG emissions contribute to a negative environmental impact; however, some projects will replace existing development or baseline activity that has a higher GHG profile. Therefore, the significance of a project's emissions should be based on its net impact over its lifetime, which may be positive, negative or negligible;
- Where GHG emissions cannot be avoided, the goal of the EIA process should be to reduce the project's residual emissions at all stages; and
- Where GHG emissions remain significant, but cannot be further reduced, approaches to compensate the project's remaining emissions should be considered.

The criteria for determining the significance of effects are a two-stage process that involves defining the magnitude of the impacts and the sensitivity of the receptors (i.e. Ireland's National GHG targets). In relation to climate, there is no project specific assessment criteria, but the project will be assessed against the recommended TII significance determination. This takes account of any embedded or committed mitigation measures that form part of the design which should be considered.

TII (TII, 2022) states that professional judgement must be considered when contextualising and assessing the significance of a project's GHG impact. TII reference the ISEP guidance (ISEP, 2022) which states that the crux of assessing significance is "*not whether a project emits GHG emissions, nor even*

the magnitude of GHG emissions alone, but whether it contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050".

Significance is determined using the criteria outlined in Table 9.3 (derived from Table 6.7 of PE-ENV-01104 (TII, 2022)) along with consideration of the following two factors:

- The extent to which the trajectory of GHG emissions from the project aligns with Ireland's GHG trajectory to net zero by 2050; and
- The level of mitigation taking place.

Table 9.3 Significance Criteria for GHG Assessment

Effects	Significance Level	Description
Significant adverse	Major adverse	▪ The project's GHG impacts are not mitigated. ▪ The project has not complied with do-minimum standards set through regulation, nor provided reductions required by local or national policies; and ▪ No meaningful absolute contribution to Ireland's trajectory towards net zero.
	Moderate adverse	▪ The project's GHG impacts are partially mitigated. ▪ The project has partially complied with do-minimum standards set through regulation, and have not fully complied with local or national policies; and ▪ Falls short of full contribution to Ireland's trajectory towards net zero.
Not significant	Minor adverse	▪ The project's GHG impacts are mitigated through 'good practice' measures. ▪ The project has complied with existing and emerging policy requirements; and ▪ Fully in line to achieve Ireland's trajectory towards net zero.
	Negligible	▪ The project's GHG impacts are mitigated beyond design standards. ▪ The project has gone well beyond existing and emerging policy requirements; and ▪ Well 'ahead of the curve' for Ireland's trajectory towards net zero.
Beneficial	Beneficial	▪ The project's net GHG impacts are below zero and it causes a reduction in atmosphere GHG concentration. ▪ The project has gone well beyond existing and emerging policy requirements; and ▪ Well 'ahead of the curve' for Ireland's trajectory towards net zero, provides a positive climate impact.

Ireland's carbon budgets can also be used to contextualise the magnitude of GHG emissions from the proposed development (TII, 2022). The approach is based on comparing the net proposed development GHG emissions to the relevant carbon budgets (Government of Ireland, 2025). With the publication of the Climate Action Act in 2021 and the Climate Action Plan 2025, sectoral carbon budgets have been published for comparison with the net GHG emissions from the development over its lifespan. The aim of the carbon budgets is to ensure we are on a trajectory to meet the National Climate Objective of Net Zero by 2050.

9.3.2 Climate Change Risk Assessment (CCRA)

The assessment involves determining the vulnerability of the proposed development to climate change. This involves an analysis of the sensitivity and exposure of the development to climate hazards which together provide a measure of vulnerability.

PE-ENV-01104 (TII, 2022) states that the CCRA is guided by the principles set out in the overarching best practice guidance documents:

- Technical Guidance on the Climate Proofing of Infrastructure in the Period 2021-2027 (European Commission, 2021a); and
- The Institute of Environmental Management and Assessment, Environmental Impact Assessment Guide to: Climate Change Resilience and Adaptation (2nd Edition) (ISEP, 2020).

The baseline environment information provided in Section 9.5, future climate change modelling and input from other experts working on the proposed development (i.e. hydrologists) should be used to assess the likelihood of a climate risk.

First an initial screening CCRA based on the operational phase is carried out, according to the TII guidance PE-ENV-01104. This is carried out by determining the sensitivity of proposed development assets (i.e. receptors) and their exposure to climate change hazards.

The proposed development asset categories must be assigned a level of sensitivity to climate hazards. PE-ENV-01104 (TII, 2022) provides the list of asset categories and climate hazards to be considered. The asset categories will vary for development type and need to be determined on a development-by-development basis.

- **Asset Categories** Pavements; drainage; structures; utilities; landscaping; signs, light posts, buildings, and fences.
- **Climate Hazards** Flooding (coastal, pluvial, fluvial); extreme heat; extreme cold; wildfire; drought; extreme wind; lightning and hail; landslides; fog.

The sensitivity is based on a High, Medium or Low rating with a score of 1 to 3 assigned as per the criteria below.

- **High Sensitivity** The climate hazard will or is likely to have a major impact on the asset category. This is a sensitivity score of 3.
- **Medium Sensitivity** It is possible or likely the climate hazard will have a moderate impact on the asset category. This is a sensitivity score of 2**.**
- **Low Sensitivity** It is possible the climate hazard will have a low or negligible impact on the asset category. This is a sensitivity score of 1.

Once the sensitivities have been identified the exposure analysis is undertaken (European Commission, 2021a; TII, 2022). The exposure analysis involves determining the level of exposure of each climate hazard at the project location irrespective of the project type. Current and future climate hazards are discussed in Section 9.5. For example, flooding could be a risk if the project location is next to a river in a floodplain. Exposure is assigned a level of High, Medium or Low as per the below criteria.

- **High Exposure** It is almost certain or likely this climate hazard will occur at the project location, i.e. might arise once to several times per year. This is an exposure score of 3.
- **Medium Exposure** It is possible this climate hazard will occur at the project location, i.e. might arise a number of times in a decade. This is an exposure score of 2.
- **Low Exposure** It is unlikely or rare this climate hazard will occur at the project location, i.e. might arise a number of times in a generation or in a lifetime. This is an exposure score of 1.

Once the sensitivity and exposure are categorised, a vulnerability analysis is conducted by multiplying the sensitivity and exposure to calculate the vulnerability.

9.3.2.1 Significance Criteria for CCRA

The CCRA involves an initial screening assessment to determine the vulnerability of the proposed development to various climate hazards. The vulnerability is determined by combining the sensitivity and the exposure of the proposed development to various climate hazards.

Vulnerability = Sensitivity x Exposure

The vulnerability assessment takes any proposed mitigation into account. Table 9.4 details the vulnerability matrix; vulnerabilities are scored on a high, medium and low scale.

TII guidance (TII, 2022) and the EU technical guidance (European Commission, 2021a) note that if all vulnerabilities are ranked as low in a justified manner, no detailed climate risk assessment may be needed. Therefore, the impact from climate change on the proposed development is considered not significant.

However, where residual medium or high vulnerabilities exist the assessment may need to be progressed to a detailed climate change risk assessment and further mitigation implemented to reduce risks.

Table 9.4 CCRA Vulnerability Matrix

		Exposure		
		High (3)	**Medium (2)**	**Low (1)**
Sensitivity	**High (3)**	9 - High	6 – High	3 - Medium
	Medium (2)	6 - High	4 - Medium	2 - Low
	Low (1)	3 - Medium	2 – Low	1 - Low

The screening CCRA, detailed in Section 9.6.3.2, did not identify any residual medium or high risks to the proposed development due to climate change. Therefore, a detailed CCRA for the construction and operational phase were scoped out.

9.3.3 Difficulties Encountered in Compiling Information

There were no significant difficulties encountered when completing this assessment. A number of assumptions were made where necessary where full design details were not known or will not be finalised until the detailed design stage of the project. Any assumptions were selected to be conservative in nature and are outlined in the relevant sections of this report. The assumptions do not significantly affect the conclusions of the assessment.

9.4 Proposed Development

A full description is provided in Chapter 3 of this EIAR.

9.5 Description of Existing Environment

PE-ENV-01104 (TII, 2022) states that a baseline climate scenario should identify, consistent with the study area for the project, GHG emissions without the project for both the current and future baseline. As impacts are assessed against compliance with national targets the study area for climate is the Republic of Ireland.

Ireland declared a climate and biodiversity emergency in May 2019 and in November 2019 there was European Parliament approval of a resolution declaring a climate and environment emergency in Europe. This, in addition to Ireland's current failure to meet its EU binding targets under Regulation 2018/842 (European Union, 2018) results in changes in GHG emissions either beneficial or adverse being of more significance than previously considered prior to these declarations.

9.5.1 Current GHG Baseline

Data published in July 2025 (EPA, 2025a), indicates that Ireland exceeded, without the use of flexibilities, its 2024 annual limit set under EU's Effort Sharing Decision (ESD) (EU 2018/842) by 1.03 Mt CO_2e. However, the 2024 emissions represent the second consecutive year in which Ireland's emission were below (-4.2%) 1990 levels. ETS (Emissions Trading Scheme) emissions decreased (-7.4%) and ESR (Effort Sharing Regulation) emissions decreased (-0.5%). Ireland's target is an emission reduction of 626 kt of CO_2e by 2030 on an average baseline of 2016 to 2018.

The EPA estimate that 2024 total national GHG emissions, excluding LULUCF, have decreased by 2.0% on 2023 levels to 53.75 Mt CO_2e, with a 0.7 Mt CO_2e (-8.9%) reduction in electricity industries alone. This was driven by a 39.6% share of energy from renewables in 2024 and the complete phase-out of peat for electricity generation. Manufacturing combustion and industrial processes decreased by 4.6% to 6.0 Mt CO_2e in 2024 due to declines in fossil fuel usage. The sector with the highest emissions in 2024 was agriculture at 38% of the total, followed by transport at 21.7%. For 2024, total national emissions (including LULUCF) were 57.64 Mt CO_2e (EPA, 2025a) (Table 9.5).

The current estimates of national greenhouse gas emissions (including LULUCF) in 2024 are 12.0% below 2018, well off the national climate ambition of a 51% reduction by 2030. The data indicate that from 2021- 2024 Ireland has used 82.5% of the 295 Mt CO_2e Carbon Budget for the five-year period

2021-2025. This leaves 17.5% of the budget available for 2025, requiring a substantial 10.3% annual emissions reduction for 2025 to stay within budget.

Delivery of the Proposed Development is assumed to be completed within the 2026-2030 Carbon Budget period. The budget for Ireland for this period is 200 $MtCO_2e$ versus 295 $MtCO_2e$ for the period 2021-2025. Annual reductions of 8.3% are required.

Table 9.5 Trends in Total National GHG Emissions 2021 – 2024

Sector Note 1	2021	2022	2023	2024	Total Budget (Mt CO_2e) (2021-2025)	% Budget 2021-2025 Used	Annual Change 2023 to 2024
Electricity	9.89	9.69	7.57	6.95	40	85.25%	-8.19%
Transport	11.09	11.76	11.8	11.65	54	85.74%	-1.27%
Buildings (Residential)	6.87	5.75	5.35	5.61	29	81.31%	4.86%
Buildings (Commercial and Public)	1.44	1.45	1.39	1.49	7	82.43%	7.19%
Industry	7.09	6.62	6.31	6.01	30	86.77%	-4.75%
Agriculture	21.94	21.78	20.72	20.41	106	80.05%	-1.50%
Other Note 2	1.86	1.93	1.81	1.63	9	80.33%	-9.94%
LULUCF	4.63	3.98	3.89	3.89	–	–	0
Total including LULUCF	**64.81**	**62.96**	**58.84**	**57.64**	**295**	**82.81%**	**-2.04%**

Note 1: Reproduced from latest emissions data from the EPA (EPA, 2025a).

Note 2: Other includes Petroleum refining, F-Gases and Waste (emissions from solid waste disposal on land, solid waste treatment (composting and anaerobic digestion), wastewater treatment, waste incineration and open burning of waste).

9.5.2 Future GHG Baseline

The future baseline with respect to the GHGA can be considered in relation to the future climate targets which the assessment results will be compared against. In line with TII (TII, 2022) and ISEP Guidance (ISEP, 2022) the future baseline is a trajectory towards net zero by 2050, "*whether it* [the project] *contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050*".

The future baseline will be determined by Ireland meeting its targets set out in the CAP25, and future CAPs, alongside binding 2030 EU targets. The European Union (EU) enacted *'Regulation (EU) 2018/842 on binding annual GHG emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement and amending Regulation (EU) No. 525/2013'* (hereafter referred to as the Regulation) (European Union, 2018) to meet the commitments under the Paris Agreement. The Regulation aims to deliver, collectively by the EU in the most cost-effective manner possible, reductions in GHG emissions from the Emission Trading Scheme (ETS) and non-ETS sectors amounting to 43% and 30%, respectively, by 2030 compared to 2005. The Regulation was amended in April 2023 and Ireland must now limit its ETS and non-ETS greenhouse gas emissions by at least 42% by 2030. The ETS is an EU-wide scheme which regulates the GHG emissions of larger industrial emitters including electricity generation, cement manufacturing and heavy industry. The non-ETS sector includes all domestic GHG emitters which do not fall under the ETS scheme and includes GHG emissions from transport, residential and commercial buildings and agriculture.

In May 2025, the EPA released the report *Ireland's Greenhouse Gas Emissions Projections 2024-2055* (EPA, 2025b), which includes total projected emissions and a breakdown of projected emissions per sector under the 'With Existing Measures' and 'With Additional Measures' scenarios. The EPA projections indicate that currently implemented measures (With Existing Measures) will achieve a reduction of 10% on 2005 levels by 2030, significantly short of the 42% reduction target. If measures in the higher ambition (With Additional Measures) scenario are implemented, EPA projections show that Ireland can achieve a reduction of 22% by 2030, still short of the 42% reduction target.

9.5.3 Current CCRA Baseline

The region of the proposed development has a temperate, oceanic climate, resulting in mild winters and relatively cooler summers when compared with continental Europe. This baseline data is derived from the European Centre for Medium-Range Weather Forecasts (ECMWF) ERA5 data reanalysis (ECMWF, 2023) which includes observed data from individual meteorological weather stations across Ireland from 1950-2023 such as that at Cork Airport. This data is reanalysed to model a complete picture of Irelands historical climate. This method has been chosen to ensure data can be analysed at the daily level and harmoniously compared with future scenarios. The baseline time-period referred to for the Baseline assessment was from 1991-2020 and is specific to County Cork and the location of the development in question.

Figure 9.2 below shows the climatology for County Cork across the 30-year period from 1991 to 2020 indicating the wettest months are from October through to January, with December (109mm) being the wettest on average. Late spring and summer are markedly drier compared to the wettest months with average monthly precipitation 85mm-78mm respectively. The driest month on average was June (78mm), with March and September also experiencing lower than average rainfall (~80mm). Ireland and Cork's precipitation patterns are strongly influenced by its oceanic climate, with the wettest months typically coinciding with periods of frequent low-pressure Atlantic storm systems.

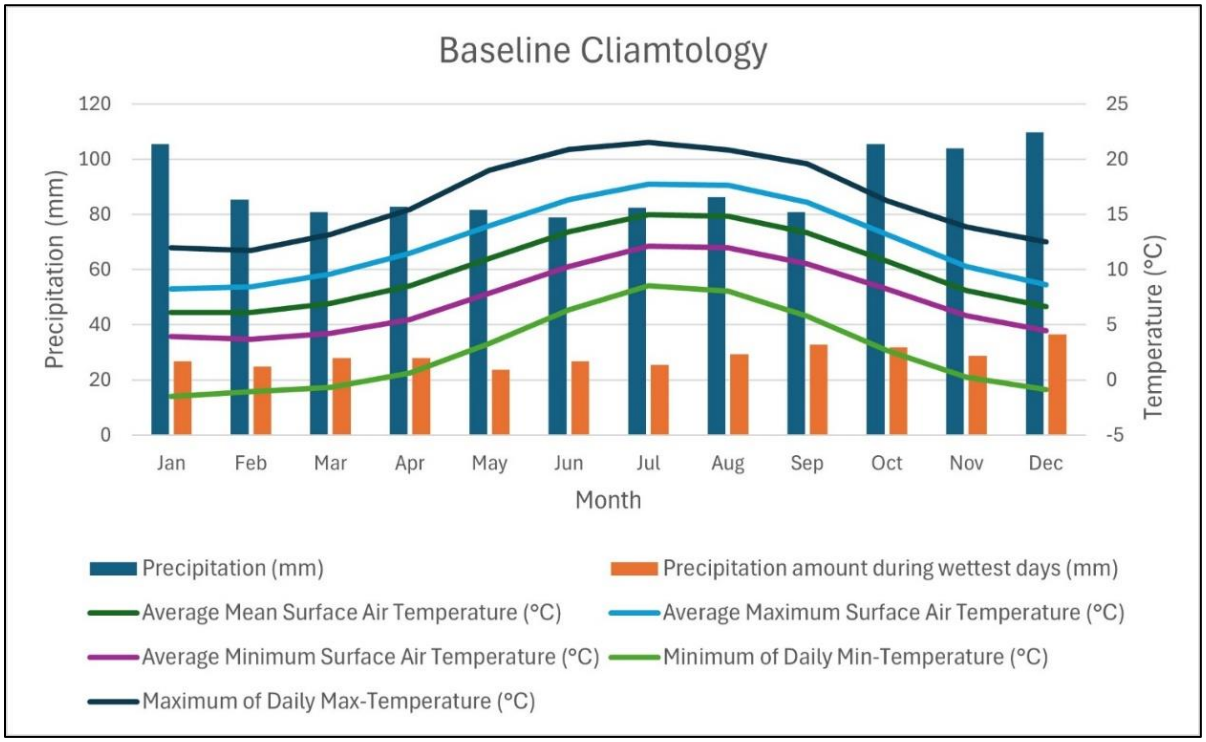


Figure 9.2 Baseline Climatology (Cork County) 1991-2020

July was the warmest month with a mean temperature of 14.9°C with average mean surface temperatures across the summer months (July – August) >17°C. July is also the warmest month for

maximum daily temperatures (21°C) which showcases the higher value ranges recorded during a particular month. Across May – September average maximum daily temperatures exceed 19°C.

January and February are the coldest months with average mean surface air temperatures of 6.1°C and average minimum temperatures of 3.7-3.9°C. For daily minimum temperatures which reference the lowest range values (10th percentile range) of the data, January (-1.5°C) and February (-1.0°C) also remain the coldest with marginal difference. Several other winter and early spring months (November - March) also experience minimums of below 0°C.

Historical records show Cork has experienced several severe storms, with wind speeds exceeding 100 km/h. Storm activity is concentrated in winter (December–February), with an average of eight named storms annually (Met Éireann, 2026).

Analysis of data from Cork Airport (1962–2020) indicates a mean 10m wind speed of 10 knots (18 km/hr) and an average maximum gust speed ≥60 knots (111 km/h) (Met Éireann, 2026).

Overall, the baseline climatology for the proposed development location and region shows evidence of a high frequency of precipitation across the year with instances of very wet days (≥30mm) occurring across October and December. Mild winters with average minimums >0°C and relatively mild summers with average maximums of +17°C but not significant for extreme heat or prolonged drought.

9.5.4 Future CCRA Baseline

9.5.4.1 Climate Change Impacts and Projections for Ireland

Ireland is already experiencing increased annual rainfall in the north and west, with more variable patterns in the south and east including the area of the proposed development (EPA, 2021b). Key risks identified by the EPA relevant to the proposed project include:

- Increased likelihood of more frequent and intense North Atlantic low-pressure systems bringing high rainfall and high winds.
- More intense rainfall periods which may lead to pluvial flooding and elevated fluvial levels.
- Longer dry spells and increased temperatures will elevate the risk of wildfire.

9.5.4.2 Climate Modelling and Planning

International best practice and national policy such as the NCCRA (2024), IPCC (2023), and Transport Infrastructure Ireland (TII, 2022) recommends using two emission scenarios to project future climate change. This includes a moderate and high emission scenarios (RCP4.5 and RCP8.5) for future planning. These Representative Concentration Pathways (RCPs) reflect varying levels of global climate mitigation explained below.

- RCP 4.5 (a 'moderate' scenario) represents an approximate 2.4°C increase in global average temperatures (1.7-3.2°C). It assumes moderate mitigation efforts leading to stabilisation of emissions by mid-century and is generally aligned with current policies for emission reduction.
- RCP 8.5 (a 'worst case' / high emissions scenario) represents an approximate 4.3°C increase in global average temperatures (3.2-5.4°C) and assumes continued high emissions with minimal mitigation. This high-end scenario is useful for understanding potential impacts of current emission trends continue. Consequently, this scenario will result in the highest level of physical risk for Ireland, and therefore the greatest requirement for adaptation.

This climate change assessment uses the latest climate change projections standardised and bias corrected for Ireland available through the EPA and the TRANSLATE project (EPA, 2025e).

9.5.4.3 Key Findings from Climate Projections

Table 9.6 below provides a detailed comparison of baseline and future climatology across a medium (RCP4.5) and high emissions scenario (RCP8.5) up to 2070. Key projected changes include:

- Summer temperatures rising by over 2°C and overall mean temperatures increasing 1.1°C and 1.5°C by mid-century under RCP4.5 and RCP8.5 respectively.

- Summer rainfall decreasing while winter rainfall increases sharply, contributing to an overall increase in rainfall annually for the site location.
- Fewer cold winter nights and more frequent short heatwaves (≥5 days >25°C).
- Increased likelihood of dry spells and drought which may elevate the risk of wildfire.

This will result in longer dry periods and heavy rainfall events. Met Éireann has high confidence in maximum rainfall rates increasing but not in how the frequency or intensity of storms will change with climate change.

Impacts resulting from climate change hazards will evolve and have the potential to include increases in global temperatures and increases in the intensity and frequency of rainfall days per year combined with increases in the intensity and frequency of low-pressure systems in the North Atlantic during the winter storm period. Therefore, it is expected that the climate over the proposed site in will evolve over time and consideration is needed with respect to this within the design of the proposed development.

Table 9.6 Site Specific - Future Climate Change Summary of Projections under both RCP scenarios for 2050 period (2040-2070) taken from the EPA Climate Ireland Translate Projections

Climate Hazard	Indicator	Baseline	RCP4.5 (2040 – 2070)	RCP8.5 (2040 – 2070)
Temperature	*Mean temp (°C)*	10.0	11.0	11.5
	Mean Max temp (°C)	13.5	14.5	14.9
	Mean Min temp (°C)	6.5	7.6	8.0
	Average of Daily Max temp (°C)	24.6	26.9	27.5
Precipitation and Flooding	*Annual precipitation (mm)*	1629	1671 (+41)	1695 (+65)
	Max 1-day (mm)	49	58 (+9)	58 (+9)
Storms and high winds	*Storm Frequency and Average speed (Descriptive)*	On Average 8 named storms annually with speeds exceeding 100km/hr *Note 2*	Winter storm frequency is projected to increase, with a possible extension of the storm season. While the intensity of individual storms cannot be accurately projected, storm wind speeds are likely to remain above 100 km/hr.	
	Max gust Speed (90th percentile) (knots) *Note 3*	60		
Wildfire	*No. of Wildfires (Descriptive)*	Several wildfires have occurred across Ireland	Rising temperatures and prolonged dry spells are projected to elevate wildfire risk.	
Drought	*Absolute Drought (≥15 days with less than 1mm)*	Rare	Marginal increase	Increased Likelihood
Lightning	*Qualitative (Descriptive)*	Occurring during summer periods	This hazard may modestly increase in the future due to more favourable conditions, such as rising temperatures and extended warm periods beyond the traditional summer season	

Note 1 Data from EPA TRANSLATE Climate Ireland projections
Note 2 Data from combined Met Éireann, UK Met Office and Dutch Meteorological services.
Note 3 Data from Cork Airport (~42km from site) between 1976 – 2005

9.6 Impact Assessment

9.6.1 Do Nothing Scenario

The Do Nothing scenario will see the site remain as is with no quarrying operations taking place. There are no predicted impacts to climate under this scenario. The climate baseline will continue to develop in line with current trends as per Section 9.5.

9.6.2 Greenhouse Gas Assessment

9.6.2.1 Construction Phase

There are no significant construction works associated with the proposed development.

There is an initial development phase involving preparation for rock extraction activities. To facilitate the excavation of stone, any vegetation and soil cover will be removed. Excavators and dump trucks will be the main type of machinery/plant used during this phase to remove overburden and construct berms. This work will be carried out in phases over the operational lifetime of the proposed development.

As a result significant impacts to climate are not predicted and they have not been considered further. The primary impacts to climate will occur as part of the day-to-day operational activities on site.

9.6.2.2 Operational Phase

Site fuel usage and vehicle emissions were identified as the primary sources of GHG emissions for the development. The estimated fuel usage on site is c. 360,000 litres of diesel per year. Using the carbon emission factor for diesel fuel usage from the TII carbon tool it has been calculated that there are 1,203 tCO_2e per year associated with fuel usage on site (see Table 9.7). Traffic movements include HGV trips as well as staff vehicle trips (assumed by car), with resulting traffic emissions of 4,338 tCO_2e.

Table 9.7 Predicted Annual GHG Emissions from Site Activities

Activity		tCO_2e	Sector for Emissions Comparison	Sectoral Budget (tCO_2e)	Site GHG Emissions as % of Relevant Budget
Fuel Usage	c. 360,000 litres diesel/yr	1,203	Industry	4,000,000	0.03%
Traffic	Staff vehicle and HGV movements to/from site	4,338	Transport	6,000,000	0.07%
Total	Total site GHG emissions	5,541	National Non-ETS 2030 Target	27,721,670	0.02%
			Ireland's 2024 Total GHG Emissions (existing baseline)	57,640,000	0.01%

The GHG emissions from the proposed development as a total cannot be compared against one specific sector 2030 carbon budget. The emissions are broken down into different assessment categories and these must be compared separately to the relevant sectoral emissions budgets (see Table 9.7). The relevant sectoral emissions for the proposed development comparison include the Industry sector and Transport sector. The predicted emissions for the proposed development are calculated on an annual basis and then compared to the relevant sector 2030 carbon budgets. Annualising the full carbon emissions allows for appropriate comparison with annual GHG targets.

In Table 9.7, GHG emissions have been compared against the carbon budget for the industry and transport sectors in 2030 (Government of Ireland, 2025), against Ireland's total GHG emissions in 2024 and against Ireland's EU 2030 target of a 30% reduction in non-ETS sector emissions based on 2005 levels (27.7 Mt CO_2e) (set out in Regulation EU 2018/842 of the European Parliament and of the Council).

The estimated total annual GHG emissions are equivalent to 0.01% of Ireland's total GHG emissions in 2024 and 0.02% of Ireland's non-ETS 2030 emissions target. The estimated GHG emissions associated with transport-related activities are 0.07% of the 2030 Transport budget, and fuel usage is 0.03% of the 2030 Industry budget.

9.6.2.3 GHG Assessment Significance of Effects

The TII guidance states that the following two factors should be considered when determining significance:

- The extent to which the trajectory of GHG emissions from the project aligns with Ireland's GHG trajectory to net zero by 2050; and
- The level of mitigation taking place.

The level of mitigation described in Section 9.7 has been considered when determining the significance of the proposed development's GHG emissions. According to the TII significance criteria described in Section 9.3.1.3 and Table 9.3, the significance of the GHG emissions is minor adverse. The proposed development has mitigated some GHG impacts where possible.

In accordance with the EPA guidelines (EPA, 2022), this equates to a ***direct, long-term, negative*** and ***slight*** effect, which is overall a ***not significant*** effect of GHG emissions during the construction and operational phase.

9.6.3 Climate Change Risk Assessment

9.6.3.1 Construction Phase

There are no significant construction works associated with the proposed development. Land clearance activities will be carried out in phases over the operational lifetime of the proposed development.

9.6.3.2 Operational Phase

To determine the vulnerability of the proposed development to climate change the sensitivity and exposure of the development to various climate hazards must first be determined. Table 9.8 presents the initial qualitative climate hazards screening relevant to the proposed development. Due to the proposed development location some hazards have been screened out of the assessment.

Table 9.8 Climate Hazard Screening

Climate-related Hazard	Hazard Screening Rationale	Screening
Extreme Heat temperatures	High temperatures are a key consideration for long-term operation of the proposed project. Heat and thermal expansion can damage materials, road surfaces, and auxiliary systems such as electrical while also affect the lifecycle of assets.	Screen in
Extreme Cold Temperature	Snow and ice events pose significant risks to health, safety, and site operations. Road access may be disrupted, and low temperatures can affect assets such as fuel tankers, workers, and infrastructure. Freeze-thaw cycles may cause cracking in concrete and road surfaces, requiring snow clearance and ice management.	Screen in
High precipitation and pluvial flooding	Surface water remains a key vulnerability for any proposed development during all phases due to the sensitivity of site access, and site assets to water exposure.	Screen in
Fluvial flooding	Fluvial flood risk is a key vulnerability for a proposed development.	Screen in
Drought	Droughts have occurred across Ireland, previously impacting water supply. The water demands on site are relatively low and are unlikely to be significantly impacted by drought conditions.	Screen out
Wildfire	The predominant land-use in the vicinity of the site is managed agricultural land, therefore the risk of wildfire is significantly reduced. The Applicant will ensure adequate safety protocols are in place which ensure site safety in relation to potential wildfire events.	Screen out

Climate-related Hazard	Hazard Screening Rationale	Screening
High winds and storms	Historically, Ireland has experienced several notable storm events including Storm Éowyn and Storm Darragh (2024), which caused widespread damage across Ireland. These storms often bring heavy rainfall and flood warnings, increasing overall risk. Once risk assessment procedures and best practice site management is followed and works are suspended in the event of significant high wind and storm conditions, no significant risk is anticipated.	Screen out
Fog	Fog is not considered a significant hazard for this development, as it does not involve transport, aviation, or activities requiring high visibility.	Screen out
Lightning	Lightning is not considered a risk for the proposed development site as it does not involve high buildings or tall infrastructure.	Screen out
Landslides and Subsidence	The Geological Society of Ireland (GSI) landslide susceptibility mapping database (GSI, 2025) was reviewed to determine the risk from landslides at the proposed development location. The site includes areas of low, moderately low and moderately high landslide susceptibility.	Screen in
Sea level rise and coastal flooding	The proposed development is not in close proximity to the coast.	Screen out

The sensitivity and exposure of the development to the screened in climate hazards must first be determined to then determine the vulnerability of the proposed development to climate change.

The sensitivity of the proposed development to the climate hazards is assessed irrespective of the project location. Table 9.9 details the sensitivity of the proposed development on a scale of high (3), medium (2) and low (1). Once the sensitivity has been determined, the exposure of the proposed development to each of the climate hazards is determined, this reflects on the possible likelihood of the climate hazard occurring at the project location and is also scored on a scale of high (3), medium (2) and low (1). The product of the sensitivity and exposure is then used to determine the overall vulnerability of the proposed development to each of the climate hazards. The results of the vulnerability assessment are detailed in Table 9.9.

Table 9.9 Climate Change Vulnerability Assessment

Climate Hazard	Sensitivity	Exposure	Vulnerability
Flooding (Pluvial & Fluvial)	1 (Low)	2 (Medium)	2 (Low)
Extreme Heat	1 (Low)	2 (Medium)	2 (Low)
Extreme Cold	1 (Low)	1 (Low)	1 (Low)
Landslide	1 (Low)	2 (Medium)	2 (Low)

The sensitivity and exposure of the area was determined with reference to a number of online tools and with input from the various discipline specialists on the project team as set out in the below subsections. This assessment was based on the best available information at the time of compiling this EIAR. Reasonable and conservative assumptions have been made where required within this assessment. The project team has been made aware of the necessary requirements to ensure that climate change vulnerability is accounted for adequately within the design of the proposed development. It was concluded that the proposed development does not have any significant vulnerabilities to the identified climate hazards as described in the below sections.

Flooding

Flooding is addressed in detail in Chapter 7 – Water, and the author of Chapter 7 was consulted and Chapter 7 was reviewed in order to inform this assessment.

In relation to flood risk:

- No instances of historical flooding were identified on the site in historic OS (Tailte Eireann) maps for the Development area;
- No instances of recurring or historic flooding were identified on OPW maps within the Proposed Development Site;
- The GSI Groundwater flood mapping does not record any groundwater flood zones within the Proposed Development Site;
- No CFRAM Fluvial Flood Zones is mapped within the Proposed Development Site;
- No NIFM fluvial flood zones are mapped within the Proposed Development Site.

The Ardcahan Quarry site area is shown to be outside the map extent of any of the OPW fluvial and pluvial flood hazard flooding scenarios of low, medium or high probability. The Ardcahan Quarry does not form any part of the flood plain for the Caha or Bandon River systems and no part of the proposed development is in a flood risk area or has any history of flooding.

The presence of the attenuation ponds and control of the sites discharge rate will help to reduce the peak storm water runoff flows from the site, and the site will not contribute to flooding in the local area.

In relation to climate change, the assessment has reviewed the NIFM modelled flood extents mapping for the Mid-Range and High-End Future Scenarios in relation to fluvial flooding. The Mid-Range scenario accounts for a 20% increase in rainfall rates due to climate change in future years while the High-End scenario accounts for a 30% increase. NIFM Modelling for both the Mid-End and High-End scenarios indicated flood extents that align with the present day scenario and therefore, future climate change related rainfall was not considered a risk in relation to flooding.

Based on the information it can be concluded that overall, the proposed development has low vulnerability to flood risk.

Extreme Temperatures (Heat & Cold)

High temperatures can result in thermal expansion which may damage materials, road surfaces and some equipment during the operation of the proposed development. Extreme temperatures also have the potential to impact site workers. Risk assessments and safety protocols will be required to reduce worker exposure to high temperatures. Operational risk assessments and site inspections of roads and equipment will reduce the risk of significant impacts. Therefore, the vulnerability of the proposed development to extreme heat is low.

Snow and ice events pose significant risks to health, safety, and site operations. Road access may be disrupted, and low temperatures can affect assets such as fuel tankers, workers, and infrastructure. Freeze-thaw cycles may cause cracking in concrete and road surfaces, requiring snow clearance and ice management. Ireland is not expected to experience absolute extreme cold conditions in the future as a result of climate change, and in general temperatures are expected to increase. Operational risk assessments and safety protocols, as well as site inspections will be in place reducing the overall vulnerability to extreme cold to low.

Landslides

The Geological Society of Ireland (GSI) landslide susceptibility mapping database (GSI, 2025) was reviewed to determine the risk from landslides at the proposed development location. The site includes areas of low, moderately low and moderately high landslide susceptibility. However, the site operations and extraction processes will be conducted in a controlled manner and are unlikely to result in a landslide risk. Appropriate risk assessment procedures will be required to ensure best practice is followed.

Summary

Overall, the climate change hazard vulnerabilities identified for the proposed development are not considered significant. Therefore, no detailed risk assessment is required.

9.6.3.3 CCRA Significance of Effects

With mitigation in place, there are no significant risks to the proposed development as a result of climate change. In accordance with the EPA Guidelines (EPA, 2022), the significance of effect of the impacts to the proposed development as a result of climate change are ***direct, long-term, negative*** and ***not significant***.

9.6.4 Decommissioning Phase

Works required during the decommissioning phase will be minimal. The quarry void will not be restored to previous ground levels and will remain open. GHG emissions are predicted to be a fraction of operational phase emissions due to the reduced works involved. Similar best practices will be followed during the decommissioning phase to ensure GHG emissions are lessened. The impact to climate will be ***short-term, direct, negative*** and ***not significant***.

9.6.5 Cumulative Impacts

With respect to the requirement for a cumulative assessment the ISEP (ISEP, 2022) and TII (TII, 2022) guidance on which the assessment is based states that "*the identified receptor for the GHG Assessment is the global climate and impacts on the receptor from a project are not geographically constrained, the normal approach for cumulative assessment in EIA is not considered applicable. By presenting the GHG impact of a project in the context of its alignment to Ireland's trajectory of net zero and any sectoral carbon budgets, this assessment will demonstrate the potential for the project to affect Ireland's ability to meet its national carbon reduction target. This assessment approach is considered inherently cumulative*".

As per the above, the cumulative impact of the proposed development in relation to GHG emissions is considered ***direct, long-term, negative*** and ***slight***, which is overall ***not significant*** in EIA terms.

9.7 Mitigation and Monitoring Measures

9.7.1 Construction Phase

Due to the minimal nature of the construction works significant impacts to climate are not predicted and no mitigation is proposed. The primary impacts to climate will occur as part of the day-to-day operational activities on site.

9.7.2 Operational Phase

A key target in CAP25 is reducing the embodied carbon of construction materials.

The proposed development will provide a local source of high value quarried raw materials.

By implementing modern blasting, crushing and screening methods as well as a good washing system, this allows for more material to be extracted from the reserve making more high value materials available locally.

By providing a local source of materials it reduces the requirement for importation of these same materials from greater distances thereby reducing transport-related GHG emissions.

Additionally, the quarrying industry is in the process of implementing Environmental Product Declarations (EPD). These are independently verified documents that provide transparent, standardised data on a product's environmental impact across its entire life cycle. This enables informed, sustainable choices and helps meet green building standards. By the time the proposed development is operational, EPDs are likely to be standard across the industry and will be available for the proposed development products.

In addition to the above, the following measures will be implemented on site to reduce GHG emissions:

- Prevention of on-site or delivery vehicles from leaving engines idling, even over short periods.

- Ensuring that fossil fuel powered plant and equipment meet the Euro Stage V emission standard.
- Ensuring, where practicable, that site vehicles and delivery vehicles meet the Euro VI/Euro 6 standards for emissions.
- Ensure all plant, machinery and vehicles are well maintained and inspected regularly.

In relation to climate change vulnerability, the following mitigation measures are required:

- Site risk assessments, method statements and good site management practices are required for extreme weather events, particularly in relation to extreme temperatures; landslide risk; high winds and storms; and extreme rainfall.
- Site plant and machinery will be accompanied by certified datasheets which will set out the limiting operating temperatures.

9.7.3 Decommissioning Phase

During the decommissioning phase the same measures as outlined for the operational phase are to be implemented on site to reduce GHG emissions and climate change risk.

9.7.4 Monitoring

Monitoring and reporting of the embodied carbon in the operational phase is recommended and the reporting of these as part of annual Scope 1, 2 and 3 GHG emissions. The aim of monitoring will be to seek further ways to minimise climate impacts. Monitoring will include contractual obligations, in line with the most recent Climate Action Plan and sectoral targets, to ensure that the proposed development stays in line with updated aims. Monitoring will include water usage, power and fuel usage, and waste generation (including reuse and recycling rates). Where monitoring shows that the proposed development is not meeting its targets, further mitigation will be put in place.

Monitoring shall also include reviewing potential for extreme weather events which may cause damage during operations. The applicant site's Environmental Management System (EMS) will include measures to address risks during such events i.e. flooding.

9.8 Risk of Major Accidents and Disasters

As detailed in Section 9.6.3.2, climate change has the potential to alter weather patterns and increase the frequency of rainfall and extreme weather events in future years. However, the potential for flooding on site has been reviewed and it is not a significant risk. All climate change related risks were categorised as 'low' as per Section 9.6.3.2.

9.9 Significant Interaction of Effects

Climate has the potential to interact with a number of other environmental attributes.

9.9.1 Land, Soils, Geology and Hydrology

The impact of flood risk has been assessed, and as per Chapter 7 – Water, the proposed development is not at risk of flooding from pluvial or fluvial sources. The increase in rainfall amounts due to climate change has been reviewed as part of the assessment. The effect of the interactions between climate and land, soils, geology and hydrology are ***direct, short-term, negative*** and ***imperceptible*** during the construction phase and ***direct, long-term, negative*** and ***imperceptible*** during the operational phase, which is overall ***not significant*** in EIA terms.

9.9.2 Air Quality

Air quality and climate have interactions due to the emissions from the burning of fossil fuels during the construction and operational phases generating both air quality and climate impacts. There is no impact on climate due to air quality; however, the sources of impacts on air quality and climate are strongly linked.

9.9.3 Traffic and Transport

During the construction and operational phase, there is the potential for interactions between climate and traffic (Chapter 11 - Traffic & Transport). Vehicles accessing the site will result in emissions of CO_2, a greenhouse gas. In this assessment, the effects of the interactions between traffic and climate are considered to be ***direct, short-term, negative*** and ***not significant*** during the construction phase and ***direct, long-term, negative*** and ***not significant*** during the operational phase.

No other significant interactions between climate and other environmental topics have been identified.

9.10 Residual Impacts

The impact to climate due to a proposed development must be assessed as a whole for all phases. The proposed development will result in some impacts to climate through the release of GHGs. TII reference the ISEP guidance which states that the crux of assessing significance is "*not whether a project emits GHG emissions, nor even the magnitude of GHG emissions alone, but whether it contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050*". The proposed development has proposed best practice mitigation measures and is committing to reducing climate impacts where feasible. The mitigation measures in relation to the proposed development are detailed in Section 9.7. As per the assessment criteria in Table 9.3 the residual impact of the proposed development in relation to GHG emissions is considered minor adverse. The proposed development is aligned with the following assessment criteria as per Table 9.3:

- The project's GHG impacts are mitigated through 'good practice' measures.
- The project has complied with existing and emerging policy requirements; and
- Fully in line to achieve Ireland's trajectory towards net zero.

The 'minor adverse' impact rating equates to a ***direct, long-term, negative*** and ***slight***, impact which is overall ***not significant*** in EIA terms.

In relation to climate change vulnerability, it has been assessed that there are no significant risks to the proposed development due to climate change. The residual effect of climate change on the proposed development is considered ***direct, long-term, negative*** and ***imperceptible***, which is overall ***not significant*** in EIA terms.

9.10.1 Compliance with Section 15 of the Climate Action and Low Carbon Development Act 2015

Section 15 of the 2015 Act, sets out the duties imposed by certain bodies, including local authorities and An Coimisiún Pleanála. This section was amended by the 2021 Act and states:

"(1) A relevant body shall, in so far as practicable, perform its functions in a manner consistent with—

(a) the most recent approved climate action plan,

(b) the most recent approved national long term climate action strategy,

(c) the most recent approved national adaptation framework and approved sectoral adaptation plans,

(d) the furtherance of the national climate objective, and

(e) the objective of mitigating greenhouse gas emissions and adapting to the effects of climate change in the State.".

This chapter demonstrates how the proposed development is consistent with the objectives of Section 15 of the 2015 Act (as amended). The EIAR has carried out a greenhouse gas emissions assessment and assessed the proposed development's resilience/adaptation to climate change.

- Greenhouse Gas Emissions Assessment – This assessment considers the proposed development's GHG emissions over its lifetime. The assessment analyses these emissions in the context of the relevant carbon budgets, targets and policies to ensure consistency with the most recent approved climate action plan and the most recent approved national long term climate action strategy, and with measures in furtherance of the national climate objective. This complies with subsections 15 (1) (a), (b), and (d) of the Act.
- Climate Change Vulnerability Assessment – This assessment identifies the impact of a changing climate on the proposed development and receiving environment in the context of the most recent approved national adaptation framework and approved sectoral adaptation plans. The assessment considers the proposed development's vulnerability and adaption to climate change and identifies adaptation measures to increase resilience, as discussed in Section 9.7.2. This covers sections 15(1)(c) and (e) of the Act.

The above measures pursue the furtherance of the national climate objective and the objective of mitigating greenhouse gas emissions and adapting to the effects of climate change in the State as far as practicable as required by section 15(1)(d) and(e) of the Acts.

9.11 Conclusion

This chapter has reviewed and analysed the potential and the predicted impacts of the proposed development with regards to climate. These impacts have been considered for all phases of the proposed development. The cumulative impact of the proposed development and surrounding developments have also been considered.

Provided all mitigation measures as set out in this chapter are implemented, the overall predicted effect of the proposed development is ***not significant*** in relation to GHG emissions and climate change risk.

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Murray Brothers Tarmacadam Ltd

CHAPTER 10
NOISE AND VIBRATION

VOLUME II
MAIN STATEMENT

APRIL 2026

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10 Noise and Vibration

10.1 Introduction

This chapter summarises the assessment of the potential significant noise and vibration effects of the existing and future extraction areas at the Murray Brothers quarry in Ardcahan, Dunmanway, Co. Cork. It describes the baseline noise environment and identifies prevention and mitigation measures which will be implemented to reduce the significance of the identified noise and vibration impacts.

10.1.1 Author Information and Competency

The assessment detailed in this chapter was conducted by Brian S. Johnson (CLV), who is an internationally experienced acoustic consultant who has been working in the fields of architectural / environmental acoustics and noise control since 1994. He has been based in America, Europe, Asia and Australia and is a member of the Institute of Acoustics. Brian also has extensive knowledge in the field of environmental acoustics and holds a Certificate of Competence in Environmental Noise Measurements from the Institute of Acoustics.

CLV Consulting is a multidisciplinary acoustic and vibration consultancy offering specialist design and assessment advice in respect of Architectural / Building & Environmental Acoustics and both Structural and Occupational Noise & Vibration.

10.1.2 Guidelines & Legislation Relevant to Discipline

In developing the noise and vibration assessment for this project, consideration will be given to the following guidance documents where appropriate:

- European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018
- Environmental Management in the Extractive Industry (Non-Scheduled Minerals), EPA 2006;
- Quarries and Ancillary Activities – Guidelines for Planning Authorities – DoEHLG, April 2004;
- The Design Manual for Roads and Bridges (DMRB)
- BS 8233 (2014): Guidance on Sound Insulation and Noise Reduction for Buildings.
- ISO 1996-2:2017 Acoustics - Description, measurement and assessment of environmental noise - Determination of sound pressure levels;
- BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites - Noise;
- BS 5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites - Vibration;
- BS 7385-2:1993 Evaluation and measurement for vibration in buildings Guide to damage levels from groundborne vibration; and,
- BS 6472:2008 - Guide to evaluation of human exposure to vibration in buildings. Vibration sources other than blasting.
- Planning and Development Act 2024

10.1.3 Methodology

In order to assess the potential for noise impacts from the proposed development on the nearest noise sensitive receptors, the following assessment methodology was adopted in the preparation of this chapter:

- ✓ Noise measurements were conducted in order to quantify the ambient noise level environment in the vicinity of the nearest noise sensitive receptors (refer to Section 10.3).
- ✓ The measured ambient noise levels were used to establish construction maximum noise emission criteria limits (refer to Section 10.4) along with establishing operational noise emission criteria limits from best practice published guidance.
- ✓ Construction Phase noise emission levels were calculated in accordance with *BS 8233:2014* at each of the nearest noise sensitive receptors based on sound power / pressure levels for expected equipment / processes and estimated utilisation periods along with standard appropriate corrections for attenuation with distance, screening from buildings / perimeter site hoarding and the presence of nearby reflecting surfaces (refer to Section 10.5.2).
- ✓ Operational Phase noise emission levels were calculated at each of the nearest noise sensitive receptors (in accordance with *BS 8233:2014*) based on all identified operational noise source sound power / pressure levels along with standard appropriate corrections for attenuation with distance, screening from buildings and the presence of nearby reflecting surfaces (refer to Section 10.5.3).
- ✓ Decommissioning & Remediation Phase noise emission levels were calculated at each of the nearest noise sensitive receptors (in accordance with BS 8233:2014) based on all identified operational noise source sound power / pressure levels along with standard appropriate corrections for attenuation with distance, screening from buildings and the presence of nearby reflecting surfaces (refer to Section 10.5.4).
- ✓ The recommended mitigation measures that were deemed to be required in this instance were identified and detailed (refer to Section 10.6).

All noise prediction calculations were conducted in general accordance with *ISO 9613: Acoustics - Attenuation of sound outdoors, Part 2: General method of calculation, 1996*.

The effects of the proposed development are described by considering the possible impacts that could occur, the probability of their occurrence and the nature and significance of such impacts. The revised EPA document *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (2022)* has been considered in this assessment.

A description of the effects (detailed in Table 3.4 in the Guidelines) is reproduced in Figure 10-1 on the following page which shows the approach taken to quantifying the significance and magnitude of potential noise impacts.

Quality of Effects It is important to inform the non-specialist reader whether an effect is positive, negative or neutral.	**Positive Effects** A change which improves the quality of the environment (for example, by increasing species diversity, or improving the reproductive capacity of an ecosystem, or by removing nuisances or improving amenities).
	Neutral Effects No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
	Negative/Adverse Effects A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem, or damaging health or property or by causing nuisance).
Describing the Significance of Effects 'Significance' is a concept that can have different meanings for different topics – in the absence of specific definitions for different topics the following definitions may be useful (also see *Determining Significance*).	**Imperceptible** An effect capable of measurement but without significant consequences.
	Not Significant An effect which causes noticeable changes in the character of the environment but without significant consequences.
	Slight Effects An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
	Moderate Effects An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
	Significant Effects An effect which, by its character, magnitude, duration or intensity, alters a sensitive aspect of the environment.
	Very Significant An effect which, by its character, magnitude, duration or intensity, significantly alters most of a sensitive aspect of the environment.
	Profound Effects An effect which obliterates sensitive characteristics.
Describing the Extent and Context of Effects Context can affect the perception of significance. It is important to establish if the effect is unique or, perhaps, commonly or increasingly experienced.	**Extent** Describe the size of the area, the number of sites and the proportion of a population affected by an effect.
	Context Describe whether the extent, duration or frequency will conform or contrast with established (baseline) conditions (is it the biggest, longest effect ever?)
Describing the Probability of Effects Descriptions of effects should establish how likely it is that the predicted effects will occur so that the CA can take a view of the balance of risk over advantage when making a decision.	**Likely Effects** The effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented.
	Unlikely Effects The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.
Describing the Duration and Frequency of Effects 'Duration' is a concept that can have different meanings for different topics – in the absence of specific definitions for different topics the following definitions may be useful.	**Momentary Effects** Effects lasting from seconds to minutes.
	Brief Effects Effects lasting less than a day.
	Temporary Effects Effects lasting less than a year.
	Short-term Effects Effects lasting one to seven years.
	Medium-term Effects Effects lasting seven to fifteen years.
	Long-term Effects Effects lasting fifteen to sixty years.
	Permanent Effects Effects lasting over sixty years.
	Reversible Effects Effects that can be undone, for example through remediation or restoration.
	Frequency of Effects Describe how often the effect will occur (once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annually).

Figure 10.1 Description of Impact Effects

10.1.4 Difficulties Encountered in Compiling Information

There were no particular difficulties encountered with the assessment or the production of this chapter.

10.2 Proposed Development

This proposed development involves quarrying of quartzitic sandstone and siltstone bedrock, thereby extending the existing old quarry extraction area. Reserves at the quarry are estimated to equate to be approximately 4,000,000 tonnes of aggregate from an area of 5.01 Ha.

The rock will be extracted using industry-standard blasting methods to produce broken rock by creating a series of benches generally of the order of 15m deep. The number of benches will vary depending on the existing ground level and depth of overburden; however, the final quarry floor across the site is proposed to be at a maximum depth of 75 mOD.

It is anticipated that the proposed quarrying activities will generally produce between 175,000 to 200,000 tonnes of aggregate per annum. Depending on demand and market conditions, the extended quarry is estimated to have an upper annual output of 225,000 tonnes.

The project site overlaps with lands under consideration for Substitute Consent by way of a concurrent planning application. The former post 1990 extraction area and adjoining lands in the south for which substitute consent is being sought are included in this prospective application to accommodate ancillary quarry activities (internal roads, aggregate processing, chip washing, settling ponds, stockpiling etc) associated with the proposed future extraction.

The application site does not include the southeast part of the landholding occupied by the tarmacadam plant, admin buildings and associated works permitted under Reg. Ref. 98/294.

10.3 Description of Existing Environment

In order to assess the potential for noise and vibration impact on the proposed development surroundings, a visual survey of the area was firstly conducted in order to identify the existing noise sensitive receptors in the vicinity of the development. The nearest noise sensitive receptors to the subject expansion site are located approximately 230 to 410 metres from the nearest development boundary. The relevant noise sensitive locations are comprised solely of residential properties.

An environmental noise survey was then conducted in order to quantify the existing noise environment in the area. The survey was conducted in general accordance with *ISO 1996-2: 2017: Acoustics - Description, measurement and assessment of environmental noise.*

Specific details of this survey are set out in the following sections.

10.3.1.1 Choice of Measurement Locations

Three measurement locations were selected and are shown in Figure 10-2 below. Refer to Chapter 3 for details of the existing quarry boundary and the future extraction application areas.

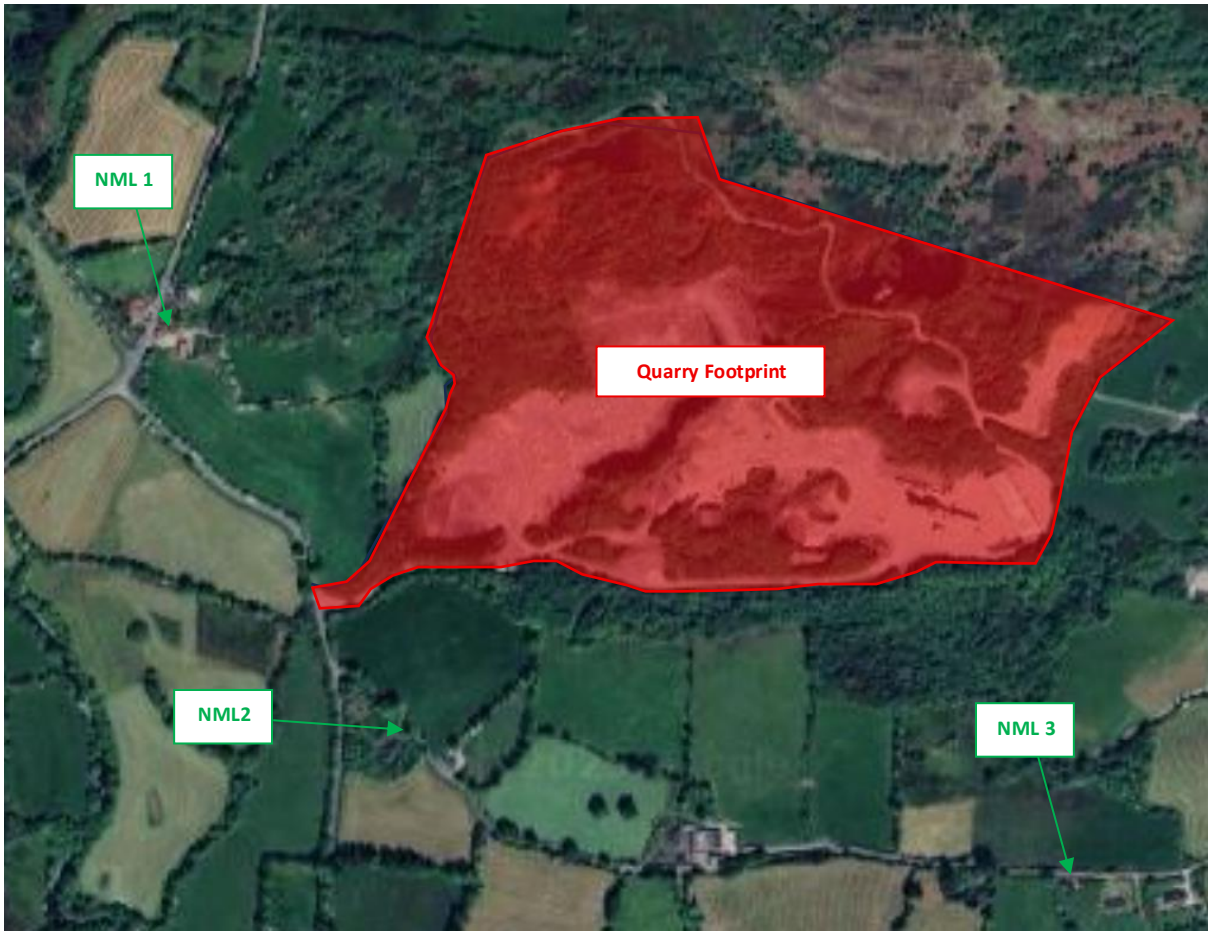


Figure 10.2 Layout Showing Approximate Positions of Measurement Locations

10.3.1.2 Survey Periods

Noise measurements were conducted over the course of the survey period as follows:

- Daytime 12:15 to 15:25 hrs on 12 May 2025

The measurements cover a period that would provide a typical snapshot of the existing daytime period noise climate, with the primary purpose being to ensure that the proposed noise criteria associated with the development are commensurate with the prevailing environment.

Note that the subject quarry is not operational during night time periods.

The weather during the survey period was 16 - 18°C and dry with < 1m/s winds from the east.

10.3.1.3 Personnel & Instrumentation

Brian S. Johnson (CLV) conducted the noise level measurements during all survey periods (relevant experience detailed in Section 10.1.1).

The measurements were conducted using an NTI Audio type XL2 Sound Level Meter (Serial #A2A-11070-EO). It was fitted with a 90mm windshield and before and after the survey the measurement apparatus was check calibrated using a Casella Cel 120 Acoustic Calibrator (Serial #5072087). The microphone was positioned approximately 1.4m above the ground.

10.3.1.4 Procedure

Measurements were conducted at Locations 1 to 3 on a cyclical basis. Sample periods for the noise measurements were 15 minutes during all periods. The results were saved to the instrument memory for later analysis. All primary noise sources contributing to noise build-up were also noted.

10.3.1.5 Measurement Parameters

The noise survey results are presented in terms of the following five parameters:

L_{Aeq} is the equivalent continuous sound level. It is a type of average used to describe a fluctuating noise in terms of a single noise level over the sample period. It is typically used as a descriptor for the ambient noise level.

L_{Amax} is the instantaneous maximum sound level measured during the sample period.

L_{Amin} is the instantaneous minimum sound level measured during the sample period.

L_{A10} is the sound level that is exceeded for 10% of the sample period. It is typically used as a descriptor for traffic noise.

L_{A90} is the sound level that is exceeded for 90% of the sample period. It is typically used as a descriptor for background noise level.

The "A" suffix denotes the fact that the sound levels have been "A-weighted" in order to account for the non-linear nature of human hearing.

All sound levels in this report are expressed in terms of decibels (dB) relative to $2x10^{-5}$ Pa.

10.3.1.6 Measurement Results

Location 1

The survey results for Location 1 are summarised in Table 10-1 below.

Time		Measured Noise Levels (dB re. 2x10-5 Pa)				
		L_{Aeq}	L_{Amax}	L_{Amin}	L_{A10}	L_{A90}
Daytime Period	12:15 - 12:30 hrs	41	69	26	41	31
	13:25 - 13:40 hrs	49	79	26	46	31
	14:30 - 14:45 hrs	44	72	29	45	36

Table 10.1Summary of Measured Noise Levels at NML 1

During daytime monitoring periods, the dominant source of noise observed in the vicinity was wind generated noise, birdsong and traffic on distant roads. There were also contributions from animal noise at the adjacent farmhouse barn.

Noise levels were relatively constant and in the range of 41 to 49dB L_{Aeq} and 41 to 46dB L_{A90}.

No significant levels of vibration were observed.

Location 2

The survey results for Location 2 are summarised in Table 10-2 below.

Time		Measured Noise Levels (dB re. 2x10-5 Pa)				
		L_{Aeq}	L_{Amax}	L_{Amin}	L_{A10}	L_{A90}
Daytime Period	12:40 - 12:55 hrs	50	67	26	53	31
	13:45 - 14:00 hrs	51	67	25	54	32
	14:50 - 15:05 hrs	51	66	26	54	31

Table 10.2 Summary of Measured Noise Levels at NML 2

During daytime monitoring periods, the dominant source of noise observed in the vicinity was wind generated noise, birdsong and traffic on distant roads. There were also significant contributions from local vehicular movements.

Noise levels were in the range of 50 to 41dB L_{Aeq} and 31 to 32dB L_{A90}.

No significant levels of vibration were observed.

Location 3

The survey results for Location 3 are summarised in Table 10-3 below.

Time		Measured Noise Levels (dB re. 2x10-5 Pa)				
		L_{Aeq}	L_{Amax}	L_{Amin}	L_{A10}	L_{A90}
Daytime Period	13:00 - 13:15 hrs	48	69	24	50	30
	14:05 - 14:20 hrs	48	63	23	49	30
	15:10 - 15:25 hrs	50	75	23	52	31

Table 10.3 Summary of Measured Noise Levels at NML 3

During daytime monitoring periods, the dominant source of noise observed in the vicinity was wind generated noise, birdsong and traffic on distant roads. There were also significant contributions from local vehicular movements.

Noise levels were in the range of 48 to 50dB L_{Aeq} and 30 to 31dB L_{A90}.

No significant levels of vibration were observed.

10.4 Impact Assessment Criteria

10.4.1 Operational Phase Noise Criteria

10.4.1.1 All operations excluding blasting

Noise criteria for the existing permitted tarmacadam plant and associated operations during general operations as permitted under Cork County Council planning decision 98/294, states that:

> *"Noise levels emanating from the proposed development when measured at the site boundaries shall not exceed 55 dBA (15 minute L_{eq}) between 08.00 hours and 20.00 hours Monday to Saturday inclusive and shall not exceed 45 dBA (15 minute L_{eq}) at any other time. Measurements shall be made in accordance with I.S.O. Recommendations R.1996/1 "Acoustics - Description and Measurement of Environmental Noise, Part 1: Basic quantities and procedures".*
>
> *If the noise contains a discrete, continuous note (whine, hiss, screech, hum, etc.), or if there are distinct impulses in the noise (bangs, clicks, clatters or thumps), of if the noise is irregular enough in character to attract attention, a penalty of +5 dBA should be applied to the measured noise level and this increased level shall be used in assessing compliance with the specified levels. (Ref. BS 4142 Section 7.2)".*

These criteria are in line with those outlined in the Environmental Protection Agency's guidance note *Environmental Management in the Extractive Industry (Non-Scheduled Minerals)*. The only discrepancy are the assessment periods which are explicitly defined as being 1-hour in duration. 1-hour periods are also consistent with the DoEHLG *Quarries and Ancillary Activities - Guidelines for Planning Authorities 2006* guidance document and most other applicable best practice guidance documents and will therefore be considered in this instance.

The applicant has confirmed that none of the quarry areas will operate outside of the hours of 07:30 to 17:30, Monday through Friday.

As such, the following limits have therefore been adopted as appropriate for the assessment of noise from the quarry operations (outside of blasting events which is addressed in the following section):

> *During the daytime period (07:00 to 19:00) Monday to Friday, specific noise levels from the site shall not exceed 55 dB $L_{Aeq,1hr}$ at the nearest noise sensitive locations.*
>
> *During all other periods, limit of 45dB $L_{Aeq,1hr}$ shall apply to specific noise levels from the site.*

10.4.1.2 Noise criteria for blast events

Blasting noise is assessed using the air overpressure parameter. Air overpressure is energy transmitted from the blast site within the atmosphere in the form of pressure waves. As such a wave passes a given position, the pressure of the air at this point rises very rapidly to a value above the ambient pressure, and then falls more slowly to a value below, before returning to the ambient value after a series of oscillations. The maximum excess pressure in this wave is known as the peak air overpressure. This value can be measured in terms of pounds per square inch or, more usually, in terms of dB (Lin).

These pressure waves will consist of energy over a wide range of frequencies, some of which are audible and known as sound waves or noise, but most of the energy is inaudible at frequencies of less than 20Hz.

Air overpressure is transmitted through the atmosphere in a similar manner to sound waves. Thus, meteorological conditions, such as wind speed and direction, temperature, cloud cover and humidity will affect the intensity of the air overpressure value experienced at a distance from the blast site.

The Environmental Protection Agency guidance note *Environmental Management in the Extractive Industry (Non-Scheduled Minerals)* indicates blast air overpressure should not exceed 125dB (linear maximum peak value) with a 95% confidence limit.

The appropriate criterion for blast related air overpressure shall therefore be as follows:

The air overpressure arising from any blast carried out on the site, when measured outside the nearest inhabited house to the location of the blast, shall not exceed 125dB (linear) at frequencies of 2Hz or over.

10.4.2 Construction Phase Noise Criteria

Appropriate criteria relating to permissible construction noise levels for a development of this scale may be found in the *British Standard BS 5228 - 1: 2009+A1: 2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites - Part 1: Noise*. This document provides guidance on selecting appropriate noise criteria for construction works.

The approach adopted here calls for the designation of a noise sensitive location into a specific category (A, B or C) based on exiting ambient noise levels in the absence of construction noise. This then sets a threshold noise value that, if exceeded, indicates a significant noise impact is associated with the construction activities.

Table 10-4 below sets out the values which, when exceeded, indicate a significant effect at the facades of residential receptors as recommended by *BS 5228 - 1*. Please note that these are cumulative levels, i.e. the sum of both ambient and construction noise levels.

Assessment Category & Threshold Value Period (L_{Aeq})	Threshold Value, Decibels (dB)		
	Category A[A]	Category B[B]	Category C[C]
Night-Time (23:00 to 07:00hrs)	45	50	55
Evenings & Weekends (19:00 - 23:00 weekdays, 13:00 - 23:00 Saturdays and 07:00 - 23:00 Sundays)	55	60	65
Daytime (07:00 - 19:00) & Saturdays (07:00 - 13:00)	65	70	75

Table 10.4 Example Threshold of Significant Effects at Dwellings

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 B values.

For the appropriate period (e.g. daytime), the ambient noise level is determined and rounded to the nearest 5dB. In this instance, the receptors in the vicinity of the development have daytime ambient noise levels in the range of 41 to 51dB L_{Aeq} (ref Section 10.3.1.6). All of the receptors in the vicinity of the development will therefore be considered with a Category A designation.

If the total noise level (i.e. construction noise plus existing ambient noise level) exceeds the appropriate category value (e.g. 65dB L_{Aeq} during daytime periods) then a relative noise impact is deemed to have occurred.

10.4.3 Vibration Criteria

10.4.3.1 During general operations

The planning permission for the site does not stipulate limits for vibration during normal operations (i.e. outside of blasting). No specific guidance on vibration criterion during normal quarry operations has been published by Cork County Council. Similarly, State guidance in relation to quarry activity provides no guidance in relation to operational vibration levels outside of blasting.

In the absence of appropriate local or national guidance in this regard, reference can be made to British Standards *BS 7385-2:1993 Evaluation and Measurement for Vibration in Buildings - Guide to Damage Levels from Groundborne Vibration* and *BS 5228-2:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites – Vibration.*

The guidance outlined in each is discussed further in the following sections.

BS 7385-2:1993: states that there should typically be no cosmetic damage if transient vibration does not exceed 15 mm/s at low frequencies rising to 20 mm/s at 15 Hz and 50 mm/s at 40 Hz and above. These guidelines relate to relatively modern buildings and should be reduced to 50% or less for more critical buildings.

BS 5228-2:2009+A1:2014: 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 15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz and 50 mm/s at 40 Hz and above. Below these values minor damage is unlikely. Where continuous vibration is such as to give rise to dynamic magnification due to resonance, the guide values may need to be reduced by up to 50%. BS 5228-2:2009+A1:2014 also comments that important buildings which are difficult to repair might require special consideration on a case by case basis.

A summary of appropriate vibration criteria for the prevention of cosmetic damage to buildings are presented in Table 10-5 on the following page.

Type of Building	**Peak particle velocities (PPV in mm/s) in frequency range of predominant pulse below which transient vibration should not cause cosmetic building damage (BS 7385, 1993 & BS 5228-2, 2009)**	
	4 - 15 Hz	**≥ 15 Hz**
Reinforced or framed str cures, industrial or heavy buildings	50 mm/s at 4 Hz and above	50 mm/s at 4 Hz and above
Residential or light commercial buildings	15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz	20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above

Table 10.5 Summary of Vibration Thresholds for Cosmetic Damage to Buildings

10.4.3.2 During blasting

Appropriate conditions offering protection against blast related vibration are outlined in the Environmental Protection Agency guidance note *Environmental Management in the Extractive Industry (Non-Scheduled Minerals)* which indicates blast vibration should not exceed 12 mm/s.

Considering this requirement, the following criteria is deemed appropriate:

> *The transmitted ground vibration arising from any blast carried out on the site shall not exceed a peak particle velocity of 12 millimetres per second for any individual blast.*

In terms of this assessment, these criteria have been adopted as an appropriate guideline against which to assess the impacts of the future expansion area blasting operations.

10.5 Impact Assessment

10.5.1 Do Nothing Scenario

With respect to the 'Do Nothing' Scenario, the noise and vibration emission levels from the quarry would be expected to remain consistent with existing.

10.5.2 Construction Phase

There are only two primary sources of activity noise that were identified in relation to the Construction Phase activities. They are summarised as follows:

- ✓ Soil Stripping
- ✓ Berm Construction

Each of these primary noise sources are addressed in turn in the following sections.

10.5.2.1 Soil Stripping

Soil stripping is required to be carried out prior to the Operational Phase of the new extraction area. It is intended that this area (5.01 ha) of the site shall be stripped of its vegetation and soil cover to a depth of approximately 1m. The excavated soil will remain on site and be utilised to resurface denuded areas and for the use as berms to screen the future extraction areas.

The main type of machinery to be used for the soil stripping operations will be a mechanical excavator (soil extraction / loading) and dump truck (for soil transport). The boundary of the extraction area will be located a minimum of 230m from the nearest residential dwelling (to the west). Haul routes will also be limited to within the site boundary and are considered separately in the Soil Storage section.

For the purposes of calculation, it is assumed that soil stripping activities will occur at their closest point in the new pit area to each receptor. These distances were estimated as follows:

Dwellings to West:	230m
Dwellings to Southwest:	460m
Dwellings to Southeast:	390m

Table 10-6 below indicates typical noise levels that would be expected from soil stripping activities during the development phase of the project with two excavators and two dumpers in operation for 75% over the considered period at the nearest location to each of the noise sensitive receptors.

Plant Item (BS 5228 Ref.)	Plant Noise Level at 10m Distance[1] (dB L_{Aeq})	Predicted Noise Level at Noise Sensitive Receptors (dB L_{Aeq})		
		Dwellings to East	Dwellings to Southwest	Dwellings to Southeast
Tracked Excavator (D6.24)	72	41	35	36
Dumper (C3.100)	74			

Table 10.6 Construction Phase Soil Stripping Activity Noise Emissions

As confirmed by the prediction results in Table 10-6, all of the predicted soil stripping noise emission levels are well below the criterion of 65dB $L_{Aeq,1hr}$ for Construction Phase activities during a weekday.

There should therefore be no significant disturbance caused at any of the nearby noise sensitive locations. It should also be highlighted that any potential noise emission exceedance that may occur will be relatively temporary in nature given the short period of occurrence.

The potential for vibration at neighbouring sensitive locations during soil stripping activities will be limited to lorry movements on uneven road surfaces. Considering the significant distance between the haulage area and the use on surrounding roads, there is little potential for structural or even cosmetic damage to existing nearby dwellings and any ground borne vibration should be well below threshold limits.

10.5.2.2 Berm Construction

A portion of the stripped topsoil will be used in the construction of screening berms around the perimeter of the expansion area boundary at appropriate locations. These berms will remain in place for the duration of the area being extracted where they will reduce noise emissions from the future expansion areas. Upon closure of the quarry and cessation of the extractive works, the berms shall be used during the decommissioning and remediation phase of the development in reprofiling and reinstating the site area.

The main type of machinery to be used for the berm construction operations will be similar to the soil stripping activities: a mechanical excavator (berm shaping) and dump truck (for soil transport). The assumed worst case distances (from the closest area of the future expansion perimeter areas to each noise sensitive receptor) would be similar as well.

Table 10-7 below indicates typical noise levels that would be expected from berm construction during the Construction Phase of the project with an excavator and dumper in operation for 75% over the considered period at the nearest location to each noise sensitive receptor.

[1] Plant noise levels are derived from *BS 5228: Part 1*.

Plant Item (BS 5228 Ref.)	Plant Noise Level at 10m Distance[2] (dB L_{Aeq})	Predicted Noise Level at Noise Sensitive Receptors (dB L_{Aeq})		
		Dwellings to East	Dwellings to Southwest	Dwellings to Southeast
Tracked Excavator (D6.24)	72	38	32	33
Dumper (C3.100)	74			

Table 10.7 Construction Phase Berm Construction Activity Noise Emissions

As confirmed by the prediction results in Table 10-7, all of the predicted berm construction noise emission levels are well below the criterion of 65dB $L_{Aeq,1hr}$ for Construction Phase activities during a weekday. There should therefore be no significant disturbance caused at any of the nearby noise sensitive locations. It should also be highlighted that any potential noise emission exceedance that may occur will be temporary in nature.

The potential for vibration at neighbouring sensitive locations during berm construction activities will again be limited to lorry movements on uneven road surfaces. Considering the significant distance between the haulage area and the use on surrounding roads, there is little potential for structural or even cosmetic damage to existing nearby dwellings and any ground borne vibration should be well below threshold limits.

10.5.2.3 Construction Phase Cumulative Noise Emissions

The total level of combined noise emissions from the Construction Phase noise sources can be determined by summing together the individual contributions determined in the previous sections. The total levels of each are summarised and totalled in Table 10-8 on the following page.

Construction Phase Noise Source	Predicted Noise Level at Noise Sensitive Receptors (dB L_{Aeq})		
	Dwellings to East	Dwellings to Southwest	Dwellings to Southeast
Soil Stripping	41	35	36
Berm Construction	38	32	33
Cumulative Noise Level	**43**	**37**	**38**

Table 10.8 Construction Phase Cumulative Noise Emissions

These cumulative noise levels are compared with the established project noise emission criteria in Table 10-9 below.

[2] Plant noise levels are derived from BS 5228: Part 1.

Location	Predicted Noise Levels	*BS 8233* Daytime Period Noise Emission Criterion	Compliant?
Dwellings to East	43 dB L_{Aeq}	65 dB $L_{Aeq,1hr}$	✓
Dwellings to Southeast	37 dB L_{Aeq}		✓
Dwellings to Southwest	38 dB L_{Aeq}		✓

Table 10.9 Construction Phase Noise Emission Level Comparison with Criteria

As can be seen in the table above, noise level emissions from Construction Phase activities at each of the nearby noise sensitive receptors are predicted to be within the established *BS 8233* criteria limit. They are not predicted to exceed the adopted daytime criteria of 65dB $L_{Aeq,1hr}$ at any of the nearest noise sensitive receptors.

Any potential noise impact caused by the proposed development Construction Phase activities is therefore expected to be not significant and temporary at all of the nearest noise sensitive receptors.

In respect of vibration, as stated in the previous sections, the only potential for impact at neighbouring sensitive locations during the Construction Phase is limited to lorry movements on uneven road surfaces. However, the relative distance between the Construction Phase activity areas and the nearest noise sensitive receptors will be such (≥ 230m) that any residual groundborne vibration will be significantly below threshold limits.

Any potential vibration impact is therefore expected to be imperceptible and temporary at all adjacent receptors during the Construction Phase.

10.5.3 Operational Phase

The Operational Phase of the proposed development will effectively consist of quarrying through the exposed rock using both boring and blasting (through the use of industrial explosives) methods. It is anticipated that boring or drilling would generally occur one week prior to blasting and that blasting would be required up to 12 times per year (up to once a month).

Excavated material will be processed on the floor of the excavated quarry. Blasted rock will be loaded into a crusher and then transferred into a screening unit for grading, before being stored in stockpiles and storage bays on site.

In considering the Operational Phase of the development, there are seven primary sources of noise and vibration that were therefore identified. They are summarised as follows:

- ✓ Boring / Drilling Activities
- ✓ Blasting Activities
- ✓ Rock Crusher
- ✓ Screening Plant
- ✓ Loading Shovels
- ✓ Tracked Excavators

- ✓ Traffic Movements

In order to consider a worst case scenario, most of the above noise sources / activities will be considered as being carried out simultaneously apart from boring / drilling (which will occur separately and during briefer periods) and blasting (which is instantaneous and therefore considered independently).

In addition to considering the above sources, it is also prudent to consider that the existing quarry area will also be back in use. The operational period will therefore consider excavation activities being carried out in both the existing and future expansion areas.

For the purposes of calculation, it is assumed that all proposed and existing quarry noise sources / activities are occurring at their closest point from the pit boundary to each receptor in order to assess an extreme worst case situation.

Boring / Drilling Noise

It is understood from the Operator that the quarried material will be extracted by boring or drilling for one week prior to blasting, approximately once per month (depending on stock levels, demand and commercial consideration). Boring / drilling operations will therefore occur for approximately one week per month.

Noise emission levels for the truck mounted drill rig can be taken directly from Table D.10 in *BS 5228* which quotes a sound pressure level of 86dB L_{Aeq} at a distance of 10m for a 160kW compressor and pneumatic drilling rig (note that a similar noise level is quoted for a 160kW diesel powered rotary rig).

Table 10-10 (on the following page) summarises the noise emissions from using this equipment to drill blastholes that would be expected from at each of the nearest noise sensitive receptors with the equipment in operation for 75% over the considered period at the nearest boundary location to each of the receptors.

Plant Item (BS 5228 Ref.)	Plant Noise Level at 10m Distance[3] (dB L_{Aeq})	Predicted Noise Level at Noise Sensitive Locations (dB L_{Aeq})		
		Dwellings to East	Dwellings to Southwest	Dwellings to Southeast
Compressor & Pneumatic Drilling Rig (D6.24)	86	43	41	40

Table 10.10 Boring / Drilling Activity Noise Emissions

As confirmed by the prediction results in the above tables, all the predicted boring / drilling activity noise emission levels are below the 50dB $L_{Aeq,1hr}$ daytime period criterion. The predicted levels are also consistent with or below the ambient noise levels at each of the nearest noise sensitive locations.

Any potential noise impact caused by the proposed development boring / drilling activities is therefore expected to be long term but not significant at all the nearby noise sensitive receptors.

General Quarry Activity Noise

Tables 10-11 & 10-12 summarise typical noise levels that would be expected from general quarry activities during the Operational Phase of the project with equipment in operation for 75% over the considered period.

Plant Item (BS 5228 Ref.)	Plant Noise Level at 10m Distance[3] ($dB L_{Aeq}$)	Predicted Noise Level at Noise Sensitive Locations ($dB L_{Aeq}$)		
		Dwellings to East	Dwellings to Southwest	Dwellings to Southeast
Tracked Excavator (D6.24)	72	40	40	38
Loading Shovel (D10.61)	76			
Sand Screening Equipment[4]	78 at 3m			
Rock Crusher (C1.14)	82			

Table 10.11 Operational Phase General Activity Noise Emissions (Existing Quarry Area)

Plant Item (BS 5228 Ref.)	Plant Noise Level at 10m Distance[3] ($dB L_{Aeq}$)	Predicted Noise Level at Noise Sensitive Locations ($dB L_{Aeq}$)		
		Dwellings to East	Dwellings to Southwest	Dwellings to Southeast
Tracked Excavator (D6.24)	72	40	34	36
Loading Shovel (D10.61)	76			
Sand Screening Equipment[4]	78 at 3m			
Rock Crusher (C1.14)	82			
Dumper (C3.100)	74			

Table 10.12 Operational Phase General Activity Noise Emissions (Future Expansion Area)

The cumulative noise emission levels for the worst case scenario of all quarry general activities occurring in both existing and future expansion areas simultaneously at the nearest site location to each of the nearby noise sensitive receptors is summarised in Table 10-13 below.

[3] Plant noise levels are derived from BS 5228: Part 1.

[4] Measured by CLV Consulting Ltd.

Quarry Area	Predicted Noise Level at Noise Sensitive Locations (dB L_{Aeq})		
	Dwellings to East	Dwellings to Southwest	Dwellings to Southeast
Existing Areas	40	40	38
Future Expansion Area	40	34	36
TOTAL	**43**	**41**	**40**

Table 10.13 Operational Phase Cumulative General Activity Noise Emissions

As confirmed by the prediction results in the above tables, all of the predicted Operational Phase activity noise emission levels are below the 50dB $L_{Aeq,1hr}$ daytime period criterion. Although operational noise emissions will likely be occasionally perceptible at some of the noise sensitive receptors, the predicted levels are also consistent with or below the ambient noise levels at each of the nearest noise sensitive locations.

It is also critical to note that this assessment considers all existing and future expansion operational phase activities as occurring at the nearest boundary location to each of the noise sensitive receptors. This will likely never be the case, but it is useful in demonstrating that even this worse case situation is both within criteria and consistent with or below the ambient noise levels at each. The actual noise emissions from each will likely be ≤ 40dB L_{Aeq} and therefore nominally imperceptible for the vast majority of the time.

Any potential noise impact caused by the proposed development Operational Phase general quarry activities is therefore expected to be long term but not significant at all the nearby noise sensitive receptors.

Traffic

The criterion for assessment of "affected roads" contained within the latest DMRB guidance focuses on roads with relatively high changes in flows or high proportion of HDV / HGV traffic. Affected roads are defined as those that meet any of the following criteria:

- ✓ road alignment will change by 5m or more; or
- ✓ daily traffic flows will change by 1,000 Annual Average Daily Traffic (AADT) movements or more; or
- ✓ HDV / HGV flows will change by 200 AADT or more; or
- ✓ daily average speed will change by 10 km/hr or more; or
- ✓ peak hour speed will change by 20km/hr or more.

It is anticipated that the proposed quarrying activities will generally produce between 175,000 to 200,000 tonnes of aggregate per annum. Depending on demand and market conditions, the extended quarry will have an upper annual output of 225,000 tonnes.

Taking the upper output of 225,000 tonnes per year, that equates to 4,500 tonnes per week (assuming 50 working weeks). For 5 days loading per week, the 12-hour day tonnage is 900. Assuming rigid body trucks @ 20 tonne capacity each, the result is 45 loads per day. This equates to 90 HGV traffic movements per day (Mon - Fri).

Regarding staff traffic generation, assuming a worst case scenario with both the six full time and six part time working for modelling purposes, the result is 24 staff traffic movements per day.

It is also assumed there will be some visitor traffic to the site, say 3 visitors average a day. This equates to an additional 6 visitor traffic movements.

The total daily traffic movements for the proposed development therefore equals 90 HGV + 24 staff + 6 visitors = 120 movements per day (Mon-Fri).

These traffic flows will be below this assessment criteria and are therefore considered as being not significant in this instance.

Blasting Noise

Historical air overpressure monitoring data during blasting in the existing quarry areas has been outlined in Table 10-14.

Date	Location	Distance to Blast	Peak Sound
20-Jan-09	Tarmac Plant	328	102
06-Apr-09	na	na	120
30-Apr-09	Tarmac Plant	na	121
12-Nov-10	Tarmac Plant	316	106
14-Jun-11	Pat Hayes	744	121
16-Jan-12	Tarmac Plant	273	122
16-Feb-12	Pat Hayes	739	119
20-Mar-13	Tarmac Plant	739	100
20-Mar-13	Pat Hayes	359	119
14-Feb-14	Pat Hayes	732	116
14-Feb-14	Tarmac Plant	366	122

Table 10.14 Historic Blasting Air Overpressure Monitoring Data from Existing Quarry (2009 - 2014)

Historical blasting air overpressure monitoring data for the site demonstrates that blasting air overpressure ranged from 116 to 121 dB (Lin) at the various measurement positions. Routine open pit blasting operations in the UK regularly generate air overpressures up to a magnitude of 120 dB (Lin)

(measured with a 2.0 Hz High Pass system), with levels in excess of 125 dB (Lin) being relatively rare. Damage levels are rarely approached, let alone exceeded.

Although the measured historic data was not measured at the nearest noise sensitive receptors, the measurement results demonstrate compliance with the adopted criteria. It is also likely that due to the elevated profile of intermediate ground between the blast areas within the existing quarry area and the nearest noise sensitive receptors, that there is sufficient acoustic screening to compensate against the potential for increases at these receptors.

The future expansion areas are located a similar distance or greater to all of the nearest noise sensitive receptors in all directions except to the north where the nearest receptors are all ≥ 500m away and therefore much further than the assessed receptors in both this report and all previous applications.

It can therefore be reasonably confirmed that blasting noise will only give rise to slight to moderate negative impacts of momentary duration over the assessment period due to their audibility.

Blasting Vibration

Historical blasting vibration monitoring data as measured during blasting over the period 2009 to 2014 is presented in Table 10-15 below.

Date	Location	Distance to Blast (m)	Peak Particle Velocity (PPV)		
			L	T	V
20-Jan-09	Tarmac Plant	328	1.5	1.4	0.6
06-Apr-09	na	na	4.6	3.9	3.9
30-Apr-09	Tarmac Plant	na	1.4	1.3	0.8
12-Nov-10	Tarmac Plant	316	2.4	1.7	1.4
14-Jun-11	Pat Hayes	744	1.2	1.2	0.8
16-Jan-12	Tarmac Plant	273	2.5	2.0	4.1
16-Feb-12	Pat Hayes	739	1.4	0.6	1.0
20-Mar-13	Tarmac Plant	739	1.6	1.6	1.6
20-Mar-13	Pat Hayes	359	1.2	0.6	0.6
14-Feb-14	Pat Hayes	732	1.8	1.0	0.6

Date	Location	Distance to Blast (m)	Peak Particle Velocity (PPV)		
			L	T	V
14-Feb-14	Tarmac Plant	366	2.0	2.0	2.7

Table 10.15 Historic Blasting Vibration Measurement Data from Existing Quarry (2009 - 2014)

No historical blasting events from the existing quarry data exceeded or even approached the 12 mm/s criteria.

Although people exhibit a wide variation of tolerance to vibration within residential properties, vibration magnitude of greater than 6 mm/s is potentially perceptible to the majority of people under certain conditions. The potential for nuisance is increased further when this vibration magnitude is accompanied by an associated air overpressure as has been discussed in the previous section.

Based on the results of the vibration monitoring for the existing quarry, it has been demonstrated that vibration levels measured both on and offsite were below the magnitude of that which is typically perceptible.

Predictions of blasting vibration magnitude at distance are generally not undertaken due to the significant level of uncertainty inherent in the calculations. However, based on the similar (or greater) proximity of the distance between the nearest noise sensitive receptors and the quarry existing and future expansion blasting areas, it is reasonable to conclude that vibration magnitudes generated by blasting in the future expansion areas would be similar or less than the measured levels in Table 10-15 and therefore within the acceptability range.

They would therefore be within the established criteria and thus would only be expected to give rise to slight to moderate negative impacts of momentary duration (given the audibility associated with them).

General Quarry Activity Vibration

Similar to the Construction Phase, the potential for vibration at neighbouring sensitive locations during the Operational Phase will again be limited to lorry movements on uneven road surfaces. Considering the significant distance between the haulage area and the use on surrounding roads, there is little potential for structural or even cosmetic damage to existing nearby dwellings and any ground borne vibration should be well below threshold limits.

Any potential vibration impact is therefore expected to be imperceptible over the long term at all adjacent receptors during the Operational Phase.

10.5.4 Decommissioning & Remediation Phase

The Decommissioning & Restoration Phase of the proposed development will not include reinstatement of previous ground levels, with the quarry void to be left open.

There will therefore be no noise and vibration impact once the Operation Phase has been completed.

10.5.5 Cumulative Impacts

The cumulative effects for each phase are detailed in their respective sections (10.5.1 - 10.5.4).

10.5.6 Summary

The proposed development is not expected to have a significant noise or vibration impact on any of the nearby noise sensitive locations during any phase of the development. Although noise emissions will likely be occasionally perceptible at the nearest dwellings to the west and south during all phases (especially during blasting activities), the predicted levels for the worst case condition are all compliant with the established criteria and consistent with or below the ambient noise levels at each of the nearest noise sensitive receptors.

Table 10-16 below summarises the identified likely significant effects during the development phase of the proposed development before mitigation measures are applied.

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Soil Stripping	Negative	Not Significant	Local	Likely	Brief	Direct
Berm Construction	Negative	Not Significant	Local	Likely	Brief	Direct

Table 10.16 Summary of Construction Phase Likely Effects in the Absence of Mitigation

Table 10-17 below summarises the identified likely significant effects during the operational phase of the proposed development before mitigation measures are applied.

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
General Quarry Activities	Negative	Not Significant	Local	Likely	Long Term	Cumulative
Boring / Drilling	Negative	Not Significant	Local	Likely	Long Term	Direct
Blasting	Negative	Slight to Moderate	Local	Likely	Momentary	Direct

Table 10.17 Summary of Operational Phase Likely Effects in the Absence of Mitigation

Table 10-18 below summarises the identified likely significant effects during the decommissioning and remediation phase of the proposed development before mitigation measures are applied.

Likely Significant Effect	Quality	Significance	Extent	Probability	Duration	Type
Decommissioning & Restoration Phase Activities	Neutral	Not Significant	None	None	N/A	None

Table 10.18 Summary of Decommissioning & Restoration Phase Likely Effects in the Absence of Mitigation

10.6 Mitigation and Monitoring Measures

10.6.1 Construction Phase

Given the site layout itself and its surrounding topography, the location of the future expansion areas provide a significant degree of natural acoustic screening to the nearest noise sensitive receptors. And although no specific mitigation measures were deemed to be required from the findings of this assessment, the quarry will still be obliged to give due regard to *BS 5228*, which offers detailed guidance on the control of noise from site activities.

In particular, it is proposed that various practices be adopted, including the following:

- ✓ Limiting Development Phase activity hours to within daytime periods only (in line with the previous operating hours of the existing quarry).
- ✓ Establishing channels of communication between the quarry, local authority and local residents.
- ✓ Appointing a site representative responsible for matters relating to noise.
- ✓ Ensuring all site access roads are kept as even as possible so as to mitigate the potential for vibration from dumper movements.
- ✓ Ensuring all site roads within the site have as low a gradient as possible.
- ✓ Carrying out berm construction to perimeter pit areas to provide additional acoustic screening for the nearby noise sensitive receptors during the Operational Phase.

10.6.2 Operational Phase

Although no specific mitigation measures were deemed to be required in respect of Operational Phase activities, the following measures should still be provided in order to maintain good neighbourly relations with all the nearest noise sensitive receptors.

10.6.2.1 Selection / Maintenance of Quarry Process Equipment

The following management mitigation measures should be employed to ensure that noise emissions from the quarry's processing equipment (e.g. tracked excavators, loaders, dumpers, crushers, screening plant, etc) are minimised as far practicable going forward.

- ✓ All processing vehicles and equipment shall be regularly serviced and maintained to ensure that any potential excessive noise generated by worn components is minimised.

- ✓ All machinery and vehicles shall be fitted with effective silencers of a type appropriate to the specification and at all times the best available technology shall be employed to prevent or counteract defects of noise emitted by vehicles, plant equipment or otherwise arising from site activities.
- ✓ Any new or replacement equipment shall be selected so that all noise emissions from site do not exceed the noise limits outlined in this chapter.

10.6.2.2 Screening

Significant acoustic screening will naturally be provided by the working quarry pit itself. The operational areas will therefore not have a direct line of sight with any of the nearby noise sensitive receptors.

Additional acoustic screening will also be constructed at the Construction Phase through the erection of perimeter boundary berm constructions around the perimeter of the working pit.

10.6.2.3 Blasting Mitigation

Recommended measures for the control of noise and vibration impact from blasting are as follows:

- ✓ Taking particular care with the development of faces and with trial blasts, as anomalous vibration levels might be produced when there is no free face to relieve the energy;
- ✓ Ensuring appropriate burden to avoid over or under confinement of the charge;
- ✓ Accurate setting out and drilling;
- ✓ Appropriate charging;
- ✓ Appropriate stemming w/ appropriate material such as sized gravel or stone chippings;
- ✓ Using delay detonation to ensure smaller maximum instantaneous charges (mics);
- ✓ Using decked charges and in-hole delays;
- ✓ Blast monitoring to enable adjustment of subsequent charges;
- ✓ Designing each blast to maximize its efficiency and reduce the transmission of vibration;
- ✓ Avoiding the use of exposed detonating cord on the surface in order to minimize air overpressure - if detonating cord is to be used in those cases where down-the-hole initiation techniques are not possible, it should be covered with a reasonable thickness of selected overburden.
- ✓ Vibration monitoring should be carried out in the vicinity of the nearest noise sensitive receptors during the initial blasting period to confirm the findings of this assessment and ensure that vibration from blasting events is within acceptable thresholds.

10.6.2.4 Liaison with the Public

In order to maintain good relations with the residents of the adjacent dwellings, a dedicated Noise Liaison Officer should be appointed for the quarry to ensure that potential noise disturbance at the nearby noise sensitive receptors is minimised.

The appointed Noise Liaison Officer shall ensure that all equipment operators have been briefed and understand the requirements of the site. It will be the Noise Liaison Officer's responsibility to ensure that drivers are adhering to the requirements of site practice.

10.6.2.5 Hours of Work

The proposed hours of operation for the pit (including all extraction and processing) shall be limited to those being proposed as follows:

- Loading of vehicles between 07:00 to 23:00hrs (Monday to Friday).
- Crushing or washing from 08:00 to 16:00hrs (Monday to Friday), with occasional Saturday hours of 07:30 to 14:30hrs.
- Blasting operations should be restricted to 10:00 to 16:00hrs.

All of these hours are within standard daytime period ranges. The quarry should not operate on Sundays or Bank Holidays except in emergency circumstances or unless otherwise agreed with the Planning Authority. Restriction of operating hours to these hours will be relatively consistent with those when the existing quarry was in operation.

10.6.2.6 Noise Monitoring

No noise monitoring is currently conditioned for the existing quarry. Given that pit operations for the future expansion areas are expected to be similar to or less than the existing quarry areas and that noise emissions are also not expected to increase significantly or exceed established best practice guidance criteria, no additional noise monitoring would be deemed as being required in this instance.

10.6.2.7 Additional Vehicular Traffic on Surrounding Roads

The proposed traffic movements for the proposed expansion areas are below the DMRB guidance daily traffic flow thresholds for affected roads and therefore considered to be not significant. No mitigation measures would therefore be required in this instance.

10.6.3 Decommissioning & Restoration Phase

There is no mitigation measures required for the Decommissioning & Restoration Phase of the proposed development.

10.6.4 Vibration Monitoring

Vibration monitoring should be carried out in the vicinity of the nearest noise sensitive receptors during the initial blasting period to confirm the findings of this assessment and ensure that vibration from blasting events is within acceptable thresholds.

10.7 Risk of Major Accidents and Disasters

The results of this assessment indicate that there are no risk of major accidents or disasters due to noise and vibration emissions from the future quarry expansion areas.

10.8 Residual Impacts

This section assesses potential significant environmental impacts which remain after mitigation measures are implemented.

10.8.1 Construction Phase

No significant residual noise or vibration impact from the Construction Phase is expected at any of the noise sensitive locations in the vicinity of the development.

10.8.2 Operational Phase

The application of the practicable noise control mitigation measures listed Section 10.6 and daytime period hours of working will ensure that the noise and vibration emission associated with the proposed development Operational Phase is both within the criteria limits established in this report and minimised as far as practicable.

No significant residual noise or vibration impact from the Operational Phase is expected at any of the noise sensitive locations in the vicinity of the development.

10.8.3 Decommissioning & Restoration Phase

No significant residual noise or vibration impact from the Decommissioning & Restoration Phase is expected at any of the noise sensitive locations in the vicinity of the development.

10.9 Conclusion

The conclusion of this noise and vibration assessment are that no significant noise or vibration impact from the proposed development is expected to occur from the future expansion areas and / or the existing and future expansion areas at any of the noise sensitive locations in the vicinity.

10.10 References

The following documents were referenced during the course of the assessment:

- EPA Guidelines "Guidelines on the information to be Contained in Environmental Impact Assessment Reports (May 2022).
- European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018Environmental Noise Regulations (2006).
- The Design Manual for Roads and Bridges (DMRB)
- ISO 1996-2: 2017: Acoustics - Description, measurement and assessment of environmental noise
- Guidelines for the Treatment of Noise and Vibration in National Road Schemes (NRA).
- British Standard, BS 8233 (2014): Guidance on Sound Insulation and Noise Reduction for Buildings.
- British Standard BS 5228-1:2009+A1 Code of practice for noise and vibration control on construction and open sites - Part 1: Noise.
- British Standard, BS 5228-2: 2009: Code of practice for noise and vibration control on
- construction and open sites - Vibration.
- British Standard, BS 7385: 1993: Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration.
- Environmental Protection Agency (2002) Guidelines on Information to be contained in Environmental Impact Statements.
- Institute of Acoustics / Institute of Environmental Management and Assessment (2002) The Draft Guidelines for Noise Impact Assessment.
- Office of Environmental Enforcement (2003) Advice Note on Current Practice (in the preparation of Environmental Impact Assessments).
- Environmental Management in the Extractive Industry (Non-Scheduled Minerals), EPA 2006;

- Quarries and Ancillary Activities – Guidelines for Planning Authorities – DoEHLG, April 2004;
- Planning and Development Act 2024

Murray Brothers Tarmacadam Ltd

CHAPTER 11
LANDSCAPE AND VISUAL IMPACT

VOLUME II
MAIN STATEMENT

APRIL 2026

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11 Landscape and Visual Impact

11.1 Introduction

This chapter of the EIAR provides an assessment of the landscape and visual impact associated with the proposed future quarrying at Ardcahan Quarry. The Ardcahan Quarry landholding has a total area of approx. 25 hectares. The EIAR is to provide a detailed assessment of the construction phase (extension of extraction area and associated works e.g. provision of settlement ponds etc) of the future development, as well as the operational phase (i.e. crushing, grading and washing aggregates etc) and decommissioning phase.

This 37L application relates to lands as indicated in the EIAR site boundary as detailed in Chapter 1 of the EIAR.

The assessment of potential landscape effects considers the sensitivity of the landscape resource and the magnitude of landscape change, which resulted from this development. The acceptability of a development is determined by the extent to which the long-term landscape and visual effects are significant. Understanding the character, quality and value of the landscape prior to the existence of the development determines the sensitivity of that landscape to accommodate change that would have occurred through development.

By employing these criteria, the potential significant impacts (prior to mitigation measures) are considered to occur where highly sensitive landscape and visual receptors occur with high order landscape and visual effects.

11.1.1 Author Information and Competency

Cathal O'Meara Landscape Architects were commissioned to conduct the Landscape and Visual Impact Assessment of the site and its environs. Cathal O'Meara undertook this Assessment. Cathal has studied, taught and practiced Landscape Architecture at a Masters level for 18 years, is a Chartered Landscape Architect and Member of the Irish Landscape Institute. Cathal has recently written Landscape and Visual Impact Assessments for the 10-storey student development on the site of the former Bottle works factory on the Carrigrohane Road as well as for the redevelopment of the Square Deal site on Washington Street, Cork. Prior to establishing Cathal O'Meara Landscape Architects in 2010 Cathal worked as a landscape consultant in Saudi Arabia, Dubai, Guatemala, Norway and the UK. Cathal also holds a graduate Degree in Industrial Design where he was awarded a first-Class honour from the National College of Art and Design.

11.1.2 Guidelines & Legislation Relevant to Discipline

This Assessment methodology follows best practice advisory guidelines set out in the following guidance documents

- Guidelines for landscape & Visual Impact Assessment" 3rd Edition, published by the Landscape Institute (UK), - (2013).
- Guidelines on the information to be contained in Environmental Impact Assessment Reports (EPA 2022) and the
- Draft Advice Notes for preparing Environmental Impact Statements (EPA, 2015)
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (August 2018)

This assessment has regard to related legislation, planning policies and Guidance, specifically;

- The European Landscape Convention
- The National Landscape Strategy for Ireland 2015-2025
- Cork County Draft Landscape Character Assessment (2007)
- Cork County Development Plan 2022-2028

11.1.3 Methodology

This methodology includes a desktop analysis of the existing landscape area, including specific designations and land use patterns. Site visits were undertaken to assess the impact of the historical development on the surrounding landscape and to assess likely visibility and consequent visual impact of the development. Cathal O'Meara undertook these visits of the site and from the roads in the vicinity in May 2020 and April 2025. The conditions were clear with good visibility. This report includes photographs taken with a Nikon D-3300 SLR camera with a Nikkor 18-105mm lens. Photographs were taken at a variety of lens settings including a setting of 32 mm (equivalent to 50 mm on a standard 35 mm camera) to approximate normal human eyesight relative to scale. Additional landscape photography includes photos with a wide angle to represent panoramic views, which were then digitally stitched together in Adobe Photoshop CS.

The following maps were included as part of the desktop review and were also used as field references.

- 1:50,000 OSI Discovery Series (Maps 85, 86)
- A digital OSI Map was also used

In order to classify the significance of effects/impacts of the development the "Guidelines on information to be contained in Environmental Impact Assessment Reports (EPA, 2022)" was used, specifically Figure 10.2, included below.

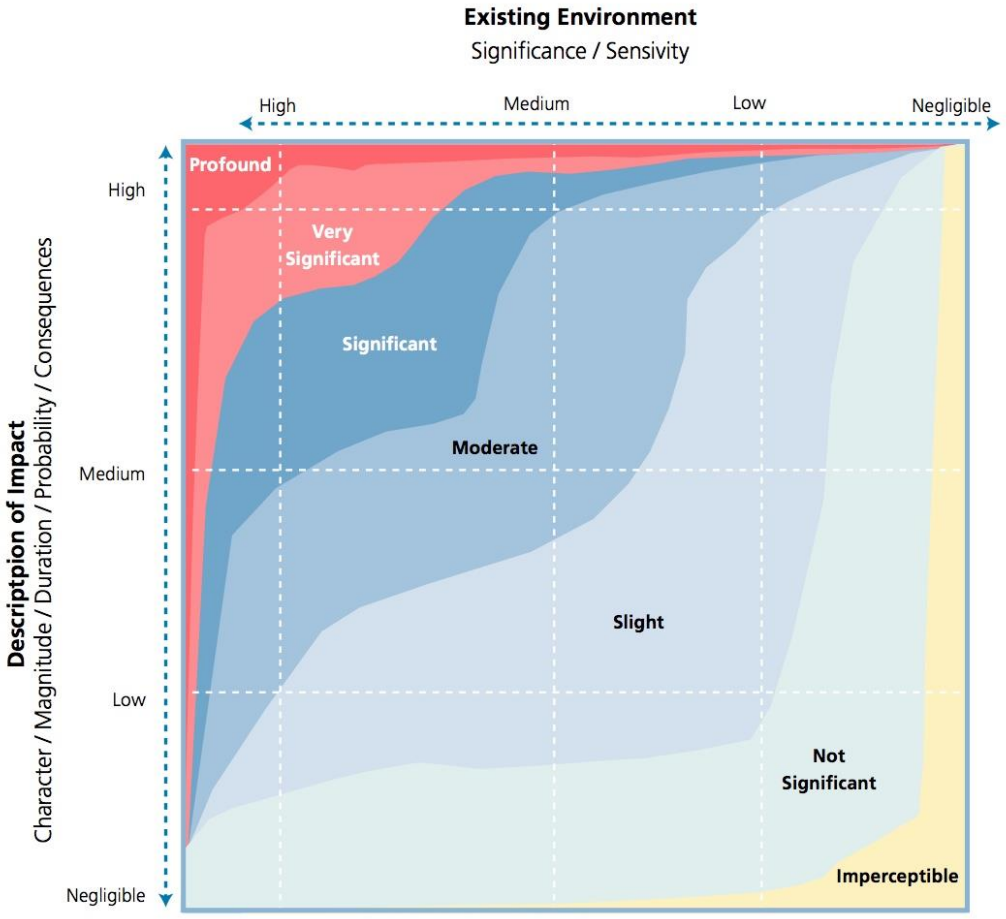


Figure 11.1 Classification Of Significance Of Effects (Impacts), EPA, 2022

The EPA has defined the impacts concerned with the likely and probable impacts of the development. These principal headings are outlined below as well as a description of each. This classification system as well as the descriptions used provides the basis for the assessment of the viewpoint receptors, which follows.

The relevance of defining the effect (impact) is to inform the non-specialist whether an effect is positive, neutral or negative.

Table 11.1 Classification The type Of Landscape Impact (Effects), EPA, 2017

Quality of Effects	Criteria
Positive Effects	Change which improves the quality of the environment
Neutral Effects	Change that does not effect the quality of the environment
Negative Effects	Change which reduces the quality of the environment

In order to provide a systematic means of classifying the significance of the effects the table below outlines how visual receptors can be effected in terms of proximity, orientation and landscape context.

Table 11.2 Classification Of the Landscape Significance Criteria, EPA, 2017

Significance of the Effects	Criteria
Imperceptible	An effect capable of measurement but without significant consequences.
Not significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends
Significant	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment
Profound	An effect which obliterates sensitive characteristics

Impacts are also assessed at different stages of the project.

Table 11.3 Classification Of the Duration of Landscape Impact, EPA, 2017

Duration of the Effects	Criteria
Momentary Effects	Effects lasting from seconds to minutes
Brief Effects	Effects lasting less than a day
Temporary Effects	Effects lasting less than a year
Short-term Effects	Effects lasting one to seven years.
Medium-term Effects	Effects lasting seven to fifteen years.
Long-term Effects	Effects lasting fifteen to sixty years.
Permanent Effects	Effects lasting over sixty years
Reversible Effects	Effects that can be undone, for example through remediation or restoration
Frequency of Effects	Once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annual

11.1.4 Difficulties Encountered in Compiling Information

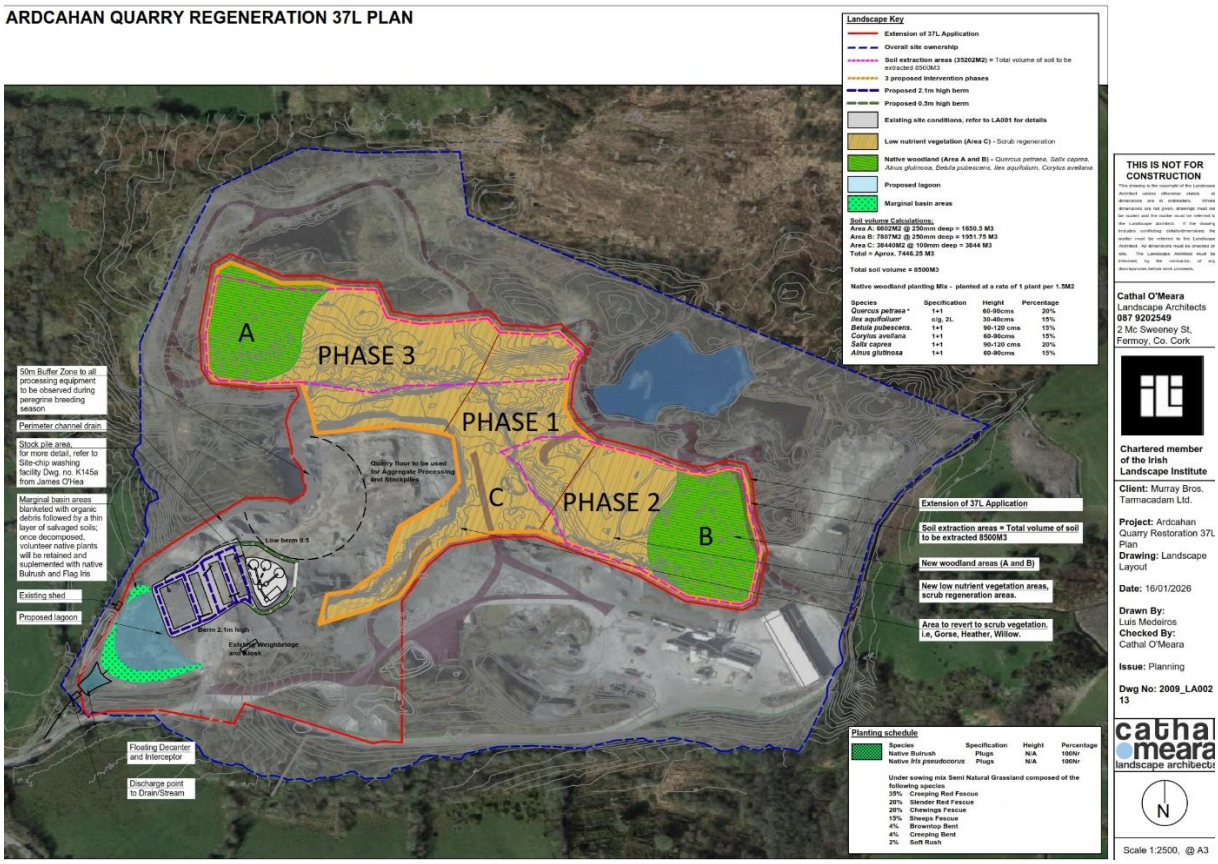
As is the case in many rural locations it was not possible to gain unfettered access to private sites/dwellings within the study area. In order to carry out visibility analysis, a proximate setting or receptor location has in these instances been used.

11.2 Proposed Development

The proposed development is for the extension of the existing quarry and extraction area. It is estimated that the proposed total extraction area would be in the region of approximately 5-6ha over 3 phases as follows and as indicated in figure 3 below

- Phase 1=1.8ha
- Phase 2=1.6ha
- Phase 3=2.1ha

Figure 11.2 Diagram of Phasing and Regeneration Plan proposed as part of 37L application



It is intended that the new extraction areas would be brought down to or close to the level of the existing quarry floor level at 75m OS datum (subject to groundwater and other surveys/site investigation works). An initial calculation of the potential volumes of rock to be extracted (using 2014 survey data, and assuming an average depth of20-25m) is in the region of approximately 1,500,000m3 (c.4-5 million tons). This would equate 20–-year timeframe.

The proposed development will use the existing entrance and access roads on site but is likely to include the provision of a new bored well, pump house and septic tank/wastewater treatment system as well as a new weigh bridge. The office, canteen and WC will be located off the roadway to the tarmac plant on the quarry floor as shown. A bunded fuel store will also be required in this area. A more detailed description of the proposed works is given in Chapter three.

11.2.1 Lagoon, Silt Pond, and Washing Facility

The proposed site layout will need to make provision for a clean water lagoon(s), located on the quarry floor. This may involve blasting to form a lake. The whole site would drain into this lagoon(s)and so would require a controlled overflow for times of heavy rainfall. This would require a new discharge point to the Caha Stream and will require monitoring as well as possible discharge license. It is intended that the clean water lagoon will be constructed under Phase 1/2 of the development as under Phases 2 and 3 some of the existing lagoons may need to be removed. The silt ponds and adjoining washing facility will also need to be designed on the proposed site layout plan for taking the silt from washing chips and dust. The water would in turn drain from the ponds to the clean water lagoon. The area of stockpiling will be located on the main quarry floor and denoted on the site layout.

11.2.2 Quarrying and Machinery

It is intended that the quarried material will be extracted variously by boring and blasting through the use of industrial explosives. It is anticipated that boring or drilling would generally occur 1 week prior to blasting and that blasting would be required up to 12 no. times per year (up to once a month), depending on stocks and commercial environment. The blasting would be undertaken by a specialised company under Garda escort. The rock would then be crushed and screened on the quarry floor, before being stored in stockpiles and storage bays on site. It is intended to primary crush & secondary crush at the face of the blast and then to rinse and waste dust at the washing plant location.

11.3 Description of Existing Environment

The applicant site is located 3.5km northeast of Dunmanway, in West Cork Co, approximately 300 meters east of the regional road the R587. Dunmanway serves as the local population centre with smaller villages dispersed within the wider area.

Quarrying operations at the existing quarry site commenced prior to 1964. The quarry was formerly owned by Cork County Council, who leased the site to Mid Cork Quarries before transferring operations to Murray brothers in 1999.

The site is located in a rural setting characterised by undulating topography, irregularly shaped fields and clusters of mixed woodland. The land immediately around the quarry consists of scrub, woodland and agricultural grassland. Land uses in the surrounding area primarily comprise livestock farming and rural housing.

The nearest dwellings to the quarry site are located approximately 300m south; 275m west; 450m north and 400m east of the site. There are no commercial premises or community facilities in the immediate environs.

The junction of the Caha and Bandon Rivers is located approximately 400m west of the site. A small watercourse that flows into the Bandon River extends along the eastern and southern boundaries of the landholding.

11.3.1 Baseline scenario

As described in the Introduction, the Landscape Assessment attempts to measure the sensitivity of specific landscape resources and describe the significance of changes to that resource occurring as a result of the development.

11.3.2 Landscape Characteristics

The Cork County Draft Landscape Strategy notes the presence of coniferous commercial forestry in the vicinity and views from the site confirm this. This land use is seen as temporal, with evidence of extensive felling noted in the Landscape Strategy. This contributes to a less static landscape quality compared with equivalent rural environs. Much of this coniferous tree cover is evident from aerial photos from 1995.

The Draft Landscape Strategy also identifies the site as being located a “middle ground landscape comprising of rolling topography with rugged rocky ridges” (classification no. 12b). It has the subcategorisation of “Shanlaragh: Middle Valley of Rugged Moorland and Patchwork Moraines”. Shallow river basins; low hills and rocky ridges define this terrain. The vegetation is characterised by

irregular, patchy pastureland, moorland scrub and small clusters of trees, exhibiting a mottled colour and texture in the landscape.

There is one SAC within this landscape type "The Bandon River SAC". This is south of the site adjacent to the Bandon River and is described as an "important example of alluvial wet woodland, a rare and important habitat". Given proximity to the site, intervening terrain and the low laying elevation of the Scenic Landscape zone, visual connectivity to the site would appear unlikely.

Scenic Routes S30 and S31 are located approximately 3km southwest and southeast of the site respectively. But, as a result of intervening "rolling topography", visual connectivity to the site would also appear unlikely.

The site is located east of the Bandon and Caha Rivers. These rivers are identified as "The Bandon River SAC" and are listed as A Special Area of Conservation (SAC-2171). As a result of the river basin, the surrounding environs have a greater degree of deciduous tree planting than the landscape classification description would suggest.

The Ordnance Survey Discovery Series map indicates a scattering of ring forts to hilltops 1km east of the site and an Ogham Stone 2km north of the site. These features are on private lands. No other monuments or structures of significance are identified.

A notable local landscape feature is the conical, tree-less rocky peak of Mount Gunnery (known locally as Yew Tree Hill, but referred to as the former Mount Gunnery, as this is the name still identified on Ordnance Survey maps). The conical hill of Mount Gunnery is located approximately 2km from the subject site. Given its elevated position, views of several wind farms are afforded from these vantages points including, Milane Hill, Currabwee, Kilvinane, Killaveengoe, and Coomatallin.

To the east and north, the terrain rises sharply to peaks and ridgelines. This terrain prevents long-range site visibility from the north and east, while also providing a backdrop for views from the west and south. Located along these ridgelines are a number of residential houses having views of the site.

Further afield (10-30km), the peaks of the Sheehy Mountains and Milane Hill are visible in the distance.

Within the context of the current (Draft) Landscape Strategy the site is situated in a landscape classified as having a Medium Value landscape. Medium value landscapes are those "with positive characters and with local or county importance.

Table 11.4 Location of Ardcahan Quarry as Per The Draft Cork Landscape Strategy

Landscape Character Types	Low - High
Low Value	
Medium Value	Ardcahan Quarry
High Value	
Very High Value	

11.3.2.1 Landscape Character Sensitivity

Similarly, the Landscape Character Sensitivity is classified as being of Medium Value. Medium sensitivity landscapes can accommodate development pressure, but with limitations in the scale and magnitude of the development. In this rank of sensitivity, the landscape can accept some changes while others are more vulnerable to change. If pressure exceeds the landscapes limitation the character of the landscape may change.

Table 11.5 Landscape Character Sensitivity of Ardcahan Quarry as Per the Draft Cork Landscape Strategy

Landscape Character Sensitivity	Low - High
Low Value	
Medium Value	Ardcahan Quarry
High Value	
Very High Value	

The baseline assessment with respect to the Landscape Character Importance, describes the wider context of the site as being locally important.

11.3.2.2 Magnitude of Landscape Change

The magnitude of landscape change is a crucial measurement to assess the degree to which change is perceived. Whereas the magnitude or degree of landscape change is a determination based on the influence of the proposed development on the landscape; the magnitude of visual change is a more subjective determination based on proximity, orientation and landscape context.

11.4 Landscape and Visual Impact Assessment

11.4.1 Landscape Impacts

The expansion of the existing quarry will alter the landscape of the local area and especially specific elements of the landscape itself. However, changes to the landscape elements or fabric such as the removal of woodland fragments and the expansion of the quarry, while representing significant changes to the individual elements do not necessarily represent significant changes to the wider landscape character.

A significant amount of screening woodland to the site peripheries in the south, southwest and west have been completed and will be retained.

In the south and southwest these woodlands have been planted on top of raised earthen berms, which has the effect of increasing the height of the vegetation screen, thereby reducing landscape level impacts.



Figure 11.3 Showing southern berm (left) and southwestern berm (right)

11.4.2 Sensitivity of the Landscape Resource

The quarry is situated in a landscape classified as having a **Medium Value Landscape Character as well as a Medium Value Landscape Sensitivity**. Medium value landscapes are those "with positive characters and with local or county importance.

11.4.3 Magnitude of Landscape Change

At the scale of the wider landscape the change in character will be noticeable from some viewpoints only where the existing screening woodland and scrub vegetation will be felled and the quarry void or exposed rockfaces may be seen. From these viewpoints chiefly to the couth of the quarry some stockpiles, quarry tracks and or topsoil and storage berms are likely to be visible. These changes to the landscape character are not considered to be as pronounced as changes to the landscape fabric, as the quarry is largely screened from view from the wider landscape. **The level of landscape change is considered to be Medium.**

11.4.4 Significance of Effect

At the wider landscape scale (within 5km) the significance of effect that is anticipated is considered as **Moderate-Slight**. The changes to the topography as a result of quarrying are visible in the wider landscape from certain viewpoints only, primarily to the south and west with most other views remaining unchanged.

In order to determine the visual effects on views and visual amenity nine viewpoints were identified to represent key visual receptors in the receiving environment. These are based on the analysis of the receiving environment.

11.5 Zone of Visual Influence and Visual Receptors

The zone of visual influence is the extent of visibility of the site from the landscape and is defined further by topography and built structures. Due to screening and local topography adjacent to the rivers Bandon and Caha as well as the presence of ridgelines to the east and south and the local peak of Mount Gunnery the number and spread of potential visual receptors is limited to lands principally to the south and immediately west of the site. Elevated views of the site exist from Mount Gunnery and are also included.

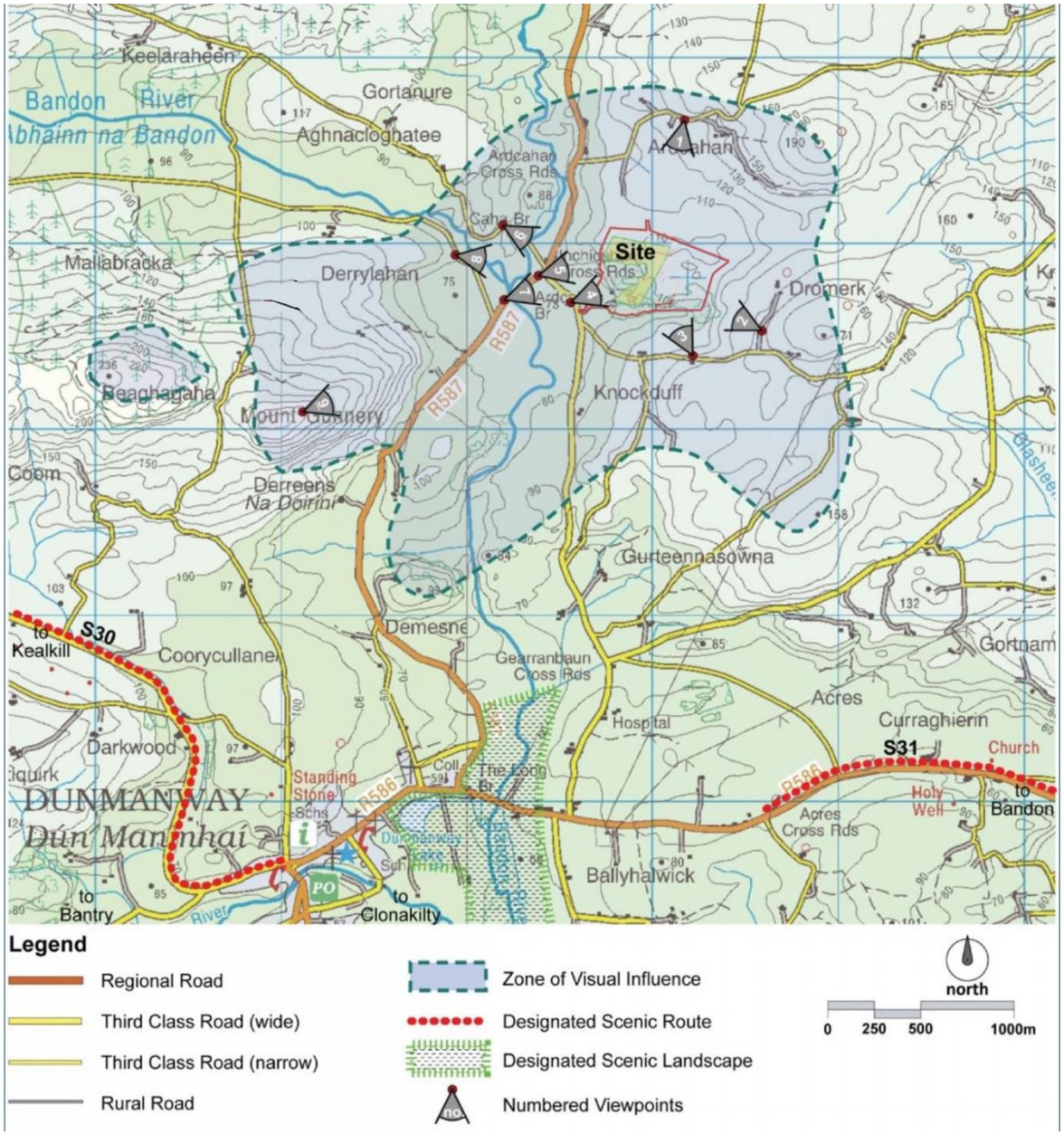


Figure 11.4 ***Location of Viewpoint receptors***

Viewpoint 1

View from Ardcahan on the L8664 looking south

Existing View
This view is approximately 600m from the subject site and is taken from a local road that serves a cluster of dwellings/farmsteads. Despite the proximity to the site and the gentle sloping intervening landscape, the existing hedgerows provide effective screening into the site. It is possible however, that occasional views towards storage of overburden and machinery on the tops of the slopes will be occasionally visible.



Figure 11.5 Viewpoint 1, From Ardcahan on the L8664 Looking South

Visual Receptor Sensitivity
Visual Receptor Sensitivity is considered to be Medium. The view is a pleasant rural view but is not considered of highly scenic value

Magnitude of Change
The magnitude of change from the proposed quarry expansion to the north is unlikely to be evident from this view as that aspect of the quarry faces to be exposed will be concealed by the existing raised ground. **The magnitude of change is considered to be Low.**

Significance of Effect
Visual impact from this location has been Slight, Neutral.

Viewpoint 2
View from Dromerk on local laneway/cul de sac looking west.

Existing View
This view represents an elevated aspect approximately 800 meters from the subject site. The contextual landscape is defined by a series of undulating drumlins and a mosaic of landscape features.

These features are dominated in the middle ground by a large drumlin, scrub vegetation and existing screening vegetation in the southeast corner of the quarry, which is restricting views. This long-established woodland vegetation is diluting the impact of the excavated rock faces and quarry floor which are still clearly visible and indicated by their monotonous grey colour. A portion of the roof of the tarmacadam plant is also visible. Long distance views of exposed hillsides and mountain ridges contain the views.



Figure 11.6 Viewpoint 2, From Dromerk On Local Laneway/Cul De Sac Looking West.

Visual Receptor Sensitivity
The visual receptor sensitivity is considered to be Medium. It is adjacent to a residence and the view is a pleasant expansive local view.

Magnitude of Change
The magnitude of change which will be evident from this view includes the expansion of the quarry to the north. While the quarry void is currently evident, the expansion will increase this exposed aspect. This will have the effect of increasing the extent of visible quarry faces. **The magnitude of change is considered to be Medium.**

Significance of Effect
Rock faces that were previously excavated have since mottled and their level of exposure has decreased with time. The anticipated impact from the proposed quarrying will represent a **Moderate and Negative effect over time tending to Slight and Neutral** as scrub vegetation and the proposed new woodland areas develop and the exposed rock faces and quarry floor mottle in colour.

Viewpoint 3
View from Knockduff, looking northwest. This view is approximately 280m from the subject site

Existing View

This viewpoint is in an elevated position and represents a series of single dwellings. It is defined in the foreground by mixed species hedgerows and fences with occasional taller trees. The middle ground, which contains a partial view of the quarry is characterised by a mottled hue of long-established woodland vegetation. Longer distance views contain plantation forestry and give way to elevated peaks. Within this view the visual impact of the former quarrying activity is evident in the upper strata of exposed rock faces facing the receptor and having the greatest visual impact. Given the height of the Tarmacadam plant, a small portion of the structure is evident, however the existing woodland within the site is achieving an effective visual barrier and restricting views significantly.



Figure 11.7 Viewpoint 3, From Knockduff, Looking Northwest.

Visual Receptor Sensitivity

The visual receptor sensitivity is considered to be Medium. It is adjacent to residences and the view is a pleasant long distant view of rocky mountain ridges.

Magnitude of Change

The magnitude of change anticipated from this view includes the expansion of the quarry to the north. From this receptor this will increase the visible the extent of exposed quarry faces. Also, the proposed operations will prevent the mottling of pre-exposed rock faces, leaving sharper colours of recently exposed rock visible. There will also be a removal of scrub vegetation, currently growing above the exposed quarry faces. It is unlikely that the extended quarry floor will be visible from this location. **The magnitude of change is considered to be Medium.**

Significance of Effect

Rock faces that were previously excavated represent the most dominant aspect of this viewpoint. With the passage of time these quarry faces have muted in colour. However, with the proposed expansion to the quarrying activity there will be increased exposure of newly quarried rock faces.

Visual impact from this location will be Moderate and Negative over time tending to Moderate, Neutral as native woodland vegetation (principally at area B in the landscape plan) in the eastern corner of the site develops.

Viewpoint 4
View from L461 at site entry, looking northeast. This view is approximately 115m from the subject site

Existing View
This viewpoint is from a local road and as the viewpoint represents a transitory location on the L461, views tend to be filtered through the existing vegetation at an oblique angle. Scrub willow in the foreground provides effective screening to the entrance. This is in addition to the dense screening vegetation within the site. The extraction area is not visible due to the presence of existing screening vegetation on raised berms within the site.



Figure 11.8 Viewpoint 4, From L461 At Site Entry, Looking Northeast.

Visual Receptor Sensitivity
The visual receptor sensitivity is considered to be Medium. It represents a transitory receptor, commonly viewed from an oblique angle while passing the site.

Magnitude of Change
The proposed change includes the expansion of the quarry to the north. However, this expansion is unlikely to be evident from this receptor due to the presence of intervening screening vegetation which will mitigate the visual impact. **The magnitude of change is considered to be Low-neglibile.**

Significance of Effect

Visual impact from this location is anticipated to be Slight-Not Significant and Neutral.

Viewpoint 5
View from R587 at Inchicuhan Cross, looking east. This view is approximately 345m from the subject site

Existing View
This viewpoint represents a transitory receptor – the R587. The subject site is only partially visible at an oblique angle as one travels north. Vegetation including hedgerows and isolated trees limit views significantly. Inchicuhan Cross on the R587 allows partial visibility to the site. However, owing to the lower elevation of the cross and the existing hedgerow vegetation, visibility is limited. Despite this proximity the lower elevation of the junction has limited views into the site due to intervening vegetation.



Figure 11.9 Viewpoint 5, From R587 At Inchicuhan Cross, Looking East.

Visual Receptor Sensitivity
The visual receptor sensitivity is considered to be Medium. It represents a transitory receptor and the view is at an oblique angle.

Magnitude of Change
Views in the direction of the site are screened by the topography and intervening vegetation. The magnitude of change due to the proposed expansion to the existing quarry is considered to be low from this receptor. **Magnitude of change is considered to be Low**

Significance of Effect
Visual impact from this location has been Slight and Neutral.

Viewpoint 6
View from the Caha Bridge, looking east. This view is approximately 620m from the subject site

Existing View
This viewpoint is from a local road crossing the Caha bridge. The receptor location is at a low elevation and views to the subject site are limited owing to the existing riverside vegetation. Additional layers of screening vegetation also exist such as hedgerows and more mature tree cover.



Figure 11.10, Viewpoint 6, From The Caha Bridge, Looking East.

Visual Receptor Sensitivity
Views are currently experienced by road users walking or driving slowing on these country roads
The view is a pleasant rural view with a scenic local element, the Caha Bridge. **The visual receptor sensitivity is considered to be Medium**

Magnitude of Change
Views in the direction of the site are limited by the topography and intervening vegetation. There is no visibility of the quarry development and no change. **Magnitude of change is considered to be Negligible**

Significance of Effect
Visual impact from this location has been Imperceptible.

Viewpoint7
View from the R587 at the Bandon River crossing, looking northeast, 200 meters southwest of viewpoint 5. This view is approximately 430m from the subject site

Existing View

This receptor represents a stationary position for northbound drivers as northbound traffic must give way to oncoming traffic at the bridge. As such, potential views would have been afforded to drivers as they wait at the bridge. The dense screening vegetation of the river banks and multiple layers of additional intervening vegetation restrict views of the subject site.



Figure 11.11, Viewpoint 7, From The R587 At The Bandon River Crossing, Looking Northeast, 200 Meters Southwest Of Viewpoint 5.

Visual Receptor Sensitivity

The visual receptor sensitivity is considered to be Medium. It represents a transitory receptor most commonly viewed from vehicles travelling the R587. Views into the subject site are at an oblique angle.

Magnitude of Change

Views in the direction of the site are screened by the topography and intervening vegetation. There is currently no visibility of the quarry development and no change. **Magnitude of change is considered to be Negligible**

Significance of Effect

Visual impact from this location will be Imperceptible.

Viewpoint 8

View from the L4615-27 adjacent to the Bandon River, looking east. This view is approximately 625m from the subject site

Existing View

This represents a cluster of houses adjacent to a local road the L4615-27. This road also accesses the proximate Birthplace of Sam Maguire. Multiple layers of vegetation including the wooden banks of the Bandon River and the rolling Drumlin landscape restrict views of the subject site.



Figure 11.12 Viewpoint 8, From The L4615-27 Adjacent To The Bandon River, Looking East.

Visual Receptor Sensitivity

The visual receptor sensitivity is considered to be Medium. It represents a local road as well as adjacent residences and the view is at a distance and not the object of focus. Although the view is pleasant it is not highly scenic.

Magnitude of Change

Views in the direction of the site are screened by the topography and intervening vegetation. **Magnitude of change is likely to be Negligible.**

Significance of Effect

Visual impact and landscape character impact from this location is deemed Imperceptible.

Viewpoint 9

View from the top of Mount Gunnery, looking northeast. 2 km from the subject site.

Existing View

The peak of Mount Gunnery is accessible via a car park and grotto on its western slopes. No views of the subject site are afforded from the car park or Grotto. The mountain peak however, offers wide sweeping views of the landscape in all directions. From this vantage, the rock faces of the quarry and the gravel basin provide a contrasting colour to the surrounding fields. Views of the quarry are contained in the foreground by the exposed bare rock of the top of Mount Gunnery. While this receptor has a higher degree of sensitivity than most other receptors the view afforded is of a local

anthropomorphic landscape consisting of elements of strong human habitation. Wind turbines, pockets of coniferous forestry, isolated dwellings and clusters of houses all add to this composition.



Figure 11.13 Viewpoint 10, From The Top Of Mount Gunnery, Looking Northeast.

Visual Receptor Sensitivity

The visual receptor sensitivity is considered to be High. This is a scenic panorama over the countryside and represents the reward of a short but steep way marked hike up a local Peak, Mount Gunnery.

Magnitude of Change

The proposed quarry expansion and the partial removal of woodland elements from above the rock faces (to be excavated), will increase views of the quarry floor and exposed quarry faces. From this receptor these elements will appear as an increase in the exposed rock currently visible within the centre of the visual frame. However, the exposed rock is not in itself an unusual element, and is already evident on Mount Gunnery. The scale of development also will not represent a significant magnitude of change given the distance from the selected receptor. **The magnitude of change is therefore considered Low**

Significance of Effect

The visual impact from this location is deemed been Moderate-Slight and Neutral.

11.5.1 Do Nothing Scenario

In the *Do-Nothing Scenario*, the site (which has been partially quarried) will remained in this quarried form and appear as a mottled scar in the landscape. Appearance and landscape character in the area would be slow to evolve. In 25-40 years, volunteer trees will have emerged, providing an additional

visual buffer layer from low-level views. Views at higher elevations and therefore some distance would generally remain somewhat unchanged. The grey colour of the exposed rock faces and basin floor would gradually mute in time and their hue would become more sympathetic with the surrounding landscape.

11.5.2 Construction Phase

This development relates to the construction of a quarry. As the Construction Phase and the Operation Phase concern the transportation of soil and materials these activities are similar in visual respects. Construction Phase impacts include:

- Excavation and removal of soils and vegetation and trees
- Construction of any internal roads
- Construction of settlement ponds
- Construction of berms

The above activities, while representing significant ecological impacts are unlikely to have significant landscape or visual impacts. This is principally due to the retention of existing screening vegetation and the form of the landscape where views are restricted owing to the undulating landscape character. Furthermore, the construction phase concerns activities that from a landscape and visual impact perspective are similar to the operation of the pre-existing quarry. Taking the above into consideration the impacts associated with the construction phase of the development are considered likely to have a **slight to moderate temporary negative impact** on landscape and visual resources

11.5.3 Operational Phase

The operational phase of the development will result in the use of the extraction area for quarrying aggregates. The proposed operation of the quarry will also add machinery, traffic, noise and dust to the landscape. However, these are temporary impacts and unlikely to change the character of the immediate area as quarrying activities have taken place at this location since the 1960's. Operation phase impacts include

- Blasting and drilling
- Crushing and screening
- Stockpiling or overburden
- Discharge of water to settlement pond
- Transportation to and from site

Taking the above into consideration the impacts associated with the operation phase of the development are considered likely to have a **slight to moderate negative impact** on landscape and visual resources.

11.5.4 Risk of Major Accidents

The results of this assessment indicate that there are no risk of major accidents or disasters due to landscape and visual impacts from the future quarry expansion areas.

11.5.5 Cumulative Impacts

Cumulative impact describes the "addition of many minor or significant effects" including both the applicant development and the wider context of surrounding lands to create "larger, more significant effects".

The current landscape of the wider site area contains limited industrial type activities. This landscape is impacted principally by agricultural and forestry activities with a dispersed settlement pattern of one-off housing also evident, however once the tarmacadam plant became operational (1999), a minor intensification of activities has occurred. This has impacted traffic on local roads as these impacts combine to contribute to a small-scale change which is continuing to occur.

The cumulative impact on the area has been **slight-Moderate and long-term** resulting in permanent alterations to the landscape.

No significant cumulative effects have occurred, are occurring or are reasonably expected to occur to the landscape and visual receptors.

11.5.6 Mitigation

Many of the exposed quarry faces are hidden from view owing to the angle of the receptors, the sunken nature of the quarry and the intervening vegetation. Screening vegetation as well as raised berms along the southern boundary and south-western boundaries should be retained undisturbed to restrict views from the nearby receptors Dromerk, Knockduff and at the L461 local road.

These berms and their associated planting were inspected as part of this report. Screen planting at these locations is developing well and needs to be retained to enable their screening function. These berms merge with the existing hedgerows and peripheral scrub vegetation lending a consistent naturalistic appearance when viewed from a distance.

An accompanying drawing (Regeneration Plan) is included with this 37L application. This plan aims to cultivate two native woodland pockets in the east and west of the quarried area. However the visual impact of these woodland pockets will be minor as they will be planted on a level consistent with the new quarry floor. In addition a seasonal lagoon is proposed in the south of the site and this is to be planted in its margins with native wetland plugs.

11.5.7 Monitoring

A designated person from the project management team will have overall responsibility for ensuring that all landscape and remediation operations are carried according to an agreed landscape and remediation plan.

11.6 Residual Impacts

The Residual Impacts are the final effects after all the measures have been implemented. These remaining "Environmental Effects" are those impacts that could not be reasonably avoided.

The development does not impact Scenic Routes, Protected Structures, areas of special designation or historical areas and has only a minor impact on culturally relevant areas.

In the event that permission for future works are not permitted, the site will be returned to biodiversity use as the remaining measures indicated in the substitute consent application are implemented.

These resultant landscape measures will represent a **Moderate-Slight** and on balance **Neutral Impact** on visibility and landscape character.

Given the history of quarrying on the site as well as the site suitability it is deemed that the works for which this substitute consent applies will not have a significant or profound residual landscape or visual impact.

11.7 Conclusion

The conclusion of this Landscape and Visual Impact assessment are that no significant landscape or visual impact from the proposed development is expected to occur from the future expansion areas and / or the existing and future expansion areas at any of the landscape and visually sensitive locations in the vicinity.

11.8 References

Guidelines for landscape & Visual Impact Assessment" 3rd Edition, published by the Landscape Institute (UK), - (2013).

Guidelines on the information to be contained in Environmental Impact Assessment Reports (EPA 2022)

Draft Advice Notes for preparing Environmental Impact Statements (EPA, 2015)

Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (August 2018)

The National Landscape Strategy for Ireland 2015-2025

Cork County Draft Landscape Character Assessment (2007)

Cork County Development Plan 2022-2028

Murray Brothers Tarmacadam Ltd

CHAPTER 12
TRAFFIC AND TRANSPORTATION

VOLUME II
MAIN STATEMENT

APRIL 2026

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12 Traffic and Transportation

12.1 Introduction

This Traffic & Transportation chapter assesses and evaluates the likely impact the proposed development will have on the existing roads network in the vicinity of the site, as well as identifying proposed mitigation measures to minimise such impacts.

12.1.1 Author Information and Competency

This chapter was prepared by Ken Manley BE CEng MIEI HDip Envm Eng FConsEI of MHL Consulting Engineers. Ken has been involved in the preparation of Traffic & Transportation Schemes for over 20 years and is fully competent in the use of traffic modelling software used as part of this assessment, namely Junctions 11: PICADY.

12.1.2 Reference to Guidelines Relevant to Discipline

The structure of this TTA is in accordance with TII Document, Traffic and Transport Assessment Guidelines, 2014 and is developed using data from independently commissioned traffic counts at the identified key junction/location, local data extracted from the 2022 National Census.

12.1.3 Methodology

The report adopts the guidance for such assessments set out by Transport Infrastructure Ireland (TII) in the document PE-PDV-02045 “Traffic and Transport Assessment Guidelines”.

The Traffic & Transport Assessment includes the following tasks:

- A review of the transport infrastructure in the vicinity of the development.
- Estimation of the trips generated from the proposed development in the AM and PM peak hours and the distribution onto the local roads network
- Estimation of the traffic growth rates and calculation of predicted future traffic volumes.
- Assessment of impacted junctions surrounding the proposed development.
- Proposed mitigation measures (if required) to help offset any impact the development may have.

The aim of this TTA is to identify the characteristics of the application site and surrounding area, examine the likely transport implications, ensure sustainable accessibility is maximised and appropriate infrastructure provided to accommodate the proposed development.

The key issues that need to be addressed within this TTA, with reference to the size and location of the development proposal, are as follows:

- Review of the site location, composition, and local roads network.
- Analysis of Road Safety data.
- A review of the relevant planning and transport policy.
- Forecast trip generation.
- The use of appropriate and agreed traffic modelling software for the assessment of individual junctions.
- Provide Without/With Development assessment for each of the critical junctions.
- Assess significance of development generated traffic upon the surrounding transport infrastructure and identify any necessary mitigation.

The TTA concludes that the proposed development, in traffic and transportation terms is acceptable, and there are no traffic and transportation reasons that should prevent the Planning Authority from recommending approval of this application.

12.2 Description of Existing Environment

12.2.1 Land Use

The site is located in the Ardcahan townland in the Dunmanway area, Co. Cork, as shown in Figure 12.1, which also highlights the surrounding local and national roads of development. The site is located off the L4621 Road (Hospital Road) which is approximately 300m from the R587/L4621 junction. The R587 regional road links Dunmanway town with Macroom town via Kilmichael parish.

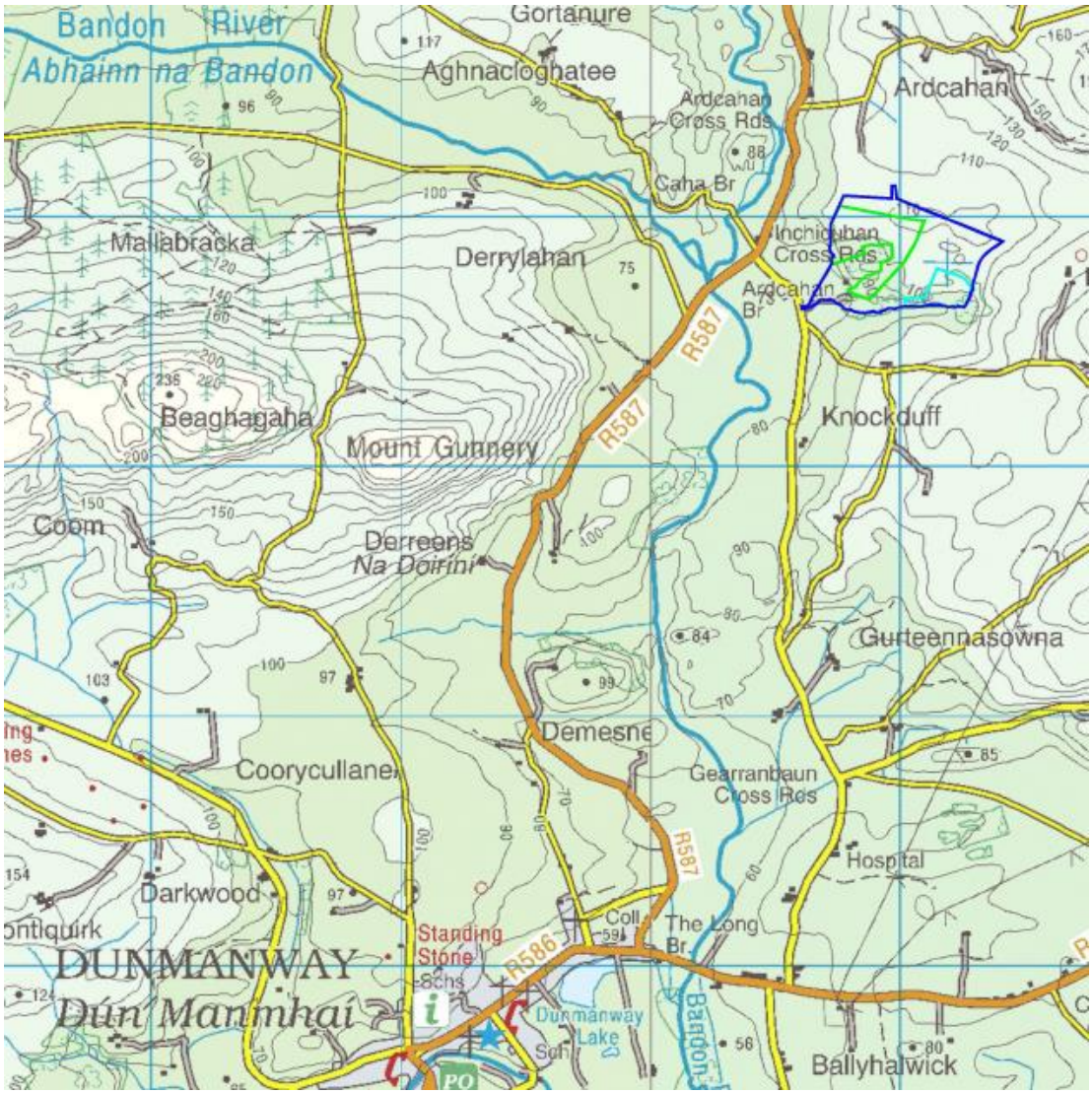


Figure 12.1 Site Location (outlined in blue) and Surrounding Road Network

12.2.2 Existing Road Network

The quarry is primarily accessed via the R587, followed by a left or right turn at the priority junction with L4621, as shown in Figures 12.2 and 12.3. This junction has standard geometry with 2 x 3.5m wide lanes on the R587 with wide splays turning onto the L4621 with comprises of 2 x 3.0m lanes.



Figure 12.2 R587/L4621 T-Junction (Looking North)



Figure 12.3 R587/L4621 T-Junction (Looking West)

Access to the quarry from the L4621 is gained via the existing development entrance junction as shown in Figure 12.4.



Figure 12.4 Loo|king South toward Site Entrance on the L4621

12.2.3 Existing Traffic Conditions

As part of the pre-application process, the extent of data collection and the critical links and junctions were discussed with the local authority.

A variety of different data sources have been used, including:

- 12-hour classified turning counts (1 site, refer Figure 12.5).
- Background OS Mapping and aerial photography.
- On-site junction measurements for the modelled junction.

Turning count surveys were undertaken at the R587/L4621 junction as part of this study on 2nd March, 2023. On-site measurements including lane widths, junction turning radii, and lane lengths were undertaken by MHL.

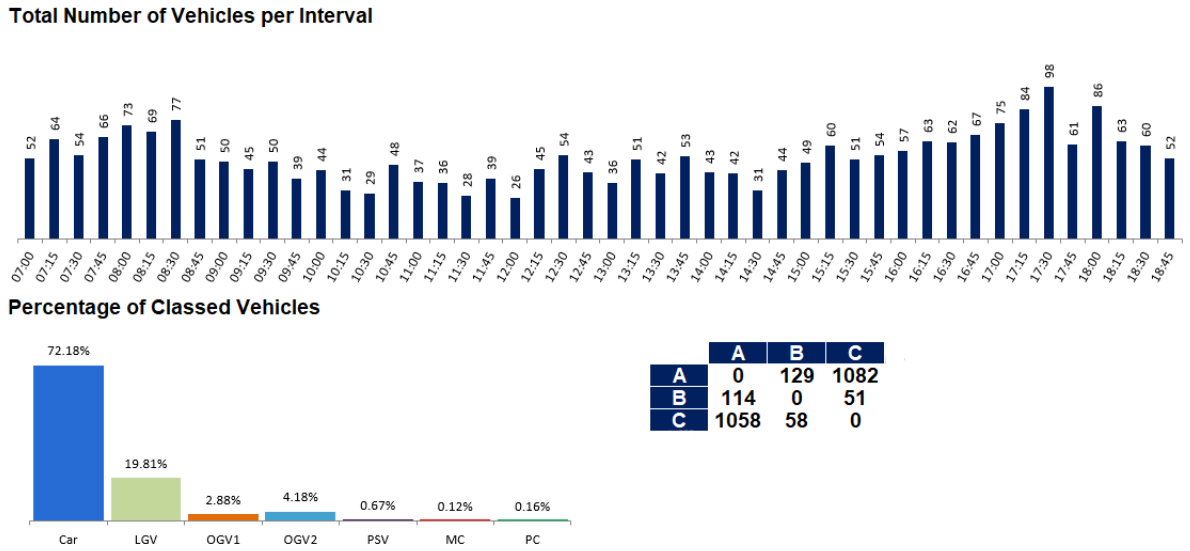


Figure 12.5 Traffic Count Survey Locations

The following figures present the recorded 12-hour traffic profile, percentage of classified vehicles and turning movements for the R587/L4621 junction carried out 2nd March 2023:



Figure 12.6 Junction R587/L4621 Arm Designation



	A	B	C
A	0	129	1082
B	114	0	51
C	1058	58	0

Figure 12.7 Junction R587/L4621 Traffic Count Results (07:00-19:00)

12.2.4 RSA Collison data

The Road Safety Authority are presently reviewing their road traffic collision data sharing policies and have decided to remove access to the collision data until their review is complete. However, the following collision data was obtained prior to this decision when initial research for this application was undertaken.

The data obtained from the road collisions database, included as shown in Figure 12.8, shows that there have been a small number of road traffic incidents in the greater area of the proposed development. The recorded incidents range in severity from minor to fatal. No accidents were recorded at the junction of R587 and L4621 during the years 2005 to 2016 inclusive. Any road traffic incidents that occurred prior to 2005 were not available from the Road Safety Authority's road traffic collision database when this information was gathered.

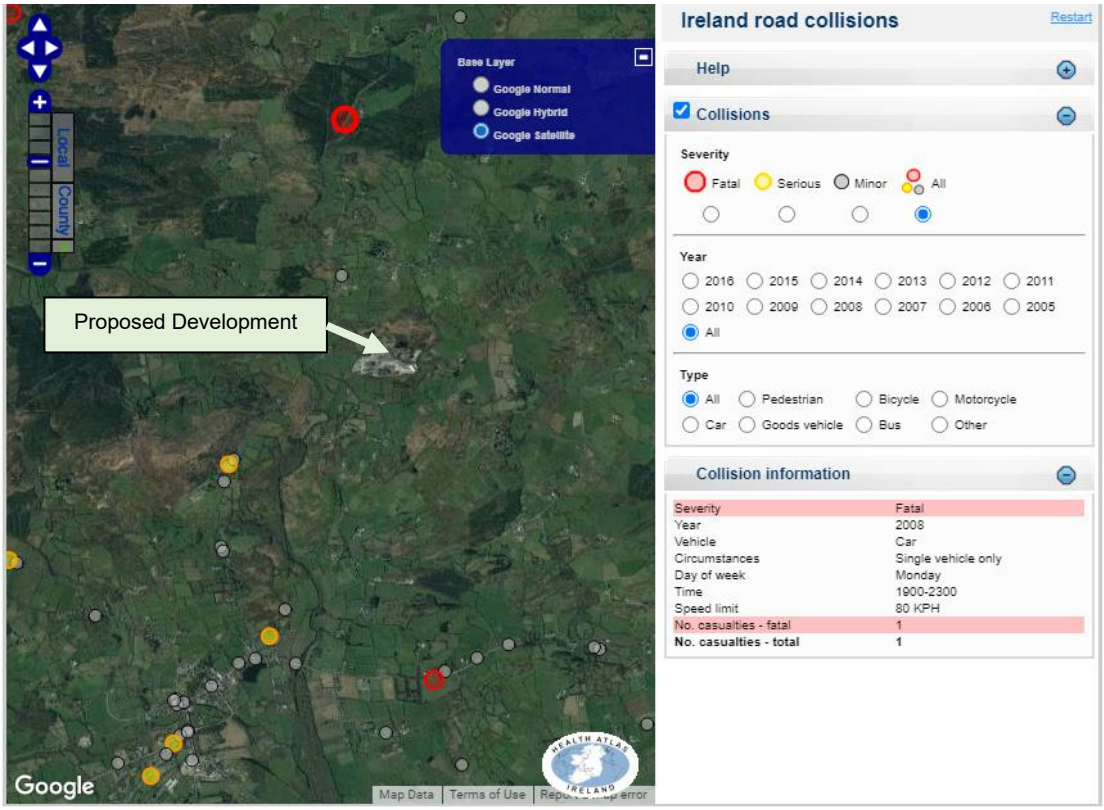


Figure 12.8 RSA Collisions Database for Surrounding Road Network

12.3 Impact Assessment

12.3.1 Do Nothing Scenario

The local roads network has been assessed for the Do-Nothing Scenario and is presented as the 'without dev' results for the modelled junction. The results table generated by the Junctions 11 PICADY traffic modelling package has been constructed to allow for an easy direct comparison to be made between the with/without scenarios for each of the years and peak hours.

12.3.2 Operational Phase Traffic Impact

In order to assess the impact of the proposed development on the identified study area, the key junction has been assessed both with/without development traffic for both AM and PM peak development traffic hours. Results are presented for the current year 2026, Design Year 2027 when the full development would be in operation, 5 years after the full operation start 2032, and 15 years after the full operation start 2042.

The traffic data recorded shows the morning and evening peak hour traffic periods to be 07:45 to 08:45 and 17:15 to 18:15, respectively. Refer to Figure 12.7.

12.3.2.1 Traffic Forecasting

The TII Guidelines have been followed when forecasting growth rates for background traffic for the area. Recorded background traffic was factored using TII (Transport Infrastructure Ireland) Project Appraisal Guidelines (PE-PAG-02017) for use in future year scenarios. The following table presents the factors used on recorded Passenger Car Units (PCU's) based on Link Based Growth Rates (Central Growth) for County Cork. A Passenger Car Unit is a measure used to assess highway capacity, for modelling purposes.

			Cars/LGV	HGV	Combined
Count %			92%	8%	**100%**
2023	**to**	**2026**	1.058	1.117	**1.063**
2023	**to**	**2027**	1.078	1.160	**1.084**
2023	**to**	**2032**	1.145	1.297	**1.157**
2023	**to**	**2042**	1.233	1.482	**1.253**

TII Project Appraisal Guidelines for National Roads Unit 5.3
Travel Demand Projections (PE-PAG-0217-02)

Table 12.1 Background Traffic Growth Rates per Annum

12.3.2.2 Traffic Generation

This section describes the traffic generation from the development and is based on the employee work patterns and HGV traffic proposed. It is proposed that upwards of 12 additional employees (5 or 6 full time and up to 6 part time) will be employed at the proposed development. The traffic surveys undertaken as part of this assessment will have captured the traffic generated by the existing development.

The standard working hours at the quarry will be as follows:

- Loading of vehicles between 7am and 7pm, Monday to Friday
- Crushing or washing from 8am to 6pm, Monday to Friday, with occasional Saturday hours of 7:30am to 2:30pm
- Blasting operations would be restricted to 10am to 4pm

Staff who work these hours will in general avoid the peak traffic hours of the local roads network. It is assumed that the development will receive a number of additional visitors due to the proposed works. For the purposes of analysing the traffic impact of the new development, 5 additional visitors per day is assumed.

The number of HGVs entering and exiting the quarry due to the new development is calculated by taking the upper annual output into account. This ensures that a robust analysis of the local roads network is completed. The Upper Annual Output is proposed at 225,000 tonnes per year which converts approximately 5 HGV loads per hour or 10 movements (5 entering and 5 exiting).

The number of HGV loads per hour was determined based on the following assumptions:

- Upper Annual Output of 225,000 tonnes per year
- Assuming 48 working weeks converts to 4690 tonnes per week
- Loading of vehicles Mon-Fri only converts to 938 tonnes per day
- 11 hour work day (assuming 1 hour lunch break) converts to 85 tonnes per hour
- Assuming 18 tonnes per load rounds up to 5 loads per hour

The number of movements for all traffic anticipated at the new development is summarised in Table 12.2.

Traffic Generation	*Movements per day (Mon-Fri)*		*Movements at AM/PM peak hours*	
Type	In	Out	In	Out
HGV	55	55	5	5
Employee	12	12	NOT DURING PEAK	
Visitor	5	5	1	1
Total	72	72	6	6

Table 12.2 Traffic Generated from proposed quarry works

12.3.2.3 Modal Shift

This section describes the current level of modal shift (the use of sustainable modes of travel) based on available data and compares these to national targets.

The 2022 Census online SAP data was used to assess current modal shift patterns in the study area comprising of the Aultagh, Dunmanway North, and Manch electoral divisions. When averaged across the three electoral divisions, 14% of people in this area said they were commuting on foot, bike or using public transport.

Means of Travel	Usually resident by means of travel to work (Number)	Usually resident by means of travel to school, college or childcare (Number)	Usually resident by means of travel to work, school, college or childcare (total) (Number)
On Foot	7	10	17
Bicycle	0	0	0
Bus, minibus or coach	1	21	22
Train, DART or LUAS	0	0	0
Motorcycle or scooter	0	0	0
Car Driver	88	10	98
Car passenger	1	60	61
Van	22	0	22
Other (incl. lorry)	5	0	5
Work mainly at or from home	34	1	35
Not stated	10	11	21
Total	168	113	281

Table 12.3 2022 Model Split by means of travel to work, school, or college (Electoral Division of Aultagh)

Means of Travel	Usually resident by means of travel to work (Number)	Usually resident by means of travel to school, college or childcare (Number)	Usually resident by means of travel to work, school, college or childcare (total) (Number)
On Foot	50	52	102
Bicycle	0	1	1
Bus, minibus or coach	3	21	24
Train, DART or LUAS	1	0	1
Motorcycle or scooter	1	0	1
Car Driver	267	7	274
Car passenger	10	159	169
Van	56	1	57
Other (incl. lorry)	5	0	5
Work mainly at or from home	41	2	43
Not stated	109	50	159
Total	543	293	836

Table 12.4 2022 Model Split by means of travel to work, school, or college (Electoral Division of Dunmanway North)

Means of Travel	Usually resident by means of travel to work (Number)	Usually resident by means of travel to school, college or childcare (Number)	Usually resident by means of travel to work, school, college or childcare (total) (Number)
On Foot	3	6	9
Bicycle	2	0	2
Bus, minibus or coach	1	33	34
Train, DART or LUAS	0	0	0
Motorcycle or scooter	0	1	1
Car Driver	168	24	192
Car passenger	4	97	101
Van	29	3	32
Other (incl. lorry)	3	0	3
Work mainly at or from home	36	1	37
Not stated	27	8	35
Total	273	173	446

Table 12.5 2022 Model Split by means of travel to work, school, or college (Electoral Division of Manch)

The Modal Shift of the study area is lower than national targets however, for the purposes of this model, no future increase in modal shift has been applied to the background traffic. This should ensure a conservative analysis of the junction is carried out.

12.3.2.4 Trip Generation

This section describes the trip generation from the development and is based on the proposed employee work patterns.

Table 12.6 presents the development traffic generated by the proposed works during the measured peak traffic hours of the local road network. The proposed trips have been converted to Passenger Car Unit (PCU) to assess the impact of the development traffic more accurately on the road network. This traffic has been added to existing and future projected background flows in the model for the assessed junction. The results are presented in Section 12.3.2.6 of this report.

Ardcahan Quarry - New Excavation Works	AM PEAK		PM PEAK	
	Arrivals	Departures	Arrivals	Departures
Proposed Quarry Trip Generation - based on projected loads				
Peak Trips (converted to pcu)	*13*	*13*	*13*	*13*
Total Peak Trips (pcu)	*26*		*26*	

Table 12.6 Proposed Development Traffic (2027 onwards)

No intensification of traffic is anticipated beyond what is shown in Table 12-6. The number of trips calculated represents the upper annual output projected for the scheme and therefore represents a worst case scenario in traffic terms for the local roads network. Refer to section 12.3.2.2 for further details on the traffic generated from the works.

12.3.2.5 Trip Distribution

Traffic flow matrices have been developed for each junction for the following scenarios:

- 2026 AM/PM Without Dev
- 2027 AM/PM Without/With Dev (Opening Year)
- 2032 AM/PM Without Dev/With (Opening Year +5 years)
- 2042 AM/PM Without/With Dev (Opening +15 years)

2023 AM

Origin \ Destination	A	B	C	Tot
A	0	22	129	151
B	14	0	5	19
C	129	6	0	135
Total	143	28	134	305

2023 PM

Origin \ Destination	A	B	C	Tot
A	0	24	177	201
B	15	0	6	21
C	103	12	0	115
Total	118	36	183	337

2026 AM

Origin \ Destination	A	B	C	Tot
A	0	23	137	160
B	15	0	5	20
C	137	6	0	143
Total	152	30	142	324

2026 PM

Origin \ Destination	A	B	C	Tot
A	0	26	188	214
B	16	0	6	22
C	109	13	0	122
Total	125	38	194	358

2027 AM

Origin \ Destination	A	B	C	Tot
A	0	24	140	164
B	15	0	5	21
C	140	7	0	146
Total	155	30	145	331

2027 PM

Origin \ Destination	A	B	C	Tot
A	0	26	192	218
B	16	0	7	23
C	112	13	0	125
Total	128	39	198	365

2032 AM

Origin \ Destination	A	B	C	Tot
A	0	25	149	175
B	16	0	6	22
C	149	7	0	156
Total	166	32	155	353

2032 PM

Origin \ Destination	A	B	C	Tot
A	0	28	205	233
B	17	0	7	24
C	119	14	0	133
Total	137	42	212	390

2042 AM

Origin \ Destination	A	B	C	Tot
A	0	28	162	189
B	18	0	6	24
C	162	8	0	169
Total	179	35	168	382

2042 PM

Origin \ Destination	A	B	C	Tot
A	0	30	222	252
B	19	0	8	26
C	129	15	0	144
Total	148	45	229	422

Table 12.7 Traffic flow matrices for R587/L4621 junction without development traffic

2027 *AM*

Origin \ Destination	A	B	C	Tot
A	0	34	140	174
B	25	0	8	34
C	140	10	0	149
Total	165	43	148	357

PM

Origin \ Destination	A	B	C	Tot
A	0	35	192	227
B	25	0	11	36
C	112	17	0	129
Total	137	52	202	391

2032 *AM*

Origin \ Destination	A	B	C	Tot
A	0	35	149	185
B	26	0	9	35
C	149	10	0	159
Total	176	45	158	379

PM

Origin \ Destination	A	B	C	Tot
A	0	37	205	242
B	26	0	11	37
C	119	18	0	137
Total	146	55	216	416

2042 *AM*

Origin \ Destination	A	B	C	Tot
A	0	38	162	199
B	28	0	9	37
C	162	11	0	172
Total	189	48	171	408

PM

Origin \ Destination	A	B	C	Tot
A	0	39	222	261
B	28	0	12	39
C	129	19	0	148
Total	157	58	233	448

Table 12.8 Traffic flow matrices for R587/L4621 junction with development traffic

Refer to Figure 12.6 in section 12.2.3 for the arm designation at the assessed junction.

12.3.2.6 Network Modelling Results

This section presents the results of the traffic modelling at each junction presented both without/with development in place for the current year 2026, Opening Year 2027, 5 years after the development is in operation 2032, and 15 years after the development is in operation 2042. The Junctions 11: PICADY software package is used to analyse the junction. PICADY (Priority Junction CApacity and DelaY) is a computer software program dealing with capacities, queue lengths and delays at priority-controlled junctions.

The Junctions 11: PICADY modelling software produces an RFC % (Ratio of Flow to Capacity), a Delay figure measured in seconds and a LOS (Level of Service) which are used to compare the effects the development will have on the junction being modelled. An RFC of 85% on a junction implies that the junction has reached capacity but is still operational with delay incurred. The following table describes the different LOS and the implications for the junction being assessed.

Level of Service A	Free-Flow
Level of Service B	Reasonably Free-Flow (no delay incurred)
Level of Service C	Stable Operation (busy but operational with acceptable delay incurred)
Level of Service D	Borderline Unstable (Junctions reaching capacity – but still operational-delay incurred)
Level of Service E	Extremely Unstable (Junctions at capacity or over, any incident will cause a grid-lock situation- significant delay incurred)
Level of Service F	Breakdown (Junctions over capacity, unacceptable delay traffic at a standstill)

Table 12.9 Level of Service Description

The PICADY results for the assessed junction both without/with development are presented in Table 12.10 below.

	AM						PM					
	Set ID	Queue (PCU)	Delay (s)	RFC	LOS	Network Residual Capacity	Set ID	Queue (PCU)	Delay (s)	RFC	LOS	Network Residual Capacity
	2026 - Base Year											
Stream B-AC	D1	0.0	6.71	0.04	A	445 %	D2	0.0	6.88	0.04	A	368 %
Stream C-AB		0.0	5.52	0.01	A	[Stream B-AC]		0.0	5.79	0.03	A	[Stream B-AC]
	2027 - Op Year Without Dev											
Stream B-AC	D3	0.0	6.73	0.04	A	433 %	D4	0.0	6.85	0.05	A	360 %
Stream C-AB		0.0	5.52	0.01	A	[Stream B-AC]		0.0	5.78	0.03	A	[Stream B-AC]
	2027 - Op Year With Dev											
Stream B-AC	D5	0.1	6.97	0.07	A	358 %	D6	0.1	7.08	0.07	A	304 %
Stream C-AB		0.0	5.56	0.02	A	[Stream B-AC]		0.0	5.83	0.04	A	[Stream B-AC]
	2032 - +5 without Dev											
Stream B-AC	D7	0.0	6.77	0.04	A	402 %	D8	0.1	6.97	0.05	A	331 %
Stream C-AB		0.0	5.50	0.01	A	[Stream B-AC]		0.0	5.78	0.03	A	[Stream B-AC]
	2032 - +5 with Dev											
Stream B-AC	D9	0.1	7.03	0.07	A	334 %	D10	0.1	7.20	0.08	A	282 %
Stream C-AB		0.0	5.54	0.02	A	[Stream B-AC]		0.1	5.83	0.04	A	[Stream B-AC]
	2042 - +15 without Dev											
Stream B-AC	D11	0.1	6.94	0.05	A	357 %	D12	0.1	7.12	0.06	A	296 %
Stream C-AB		0.0	5.48	0.02	A	[Stream B-AC]		0.0	5.77	0.03	A	[Stream B-AC]
	2042 - +15 with Dev											
Stream B-AC	D13	0.1	7.19	0.08	A	301 %	D14	0.1	7.36	0.08	A	254 %
Stream C-AB		0.0	5.52	0.02	A	[Stream B-AC]		0.1	5.82	0.04	A	[Stream B-AC]

Table 12.10 Junctions 11: PICADY Traffic Modelling Results

The current year (2026) results are representative of how the junction currently operates during peak periods. This is borne out in terms of measured queue and observed delay recorded as part of the data collection process. Figure 12.6 is referred to for each individual junction's arm designation when interpreting the results. The constructed model is deemed to be fit for purpose.

The results indicate that the junction operates within capacity currently and will continue to do so up to and including the design year 2042 with the development in place. The maximum future year RFC (Ratio of Flow to Capacity) is 8% in 2042 peak hours. The Level of Service is A – Free-Flow. The full results are included in the Appendix section of this report.

12.3.3 Summary of Operational Phase Traffic Impacts

A summary of predicted operational phase impacts is presented in Table 12.11.

Mode	Cause	Impact
Traffic	Development generated traffic onto roads network	Slight Negative

Table 12.11 Development Related Impacts – Operational Phase

12.3.4 Construction Phase Traffic Impact

In terms of traffic generation, the enabling works in advance of normal quarry operation are expected to be the same as the traffic generated during the operational phase. For this reason, the results of the traffic analysis in section 12.3.2 will also reflect the construction stage traffic impact.

12.3.5 Summary of Construction Phase Traffic Impacts

A summary of predicted operational phase impacts is presented in Table 12.12.

Mode	Cause	Impact
Traffic	Development generated traffic onto roads network	Temporary Slight Negative

Table 12.12 Development Related Impacts – Construction Phase

12.4 Mitigation and Monitoring Measures

The proposed development will impact on the surrounding roads network during operation. To minimise disruption to the local roads network the following measures are proposed during both Construction & Operational Phases.

12.4.1 Construction & Operational Stage

12.4.1.1 Mitigation Measure 1

In general, workers will travel to site before the measured AM peak hour of 07:45 – 08:45, to be on location for a 07:00 start-time. A limited number of employees may occasionally travel to the site during peak hours. Working hours for the quarry will to be from 07.00 to 17:00 Monday to Friday, 07:30 to 14:30 Saturday, through the operation. The measured PM peak period for the local roads network development (17:15-18:15) will also avoid direct conflict with that of employees.

12.4.1.2 Mitigation Measure 2

Typically, HGV's carrying material to and from the site will arrive interspersed throughout the day avoiding a clustered arrival. Where feasible, HGV's will restrict movements on the local road network to during off-peak periods.

12.4.1.3 Mitigation Measure 3

HGV access to the quarry will be solely from the R587 direction with a prohibition of HGV's accessing via the L4621 road from the south.

12.5 Risk of Major Accidents and Disasters

The likelihood of an accident occurring involving development traffic is unlikely with both the R587/L4621 junction and the L4621 quarry entrance junction availing of good visibility in both directions.

12.6 Cumulative Impacts

Industry standard growth rates have been applied to background traffic for future year assessments (to account for further development within the area). These growth rates make allowance for modal shift targets as set by national policy but do not take account of site-specific measures that may be implemented to mitigate against traffic generation from a particular development.

12.7 Residual Impacts

The following table outlines the residual impacts of the proposed development on the study area.

Mode	Cause	Quality	Mitigation	Significance	Probability	Duration of Impact
Traffic	Development traffic flow onto roads network	Negative	Off peak arrival hours, non-clustered arrival and departure of HGVs	Slight	Likely	Medium/ Long terms

Table 12.13 Development Residual Impacts

12.8 Conclusion

The traffic assessment concludes that the proposed development would have a slight impact on the local roads network during both construction and operational stages. The surrounding road network is shown to continue to operate well within capacity up to and including design year 2042 with the development traffic added.

12.9 References

I. TII Publications, Traffic and Transport Assessment Guidelines, PE-PDV-02045 (May 2014)
II. Institution of Highways & Transportation (1994) Guidelines for Traffic Impact Assessment IHT, London
III. TII Publications, Geometric Design of Junctions, DN-GEO-03060 (May 2023)
IV. National Roads Authority (2000) Road Geometry Handbook NRA, Dublin
V. TII, Design Manual for Roads and Bridges NRA, Dublin (revised 2003)
VI. TII Publications, Rural Road Link Design DN-GEO-03031 (May 2023)
VII. TII Publications, Project Appraisal Guidelines for National Roads Unit 5.3 – Travel Demand Projections, PE-PAG-02017 (October 2021)
VIII. Collision Statistics – Road Safety Authority

Murray Brothers Tarmacadam Ltd

CHAPTER 13

MATERIAL ASSETS – SERVICES AND UTILITIES

VOLUME II

MAIN STATEMENT

APRIL 2026

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13 Material Assets: Services and Utilities

13.1 Introduction

The purpose of this chapter is to assess the potential impacts on material assets, including the existing utility network which includes the following infrastructure:

- Surface Water Drainage
- Foul Water Drainage
- Water Supply
- Electricity Supply
- Natural Gas
- Telecoms

The construction and operation of the quarry is described in detail in Chapter 3 of this EIAR.

13.1.1 Author Information and Competency

This chapter was prepared by Martina Keenan Rivero of McCutcheon Halley Chartered Planning Consultants. Martina holds a BSc (Hons) in Spatial Planning from Technological University Dublin and an Advanced Diploma in Planning and Environmental Law from Kings Inns. She has 10 years of professional experience, working in NSW, Australia with a Local Authority and as a planning and environmental consultant in Ireland. Martina has prepared AA screening reports, Environmental Impact Assessment screening reports and coordinated and contributed to Environmental Impact Assessment Reports for a range of development projects. Relevant project experience includes large housing developments, mixed-use schemes, industrial and commercial projects.

13.1.2 Methodology

The 2022 EPA Guidelines on the Information to be Contained in Environmental Impact Assessment Reports note that material assets can be taken to include built services, roads and traffic, and waste management. The Guidelines also note that the sealing of agricultural land and effects on mining or quarrying potential come under the factors of land and soils.

Traffic is assessed in Chapter 12 and Land and Soils are assessed in Chapter 6 of this EIAR. This chapter provides an assessment of the built services and waste.

Resources that are valued and that are intrinsic to specific places are called “material assets”. They may be either human or natural origin and the value may arise for either economic or cultural reasons. This chapter is intended to deal with the physical resource in the environment which may be of either human or natural origin. The objective of the assessment is to ensure that these assets are used in a sustainable manner, so that they are available for future generations, after the delivery of the development.

The following sources have been used to collate information on built services within the general area of the site;

- Information from the applicant
- Gas Networks Ireland https://www.gasnetworks.ie

- ESB Networks
- Concurrent substitute consent and associated remedial EIAR.

The scope of the investigation consists of a site investigation and desk study. Information in relation to Water Services (surface water drainage, foul water drainage and water supply) and utilities (i.e. ESB and Telecoms) was received from the owner and operator of the existing quarry and was verified based on visual inspections of the site, survey material and information submitted for previous planning applications.

Significance criteria for impacts on utilities are set out in Table 13.1 in accordance with the requirements of the following EPA guidance documents:

- Guidelines to Planning Authorities and An Coimisiún Pleanála on carrying out EIA (Department of Housing, Planning and Local Government, 2018)
- Guidelines on the information to be contained in Environmental Impact Assessment Reports (EPA, 2022).

Table 13.1 Significance Criteria for Impacts on Material Assets – Utilities

Significance Level	Criteria
Profound	Profound impact occurs where there is permanent disruption to a utility service or where there is significant surcharging of an existing system.
Significant	Significant impact occurs where there is long-term disruption to a utility service or where there is minor surcharging of an existing system.
Moderate	Moderate impact occurs where there is medium-term disruption to a utility service or significant increase of flow within an existing system.
Slight	Slight impact occurs where there is short-term disruption to a utility service or minor increase of flow within an existing system.
Imperceptible	Imperceptible impact occurs where there is temporary disruption to a utility service or no quantifiable increase of flow within an existing system.

13.1.3 Difficulties Encountered in Compiling Information

No significant difficulties were encountered in the preparation of this chapter.

13.2 Description of Baseline Environment

13.2.1 Ownership and Access

The development comprises a quartzitic sandstone quarry which was established by the Council prior to October 1964 and operations continued up until 2014. The subject land is owned by the applicant, Murray Brothers Tarmacadam Ltd, who purchased the quarry from Cork County Council in the 1990's.

Chapter 12 Material Assets Traffic and Transport was prepared by MHL Consulting Engineers and addresses the impact of the development on the surrounding road network.

Vehicular access and egress to and from the application site is via an existing entrance at the public road. This site is accessed just off L4621-9 road along a paved roadway. In the locality this paved road is referred to as the Hospital Road and is located in an area known locally as Clashnagallagh Wood, which is to the east of the Inchicahan crossroads.

13.2.2 Plant and Machinery

There is an existing macadam plant located on the site.

13.2.3 Buildings and Structures

The buildings currently at the site have all been granted planning permission previously and include: Prefabricated office building/toilet/canteen, laboratory, mixing plant, storage silos, plant, plant/machinery, bins for plant, covered aggregate storage bays, storage shed, bitumen tanks, enclosed bitumen tanks, well/pumphouse, weighbridge and lagoon with pump.

There is also a septic tank with a 4000-litre capacity and percolation area present at the site having also been granted permission previously. From its construction up until 2011, the percolation area remains active and continues to act within its design parameters as per the planning application.

13.2.4 Surface Water

There is no public surface water drainage serving the site/area. All surface water drainage infrastructure existing on the site forms part of the existing quarry.

The quarry had a permanent settlement pond system situated in the SW corner of the site, downgradient of the main rock crushing and product stockpile area. The northern part of the site has not been quarried but portions of it are used for stockpiling subsoils and crushed rock, for settling ponds and for backfilling areas with surplus soil and sludge material. A number of permanent shallow ponds/lakes have also been developed by placing berms around the natural depressions and lower-lying areas in the northern part of the site. The settlement ponds are also used for water storage and water re-use in the quarry and tarmac areas as necessary.

13.2.5 Foul Water

Permission was granted for a septic tank as part of the 1998 application for a tarmacadam / asphalt manufacturing plant, (Council Ref. 98/284). The 2011 Environmental Report prepared by ATServices identified that there was a percolation area and septic tank in operation at the site.

13.2.6 Water Supply

The Ardcahan quarry has its own drinking water supply well which was drilled in the Tarmac Plant Yard area in the late 1990's. The water is used as a potable supply for the site canteen and wash water in the site's welfare facilities. Water usage is low and there have been no water supply or quality issues since its installation.

Ardcahan is not in proximity to any group water schemes (refer to Fig 13.2).

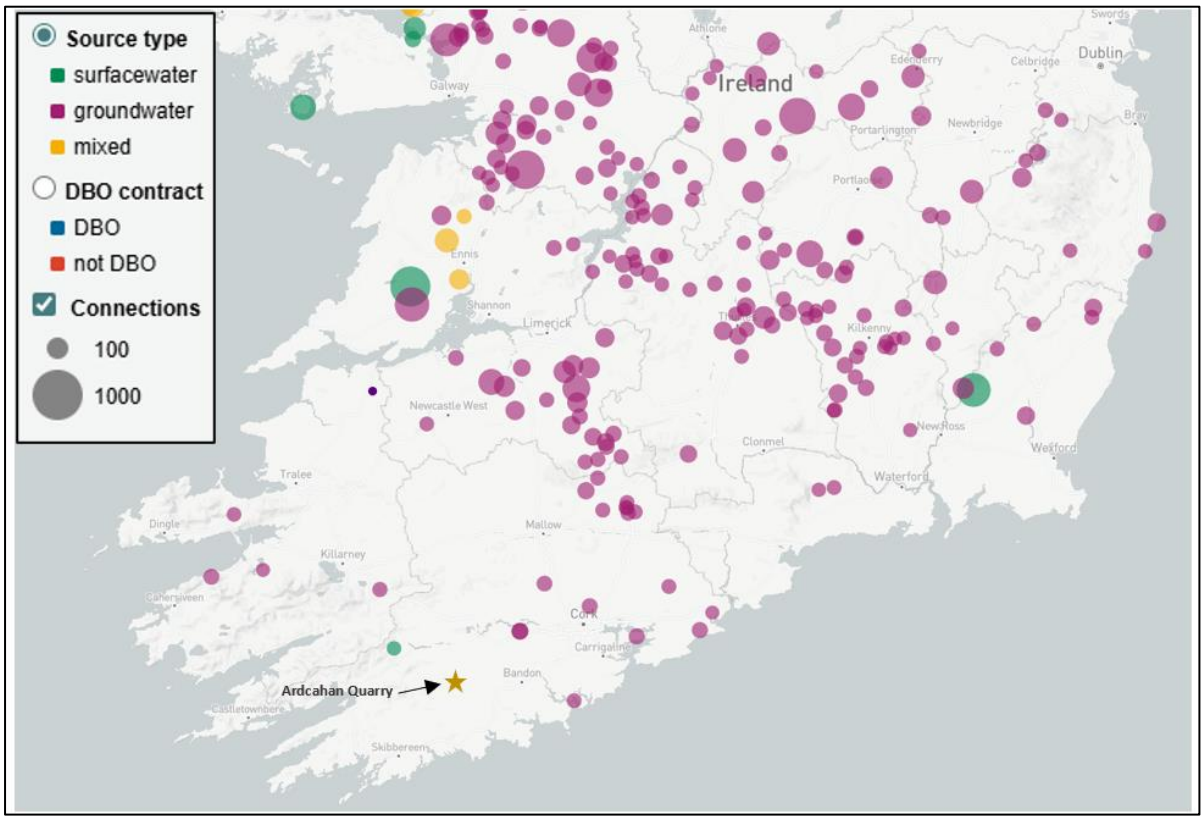


Figure 13.1 Extract from distribution map of group water schemes. Accessed from www.nfgws.ie. Accessed on 29th January 2026.

13.2.7 Telecoms

There is good communications network in the area with Imagine and Eircom having a relatively widespread communication networks in the vicinity. A landline was installed for office administration in April 1998 when Murray Bros took ownership of the quarry, following grant of permission for the tarmacadam plant.

13.2.8 Electricity

The quarry has been in operation since the 1960's. An ESB supply was provided to the site prior to 1990 and was operational before Murray Brothers took ownership of the quarry. Fig 13.3 shows the Electricity network in proximity to the quarry – a 110 KV line connects the substations of Dunmanway and Macroom and runs c. 800m to the east of the quarry boundary.

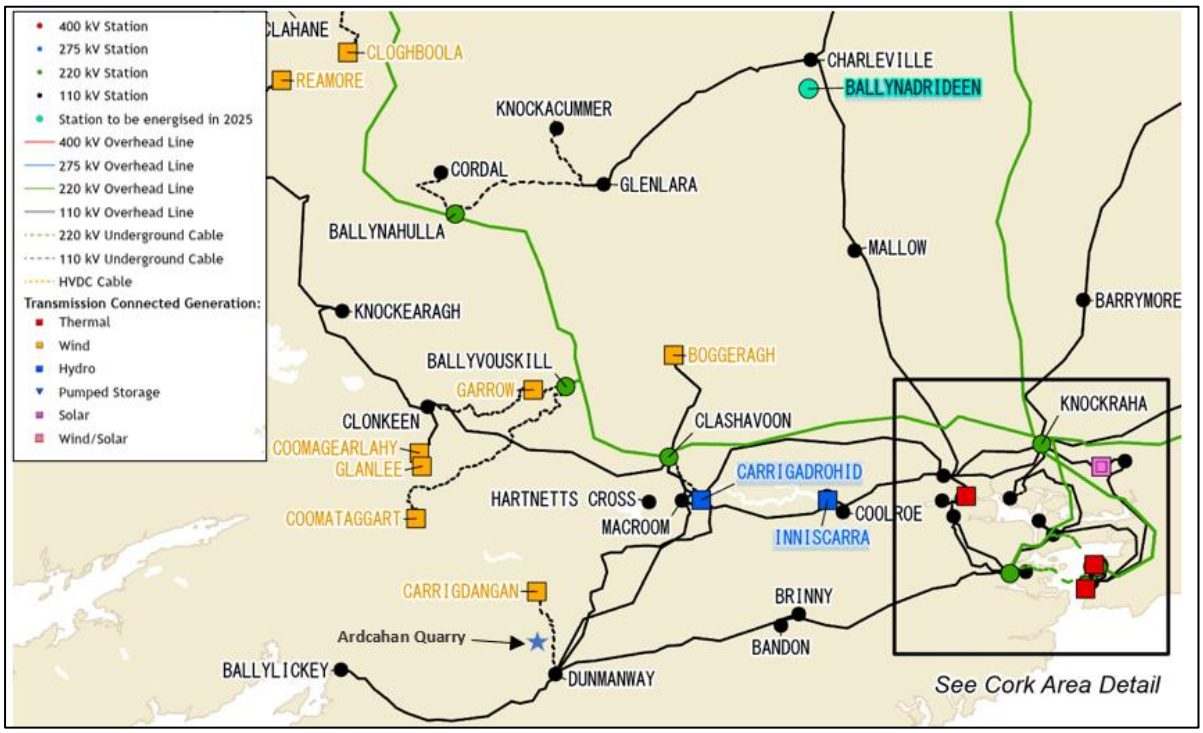


Figure 13.2 Extract from Eirgrid Group Transmission Systems Map. (https://www.eirgridgroup.com/). Accessed on 29th January 2026.

13.2.9 Gas

A desk study was carried out to determine the extend of gas infructure in the vicinity of the quarry. The quarry is not connected to the Gas distribion network. The nearest pipeline terminates at Ballineen, c. 10km to the east (refer to Fig 13.4).

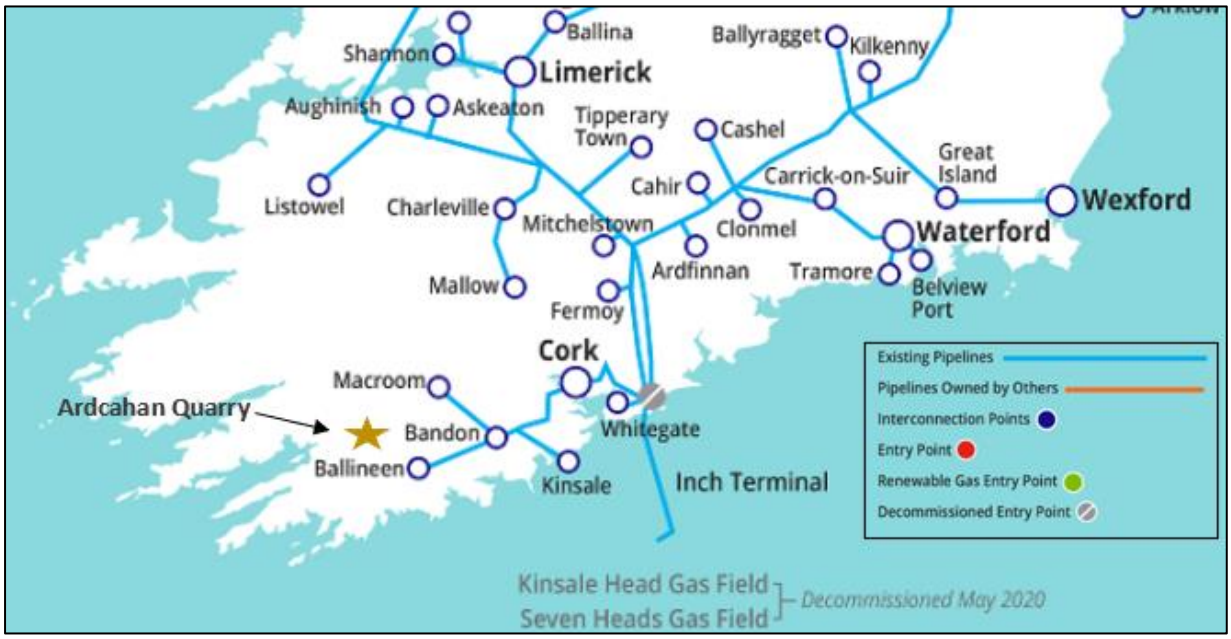


Figure 13.3 Pipeline map of gas networks in the vicinity of Ardcahan Quarry. (Source: Gas Networks Ireland, Accessed on 16th January 2026.).

13.2.10 Geological Resources

The geology of the Site and potential impacts associated with construction and operation of the quarry are assessed in detail in Chapter 6 (Land, Soils and Geology). No significant negative impacts have been identified.

13.2.11 Waste Management

Waste produced on site will be collected by appropriately licenced contractors.

13.3 Proposed Development

Chapter 3 provides a full description of the proposed development which will comprise an extension of the extraction area of the existing quarry.

13.4 Impact Assessment

Potential impacts are assessed at the Construction and Operational Phases. Activities which may take place at the quarry include;

Construction Activities are identified as;

- Excavation and removal of topsoil and vegetation;
- Construction of settlement ponds;
- Construction of berm;

Operational Activities are identified as;

- Blasting and drilling;
- Crushing and Screening;
- Stockpiling of overburden;
- Discharge of water to settlement ponds;
- Transportation of aggregates to and from site.

Potential impacts as a result of blasting are considered in Chapter 10 Noise and Vibration. However, there is no evidence that construction and operational activities may have any significant negative impact on services, either within or in proximity to the quarry.

No effects on services or utilities are reasonably likely to occur as a result of quarrying activity.

13.4.1 Electricity

Quarry activities are not anticipated to have a result on a significant demand for power. There are no historical reports of interruptions to supply for the wider area. Any works which may be required to the electrical network during the assessment period will be carried out according to ESB Network Guidelines.

13.4.2 Gas

There is no gas supply to the site, and there are no gas distribution pipelines within or in proximity to the quarry. The closest gas pipeline is c. 10km to the east of the quarry. The construction and operation of the quarry would not have had any impacts on Gas services or Gas networks in proximity.

13.4.3 Water

The quarry benefits from its own well, and no significant demands on water supply have been identified. Chapter 7 of the EIAR assesses hydrology and hydrogeology and concludes that the water quality of the small watercourse adjacent to the site was found to be good with no evidence of sediment or pollution related to the quarry site and that if the recommended remedial and reductive measures are fully implemented and properly maintained and managed, then the proposed development will not give rise to any significant residual adverse impact on the hydrological aspects of the adjacent watercourse or Bandon River system located downstream of the site.

13.4.4 Surface Water and Foul Water

The impacts on surface water and foul water services are also assessed in Chapter 7 Water. No significant negative impacts have been identified.

13.4.5 Telecoms

There is no evidence that any significant negative impacts on telecommunications at the site or wider area will occurred as a result of construction and operations at the quarry.

13.5 Do Nothing Scenario

In a 'do nothing' scenario there would be no impact on the associated demand on services.

13.6 Risk of Major Accidents and Disasters

No risk of impacts to services has been identified.

13.7 Cumulative

Any impacts on water supply, foul and surface water drainage and utilities/telecommunications is expected to be imperceptible as the nearby developments would have separate private water supply and surface/wastewater treatment and utilities/telecommunications. No significant cumulative impacts have been identified as a result.

13.8 Monitoring

None proposed other than any general ESB and water metering and monitoring arrangements.

13.9 Residual Impacts

No residual impacts on services or utilities have been identified as a result of the construction and operation.

13.10 References

Websites:

www.gasnetworks.ie Last accessed 29th January 2026

www.eirgridgroup.com Last accessed 29th January 2026

National Federation of Group Water Schemes. https://nfgws.ie/distribution-map-of-group-water-schemes/ Last accessed 29th January 2026

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CHAPTER 14
BIODIVERSITY

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14 Biodiversity

14.1 Introduction & Methods

This Chapter of the EIAR has been prepared by the MOR Environmental Team. This chapter provides a description and assessment of the potential, likely and significant effects of the Proposed Development on ecology and biodiversity.

A detailed ecological appraisal has been carried out by a fully qualified and experienced MOR Environmental Ecologist in line with Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine (2018 and revisions) [1].

In addition, an assessment on potential effects on European sites was also undertaken and is presented in the Natura Impact Statement ('NIS') submitted as part of the overall planning application. The NIS should be read in conjunction with this chapter.

14.1.1 Author Information and Competency

This chapter of the EIAR was approved by Mr. Dyfrig Hubble, Malone O' Regan Environmental ('MOR Environmental') Associate Director – Ecologist. Dyfrig is a full member of CIEEM. Dyfrig has over 18 years' experience working in the ecological consultancy sector, including habitat surveys and appraisals and specialist protected species surveys in support of Appropriate Assessments and Ecological Impact Assessments.

14.1.2 Methodology

14.1.2.1 Relevant Guidance

The following standards and guidance documents were utilised to characterise the baseline conditions of the Site, the assessment of potential effects to biodiversity and the appropriate mitigation measures required:

- CIEEM, '*Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine (2018 and revisions)*' [1];
- National Roads Authority ('NRA'), '*Guidelines for Assessment of Ecological Impacts of National Roads Schemes*' [2]*;*
- *Fossitt's Guide to Habitats in Ireland*' [3];
- Heritage Council's '*Best Practice Guidance for Habitat Survey & Mapping*' [4];
- NRA, '*Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes*' [5];
- British Trust for Ornithology ('BTO')– *A Field Guide to Monitoring Nests* [6];
- BTO – *Breeding Bird Survey ('BBS') in Breeding Bird Survey Instructions* [7];
- Bibby, Burgess, Hill, & Mustoe. *Bird Census Techniques (2000)* [8];
- Raptors*: A Field Guide for Surveys and Monitoring* ; [9]
- NRA*, Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Scheme*s [10];
- *A Conservation Plan for Irish Vesper Bats Irish Wildlife Manual No. 20* [11];
- UK Bat Mitigation Guidelines: *A guide to impact assessment, mitigation and compensation for developments affecting bats* [12];

- CIRIA, C532 – *Control of Water Pollution from Construction, Guidance for Consultants and Contractors* [13]*;*
- *Bat Mitigation Guidelines for Ireland. Irish Wildlife Manuals, No. 25* a publication by the NPWS [14];
- *Bat Surveys for Professional Ecologists - Good Practice Guidelines (4th edition).* London: The Bat Conservation Trust [15];
- Scottish Badgers, '*Surveying for Badgers: Good Practice Guidelines*' [16];
- The Mammal Society, '*Surveying Badgers*' [17];
- NRA, '*Guidance for the Treatment of Badgers Prior to the Construction of National Road Schemes*' [18];
- DoAGH, '*National Otter Survey of Ireland 2010 / 12*' [19];
- SNH, '*Technical Advice Note #2: Otter Surveys*' [20];
- Joint Nature Conservation Committee ('JNCC'), '*Common Standards Monitoring Guidance*,' [21] ;
- JNCC '*Herpetofauna Worker's Manual*' [22];
- Froglife, '*Surveying for Amphibians*' [23];
- C811 – '*Environmental Good Practice on Site (5th Edition)*' [24];
- NRA, '*Guidelines on the management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads* [25];
- Transport Infrastructure Ireland ('TII'), '*The Management of Invasive Alien Plant Species on National Roads – Technical Guidance*' [26];
- Inland Fisheries Ireland ('IFI'), '*Guidelines on Protection of Fisheries Habitat during Construction works in and adjacent to water*' [27] .

14.1.3 Desk Study

As a starting point, the desk study focused on identifying European sites within a 15km radius of the Site, nationally designated sites within a 5km radius of the Site and records of legally protected and notable species within 2km of the Site.

The area for which biological data was collected was based on an assessment of the ecological zone of influence of the Site (i.e., the area that could be affected by the scheme within which there is the potential for significant ecological effects).

The following literature sources were consulted as part of the desktop study for ecological information:

- Aerial maps of the Site and surrounding area;
- The National Parks and Wildlife Service ('NPWS') website was consulted with regard to the most up to date detail on conservation objectives for the European Designated sites relevant to this assessment [28];
- The National Biodiversity Data Centre ('NBDC') website was consulted with regard to species distributions [29];
- The Environmental Protection Agency ('EPA') Maps website was consulted to obtain details about watercourses in the vicinity of the Site [30]; and,
- BirdWatch Ireland – The Irish Wetland Bird Survey ('I-WeBS') data, which is coordinated by BirdWatch Ireland and under contract to the NPWS, was reviewed with regard to wintering waterbird population within the vicinity of the Site [31];
- The Cork County Council ('CCC') Planning Portal was consulted to obtain details about existing / proposed developments in the vicinity of the Site [32].

14.1.3.1 I-WeBS Data Request

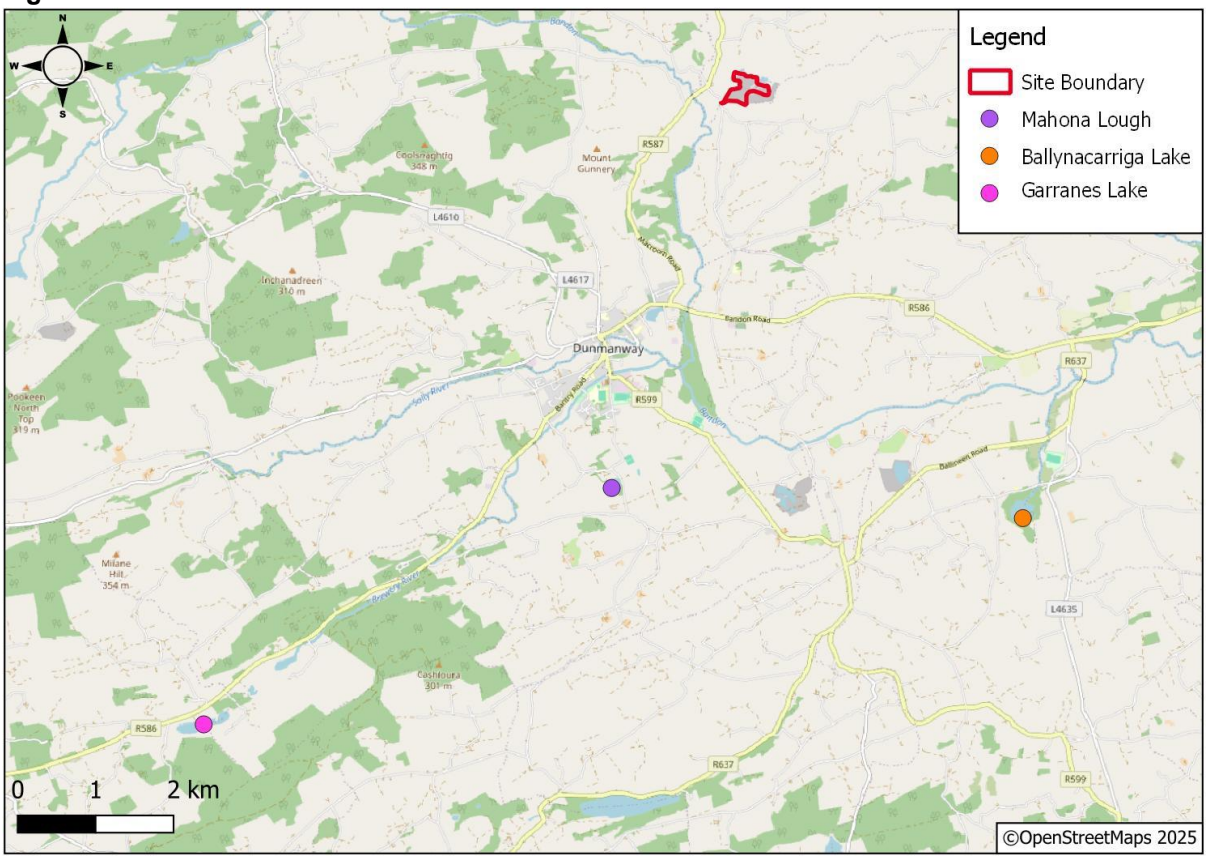
As mentioned above, I-WeBS data was reviewed in order to understand the potential assemblages of wintering bird populations that tend to occur within the vicinity of the Site.

As part of this review, a data request was submitted to the I-WeBS, which is coordinated by BirdWatch Ireland and under contract to the NPWS. The data request was made for all available data from the nearest subsites to the southeast and southwest of the Site, as listed in Figure 14-1. See Figure 14-2 for the details of the subsites and their locations in relation to the Site.

Figure 14.1 I-WeBS Subsites

Site Name	Site Code	Distance from the Survey Area (km)	Direction from the Survey Area
Ballynacarriga Lake	0L013	ca. 6.1km	SE
Mahona Lough	0L014	ca. 5.1km	SW
Garranes Lake	0L023	ca. 10.3km	SW

Figure 14.2: I-WeBS Subsites



14.1.4 Consultation

A Site meeting was held with Claire Deasy from NPWS on the 23rd April 2025 to discuss the ongoing and proposed ecological surveys at the Site. NPWS was satisfied with the approach discussed during the Site meeting, and a follow-up email was issued outlining these surveys. No further comments were made.

In addition, an email was sent to the NPWS on the 16th January 2026, regarding the proposed wash plant to be installed in the quarry as part of the Proposed Development. No response was provided.

14.1.5 Field Survey

14.1.5.1 Habitat Survey

To establish baseline conditions at the Site and surrounding area ('Survey Area'), a Site walkover was undertaken on 9th January 2023 by the Principal MOR Environmental Ecologist and a suitably qualified MOR Environmental Ecologist to assess the extent and quality of habitats present within the Site and Survey Area and to identify any potential ecological receptors. See Figure 14-3 below for the location of the Site and Survey Area.

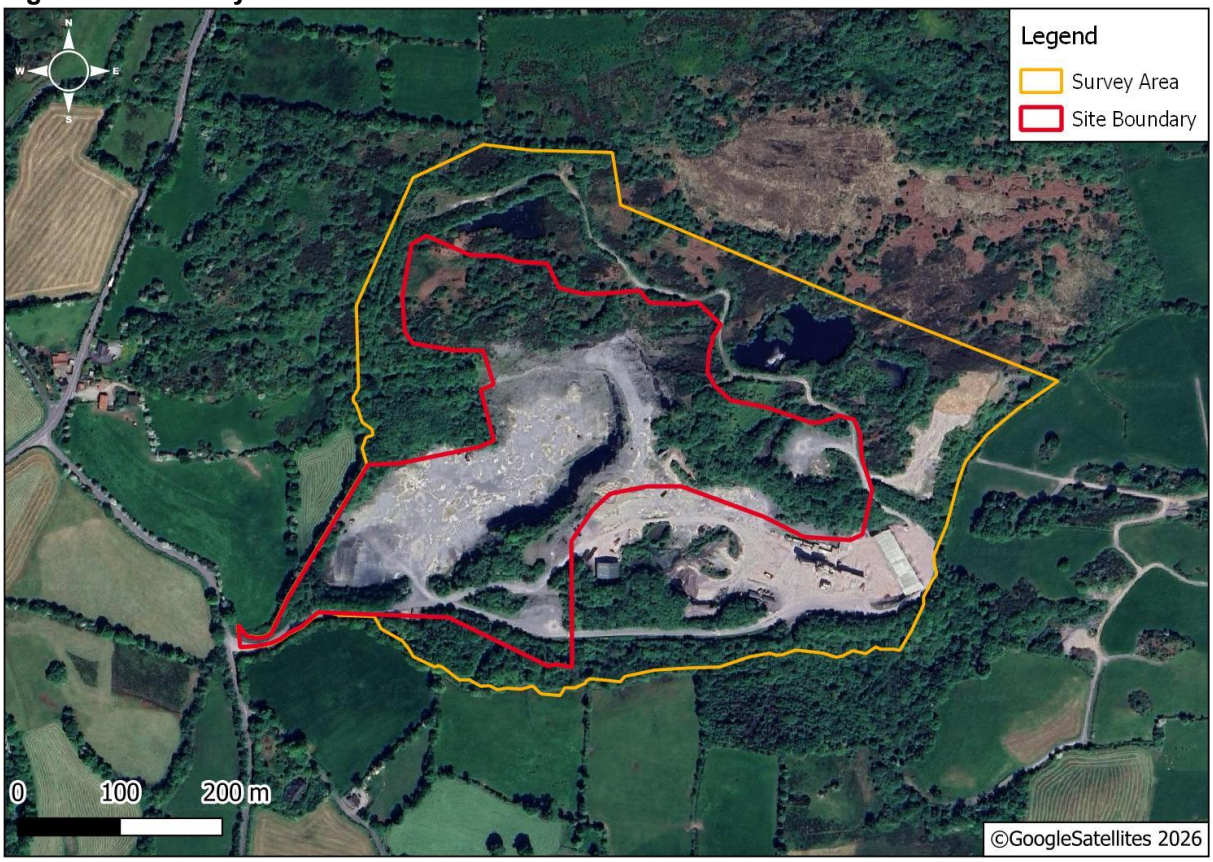
Updated Site walkovers were undertaken by two suitably qualified and experienced MOR Environmental Ecologists on

- 17th September 2024; and,
- 21st May 2025.

All surveys were undertaken using the Heritage Council's 'A Guide to Habitats in Ireland' [3]. This is the standard habitat classification system used in Ireland and includes both desk-based and field-based assessments.

The assessments were extended to also identify the potential for these habitats to support other features of nature conservation importance, such as species afforded legal protection under either Irish or European legislation.

Figure 14.3: Survey Area



14.1.5.2 Protected / Notable Species Survey

The methodologies used to establish the presence / potential presence of faunal species are summarised below. These survey methodologies relate to the species / biological taxa that both the desk study and habitat survey indicated could occur within the Site and ecological Survey Area.

Flora

During the habitat surveys, the Site and ecological Survey Area were assessed for the presence of notable / protected flora species in accordance with the following:

- Flora (Protection) Order 2022 (S.I. No. 235/2022); and,
- Ireland Red List No. 10: Vascular Plants [33].

Amphibians

During the initial Site walkover and the habitat surveys, the Site and ecological Survey Area were assessed for their potential to provide sheltering, foraging and breeding habitat for amphibians in line with the NRA, now TII, '*Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes*,' [5]. These include water bodies suitable for egg-laying and terrestrial habitats comprising open areas with mixed-height vegetation, such as heathland, rough grassland, open scrub, or waterbody margins. Suitable, well-drained and frost-free areas are needed to enable amphibians to survive the winter.

Some areas of the drainage ditches were identified as potential habitats for breeding amphibians during the initial Site walkover. In addition, open areas with mixed-height vegetation and overgrown/rank grassland were identified within the Study Area and considered suitable for amphibians during the terrestrial phase of their life cycle. Given the presence of features suitable for supporting amphibians, a follow-up presence / absence amphibian survey was conducted.

Presence / absence surveys were carried out along the drainage ditches within the Site. These surveys were carried out during the optimal survey period, with the following methods of surveying employed:

- Egg search – marginal aquatic macrophytes were inspected for the presence of smooth newt and common frog eggs. If a smooth newt egg wrap is found, the search ends to avoid further disturbance.
- Sweep netting – using a net to sweep through the water and aquatic vegetation to investigate the presence of amphibians in a pond. If an amphibian is caught, netting is ceased immediately due to the disruptive nature of netting; and,
- Torch-light surveying – using a high-powered torch (one million candle power). The torch is used around the margins of the waterbody to detect amphibian activity.

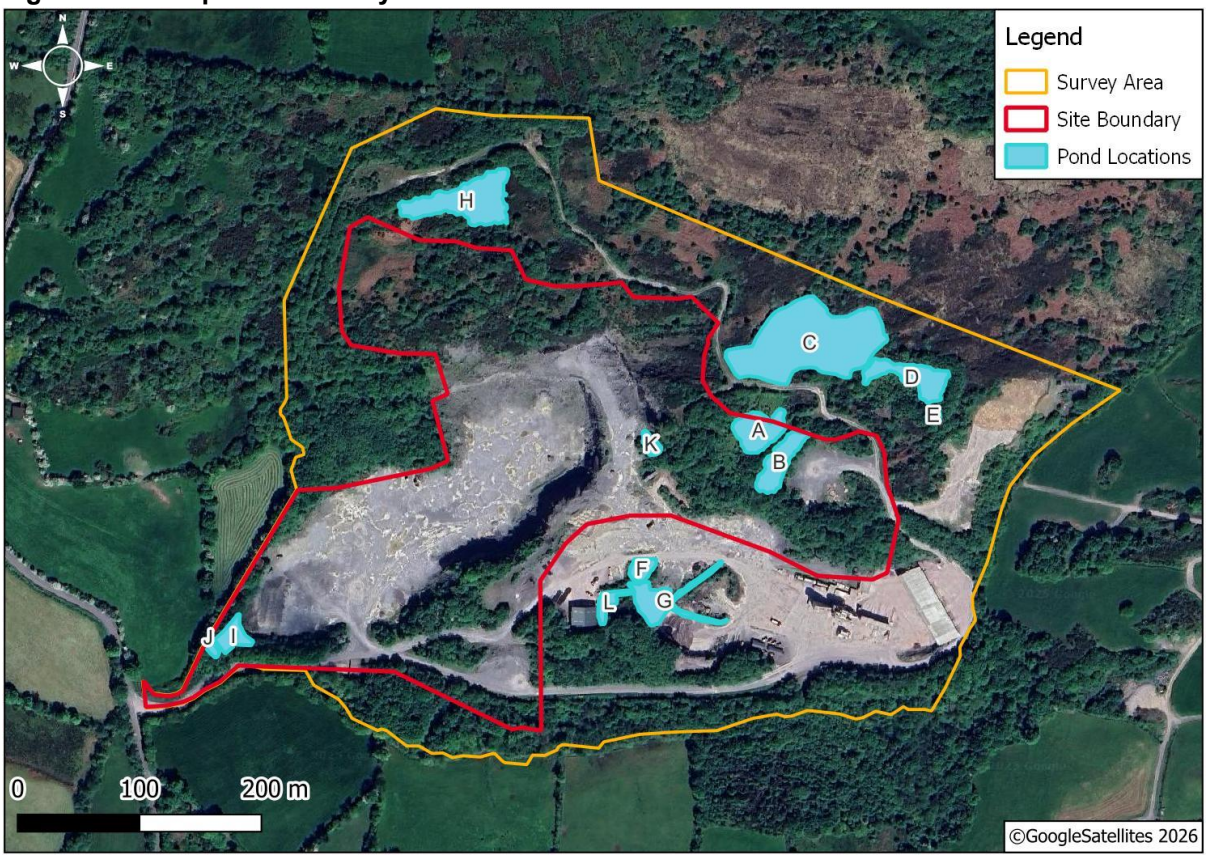
Where possible, the drainage ditches were torched from the bank and in-stream. However, some areas of the drainage ditches were inaccessible due to dense vegetation.

These methodologies are in line with the following guidance:

- NRA, now TII, '*Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes*,' [5] ;
- Joint Nature Conservation Committee ('JNCC'), '*Common Standards Monitoring Guidance*,' [21] ;
- JNCC '*Herpetofauna Worker's Manual*' [22]; and,
- Froglife, '*Surveying for Amphibians*' [23].

See Appendix 14-1 for full survey details.

Figure 14.4: Amphibian Survey Locations



Aquatic Ecology

A specialist Freshwater Pearl Mussel ('FWPM') survey was conducted on 25th May, 30th May, 1st June and 22nd June 2023 by Sweeney Consultancy. An updated survey was carried out on 10th September 2024 by Sweeney Consultancy and MOR Environmental. The assessment aimed to identify the presence / habitat suitability of watercourses for FWPM.

The Aquatic Survey report is presented in Appendix 14-2.

Badgers

The survey aimed to identify and examine areas where badgers might occur by noting any evidence of badger activity. This included:

- Mammal paths;
- Badger hairs caught in sett entrances / fences / vegetation;
- Paw prints;
- Evidence of foraging (usually in the form of 'snuffle holes');
- Badger Scat (isolated badger droppings)
- Latrines(shallow pits/holes occurring together compromised of exposed badger droppings); and,
- Badger setts.

A mammal path was assumed to be used by badgers if the character of the path (in terms of size) was appropriate and / or if any other signs were in close vicinity (e.g. a badger sett).

The field survey of the Site was conducted in line with the following relevant guidance for badger:

- Scottish Badgers, '*Surveying for Badgers: Good Practice Guidelines*,' [16];
- The Mammal Society, 'Surveying Badgers,' [17]; and,

- NRA, now TII, '*Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes*,' [5] .

Bats

An initial assessment was carried out during the habitat survey to determine the suitability of habitats within the Site for bat roosting, foraging and flight paths. Bat habitats and commuting routes identified were considered in relation to the wider landscape to determine connectivity for local bat populations, and through the examination of aerial mapping.

Assessment criteria for evaluating the potential suitability of the Site for bats were carried out in line with '*Bat Surveys for Professional Ecologists: Good Practice Guidelines*' [34].

An assessment of the suitability of the habitats within the Site and ecological Survey Area to support bat roosting, foraging and commuting was carried out.

Table 14.1 Guidelines for assessing the potential suitability of proposed development sites for bats, based on the presence of habitat features within the landscape, to be applied using professional judgement

Potential Suitability	Description of Roosting habitats in structures	Description of Potential flightpaths and foraging habitats
None	No habitat features on site likely to be used by any roosting bats at any time of the year (i.e. a complete absence of crevice/suitable shelter at all ground/underground levels).	No habitat features on site likely to be used by any commuting or foraging bats at any time of the year (i.e. no habitats that provide continuous lines of shade/protection for flight-lines, or generate/shelter insect populations available to foraging bats).
Negligible[1]	No obvious habitat features on site likely to be used by roosting bats; however, a small element of uncertainty remains, as bats can use small and apparently unsuitable features on occasion.	No obvious habitat features on site likely to be used as flight-paths or by foraging bats, however, a small element of uncertainty remains in order to account for non-standard bat behaviour.
Low	A structure with one or more potential roost sites that could be used by individual bats opportunistically at any time of the year. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions[2] and/or suitable surrounding habitat to be used regularly or by larger numbers of bats (i.e., unlikely to	Habitat that could be used by small numbers of bats as flight-paths, such as a gappy hedgerow or unvegetated stream, but isolated, i.e., not very well connected to the surrounding landscape by another habitat. Suitable, but isolated habitat that could be used by small numbers of foraging bats, such as a lone tree

[1] Negligible is defined as 'so small or unimportant as to be not worth considering, insignificant'. This category may be used where there are places that a bat could roost or forage (due to one attribute) but it is unlikely that they actually would (due to another attribute).

[2] For example, in terms of temperature, humidity, height above ground level, light levels or levels of disturbance.

Potential Suitability	Description of Roosting habitats in structures	Description of Potential flightpaths and foraging habitats
	be suitable for maternity and not a classic cool/stable hibernation site, but could be used by individual hibernating bats[3]).	(not in a parkland situation) or a patch of scrub.
Moderate	A structure with one or more potential roost sites that bats could use due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only, such as maternity and hibernation – the categorisation described in this table is made irrespective of species conservation status, which is established after presence is confirmed).	Continuous, high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by bats for flightpaths such as river valleys, streams, hedgerows, lines of trees and woodland edge. High-quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, tree-lined watercourses and grazed parkland. Site is close to and connected to known roosts.
High	A structure with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat. These structures have the potential to support high conservation status roost, e.g. maternity or classic cool/stable hibernation site.	Continuous, high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edge. High-quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, tree-lined watercourses and grazed parkland.
Potential Suitability	Description of Roosting habitats in structures	Description of Potential flightpaths and foraging habitats

Nighttime Bat Walkover ('NBW') Surveys

[3] Evidence from the Netherlands shows mass swarming events of common pipistrelle bats in the autumn followed by mass hibernation in a diverse range of building types in urban environments [41] (and [40]).Common pipistrelle swarming has been observed in the UK [42] (and [43]) and winter hibernation of numbers of this species has been detected at Seaton Delaval Hall in Northumberland [44]. This phenomenon requires some research in the UK, but ecologists should be aware of the potential for larger numbers of this species to be present during the autumn and winter in prominent buildings in the landscape, urban or otherwise.

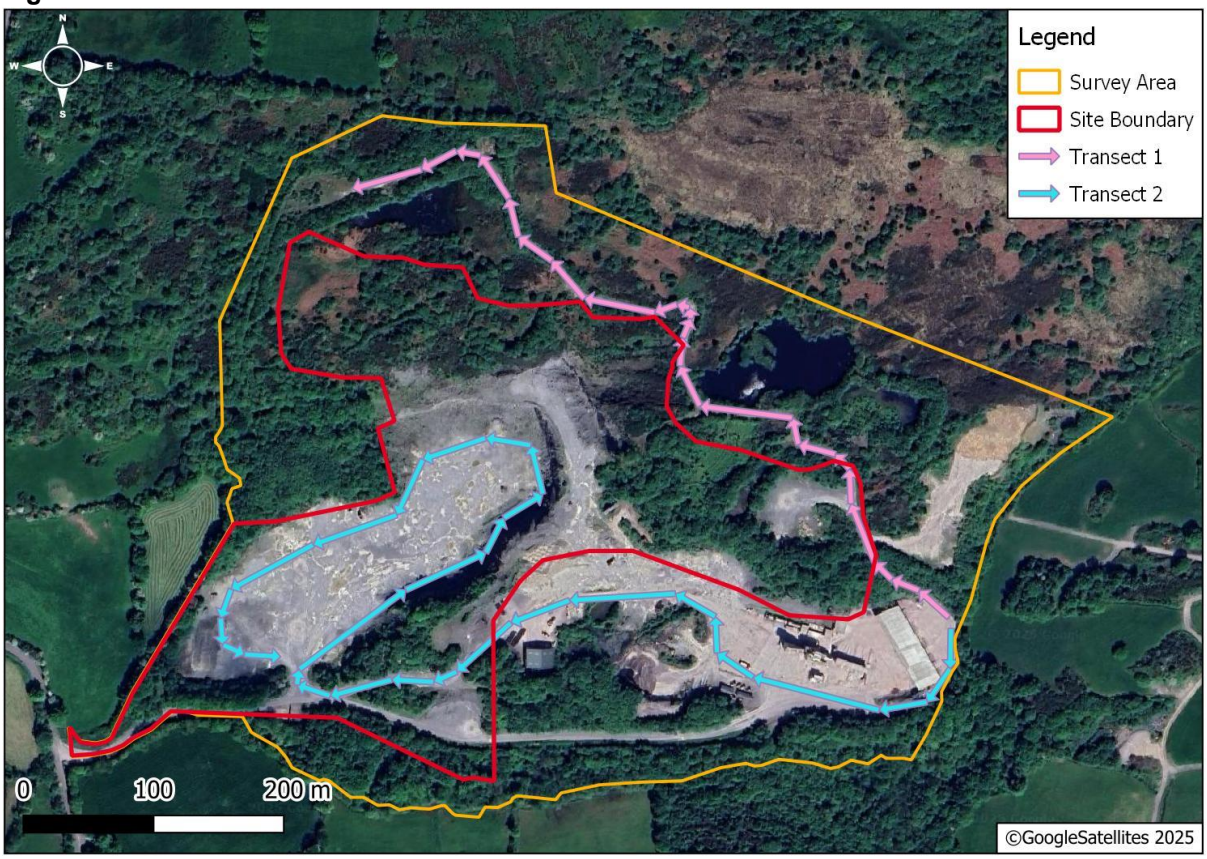
Given the presence of features suitable for foraging and commuting bats, NBW surveys were undertaken at the Site to assess the importance of the onsite habitats for these bats. The first survey was undertaken on 24th July 2023 and an updated NBW survey was undertaken on 17th September 2024 and 3rd June 2025. See Figure 14-5 for NBW Transect locations.

The surveys were undertaken in accordance with recognised best practice guidance as outlined below:

- Best Practice Guidelines for the Conservation of Bats in the Planning of National Road Schemes [10];
- A Conservation Plan for Irish Vesper Bats Irish Wildlife Manual No. 20 [11];
- UK Bat Mitigation Guidelines: A guide to impact assessment, mitigation and compensation for developments affecting bats [12];
- Bat Mitigation Guidelines for Ireland. Irish Wildlife Manuals, No. 25, a publication by the NPWS [14]; and,
- Bat Surveys for Professional Ecologists - Good Practice Guidelines (4th edition). London: The Bat Conservation Trust [15] .

Full details of the survey methodology are provided in Appendix 14-3 – Bat Report.

Figure 14.5: NBW Transect Locations



Bird Suitability Assessment

The Site and ecological Survey Area were assessed for their potential to provide nesting habitat for breeding birds or to support important assemblages of rare or notable bird species. Surveys aimed to identify and examine areas where wintering and breeding birds might occur. Any activity and potential nesting habitats were noted.

The Site and ecological Survey Area were noted to be suitable for nesting and foraging bird species on both the quarry's cliff faces and its waterbody. Additionally, the cliff faces of the quarry were noted to have potential nesting habitat for peregrine falcon.

Following the bird suitability assessment, it was deemed necessary to undertake breeding bird, peregrine falcon and wintering bird surveys.

Wintering Bird Surveys

Vantage point ('VP') bird surveys were undertaken at the Site by a suitably qualified and experienced MOR Environmental Ecologist on 16th February 2023 and 21st March 2023. The surveys were undertaken at pre-determined VP locations; see Figure 14-6. Given that the Site contains two separate waterbodies, two VP locations were identified that provide suitable views of each waterbody and are located in a safe position away from ongoing activities within the Site.

All species observed utilising the Site were recorded, and their locations were marked on the maps. The surveys were undertaken using the I-WeBS Core Counts methodology [35].

During the surveys, all birds were recorded using a standard British Trust for Ornithology ('BTO') code through sight and sound and optical equipment, such as a telescope and binoculars, to minimise disturbance to wintering birds. The behaviours and activities of the birds were recorded to determine whether they were roosting or feeding within the Site.

Full details on survey methodology are presented in Appendix 14-4 – Bird Report.

Breeding Bird Surveys

Breeding bird transect surveys were undertaken within the Survey Area on the following dates:

- 17th May 2023;
- 7th June 2023;
- 12th July 2023;
- 10th April 2025; and,
- 23rd April 2025.

These breeding bird surveys were conducted by a suitably qualified and experienced MOR Environmental Ecologist, and in line with the methodology described in:

- British Trust for Ornithology ('BTO') – A Field Guide to Monitoring Nests [6] ; and,
- Common Bird Census in Bird Monitoring Methods [8] .
- The Common Bird Census ('CBC') methodology was used to establish whether any breeding bird species were utilising the Site.

All birds were recorded through sight and sound. Optical equipment was used, including binoculars, in order to minimise disturbance to potentially breeding birds. Suitable vegetation on-site was examined for the presence of nests. During the survey, the behavioural activity of the recorded birds was noted using the BTO breeding status codes. Birds that displayed non-territorial behaviours were recorded as well (i.e. birds that were flying over the Site, birds that were foraging and not calling, birds that were loafing). Birds were then classified as non-breeding, possibly breeding and confirmed breeding based on the behaviours exhibited.

Full details of the survey methodology are provided in Appendix 14-4: Bird Report.

Peregrine Falcon Surveys

Following the identification of suitable peregrine falcon (*Falco peregrinus*) habitat within the Site and the wider area, targeted surveys were undertaken to confirm the presence / absence of peregrine falcon within the Site and the vicinity of the Site on the following dates:

- 17th May 2023;
- 7th June 2023;
- 14th April 2025; and,
- 23rd April 2025.

The surveys were undertaken at a predetermined vantage point to the southwest of the Site, which provided appropriate views of the suitable nesting habitat for peregrine falcon, see Figure 14-6.

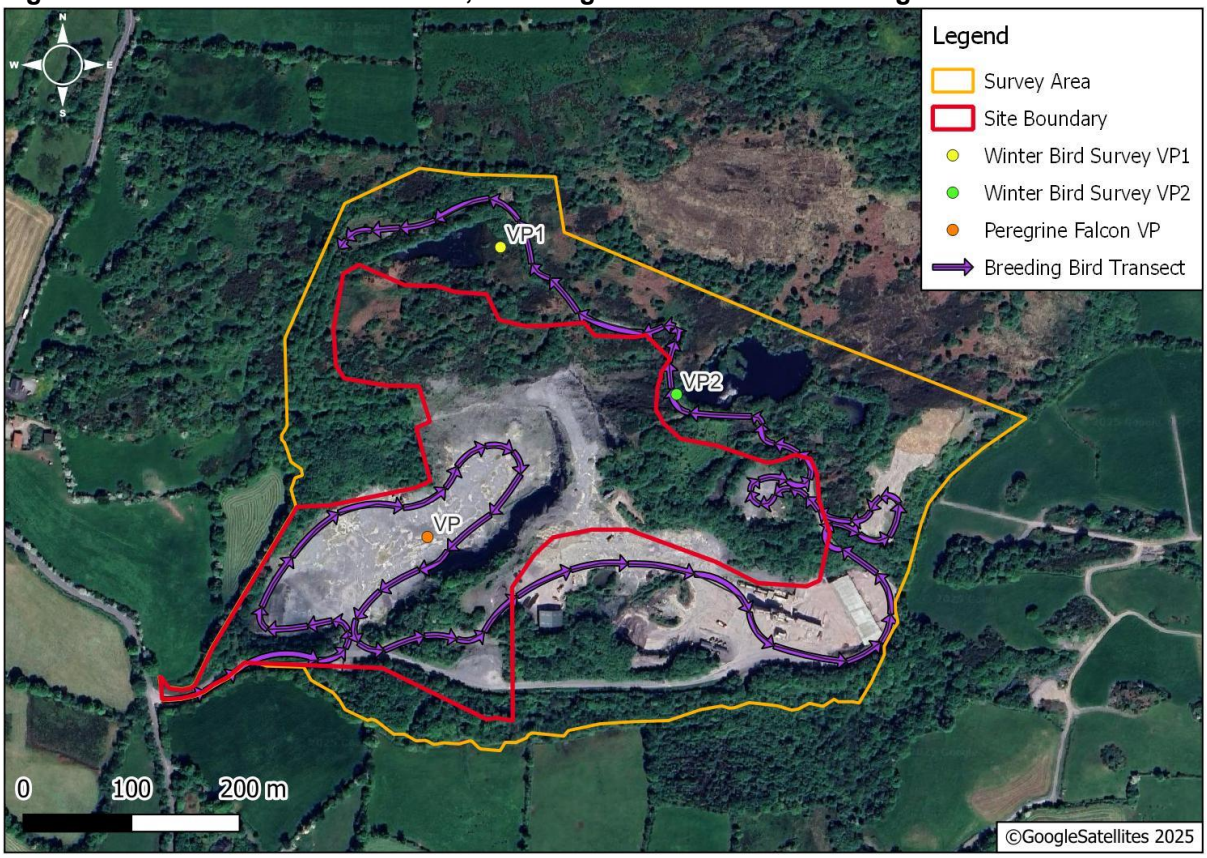
The surveyor recorded peregrine falcons through sightings and, where possible, sound. Optical equipment, including binoculars and telescopes, was used to minimise disturbance to any birds potentially present on-site.

The peregrine falcon surveys were conducted in line with the guidelines described in:

- Raptors: '*A Field Guide for Surveys and Monitoring*' [36]; and
- BTO – '*A Field Guide to Monitoring Nests*' [6].

Full details of the survey methodology can be found in Appendix 14-4: Bird Report.

Figure 14.6: Locations of Winter VPs, Breeding Bird Transect and Peregrine Falcon VP



Hedgehogs and pygmy shrews

The habitats within and adjacent to the Site were appraised for their potential to support hedgehogs (*Erinaceus europaeus*) and pygmy shrews (*Sorex minutus*) in line with the NRA, now TII, 'Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes, [5].

Otter

The survey aimed to identify and examine areas where otter might occur by noting any evidence of otter (*Lutra lutra*) observed. Evidence of otter searched for included:

- Holts (features log piles, caves and cavities);
- Slides (flattered areas of mud or vegetation);
- Paw prints;
- Evidence of foraging (usually in the form of feeding remains such as fish scales, shellfish, etc.); and,
- Spraints.

The field surveys of the Site were conducted in line with the following relevant guidance for otter:

- Scottish Natural Heritage ('SNH'), '*Technical Advice Note #2: Otter Surveys'* [37];
- DoAHG, '*National Otter Survey of Ireland 2010 / 12'* [19]; and,
- NRA, now TII, '*Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes*,' [5].

Invasive Species

The Site was visually assessed for the presence of any noxious / invasive species that are regulated under the European Union (Invasive Alien Species) Regulations 2024 (S.I. No. 374/2024) [38] such as Japanese knotweed (*Reynoutria japonica*) and Himalayan balsam (*Impatiens glandulifera*).

The Site was also assessed for the presence of non-regulated invasive species that have the potential to affect biodiversity.

Other Species

In addition, an assessment was carried out of the potential of the Site to support other species considered to be of value for biodiversity, including those identified as occurring locally based on the findings of the desktop study and professional judgment.

14.1.6 Survey Limitations

Some areas of the Site were inaccessible due to dense vegetation. However, these areas were assessed at a distance using binoculars. It is not considered that this survey limitation will alter the findings of this assessment.

According to CIEEM Advice Note on the Lifespan of Ecological Reports and Surveys, survey data that is 12-18 months old can remain valid following an updated survey by a professional ecologist and an updated desk-based assessment to confirm that the Site has not experienced significant change, and the local distribution of species in the wider area around the Site has not changed [39]. Following the updated surveys undertaken on 21st May 2025, it was concluded that the results of the 2023 wintering bird surveys remain valid.

14.1.7 Assessment Methodology

The starting point for the assessment was a scoping exercise to identify ecological receptors that would require further consideration. This involved differentiating the biodiversity receptors (i.e. designated sites, habitats and species populations) that could be significantly affected by the Proposed Development.

The approach that was used for determining which receptors have the potential to be significantly affected by the Proposed Development involved using baseline data collected through the desk study (2km away for protected species, 15km for European Designated sites and 5km for nationally protected sites) and field surveys for the Site and to determine:

- Which, if any, of the species or habitats recorded are legally protected or controlled (see Box 1); and,
- Which, if any, sites, areas of habitat or species recorded are of importance for biodiversity conservation.

The next stage of the assessment was to determine whether the identified receptors have sufficient biodiversity value that an effect upon them would be of potential significance for this EIAR. In this regard:

- Biodiversity conservation value relates to the quality and / or size of sites or habitats, or the size of species' populations; and,
- Potential significance means that the effect could be of sufficient concern or, for positive effects, of such substantial benefit that it could be material to influencing the planning decision.

Those receptors identified as having sufficient value, where an effect upon them could be significant, have been taken forward for further consideration. Legally protected species were also considered further. This involved:

- Identifying, for each receptor, any significant effect that is likely to be caused by the Proposed Development, which has the potential to lead to a significant effect and / or to contravene relevant legislation;
- Determining the area within which the likely effects would cause a potentially significant effect on the identified receptor and / or could contravene relevant legislation (ecological zone of influence); and,
- If the receptor occurs or is likely to occur within the zone of influence, and it is concluded that the receptor could be significantly affected and / or the relevant legislation contravened, the receptor would be subject to further assessment.

14.1.8 Evaluation of the Conservation Importance of the Site

In terms of biodiversity conservation value, identified receptors have been valued using the National Roads Authority Scheme [2], using the following scale:

- International importance;
- National importance;
- County importance (or vice-county in the case of plant or insect species);
- Local importance (higher value); and,
- Local importance (lower value).

14.1.9 Legislation / Policy Context

Within Ireland, a number of sites of international or national importance to nature conservation, as well as many species of animals and plants, are afforded a degree of legal protection, as set out in Box 1 below.

A study of biodiversity related planning policy at both national, regional and local level has been undertaken for the Site and locality in order to highlight any potential conflicts with the relevant legislation and guidance documents.

Box 1	Designated Wildlife Sites and Protected and Otherwise Notable Habitats and Species

The National Parks and Wildlife Service ('NPWS)' notifies sites in Ireland that are of international or national importance for nature conservation (although some sites that are of national importance for certain species have not been so designated).

Internationally important sites may also be designated as:

- Special Areas of Conservation ('SACs') and Candidate Special Area of Conservation ('cSACs'): the legal requirements relating to the designation and management of SACs in Ireland are set out in the European Communities (Birds and Natural Habitats) Regulations 2011-2021.
- Special Protection Areas ('SPAs') and candidate Special Protected Areas ('cSPAs'): strictly protected sites classified in accordance with Article 4 of the EC Directive on the Conservation of Wild Birds (2009/147/EC), also known as the Birds Directive; and,
- Ramsar sites: wetlands of international importance designated under the Ramsar Convention, to which Ireland is a signatory.

Other statutory site designations relating to nature conservation are:

- Natural Heritage Areas ('NHAs'): these represent examples of some of the most important natural and semi-natural terrestrial and coastal habitats in the country and are afforded protection under the Wildlife (Amendment) Act 2000. NHAs are legally protected from damage and receive protection from the date they are formally proposed for designation; and,
- Proposed Natural Heritage Areas ('pNHAs'): these sites are not afforded the same protection as NHAs. These sites are proposed by the NPWS but are not statutorily proposed or designated. Prior to statutory designation these are subject to a very limited legal protection. They are, however, sites of significance for wildlife and habitats and are important for the purposes of this Biodiversity Chapter.

Legally protected species

Many species of animal and plant receive some degree of legal protection. For the purposes of this study, legal protection refers to:

- Species included in the Wildlife (Amendment) Act 2000, excluding species that are only protected in relation to their sale, reflecting the fact that the site disposal will not include any proposals relating to the sale of species; and,
- Species afforded protection under the Flora (Protection) Order 2022 (S.I.No.235/2022).

Other notable habitat/species categories

- Biodiversity Action Plan ('BAP') species: those targeted in local or national BAPs as being of particular conservation concern (priority species);
- Red and Amber List birds: those listed as being of high or medium conservation concern as listed by Birdwatch Ireland on the Birds of Conservation Concern in Ireland 2020-2026 [40]; and,
- Other Irish Red Data Book species [41]; and Nationally/Regionally/Locally Notable species where appropriate.

14.1.10 National Planning Context

14.1.10.1Project Ireland 2040 National Planning Framework

Project Ireland 2040 was launched by the Government in February 2018 [42] and incorporates two policy documents - the National Planning Framework ('NPF') and the National Development Plan ('NDP').

Following a decision of the Government in June 2023, the preparation of a revised NPF [36] commenced to take account of changes that have occurred since it was published (in 2018) and to build on the existing framework. Public consultation took place from 10th July 2024 to 12th September 2024, following which the Government agreed to progress and publish a draft schedule of

amendments to the First Revision to the NPF in November 2024. On 8th April 2025, the Government approved the revised NPF following the conclusion of environmental assessments which included a Strategic Environmental Assessment ('SEA'); NIS and Appropriate Assessment Determination and a Strategic Flood Risk Assessment ('SFRA'). Both houses of the Oireachtas, the Seanad and the Dáil, approved this document as of 30th April 2025. The revised NPF is a direct replacement of the NPF and therefore, is detailed further below.

First Revision to National Planning Framework (April 2025)

Objectives under the 'Strategic Planning for Biodiversity' section of the revised NPF [43], include the following:

National Policy Objective 84:

> *'In line with the National Biodiversity Action Plan and European Union Nature Restoration Law, and best available scientific information, regional and local planning authorities shall support the preparation and implementation of the National Restoration Plan.'*

National Policy Objective 85:

> *'In line with the National Biodiversity Action Plan; the conservation, enhancement, mitigation and restoration of biodiversity is to be supported by:*
>
> - *Integrating policies and objectives for the protection and restoration of biodiversity, including the principles of the mitigation hierarchy of - avoid, minimise, restore and offset - of potential biodiversity impacts, in statutory land-use plan.*
> - *Retention of existing habitats which are currently important for maintaining biodiversity (at local/regional/national/international levels), in the first instance, is preferable to replacement/restoration of habitats, in the interests of ensuring continuity of habitat provision and reduction of associated risks and costs.'*

National Policy Objective 86:

> *'In line with the objectives of the National Biodiversity Action Plan, planning authorities should seek to address no net loss of biodiversity within their plan making functions.'*

National Policy Objective 87:

> *'Enhance the conservation status and improve the management of protected areas and protected species by:*
>
> - *Implementing relevant EU Directives to protect Ireland's environment and wildlife and support the objectives of the National Biodiversity Action Plan;*
> - *Developing and utilising licensing and consent systems to facilitate sustainable activities within Natura 2000 sites;*
> - *Continued research, survey programmes and monitoring of habitats and species.'*

National Policy Objective 88

> *Facilitate the protection and restoration of biodiversity [including in European sites and the habitats and species for which they are selected] through the preparation of national guidance in relation to Planning and Biodiversity to:*
>
> - *Plan and manage for integration of biodiversity protection and restoration in future planning and development;*

- *Ensure a consistent and strategic approach to biodiversity protection and restoration across planning authorities and administrative boundaries, and*
- *Support the implementation of the National Biodiversity Action Plan (2023-2030) and the forthcoming National Restoration Plan.*

The National Development Plan (2021-2030)

The NDP also lists the following items as strategic investment priorities in relation to National Heritage and biodiversity:

- '*Implementation of the current and future National Biodiversity Action Plan, delivery of National Parks and Wildlife Service Farm Plans and LIFE projects, enhanced wildlife crime investigation capacity and identification and delivery conservation measures at designated sites as identified in the Prioritised Action Framework for Ireland (2021-2027).'*
- *'Investment in nature and biodiversity, to improve the quality of natural habitats and support native plants and animals, including those under threat, and to bolster broader societal wellness and sustainability goals.'*
- *'Future-proofing obligations under the Biodiversity Strategy 2030, including potential national designations and the preparation and delivery of a National Restoration Plan*.'

14.1.10.2 Ireland's 4th National Biodiversity Action Plan 2023-2030

The 4th National Biodiversity Action Plan ('NBAP') 2023-2030 sets out a number of strategic objectives that lay out a clear framework for Ireland's approach to biodiversity and demonstrates Ireland's commitment to protect biodiversity and also halt decline [44].

'*This National Biodiversity Action Plan 2023-2030 builds upon the achievements of the previous Plan. It will continue to implement actions within the framework of five strategic objectives, while addressing new and emerging issues*.' The five objectives are as follows:

- **Objective 1**: Adopt a Whole of Government, Whole of Society Approach to Biodiversity;
- **Objective 2**: Meet Urgent Conservation and Restoration Needs;
- **Objective 3**: Secure Nature's Contribution to People;
- **Objective 4**: Enhance the Evidence Base for Action on Biodiversity; and,
- **Objective 5**: Strengthen Ireland's Contribution to International Biodiversity Initiatives.

The following Objective Outcomes were considered relevant to the Proposed Development and this report.

There are two targeted outcomes listed under this objective which are considered relevant to the Proposed Development. These outcomes are as follows:

Outcome 2A:

> '*The protection of existing designated areas and species is strengthened and conservation and restoration within the existing protected are network are enhanced.'*

Outcome 2B:

> *'Biodiversity and ecosystem services in the wider countryside are conserved and restored – agriculture & forestry.'*

Outcome 2C:

> *'All freshwater bodies are of at least 'Good Ecological Status' as defined under the EU Water Framework Directive.'*

Outcome 2D:

> *'Biodiversity and ecosystem services in the marine and freshwater environment are conserved and restored.'*

Outcome 2H:

> '*Invasive alien species (IAS) are controlled and managed on an all-island basis to reduce the harmful impact they have on biodiversity and measures are undertaken to tackle the introduction and spread of new IAS to the environment*.'

Outcome 3B:

> *'The role of biodiversity in supporting wellbeing, livelihoods, enterprise and employment is recognised and enhanced.'*

Outcome 3C:

> '*Planning and development will facilitate and secure biodiversity's contributions to people*.'

14.1.10.3 All-Ireland Pollinator Plan 2021 – 2025

Irish pollinators are in decline and in response, Ireland joined a small number of countries in Europe who have developed a strategy to address pollinator decline and protect pollination services.

The All-Ireland Pollination Plan [45] was developed by a fifteen-member All-Ireland steering group, with the aim to build a foundation to bring about a landscape where pollinators can flourish, reverse pollinator losses, help restore populations to healthy levels and make Ireland pollinator friendly.

The Plan identifies targets that can be incorporated into agri-environment schemes and actions that can be undertaken voluntarily by farmers in order to make farmland more pollinator friendly, including:

- Create a network of meadows and other flower-rich habitats to serve as pollinator havens;
- Maintenance of good quality hedgerows;
- Allow wildflowers to grow around the farm;
- Plant nectar and pollen rich trees and shrubs;
- Provide nesting areas around the farm; and,
- Maximise wildflowers within field margins / buffer strips.

14.1.11 Regional Planning Context

14.1.11.1 Regional Spatial and Economic Strategy for the Southern Region

The Regional Spatial and Economic Strategy for the Southern Region ('RSES') [46] recognises the need to conserve and enhance biodiversity through coordinated spatial planning between the counties within the southern region of Ireland. This strategy came into effect on 31st January 2020.

Under the biodiversity section, Regional Policy Objective 126 states that the Southern Regional Assembly will:

a) *'Promote biodiversity protection and habitat connectivity both within protected areas and in the landscape through promoting the integration of green infrastructure and ecosystem services, including landscape, heritage, biodiversity and management of invasive and alien*

species in the preparation of statutory and non-statutory land-use plans. The RSES recognises the role of the National Biodiversity Data Centre through its Citizen Science initiatives;

b) *Support local authorities acting together with relevant stakeholders in implementing measures designed to identify, conserve and enhance the biodiversity of the Region; seek and support the implementation of the All-Ireland Pollinator Plan, National Biodiversity Action Plan and National Raised Bog SAC Management Plan;*
c) *Local Authorities are required to carry out required screening of proposed projects and any draft land-use plan or amendment/ variation to any such plan for any potential ecological impact on areas designated or proposed for inclusion as Natura 2000/ European Sites and shall decide if an Appropriate Assessment is necessary, of the potential impacts of the project or plan on the conservation objectives of any Natura 2000/European Site;*
d) *Support local authorities to carry out, monitor and review biodiversity plans throughout the Region. Planning authorities should set objectives in their land use plans to implement and monitor the actions as set out in the National and County Biodiversity Plans, as the conservation of biodiversity is an essential component of sustainable development. Local authorities should address the issue of fisheries protection and invasive introduced species and encourage the use of native species for landscape planting in rural areas, in the review of their biodiversity plans;*
e) *Support local authorities to work with all stakeholders to conserve, manage and where possible enhance the Regions natural heritage including all habitats, species, landscapes and geological heritage of conservation interest and to promote increased understanding and awareness of the natural heritage of the Region.'*

The RSES also contains policies relating to invasive species. Regional Policy Objective 127 states that it is an objective to:

a) *'Support coordination between the Region's local authorities in terms of their measures to survey invasive species in their counties and coordinate regional responses;*
b) *Encourage greater awareness of potential threats caused by invasive species and how they are spread;*
c) *Carefully consider and implement the management of invasive species where there is a corridor, such as hydrological connections to European Sites in order to prevent the spread of invasive to sensitive sites.'*

14.1.12 Local Planning Context

14.1.12.1 Cork County Development Plan 2022 – 2028 ('CCDP')

The CCDP [47] contains several objectives which relate directly to the protection of biodiversity and natural heritage in the context of the Proposed Development. These include objectives to ensure compliance with the EU Habitats Directive and to ensure the protection of the integrity of European sites. It also includes objectives relating to the management of invasive species and the maintenance of ecological corridors. It includes the following policies and objectives that are considered relevant to this project:

<u>Objective BE 15-1:</u>

> '*a) Support and comply with the objectives of the National Biodiversity Plan 2017-2021 (and any future National Biodiversity Plan which may be adopted during the period of this Plan) as appropriate,*

b) Implement the current County Biodiversity Action Plan and any future updated Plan

c) Support and comply with biodiversity policy set out in other national and regional policy documents as appropriate.'

Objective BE 15-2:

'a) Protect all natural heritage sites which are designated or proposed for designation under European legislation, National legislation and International Agreements. Maintain and where possible enhance appropriate ecological linkages between these. This includes Special Areas of Conservation, Special Protection Areas, Marine Protected Areas, Natural Heritage Areas, proposed Natural Heritage Areas, Statutory Nature Reserves, Refuges for Fauna and Ramsar Sites. These sites are listed in Volume 2 of the Plan.

b) Provide protection to species listed in the Flora Protection Order 2015, to Annexes of the Habitats and Birds Directives and to animal species protected under the Wildlife Acts in accordance with relevant legal requirements. These species are listed in Volume 2 of the Plan.

c) Protect and where possible enhance areas of local biodiversity value, ecological corridors and habitats that are features of the County's ecological network. This includes rivers, lakes, streams and ponds, peatland and other wetland habitats, woodlands, hedgerows, tree lines, veteran trees, natural and semi-natural grasslands as well as coastal and marine habitats. It particularly includes habitats of special conservation significance in Cork as listed in Volume 2 of the Plan.

d) Recognise the value of protecting geological heritage sites of local and national interest, as they become notified to the local authority and protect them from inappropriate development.

e) Encourage, pursuant to Article 10 of the Habitats Directive, the protection and enhancement of features of the landscape, such as traditional field boundaries, important for the ecological coherence of the Natura 2000 network and essential for the migration, dispersal and genetic exchange of wild species.'

Objective BE 15-3:

'a) Ensure that biodiversity issues are considered at the earliest possible stages of plan making;

b) Ensure that plans and strategies comply with nature conservation legislation and policy as required (fulfil Strategic Environmental Assessment and Appropriate Assessment requirements); and

c) Carry out ecological impact assessment of plans and strategies as appropriate.'

Objective BE 15-4:

'*a) Ensure that biodiversity protection is considered at design stage for works and development planned and progressed by Cork County Council and that all such projects comply with nature conservation legislation and policy as required;*

b) Fulfil Appropriate Assessment and Environmental Impact Assessment requirements and carry out Ecological Impact Assessment in relation to Local Authority plans and projects as appropriate.'

Objective BE 15-6:

'Provide for the protection and enhancement of biodiversity in the development management process and when licensing or permitting other activities by:

a) Providing ongoing support and guidance to developers on incorporating biodiversity considerations into new development through preplanning communications and the Council's guidance document 'Biodiversity and the Planning Process – guidance for developments on the management of biodiversity issues during the planning process' and any updated versions of this advice;

b) Encouraging the retention and integration of existing trees, hedgerows and other features of high natural value within new developments;

c) Requiring the incorporation of primarily native tree and other plant species, particularly pollinator friendly species in the landscaping of new developments;

d) Fulfilling Appropriate Assessment and Environmental Impact Assessment obligations and carrying out Ecological Impact Assessment in relation to development and activities, as appropriate;

e) Ensuring that an appropriate level of assessment is completed in relation to wetland habitats subject to proposals which would involve drainage or reclamation. This includes lakes and ponds, watercourses, springs and swamps, marshes, heath, peatlands, some woodlands as well as some coastal and marine habitats;

f) Ensuring that the implementation of appropriate mitigation (including habitat enhancement, new planting or other habitat creation initiatives) is incorporated into new development, where the implementation of such development would result in unavoidable impacts on biodiversity - supporting the principle of biodiversity net gain.'

Objective BE 15-7:

'Implement best practice to minimise the risk of spread of invasive alien species, on Council owned or managed land and require the development and implementation of Invasive Alien Species Management Plans for new developments where required.'

Objective BE 15-9:

'a) Implement the County Biodiversity Action Plan and any future updated Plan;

b) Support the implementation of the All-Ireland Pollinator Plan.'

Objective BE 15-13:

'a) Seek the minimisation and control of noise pollution associated with activities or development, having regard to relevant standards, published guidance and the receiving environment.

b) Ensure noise-sensitive developments are adequately protected from potential sources of noise (e.g. national roads). New developments should take account of and mitigate against, any existing noise sources.

c) Support the implementation of Noise Action Plans prepared for the Cork County area.

d) Seek the minimisation and control of light pollution associated with activities of development, having regard to relevant standards, published guidance and the receiving environment and Dark Sky principles.

e) Review and update Cork County Council Policy Guidelines for Public Lighting to take account of impacts of public lighting on wildlife and night skies.'

14.2 Receiving Environment

14.2.1 Desk Study Results

Prior to conducting any surveys onsite, a desk-based review of information sources was completed. The findings of the desk-based review provided valuable insight into the types of flora and fauna that may occur onsite and allowed for the identification of features / habitats located within the vicinity of the Site that may require further assessment.

14.2.1.1 European Sites

In accordance with the European Commission Methodological Guidance [48] a list of European sites that can be potentially affected by the Proposed Development has been compiled. Guidance for Planning Authorities prepared by the Department of Environment, Heritage and Local Government [49] states that defining the likely zone of impact for the screening and the approach used will depend on the nature, size, location and the likely effects of the project. The key variables determining whether or not a particular European Designated site is likely to be negatively affected by a project are:

- The physical distance from the project to the European site;
- The presence of impact pathways;
- The sensitivities of the ecological receptors; and,
- The potential for in-combination effects.

All SPAs and SACs within 15km have been considered to assess their ecological pathways and functional links. As acknowledged in the OPR guidelines [50], few projects have a Zone of Influence this large, however the identification of European designated sites within 15km has become widely accepted as the starting point for the screening process. For this reason, all SPAs and SACs in 15km have been identified for consideration as part of the screening.

Three European sites were identified within 15km of the Site (Figure 14-7, Table 14-2).

Figure 14.7: European Sites within 15km of the Site

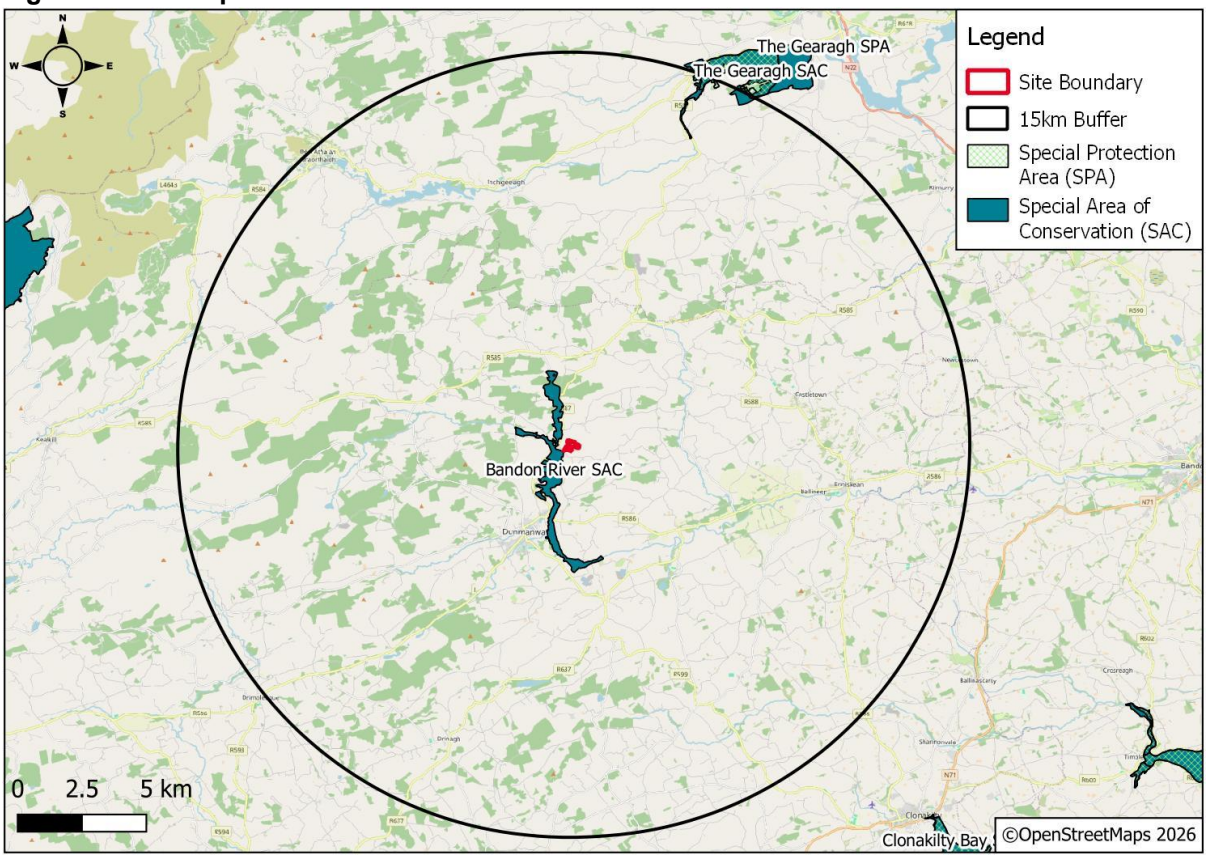


Table 14.2: European Sites within 15km of the Site

Site Name	Code	Distance	Direction from the Site
Special Areas of Conservation ('SAC')			
Bandon River SAC	002171	0.01km	W
The Gearagh SAC	000108	12.7km	NE
Special Protection Area ('SPA')			
The Gearagh SPA	004109	14.6km	NE

The Site is not located within any European sites, however, the boundaries of the two SACs and one SPA are located within 15km from the Site.

Given the distance, intervening lands and lack of impact pathways between the Site and The Gearagh SAC and The Gearagh SPA, these European Designated sites have been screened out from further consideration.

All the Natural Heritage Areas ('NHA') and proposed Natural Heritage Areas ('pNHA') within 5km of the Site have been considered in line with objectives EC 8-3 and BE 15-2 of the CCDP [47].

No NHAs were identified within 5km of the Site. However, one proposed Natural Heritage Areas ('pNHA') was identified within 5km of the Site, refer to Figure 14-8 and Table 14-3.

Figure 14.8: Proposed Natural Heritage Areas within 5km of the Site

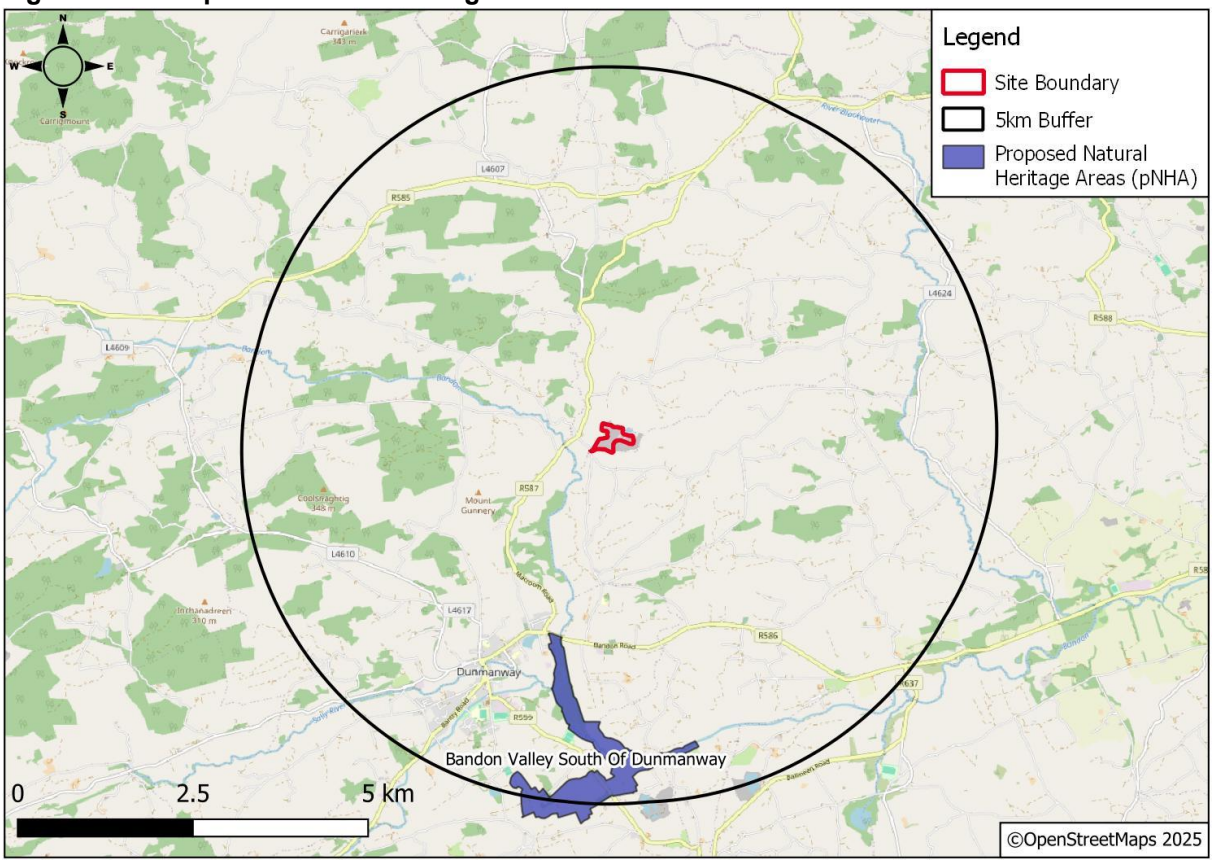


Table 14.3: Proposed Natural Heritage Area within 5km of the Site

Site Name	Site Code	Distance (km) & Direction	Qualifying Interests
Bandon Valley South of Dunmanway	001035	2.7km S	There is no site synopsis available for this pNHA from the NPWS. However, the pNHA covers the southern sections of the Bandon River SAC. See NIS submitted as part of planning application for further details.

14.2.1.2 Protected / Notable Species

Table 14-4 provides a summary of records of legally protected or otherwise notable species that occur within 2km of the Site over the last 10 years within 2km of the Site at the time of writing this report [29]. The NBDC records were checked on 9th January 2026. The following NBDC 2km grid squares were checked: W25L, W25G, W25H, W25I, W25M, W25N, W25R, W25S and W25T.

Only species recorded within the past 10 years were included in Table 14-4. The parameter of 10 years was chosen on the basis of habitat adaption and modification, it is considered that any records over 10 years old are not representative of the current distribution of species populations.

Table 14.4: Protected and / or Notable Species within 2km of the Site

Common Name	Scientific Name	Date of last record	Designation
Bird Species			
Common Kingfisher	Alcedo atthis	15/06/2017	Wildlife Acts 1976 / 2000 EU Habitats Directive Annex I Bird Species Birds of Conservation Concern Amber List
Bat Species			
Brown Long-eared Bat	Plecotus auritus	31/08/2019	Wildlife Acts 1976 / 2000 EU Habitats Directive Annex IV
Daubenton's Bat	Myotis daubentonii	30/08/2021	Wildlife Acts 1976 / 2000

Common Name	Scientific Name	Date of last record	Designation
			EU Habitats Directive Annex IV
Soprano Pipistrelle	Pipistrellus pygmaeus	30/05/2017	Wildlife Acts 1976 / 2000 EU Habitats Directive Annex IV
Invasive Species			
Japanese Knotweed	Reynoutria japonica	05/06/2018	High Impact Invasive Species Regulation S.I. 374 (Ireland)
Rhododendron	Rhododendron ponticum	21/03/2023	High Impact Invasive Species Regulation S.I. 374 (Ireland)
Terrestrial			
European Otter	Lutra lutra	31/12/2016	Wildlife Acts 1976 / 2000 EU Habitats Directive Annex II and IV
West European Hedgehog	Erinaceus europaeus	16/10/2021	Wildlife Acts 1976 / 2000

14.2.2 Field Survey Results

14.2.2.1 Habitats

The following section provides details of the field-based assessment that was undertaken on the following dates:

- 9th January 2023;
- 17th September 2024; and,
- 21st May 2025.

Active Quarry and Mines (ED4)

This habitat was identified as the main habitat type within the Site and comprised areas previously subject to the extraction of rock and associated operations. The habitat was predominantly unvegetated, characterised by exposed rock faces and compacted quarry floor. Regular disturbance from machinery and ongoing activity limited any significant vegetation establishment. Occasional patches of bare ground and temporary water accumulation were observed but lacked notable flora or fauna at the time of survey. The habitat is considered to have low ecological value due to the lack of soil substrate, its ongoing disturbance regime, and limited botanical diversity, as well as ongoing disturbance in parts of the quarry associated with the current permitted operations at the Site.

Buildings and Artificial Surfaces (BL3)

Artificial surfaces were present throughout the Site, primarily in the form of internal quarry roads, inactive quarry floor areas and built infrastructure including a security office and a macadam plant. The built infrastructure is located in the Landownership Boundary and is not part of the Site.

While largely composed of compacted gravel or concrete, some of these areas supported sparse, pioneer vegetation within cracks, edges and less trafficked sections. Species observed in these locations included oxeye daisy (*Leucanthemum vulgare*), lesser trefoil (*Trifolium dubium*), creeping buttercup (*Ranunculus repens*), ribwort plantain (*Plantago lanceolata*) and sweet vernal grass (*Anthoxanthum odoratum*), reflecting colonisation by disturbance-tolerant flora. These species were typically scattered and patchy, indicating low but ongoing vegetation growth within these artificial substrates.

Buildings present within the eastern portion of the Site included a macadam plant, prefabricated security office, canteen and toilets, aggregate storage sheds and silos and a laboratory.

Bare Ground (ED2)

Bare ground was present in scattered locations within the Landownership Boundary, typically occurring as narrow, unvegetated strips adjacent to access routes or separating other habitat types.

In the western portion of the Site, this habitat formed a transitional zone between an internal access road and adjacent scrub.

Further south, bare ground was noted as an informal pathway linking areas of hardstanding, likely the result of repeated disturbance and vehicular movement associated with quarry operations.

Dense Bracken (HD1)

Dense bracken (*Pteridium aquilinum*) was observed in several areas across the Site, most notably in patches surrounding existing scrub habitats and within a more extensive stand in the northern portion of the Site.

These areas were characterised by a thick, largely monocultural cover of dead or decaying bracken fronds, indicative of seasonal dieback and with very limited ground flora diversity. In the northern extent, signs of recent clearance were evident, with disturbed ground and flattened vegetation suggesting previous management works.

Grassy Verges (GS2)

This habitat was present along the access road to the macadam plant bordering the oak-birch-holly woodland and mixed broadleaved woodland. The species present were coltsfoot, bramble, soft shield fern (*Polystichum setiferum*), ribwort plantain, oxeye daisy, common rush (*Juncus effusus*), purple clover (*Trifolium pratense*), herb-robert (*Geranium robertianum*), winter heliotrope (*Petasites pyrenaicus*), foxglove (*Digitalis purpurea*), common polypody (*Polypodium vulgare*), black medick (*Medicago lupulina*), fringed willowherb (*Epilobium ciliatum*) and birdsfoot -trefoil (*Lotus corniculatus*). Pedunculate oak (*Quercus robur*), and grey willow (*Salix cinerea*) saplings had begun to establish in this habitat.

Marsh (GM1)

This habitat was identified within the central portion of the Site, directly adjacent to an area of wet grassland. This habitat occupied a shallow depression with seasonally wet soils and supported a community of hydrophilic and semi-aquatic species typical of marshy ground.

Characteristic marsh species identified here included water plantain (*Alisma plantago-aquatica*), lesser spearwort (*Ranunculus flammula*), water mint (*Mentha aquatica*), pennywort (*Hydrocotyle vulgaris*), fen bedstraw (*Galium uliginosum*) and marsh thistle (*Cirsium palustre*). Broadleaf cattail (*Typha latifolia*) was also dominant, occurring in denser stands toward the wettest central areas of the habitat.

Grey willow was present along habitat edges and within transitional zones where the marsh graded into wet grassland. Creeping buttercup and field horsetail (*Equisetum arvense*) were also frequently recorded in marginal areas and slightly drier microhabitats within the marsh.

Mixed Broadleaved Woodland (WD1)

Mixed broadleaved woodland was recorded primarily in the central and northeastern portions of the Site, typically bordering areas of artificial surfaces and forming a transition between more heavily disturbed ground and adjacent natural habitats. This woodland was distinguished from surrounding

scrub and immature woodland by the presence of more mature trees and a more developed canopy layer.

Canopy species included grey willow, hazel (*Corylus avellana*) and silver birch (*Betula pendula*), which together created a partially shaded environment conducive to a varied understorey flora. The understorey consisted of bramble, butterfly bush (*Buddleja davidii*), creeping buttercup, common polypody, St John's wort (*Hypericum perforatum*.) and foxglove. These species contributed to a diverse woodland ground layer and reflected the transitional nature of this habitat within the quarry landscape.

Oak-Birch-Holly Woodland (WN1)

This habitat was identified primarily in the southern portion of the Site, occurring along the southern boundary of the quarry access track, with smaller pockets also present atop the quarry cliff edge along the western boundary, within areas otherwise dominated by scrub and immature woodland. This habitat extended into the Landownership Boundary. This habitat comprised of an established woodland, on relatively undisturbed ground.

The canopy layer consisted predominantly of sessile oak (*Quercus petraea*), downy birch (*Betula pubescens*), beech (*Fagus sylvatica*), holly (*Ilex aquifolium*) and hazel, forming a relatively dense canopy structure.

The understorey supported a diverse range of woodland herb and shrub species including bracken, bramble, gorse and wood rush (*Luzula multiflora*). Ferns such as soft shield-fern, hart's tongue fern (*Asplenium scolopendrium*) and wall fern (*Asplenium ruta-muraria*) were also recorded, typically occupying shaded banks or rocky outcrops. Herbaceous flora included wood sorrel (*Oxalis acetosella*), foxglove, goldenrod (*Solidago virgaurea*), saxifrage (*Saxifraga* spp.) and herb-robert (*Geranium robertianum*), which collectively contributed to the biodiversity of the woodland floor.

This habitat corresponds to an Annex I habitat listed under the EU Habitats Directive – Annex I Old Sessile Oak Woods with Ilex and Blechnum [91A0].

Other Artificial Lakes and Ponds (FL8)

A number of artificial ponds were recorded across the Site and Land Ownership Boundary, with the most notable concentrations located within the northern and central portions. These waterbodies varied considerably in size and depth, with some appearing shallow and possibly linked to past quarrying activities or surface water accumulation, while others were markedly deeper.

The margins of these ponds were often bordered by wet grassland or scrub habitats, creating transitional habitats that supported a range of hydrophilic and semi-aquatic vegetation. In several instances, natural colonisation had occurred along pond fringes, contributing to habitat complexity and local biodiversity.

Recolonising Bare Ground (ED3)

Recolonising bare ground was identified primarily within the northeast portion of the Site. This habitat featured a diverse assemblage of early-successional and disturbance-tolerant species such as dandelion (*Taraxacum officinale*), yarrow (*Achillea millefolium*), bird's-foot trefoil (*Lotus corniculatus*), cat's-ear (*Hypochaeris radicata*) and creeping buttercup. These species are typically associated with recently disturbed substrates and nutrient-poor soils.

Shrub species such as gorse, bramble and saplings of grey willow were also present and indicate the early stages of scrub encroachment and vegetation succession. Various grasses including creeping bent (*Agrostis stolonifera*), cock's-foot (*Dactylis glomerata*), Yorkshire fog (*Holcus lanatus*), sweet vernal grass, red fescue (*Festuca rubra*) and common bent (*Agrostis capillaris*) were recorded throughout the habitat, contributing to a heterogeneous ground cover.

In addition, a range of flowering plants were identified, including ribwort plantain, common daisy (*Bellis perennis*), oxeye daisy, tufted vetch (*Vicia cracca*), hawkbit (*Leontodon* spp.), mayweed (*Matricaria* spp.), figwort (*Scrophularia* spp.), black medick, yellow trefoil, purple clover, germander speedwell (*Veronica chamaedrys*), rough hawkbit (*Leontodon hispidus*), colt's-foot (*Tussilago farfara*), foxglove and sheep's-bit (*Jasione montana*). These species reflect the transitional nature of the habitat and its high floristic diversity.

Tree and sapling species observed included downy birch and grey willow, with fuchsia (*Fuchsia magellanica*) also occasionally present. Ferns such as field horsetail were noted in patches of damper ground.

Toward the southern portion of this habitat, a gradual increase in surface gravel was noted, suggesting a transition into a more disturbed ground layer, consistent with artificial surfaces used as access tracks.

Scrub (WS1)

This habitat was recorded in small, scattered patches across the central and southern-middle portions of the Site. These areas were typically found on sloped or slightly elevated ground where soil conditions and disturbance allowed for encroachment by woody vegetation. The scrub was dominated by gorse, bracken, bramble and silver birch with frequent occurrences of grey willow and occasionally eared willow (*Salix aurita*). This habitat often formed a transitional zone between open ground and more established woodland or grassland areas.

Scrub / Immature Woodland (WS1 / WS2)

Scrub and immature woodland were dominant habitats within the northern portion of the Site. These two habitats formed a mosaic of woodland and dense scrub.

The canopy layer included tree species such as sycamore (*Acer pseudoplatanus*), beech, pedunculate oak, rowan (*Sorbus aucuparia*), downy birch and silver birch. These species were generally present as saplings or young trees, reflecting the early development stage of the woodland.

The scrub layer was dominated by species such as grey willow, bramble, gorse, butterfly bush and traveller's joy (*Clematis vitalba*). These species formed dense thickets, suppressing ground flora and preventing the growth of a mature woodland.

Stands of Japanese knotweed (*Reynoutria japonica*) were identified in the eastern-most portion of this habitat within the landholding, bordering an area of recolonising bare ground (See Habitat map 14.9 below).

Grasses were generally sparse but present in open patches and included species recorded in adjacent habitats such as creeping bent, Yorkshire fog, sweet vernal grass and red fescue.

Ruderal and disturbance-tolerant species were also scattered throughout the habitat, including ivy (*Hedera helix*), herb-robert and wild strawberry (*Fragaria vesca*), indicating anthropogenic influence.

The understorey flora, limited by shading in denser areas, included oxeye daisy, ribwort plantain, dandelion, common polypody and germander speedwell. These species were present in more open zones of the habitat.

Wet Grassland (GS4)

Wet grassland was identified primarily in the northeastern portion of the Site, directly adjacent to a marsh habitat, with small, fragmented patches also present in the eastern section. This habitat was indicated by seasonally waterlogged soils and supported a diverse mix of hydrophilic grasses, sedges and broadleaved herbs.

Grass species recorded included creeping bent, sweet vernal grass, red fescue, common bent and Yorkshire fog, forming a variable but generally dense sward across much of the habitat.

Common rush and sharp-flowered rush (*Juncus acutiflorus*) were dominant in wetter areas and contributed to the habitat's tussocky structure.

Forb species included ribwort plantain, tormentil (*Potentilla erecta*), heath bedstraw (*Galium saxatile*), sow thistle (*Sonchus* spp.) and bull thistle (*Cirsium vulgare*). Notably, a minimum of 29 flowering individuals of Irish marsh orchid (*Dactylorhiza kerryensis*) were recorded throughout this habitat, significantly enhancing its botanical value and indicating favourable conditions for orchid establishment.

Bramble was observed encroaching in places, particularly at habitat edges where conditions were slightly drier.

Overall, the wet grassland habitats on-site were species-rich, providing valuable connectivity between wetter areas such as marsh and drier grassland and scrub communities elsewhere on Site.

14.2.3 Habitats Recorded within the Land Holding

Dry Siliceous Heath (HH1)

Dry heath was recorded along the northern boundary of the Landownership Boundary, with additional patches identified in the north-east corner. This habitat was not part of the Site. This habitat was characterised by a dominance of dwarf shrub species and is considered of ecological value due to its structural diversity and sensitivity to disturbance.

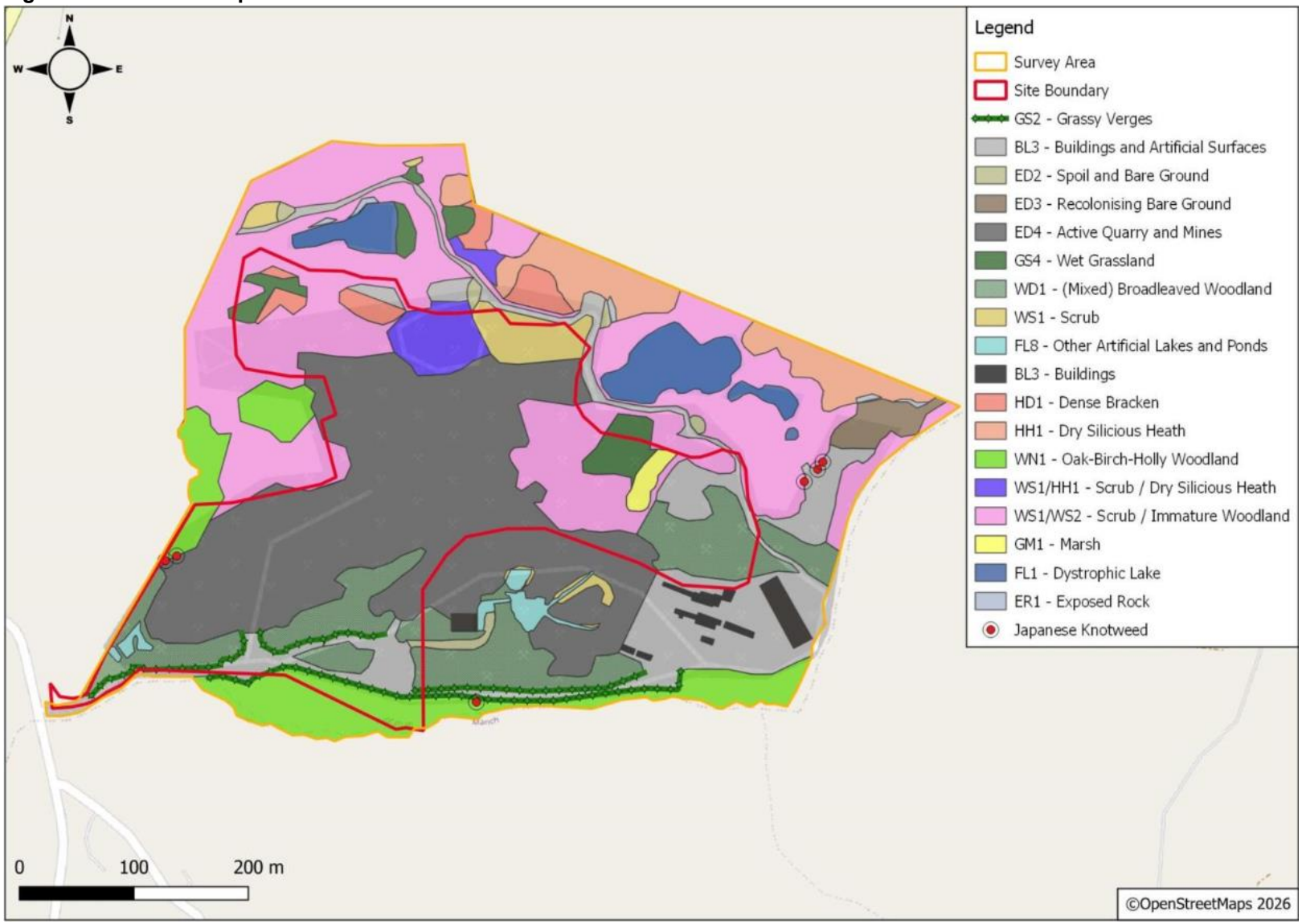
The habitat was dominated by gorse (*Ulex europaeus*), bell heather *(Erica cinerea*), ling heather (Calluna vulgaris) and cross-leaved heath (*Erica tetralix*), forming a patchy but well-established low shrub layer. Bramble (Rubus fruticosus) was present throughout, generally occurring at habitat edges or within more open patches.

Juniper haircap (*Polytrichum juniperinum*) was also frequently recorded across the habitat, particularly in areas of shallower substrate or exposed mineral soil.

One discrete stand of invasive rhododendron (*Rhododendron ponticum*) was identified within the northernmost occurrence of this habitat, located near the northern Site boundary. Its presence is considered locally significant given the potential for further spread and potential suppression of native heath flora.

This habitat corresponds to an Annex I habitat listed under the EU Habitats Directive – Annex I European Dry Heaths [4030].

Figure 14.9: Habitat Map



14.2.3.1 Protected / Notable Species

Flora

No plant species protected under the Flora Protection Order were recorded onsite or within 2km of the Site in the last 10 years [29]. Irish Marsh Orchids were recorded on-site during the recent surveys. This species is endemic to Ireland; however, it is not protected under the Flora Protection Order.

Amphibians

The NBDC held no records of amphibians within 2km of the Site [29].

Amphibians require static or slow-moving waterbodies in order to successfully lay their eggs and tend to favour shallow areas where they are less susceptible to being preyed on by fish.

During the initial Site assessment undertaken on 9th January 2023, suitable waterbodies for breeding amphibians were located within the Site. In turn, one amphibian survey was conducted on 6th June 2023, with follow up surveys conducted on 14th April and 6th May 2025. The methodology used and results from these surveys can be found in Appendix 14-1 - Amphibian Report.

Aquatic Ecology

The NBDC held no records for FWPM within 2km of the Site in the last 10 years [29]. The 2023 survey conducted by Sweeney Consultancy found 148 FWPM at the confluence of the boundary stream and the River Bandon. In 2024, 1,008 FWPM were found in the same location. Further details for the increase in the population at this location are outlined in the FWPM Report attached as Appendix 14-2.

Badger

The NBDC held no records for badger within 2km of the Site [29].

The field surveys did not identify any badger setts within the Survey Area. However, badger scat was identified within the Site boundary. The habitats on the Site, including the heathlands, woodland, scrub and grassland habitats on Site, provide a suitable commuting habitat for badgers. Additionally, the woodland and scrub habitats onsite provide suitable foraging habitat for badger. The presence of badger scat onsite leaves it reasonable to conclude that badger are utilising the Site for commuting or foraging purposes.

Bats

According to the NBDC, the Site is located within a high bat suitability landscape with an index score of 29.22 [29]. Additionally, the NBDC held records for two bat species within 2km of the Site over the last 10 years – Daubenton's bat, brown long-eared bat and soprano pipistrelle [29].

The initial Site walkover identified a number of linear features within the Survey Area which were considered suitable foraging and commuting habitat for bat species. No direct evidence of roosting bats was identified during the initial assessment of these features. However, the woodland habitats within the Site boundary that have the potential to be affected by the Proposed Development were subjected to nighttime bat walkovers ('NBWs').

These NBWs confirmed the absence of bat roosts within the linear features onsite, However, moderate to high levels of bat activity were recorded during both NBWs.

The NBWs confirmed that the Site holds high value foraging and commuting habitat for multiple bat species – common pipistrelle, soprano pipistrelle, Leisler's bat, brown long-eared bat and Myotis species. Leisler's bat and soprano pipistrelle were recorded soon after dusk during the first survey, indicating that a bat roost for this species is likely to be present within the local AREA. The surveys recorded the majority of bat commuting and foraging activity over the woodland, scrub and other vegetation in the north of the Survey Area.

Please refer to Appendix 14-3 – Bat Report for full details of the results of the bat surveys.

Birds

The NBDC held records of kingfisher within 2km of the Site in the last 10 years , as outlined in Table 14-7 [29].

During the initial habitat survey on 9th September 2023, the Site was assessed for its potential to provide nesting habitat for breeding birds, to support important assemblages of wintering birds or to support rare or notable species.

Following the initial Site walkover, it was deemed necessary to undertake wintering and breeding bird surveys and peregrine falcon surveys on the Site.

Wintering Birds

Two wintering bird surveys were completed on 16th February 2023 and 21st March 2023. During the wintering bird VP surveys, a total of ten species were recorded:

- Four Green listed BoCCI non-Annex I species– buzzard, grey heron, jay; and, moorhen;
- Six Amber-listed BoCCI, non-Annex I species were recorded – coot, herring gull, mallard, tufted duck, teal and little grebe; and,
- No Red-listed BoCCI species were recorded.

Full details of the wintering bird survey results are provided in the Bird Report attached as Appendix 14-4– Bird Report

Breeding Birds

Breeding bird transect surveys were undertaken within the ownership boundary on 17th May, 7th June, 12th July 2023 and 10th April and 23rd April 2025.

During the 2023 breeding bird surveys, a total of 26 species were recorded:

- 20 Green Listed BoCCI non-Annex I species – blackbird, blackcap, blue tit, bullfinch, chaffinch, chiffchaff, dunnock, goldfinch, great tit, jackdaw, little grebe, moorhen, pied wagtail, redpoll, robin, rook, sedge warbler, song thrush, treecreeper; and wren; and,
- Six Amber Listed BoCCI, non-Annex I species were recorded – goldcrest, house sparrow, swallow, willow warbler, mallard and sand martin.

Of the species recorded, three were classified as 'Confirmed Breeding,' jackdaw, wren, and sand martin. In addition, seven other species were classified as 'Possibly Breeding' and 16 species were classified as 'Non-breeding'.

During the 2025 breeding bird surveys, a total of 28 species were recorded:

- 21 Green Listed BoCCI non-Annex I species – blackbird, blackcap, blue tit, chaffinch, chiffchaff, coal tit, dunnock, great tit, hooded crow, jackdaw, jay, little grebe, mistle thrush, peregrine falcon, pheasant, redpoll, robin, rook, song thrush, wood pigeon and wren; and,

- Six Amber Listed BoCCI, non-Annex I species were recorded – goldcrest, mallard, sand martin, swallow, willow warbler, grey wagtail and starling.

No Red-listed species were recorded.

Of the species recorded, four were classified as 'Confirmed Breeding,' – blackbird, jackdaw, rook, and sand martin. In addition, 20 other species were classified as 'Possibly Breeding', and four species were classified as 'Non-Breeding'.

Full details on breeding bird survey results are presented in Appendix 14-4 – Bird Report.

Peregrine Falcon

Targeted peregrine falcon surveys were undertaken on 17th May 2023, 6th June 2023, 14th April 2025, and 23rd April 2025 to confirm the presence / absence of peregrine falcon within the vicinity of the Site.

During the 2023 peregrine falcon surveys:

- High levels of peregrine falcon activity were noted within the quarry during the first peregrine falcon survey. A male and female peregrine were identified potentially using a nest in the quarry face; and,
- In the second survey, two peregrine falcon chicks were observed in the nest during the survey. The female peregrine were observed bringing food to the nest and both the male and female were observed feeding the chicks.

During the 2025 peregrine falcon surveys:

- High levels of peregrine and raptor activity were observed during the survey on 10th April 2025. A peregrine was observed on a nest with signs suggesting the possible presence of chicks; and,
- High levels of peregrine activity were observed during the survey on 24th April 2025. Two peregrines were noted utilising the quarry cliff face. No eggs or chicks were observed.

Full details on survey results are presented in Appendix 14-4 – Bird Report.

Otter

The NBDC held records within 2km of the Site over the last 10 years [29]. However, during the Site walkover, no evidence of otter, such as spraints or holts were identified.

Otters are known to travel up to 500m from waterbodies for holt construction. The nearest surface waterbody was identified along the southern Site boundary. In theory, the woodland and scrub habitats within the Site have the potential to support otter as they are within 500m of the nearest river. In addition on Site ponds could be used by foraging otters.

Invasive Species

The NBDC held records for two invasive species within 2km of the Site – Japanese knotweed and rhododendron [29].

Japanese knotweed and rhododendron are both non-native, high impact plant species that are subject to restrictions under Regulations 16(1) and 17 of the European Union (Invasive Alien Species) Regulations 2024 (S.I. No. 374/2024) [38]. These species were both identified within the landholding.

Four medium impact invasive species – sycamore, butterfly bush, traveller's joy and winter heliotrope –were also identified on the Site during the surveys. These species are not currently regulated in Ireland.

Other Species

The NBDC also held records for hedgehog within 2km of the Site [29]. Hedgehog are common and widespread species in scrub, woodland and rank grassland habitats. No direct evidence of hedgehog was identified onsite; however, the hedgerow / treelines and scrub habitats within the Site provide suitable cover and sheltering habitat for this species. It is considered likely that hedgehog could utilise habitats within the Site.

During the field surveys pine marten and fox scat were identified within the Site boundary. The woodland and treelines onsite could provide suitable habitat for commuting pine marten and fox. Additionally, the woodland within the north of the Site provides connectivity to the surrounding area. This leaves it reasonable to conclude that pine marten and fox are utilising the Site. Additionally, the remaining woodland in the Survey Area is suitable for red squirrel and Irish stoat. No other evidence of protected or otherwise notable species was identified during the field surveys.

14.3 Characteristics & Predicted Effects of the Proposed Development

The proposed development comprises the quarrying of quartzitic sandstone, thereby extending the existing quarry and extraction area. A full description of the proposal is provided in Chapter 3 of this EIAR and in the statutory notices.

14.3.1 Sensitive Design

- The Proposed Development has been designed to avoid any significant effects to the Dry Silicious Heath and Oak-Birch-Holly Woodland as these habitats correspond with Annex I habitat listed under the EU Habitats Directive - Annex I European Dry Heaths [4030] and Annex I Old Sessile Oak Woods with Ilex and Blechnum [91A0]. A 25m buffer will be in place between these habitats and the Proposed Development;
- The proposed wash plant location has been designed to provide a 50m buffer zone between all processing plant equipment and the quarry edge used by peregrines;
- A Regeneration Plan will be implemented for the Site (Appendix 11-1). This plan will seek to conserve and, where possible, enhance the area of retained and created habitat. Existing long-established woodland to be protected and remain undisturbed. Existing dry silicious heath to be protected and remain undisturbed. Fencing and signage will be installed on the ground. This habitat is to be managed to allow expansion. Existing ponds are to be retained to promote biodiversity;
- All trees that are to be retained will be protected from unnecessary damage. A minimum buffer of 5m will be maintained between the proposed extraction area and the retained trees onsite.
- All vegetation removal required onsite will be undertaken in accordance with relevant legislation to avoid potential disturbance to nesting birds. These works will be undertaken outside the period of 1st March to 31st August, inclusive;
- The Site's standard operation hours will be from 07:00 to 19:00 Monday to Friday, with occasional Saturday hours of 07:00 to 14:30. Therefore, potential significant effects to nocturnal and crepuscular species in the area will be limited.

14.3.2 Identification of Potentially Significant Effects on Identified Receptors

Based on the methodology that is set out in Section 14.1, Table 14-8 sets out the findings of the valuation of important and legally protected receptors. Each receptor is assessed and a scoping justification for each receptor is provided for the Construction, Operational and Rehabilitation Phases combined.

Table 14.5: Valuation of Potential Ecological Receptors

Potential Biodiversity Receptor	Relevant Legislation	Valuation	Scoping Result and Justification	Scoping Result
Protected Sites				
European sites	European Communities (Natural Habitats) Regulations 1997 (as amended)	Internationally designated sites for conservation.	An NIS was prepared as part of the overall planning application. These designated sites were assessed in line with Objectives 15-2, 15-3, 15-4, 15- 6 and 15-17 of the CCDP [47]. The NIS concluded that the Proposed Development would not cause any significant adverse effects on any European sites or any of their designated features of interest, provided that the design mitigation measures incorporated in the NIS are fully adhered to. Therefore, progression to Stage Three of the Appropriate Assessment process (i.e. Assessment of Alternative Solutions) was not considered necessary. For full details on the assessment of effects on European sites, refer to the NIS submitted as part of planning.	European sites have been scoped in for further consideration. Refer to the NIS submitted as part of the planning application for full details.
Natural Heritage Areas ('NHAs') and proposed Natural Heritage Areas ('pNHAs')	Wildlife Act 2000 (as amended)	Nationally designated sites for conservation	Nationally designated sites for conservation i.e., NHAs and pNHAs were considered as part of this assessment in line with Objective 15-2 of the CCDP [47]. No NHAs were identified within 5km of the Site; however, one pNHA was identified. There is a hydrological connection between the Site and the Bandon Valley South of Dunmanway pNHA via the boundary stream. Water mitigation measures will be put in place as part of the Proposed Development. This receptor has therefore been scoped in for further consideration.	NHAs have been scoped out from further consideration. pNHAs have been scoped in for further consideration.
Habitats – within the Site				
Active quarries and mines (ED4)	N/A	Moderate Local Value	While the quarry is not currently active, given the disturbed nature of this habitat from historic quarrying activities and also on going activates at the Site, it is considered to be of limited ecological value. Therefore, any alteration / loss of this habitat is not considered to be significant. Subsequently, the impact of the Proposed Development on quarry areas is not significant, and this receptor has been scoped out from further consideration.	Active quarries and mines has been scoped out from further consideration.

			However, this habitat supports the peregrine falcon. Additionally, the quarry face that was being used by this species will be retained and protected as part of the Proposed Development.	
Artificial Surfaces (BL3)	N/A	Low local value	The artificial surfaces on the Site were considered to have low ecological value. Subsequently, any alteration or loss of this habitat is not considered to be significant. Additionally, all buildings in the Survey Area are outside of the Site Boundary and will be left in-situ as part of the Proposed Development. Therefore, this receptor has been scoped out from further consideration.	Artificial Surfaces has been scoped out from further consideration
Bare Ground (ED2)	N/A	Low local value	The bare ground in the Survey Area is of limited ecological value. This habitat is not part of the Site Boundary and will not be affectedby the Proposed Development. Therefore, this receptor has been scoped out from further consideration.	Bare Ground has been scoped out from further consideration
Dense Bracken (HD1)	N/A	Low local value	The areas of bracken were dead at the time of the most recent survey. Bracken is known for its highly competitive and suffocating nature, often outcompeting native vegetation and reducing overall biodiversity. As such, this habitat was considered to be of low ecological value. Subsequently, the effect of the Proposed Development on areas of dense bracken is not significant and this receptor has been scoped out from further consideration.	Dense Bracken has been scoped out from further consideration
Grassy Verges (GS2)	N/A	Low Local Value	This habitat supports a range of floral species associated with pollinators and is considered to be of high ecological value. As part of the Proposed Development the grassy verges within the Site will be retained in-situ and are not expected to be subject to direct disturbance. Appropriate buffer zones will be established to ensure protection of these areas from indirect effects during all phases of the Proposed Development. As these habitats will be fully retained and safeguarded through design measures, grassy verges have been scoped out from further consideration.	Grassy Verges has been scoped out from further consideration
Marsh (GM1)	N/A	High Local Value	This habitat was identified to be of high local biodiversity value and was present within the proposed extraction area of the quarry extension. This habitat supports a range of wetland flora and fauna, including the presence of a rare orchid species – Irish marsh orchid, which increases its ecological significance. The habitat will be subject to direct disturbance and partial or complete loss as	Marsh has been scoped in for further consideration.

			a result of the Proposed Development. Given its sensitivity and high local value, this receptor has been scoped in for further detailed consideration.	
Mixed Broadleaved Woodland (WD1)	Wildlife Act 2000 (as amended)	High Local Value	Mixed broadleaved woodland within the Site was found to have high local value. This habitat provides important ecological functions, including structural diversity, habitat for protected species, and landscape connectivity. Parts of this woodland will be directly impacted and removed to facilitate the Proposed Development. Given the local ecological importance of this habitat and the extent of potential loss, this receptor has been scoped in for further detailed consideration. Mitigation measures, including protection of retained areas and allowing the woodland to be reestablished in the north of the Site are proposed.	Mixed Broadleaved Woodland has been scoped in for further consideration.
Other Artificial Lakes and Ponds (FL8)	N/A	High Local Value	Artificial ponds are present in the Survey Area. The waterbody in the southwest of the Site is proposed to be turned into a wet woodland area with appropriate planting. The other waterbodies in the Survey Area will be retained. Amphibians were found to be present within the waterbodies in the centre of the Survey Area. No amphibians were found in the waterbody in the southwest of the Site. However, appropriate mitigation will be put in place during the planting of this waterbody.	Other Artificial Lakes and Ponds has been scoped in for further consideration
Recolonising Bare Ground (ED3)	N/A	Low Local Value	This habitat was not present within the Site Boundary and will not be affected by the Proposed Development. Therefore, this receptor has been scoped out from further consideration.	Recolonising Bare Ground has been scoped out from further consideration.
Scrub (WS1)	Wildlife Act 2000 (as amended)	Low Local Value	The Proposed Development will result in the removal of areas of scrub to facilitate the quarry extension. The area of scrub to be removed as part of the proposed works is not considered to be of high conservation value, though it does have the potential to support protected species such as nesting birds. Restrictions apply with regard to the time of year in which vegetation can be cut (see Nesting Birds below)/ Therefore, any vegetation clearance works will need to take account of protected species.	Scrub has been scoped in for further consideration
Scrub / Dry Siliceous Heath (WS1 / HH1)	Wildlife Act 2000 (as amended)	High local value	The Proposed Development will result in the removal of areas of scrub and dry siliceous heath within the quarry extension boundary. This habitat no longer conforms to the Annex I habitat due to the invasion of the scrub. However, it is still of high ecological value due to its potential to support protected species.	Scrub / Dry Siliceous Heath has been scoped in for

			Due to the presence of this habitat and its ecological sensitivity, this receptor has been scoped in for further consideration. Mitigation measures will be developed to minimise potential effects on the dry heath component and to address any potential loss of associated scrub habitat.	further consideration.
Scrub / Immature Woodland (WS1 / WS2)	Wildlife Act 2000 (as amended)	Moderate local value	The Proposed Development will involve the removal of areas of scrub and immature woodland within the quarry extension boundary. While these habitats are not considered to be of high conservation priority, they still provide some local biodiversity value and may support protected species. Therefore, vegetation clearance will be subject to seasonal restrictions to avoid significant effects on sensitive fauna, such as nesting birds (see below). Given the moderate ecological value of these habitats and the need for protection measures, scrub / immature woodland has been scoped in for further consideration.	Scrub / Immature Woodland has been scoped in for further consideration.
Wet Grassland (GS4)	N/A	High Local Value	Wet grassland habitat was identified within the central portion of the Site. This habitat plays an important ecological role by providing valuable connectivity between wetter habitats, such as marsh, and drier grassland and scrub areas elsewhere on Site. Notably, the wet grassland onsite supports populations of Irish marsh orchid, enhancing its botanical significance. As areas of wet grassland will be directly removed to facilitate the Proposed Development, this habitat has been scoped in for further consideration.	Wet Grassland has been scoped in for further consideration.
Habitats – within the Land Holding				
Dry Siliceous Heath (HH1)	Wildlife Act 2000 (as amended) European Communities (Natural Habitats) Regulations 1997 (as amended)	National Importance	Dry siliceous heath is a habitat of high biodiversity value and is corresponds to European Dry Heaths (4030), which is designated under Annex I of the EU Habitats Directive [51]. This habitat is outside of the Site Boundary but is within the overall landholding. This habitat will be left in-situ and will not be directly affected by the Proposed Development. In recognition of the ecological importance of this habitat, appropriate buffer zones have been established to ensure its protection during all phases of the Proposed Development. These buffers will help prevent indirect effects such as dust deposition, surface water runoff, and physical encroachment during construction and operation. As the habitat will be retained in its entirety and safeguarded through suitable design measures, this habitat has been scoped out from further consideration.	Dry Siliceous Heath has been scoped out from further consideration.

			Additionally, as part of the on-site Regeneration Plan, this habitat will be protected and remain undisturbed. Fencing and signage will be installed on the ground delineate the heath.	
Dystrophic Lake (FL1)	N/A	High Local Value	The dystrophic lakes are located in the north of the Survey Area. These lakes are considered to be of high ecological value based on the aquatic vegetation and support of bird and invertebrate species. They are not within the Site Boundary, and the Proposed Development will not affect them. Therefore, this receptor has been scoped out from further consideration.	Dystrophic Lake has been scoped out from further consideration
Exposed Rock (ER1)	N/A	High Local Value	This habitat supports a range of species. St. Patrick's cabbage is native to Ireland and present in this habitat. This habitat is outside the Site Boundary and will be retained as part of the Proposed Development and is therefore scoped out from further consideration	Exposed Rock has been scoped out from further consideration
Oak-Birch-Holly Woodland (WN1)	Wildlife Act 2000 (as amended) European Communities (Natural Habitats) Regulations 1997 (as amended)	National Importance	This habitat corresponds to the Annex I habitat of the EU Habitats Directive: 91A0 Old sessile oak woods with Ilex and Blechnum in the British Isles [51]. This habitat is not within the Site Boundary. This woodland will be fully retained and will not be subject to direct effects as part of the Proposed Development. To safeguard its ecological integrity, appropriate buffer zones of 25m will be implemented to prevent indirect effects such as dust deposition, surface water runoff, or encroachment during extraction activities. As the habitat will be preserved in its entirety and protected through the design of the Proposed Development, this habitat has been scoped out from further consideration.	Oak-Birch-Holly Woodland has been scoped out from further consideration.
Recolonising Bare Ground (ED3)	N/A	Low Local Value	There are areas of recolonising bare ground within the landholding. These habitats are not considered to be of significant conservation value. This habitat was not present within the Site Boundary and will not be affected by the Proposed Development. Therefore, this receptor has been scoped out from further consideration.	Recolonising Bare Ground has been scoped out from further consideration.
Flora and Fauna				
Flora	N/A	Flora	<u>Irish Marsh Orchid</u> Irish marsh orchid was recorded in high numbers within the wet grassland on the Site and additionally in low numbers within the wider Survey Area. The Proposed Development will require the removal of the wet grassland to facilitate the extension of the quarry. It should be noted that this plant species is not	Flora has been scoped in for further consideration.

			afforded any legal protection under the Flora Protection Order. Irish Marsh Orchids are, however, rare due to their specialised habitat requirements and are considered to be a notable species and therefore have been scoped in for further consideration.	
Amphibians	Wildlife Acts 1976 / 2000 EU Habitats Directive Annex V	High Local Value	Amphibians are commonly associated with quarry sites. It should be noted that amphibians are relatively widespread and abundant in Ireland, however, they are of conservational interest and are protected under the Schedule V of the Wildlife Act. Amphibian surveys were undertaken in 2023 and 2025. Smooth newt and common frog were identified within the Survey Area. For full survey results, please see Appendix 14-1. No amphibians were recorded within the Site, given the confirmed presence of this species within the area, appropriate mitigation measures will be put in place to protect this species. Therefore, this receptor has been scoped in for further consideration.	Amphibians have been scoped in for further consideration.
Aquatic Species	<u>Freshwater Pearl Mussel</u> Habitats Directive Annex II, Annex IV Wildlife Act 2000 (as amended)	High Local Value	FWPM are very sensitive to water quality and any effects on water quality could have adversely affected this species. This species is known to occur within the vicinity of the Site and the FWPM survey conducted in 2024 found 1,008 FWPM in the River Bandon downstream of where the boundary stream discharges into the river. See Appendix 14-4 for full survey results. Given that the Site falls within the catchment area for this species and the recording of them ca. 375m downstream from the Site, the Proposed Development has the potential to negatively affect them during the Construction, Operational and Regeneration phases. Water quality mitigation measures are therefore required to ensure that significant effects are avoided. Full details of the water migration measures are presented in Chapter 7. Therefore, this receptor has been scoped in for further consideration.	Aquatic species have been scoped in for further consideration.
Bats	Wildlife Acts 1976 / 2000 EU Habitats Directive Annex IV	High Local Value	No trees or buildings suitable for roosting bats were identified within the Site or wider Survey Area. The Site was deemed to be of high local value for foraging and commuting bats following the bat surveys undertaken in 2023, 2024 and 2025 on the Site.	Bats have been scoped in for further consideration.

			Given the presence of bat activity onsite and the loss of foraging / commuting habitats onsite to facilitate the Proposed Development, this receptor has been screened in for further consideration. It is important to note that no lighting is proposed as part of the Proposed Development and therefore, it is reasonable to conclude that bats and other nocturnal species will not be adversely affected as a result of light spillage into dark areas. Therefore, this receptor has been scoped in for further consideration.	
Badger	Wildlife Acts 1976 / 2000	Low Local Value	The woodland on-site is suitable for sett construction. Additionally, the immature woodland and scrub habitat are suitable for foraging and commuting badger. Evidence of badger has been found on site in the form of scat. Therefore, this species has been scoped in for further consideration and mitigation measures to prevent effects on badgers will be implemented as part of the Proposed Development. Refer to Section 6.5 below for further details. These measures are in line with Objectives 15-2, 15-3, 15-4 and 15-6 of the CCDP [47]. This species has been scoped in for further assessment.	Badgers have been scoped in for further consideration.
Birds	Nesting Birds Wildlife Acts 1976 / 2000 Peregrine Falcon Wildlife Acts 1976 / 2000 Birds of Conservation Concern – Green List European Birds Directive – Annex I	High Local Value	<u>Wintering Birds</u> The I-WeBS data found that Coot were recorded at numbers of international importance in the 2019/20 in Ballynacarriga Lake. Ballynacarriga Lake is located ca. 6.1km southeast of the Site. During the winter bird surveys, a total of ten bird species were recorded during the surveys. No species were recorded during the surveys in numbers that would be considered of national or international importance. The Survey is not considered to be of importance for wintering bird species. Additionally, the Proposed Development will not interfere with the lakes in the north of the Site that are considered suitable for wintering birds. <u>Breeding Birds</u> The works will require the removal of immature woodland, scrub, scrub / dry siliceous heath and mixed broadleaved woodland on-site. This will result in the loss of potential nesting and foraging habitat for a range of countryside birds. Therefore, mitigation measures have been incorporated below in relation to nesting birds. <u>Peregrine Falcon</u>	Birds have been scoped in for further consideration.

			High levels of peregrine falcon activity have been recorded within the Site during surveys undertaken since 2023. Peregrine falcon nests with chicks have been identified during these surveys. The surveys confirmed that peregrine falcon are utilising the Site and wider Survey Area for nesting and foraging purposes. Further consideration will be given to this species in order to ensure peregrine falcon are not disturbed by the Proposed Development. In addition, the wash plant location has been designed to provide a 50m buffer between the nest location and all processing plant equipment. Therefore, this receptor has been scoped in for further consideration.	
Otter	Wildlife Act 2000 (as amended)	Low Local Value	Otters are known to travel up to 500m from waterbodies for holt construction. The nearest surface waterbody was identified along the southern Survey Area boundary. The woodland and scrub habitats within the Site have the potential to support otter as they are within 500m of the nearest river. In addition, the waterbodies created in the Survey Area also considered to provide suitable foraging habitat for otters. Therefore, this receptor has been scoped in for further consideration. It should be noted that Water quality mitigation measures will be implemented as part of the Proposed Development and this will ensure that prey species within river are not impaired by the works.	Otter have been scoped in for further consideration.
Invasive Species	Invasive Species under Regulation S.I. 477 (Ireland)	Species dependent	Two high-impact invasive species listed on the First Schedule of the European Union (Invasive Alien Species) Regulations 2024 (i.e. species of which it is an offence to disperse, spread or otherwise cause to grow in any place) were noted in the Survey Area during the field surveys – Japanese knotweed and rhododendron. Japanese knotweed was noted in the Site Boundary. As such, specialised mitigation measures will be implemented to ensure that these species are not allowed to spread during the construction or operational phases of the Proposed Development. A Japanese Knotweed Management Plan will be implemented as part of the Proposed Development and is located in Appendix 14-5 Additionally, standard measures will be implemented in order to ensure no invasive species are introduced into the Site during the construction or operational phases (see Section 6.5). All measures are in compliance with Objective 15-7 of the CCDP [47].	Invasive species have been scoped in for further consideration.

Other Species	Pine marten & hedgehogs Wildlife Act 2000 (as amended) Common species N/A	Moderate Local Value	Given the presence of suitable habitats onsite and within the wider area for hedgehog, pine marten, red squirrel and Irish stoat and other terrestrial mammals, standard protection measures for these species will be incorporated into the works.	Other species have been scoped in for further consideration.

14.3.3 Summary of Potential Effects

Following a detailed assessment, the following species and habitats were identified as receptors that warranted further consideration in Section 14.4 below:

- European sites;
- Marsh (GM1);
- Mixed Broadleaved Woodland (WD1);
- Other artificial lakes and ponds (FL8);
- Scrub (WS1);
- Scrub / Dry Siliceous Heath (WS1 / HH1);
- Scrub / Immature Woodland (WS1 / WS2);
- Wet Grassland (GS4);
- Flora;
- Amphibians;
- Aquatic species;
- Bats;
- Badger;
- Birds;
- Otter;
- Invasive species; and,
- Other species.

In addition to habitat and species-specific mitigation for the receptors listed above, general mitigation / best practice measures have also been included for the Proposed Development. As noted above, a Regeneration Plan has been developed for the Site, which involves continuous restoration as works progress through the Site. This Regeneration Plan is presented as part of Appendix 11-1. An annual review of the Regeneration Plan will be conducted to track the progress of regeneration works and outline any additional works required.

14.4 Proposed Mitigation Measures and / or Factors

The following mitigation measures will be incorporated and adhered to during the Construction, Operational and Rehabilitation Phases at the Site to ensure that the works do not result in contravention of wildlife legislation:

- Quarrying activities will comply with all relevant legislation and best practice to reduce any potential environmental impacts. The mitigation measures detailed within this EIAR will be fully adhered to; and,
- The Site manager shall ensure that all personnel working onsite are trained and aware of the mitigation measures detailed within the EIAR.

The following general measures will also be adhered to during the Proposed Development works:

- If protected or notable species are encountered during operations at the Site, works will stop within the area that the notable species was identified in, and a suitably qualified ecologist will be contacted for advice; and,
- Should unidentified burrows be identified within the works area, a suitably qualified ecologist will be contacted, and advice sought.

The operator will appoint an Ecological Clerk of Works ('ECoW'). Their contact details will be kept at the Site office and made available to the on-site manager. The ECoW will inspect the Site in advance of works commencing and will undertake Site inspections as required during the works to ensure that all the works are completed in line with the measures in this EIAR and wildlife legislation.

The ECoW will be contacted in the event that habitat or species of interest are identified during day-to-day operations and will be involved in the oversight and sign-off of landscaping, ecological mitigation works, and Regeneration work.

14.4.1 Protection for Amphibians

No locations where amphibians were recorded will be affected by the expansion of the quarry. Ponds A, B and K will be removed, and Pond I will be increased in size to facilitate the expansion of the quarry. The remaining waterbodies will be maintained and protected during the works.

Given the confirmed presence of smooth newts and common frogs and the presence of suitable breeding, foraging and sheltering habitats for amphibians, the following regeneration/mitigation measures will be implemented to ensure the works do not adversely affect amphibians.

The following mitigation measures will be implemented:

- The infilling of the ponds and the removal of suitable marsh habitat will be scheduled to take place outside of the amphibian breeding season (February - August). ECoW will inspect the area and net any ponds prior to infilling and supervise the works to ensure that no amphibians are present;
- Any amphibians that are found during the removal of the five ponds or marsh habitat will be relocated to the newly created pond in the western part of the Site; and,
- Should amphibians be encountered during any other activities associated with the Proposed Development, the ECoW will be consulted for advice.

14.4.2 Protection for Aquatic Species

Water mitigation measures are presented in Chapter 7. The water mitigation measures will be adhered to throughout the construction, operational and regeneration phases of the Proposed Development.

14.4.3 Protection of Woodland and Trees

The Proposed Development will require the removal of ca. 1.7 hectares of scrub, mixed broadleaved woodland and immature woodland. All other woodland and trees onsite will be protected from unnecessary damage in accordance with BS 5837:2012, Trees in relation to design, demolition & construction. During the construction works, care will be taken to protect trees and woodland areas from both direct and indirect disturbance. The following mitigation measures for the retained immature woodland areas will be adhered to:

<u>Tree Protective Fencing</u>

- All development works will be set back a minimum of ca. 5m from retained trees and woodland areas;
- All trees and woodland areas to be retained that will be located within close proximity to the extraction area will be fenced off by a security fence. These barriers will remain in place for the lifetime of the Proposed Development and will prevent accidental disturbance and define the limits for quarrying activities;

- All materials, equipment or machinery will be stored on the quarry side of the boundary fence;
- In order for tree protection measures to work effectively, all personnel associated with the operation of heavy plant machinery must be familiar with the above principles for the protection of treelines;
- Notice boards, wires, etc., will not be attached to any trees;
- An ECoW will undertake weekly inspections during the construction of the berms to ensure that no effects occur to bordering hedgerows / treelines; and,
- The retained trees and woodland will be assessed by an arborist or the ECoW following the completion of berm construction.
- The following principles will be adopted by site personnel within the root protection zones during construction, to ensure protection of retained trees:
    - No level changes;
    - No excavations;
    - No fires;
    - No use of herbicides; and,
    - No storage of materials, machinery or access for construction workers.

14.4.4 Translocation of Marsh Orchids

Given the presence of Irish marsh orchids within habitats to be removed as part of the Proposed Development, a transplantation exercise will be undertaken to relocate a viable population of this species into the newly re-created wetland areas. The works will involve the following steps:

- **Site Selection**: The receiver site must closely match the source in soil pH, nutrient levels, and hydrology.
- **Fungal Symbiosis**: Successful translocation depends on the presence of specific soil fungi (mycorrhizae) that orchids require to survive. Therefore, an intact section of soil turf, containing Irish marsh orchids, will be moved to preserve these fungal networks.
- **Timing**: Lifting and moving of the turf will occur in early autumn or early spring.
- **Methodology**: Sections of turf will be cut and maintained intact and translocated in sections into the early-created wetland areas. The ecologist will supervise these works.
- **Monitoring**: Post-translocation surveys will be undertaken to track survival success.

14.4.5 Protection for Bats

<u>Roosting bats</u>

Given the levels of activity recorded during the on-site surveys, it is proposed to install artificial bat boxes within the Site.

Artificial bat boxes will also be erected on suitable mature trees within the Site. Artificial bat boxes can provide vital roosting places in habitats devoid of natural roosting opportunities. Bat boxes can also provide additional suitable roosting habitats for bats in an area.

Bat boxes should be placed in a position sheltered from strong winds and exposed to the sun for part of the day. The boxes will be located in / close to linear features, such as the treelines and placed a minimum of 2m above the ground. The number and location of which will be specified by an ecologist.

Figure 14-10 below shows suitable bat roost box examples, including a Pole Mounted Bat Box, Bat Box Schwegler 1FF and Vivara Small Bat Box.

Figure 14.10: Suitable Bat Boxes



Additionally, as lesser horseshoe bats will not use bat boxes as they require flight space and flying access into their roost, it is proposed to construct a dedicated lesser horseshoe bat roosting space on site. The roost will have a suitable flight entrance space for lesser horseshoe bats (2.8m in height and 5m in length and width) [52]. Figure 14-11 below shows a suitable artificial lesser horseshoe bat roost structure that could be constructed on site. The lesser horseshoe bat roost will be located in the northwest of the Site within close proximity to the woodland area.

Figure 14.11: Suitable Artificial Lesser Horseshoe Bat Box



Foraging and Commuting Bats

Bats will be able to use the retained and regenerated habitats included in the Regeneration Plan for foraging and commuting.

14.4.6 Protection for Birds

14.4.6.1 Breeding Birds / Peregrine Falcons

To ensure no adverse effects occur to birds as a result of the Proposed Development, the following mitigation measures will be put in place:

- Any vegetation clearance required will take place outside of the nesting bird season (1st March to 31st August), as per Section 40 of the Wildlife Act 1976, as amended by Section 46 of the Wildlife (Amendment) Act 2000;
- In the event that works need to be undertaken within the main breeding season, this would be undertaken in consultation with NPWS;
- Prior to the vegetation removal the ECoW will inspect the Survey Area;
- The management and removal of vegetation onsite will be undertaken in a systematic way under the direction of the ECoW to ensure that retained areas of vegetation are not damaged by the works;

- Should birds nest within the active working area during Site operations, works within the area will stop within the area and the ECoW will be consulted;
- Any quarry faces identified as historically or currently used by peregrine falcons for nesting will be surveyed annually by the ECoW during the breeding season to confirm activity;
- Alternative nesting opportunities, such as artificial nesting ledges or boxes, will be considered and installed in suitable locations within or near the quarry to compensate for any potential loss of traditional nesting sites;
- Timing of rock extraction activities will be planned, where feasible, to avoid peak breeding periods of peregrine falcons;
- Site personnel and contractors will be briefed on the protection measures for peregrine falcons as part of site induction and toolbox talks, including identification and reporting procedures;
- If peregrine falcons or other notable / protected bird species are identified colonising any areas to be affected by the works, then works will stop within the identified area. An appropriate undisturbed buffer zone will need to be established for the duration of the breeding season or until the chicks have fledged and left the nest. This will be confirmed by the ECoW; and,
- The ECoW will undertake annual breeding bird monitoring to ensure no adverse effects occur to breeding birds as a result of the Proposed Development. The findings of the monitoring will be submitted to Cork County Council.

14.4.7 Protection for Terrestrial Mammals

The NBDC held records of otter, hedgehogs within 2km of the Site and evidence of badger and pine marten was identified onsite during the field surveys. As described in Table 14-5, there is potential for badgers to commute through the Site given their widespread abundance across Ireland. Therefore, to ensure that the works in relation to the Proposed Development do not have significant effects on mammals (including badgers and foxes), construction works will be in line with the NRA (now TT) guidance for Badgers [53]. The following mitigation measures will be implemented onsite:

- A pre-construction mammal survey will be conducted prior to any construction works within new areas of the Site;
- Should construction works be required outside of daylight hours, the appointed project EcoW will be consulted as required;
- All vegetation clearance will be undertaken in a systematic way to allow any potential species that may be utilising these areas to disperse naturally as works progress;
- Waste will be kept contained in a designated area to avoid animals becoming trapped in litter; and,
- If unidentified burrows are identified within the works area during construction, works will cease within that area and the project ECoW will be contacted for advice.

<u>Noise Disturbance Effects on Terrestrial Mammals</u>

There is potential that terrestrial mammals utilising the Site and surrounding area may be subject to noise disturbance from the Proposed Development. Construction noise and vibration can result in disturbance behavioural effects, stress and displacement from feeding grounds for various species. Working hours will be restricted and also noise mitigation measures will be implemented during the construction phase of the Proposed Development to minimise potential effectsarising from the proposed works, refer to Chapter 10: Noise and Vibration for further details.

14.4.8 Measures for Invasive Species

An invasive species management plan has been developed for the Site (refer to Appendix 14-5) that will include measures for the remediation of stands of Japanese knotweed and rhododendron located on the Site and in the Survey Area.

14.4.9 Closure & Regeneration Phase

The site closure plan for the expansion phase areas is to start reinstatement works once the eastern Phase 2 expansion area is completed. Stockpiled subsoil and soil will be spread over the exposed bedrock and planted with native flora such as grasses, wildflowers and trees. As the initial Phase 1 area will be needed for access to the later quarry phases, it will be reinstated after the excavation works in the western Phase 3 area are completed.

Once the quarry works are finalised, the wash plant, weighbridge, administration office and related facilities will be decommissioned and removed off-site. The two lower attenuation ponds (Ponds I and J) and associated wetland area will be left in-situ in order to enhance the wetland habitat and biodiversity potential for the locality and will help reduce peak flows to the river after heavy rainfall.

Further works are discussed in Section 14.7, below.

14.4.10 Cumulative and In-Combination Effects

As described above, the Proposed Development works will not have any likely significant effects on valued ecological receptors within the Site. The Proposed Development consists of the extension of the existing Quarry, therefore, cumulative or in-combination effects of the Proposed Development in combination with the historical activity in Ardcahan Quarry and the ongoing operations have been considered throughout this assessment. Furthermore, there are no significant industry or similar developments within the vicinity of the Site that could affect the Proposed Development or be affected by the Proposed Development in terms of likely significant cumulative effects.

Additionally, potential cumulative effects will be minimised as all works will be completed in line with relevant best practice and legislation and mitigation measures outlines in this EIAR and NIS. It has therefore been concluded that no likely significant cumulative ecological effects will arise as a result of the Proposed Development.

14.4.11 Interactions with other Environmental Attributes

The Environmental Attributes with which flora and fauna interact include:

- Chapter 6: Land Use and Geology; The alteration of soil conditions on-site through the removal of topsoil, subsoil and extraction of aggregate had an effect on biodiversity. However, appropriate mitigation measures are outlined in detail in Chapter 6;
- Chapter 7: Hydrology and Hydrogeology; Potential effects on hydrology can also impact ecological conditions. The deterioration of water quality had the potential to affect European designated sites, proposed Natural Heritage Areas and protected / notable species within the wider area. However, appropriate mitigation measures are presented in Chapter 7 to prevent potential effects to surface water and groundwater. By protecting local water quality, these measures also protect biodiversity; and,

- Chapter 8: Air Quality; Air quality can potentially affect ecosystems. Chapter 8 includes appropriate mitigation measures for the Proposed Development that will ensure that negative effects on ecosystems can be avoided.

14.5 Residual Effects

Based on the methodology set out in Section 14.1.7 the initial assessment of ecological receptors (Table 14-5) screened out the following habitats and species:

- Active quarries and mines (ED4);
- Artificial Surfaces (BL3);
- Bare ground (ED2);
- Dense Bracken (HD1);
- Dry Siliceous Heath (HH1);
- Dystrophic Lake (FL1);
- Exposed Rock (ER1);
- Grassy Verges (GS2);
- Oak-Birch-Holly Woodland (WN1); and,
- Recolonising Bare Ground (ED3).

These ecological receptors were screened out from further assessment as the potential effects were not considered to be significant, refer to Table 14-4 for further details. The following species and habitats outlined in Table 14-5, were identified as receptors that warranted further consideration to avoid effects:

- European Designated sites;
- pNHAs;
- Marsh (GM1);
- Mixed Broadleaved Woodland (WD1);
- Other Artificial Lakes and Ponds (FL8);
- Scrub (WS1);
- Scrub / Dry Siliceous Heath (WS1 / HH1);
- Scrub / Immature Woodland (WS1 / WS2);
- Wet Grassland (GS4);
- Flora;
- Amphibians;
- Aquatic Species;
- Bats;
- Badger;
- Birds;
- Otter;
- Invasive Species; and,
- Other Species.

Mitigation has been proposed for each of these ecological receptors alongside enhancement measures for the Site as part of the Regeneration Plan. The results of these measures on the ecological receptors and the resulting residual effects are described below in Table 14-6.

Table 14.6: Valuation of Potential Ecological Receptors Post Mitigation and Enhancement

Receptor	Potential Effect	Assessment of Effects Post Mitigation and Enhancement	Residual Effect
European sites	Water Quality Impairment	It is considered that following the implementation of the water quality mitigation measures presented in Chapter 7, the Bandon River SAC will not be affected by the Construction, Operation or Regeneration Phases of the Proposed Development.	Imperceptible
pNHAs	Water Quality Impairment	It is considered that following the implementation of the water quality mitigation measures presented in Chapter 7, the Bandon Valley South of Dunmanway pNHA will not be affected by the Construction, Operation or Regeneration Phases of the Proposed Development.	Imperceptible
Marsh	Habitat Loss	This habitat will be removed as part of the Proposed Development. The removal of this habitat will be scheduled to take place outside of the amphibian breeding season. Furthermore, additional wetland habitat areas are to be created as part of the Proposed Development.	Imperceptible
Mixed Broadleaved Woodland	Habitat Loss	It is considered that, following the implementation measures outlined in Section 14.4.3 and with the addition of new woodland areas to be planted as part of the Proposed Development, the residual effects of the removal of this habitat will be imperceptible in the long term.	Imperceptible
Other Artificial Lakes and Ponds	Habitat Loss	It is considered that following the implementation of the mitigation measures, this habitat will not be affected by the Construction or Operation Phases of the Proposed Development. In addition, the proposed seasonal lagoon will be retained as part of the Regeneration Phase.	Imperceptible
Scrub	Habitat Loss	The Proposed Development will include the removal of an area of scrub. It is considered that, following the implementation of mitigation measures outlined in Section 14.4.5, the effect of the Proposed Development on this habitat will be imperceptible.	Imperceptible
Scrub / Dry Siliceous Heath	Habitat Loss	The Proposed Development will include the removal of an area of this habitat. It is considered that, following the	Imperceptible

Receptor	Potential Effect	Assessment of Effects Post Mitigation and Enhancement	Residual Effect
		implementation of mitigation measures outlined in Section 14.4.5, the effect of the Proposed Development on this habitat will be imperceptible.	
Scrub / Immature Woodland	Habitat Loss	The Proposed Development will include the removal of an area of this habitat. It is considered that, following the implementation of mitigation measures outlined in Section 14.4.5, the effect of the Proposed Development on this habitat will be imperceptible.	Imperceptible
Wet Grassland	Habitat Loss	The Proposed Development will include the removal of an area of this habitat. However, as part of the Regeneration works, additional wetland areas are to be created, and the effect of the Proposed Development on this habitat will be imperceptible.	Slight Negative
Flora	Loss of native flora	The Proposed Development will include the removal of a habitat supporting the Irish Marsh Orchid. However, as part of the Regeneration works, additional wetland areas are to be created, and a translocation exercise undertaken; therefore, the effect of the Proposed Development on this habitat will be imperceptible.	Imperceptible
Amphibians	Habitat Loss	It is considered that, following the implementation of mitigation measures outlined in Section 14.4.1, and also the Regeneration works, the effect of the Proposed Development on this species will be imperceptible.	Imperceptible
Aquatic Species	Habitat Degradation	It is considered that following the implementation of mitigation measures outlined in Section 14.4.2, and also the Regeneration works, the effect of the Proposed Development on this species will be imperceptible.	Imperceptible
Bats	Habitat Loss	It is considered that, following the implementation of mitigation measures outlined in Section 14.4.4, the effect of the Proposed Development on this species will be imperceptible.	Imperceptible
Badger	Habitat Loss	It is considered that, following the implementation of mitigation measures outlined in Section 14.4.6, the effect of the	Imperceptible

Receptor	Potential Effect	Assessment of Effects Post Mitigation and Enhancement	Residual Effect
		Proposed Development on this species will be imperceptible	
Birds	Habitat Loss	It is considered that, following the implementation of mitigation measures outlined in Section 14.4.5, the effect of the Proposed Development on this species will be imperceptible.	Imperceptible
Otter	Habitat Degradation	It is considered that following the implementation of mitigation measures outlined in Sections 14.4.2 and 14.4.6, the effect of the Proposed Development on this species will be imperceptible.	Imperceptible
Invasive Species	Unintentional Spread	It is considered that, following the implementation of mitigation measures outlined in Section 14.4.7 and the Japanese Knotweed Management Plan attached as Appendix 13-5, there will be a slight positive effect of the Proposed Development on this receptor.	Slight positive
Other Species	Habitat Loss	It is considered that, following the implementation of mitigation measures outlined in Sections 14.4.1 – 14.4.7, the effect of the Proposed Development on these species will be imperceptible.	Imperceptible

Slight negative effects were identified for biodiversity in terms of the loss of native woodland. However, given the woodland planting proposed as part of the Regeneration Plan for the Site, the long-term effects are considered imperceptible.

Significant negative effects on biodiversity were identified, including the loss of species-rich wet grassland habitat containing an endemic, rare species – the Irish marsh orchid.

Additional wetland habitat areas are to be created as part of the Proposed Development, and it is considered that this species could re-establish elsewhere in the Site within suitable habitat, as this species was also noted along access tracks within the Site. A translocation exercise will also be undertaken as part of the works. Following the successful creation of wetland habitats and the establishment of Irish Marsh Orchid within these areas, the long-term effects on this receptor were reduced to imperceptible.

Slight positive long-term effects on biodiversity were identified relating to invasive species. It is considered that given the implementation of the Invasive Species Management Plan prepared as part of the Proposed Development, the eradication and management of regulated invasive species such as Japanese Knotweed will result in a slight positive long-term effect.

In the longer term, following cessation of the quarry activities at the Site and the successful implementation of the Regeneration Plan, it is considered that the Proposed Development will have a long-term imperceptible effect on biodiversity.

14.6 Monitoring

The following monitoring works to ensure that the works comply with the recommendations detailed within this chapter of the EIAR.

14.6.1 Habitats

An ECoW will inspect the Site in advance of ground stripping works commencing and will undertake Site inspections as required during the Construction Phase to ensure that all works are completed in line with the EIAR.

A habitat survey will be undertaken within the Site every second year for the duration of the Proposed Development to monitor any potential effects of the Development on the habitats in the surrounding area and monitor the Oak-Birch-Holly Woodland and Dry Silicious Heath. The ECoW will also inspect and monitor the success of the planting and habitat creation works.

14.6.2 Aquatic Species

Annual biological monitoring, in the form of Q-Rating Sampling, should be completed by a suitably qualified and experienced aquatic ecologist between April to June at dedicated upstream and downstream locations on the small water course, as done previously.

Annual FWPM surveys should be completed by a suitably qualified and experienced aquatic ecologist and reports submitted to the NPWS.

14.6.3 Bats

An annual NBW survey should be carried out to monitor the levels of bat activity to ensure no effects have occurred to bats as a result of the Proposed Development and to monitor the usage of the artificial lesser horseshoe roost. The findings of the monitoring will be submitted to Cork County Council.

14.6.4 Birds

14.6.4.1 Breeding Birds

The ECoW will undertake annual breeding bird monitoring to ensure no effects occur to breeding birds as a result of the Proposed Development, the findings of the monitoring will be submitted to Cork County Council.

14.6.4.2 Peregrine Falcon

Any quarry faces identified as historically or currently used by peregrine falcons for nesting will be surveyed annually by the ECoW during the breeding season to confirm activity. The findings of the monitoring will be submitted to Cork County Council and the NPWS.

14.6.4.3 Invasive species

An annual invasive species survey will be undertaken by the ECoW to monitor the implementation of the invasive species management plan on-site until the Site has been fully remediated. Following the eradication of invasive species on-site, the Site will be monitored for invasive species as part of the biennial habitat surveys.

14.7 Reinstatement

The Site will undergo a decommissioning and regeneration phase. Regeneration works on site cannot practically include reinstatement to previous ground levels, and the quarry void is to be left open. As part of the decommissioning phase, all stockpiles, plant and equipment will be removed, and regeneration will include the cultivation of two native woodland pockets in the east and west of the proposed quarried area. In addition, the settlement ponds on the southwest of the site will form a seasonal lagoon(s) which will be planted in its margins with native wetland plugs. See Appendix 11-1 for full details.

14.8 Difficulties Encountered in Compiling Information

Some areas of the Site were inaccessible due to dense vegetation. However, these areas were assessed at a distance using binoculars and aerial imagery. It is not considered that this survey limitation will alter the findings of this assessment. Precautionary mitigation measures have been included as part of the Proposed Development to ensure that adverse effects can be avoided.

14.9 References

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Murray Brothers Tarmacadam Ltd

CHAPTER 15
CULTURAL HERITAGE AND ARCHAEOLOGY

VOLUME II
MAIN STATEMENT

APRIL 2026

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15 Cultural Heritage & Archaeology

15.1 Introduction

The assessment identifies the potential direct and indirect impacts on the archaeological, architectural and cultural heritage environment of the proposed future extension of the quarry at Ardcahan, Dunmanway, Co. Cork. A detailed description of the project is provided in Chapter 3.

The Landownership Boundary (LOB), which extends to c. 25.2ha (see Fig. 15.1), comprises three distinct zones;

- Southeast: The existing tarmacadam production plant and administrative buildings;
- Southwest: A previously worked extraction area, where quarrying operations ceased in 2014;
- North: Predominantly undeveloped lands, forming the location of the proposed new extraction area. Although not historically quarried, parts of this section were used for ancillary quarrying activities, including crushing-product storage, settling ponds and backfilling.

The site boundary for the S37L application, referred to as the proposed development site, covers c.10.4 ha. Of this, the proposed extraction area comprises c. 5.01ha , primarily within the northern portion of the site, with the remainder allocated to associated quarry infrastructure and operations. The S37L application boundary is illustrated in Fig. 15.1 and Chapter 1, Fig. 1.1.

There are no recorded archaeological monuments within the proposed development site or the wider LOB. The closest recorded monuments lie within the adjacent townland of Dromerk: a ringfort (CO108-001), c. 250m to the east, and an enclosure and associated burial ground (CO108-002001 and CO108-002002), located c. 350m to the east. In total, twenty-two recorded archaeological sites fall within a 2km radius of the LOB, eight of which are within 1km, highlighting the archaeological sensitivity of the wider landscape and, by extension, the potential of the proposed development area.

No Protected Structures listed in the Cork County Development Plan 2022-2028 occur within the LOB or the wider Study Area, nor are there any buildings included in the National Inventory of Architectural Heritage (NIAH).

Some terms used in this report are explained below;

Archaeological Heritage

Archaeological heritage can be described as the study of past human societies through their material remains and artefactual assemblages. The Valletta Treaty (or the European Convention on the Protection of the Archaeological Heritage, 1992) defines archaeological heritage as 'all remains and objects and any other traces of humankind from past times' this includes 'structures, constructions, groups of buildings, developed sites, moveable objects, monuments of other kinds as well as their context, whether situated on land or under water'.

Architectural Heritage

Architectural Heritage is defined in the Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act, 1999 as structures and buildings together with their settings and attendant grounds, fixtures and fittings, groups of such structures and buildings, and sites, which are of architectural, historic, archaeological, artistic, cultural, scientific, social or technical interest.

Cultural Heritage

Cultural Heritage is a generic term that spans thousands of years and covers a multitude of cultural, archaeological and architectural sites and monuments within the LOB. EPA Guidelines (2003), define cultural heritage as including archaeological heritage, architecture, history, landscape and garden design, folklore and tradition, geological features, language and dialect, religion, settlements, inland waterways (rivers) and place names. The more recent EPA Guidelines (2022), include archaeology, architectural heritage and folklore and history under the broad category of cultural heritage.

In this assessment, cultural heritage encompasses the following; the history of Dunmanway, the closest significant settlement, 3.5km to the southwest; the birthplace of Sam Maguire in the townland of Mallabraka to the west; prominent landscape features such as Mount Gunnery (Yew Tree Hill), the grotto and holy well located on its western flank; historic rural settlement patterns such as single farmsteads and clusters of buildings depicted on early Ordnance Survey (OS) mapping; and placenames and historical references associated with the subject site and surrounding townlands.

Study Area: To support a comprehensive assessment of the Cultural Heritage Environment, a study area comprising a 2km radius of the LOB has been chosen.

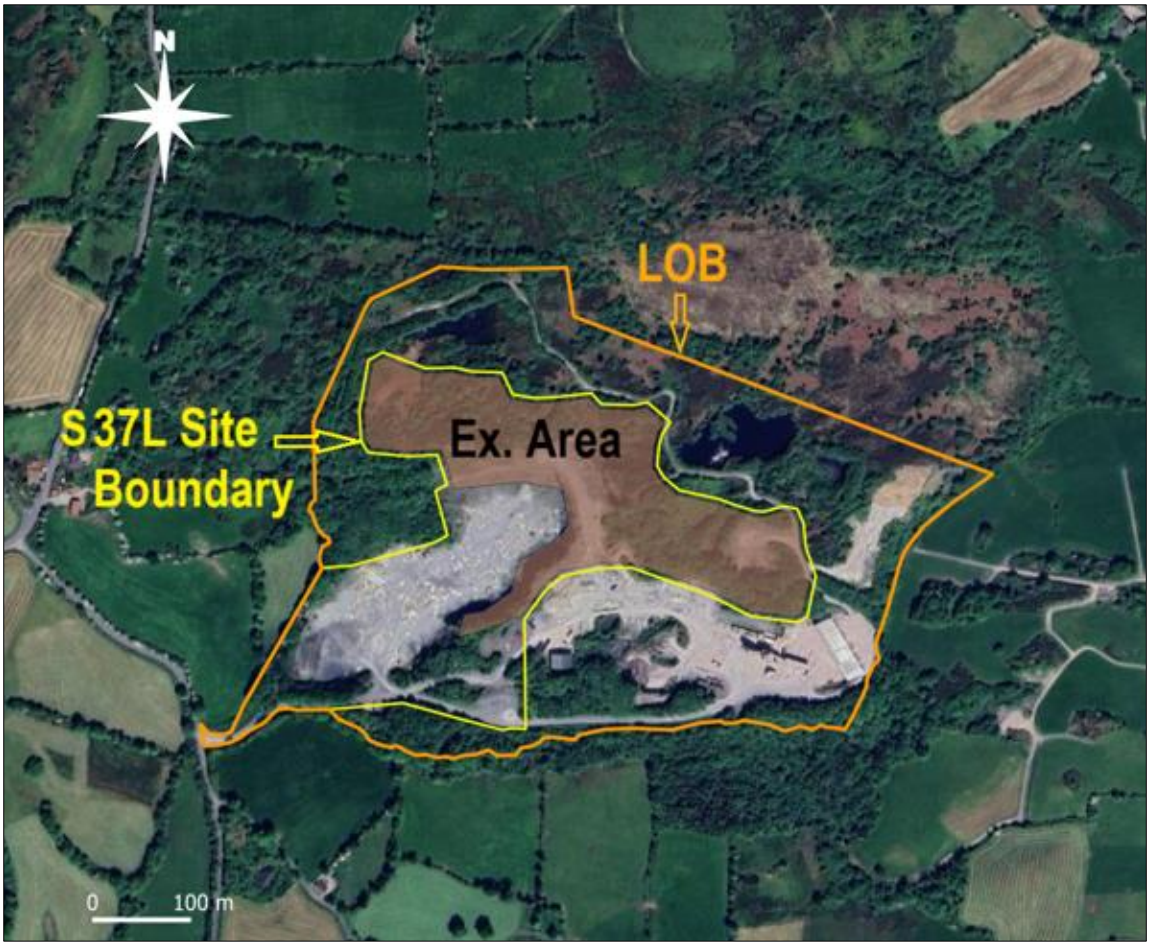


Figure 15.1 Aerial image (Google maps, 2025) showing the LOB outlined in orange, the S37L boundary in yellow and the proposed quarry Extraction Area in brown. The former extraction area is visible to the southwest, while the existing tarmacadam plant is located to the southeast (source: McCutcheon Halley Planning)

15.1.1 Author Information and Competency

This chapter of the EIAR has been prepared by Musetta O'Leary and Avril Purcell of Lane Purcell Archaeology.

Musetta O'Leary MA (Archaeology), NUI Cork

Musetta O'Leary has over 20 years of experience in all aspects of archaeological consultancy. She specialises in managing the archaeological and cultural heritage components of developments at the pre-planning stage. Musetta has coordinated and authored the Cultural Heritage sections of Environmental Impact Assessment Reports (EIARs) for a wide range of development types, including residential, infrastructure (roads and utilities), industrial, energy, and extractive industries. She has presented expert witness evidence at An Bord Pleanála oral hearings.

Avril Purcell MA (Archaeology), NUI Cork

Avril Purcell is the director of Lane Purcell Archaeology and is a licensed archaeologist with 30 years of experience in research, consultancy, surveying and excavation. She has contributed to a wide range of EIAR projects across the country, often from the initial constraint study stage through pre-development investigations, resolution and construction-phase monitoring. Avril has presented expert witness evidence at An Bord Pleanála oral hearings.

15.2 Impact Assessment Methodology

The methodology used to complete the Cultural Heritage section of this EIAR comprised the following:

- A review of the relevant Legislation and Guidelines;
- A desktop assessment of the proposed development site, LOB and the defined Study Area;
- A walkover survey of the subject site and LOB;
- An evaluation of the effects of the proposed development on the cultural heritage environment – Section 15.5. Impacts are assessed in accordance with the Guidelines on the Information to be contained in Environmental Impact Assessment Reports (EPS, 2022);
- The identification of mitigation measures to reduce or offset potential impacts on the cultural heritage environment – Section 15.4 while Residual Impacts are provided in Section 15.7.
- References and Sources – Section 15.9.

15.2.1 Guidelines & Legislation Relevant to Discipline

In Ireland, the primary means of protecting Cultural Heritage are: The National Monument (Amendments) Acts 1930 to 2014, The Heritage Act 1995, the relevant provisions of the National Cultural Institutions Act 1997, The Architectural Heritage (National Inventory) and Historic Monuments (Misc. Provisions) Act 1999 and the Local Government (Planning and Development) Act 2000.

Historical and Archaeological Heritage and Miscellaneous Provisions Act 2023

A new Heritage Bill, introduced by the Minister for Housing, Local Government, and Heritage, was passed by Seanad Éireann and Dáil Éireann on the 13th of October, 2023. This Act replaces the National Monuments Acts (1930–2014) and other related legislation, strengthening protections for heritage sites. Key measures introduced by this Act include: A single Register of Monuments, A statutory reporting scheme for newly discovered monuments and Provisions to prevent the illicit import and

possession of stolen cultural property. As the new Act is implemented over time, the existing legislation will remain in effect**.**

The government's policies for both the archaeological and architectural heritage are outlined in a series of specific published guidelines. This chapter is prepared with regard to the following guidelines:

Guidelines on the information to be contained in Environmental Impact Statements, 2022 (Environmental Protection Agency).

Advice Notes on Current Practice in the Preparation of Environmental Impact Statements, 2003 and Draft Revised Advice Notes, 2015 (Environmental Protection Agency, 2003).

Framework & Principles for the Protection of the Archaeological Heritage, 1999 (Department of Arts, Heritage, Gaeltacht & the Islands).

Policy & Guidelines on Archaeological Excavation, 1999 (Department of Arts, Heritage, Gaeltacht & the Islands).

Architectural Heritage Protection, Guidelines for Planning Authorities, 2004. (Department of the Environment, Heritage and Local Government)

Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment, 2018 (Department of Housing, Planning and Local Government)

Code of Practice between the Department of Environment, Heritage and Local Government and the Irish Concrete Federation, 2009. (Department of Environment, National Monuments Service DHLG).

Cork County Development Plan 2022-2028 (CCDP) – Local Polices with regards to Heritage.

The CCDP outlines Cork County Council's objectives/policies regarding the protection and management of the archaeological, architectural, and cultural heritage of the county. The Plan *'recognises the importance of identifying, valuing and safeguarding our archaeological, architectural and cultural heritage for future generations through appropriate protection, management and enhancement measures or via the sensitive development of this resource*' (CCDP, Vol. 1, Chapter 16, 353).

Objectives relating to heritage which are of relevance to this development include the following;

Objective 16-13:

> *Previously unidentified archaeological sites that are uncovered during construction works must be investigated and recorded. 'The Council will require preservation in situ to protect archaeological monuments discovered. Preservation by record will only be considered in exceptional circumstances.*

Objective 16-23: The CCDP seeks to;

> *'Protect and promote the cultural heritage of County Cork as an important economic asset and for its intrinsic value to identity of place and the wellbeing of people within the County.'*

The CCDP includes a Record of Protected Structures (RPS), as mandated by the Planning and Development Act 2000, to safeguard buildings of special heritage value. The RPS aims to ensure any changes to listed structures preserve their character and setting. Cork County Council's objectives include expanding the RPS, protecting structures and their surroundings, ensuring high-quality development proposals, and promoting best conservation practices. The Council also seeks to

enhance historic features not formally listed. There are no protected structures within the LOB or within 2km; the nearest protected structure is St. Patrick's Roman Catholic Church (RPS00683), located 2.7km southwest in Dunmanway North.

15.2.2 Desktop Study

The desktop study provides a cultural heritage overview of the subject site and study area using the following sources.

Record of Monuments and Places (RMP) - This record was established under Section 12 (1) of the National Monuments (Amendment) Act 1994. It lists all monuments and places believed to be of archaeological importance in the County. The numbering system consists of two parts: the first part is the county code (CO for Cork) followed by the Ordnance Survey map number (six inch to the mile scale); the second part is the number of a circle surrounding the site on the RMP map, e.g. CO108-001 refers to circle 001 on OS sheet 108 for County Cork. The area within the circle is referred to as the *Zone of Archaeological Potential (ZAP)* for that site. Its diameter can vary depending on the size and shape of the site but it averages out at *c.* 180m. The RMP for County Cork was published in 1998. It is an offence to interfere with any of the sites or monuments listed in the RMP without first giving two months' notice in writing to the National Monuments Service (NMS) at the Department of Housing, Local Government and Heritage.

Sites and Monuments Record (SMR) Database of the ASI - The purpose of the ASI is to compile a base-line inventory of the known archaeological monuments in the State. The large record archive and databases resulting from the survey are being continually updated. This database, complete with maps is now available for consultation via the NMS website at www.archaeology.ie

Archaeological Inventories and NMS Archive Files – Information on all the recorded archaeological sites within the Study Area has been sourced from the ASI online database. This database incorporates material published in the Archaeological Inventories of County Cork; Volume 1: West Cork (Power *et al.* 1992) and Volume 5 (Ronan *et al.* 2009). These volumes provide comprehensive descriptions of archaeological sites in the region. Where entries have since been revised or supplemented through more recent surveys or research, the online database reflects these updates. In instances where the ASI carried no descriptive record for a given RMP entry, additional information was obtained from the National Monuments Service (NMS) Archive Files. These archival files were accessed and supplied by the NMS through email request, where available.

Review of Previous EIS – A review was undertaken of the 2014 Environmental Impact Statement (EIS) prepared by McCutcheon Halley for the continued use of Ardcahan Quarry. Chapter 10 of the EIS, Cultural Heritage (Purcell, 2014), evaluated the potential effects of the proposed continuation of quarry operations on archaeological, architectural, and cultural heritage resources.

The assessment concluded that, subject to the implementation of the recommended mitigation measures, the proposed development would not give rise to any significant adverse impacts on cultural heritage assets either within the site or in the surrounding area.

Consultations – During the compilation of the S37L EIAR, Ms. Mary Sleeman, former County Archaeologist for Cork, was consulted and her recommendations have been incorporated in the Mitigation Measures in Section 15.6 below.

Files of the NMS, Department of Housing, Local Government and Heritage – The NMS was consulted to retrieve information on RMP sites that have been afforded added protection such as;

- National Monuments in the ownership or guardianship of the state – None in the Study Area
- Monuments subject to Preservation Orders and Temporary Preservation Orders – None in the Study Area
- Monuments listed in the Register of Historic Monuments – One in the Study Area Kilmalooda souterrain (CO094-121).

National Inventory of Architectural Heritage (NIAH)- The NIAH was established under the 1999 Architectural Heritage Act, following the 1985 Granada Convention. It systematically identifies and records Ireland's architectural heritage from 1700 to the present through two surveys: the Building Survey and the Historic Garden Survey. Between 2006 and 2011, the NIAH surveyed County Cork, identifying approximately 6,500 items of architectural significance. Structures deemed of regional or higher importance are recommended for inclusion in the RPS under Section 53 of the Planning and Development Act 2000. There are no NIAH-listed buildings or historic gardens within the LOB, or the 2km study area. The nearest structures are in Dunmanway, approximately 3.5km to the southwest.

Database of Irish Excavation Reports (www.excavations.ie) - This web site contains summary records of archaeological excavations and investigations in Ireland from 1970 to 2026. A search of the database for the townlands within the Study Area found no investigations had taken place on the LOB or within the 2km study area. Two investigations were carried out in Dunmanway town; one at Underhill (Lane, 2001) and another at Dunmanway South (Purcell, 2002). Neither investigation produced features or finds of archaeological significance.

Historical Sources Consulted – As part of the 2014 EIS (Purcell, 2014), the Ordnance Survey Name Books for County Cork were reviewed at Cork County Library. These were compiled during the 1841 six-inch mapping project and contain valuable antiquarian and folklore references; there are no OS letters for the county. The local history section of the library was also consulted for site-specific publications, including historical journals and local histories. For this S37L EIAR, a further library search was conducted to identify any new or updated sources relevant to the study area.

Cartographic Sources – The following maps were consulted as part of the assessment:

- OSI Discovery Series 1:50,000 maps.
- OS 6-inch maps; first edition (1841-42) and second edition (1902); no third edition exists.
- The OS 25-inch map (1897-1904), which informed the 1902 second edition 6-inch map.

Aerial Photographs – OSI online aerial photographs (dated 1995, 1996-2000, 2001-2005, 2006-2012, 2011-2013 and 2013-2018 and 2025) via GeoHive (OSI) and Google maps (www.google.ie). These were examined to identify any previously unrecorded features of archaeological/cultural heritage significance that may only be visible from the air. No archaeological features were apparent in the photographs. The site appears as a quarry on all editions of the aerial photographs, with no potential archaeological features visible.

15.2.3 Walkover Survey

The primary purpose of the walkover survey was to assess the physical environment of the subject site and the overall LOB to identify any possible features of cultural heritage significance. Current land use, local topography and environmental conditions are evaluated to gain an overall understanding of the area. Walkover surveys were conducted in 2014, 2020 and 2023, as part of an ongoing assessment of the site spanning several years. On all occasions, no features, deposits, or finds of archaeological potential were identified. The results of the walkover survey are presented in Section 15.4.9, with corresponding photographic plates included **in Appendix 15.1, Volume 3**.

15.2.4 Difficulties Encountered in Compiling Information

Much of Ireland's archaeological heritage survives only as subsurface remains, long obscured and unrecorded within the landscape. Outside the previously worked extraction area at the southwest, the proposed development site comprises a mix of dense natural scrub - heather, gorse, bramble and scattered trees – as well as extensive exposed bedrock. Significant portions of the southern and central areas have previously been quarried, resulting in ground reduction, while non-excavated areas were used for ancillary activities including access tracks, hardstanding, storage areas and settlement ponds.

Walkover inspections of the proposed development site and wider LOB were undertaken in 2014, 2020 and 2023. No visible features or artefacts of archaeological potential were identified during these surveys. However, the density and impenetrable nature of scrub vegetation rendered portions of the site inaccessible, restricting surface visibility and limiting the effectiveness of assessment. Accordingly, while no archaeological features were recorded, it remains possible that previously unrecognised upstanding or subsurface remains survive within undisturbed areas of the site.

15.3 Proposed Development

A full description is provided in Chapter 3 of this EIAR.

15.3.1 Description of Existing Environment

Archaeological sites naturally erode and degrade with the passage of time, particularly those constructed from timber. Even stone-built structures and large earthworks can become denuded, collapse, or survive only as low or ground-level features. The pace of landscape change in Ireland accelerated in the second half of the 20th century and many archaeological sites have been levelled by activities associated with modern development and progress such as agriculture, industry and infrastructural improvements. This has ensured that the present day archaeological landscape is not fully representative of the human occupation of this island, which has spanned some twelve thousand years. While many archaeological sites survive today as partially upstanding structures, such as earthworks and stone monuments, many more survive only as subsurface remains, often forgotten and concealed from view. Subsurface archaeological remains are frequently uncovered during archaeological investigations carried out in advance of development.

There are twenty-two recorded archaeological sites within 2km of the LOB, four of which are listed as Redundant Records, meaning they are no longer considered to be archaeological sites. Of the remaining eighteen, eight lie within a 1km radius of the quarry site (see Fig. 15.2 and Table 15.1 below). Only one archaeological site within the study area dates to the prehistoric period: a standing stone (CO094-076) in Ardcahan, c. 900m to the north of the subject site. This does not indicate an absence of human activity in the area during this very substantial period of time. The broader landscape beyond the study area contains ample evidence of prehistoric populations shaping and modifying the landscape around them for a diversity of purposes, be it agricultural, social, political, or religious.

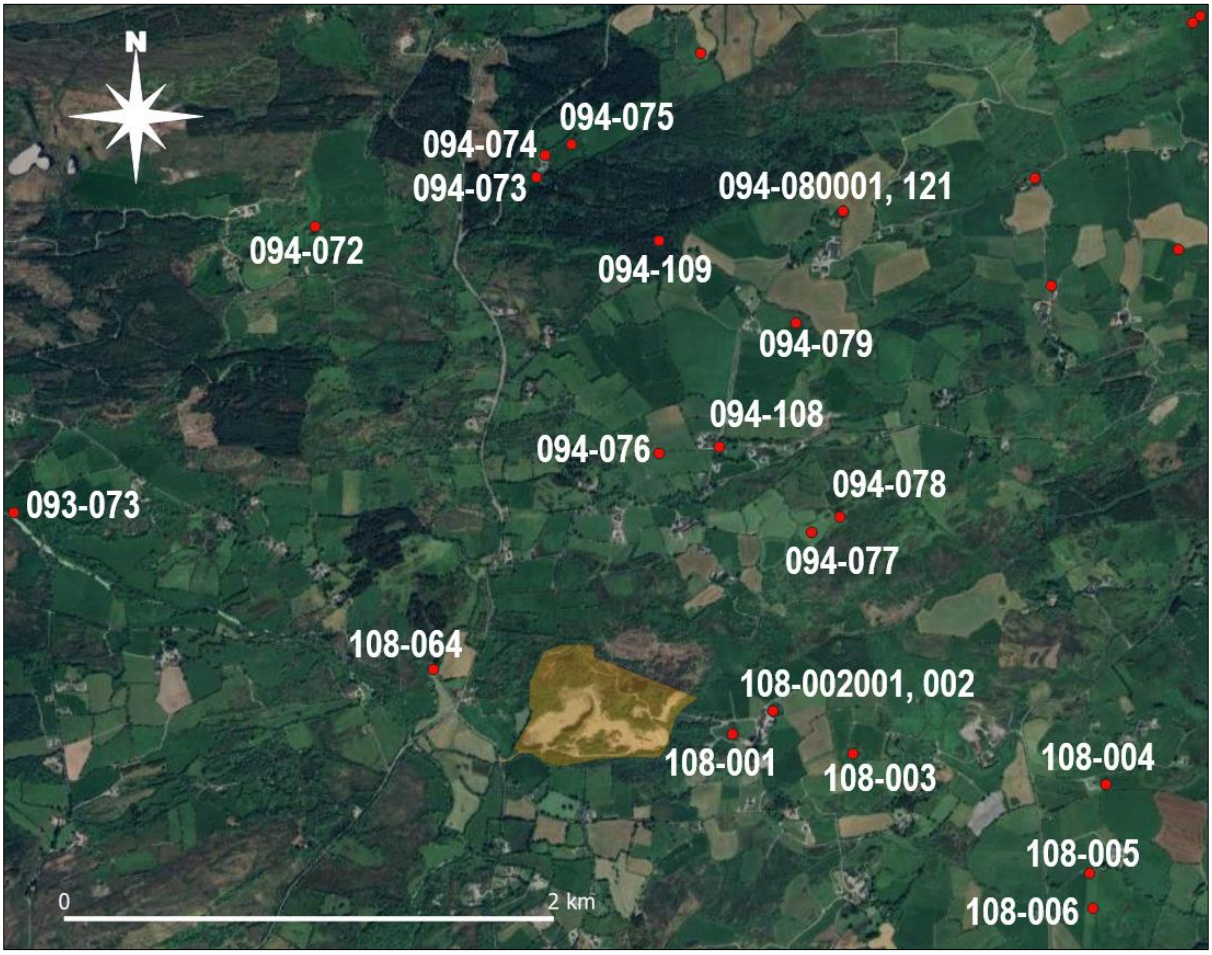


Figure 15.2 OS map with LOB highlighted orange with RMP detail within a 2km radius (source: www.archaeology.ie)

Table 15.1 RMP and SMR sites within a 2km radius of the LOB

RMP	Site Type	Townland	Distance from LOB
CO108-001	Ringfort	Dromerk	250m to E
CO108-002001-	Enclosure	Dromerk	350m to E
CO108-002002-	Burial ground	Dromerk	350m to E
CO108-003	Ringfort	Dromerk	800m to E
CO108-004	Redundant record	Knockaghaduff	1.9km to E
CO108-005	Ringfort	Behagh	1.6km to SE
CO108-006	Redundant record	Behagh	1.9km to SE
CO108-064	Bridge	Gortanure/Ardcahan	380m to W
CO093-073	Horizontal wheeled mill	Keelaraheen	2km to NW
CO094-072	Circular enclosure	Neaskin	2km to NE
CO094-073	Ogham stone	Aultagh	1.9km to N
CO094-074	Ringfort	Aultagh	2km to N
CO094-075	Redundant record	Aultagh	2km to N
CO094-076	Standing stone	Ardcahan	900m to N
CO094-077	Ringfort	Ardcahan	1km to NE
CO094-078	Ringfort	Ardcahan	1.1km to NE
CO094-079	Ringfort	Ardcahan	1.6km to NE
CO094-080001-	Early ecclesiastical enclosure	Kilmalooda	2km to NE
CO094-080002-	Burial ground	Kilmalooda	2km to NE
CO094-108	Country house	Ardcahan	1km to NE
CO094-109	Redundant record	Aultagh	1.8km to N
CO094-121	Souterrain	Kilmalooda	2km to NE

Prehistoric Period

Mesolithic - (*c.* 8000 to 4000 BC)*; Neolithic* - (*c.* 4000 to 2400 BC)*; Chalcolithic* (c. 2450 – 2200 BC); *Bronze Age* (*c.* 2200 to 700 BC) – *Iron Age* (*c.* 700 BC to AD 400).

15.3.2 Mesolithic And Neolithic

The earliest evidence for human colonisation and settlement in Cork can be dated to 8000 BC, the Mesolithic Period. The people of this era were hunter-gatherers, entirely dependent on what food could be obtained through hunting and gathering, including edible plants and shellfish. They used flint and other hard stone to manufacture their tools, and their settlements can often be identified by locating scatters of these stone tools in ploughed fields. The transition of these early settlers from hunter/gatherers to a farming way of life in the Neolithic Period brought about revolutionary change. This led to more permanent settlements and substantial houses and a more complex and structured social hierarchy. A steady food supply meant that people had more time to increase their toolkit and domestic equipment and develop specialised crafts. While much evidence for the Neolithic Period now remains below ground, the characteristic upstanding feature of this period is the Megalithic tomb.

There are no known archaeological sites dating to the Mesolithic or Neolithic Periods within the Study Area. The lack of sites, however, does not mean that the region is devoid of such early settlement and use. In general, archaeological sites from the early Prehistoric Period leave little or no surface evidence on the landscape. In most cases they only come to light during archaeological testing/monitoring in association with industrial, residential and infrastructural development.

Consequently, the potential for finding archaeological sites from this period can never be overlooked and there is always the possibility of finding sites of prehistoric date below ground that would otherwise go undetected.

15.3.3 Chalcolithic and Bronze Age

The Chalcolithic, meaning the 'Copper and Stone Age' is a transitional phase in Ireland between the Neolithic and Bronze Age that is characterised by the adoption of copper metallurgy as an established technology prior to the use of bronze. This period is also frequently represented on excavated sites 'by the widespread cultural adoption of a new form of pottery, collectively referred to as Beaker Ware' (Hanley, 2013). The first metal to be used as a raw material in Ireland was unalloyed copper. Much evidence for primitive copper mining in Ireland has been discovered in the southwest, at Ross Island, Co. Kerry and Mountgabriel in Co. Cork. The communal burial tradition in large megalithic tombs of the Neolithic continued in this period in the form of wedge tombs. The large majority of megalithic tombs found in Co Cork are wedge tombs which generally date to this transitional period, the Chalcolithic period. The majority of wedge tombs conform to a general design; they have a pronounced wedge shape in plan and section with the entrance generally located at the broader southwestern end. The human remains interred in the monuments are generally cremated and grave goods frequently accompany them. Although there are no wedge tombs in the Study Area there are quite a number in the wider landscape at Milleennagun (CO121-038) (*c*. 9km to the south), Keenrath (CO093-062) (*c.*8km to the west), Inchincurka (CO093-052002-) (*c.*5km to the northwest), Mamucky (CO094-005) (*c.* 6km to the north) and Clashbredane (CO094-13) (*c.* 8km to the northeast). None of these typical wedge tombs have been excavated (Power *et al*. 1992 and 1997) and all are listed in the RMP.

The Irish Bronze Age is characterised by the introduction of metallurgy, distinctive pottery styles, changes in burial traditions and an increase in population. The burial traditions of the Bronze Age were generally much simpler than the elaborate megalithic tombs of the earlier Neolithic and Chalcolithic periods, although these were frequently reused for later burials. Most Bronze Age burials, either cremated or inhumed, were placed in stone-lined cists or simple earth-cut pits often accompanied by grave goods. Some graves were marked with a cairn or a mound of stones, while others were marked by a mound of earth known as a barrow. There are no Bronze Age burials in the study area.

The erection of large unhewn stones in prominent locations was widespread and many date to the Early Bronze Age. Their exact function is unclear, although it is thought they were erected primarily for ceremonial and ritual purposes. They were often erected in prominent locations and may have marked routeways or tribal boundaries but others may have marked burials or had a ceremonial or ritual purpose. An association exists between standing stones and other Bronze Age monuments such as stone circles, stone rows and stone pairs and many share a preference for a northeast – southwest alignment. There is one standing stone in the study area in Ardcahan (CO094-076) of which no upstanding trace now remains (*ibid.*, 66). As the standing stone is no longer extant its alignment remains unknown.

Outside the study area there is a particularly noteworthy concentration of monuments dating to the Bronze Age, including stone circles, stone rows, standing stone pairs and lesser known monuments such as radial-stone cairns as well as the wedge tombs and standing stones discussed above. The

closest to the LOB include a stone row (CO094-085) and radial stone cairn (CO094-125) in Behagullane 3km to the east and two standing stone pairs, one in Toom (CO108-011) 4km to the southeast and the other in Ballyhalwick (CO108-023) 4km to the south. This concentration of monuments extending across the valleys of the Rivers Lee and Bandon and their tributaries had been well-documented over many years. The precise reason for this concentration of activity remains elusive. It does, however, demonstrate large-scale human activity by a vibrant population over the broader landscape despite the relative paucity of activity within the study area itself.

15.3.4 Iron Age

The transition from bronze to iron working was a significant technological innovation that had a major impact on agriculture, making it more efficient and productive and thus having an effect on society as a whole. Iron, a much harder substance than bronze, was used to make more efficient tools to clear large tracts of dense forest. It is around this time that we see the adoption of the La Tene style of art practiced by the Celtic peoples of Europe, a people who had been using iron as a far superior metal to bronze from around 1000 to 700 BC. This La Tene culture is represented in metalwork and some stone sculpture, mainly in the north and west of the country.

Burial practices included both cremation and inhumation, with remains interred in pits or in pre-existing tumuli. Burial monuments associated with this period include ring barrows, ring-ditches and embanked enclosures. Cremation burial appears to have declined in the Iron Age, a trend that has been attributed to Roman and Christian influence.

Ogham is the earliest form of writing in Ireland, dating to approximately the early 5th century, during the transitional phase between the pagan Iron Age and the Early Medieval/Christian Period. Most surviving ogham stones are located in the southern part of the country, with Munster having the largest concentration of this monument type in either Britain or Ireland (Moore, 1998, 23). The ogham stones in Munster are found in various contexts, some associated with ringforts and enclosures, but the majority are linked to souterrains and ecclesiastical enclosures (*ibid*., 23). Many of the stones feature inscriptions that read the name of the person, followed by the name of their father and their tribe. According to Moore, the variety of contexts and their locations along geographical and political boundaries suggest that ogham stones may have served a broader function than merely being memorial monuments to the dead. They may also have been used to mark sacred places, burial grounds, tribal boundaries, church foundations, hermitages, or a combination of these (*ibid*., 25). Within the study area, there is one ogham stone at Aultagh (CO094-073) in Aultagh Wood, which bears an inscription on a flat face of the stone (Power *et al.* 1992, 124).

15.3.5 Early Medieval Period (c. 500 to 1100AD)

This period in Ireland is characterised by the influx and influence of Christianity, which had become widely established by the 6th century AD. A distinctive feature of the development of early Irish Christianity was the significant role played by monasticism. From their monasteries, Irish monks embarked on pilgrimages, preaching the gospel and establishing new communities across the continent. Monasteries became focal points for the lay communities spread throughout the countryside, in settlements such as ringforts/raths, crannogs, and simple huts.

Ringforts are one of the most characteristic monuments of this period. There are seven ringforts in the study area – one each in Behagh (CO108-005), Aultagh (CO094-074), three in Ardcahan (CO094-077, CO094-078 and CO094-079) and two in Dromerk (CO108-001 and CO108-003). Ringforts, also known by the names rath, lios, cathair or caiseal/cashel, generally consist of circular or sub–circular areas enclosed by an earthen bank, made up of material thrown up from a concentric fosse outside the bank. The sub-surface remains of circular dwelling houses and associated outbuildings are

frequently revealed within ringforts during excavation. More occasionally, evidence of specialised craftwork is also found during excavation, indicating the possibility of higher status sites. The main phase of construction and occupation of these sites dates from the beginning of the 7th century AD to the end of the 9th century. These sites would have been occupied by the elite and their families of the time while others of lower status in society lived outside the ringfort in small huts. Cattle dominated the agricultural economy of the period, with dairying being the primary pursuit. Tillage was secondary, the most important crops being wheat, oats, barley, rye and flax. In the absence of money (coinage did not become widespread until the medieval period), cattle were the indicator of one's status and were the currency for payment of fines, rent, tributes and gifts. Land was valued on the basis of the number of cows it could support (Feehan, 2003, 55). Cattle-raiding was widespread and the ringfort provided protection for the animals at night when they would have been kept within its defensive palisade (*ibid*., 62).

The closest ringfort to the LOB is that at Dromerk (CO108-001) 250m to the east. The monument is depicted on the OS 1842 map, but no surface trace of it survives (Power *et al., ibid.* 215). The other ringfort in the same townland (CO108-003) lies a short distance to the east. This ringfort is upstanding and comprises an earthen bank and external fosse with a causeway, suggesting the presence of the entrance in the east (*ibid.* 167). The three ringforts in Ardcahan are located to the northeast of the LOB. Two are upstanding (CO094-077 and CO094-078) and the third (CO094-79) is no longer extant. Of the two that are upstanding, one (CO094-078) is a small monument approximately 20m diameter defined by a low earthen bank and the other (CO094-077) is almost twice the diameter with a stone and earthen bank with a partially raised interior (*ibid*. 133 and 211). The ringfort in Aultagh (CO094-074) to the north was inaccessible when visited by the Archaeological Survey of Ireland (*ibid.* 211) and the ringfort in Behagh (CO108-005) to the east was barely discernible in a pasture field (*ibid.* 212).

There are two circular enclosures in the study area, one in Dromerk (CO108-002001-) approximately 350m east of the LOB and the other in Neaskin (CO094-072) to the north. The term enclosure is applied to archaeological sites, which cannot be definitively classified. Very often these enclosures are ringforts or cashels, which fall beyond the accepted size range for these monuments (i.e. less than 20m or more than 60m in diameter). Sometimes they can be of indeterminate shape and may date to as early as the Bronze Age or as recently as the last century when they were used as animal shelters. The enclosure in Neaskin defines a natural hillock of outcropping rock, which is partially defined by a stone-faced earthen bank, a stone-faced scarp, an external fosse and a stream (*ibid.* 264). The enclosure in Dromerk defines a circular area enclosed by an eroded earthen bank topped in part by a modern stone wall. There is a burial ground (CO108-002002-) in the southeastern quadrant (*ibid.* 262) which is defined as a raised oval area with some grave markers present. The burial ground is marked 'burial ground for children' on the 1842 OS 6 inch map (*ibid.* 299).

There is a second burial ground (CO094-080002-) in the study area in the early ecclesiastical enclosure at Kilmalooda (CO094-080001-). Early ecclesiastical enclosures are the earliest remains of Christian activity in the country and can date from the 6th century. These are the remains of scattered rural monasteries enclosed within usually circular or oval earthen banks ranging in size from 40m to 400m. The smallest of these may have contained churches, graveyards, dwellings, outbuildings, and workshops while the larger ones may have been akin to the size of a small town (*ibid.* 271). The early ecclesiastical enclosure at Kilmalooda (CO094-080001-) is approximately 100m in diameter. The bank is levelled and the western half destroyed by quarrying, but a burial ground (CO094-080002-) and a souterrain (CO094-121) survive within the interior (*ibid.* 273). The burial ground is a sub-circular area in the southern quadrant with a mound to the southeast. A stone-lined grave was uncovered in 1981 during ground clearance but immediately filled in (*ibid.* 304). The souterrain was revealed during quarrying work in 1981 in the northern quadrant of the enclosure (it is the only monument in the study area included in the Register of Historic Monuments). It comprised three chambers cut into gravel and significant collapse had occurred (*ibid.* 236). Souterrains are man-made underground

tunnels leading to a chamber or series of chambers, frequently associated with ringforts and ecclesiastical enclosures. They were used as areas of refuge in times of stress and probably had a secondary purpose as storage areas.

There was a horizontal wheeled mill in Keelaraheen (CO093-073), c. 2km to the northwest of the LOB on the River Bandon. These mills employed horizontal water wheels onto which water was directed by a wooden flume. They generally date from the early 7th to the late 10th century and they are the earliest example of hydro-engineering in the country (*ibid.* 289). The example at Keelaraheen was exposed by a mechanical excavator in 1976 and was dendrochronologically dated to *c.* AD 843 (*ibid.*).

15.3.6 Late Medieval to Early Modern Period (c. 12th Century to 19th Century)

There are no recorded monuments in the study area which date to the high medieval or late medieval periods (12th century – 16th century). However, two monuments date to the post medieval – early modern period (17th century – 19th century). Caha Bridge (CO108-064) is a road bridge with three semi-circular arches spanning the River Bandon, approximately 400m west of the LOB, between Gortanure to the west and Ardcahan to the east. Ardcahan House (CO094-108) is a country house situated 1km to the northeast of the LOB. While it is included in the RMP, no details are available on the ASI database. The Archive Files of the NMS were consulted in February 2025, and the following information was retrieved: '*A 3-bay, 2-storey gable-ended residential house with unusual 1-bay, 2-storey concave-topped walls to the right and left. There is a central gabled (2-storey) projection to rear, with modern addition to right and stone built addition to left*'. Ardcahan House is not listed in the Cork County Development Plan (2022-2028) and is not detailed in the NIAH.

15.3.7 Rivers And Streams

Waterways have always been a vital resource, encouraging human settlement along their banks and within their drainage areas from prehistoric times to the present. Their channels would have been central to activities such as transport, fishing and trade. As a result, there is a potential for archaeological finds and features associated with rivers and streams, either on their banks or within their beds. For this reason, they are considered Areas of Archaeological Potential (AAP).

An unnamed tributary of the Bandon River defines the eastern and part of the southern boundary of the LOB, forming the townland boundary between Ardcahan and Knockduff to the south and Ardcahan and Dromerk to the east. This small watercourse reaches the Bandon River approximately 500m southwest of the quarry. The northwestern townland boundary of Ardcahan is defined by the Caha River, after which the townland is named. This river flows south to join the Bandon River, 300m southwest of the LOB. The Caha River is bridged to the west of Ardcahan Quarry along a local road at Caha Bridge (CO108-064) while the Bandon River is bridged to the west along the R587 Dunmanway-Macroom Road at Ardcahan Bridge.

15.3.8 Cultural Heritage of The Study Area

Ardcahan Quarry is located in the townland of Ardcahan in the parish of Fanlobbus, in the barony of East Carbery, in a rural, agricultural area of west County Cork, approximately 3.5km northeast of Dunmanway town. Dunmanway itself is a plantation town dating to the early 17th century, with two triangular 'squares' at its core (Pochin Mould 1992, 106). In the late 17th century, Cox described it as 'a fine English plantation' (O'Flanagan 1993, 410), and by the mid-18th century, it had become an important centre of linen production (*ibid.* 414). Lewis described the town of Dunmanway in 1837 as a relatively busy market town with its linen trade in decline but its corn trade expanding (Cadogan, 1998, 231). He describes the town as modestly consisting of 'one long street extending about half a mile to the west of the bridge' which crosses the Bandon River and the 419 houses as 'indifferently

built' but 'distinguished by an appearance of cleanliness and comfort'. The town is 'surrounded on the north, west and south by lofty hills, rocks and mountains' (*ibid.*) and the LOB is located in the hills to the north.

Fanlobbus is derived from the Irish '*Fan Leaba Ois*' meaning the slope of the fawns bed. In former times, the surrounding district was known as Gleann-nacroim/Gleann Abha Croim or glen of the winding river, a name that is no longer in use (McCarthy, 2011).

The Irish landscape is divided into over 62,000 townlands, a system of landholding that is unique in Western Europe for its scale and antiquity (O'Connor 2001, 7). Many townlands are pre-Anglo/Norman in origin and Irish historical documents consistently use townland names throughout the historic period to describe areas and locate events accurately in their geographical context. The townland names and boundaries were standardised in the nineteenth century when the Ordnance Survey began to produce large-scale maps of the country. Townlands existed long before the parishes and counties, with original Irish names eventually anglicised based on how they sounded to English court scribes. The townland boundaries recorded by the Ordnance Survey, therefore, may well be aligned on older land divisions dating to early historic times and may physically overlie archaeological evidence for such early forms of land division. For this reason they are considered Areas of Archaeological Potential (AAP). The social customs or history of the people who have lived in a particular place can often be reflected in the townland names, many of which describe the landscape of the area. Both the proposed development site and LOB lie in the townland of Ardcahan (*Ard Ceachan*) meaning 'the high land (height) of the River Caha' while part of the southern boundary of the LOB is aligned on the townland boundary of Ardcahan and Knockduff. Knockduff (An Cnoc Dubh) translates to 'the black hill'. The eastern boundary of the LOB aligns with the townland boundary of Ardcahan and Dromerk. Dromerk (*Drom Eirc*) translates to 'ridge' (www.logainm.ie). The townland names are descriptive of the natural rugged landscape of the quarry and surrounding region.

The townland of Mallabraka, *c.* 2.5km to the west of the Quarry, is the birthplace of Sam Maguire, born here in 1877, where the family farmed 200 acres. The townland of Mallabraka or 'land of the little hillocks' is now mostly under forestry. Sam Maguire worked for a time in the British Civil Service in London and captained the London Hibernians Gaelic football team, which won several All-Ireland finals between 1900 and 1904. A noted nationalist, he recruited Michael Collins to the Irish Republican Brotherhood in 1909 and served as Collins's chief intelligence officer in London. Maguire became a central figure in the investigation into the assassination of Sir Henry Wilson and fled to Dublin in 1923, where he secured a position in the newly established Irish Civil Service. However, due to his Anti-Treaty sympathies, he clashed with his superiors and was dismissed. He developed TB and died penniless in 1927 (Walsh, 2003). Sam Maguire is buried in St. Mary's Cemetery in Dunmanway. After his death, the Sam Maguire Cup, designed like the Ardagh Chalice, was presented to the Gaelic Athletic Association in his honour. The former home of Sam Maguire is now a visitor centre and a complex of eight holiday homes has been built in its grounds.

A notable landscape feature to the southwest of Ardcahan Quarry is Mount Gunnery, known locally as Yew Tree Hill. This tree-less, rocky formation is a popular hiking route, and an activity centre, Funmanway, is situated on its northern side. On the west side of Mount Gunnery, *c.* 2km to the southwest of the quarry, are a grotto and holy well. The holy well is not listed in the RMP. The tradition of visiting holy wells goes back to the very beginnings of Irish Christianity, but most wells probably have their origin in pre-Christian ritual activities. The majority of the 'wells' are springs or just depressions in rocks where rainwater collects; some have more recently constructed stone or concrete surrounds (Power 1994, 171). Some wells are still maintained for holy use when at certain times of the year they would be visited in the form of a pilgrimage often referred to as a 'round' or 'pattern'. Other wells are known through tradition for their reputed curative properties. Patrick Logan

in his book 'The Holy Wells of Ireland' notes the long tradition of visiting holy wells down through the centuries and lists many of the customs that have been associated with these sites. Customs such as leaving votive offerings at the well are an essential part of the pilgrimage to the site. Offerings of money, stones, pieces of cloth, buttons, brooches and other everyday items are commonplace (Logan, 1992, 116). Offerings may be left at the side of the well, tied to a nearby tree or thrown into the well. Holy wells are so abundant in Ireland that most parishes in the country have at least one such site, whether they are in use or not (*Ibid*, 14). The holy well on the western side of Mount Gunnery is well maintained and in use and has a dedication plaque which reads '*Blessed on 15-8-2000 by Rev. Canon Denis Forde P.P. Dunmanway'* (Figs. 1 and 2; Appendix 15.1). The grotto, a short distance to the north of the holy well is also well maintained and has a large car parking area to the front, used by visitors to both the grotto and those wishing to hike Mount Gunnery. The grotto has a dedication plaque that reads *''Erected by Sean Kelleher during the Marian year 1988. Blessed by Canon D. McCarthy Dunmanway on 15th August 1988'*.

15.3.9 Cartographic Information

Two OS maps dating to the second half of the 19th century and the early 20th century depict the landscape layout of the LOB at those times. A third edition was produced in the mid-20th century as part of a national revision; however, this edition did not cover the entire country, and the LOB falls within an area excluded from the updated coverage.

The published 19th and early 20th century maps illustrate field boundaries and land use of that period. On the 1842 OS 6-inch map (**Fig. 15.3**), much of the southern half of the area of the LOB is shown as a large, mixed woodland with areas of exposed rock. In the southwest corner, there are two irregularly-shaped fields and in the westernmost of these fields there is a NE-SW unnamed rectangular structure.

The northern section of the LOB area is characterised by open rough pasture, outcropping rock, and portions of two irregular fields to the northwest. These fields contain no significant features, apart from a Trigonometrical Station showing a height of 371 ft OD in the western field.

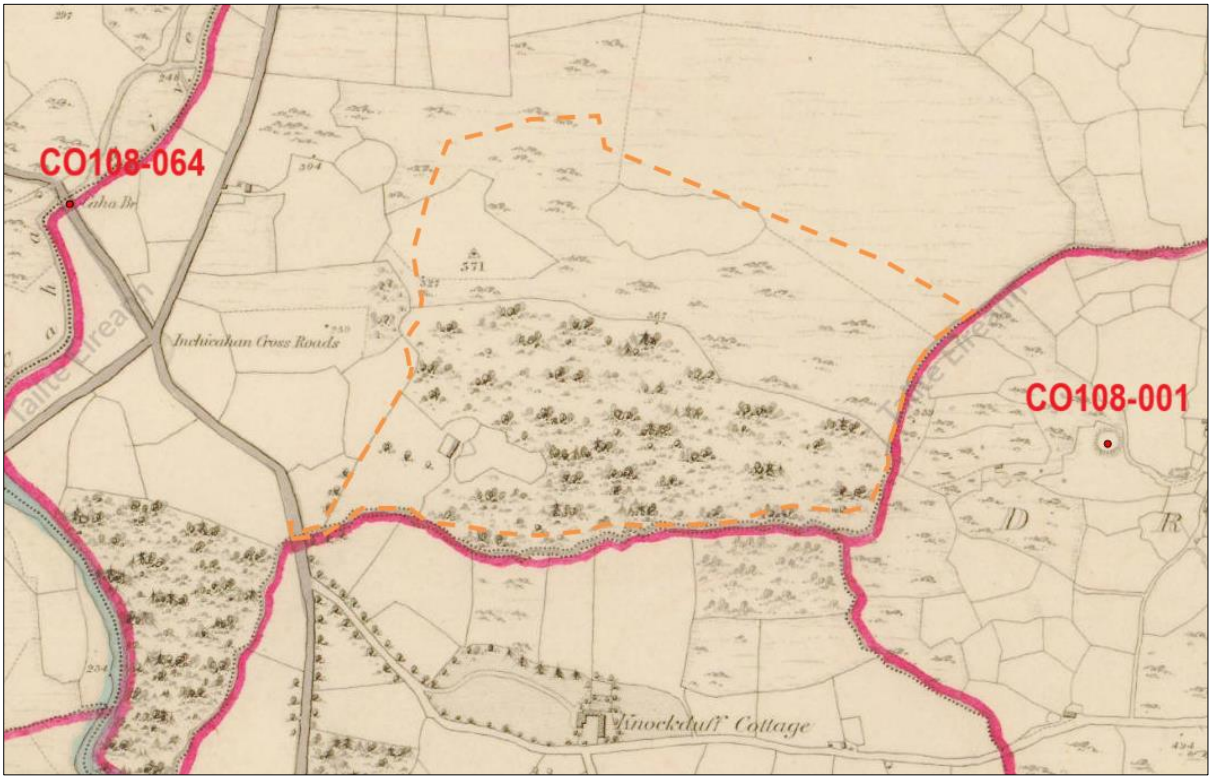


Figure 15.3 OS 6-inch map (1841-42) with approximate LOB boundary outlined in dotted red (source: www.archaeology.ie).

The 1902 OS 25-inch map (**Fig. 15.4**) depicts very little change in the area of the LOB. The large wooded area in the southern half is now named *Clashnagallagh Wood*, and it is traversed by several unfenced roads or tracks. The woodland has contracted slightly along its northeastern edge, where rough pasture and outcropping rock are now indicated and there is a small, irregularly-shaped field just inside its southern edge.

To the north the area of open rough pasture has expanded slightly, encroaching northward into the two previously defined irregular fields and these are now amalgamated into the larger open area. The two irregular fields to the southwest remain unchanged and the rectangular structure is still depicted. A small rectangular enclosure or haggard has been added to its southern side, and several additional unnamed small structures are also depicted. A pathway now extends southwest from the main structure, leading toward the stream to the south and it continues westward to the adjacent road.

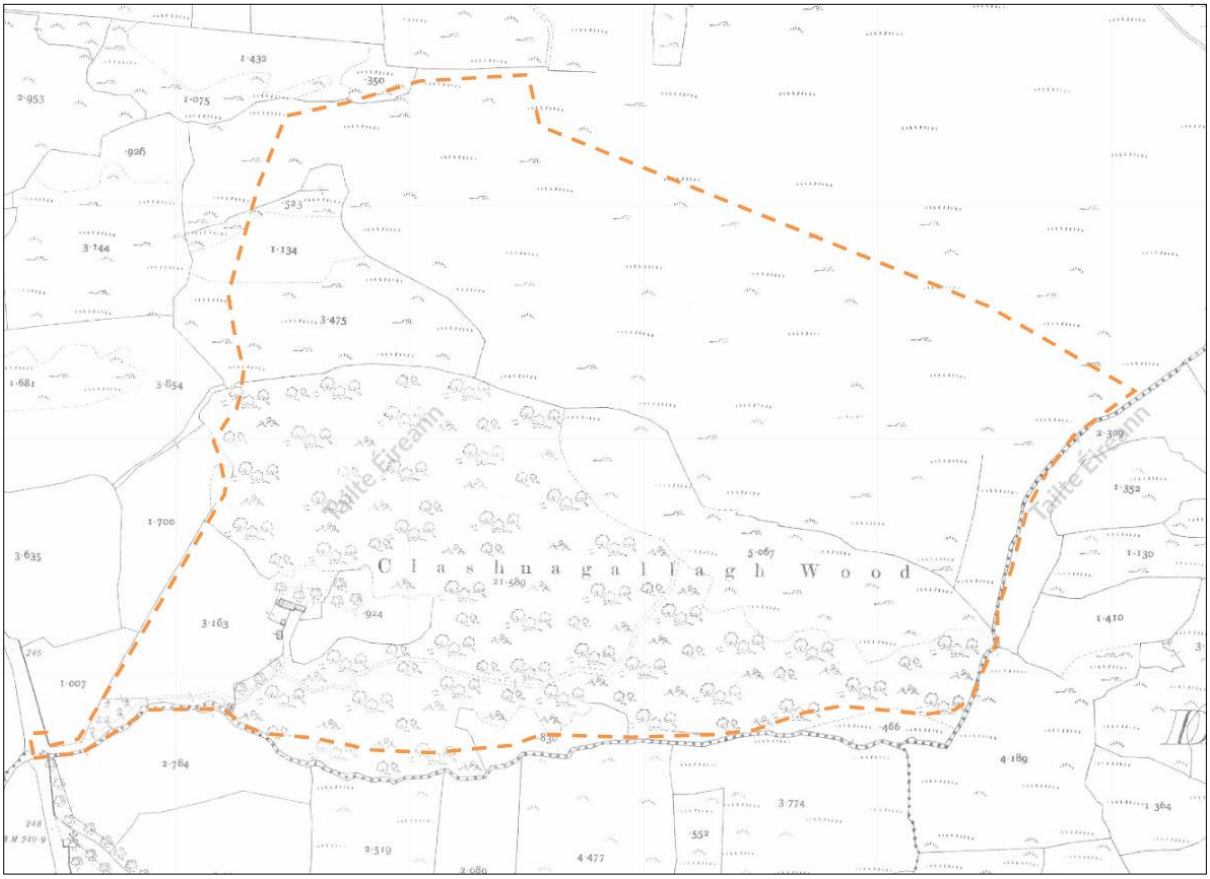


Figure 15.4 OS 25-inch map (1902) with approximate LOB boundary outlined in red (source www.archaeology.ie)

15.3.10 Walkover Survey

The primary purpose of the walkover survey was to assess the physical environment of the proposed development site and to identify any possible archaeological/cultural heritage features. Current land use, local topography and environmental conditions were evaluated to gain an overall understanding of the area. Walkover surveys were conducted on June 24th, 2014 (as part of the 2014 EIS), May 12th 2020, and February 16th 2023. On all occasions, no features, deposits, or finds of archaeological/cultural heritage potential were identified (Appendix 15.1; Figures 3-10). The aerial photograph in Figure 15.5 provides a clear representation of the proposed development site and other components within the overall LOB.

Ardcahan Quarry is located on a low hill within a valley basin surrounded by higher ridgelines and peaks. The setting is predominantly rural, characterised by low-density housing and small-scale farms. Access to the quarry is via a minor road (L4621-9), locally known as Hospital Road, which connects near its junction with the R587 at Inchicahan Cross Roads. This regional road links Dunmanway (to the south) with Macroom (to the north).

The southern portion of the proposed development site has been significantly altered by quarrying activity. The former extraction area, active between 1990 and 2014, is located in the southern and central part of the site, while the tarmacadam production plant lies outside it to the southeast. Both quarried zones are shown as woodland on the 1842 Ordnance Survey map (**Fig.15.3**) and are labelled "Clashnagallagh Wood" on the 1902 OS 25-inch map (**Fig. 15.4**). Remnants of this historically undisturbed mixed woodland remain, particularly along the southern boundary, south of the quarry access road.

The southwestern half of the proposed development site includes the former quarry extraction area (1990 - 2014). Outside of this, the northern and northeastern parts of the site consist of dense natural scrubland - primarily heather, gorse, bramble, and scattered trees. These areas are interspersed with exposed rock outcrops and large zones of hardstanding. Due to the density and inaccessibility of the vegetation, some areas could not be physically surveyed.

Areas of potential undisturbed ground within the proposed development site include:

- Natural scrubland: pockets of dense vegetation comprising heather, gorse, bramble, and willow, found between quarried zones, access roads, hardstanding areas, and artificial ponds.

No features, deposits, or other indicators of archaeological potential were identified during any of the walkover surveys.

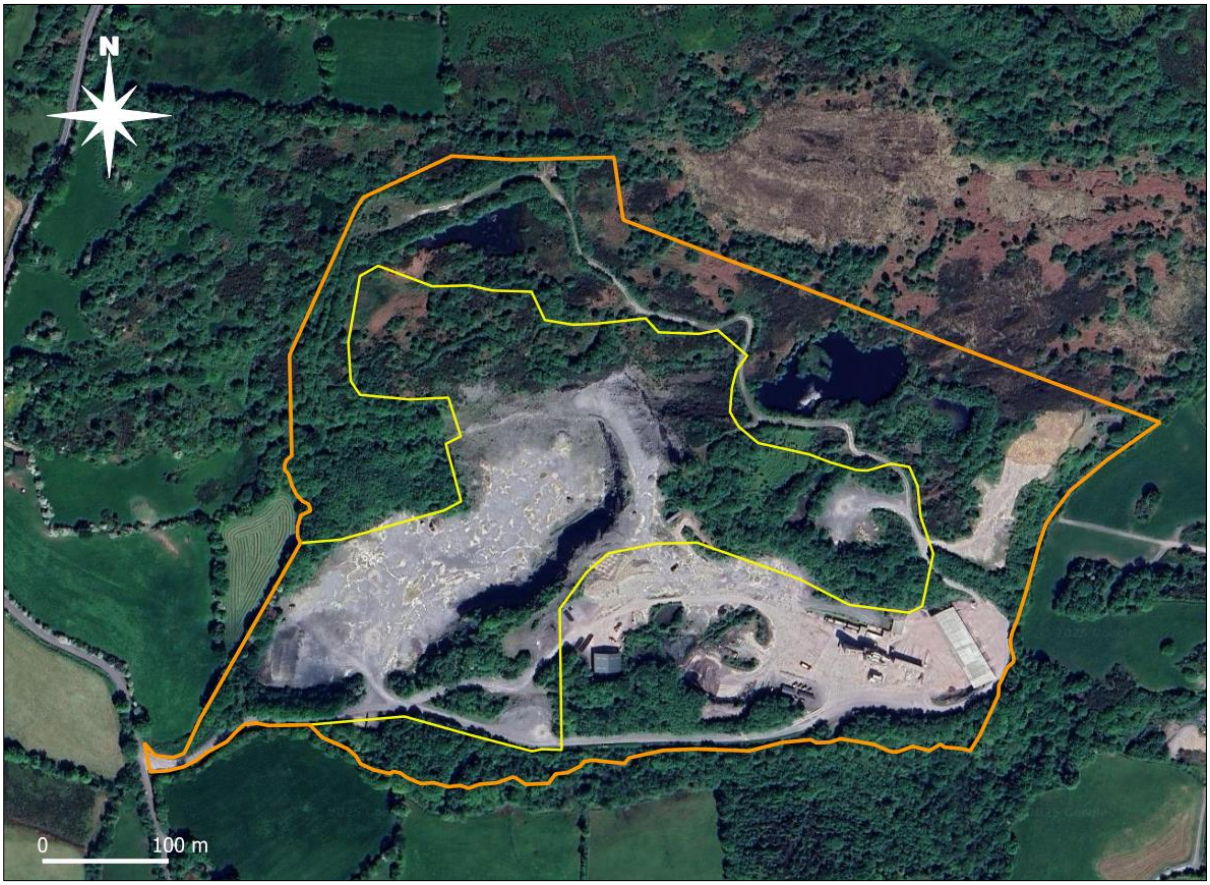


Figure 15.5 OS aerial view (2025) of Ardcahan Quarry with LOB outlined in orange and proposed development site in yellow (source www.google.ie)

15.3.11 Impact Assessment

The assessment of the direct and indirect impacts during construction and operational phases of the proposed development has been carried out in accordance with the *Guidelines on the Information to be contained in Environmental Impact Assessment Reports* (EPS, 2022).

15.3.12 Do Nothing Scenario

In the absence of the proposed development, previously unrecorded archaeological remains, if present beneath vegetation or the natural ground surface, would remain undisturbed, and no additional effects on the cultural heritage resource would occur.

15.3.13 Construction Phase

Archaeology

Registered Archaeological Monuments

There are no recorded archaeological sites in the footprint of the proposed development or the wider LOB. Therefore, no significant direct or indirect impacts on registered archaeological monuments are anticipated.

Potential for Previously Unknown Archaeological sites or Features

Much of our archaeological heritage survives only as subsurface remains. The proposed development site comprises dense scrub - heather, gorse, bramble, and trees - interspersed with large areas of exposed rock. Walkover surveys undertaken in 2014, 2020, and 2023 did not identify any archaeological features. However, large areas were inaccessible due to vegetation density, reducing surface visibility.

Given these constraints, the presence of previously unknown upstanding or subsurface archaeological remains cannot be ruled out. The impact on such unknown archaeological resources is assessed as direct, as their nature is currently unknown and unquantified. Where ground reduction is involved, there is always a possibility of uncovering archaeological material.

Area of Archaeological Potential

An unnamed tributary of the Bandon River forms the eastern boundary of the proposed development and coincides with the townland boundary between Ardcahan and Dromerk. Watercourses and townland boundaries have been identified in this assessment as AAP's. Therefore, previously unknown surface or subsurface archaeological sites may exist along the watercourse and its banks.

The proposed development will have no direct or indirect significant effects on this watercourse/townland boundary.

Architectural Heritage

There are no PS's or NIAH-listed structures within the proposed development site or LOB. No significant direct or indirect impacts on architectural heritage are anticipated.

Cultural Heritage

Cultural heritage includes archaeological and architectural remains, as well as the broader physical landscape, historical settlements, geological features, waterways, and their associated meanings are often reflected in local place names and historical records.

The townland names - Ardcahan ('the high land of the River Caha'), Knockduff ('black hill') to the south, Dromerk ('ridge') to the east, and Derrylahan ('broad oak wood') - reflect a natural, rugged upland landscape that has shaped the area's cultural identity.

Construction works within the LOB, which began before 1964, have already significantly altered this landscape. Much of the former *Clashnagallagh Wood*, recorded on the 1902 OS map, has been removed, and the natural upland terrain transformed by quarrying activity.

The proposed development will continue this trend resulting in a direct, moderate negative impact on the natural landscape character and cultural setting of the site and surrounding area. However, retention of undisturbed former mixed woodland along the southern and western LOB boundaries, together with pockets of dry heath vegetation (dry silice), will provide a locally positive effect on remaining landscape character. Additionally, future quarry reinstatement through native tree planting will contribute to long-term landscape rehabilitation and enhance the visual and ecological quality of the cultural landscape over time.

15.3.14 Operational Phase

Operational works within the proposed development will comprise the following;

- Blasting and drilling
- Crushing and Screening
- Stockpiling of overburden
- Discharge of water to settlement ponds
- Transportation to and from the site

No archaeological, architectural, or cultural heritage effects are predicted during the operational phase.

15.3.15 Visual Impact Assessment

There are no recorded archaeological sites on the proposed development site or the overall LOB. The nearest recorded archaeological sites are located in the adjoining townland of Dromerk: a ringfort (CO108-001), situated approximately 250m to the east, and an enclosure and associated burial ground (CO108-002001 and CO108-002002), located roughly 350m to the east. The ringfort has no surviving above-ground remains, and the enclosure is heavily eroded and not prominent within the landscape.

- No significant direct or indirect visual impacts are predicted for either of these archaeological sites as a result of the proposed development.

Caha Bridge (CO108-064), located approximately 400m west of the quarry, spans the townlands of Ardcahan and Gortanure. The bridge is not visible from the quarry due to intervening vegetation, and views from the bridge toward the quarry are similarly screened.

- The visual impact on Caha Bridge has been assessed as imperceptible (see Chapter 3: Landscape and Visual), resulting in an imperceptible indirect visual effect.

Of the remaining eighteen recorded archaeological monuments in the Study Area, four are listed as Redundant Records, meaning they are no longer considered to be archaeological sites. Of the fourteen that remain:

- One, an excavated water mill (CO093-073), and three others; a standing stone, ringfort, and souterrain, are subsurface and do not contribute to the current visual setting.

- A further seven monuments, including an ecclesiastical enclosure and burial ground, four ringforts, and an enclosure, have minimal surface expression.
- One ringfort and an Ogham stone located in Aultagh Wood, along with a country house within a complex of other structures, are screened by mature planting and therefore not visually prominent.

There are no Protected Structures (PSs) listed in the County Cork Development Plan (CCDP) and no buildings recorded in the National Inventory of Architectural Heritage (NIAH) on the LOB or within the wider 2km study area.

Previous quarrying has significantly transformed the upland landscape formerly depicted as woodland on historic maps. The proposed extension will continue to alter the landform, resulting in a moderate negative visual impact on the cultural landscape. Retained woodland and future reinstatement with native planting will soften these effects and provide long-term visual benefits; however, the original landform cannot be restored. While planting will support ecological and visual recovery, the permanent lowering of ground levels represents an irreversible cultural landscape change.

Conclusion:
Given the subsurface nature and lack of intervisibility with surrounding monuments, combined with the visual containment provided by existing vegetation and built features, the proposed development is not expected to result in any significant visual impact on known archaeological or architectural heritage. The principal visual impact relates to the cultural landscape, where ongoing landform modification constitutes a moderate negative effect.

15.3.16 Decommissioning Phase

No archaeological, architectural, or cultural heritage effects are anticipated during the decommissioning phase.

15.3.17 Cumulative Impacts

In this EIAR, cumulative impacts refer to the combined effects of historical quarrying activity within the LOB and the proposed quarry extension, assessed together to determine whether their interaction gives rise to increased effects on cultural heritage.

Consideration is also given to any permitted or reasonably foreseeable developments in the surrounding area that could compound these effects; however, no additional industrial or commercial projects are present in the immediate vicinity of the quarry.

Accordingly, no cumulative impacts are predicted in relation to archaeological or architectural heritage, as there are no recorded features within the LOB and no visual or physical interaction with the wider archaeological or architectural resource.

A cumulative effect is identified on the cultural landscape, where successive phases of quarrying – including pre-1964 workings, the 1990-2014 extraction phase, the existing tarmacadam plant, and the proposed extension - have incrementally altered the upland landform. This ongoing modification reduces the height and profile of the terrain, eroding a key element of landscape character reflected in the townland name Ardcahan and its association with rugged, elevated ground.

Construction and extraction activity within the LOB have already significantly reshaped the natural terrain. Much of the former Clashnagallagh Wood, recorded on the 1902 OS map, has been removed

and the upland topography transformed through quarrying. The proposed quarry extension will continue this trend.

15.4 Mitigation and Monitoring Measures

15.4.1 Construction Phase

The proposed development site was inspected in 2014, 2020 and on the 16th of February 2023 and found to be entirely unsuitable for pre-development archaeological investigations, such as geophysical survey and archaeological testing, due to prevailing ground conditions.

All ground works on the proposed development site will be archaeologically monitored under licence and will comprise the following;

- Removal of vegetation, trees, and dense undergrowth will be monitored archaeologically in case surface archaeological finds or features are present. If unknown archaeological features are identified, they will be preserved by record or *in situ*.
- Following vegetation clearance, topsoil removal will be archaeologically monitored. If unknown subsurface archaeological features are identified, they will be either preserved by record or preserved *in situ*.

Preservation *in situ* will require the relocation of the element of the development beyond the area of archaeological sensitivity. Preservation by record will require the excavation of the archaeological material, which will be fully resolved to professional standards of archaeological practice (Policy Guidelines on Archaeological Excavation – Department of Arts, Heritage, Gaeltacht and the Islands). This work will be funded by the developer.

15.4.2 Operational Phase

No archaeological, architectural, or cultural heritage effects are predicted; therefore, no mitigation is required.

15.4.3 Decommissioning Phase

No archaeological, architectural, or cultural heritage effects are predicted; therefore, no mitigation is required.

15.4.4 Monitoring

All ground works during construction will be archaeologically monitored under licence.

15.5 Risk of Major Accidents and Disasters

No foreseeable risks of major accidents or disasters related to the proposed development would result in significant effects on archaeological, architectural, or cultural heritage assets.

15.6 Significant Interaction of Effects

No significant interactions are anticipated between cultural heritage impacts and other environmental topics (e.g., noise, traffic, water, air quality) that would increase the overall impact significance on cultural heritage assets.

15.7 Residual Impacts

15.7.1 Construction Phase

Following a comprehensive assessment, the residual effects of the proposed development on the cultural heritage environment are considered not significant.

There are no registered archaeological monuments or architectural structures on the proposed development site or the wider LOB. All groundworks on the development site will be archaeologically monitored under licence. Should any previously unknown archaeological features be identified, they will be either preserved by record or preserved *in situ*.

Given the subsurface nature of nearby archaeological sites, the absence of visual connectivity, the presence of intervening development and vegetation, and the distance from the quarry, the potential visual impact of the proposed development on surrounding registered archaeological and architectural sites is also assessed as not significant.

Licensed archaeological monitoring during the construction phase will provide effective mitigation, ensuring any unexpected archaeological material encountered is appropriately managed. However, continued quarrying activity and associated ground reduction will result in a residual adverse impact on the cultural landscape, reflecting the ongoing removal of upland terrain and further alteration of the historic landform.

15.7.2 Operational Phase

During the operational phase, no additional direct or indirect impacts on cultural heritage are anticipated, provided ground disturbance is limited to monitored and permitted areas. The residual impact is considered neutral.

15.7.3 Decommissioning Phase

No cultural heritage effects are predicted during the decommissioning phase. Quarry reinstatement with native planting is expected to have a minor, long-term positive effect on the cultural landscape through greening and screening benefits; however, this will not reverse the permanent reduction of upland landform that underpins the cultural identity reflected in the townland name Ardcahan.

15.8 Conclusion

This cultural heritage assessment of the proposed development site and the wider LOB demonstrates that there are no recorded archaeological monuments, protected architectural structures, or features of cultural heritage significance on the footprint of the development.

Walkover surveys conducted between 2014 and 2023 identified no archaeological finds or features of potential significance, although some dense scrubland areas remain largely inaccessible. While the

possibility of previously unknown subsurface archaeological remains cannot be entirely ruled out, licensed archaeological monitoring during all ground disturbance works will ensure appropriate mitigation.

The proposed development will result in moderate negative impacts on the character of the natural landscape due to ongoing quarrying activities; however, retention of areas of undisturbed woodland and future reinstatement native planting will provide long-term positive effects on the cultural landscape and ecological quality. While planting will restore ecological and visual qualities, the permanent lowering of ground levels represents an irreversible cultural landscape change.

No significant direct or indirect effects on known archaeological sites, architectural heritage, or cultural heritage assets are anticipated during construction, operation, or decommissioning phases. Visual impacts on nearby archaeological sites and heritage features are assessed as imperceptible or not significant.

Overall, with the implementation of the recommended mitigation and monitoring measures, residual impacts on archaeological and architectural heritage will be neutral, while a minor residual negative impact on the cultural landscape will remain, reflecting the irreversible change to landform. Nonetheless, the development will comply with national heritage policy and best-practice archaeological standards.

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Murray Brothers Tarmacadam Ltd

CHAPTER 16
SIGNIFICANT INTERACTIONS OF IMPACTS

VOLUME II
MAIN STATEMENT

APRIL 2026

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16 Significant Interactions of Impacts

16.1 Introduction

The construction, operational and cumulative impacts of the proposed development have been assessed within each chapter of the EIAR. This chapter identifies the interactions and describes the potentially significant interactions of impacts identified in the previous chapters.

The potential cumulative effects of the proposed project in combination with other permitted developments in proximity has been considered in each chapter as relevant.

16.1.1 Author Information and Competency

This chapter was prepared by Martina Keenan Rivero of McCutcheon Halley Chartered Planning Consultants. Martina holds a BSc (Hons) in Spatial Planning from Technological University Dublin and an Advanced Diploma in Planning and Environmental Law from Kings Inns. She has 10 years of professional experience in both the public and private sector. Martina has coordinated the preparation of Environmental Impact Assessment Reports for a range of project types. Relevant experience includes large housing developments, mixed-use schemes, commercial and tourism projects, including the following developments that received permission:

- Southwest Gate – A mixed-use scheme across 13 blocks comprising 1,123 residential units with supporting amenities, retail units, office accommodation, a primary healthcare centre, gym, cultural centre, childcare facility, hotel and a series of public open spaces.
- Primark Distribution Centre – Construction of a Distribution Centre incorporating office floor space and ancillary buildings with a cumulative gross floor area of approx. 64,550 sq.m and associated site works.
- Oscar Traynor Road – Construction of 853 residential units (social, affordable and cost rental homes), together with a creche, retail unit/café, community facilities and a new public park.
- Inis Cealtra Visitor Experience - Proposed Visitor Centre and associated visitor facilities at Inis Cealtra (Holy Island) and Mountshannon Village, Co Clare.

16.1.2 Assessment Methodology

16.1.2.1 Legislative Requirements

The EIAR has considered and assessed the interactive effects and cumulative impacts arising from the construction and operation of the quarry at Ardcahan based on best scientific knowledge. Interactive effects (or interactions), specifically refer to any direct or indirect effects caused by the interaction of environmental factors as outlined in Article 3 (1) of the amended EIA Directive;

> *"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).

"Annex IV of the amended Directive states that a description of impacts should include:

> *"…the direct effects and any indirect, secondary, cumulative, short, medium and longterm, permanent and temporary, positive and negative effects of the project"*

The relevant interactions and interdependencies between specific environmental aspects have been summarised in the matrix set out in Table 16-1.

16.2 Description of Interactions

Based on the assessments undertaken by the specialist consultants as set out in the previous chapters of this EIAR, the primary interactions that are considered to have occurred are set out in Section 16.2.1

The potential significant impacts have been considered within the relevant discipline and remedial or mitigation measures outlined where appropriate, and in conclusion potentially significant interactions are identified in Section 16.3.1.

16.2.1 Population and Human Health

- **Land, Soils and Geology:** Quarrying activities may result in dust and particulate emissions to air as well as the potential to release contaminated soils to the local environment. Potential effects on amenity on local residents or the wider study area as a result of the visibility of construction activities and changes to the landscape such as removal of topsoil, tree cover and vegetation to construct settlement ponds, etc.
- **Air Quality:** During the construction phase, an adverse air quality impact can cause health and dust nuisance issues. The dust emissions associated with the operational quarrying activities have been modelled and the results compared to the relevant ambient air quality legislative limits, which are set for the protection of human health. The modelled results indicate that operational phase dust emissions will not have a significant impact on ambient air quality and results are compliant with the relevant limit values. Best practice mitigation measures will implemented during the operational phase to ensure that the impact of the proposed development complies with all ambient air quality legislative limits. Therefore, the predicted impact is direct, long-term, negative, localised and not significant with respect to Population and Human Health.
- **Noise and Vibration**: Increased levels of noise and vibration as a result of the construction and operation of the quarry including blasting may result in negative impacts to the amenity of local residents.
- **Landscape and Visual**: The changes to the landscape, loss of vegetation and the loss of the woodland may have a negative impact on residents if the changes are perceived negatively. However, it is likely that over time the screening provided by berms and the growth of vegetation will soften any perceived negative impacts.
- **Traffic and Transport**: Interactions with HGVs delivering product to and removing product from the quarry may result in potential impacts to health and safety, through an increased risk of collisions.

16.2.2 Land, Soils and Geology

- **Population and human health:** Quarrying activities may result in dust and particulate emissions to air as well as the potential to release contaminated soils to the local environment. Potential effects on amenity on local residents or the wider study area as a result of the visibility of construction activities and changes to the landscape such as removal of topsoil, tree cover and vegetation to construct settlement ponds, etc.
- **Water (Hydrology and Hydrogeology):** Quarrying activities may result in discharge of contaminated run-off to surface water. Runoff from the work areas, such as crushing, washing and roads could create sediment runoff, while potential for fuel from site machinery could create environmental impacts through fuel spills. Ammonia from blasting residues in storm or groundwater could also potentially pose an environmental risk.
- **Air Quality:** Operational phase activities such as land clearing, material processing, stockpiling of materials etc. have the potential for interactions between air quality and land and soils in the form of dust emissions. With the appropriate mitigation measures to prevent fugitive dust emissions, it is predicted that there will be no significant interactions between air quality and land and soils during the operational phase.
- **Climate:** The impact of flood risk has been assessed, and as per Chapter 7 – Water, the proposed development is not at risk of flooding from pluvial or fluvial sources. The increase in rainfall amounts due to climate change has been reviewed as part of the assessment. The effect of the interactions between climate and land, soils, geology and hydrology are direct, short-term, negative and imperceptible during the construction phase and direct, long-term, negative and imperceptible during the operational phase, which is overall not significant in EIA terms.
- **Noise and Vibration:** Blasting, rock crushing and traffic may result in increased levels of noise and vibration during the construction and operational phase of the quarry.
- **Landscape and Visual Impact:** Potential effects of site clearance during the construction phase and quarrying activity may impact on views and visual amenity. The development has the potential to negatively alter the composition of the view from a viewpoint.
- **Biodiversity:** Site clearance may result in the loss of vegetation including woodland and heath. The construction and operation of the quarry may result in the creation of new features of benefit for fauna diversity at site.

16.2.3 Hydrology and Hydrogeology

- **Land, Soils and Geology**: Quarrying activities may result in discharge of contaminated run-off to surface water. Runoff from the work areas, such as crushing, washing and roads could create sediment runoff, while potential for fuel from site machinery could create environmental impacts through fuel spills. Ammonia from blasting residues in storm or groundwater could also potentially pose an environmental risk.
- **Air Quality:** Dust from quarrying activities may interact with rainfall to create suspended sediment impacting air quality.
- **Biodiversity:** Surface water pollution on the site or in the local water course, could impact on its ecological and biodiversity attributes.

16.2.4 Air Quality

- **Population and Human Health:** During the construction phase, an adverse air quality impact can cause health and dust nuisance issues. The dust emissions associated with the operational

quarrying activities have been modelled and the results compared to the relevant ambient air quality legislative limits, which are set for the protection of human health. The modelled results indicate that operational phase dust emissions will not have a significant impact on ambient air quality and results are compliant with the relevant limit values. Best practice mitigation measures will implemented during the operational phase to ensure that the impact of the proposed development complies with all ambient air quality legislative limits. Therefore, the predicted impact is direct, long-term, negative, localised and not significant with respect to Population and Human Health.

- **Land and Soils:** Operational phase activities such as land clearing, material processing, stockpiling of materials etc. have the potential for interactions between air quality and land and soils in the form of dust emissions. With the appropriate mitigation measures to prevent fugitive dust emissions, it is predicted that there will be no significant interactions between air quality and land and soils during the operational phase.
- **Hydrology and Hydrogeology:** Dust from quarrying activities may interact with rainfall to create suspended sediment impacting air quality.
- **Biodiversity:** Dust generation will occur during the operational phase due to the quarrying works. Dust emissions can coat vegetation leading to a reduction in the photosynthesising ability as well as other effects. With the implementation of dust mitigation measures, dust emissions will be minimised and impacts will be direct, long-term, negative, localised and not significant with respect to biodiversity.
- **Traffic and Transport:** Interactions between air quality and traffic can be significant. With increased traffic movements and reduced engine efficiency, i.e. due to congestion, the emissions of vehicles increase. The impacts of the proposed development on air quality are assessed by reviewing the change in annual average daily traffic on roads close to the site. In this assessment, the impact of the interactions between Traffic and Air Quality are linked but there is no potential for significant impacts from traffic on air quality.
- **Climate:** Air quality and climate have interactions due to the emissions from the burning of fossil fuels during the construction and operational phases generating both air quality and climate impacts. There is no impact on climate due to air quality; however, the sources of impacts on air quality and climate are strongly linked.

16.2.5 Climate

- **Land, Soils, Geology and Hydrology:** The impact of flood risk has been assessed, and as per Chapter 7 – Water, the proposed development is not at risk of flooding from pluvial or fluvial sources. The increase in rainfall amounts due to climate change has been reviewed as part of the assessment. The effect of the interactions between climate and land, soils, geology and hydrology are direct, short-term, negative and imperceptible during the construction phase and direct, long-term, negative and imperceptible during the operational phase, which is overall not significant in EIA terms.
- **Air Quality:** Air quality and climate have interactions due to the emissions from the burning of fossil fuels during the construction and operational phases generating both air quality and climate impacts. There is no impact on climate due to air quality; however, the sources of impacts on air quality and climate are strongly linked.
- **Traffic and Transport:** During the construction and operational phase, there is the potential for interactions between climate and traffic (Chapter 11 - Traffic & Transport). Vehicles accessing the site will result in emissions of CO2, a greenhouse gas. In this assessment, the

effects of the interactions between traffic and climate are considered to be direct, short-term, negative and not significant during the construction phase and direct, long-term, negative and not significant during the operational phase. No other significant interactions between climate and other environmental topics have been identified.

16.2.6 Noise and Vibration

- **Population and Human Health**: Increased levels of noise and vibration as a result of the construction and operation of the quarry including blasting may result in negative impacts to the amenity of local residents.
- **Traffic and Transport**: Activity during day to day operations such as blasting and the use of HGVs may have given rise to local noise and vibration which may have an impact on the amenity of local residents.
- **Biodiversity**: Noise and vibration as a result of construction and operation activities may result in the displacement of fauna including birds within or in close proximity to the site.
- **Land, Soils and Geology:** Blasting, rock crushing and traffic may result in increased levels of noise and vibration during the construction and operational phase of the quarry.

16.2.7 Landscape and Visual Impact

- **Population and Human Health**: The changes to the landscape, loss of vegetation and the loss of the woodland may have a negative impact on residents if the changes are perceived negatively. However, it is likely that over time the screening provided by berms and the growth of vegetation will soften any perceived negative impacts.
- **Land, Soils and Geology:** Potential effects of site clearance during the construction phase and quarrying activity may impact on views and visual amenity. The development has the potential to negatively alter the composition of the view from a viewpoint.
- **Biodiversity**: The changes to the landscape and the loss of vegetation including the woodland and heath may have a negative impact on biodiversity. The proposed landscape plan is anticipated to have a positive impact on biodiversity as areas are encouraged to revegetate naturally, existing woodland and dry siliceous heath is to be retained, and areas adjacent to the remaining woodland are to be planted with a native woodland mix.

16.2.8 Traffic and Transport

- **Population and Human Health**: Interactions with HGVs delivering product to and removing product from the quarry may result in potential impacts to health and safety, through an increased risk of collisions.
- **Noise and vibration**: Activity during day to day operations such as blasting and the use of HGVs may have given rise to local noise and vibration which may have an impact on the amenity of local residents.
- **Air Quality:** Interactions between air quality and traffic can be significant. With increased traffic movements and reduced engine efficiency, i.e. due to congestion, the emissions of vehicles increase. The impacts of the proposed development on air quality are assessed by reviewing the change in annual average daily traffic on roads close to the site. In this assessment, the impact of the interactions between Traffic and Air Quality are linked but there is no potential for significant impacts from traffic on air quality.

- **Climate**: During the construction and operational phase, there is the potential for interactions between climate and traffic (Chapter 11 - Traffic & Transport). Vehicles accessing the site will result in emissions of CO2, a greenhouse gas. In this assessment, the effects of the interactions between traffic and climate are considered to be direct, short-term, negative and not significant during the construction phase and direct, long-term, negative and not significant during the operational phase. No other significant interactions between climate and other environmental topics have been identified.

16.2.9 Biodiversity

- **Land, Soil and Geology:** Site clearance may result in the loss of vegetation including woodland and heath. The construction and operation of the quarry may result in the creation of new features of benefit for fauna diversity at site.
- **Hydrology and Hydrogeology:** Surface water pollution on the site or in the local water course, could impact on its ecological and biodiversity attributes. However, appropriate mitigation measures are presented in Chapter 7 to prevent potential effects to surface water and groundwater. By protecting local water quality, these measures also protect biodiversity.
- **Noise and Vibration**: Noise and vibration as a result of construction and operation activities may result in the displacement of fauna including birds within or in close proximity to the site.
- **Landscape and Visual Impact**: The changes to the landscape and the loss of vegetation including the woodland and heath may have a negative impact on biodiversity. The proposed landscape plan is anticipated to have a positive impact on biodiversity as areas are encouraged to revegetate naturally, existing woodland and dry siliceous heath is to be retained, and areas adjacent to the remaining woodland are to be planted with a native woodland mix.
- **Air Quality**: Dust generation will occur during the operational phase due to the quarrying works. Dust emissions can coat vegetation leading to a reduction in the photosynthesising ability as well as other effects. With the implementation of dust mitigation measures dust emissions will be minimised and impacts will be direct, long-term, negative, localised and not significant with respect to biodiversity.

16.2.10 Cultural Heritage and Archaeology

- No significant interactions are anticipated between cultural heritage impacts and other environmental topics (e.g., noise, traffic, water, air quality) that would increase the overall impact significance on cultural heritage assets.

Interaction	Population & Human Health	Lands, Soils & Geology	Hydrology & Hydrogeology	Air Quality	Climate	Noise and Vibration	Landscape & Visual Impact	Traffic & Transport	Biodiversity	Cultural Heritage & Archaeology
Population & Human Health										
Lands, Soils & Geology										
Hydrology & Hydrogeology										
Air Quality										
Climate										
Noise and Vibration										
Landscape & Visual Impact										
Traffic & Transport										
Biodiversity										
Cultural Heritage & Archaeology										

Table 16-1 Overview of identified interactions (yellow)

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CHAPTER 17
SCREENING FOR MAJOR ACCIDENTS

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17 Screening for Major Accidents

17.1 Introduction

In order to ensure a comprehensive assessment of potential environmental effects due to risks of major accidents and/or disasters as relevant to the development, this chapter presents a review of the characteristics of the proposed development and of the project location to consider potential for accident scenarios.

In assessing likely potential and predicted impacts, account has been taken of both the importance of the attributes and the predicted scale and duration of the likely impacts. Section 8 of Annex IV of the EIA (Environmental Impact Assessment) Directive specifies that the EIAR (Environmental Impact Assessment Report) must include:

> *"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/Euratom 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".*

A major accident can be defined as an acute or chronic accident or disaster, of human or natural origin, which occurs either as a consequence of, or which interacts with, the construction or operation of the proposed Scheme, and which has substantial consequences for people or the environment.

The Seveso III Directive (2012/18/EU) also requires Member States to apply land-use or other relevant policies to ensure that appropriate distances are maintained between residential areas, areas of substantial public use and the environment, including areas of particular natural interest and sensitivity and hazardous establishments (commonly referred to as Seveso sites). For existing establishments, Member States are required to implement, if necessary, additional technical measures so that the risk to persons or the environment is maintained at an acceptable level.

The Health and Safety Authority (HSA) is the Competent Authority in Ireland as defined by Chemicals Act (Control of Major Accident Hazards Involving Dangerous Substances) Regulations 2015, (COMAH Regulations 2015) which implements the Seveso III Directive in Ireland. The HSA is responsible for ensuring that the impacts of facilities which fall within the remit of this legislation are taken into account with respect to land use planning.

The HSA does not consider the proposed development to be a COMAH facility. However, in order to ensure a comprehensive assessment of potential environmental effects due to risks of major accidents and/or disasters as relevant to the development, this chapter presents a review of the characteristics

of the proposed development and of the project location to consider potential for accident scenarios that do not fall under COMAH reporting requirements.

17.2 Expertise & Qualifications

This chapter was prepared by Martina Keenan Rivero of McCutcheon Halley Chartered Planning Consultants. Martina holds a BSc (Hons) in Spatial Planning from Technological University Dublin and an Advanced Diploma in Planning and Environmental Law from Kings Inns. She has 10 years of professional experience in both the public and private sector. Martina has coordinated the preparation of Environmental Impact Assessment Reports for a range of project types. Relevant experience includes large housing developments, mixed-use schemes, commercial and tourism projects, including the following developments that received permission:

- Southwest Gate – A mixed-use scheme across 13 blocks comprising 1,123 residential units with supporting amenities, retail units, office accommodation, a primary healthcare centre, gym, cultural centre, childcare facility, hotel and a series of public open spaces.
- Primark Distribution Centre – Construction of a Distribution Centre incorporating office floor space and ancillary buildings with a cumulative gross floor area of approx. 64,550 sq.m and associated site works.
- Oscar Traynor Road – Construction of 853 residential units (social, affordable and cost rental homes), together with a creche, retail unit/café, community facilities and a new public park.
- Inis Cealtra Visitor Experience - Proposed Visitor Centre and associated visitor facilities at Inis Cealtra (Holy Island) and Mountshannon Village, Co Clare.

17.3 Methodology

In the EIA assessment, consideration is given to both the importance of an attribute and the magnitude of the potential environmental impacts of the proposed activities on that attribute.

The principal attributes (and impacts) to be assessed include the following:

- Localised flooding (potential increase or reduction) and floodplains including benefitting lands and drainage districts (if any).
- Potential Seismic Activity (if any).
- Proximity to any COMAH/SEVESO sites.

COMAH/Seveso sites are defined as industrial sites that, because of the presence of dangerous substances in sufficient quantities, are regulated under the Seveso II Directive.

17.3.1 Relevant Legislation & Guidance

The assessment has been carried out generally in accordance with the following guidelines:

- EPA 'Guidelines on the Information to be contained in Environmental Impact Assessment Reports' (2022), and;
- National Roads Authority (NRA) 'Guidelines on Procedures for the Assessment and Treatment of Hydrology for National Road Schemes' (2009).

17.3.2 Site Surveys/Investigation

The collection of baseline regional data was undertaken by reviewing the following sources:

- Office of Public Works (OPW) flood mapping data (www.floodinfo.ie).

Site specific data was derived from the following sources:

- Assessments completed as part of this EIAR.
- Site plans and drawings prepared and submitted with the planning application.

17.3.3 Consultation

The Health Safety Authority (HSA) was contacted in August 2023 regarding the proposed development and were notified that an EIAR was being completed. The Authority did not provide any feedback in relation to the proposed development or the content of the EIAR.

17.4 Difficulties Encountered

There were no difficulties encountered during the compilation of this chapter.

17.5 Baseline Environment

The description of the site context and proposed development is presented in detail in Chapter 3 – Project Description.

17.5.1 Site Description

Ardcahan Quarry is located approximately 3.5km north-east of Dunmanway in West Cork. The site is situated off the L4621-9 local road ('Hospital Road'), approximately 300m east of its junction with the R587 regional road, which links Dunmanway and Macroom.

The site is located in a rural setting characterised by undulating topography, irregularly shaped fields and clusters of mixed woodland. The land immediately around the quarry consists of scrub, woodland and agricultural grassland. The surrounding lands comprise primarily of livestock farming and rural housing.

17.5.2 Flood Risk

The Office of Public Works (OPW) website (www.floodinfo.ie), was reviewed for information on the National Indicative Flood Mapping and the Ardcahan Quarry site area is shown to be outside the map extent of any of the OPW fluvial flood hazard scenarios of, Low and Medium Probability and Mid-Range Future and High-End Future Scenarios. The Ardcahan Quarry does not form any part of the flood plain for the Caha or Bandon River systems and no part of the proposed development is in a flood risk area or has any history of flooding.

No parts of the Proposed Development Site are mapped within any fluvial flood zones (Flood Zones A - B). The Ardcahan Quarry Site is located above the mapped 1,000-year flood level and therefore all infrastructure is located in Flood Zone C (Low Risk).

The flooding of the low-lying fields adjacent to the Bandon and Caha Rivers and two historical flooding events were found to be registered in proximity (<1km distance) to the site. OPW records from Feb 1991 and Feb 2007 show flooding of the road at the Inchacuhan Cross Roads and in the Ardcahan Bridge area.

The scale of the site (0.25km2) and the adjacent stream catchment (~1km2) with regard to the Caha and Upper Bandon river catchment areas above the Ardcahan Bridge (~100km2) and the size of the overall Bandon River catchment area (~400km2) means that the potential for any site runoff to increase the flooding potential downstream would be considered extremely low to negligible.

The presence of the attenuation ponds and control of the sites discharge rate, which is designed to retain excess stormwater on site in the wet grassland area, will reduce the peak storm water runoff flows from the site and not increase downstream flooding risks.

In relation to climate change, the OPW mapping modelled flood extents for the Mid-Range and High-End Future Scenarios in relation to fluvial flooding. The Mid-Range scenario accounts for a 20% increase in rainfall rates due to climate change in future years while the High-End scenario accounts for a 30% increase. OPW Modelling for both the Mid-End and High-End scenarios indicated flood extents that align with the present day scenario and therefore, future climate change related rainfall is not considered a risk in relation to flooding.

Based on the information provided in the OPW National Indicative Flood Mapping it can be concluded that overall, the proposed development has low vulnerability to current or future flood risk.

17.5.3 Seismic Activity

Much of the Earth's surface is covered by unconsolidated sediments which can be especially prone to instability. Water often plays a key role in lubricating the slope failure. Instability is often significantly increased by man's activities in building houses, roads, drainage and agricultural changes. Landslides, mud flows, bog bursts (in Ireland) and debris flows are a result.

In general, Ireland suffers few landslides. Landslides are more common in unconsolidated material than in bedrock, and where the sea constantly erodes the material at the base of a cliff landslides and falls lead to recession of the cliffs. Landslides have also occurred in Ireland in recent years in upland peat areas due to disturbance of peat associated with construction activities.

In Ireland, seismic activity is recorded by the Irish National Seismic Network. The Geophysics Section of the School of Cosmic Physics, Dublin Institute for Advanced Studies (DIAS) has been recording seismic events in Ireland since 1978. The station configuration has varied over the years. However, currently there are six permanent broadband seismic recording stations in Ireland including IWEX on Carrickbyrne Hill, Co. Wexford, running from 01/01/2011 and operated by DIAS. The seismic data from the stations comes into DIAS in real-time and are studied for local and regional events.

As can be seen in Figure 17.1 below, the principal events have occurred along/ beyond the east, south-east and south of Ireland with seismic movements generally up to 2.9 Magnitude recorded on land with no large seismic events recorded in the immediate vicinity of the subject site.

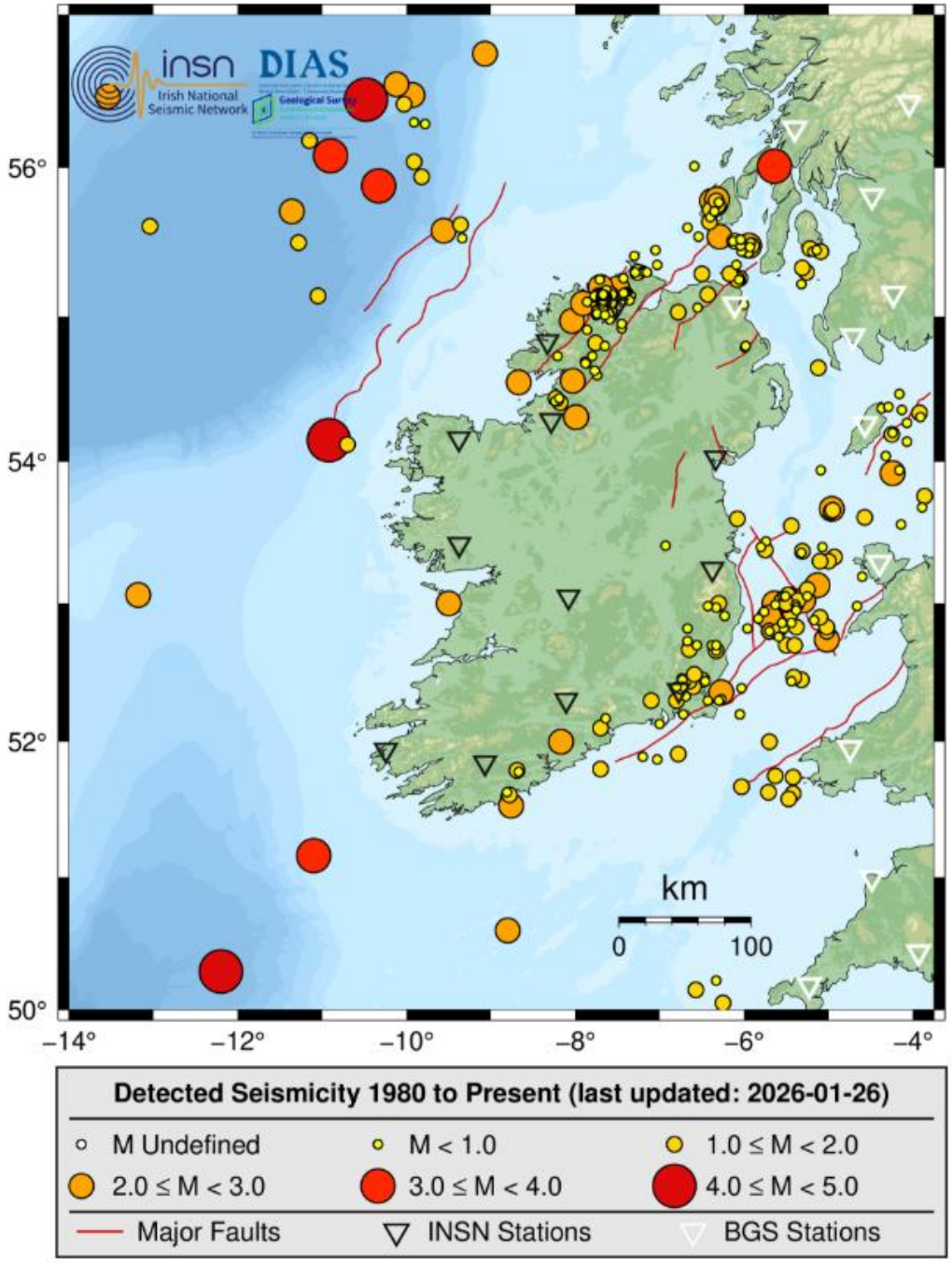


Figure 17.1 Seismic Movements. Source: Irish National Seismic Network

17.5.4 COMAH/SEVESO Sites

The Seveso Directive (Directive 82/501/EEC, Directive 96/82/EC, Directive 2012/18/EU) was developed by the EU after a series of catastrophic accidents involving major industrial sites and dangerous substances. Such accidents can give rise to serious injury to people or serious damage to the environment, both on and off the site of the accident. The Chemicals Act (Control of Major Accident Hazards involving Dangerous Substances) Regulations 2015 (S.I. No. 209 of 2015) (the "COMAH Regulations"), implement the latest Seveso III Directive (2012/18/EU).

The purpose of the COMAH Regulations is to transpose the Seveso Directive into Irish law and lay down rules for the prevention of major accidents involving dangerous substances, and to seek to limit as far as possible the consequences for human health and the environment of such accidents, with the overall objective of providing a high level of protection in a consistent and effective manner.

There are two tiers of establishment, which are related to the quantities of dangerous substances present. Depending on quantity, an establishment may be upper-tier or lower-tier. Upper-tier establishments have greater quantities of dangerous substances present and therefore are obliged to comply with additional requirements specified in the Regulations. Lower-tier establishments have lower quantities of dangerous substances present.

There are 14 no. lower tier Seveso sites and 15 no. upper tier Seveso sites located in the Cork County administrative area. The closest Seveso site to the subject site is the Carberry Food Ingredients site in Balineen, Co. Cork, c. 7.6km from the subject site. This is a 'lower tier establishment'. Given the distances between the subject site and this Seveso site, it is not considered a concern for the proposed development at construction or operational phase.

The proposed development has been designed in accordance with the Safety, Health and Welfare at Work Act 2005 (S.I. 10 of 2005) as amended and the Safety, Health and Welfare at Work (General Application) Regulations 2007 to 2016 (S.I. 299 of 2007, S.I. 445 of 2012, S.I. 36 of 2016) as amended and associated regulations.

Table 17.1 Seveso Sites

Site	Tier	Distance to Site
Carberry Food Ingredients	Lower Tier	7.6km

17.6 The 'Do nothing' Scenario

The site will remain as underutilized greenfield area.

17.7 Potential Significant Effects

17.7.1 Construction Phase

No scenarios of concern have been identified during the construction phase. As such the predicted impact is considered to be short term, imperceptible and neutral.

17.7.2 Operational Phase

No scenarios of concern have been identified during the construction phase. As such the predicted impact is considered to be short term, imperceptible and neutral.

The proposed development is not located in an area prone to seismic events or within close proximity to a COMAH/Seveso site. As such, these accident scenarios are not of concern.

Therefore, the impact is considered to be long term, imperceptible and neutral.

17.7.3 Cumulative Effects

Cumulative impacts are considered imperceptible and neutral.

17.8 Mitigation

17.8.1 Construction Phase Mitigation

No mitigation measures necessary.

17.8.2 Operational Phase Mitigation

Mitigation measures have been designed into the proposal. No further mitigation measures necessary.

17.8.3 Cumulative Mitigation

No mitigation measures necessary.

17.8.4 Monitoring

No monitoring proposed.

17.9 Residual Impact Assessment

17.9.1 Construction Phase

No scenarios of concern have been identified during the construction phase. As such the predicted impact is considered to be short term, imperceptible and neutral.

17.9.2 Operational Phase

Once the mitigation measures designed into the scheme are implemented correctly, the predicted impact as a result of flooding is long term, imperceptible and neutral.

17.9.3 Cumulative Impact

Cumulative impacts are considered imperceptible and neutral.

17.10 References & Sources

- EPA 'Guidelines on the Information to be contained in Environmental Impact Assessment Reports' (2022).
- EPA 'Draft Advice Notes on Current Practice in the Preparation of Environmental Impact Statements' (2015).
- National Roads Authority (NRA) 'Guidelines on Procedures for the Assessment and Treatment of Hydrology for National Road Schemes' (2009).
- Office of Public Works (OPW, www.floodinfo.ie).
- Irish National Seismic Network (INSN, www.insn.ie)

Murray Brothers Tarmacadam Ltd

CHAPTER 18
SUMMARY OF REMEDIAL AND MITIGATION MEASURES AND MONITORING

VOLUME II
MAIN STATEMENT

APRIL 2026

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18 Summary of Proposed Mitigation Measures

18.1 Introduction

A key objective of the Environmental Impact Assessment process is to identify likely significant environmental impacts at the pre-consent stage and where necessary to propose measures to mitigate or ameliorate such impacts. This chapter of the EIAR summarises the proposed mitigation measures set out in Chapters 5 to 17.

Table 18-1 Mitigation Measures

Aspect	Mitigation Measures and Monitoring
Population & Human Health	**Incorporated Design** The layout and direction of the proposed extension have been designed to maximise resources available within the area whilst being cognisant of the nearest sensitive receptors. In this instance, the nearest receptors are those residences' location immediately west, east and south of the proposed development site. Quarry extraction differs from many forms of development as it is an operational use and therefore does not always, as in this instance, include a requirement for built structures and therefore the usual scope available to the Applicant, for variations in design and construction, is limited. **Construction and Operational Phase Mitigation** In order to ensure there are no potential impacts associated with the health and safety, the following measures will be applied: • A site-specific Health and Safety Plan will be in place for the site. All site staff will be made aware of and adhere to the company Health and Safety Plan. • Only appropriately qualified and trained personnel will be permitted to operate machinery onsite. • Appropriate barriers and signage will be used. • The proposed development site will not be accessible to members of the public. • The site will also be secure to prevent the risk of trespass through signage and provision of barriers. The impacts of noise and vibration have been assessed in Chapter 10 of the EIAR. **Decommissioning and Restoration Phase Mitigation** The health and safety measures set out above for the construction and operational phases of development shall also be implemented during the Decommissioning and Restoration phase to ensure that no accidents occur. The impact of the dust and air quality have been assessed in Chapter 8 of the EIAR.
Land, Soils & Geology	The construction, operational and restoration phases of the quarry will occur in parallel as the quarry development progressed. Remedial measures for all phases will be applied in tandem as the work progresses and the remedial measures for the different phases is instigated. **Construction and Operational Phase** Strict control of sediment/dust generation and other pollutants such as hydrocarbons associated with the site clearance, rock excavation, blasting, crushing, aggregate washing, stockpiling, traffic and machinery use will be implemented at the site.

Aspect	Mitigation Measures and Monitoring
	The deposition of cleared soils, unsuitable rock or segregated silt materials will be at least 15m away from the watercourse to maintain a suitable buffer area. Vegetation of any stockpiled soils or material used in berms will be commenced as soon as possible after deposition to reduce sediment erosion. Proper management and use of industrial explosive will reduce the risk of unexploded materials and their residues being left in the ground after blasting. Environmental controls such as the use of dedicated refuelling areas for quarry plant and the use of dip trays under temporary fuel bowsers and/or crushers and the maintenance of all vehicles and equipment used on site will prevent the release of hydrocarbons around the site. Bunds sufficiently large to fully contain accidental spills will be provided around all tanks/storage areas containing harmful substances. Bunds are already in place around the fuel storage area established on the tarmacadam site. Construction traffic will travel along designated internal roads constructed of hard core rock material or on bedrock so that exposed areas of bare ground are not made muddy or soft due to movements of quarry traffic around the site. Machinery will be parked in designated areas. Damping down of the road ways and stockpiles using water bowsers and mist sprayers will be used during dry periods to reduce the potential for dust generation around the site and on the tarred access road to the site. Good practice guidelines for the quarry industry will be followed such as; the ICF Environmental Good Management Practices (2nd Edition), EPA Environmental Guidance for the Extractive Industry and the UK Environmental Agency Pollution Prevention Guidelines – PPG1 to PPG8. **Monitoring** Rock quality testing for PSV, pyrite, sulfur, moisture, abrasiveness, hardness and other required commercial aggregate parameters will be undertaken at the regularity required for compliance to the various commercial rock standards. Visual inspection of high walls and quarry faces immediately after blasting with periodic (bi-annual), inspection of active quarry areas by a specialist geotechnical geologist/engineer is recommended. The areas of steep quarry rock faces, the shallow earthen berms around some of the surface water ponds and the slopes of the tarmac plant sludge waste material area should be visually inspected to ensure that no visual signs of slope instability are occurring in these areas. Monthly Berger Hoff passive Dust jar air quality monitoring is recommended for the site boundaries.
Hydrology & Hydrogeology	**<u>Construction and Operational Phase</u>** Strict control of sediment/dust generation and other pollutants such as hydrocarbons associated with the site clearance, rock excavation, blasting, crushing, aggregate washing, stockpiling, process HGV and transport machinery use will be implemented at the site. The deposition of cleared soils, unsuitable rock or segregated silt materials will be at least 15m away from the watercourse to maintain a suitable buffer area. Vegetation of any stockpiled soils or material used in berms will be commenced as soon as possible after deposition to reduce sediment erosion.

Aspect	Mitigation Measures and Monitoring
	The existing storm water attenuation pond in the southwestern corner of the site, which is located down gradient of the proposed excavation area, will be enhanced by rising the berm and installing a weir sluice system, to prevent direct surface water runoff to the adjacent watercourse, thereby offsetting both the potential hydraulic and water quality impacts of the development. This attenuation area will be established at the start of the work and will remain in place for all subsequent quarrying and the decommissioning phases and into the long term. The attenuation system is designed to cater for a 100yr storm event +15%, for the full 8.3Ha extent of the final Phase 1 to 3 quarry catchment area and will therefore be over sized for the majority of the excavation works when the working catchment will be below 8.3 Ha in area. Maintenance and management of the pond areas will maintain capacity prevent peak flows going to the local stream which will help mitigate any adverse high river flows and downstream flood risks. Site activities such as rock crushing, aggregate washing and stockpiling are to be established over 80m from the attenuation pond system. The large attenuation pond J in the SW corner of the site will allow for an additional reduction in fine sediments, nutrients and toxicants and maintain the existing percolation to ground and runoff characteristics of the site by providing suitable storage for a return period of up to 1 in 100 years. Environmental controls such as the use of dedicated refuelling areas for quarry plant and the use of dip trays under temporary fuel bowsers and/or crushers and the maintenance of all vehicles and equipment used on site will prevent the release of hydrocarbons around the site. Bunds sufficiently large to fully contain accidental spills will be provided around all tanks/storage areas containing harmful substances. Construction traffic will travel along designated internal roads constructed of hardcore rock material or on bedrock so that exposed areas of bare ground are not made muddy or soft due to movements of quarry traffic around the site. Machinery will be parked in designated areas. Crash barriers with a concrete verge are to be installed in areas of the site where the internal access roads are directly adjacent to the small watercourse. This will reduce the risk of surface waters washing from the road into the stream and prevent vehicles crashing into the stream. The area of the macadam plant behind the aggregate store (upstream sample location) and the section of the sites access road just inside the main gate (downstream sample location) are locations where such a traffic management mitigation measure would be relevant. Proper maintenance of the attenuation pond water control and interceptor system will ensure that the installed equipment continues to operate successfully, and this should be undertaken in accordance with CIRIA Guidelines C697. Maintenance will include general examination and cleaning where required of the drainage system, maintenance of attenuation pond sluice weir and interceptor separator. Damping down of the roadways and stockpiles using water bowsers and mist sprayers will be used during dry periods to reduce the potential for dust generation around the site and on the tarred access road to the site.

Aspect	Mitigation Measures and Monitoring
	Good practice guidelines for the quarry industry will be followed such as; the ICF Environmental Code, (2nd Edition 2005), EPA Environmental Guidance for the Extractive Industry and the UK Environmental Agency Pollution Prevention Guidelines – PPG1 to PPG8 **Monitoring** Very regular, (daily) visual inspections and regular (monthly to quarterly) sampling and chemical monitoring of the small water course for pollution indicator parameters such as pH, total suspended sediments, turbidity, COD, and hydrocarbons will be completed at the sites discharge point as well as locations up gradient and down gradient of the site. As well as establishing a full-time turbidity probe on the discharge from Pond I a daily visual inspection of the site discharge outflow (Location 05) will be undertaken by site staff. The proposed stormwater discharge limits that the site will adhere to follow typical Environmental Limit Values (ELVs) issued for Section 4 Discharge Licenses by Cork Co. Council including; • pH = 6 to 8 • Conductivity - <1,000 mS • Total Suspended Solids = <30ug/l • Chemical Oxygen Demand = <50ug/l • THP/Min oil = <100ug/l Annual biological monitoring, in the form of Q-Rating Sampling, will be completed by an aquatic ecologist between April to June at dedicated up and down-stream locations on the small water course. Monthly groundwater levels will be recorded from the monitoring boreholes (BH01 to BH05), established around the site and bi-annual monitoring of the groundwater quality will be completed for a range of water quality indicator parameters, including hydrocarbons from the down gradient borehole (BH01), mid-borehole (BH02) and one of the upgradient boreholes (one of BH03 to BH05). The environmental monitoring requirements will be included in the sites Environmental Management Plan and results will be reported to the Council in the form of an Annual Environmental Report, (AER).
Air Quality	**Construction Phase** There are no significant construction works required for the proposed development, therefore no mitigation is proposed. **Operational Phase** There are a number of mitigation measures proposed to prevent significant dust emissions from on-site activities. These measures include: • Site roads will be dampened using wet methods during dry periods, particularly during summer months. • Inspection, sweeping and cleaning of site roads and adjoining public roads will be undertaken on a regular basis, minimum every other day. A road sweeper will be utilised if required. • All fine materials will be covered when leaving the site to prevent dust escaping. • Aggregates will be stored in an enclosed shed once processed. • Speeds restrictions will in place on site. Speeds will be reduced to a maximum of 20 kmph.

Aspect	Mitigation Measures and Monitoring
	• Drop heights will be minimised when handling material. • The perimeter natural vegetation and screening mounds will be maintained to allow for natural screening of dust from nearby receptors. • Idle times will be reduced by providing an efficient material handling plan that minimises vehicle wait time. • Regular maintenance of plant and equipment will be undertaken to ensure they will perform the most efficiently. • Traffic management measures will be implemented. These measures have been incorporated into the modelling assessment to determine the impact of the site on levels of dust deposition and ambient levels of particulate matter (PM_{10} / $PM_{2.5}$). With mitigation in place impacts to ambient air quality will be insignificant. **Decommissioning Phase** The mitigation measures proposed for the operational phase shall also be implemented during any decommissioning phase. **Monitoring** Monitoring for dust deposition is proposed using the Bergerhoff Method as per German Standard VDI 2119. This monitoring methodology is best practice for quarry sites. Monitoring is recommended to occur along the site boundary and compliance with the TA Luft limit value of 350 mg/m^2/day assessed over the monitoring period of 30 days (+/- 2 days). Monitoring will indicate whether dust mitigation measures are working satisfactorily and whether quarrying operations are leading to potential off-site dust impacts.
Climate	**Construction Phase** Due to the minimal nature of the construction works significant impacts to climate are not predicted and no mitigation is proposed. The primary impacts to climate will occur as part of the day-to-day operational activities on site. **Operational Phase** A key target in CAP25 is reducing the embodied carbon of construction materials. The proposed development will provide a local source of high value quarried raw materials. By implementing modern blasting, crushing and screening methods as well as a good washing system, this allows for more material to be extracted from the reserve making more high value materials available locally. By providing a local source of materials it reduces the requirement for importation of these same materials from greater distances thereby reducing transport-related GHG emissions. Additionally, the quarrying industry is in the process of implementing Environmental Product Declarations (EPD). These are independently verified documents that provide transparent, standardised data on a product's environmental impact across its entire life cycle. This enables informed, sustainable choices and helps meet green building standards. By the time the proposed development is operational, EPDs are likely to be standard across the industry and will be available for the proposed development products. In addition to the above, the following measures will be implemented on site to reduce GHG emissions: • Prevention of on-site or delivery vehicles from leaving engines idling, even over short periods.

Aspect	Mitigation Measures and Monitoring
	• Ensuring that fossil fuel powered plant and equipment meet the Euro Stage V emission standard. • Ensuring, where practicable, that site vehicles and delivery vehicles meet the Euro VI/Euro 6 standards for emissions. • Ensure all plant, machinery and vehicles are well maintained and inspected regularly. In relation to climate change vulnerability, the following mitigation measures are required: • Site risk assessments, method statements and good site management practices are required for extreme weather events, particularly in relation to extreme temperatures; landslide risk; high winds and storms; and extreme rainfall. • Site plant and machinery will be accompanied by certified datasheets which will set out the limiting operating temperatures. **Decommissioning Phase** During the decommissioning phase the same measures as outlined for the operational phase are to be implemented on site to reduce GHG emissions and climate change risk. **Monitoring** Monitoring and reporting of the embodied carbon in the operational phase is recommended and the reporting of these as part of annual Scope 1, 2 and 3 GHG emissions. The aim of monitoring will be to seek further ways to minimise climate impacts. Monitoring will include contractual obligations, in line with the most recent Climate Action Plan and sectoral targets, to ensure that the proposed development stays in line with updated aims. Monitoring will include water usage, power and fuel usage, and waste generation (including reuse and recycling rates). Where monitoring shows that the proposed development is not meeting its targets, further mitigation will be put in place. Monitoring shall also include reviewing potential for extreme weather events which may cause damage during operations. The applicant site's Environmental Management System (EMS) will include measures to address risks during such events i.e. flooding.
Noise & Vibration	**Construction Phase** Given the site layout itself and its surrounding topography, the location of the future expansion areas provide a significant degree of natural acoustic screening to the nearest noise sensitive receptors. And although no specific mitigation measures were deemed to be required from the findings of this assessment, the quarry will still be obliged to give due regard to BS 5228, which offers detailed guidance on the control of noise from site activities. In particular, it is proposed that various practices be adopted, including the following: • Limiting Development Phase activity hours to within daytime periods only (in line with the previous operating hours of the existing quarry). • Establishing channels of communication between the quarry, local authority and local residents. • Appointing a site representative responsible for matters relating to noise. • Ensuring all site access roads are kept as even as possible so as to mitigate the potential for vibration from dumper movements. • Ensuring all site roads within the site have as low a gradient as possible.

Aspect	Mitigation Measures and Monitoring
	• Carrying out berm construction to perimeter pit areas to provide additional acoustic screening for the nearby noise sensitive receptors during the Operational Phase. **Operational Phase** Although no specific mitigation measures were deemed to be required in respect of Operational Phase activities, the following measures should still be provided in order to maintain good neighbourly relations with all the nearest noise sensitive receptors. Selection / Maintenance of Quarry Process Equipment The following management mitigation measures should be employed to ensure that noise emissions from the quarry's processing equipment (e.g. tracked excavators, loaders, dumpers, crushers, screening plant, etc) are minimised as far practicable going forward. • All processing vehicles and equipment shall be regularly serviced and maintained to ensure that any potential excessive noise generated by worn components is minimised. • All machinery and vehicles shall be fitted with effective silencers of a type appropriate to the specification and at all times the best available technology shall be employed to prevent or counteract defects of noise emitted by vehicles, plant equipment or otherwise arising from site activities. • Any new or replacement equipment shall be selected so that all noise emissions from site do not exceed the noise limits outlined in this chapter. Screening Significant acoustic screening will naturally be provided by the working quarry pit itself. The operational areas will therefore not have a direct line of sight with any of the nearby noise sensitive receptors. Additional acoustic screening will also be constructed at the Construction Phase through the erection of perimeter boundary berm constructions around the perimeter of the working pit. Blasting Mitigation Recommended measures for the control of noise and vibration impact from blasting are as follows: • Taking particular care with the development of faces and with trial blasts, as anomalous vibration levels might be produced when there is no free face to relieve the energy; • Ensuring appropriate burden to avoid over or under confinement of the charge; • Accurate setting out and drilling; • Appropriate charging; • Appropriate stemming w/ appropriate material such as sized gravel or stone chippings; • Using delay detonation to ensure smaller maximum instantaneous charges (mics); • Using decked charges and in-hole delays; • Blast monitoring to enable adjustment of subsequent charges; • Designing each blast to maximize its efficiency and reduce the transmission of vibration; • Avoiding the use of exposed detonating cord on the surface in order to minimize air overpressure - if detonating cord is to be used in those cases

Aspect	Mitigation Measures and Monitoring
	where down-the-hole initiation techniques are not possible, it should be covered with a reasonable thickness of selected overburden. • Vibration monitoring should be carried out in the vicinity of the nearest noise sensitive receptors during the initial blasting period to confirm the findings of this assessment and ensure that vibration from blasting events is within acceptable thresholds. <u>Liaison with the Public</u> In order to maintain good relations with the residents of the adjacent dwellings, a dedicated Noise Liaison Officer should be appointed for the quarry to ensure that potential noise disturbance at the nearby noise sensitive receptors is minimised. The appointed Noise Liaison Officer shall ensure that all equipment operators have been briefed and understand the requirements of the site. It will be the Noise Liaison Officer's responsibility to ensure that drivers are adhering to the requirements of site practice. <u>Hours of Work</u> The proposed hours of operation for the pit (including all extraction and processing) shall be limited to those being proposed as follows: • Loading of vehicles between 07:00 to 23:00hrs (Monday to Friday). • Crushing or washing from 08:00 to 16:00hrs (Monday to Friday), with occasional Saturday hours of 07:30 to 14:30hrs. • Blasting operations should be restricted to 10:00 to 16:00hrs. All of these hours are within standard daytime period ranges. The quarry should not operate on Sundays or Bank Holidays except in emergency circumstances or unless otherwise agreed with the Planning Authority. Restriction of operating hours to these hours will be relatively consistent with those when the existing quarry was in operation. <u>Noise Monitoring</u> No noise monitoring is currently conditioned for the existing quarry. Given that pit operations for the future expansion areas are expected to be similar to or less than the existing quarry areas and that noise emissions are also not expected to increase significantly or exceed established best practice guidance criteria, no additional noise monitoring would be deemed as being required in this instance. <u>Additional Vehicular Traffic on Surrounding Roads</u> The proposed traffic movements for the proposed expansion areas are below the DMRB guidance daily traffic flow thresholds for affected roads and therefore considered to be not significant. No mitigation measures would therefore be required in this instance. **<u>Decommissioning & Restoration Phase</u>** There is no mitigation measures required for the Decommissioning & Restoration Phase of the proposed development. **<u>Vibration Monitoring</u>** Vibration monitoring should be carried out in the vicinity of the nearest noise sensitive receptors during the initial blasting period to confirm the findings of this assessment and ensure that vibration from blasting events is within acceptable thresholds.
Landscape & Visual Impact	**Mitigation** Many of the exposed quarry faces are hidden from view owing to the angle of the receptors, the sunken nature of the quarry and the intervening vegetation. Screening vegetation as well as raised berms along the southern boundary and south-western

Aspect	Mitigation Measures and Monitoring
	boundaries should be retained undisturbed to restrict views from the nearby receptors Dromerk, Knockduff and at the L461 local road. These berms and their associated planting were inspected as part of this report. Screen planting at these locations is developing well and needs to be retained to enable their screening function. These berms merge with the existing hedgerows and peripheral scrub vegetation lending a consistent naturalistic appearance when viewed from a distance. An accompanying drawing (Landscape Drawing) is included with this 37L application. This plan aims to cultivate two native woodland pockets in the east and west of the quarried area. However, the visual impact of these woodland pockets will be minor as they will be planted on a level consistent with the new quarry floor. In addition, a seasonal lagoon is proposed in the south of the site, and this is to be planted in its margins with native wetland plugs. **Monitoring** A designated person from the project management team will have overall responsibility for ensuring that all landscape and remediation operations are carried according to an agreed landscape and remediation plan.
Traffic & Transport	The proposed development will impact on the surrounding roads network during operation. To minimise disruption to the local roads network the following measures are proposed during both Construction & Operational Phases. **Construction & Operational Stage** <u>Mitigation Measure 1</u> In general, workers will travel to site before the measured AM peak hour of 07:45 – 08:45, to be on location for a 07:00 start-time. A limited number of employees may occasionally travel to the site during peak hours. Working hours for the quarry will to be from 07.00 to 17:00 Monday to Friday, 07:30 to 14:30 Saturday, through the operation. The measured PM peak period for the local roads network development (17:15-18:15) will also avoid direct conflict with that of employees. <u>Mitigation Measure 2</u> Typically, HGV's carrying material to and from the site will arrive interspersed throughout the day avoiding a clustered arrival. Where feasible, HGV's will restrict movements on the local road network to during off-peak periods. <u>Mitigation Measure 3</u> HGV access to the quarry will be solely from the R587 direction with a prohibition of HGV's accessing via the L4621 road from the south.
Material Assets – Services, Infrastructure, and Utilities	None Proposed
Biodiversity	The following mitigation measures will be incorporated and adhered to during the Construction, Operational and Rehabilitation Phases at the Site to ensure that the works do not result in contravention of wildlife legislation: • Quarrying activities will comply with all relevant legislation and best practice to reduce any potential environmental impacts. The mitigation measures detailed within this EIAR will be fully adhered to; and, • The Site manager shall ensure that all personnel working onsite are trained and aware of the mitigation measures detailed within the EIAR. The following general measures will also be adhered to during the Proposed Development works:

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	• If protected or notable species are encountered during operations at the Site, works will stop within the area that the notable species was identified in, and a suitably qualified ecologist will be contacted for advice; and, • Should unidentified burrows be identified within the works area, a suitably qualified ecologist will be contacted, and advice sought. The operator will appoint an Ecological Clerk of Works ('ECoW'). Their contact details will be kept at the Site office and made available to the on-site manager. The ECoW will inspect the Site in advance of works commencing and will undertake Site inspections as required during the works to ensure that all the works are completed in line with the measures in this EIAR and wildlife legislation. The ECoW will be contacted in the event that habitat or species of interest are identified during day-to-day operations and will be involved in the oversight and sign-off of landscaping, ecological mitigation works, and Regeneration work. **Protection for Amphibians** No locations where amphibians were recorded will be affected by the expansion of the quarry. Ponds A, B and K will be removed, and Pond I will be increased in size to facilitate the expansion of the quarry. The remaining waterbodies will be maintained and protected during the works. Given the confirmed presence of smooth newts and common frogs and the presence of suitable breeding, foraging and sheltering habitats for amphibians, the following regeneration/mitigation measures will be implemented to ensure the works do not adversely affect amphibians. The following mitigation measures will be implemented: • The infilling of the ponds and the removal of suitable marsh habitat will be scheduled to take place outside of the amphibian breeding season (February - August). ECoW will inspect the area and net any ponds prior to infilling and supervise the works to ensure that no amphibians are present; • Any amphibians that are found during the removal of the five ponds or marsh habitat will be relocated to the newly created pond in the western part of the Site; and, • Should amphibians be encountered during any other activities associated with the Proposed Development, the ECoW will be consulted for advice. **Protection for Aquatic Species** Water mitigation measures are presented in Chapter 7. The water mitigation measures will be adhered to throughout the construction, operational and regeneration phases of the Proposed Development. **Protection of Woodland and Trees** The Proposed Development will require the removal of ca. 1.7 hectares of scrub, mixed broadleaved woodland and immature woodland. All other woodland and trees onsite will be protected from unnecessary damage in accordance with BS 5837:2012, Trees in relation to design, demolition & construction. During the construction works, care will be taken to protect trees and woodland areas from both direct and indirect disturbance. The following mitigation measures for the retained immature woodland areas will be adhered to: Tree Protective Fencing ○ All development works will be set back a minimum of ca. 5m from retained trees and woodland areas;

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	○ All trees and woodland areas to be retained that will be located within close proximity to the extraction area will be fenced off by a security fence. These barriers will remain in place for the lifetime of the Proposed Development and will prevent accidental disturbance and define the limits for quarrying activities; ○ All materials, equipment or machinery will be stored on the quarry side of the boundary fence; ○ In order for tree protection measures to work effectively, all personnel associated with the operation of heavy plant machinery must be familiar with the above principles for the protection of treelines; ○ Notice boards, wires, etc., will not be attached to any trees; ○ An ECoW will undertake weekly inspections during the construction of the berms to ensure that no effects occur to bordering hedgerows / treelines; and, ○ The retained trees and woodland will be assessed by an arborist or the ECoW following the completion of berm construction. ○ The following principles will be adopted by site personnel within the root protection zones during construction, to ensure protection of retained trees: ○ No level changes; ○ No excavations; ○ No fires; ○ No use of herbicides; and, ○ No storage of materials, machinery or access for construction workers. **Translocation of Marsh Orchids** Given the presence of Irish marsh orchids within habitats to be removed as part of the Proposed Development, a transplantation exercise will be undertaken to relocate a viable population of this species into the newly re-created wetland areas. The works will involve the following steps: • **Site Selection**: The receiver site must closely match the source in soil pH, nutrient levels, and hydrology. • **Fungal Symbiosis**: Successful translocation depends on the presence of specific soil fungi (mycorrhizae) that orchids require to survive. Therefore, an intact section of soil turf, containing Irish marsh orchids, will be moved to preserve these fungal networks. • **Timing**: Lifting and moving of the turf will occur in early autumn or early spring. • **Methodology**: Sections of turf will be cut and maintained intact and translocated in sections into the early-created wetland areas. The ecologist will supervise these works. • **Monitoring**: Post-translocation surveys will be undertaken to track survival success. **Protection for Bats** Roosting bats Given the levels of activity recorded during the on-site surveys, it is proposed to install artificial bat boxes within the Site. Artificial bat boxes will also be erected on suitable mature trees within the Site. Artificial bat boxes can provide vital roosting places in habitats devoid of natural roosting opportunities. Bat boxes can also provide additional suitable roosting habitats for bats in an area.

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	Bat boxes should be placed in a position sheltered from strong winds and exposed to the sun for part of the day. The boxes will be located in / close to linear features, such as the treelines and placed a minimum of 2m above the ground. The number and location of which will be specified by an ecologist. Figure 14-10 (of Chapter 14) shows suitable bat roost box examples, including a Pole Mounted Bat Box, Bat Box Schwegler 1FF and Vivara Small Bat Box. Additionally, as lesser horseshoe bats will not use bat boxes as they require flight space and flying access into their roost, it is proposed to construct a dedicated lesser horseshoe bat roosting space on site. The roost will have a suitable flight entrance space for lesser horseshoe bats (2.8m in height and 5m in length and width). Figure 14-11 (of Chapter 14) shows a suitable artificial lesser horseshoe bat roost structure that could be constructed on site. The lesser horseshoe bat roost will be located in the northwest of the Site within close proximity to the woodland area. Foraging and Commuting Bats Bats will be able to use the retained and regenerated habitats included in the Regeneration Plan for foraging and commuting. **Protection for Birds** Breeding Birds / Peregrine Falcons To ensure no adverse effects occur to birds as a result of the Proposed Development, the following mitigation measures will be put in place: ○ Any vegetation clearance required will take place outside of the nesting bird season (1st March to 31st August), as per Section 40 of the Wildlife Act 1976, as amended by Section 46 of the Wildlife (Amendment) Act 2000; ○ In the event that works need to be undertaken within the main breeding season, this would be undertaken in consultation with NPWS; ○ Prior to the vegetation removal the ECoW will inspect the Survey Area; ○ The management and removal of vegetation onsite will be undertaken in a systematic way under the direction of the ECoW to ensure that retained areas of vegetation are not damaged by the works; ○ Should birds nest within the active working area during Site operations, works within the area will stop within the area and the ECoW will be consulted; ○ Any quarry faces identified as historically or currently used by peregrine falcons for nesting will be surveyed annually by the ECoW during the breeding season to confirm activity; ○ Alternative nesting opportunities, such as artificial nesting ledges or boxes, will be considered and installed in suitable locations within or near the quarry to compensate for any potential loss of traditional nesting sites; ○ Timing of rock extraction activities will be planned, where feasible, to avoid peak breeding periods of peregrine falcons; ○ Site personnel and contractors will be briefed on the protection measures for peregrine falcons as part of site induction and toolbox talks, including identification and reporting procedures; ○ If peregrine falcons or other notable / protected bird species are identified colonising any areas to be affected by the works, then works will stop within the identified area. An appropriate undisturbed buffer zone will need to be established for the duration of the breeding season or until the chicks have fledged and left the nest. This will be confirmed by the ECoW; and,

Aspect	Mitigation Measures and Monitoring
	○ The ECoW will undertake annual breeding bird monitoring to ensure no adverse effects occur to breeding birds as a result of the Proposed Development. The findings of the monitoring will be submitted to Cork County Council. **Protection for Terrestrial Mammals** The NBDC held records of otter, hedgehogs within 2km of the Site and evidence of badger and pine marten was identified onsite during the field surveys. As described in Table 14-5, there is potential for badgers to commute through the Site given their widespread abundance across Ireland. Therefore, to ensure that the works in relation to the Proposed Development do not have significant effects on mammals (including badgers and foxes), construction works will be in line with the NRA (now TT) guidance for Badgers. The following mitigation measures will be implemented onsite: ○ A pre-construction mammal survey will be conducted prior to any construction works within new areas of the Site; ○ Should construction works be required outside of daylight hours, the appointed project EcoW will be consulted as required; ○ All vegetation clearance will be undertaken in a systematic way to allow any potential species that may be utilising these areas to disperse naturally as works progress; ○ Waste will be kept contained in a designated area to avoid animals becoming trapped in litter; and, ○ If unidentified burrows are identified within the works area during construction, works will cease within that area and the project ECoW will be contacted for advice. Noise Disturbance Effects on Terrestrial Mammals There is potential that terrestrial mammals utilising the Site and surrounding area may be subject to noise disturbance from the Proposed Development. Construction noise and vibration can result in disturbance behavioural effects, stress and displacement from feeding grounds for various species. Working hours will be restricted and also noise mitigation measures will be implemented during the construction phase of the Proposed Development to minimise potential effectsarising from the proposed works, refer to Chapter 10: Noise and Vibration for further details. **Measures for Invasive Species** An invasive species management plan has been developed for the Site that will include measures for the remediation of stands of Japanese knotweed and rhododendron located on the Site and in the Survey Area. **Closure & Regeneration Phase** The site closure plan for the expansion phase areas is to start reinstatement works once the eastern Phase 2 expansion area is completed. Stockpiled subsoil and soil will be spread over the exposed bedrock and planted with native flora such as grasses, wildflowers and trees. As the initial Phase 1 area will be needed for access to the later quarry phases, it will be reinstated after the excavation works in the western Phase 3 area are completed. Once the quarry works are finalised, the wash plant, weighbridge, administration office and related facilities will be decommissioned and removed off-site. The two lower attenuation ponds (Ponds I and J) and associated wetland area will be left in-situ in order to enhance the wetland habitat and biodiversity potential for the locality and will help reduce peak flows to the river after heavy rainfall.

Aspect	Mitigation Measures and Monitoring
Cultural Heritage & Archaeology	**Construction Phase** The proposed development site was inspected in 2014, 2020 and on the 16th of February 2023 and found to be entirely unsuitable for pre-development archaeological investigations, such as geophysical survey and archaeological testing, due to prevailing ground conditions. All ground works on the proposed development site will be archaeologically monitored under licence and will comprise the following; • Removal of vegetation, trees, and dense undergrowth will be monitored archaeologically in case surface archaeological finds or features are present. If unknown archaeological features are identified, they will be preserved by record or in situ. • Following vegetation clearance, topsoil removal will be archaeologically monitored. If unknown subsurface archaeological features are identified, they will be either preserved by record or preserved in situ. Preservation in situ will require the relocation of the element of the development beyond the area of archaeological sensitivity. Preservation by record will require the excavation of the archaeological material, which will be fully resolved to professional standards of archaeological practice (Policy Guidelines on Archaeological Excavation – Department of Arts, Heritage, Gaeltacht and the Islands). This work will be funded by the developer. **Operational Phase** No archaeological, architectural, or cultural heritage effects are predicted; therefore, no mitigation is required. **Decommissioning Phase** No archaeological, architectural, or cultural heritage effects are predicted; therefore, no mitigation is required. **Monitoring** All ground works during construction will be archaeologically monitored under licence.