Keegan Quarries Ltd
Tromman Quarry, Rathmolyon

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

to accompany a S.37L Planning Application for further development of the 21.64Ha quarry site to include extraction of limestone from 14.3Ha and mobile processing to a depth of 13mAOD. The continued use of structures referenced under application PL17.305049 and the restoration of the whole quarry site.

PART 2 & 3

AUGUST 2019

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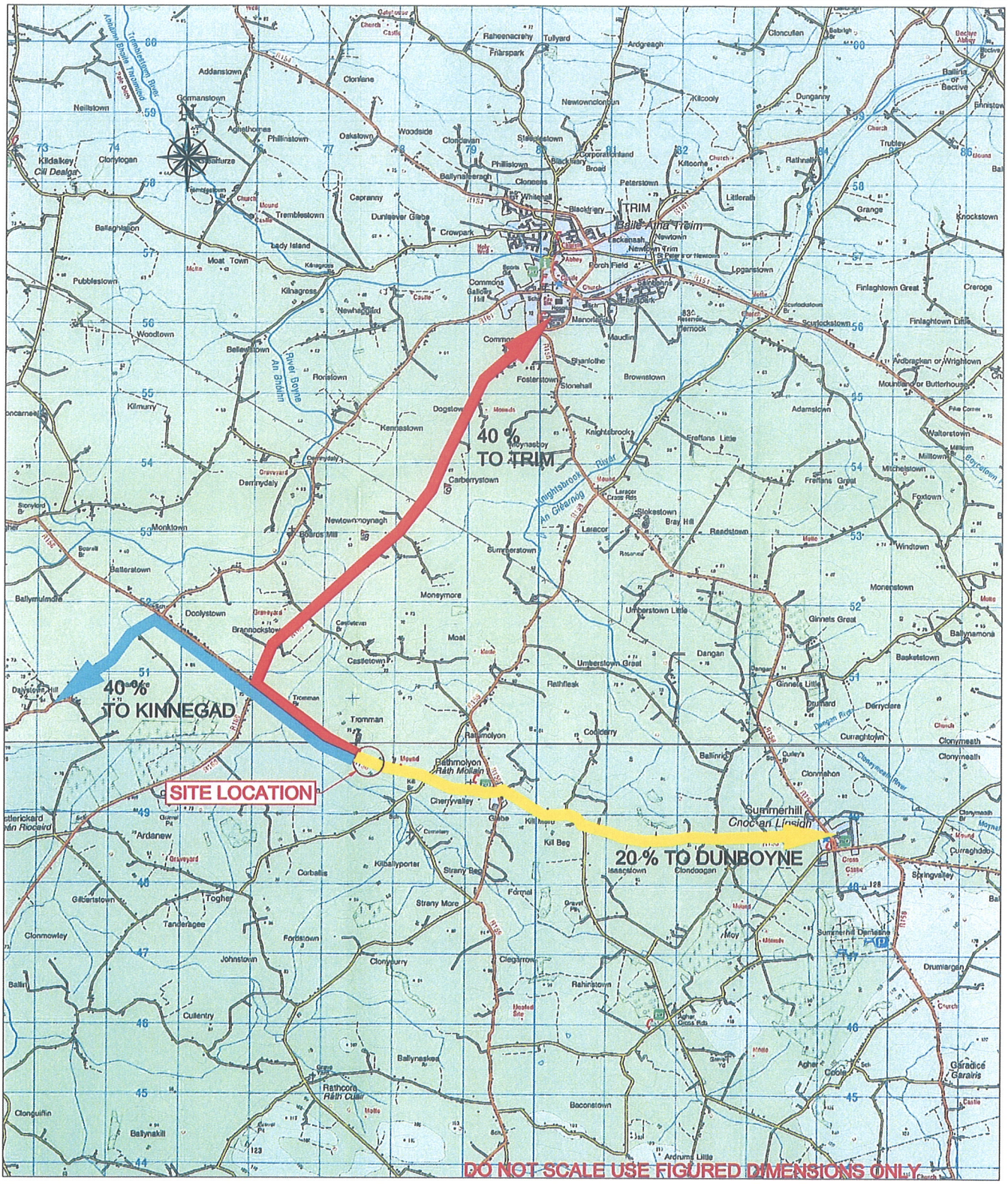

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Project Title	TRAMMON QUARRY			
Drawing Title	HAUL ROUTES			
Date NOV '06	**Scale** NTS	**CAD File** 06140.02	**Project No.** 06.140	
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PART II - INTRODUCTION AND PROPOSED DEVELOPMENT CONTEXT

1.0 PREAMBLE

This Environmental Impact Assessment Report (EIAR) has been prepared to accompany a s.37L application, of the Planning and Development Act 2000 (as amended) ('the Act'), submitted to An Bord Pleanála (the Board) for consideration.

s.37L(8) provides that upon receipt of an application it shall consider the same in conjunction with the previously submitted substitute consent application PL17.305049:

"Where the Board receives an application for permission under subsection (1) in respect of a quarry, it shall consider that application in conjunction with the application for substitute consent in respect of that quarry and it shall be the duty of the Board to take all such steps as are open to it to ensure that the decision under section 37N is made as soon as possible after the decision on the application for substitute consent."

The Application being submitted to the Board is for the continuation of quarrying activities over an area of 14.3Ha of the existing quarry site of 21.64Ha, the development has been so designed to maximise the resources to depths of operation previously assessed and permitted, whilst providing for environmental improvements and assimilation in to the surrounding landscape in particular. The remainder of the site is given over to environmental mitigation embankments, quarry infrastructure with the northern end of the quarry site dedicated to ancillary activities and structures that solely utilise the mineral produced from the adjacent quarry void.

Although the application is concerned with further quarrying, that is the winning and working of mineral and the plant to assist in achieving this, the collective operation of the larger site will be considered cumulatively, as it is the effects of the activities that combine to form the "project" in this instance. Therefore, all activities and emissions from the totality of the site that flow from the extraction of the limestone deposit will be assessed as part of this EIAR.

Inevitably given the contemporary nature of the substitute consent process and the associated supporting documents there is significant crossover in the assessments.

The site is located in the Townland of Tromman some 2.2 kilometres northwest of Rathmolyon Village and some 6.4km south of the town of Trim. The site is bounded to the west by Kilsaran's Tromman Quarry, to the south by the regional road R156 and to the north and east by agricultural fields. The precise location of the site's application area can be seen from Figure 1.1.

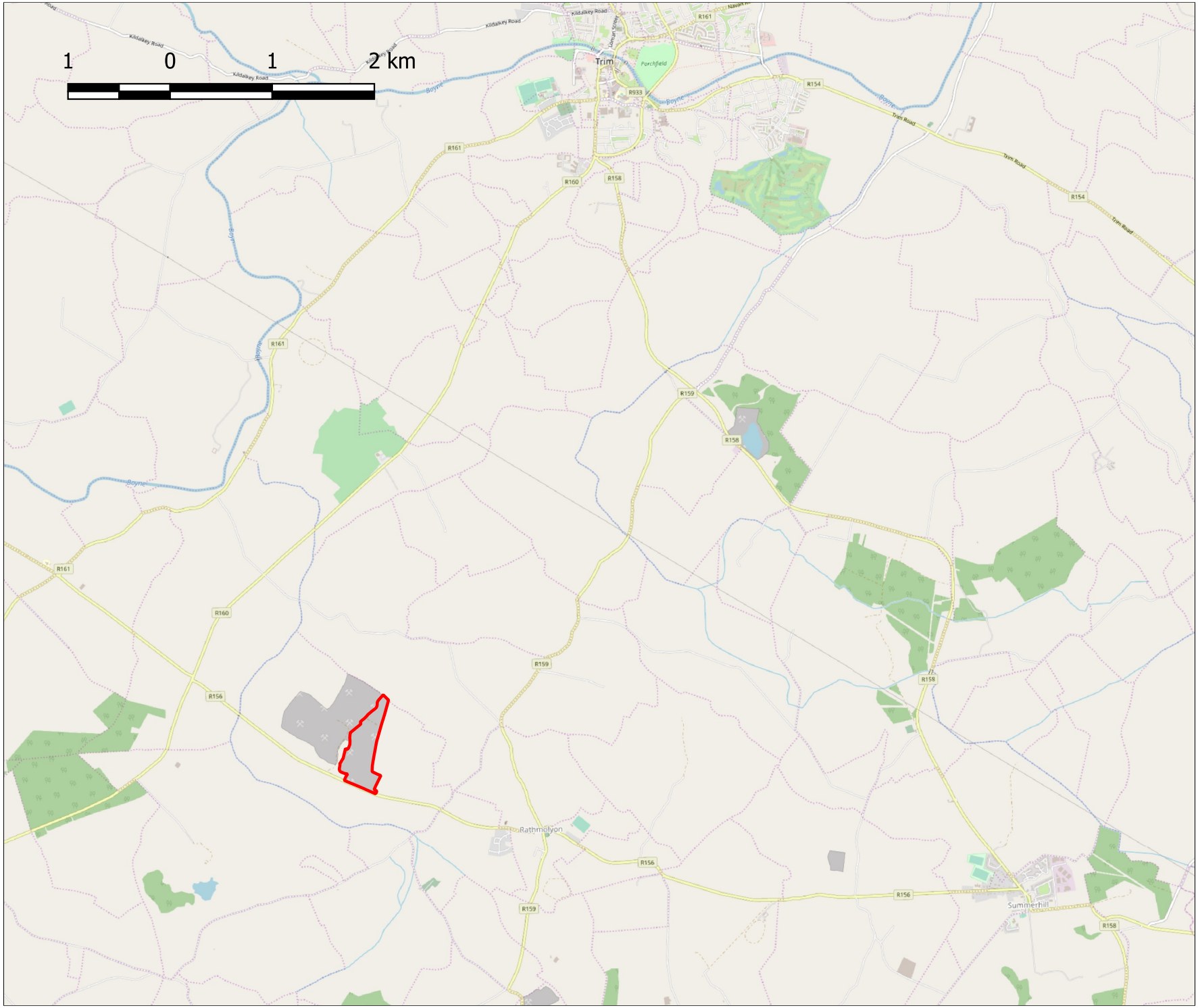
Given that the Board can only grant a substitute consent in terms of the extant operations on site and applied for at the time of submission[1], thus excluding future development, the s.37L remedies this legislative anomaly and provides for the potential for further quarrying into the future.

1.1 Planning History

The totality of the operational site has a well-established planning history dating back to the original consent for a quarry and associated works in 1998 (97/1868), followed by ancillary consents for the northern concrete products yard in 2001 (00/2075) and 2003 (TA/20408) which provided consent for the mobile block making plant and for the structure for manufacturing concrete floors and associated works in each instance. The extraction consent was accompanied by an Environmental Impact Statement

In 2004 under PL17.206702 (PA ref. TA/30334) approval was provided for the bulk of what is now the operational quarry, some **13.94 Ha**, the consent consumed and superseded the earlier permission, this application was accompanied by an Environmental Impact Statement and provided for extraction across the quarry void to a level of **13mAOD**. This application was the first at the site considered by the Board, in which they affirmed the Planning Authority's decision. The duration of the permission was extended under PA ref. TA/1 30399 and TA/1 30400 to August 2018.

[1] The Board's interpretation of S/C provided by Assistant Director Philip Jones on 25 October 2012



Notes:

Legend

Keegan

Application Boundary

Contains OpenStreetMap Data

Title:Tromman Quarry Location Map

Scale: 1:50,000 @A4

Figure 1.1

Drawn By:	Date:
APS	28/06/2019

It is this previously assessed vertical working limit that has been adopted in the current application , in part to release the previously permitted resource and further to extend the extraction limit over the totality of the proposed application area's, lowest sinking

Under PL17.235960 (and PA ref. TA/900976) the extraction area of the quarry was further extended by c.2.85ha, on land towards the southern extent and to the east of the original quarry. The term of the consent was devised to determine contiguously with the larger operational consent and likewise was extended for a further 5 years under PA ref. TA/130581, again to August 2018, due to this time restriction there was no requirement to extract in to the lowest level, of 13mAOD..

A summary of the planning application history is provided for ease of reference; in reverse chronological order from the most recent to the original application for the sites, as favoured by the Board's Inspectors.

- In July 2019, under PL17.305049 a substitute consent application was submitted to seek authorisation for the unauthorised development of ancillary plant and structures at the quarry site totalling some 21.64Ha in extent, from a baseline date of 2013. In addition, the application also covered unauthorised continuation of extraction and associated mineral processing activities and the continued use and or operation of previously authorised structures beyond the expiry of extraction consents on the 5 August 2018.
- In 2018, under PL17.249285 (PA ref: TA/161345) the Board refused the relocation of permitted blockyard and precast manufacturing plant, mixing / batching plant and associated landscaping works to the south of the R156 for the following reasons. The proposed development is dependent on the operation of the existing quarry to the north the existing block yard and existing pre-cast concrete manufacturing facility which expired on the 5th day of August 2018.

  The following reasoning was provided: In the absence of a development strategy for these adjacent lands and a valid planning permission for the on-going operation of the quarry, it is considered that the proposed development,

located on the opposite side of the R156 to existing quarry activity in the area, on low-lying land, would represent a piecemeal and disorderly approach to the development of the site and to the expansion of overall activities. Having regard to the location of this site the proposed development would seriously injure the amenities of the area and of property in the vicinity by the encroachment of an industrial type activity into an open rural area.

- In 2017, under PL17.248115 (PA ref. TA/161419), the Board granted permission for the temporary, three-year, retention of a concrete silo structure, with a footprint of 99m2 and measuring 28.6m in height, associated with and ancillary to the existing permitted precast concrete facility permitted under PA ref. TA/20408.
- In 2017 the planning authority considered three declarations sought under Section 5 as to whether or not development that had been carried out at the site (lime drying, batching plant and ESB sub-station) constituted development and was or was not exempted development. For each, the planning authority considered that the works carried out constituted development requiring planning permission (PA refs. TA/S5/1655; TA/S5/1 656 and TA/S5/1 623).
- In 2013, under PA ref. TA/130581, the planning authority granted permission for the extension of the duration of the permission granted under PA ref. PL1 7.235960 (TA/900976), with permission to expire on the 5th August 2018.
- In 2013, under PA ref. TA/1 30401, the planning authority refused permission for the extension of the duration of PA ref. TA/900976.
- In 2013, under PA ref. TA/1 30400, the planning authority granted permission for the extension of the duration of planning permission granted under PL17.206702 (PA ref. TA/30334), with permission to expire on the 5th August 2018.
- In 2013, under PA ref. TA/1 30399, the planning authority granted permission for the extension of the duration of the permission granted under PA ref. 97/1 868, with permission to expire on the 5th August 2018.
- In 2010, under PL17.235960 (PA ref. TA/900976), the Board decided to grant permission for the extension of the quarry extraction area (2.85ha).
- In 2004, under PL17.206703 and PA ref. TA/30334, the Board decided to grant permission for retention, continuance and extension of quarrying

(including modification to layout permitted under PA ref. 97/1868). The application was accompanied by an EIS. Condition no. 7 required the extension and entire quarrying operation to be completed within 15 years as per the conditions granted under PA ref. 97/1 868.

- In 2003, under PA ref. TA/20408, the planning authority granted permission for the erection of a building to manufacture concrete floors, pipes, blocks, bricks and associated products.
- In 2001, under PA ref. 00/2075, the planning authority granted planning permission for a mobile block making plant, concrete yard and water settlement tank, including temporary offices and storage shed.
- In 1998, under PA ref. 97/1 868, the planning authority granted permission (15 years) for a quarry on 8.5ha together with a workshop, a mobile pressing plant, wheel wash, weighbridge and fuel storage unit and truck parking.

1.2 Legislative Context for EIA

The legislative context for the planning application accompanied by an Environmental Impact Assessment Report (EIAR) is derived from the European Communities Directive 85/337/EEC as amended by Directive 92/11/EU on the assessment of the effects of certain public and private projects on the environment.

However, the newly named reporting system has developed because the European Union has adopted a new Directive (2014/52/EU) (The Directive) in relation to Environmental Impact Assessment (EIA). The Directive was published in the Official Journal of the EU on 25th April 2014 and is in force.

The Directive sets out a wide range of changes to the previous EIA Directive (2011/92/EU). The changes have been transposed into Irish law via Statutory Instrument No. 296 of 2018- European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 that provides for amendments to the planning and Development Act 2000 (as amended) and the Planning and Development Regulations 2001 (as amended) (‘the Regulations’). This EIAR has been prepared in accordance with the amended Act and Regulations.

Schedule 5 Part 2 of the Regulations implements Annexes I and II of the EIA Directive into Irish law and provides the following “thresholds” in respect of the extractive industry and infrastructure projects, so that an EIA is required in respect of, or against which an EIA determination is required :

2. Extractive Industry

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

It is well established that the site exceeds the 5Ha threshold and that the project for further mineral working in combination with the ancillary activities has not been the subject of EIA, and therefore having regard to the scale and nature of the project it is necessary for the development application to be accompanied by an EIAR.

It is considered appropriate to reference when preparing an EIAR the requirements of the 2000 Act, as amended and the Regulations along with the general requirements of the Guidelines for Planning Authorities and An Bord Pleanala on carrying out Environmental Impact Assessment August 2018 (‘the Guidelines’) and the Draft Guidelines on the Information to be contained in Environmental Impact Assessment Reports - August 2017 (EPA Guidelines).

In preparing this application and accompanying EIAR it is considered sensible to give consideration to the recent REIAR and essential to take in to account the environmental information; that has been considered previously by the Planning Authority and the Board and has been considered to be representative and acceptable information to provide an accurate environmental baseline for the site. This is an appropriate approach to avoid unnecessary duplication of information and is recommended by regulation 222A of the Regulations. Table 1.1 below outlines the Environmental Impact Assessments and determinations considered when preparing this Report.

Planning Reference	Applicant	Project Description	Decision
TA30334 / RPL17.206702	Keegan Quarries Ltd.	Continuation and extension of quarrying to 13mAOD.	Approved 2004
TA/70175 / PL17.227088	Cemex (ROI) Ltd.	Extension by deepening of a 16.1Ha site to 24mAOD.	Approved 2009
TA60629 / PL17.226884	Keegan Quarries Ltd.	Extension of an existing quarry with tunnel connecting to the proposed establishment of a precast concrete plant etc to the south of the R156.	Refused 2009
TA900976 / PL17.235960	Keegan Quarries Ltd.	2.85Ha southern extension of Tromman quarry to 50mAOD	Approved 2010
QY76 / QV17.QV0182	Readymix Ltd / Cemex (ROI) ltd. & Irish Asphalt	Review under s.261A(6)(a)	Council decision set aside.
QY75 / QY17.0217	Keegan Quarries Ltd.	Review under s.261A(6)(a)	Council decision set aside.
TA161345 / PL17.249285	Keegan Quarries Ltd.	Relocation of blockyard, precast concrete and block manufacturing plants to the south of the R156.	Refused 2018
PL17.305049	Keegan Quarries Ltd.	Development totalling 21.64Ha in extent to include unauthorised erection of buildings and structures and the continued use of the quarry and permitted ancillary structures post 5th August 2018	Under consideration

Table 1.1 Environmental Impact Assessments and determinations considered

1.2.1 An application for Substitute Consent

An application for substitute consent was submitted to An Bord Pleanála (the Board) in July 2019 on behalf of the Keegan Quarries Limited.

The Board held that the subject application was one which met the requirements of Section 177C(2)(a)(ii) and that exceptional circumstances existed in this case accordingly the application was accompanied by a REIAR and RNIS.

1.3 EIAR Format and Structure

It is considered that the most appropriate method /structure, for ease of reporting and also reading, is one that provides analysis of the potential for significant environmental effects under each individual heading, as prescribed by the Regulations.

The “matters for inclusion” in an EIAR are outlined in Section 4.2 of the Guidance and Article 5(1)(A) to (f) of the Directive, the overall structuring and scope of the Report has regard to the informational requirements of the Directives and Irish Statutory Regulations.

This EIAR is produced in the Grouped Format Structure and is compiled and presented in as transparent and as open a manner as possible. The various authors involved in its compilation have attempted to present their findings and recommendations in a clear and unambiguous fashion. The EIAR comprises three separate parts, The Non-Technical Summary, the Main Report and the Appendices.

Non-Technical Summary

The Main Report

Section 1 The preamble outlines the background and terms of reference for the EIAR following on from the recent Substitute Consent Application and outlines the format and the assumptions that underpin the statement.

Section 2 Review of the reasonable alternatives considered by the applicant and the scope of the assessment with respect to the site’s particular characteristics.

Section 3 describes the features of the progression of the proposed further quarry development and the intrinsic links with the ancillary buildings and structures that collectively present as the project and provides a review of the alternative designs considered and disregarded.

Section 4 defines the planning and development context in which the planning application is assessed

Sections 5-16 incorporates the main body of the EIAR and outlines the aspects of the environment likely to be significantly affected by the proposed development and the interrelationship of each discipline, as identified in the Regulations.

population and human health, biodiversity, land, soil, water, air, climate, material assets, cultural heritage and the landscape.

As the EIAR is produced in the Grouped Format Structure, this approach can lead to certain topics, such as human health, being covered to varying degrees in most of the individual Sections, whereas other specific areas required under legislation fall almost exclusively into one Section. For those aspects of the environment likely to be significantly affected by the proposed development, that fall neatly into one or two sections the sections within which they are covered are shown overleaf.

Table 1.2 Sections within EIAR that cover the Aspects Required to be covered under the Regulations

Section	Heading	Aspects Required to be covered under the Regulations
5	Geological Assessment	Soil – Material Asset
6	Water Environment	Water
7	Air Quality & Climate	Air – Human Health
8	Noise and Vibration	Human health – Material Assets
9	Landscape	Landscape
10	Extractive Waste Management	Landscape – Material Assets
11	Ecology	Biodiversity
12	Traffic Impacts	Population – Human Health
13	Soil - Natural Resources	Soil
14	Socio-Economic Impacts	Population
15	Cultural Heritage	Cultural Heritage
16	Interactions	Inter-relationship of above factors

1.4 EIAR Baseline

Annex IV(3) of the Directive requires

"A description of the relevant aspects of the current state of the environment (baseline scenario) and an outline of the likely evolution thereof without implementation of the project as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge."

The grouped format structure provides that the baseline is considered in each individual assessment with specific reference to each individual discipline, however, what is clear from the directive is that it is to include the relevant aspects of the current state of the environment, regardless of the development control status.

Therefore, consideration will be given within the EIAR to all extant activities within the site and beyond that give rise to the cumulative activities that form the existing baseline. Assessments will be made upon all activities, not just those that occur due to the winning and working of the target mineral but also those that on the wider site and give rise to the potential for significant impacts as part of the wider project.

The assessments will consider the full life cycle of the proposed development to include the remediation / restoration of the complete site and the implications of residual impacts where they could arise.

1.5 Pre application Consultations

Pre application consultations have not been held with the Board, for a combination of reasons, firstly the legislative time constraints determine that the 6-week period available for the production of the EIAR post the submission of the substitute consent application, is intensive. Conversely, there have been numerous applications over a period of 20 years, accompanied by EIS's for the subject site and

the adjacent site and the recent determination by the Board with respect to s.261A, all considered by the Board and its consultees and therefore it is considered that the Scope of this submission is well established against previously prepared and submitted statements.

1.6 Difficulties Encountered whilst preparing the EIAR

Given the frequency within which the site has been environmentally assessed over the past decade the vast proportion of environmental data is readily available.

However, difficulties were encountered gaining access to some neighbouring properties for access to water wells, to obtain water level and quality data, to include properties under the neighbouring quarry operator's control.

1.7 Competent Experts

The production of this EIAR has been project managed by Andrew Scurfield BSc MRICS – Chartered Mineral Surveyor at Quarryplan, with all external consultants having been appointed by the Project Manager. Andrew has 30 years' experience in contributing to and Project Managing Environmental Impact Assessments to accompany Mineral Extractive Projects. The individual chapter and or specialist reports, held within Appendices, have been included in their entirety or summarised by the contributor for ease of reading, however, the full reports, where available, are held within Part 3 the Appendices.

Provided below is the contributor to each Section of the Statement, in the instance where there is a full report appended the authors name, qualifications and experience is provided within the relevant section and the appended assessment.

No significant difficulties were encountered while compiling the necessary information for the EIAR.

Table 1.3 Specialist Contributors to EIAR

Section	Heading	Specialist Contributor
1	Preamble	Andrew Scurfield BSc MRICS (Chartered Mineral Surveyor), Quarryplan
2	Reasonable Alternative and Project Scoping	Andrew Scurfield BSc MRICS (Chartered Mineral Surveyor), Quarryplan
3	Project Description	Andrew Scurfield BSc MRICS (Chartered Mineral Surveyor), Quarryplan
4	Planning Policy Framework	Andrew Scurfield BSc MRICS (Chartered Mineral Surveyor), Quarryplan
5	Geological Setting	Mike Williams EurGeol, QuarryDesign
6	Water Environment	Henry Lister BSc MSc – Hydrogeologist BCL Hydrogeologists Limited
7	Air Quality & Climate	Mervyn Keegan BSc MSc AONA Environmental Consulting Ltd
8	Noise and Vibration	Mervyn Keegan BSc MSc AONA Environmental Consulting Ltd
9	Landscape	Pete Mullin -Chartered Landscape Architect Mullin Design Associates
10	Waste Management	Andrew Scurfield BSc MRICS (Chartered Mineral Surveyor), Quarryplan Mike Williams EurGeol, QuarryDesign
11	Ecology	Will Woodrow, MSc. MCIEEM, CEcol Woodrow Sustainable Solutions
12	Traffic	Andrew Scurfield BSc MRICS (Chartered Mineral Surveyor), Quarryplan
13	Natural Resources	Andrew Scurfield BSc MRICS (Chartered Mineral Surveyor), Quarryplan
14	Socio-Economic Impacts	Andrew Scurfield BSc MRICS (Chartered Mineral Surveyor), Quarryplan
15	Cultural Heritage	Andrew Scurfield BSc MRICS (Chartered Mineral Surveyor), Quarryplan Reports considered by Arch-Tech Ltd (2009) & Archaeological Services Limited (2004)
16	Interactions	Andrew Scurfield BSc MRICS (Chartered Mineral Surveyor), Quarryplan

1.8 Trans-boundary Issues

The Site is located a considerable distance from the national boundary between two member states, namely Northern Ireland and the Republic of Ireland, it has been concluded that it is unlikely that there will be areas where there is a potential for trans-boundary effects.

If any such areas should arise within the individual assessments they have been dealt with, where they occur, in the individual reports.

2.0 REASONABLE ALTERNATIVES AND PROJECT SCOPING

It is recognised within both the Act, the Guidelines and Draft Guidelines on the Information to be contained in EIAR produced by the EPA August 2017 reflect the requirements of the Directive in that:

*'A description of the **reasonable alternatives** studied by the person or persons who prepared the EIAR, **which are relevant** to the proposed development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the proposed development on the environment.'* [2]

Indeed, the Guidelines recognise at paragraph 4.13 that:

"For example, some projects may be site specific so the consideration of alternative sites may not be relevant."[3]

Furthermore, s.37L process is intrinsically linked to the preceding substitute consent application process, it arguably removes the potential for alternative site consideration as such an application process with the Board is only available for a site that is undergoing consideration rendering the alternative site element of an EIAR redundant.

It is considered that the Board's original direction under s.177D, determined that the substitute consent project satisfies the parameters of exceptional circumstances and has determined the extent of the development, which provides no leeway for alternative developments sites to be considered. However, this is not to say that alternative design and development considerations are not applicable on how best to deliver further quarrying at the Quarry site, to maximise the high-quality resource and mitigate significant impacts if and when they arise.

[2] Planning and Development Regulations 2001 as amended - Schedule 6 – Emphasis added.

[3] Page 27 Guidelines for Planning Authorities and AnBord Pleanala on carrying out EIA, August 2018.

Notwithstanding the above, it is considered that the information provided herein, demonstrates compliance with the requirements of the EIA Directive, regarding alternatives, as transposed into Irish Planning law.

2.1 Alternative Design Elements Considered

It is recognised that through the design and consultation process the development will evolve in order to take account of and mitigate potential environmental impacts.

Quarrying 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.

Furthermore, given that the proposed development is for further quarrying of a site that has already been assessed under the Impact Assessment Directive, it is not surprising that the previous designs that have been adhered to historically have mitigated out potential significant impacts.

Although limited in scope the alternative aspects of the development considered by the developer, that have led to an alteration of the proposed extraction area, are provided below.

The consolidating consent issue in 2004 provided for the overburden storage facility that is situated between the operational void and the manufacturing area of the site. The storage of the materials in this area over a quarter of a century has resulted in an artificial landform, along with sterilising an area significant high quality resource.

Although the material handling costs are substantial to relocate the overburden it is considered to be of both commercial and environmental benefit if the material was campaigned and moved into the extracted void. This will maximise the release of the high purity Walsourtian limestone and remove the geometric shape from the local external views.

In order to facilitate the relocation of the overburden and an improved vehicle management system, for vehicle movements into the void of the quarry a review of the existing system was undertaken, to see if an improve method could be devised.

This has led to the redesign of the ramping system into the deepest sinking of the quarry to follow the eastern boundary, rather than the current access via the western face. The quarry design provides a two-way system at gradients that have been evaluated by competent experts, that will minimise the haulage distances to and from both the manufacturing area and the overburden storage landform.

Over the projected life of the resource, some 37 years this will deliver significant fuel savings and deliver associated reductions in exhaust emissions.

2.2 Scope of the Environmental Impact Study

Legislation and guidelines outline that the scope of an EIAR needs to be determined by evaluating the aspects of the environment likely to be significantly affected by the development with reference to the following categories and their inter relationship.

- **Human Health**
- **Biodiversity**
- **Population**
- **Soil**
- **Water**
- **Air**
- **Climate**
- **Material Assets**
- **Cultural Heritage**
- **Landscape**

This EIAR considers the potential significant effects and consequences on the environment of the development both in the past, currently and in the future and assesses whether such effects are:

- Direct or indirect;
- short, medium or long-term;
- reversible or irreversible;
- beneficial or adverse.

Where significant adverse effects are identified a description of the measures necessary to avoid, reduce or remedy these effects is provided (mitigation measures).

To determine the environmental aspects that should be addressed within this EIAR, each of the main proposed activities within the development were examined and potential impacts arising from those activities were identified, together with receptors of any such impacts. The main site activities, impacts and receptors are all identified within Table 2.1 below.

Table 2.1. Site Activities, Impacts and Receptors

Extant Activity	Potential Source of Impact (alphabetical order)	Potential Receptors (Alphabetical Order)
Construction and operation of the structures in the concrete manufacturing area of the site.	Air Landscape Noise Traffic	Human Health Landscape Population
Placement of overburden and processing waste into storage.	Land Use Noise	Human health Landscape
Maintenance of site waters	Discharge of ground water and surface water quality.	Human Health Water
Drill and Blast Crush and Haul	Air Noise	Air Quality Ecology Human Health Landscape Water Environment
Transport to and from site	Traffic	Human health / Population

Restoration and after use	Land use Visual	Landscape Ecology Population Water Environment

From the identification of potential impacts and receptors, a scoping matrix has been compiled which gives a clear indication of the main impacts to be assessed within this EIA. The scoping matrix is set out below in Table 2.2 and has been prepared in response to the various elements given detailed consideration in the Inspector's reports associated with the Environmental Impact Assessments undertaken by the Board in Table 1.1 above.

Table 2.2. Scoping Matrix

Potential Source of Impact	Potential Receptor						
	Agriculture	Archaeology	Humans	Landscape	Water Environment	Ecology	Air Quality
Overburden	✓	✓	✓	✓	✓	✓	✓
Stockpiling							
Drill & Blast	✓	✓	✓	✓	✓	✓	✓
Visual			✓	✓			
Noise			✓			✓	
Dust	✓		✓	✓	✓	✓	✓
Traffic			✓				✓
After-use	✓		✓	✓	✓	✓	

The importance of keeping EIAR's as tightly focused as possible, is recognised by the legislation when requiring reference to preceding EIA documentation. This objective can be further achieved by avoidance of duplication of optimised assessments and by focusing upon the "Likely and Significant" effects of a development. These elements need to be discussed in detail whereas other issues, with little or no significance, may require a brief investigation. This will indicate that an area has been given due consideration but has been rejected from requiring a full investigation.

The environmental elements chosen for commissioning of renewed specialist reports and updating with detailed scrutiny are as follows:

Ecology (Flora and Fauna)
Landscape
Water Environment (Surface and Groundwater)
Air Quality
Noise and **Vibration (Blasting)**

Those elements that have been the subject of continuous monitoring or periodic monitoring for the period starting with beginning of the baseline are:

Material Assets / Geology
Traffic (via sales records / weighbridge)

Other areas that are considered less significant or have no potential for change since previous assessments were considered include, **Cultural Heritage, Soils, and Human Beings.**

Separate reports have been prepared for each of the significant elements by specialist consultants (experts), whilst analysis of the monitoring report results have been undertaken by the EIAR author and presented against the standards provided for within the Quarries and Ancillary Activities, Guidelines for Planning Authorities - April 2004. Each report considers the following:

- baseline study;
- identifying potential impacts past and future
- predicting and evaluating the magnitude and significance of those impacts;
- proposing mitigation measures, where necessary.

The remit of an EIAR is to consider all environmental aspects, which could experience impact from the proposed development, from which the identification of mitigation measures can be undertaken.

The purpose of the mitigation measures is to ensure that the development could be undertaken without creating any significant or unacceptable adverse impacts on the environment or amenity of the area going forward.

2.2.1 Impacts related to risks of major accidents and disasters

The Directive requires "a description of the likely significant effects of the project on the environment resulting from, inter alia:
(d) the risks to human health, cultural heritage or the environment (for example due to accidents or disasters)

Given that this statement is prepared in the Group Format, where such a potential exists it will be covered in the individual report. However, Annex IV point 8 of the Directive further outlines that:

"(8) A description of the expected significant adverse effects of the project on the environment deriving from the vulnerability to risks of major accidents and or disasters ***which are relevant***[4] *to the project concerned….Where appropriate, this description should include… details of the preparedness for and proposed response to such emergencies."*

Consideration has been given to this specified requirement under the amended legislation and it is considered given that the extraction of material within the confines of the existing site footprint has previously been assessed to the depths proposed, along with the proposed restoration of the site with particular attention to long term geotechnical stability. Further assessment work has been undertaken and the designs provided are in accordance with the requirements of the Quarries Regulations 2008 and when coupled with the provision of the Extractive Waste Regulations 2009 – Compliance Statement, it is considered that the potential for risks of a major accident or a disaster are minimise by the specific legislation governing quarrying in Ireland.

[4] Emphasis added

It has been considered and determined that major accidents and response plans are covered to an appropriate degree in the individual sections and the site's associated Environmental Management Plan and that disasters are not relevant to this project.

3.0 PROJECT DESCRIPTION

This Environmental Impact Assessment Report prepared to accompany the s.37L planning application, provides a continuation of development and is to be read in conjunction with, the recently submitted substitute consent (SC) and associated REIAR for the erection of the unauthorised structures in the concrete products manufacturing Northern area of the site and the unauthorised quarrying operations post the 5 August 2018 at Tromman Quarry, Co. Meath. In short, the application that this report accompanies, seeks consent for further quarrying activity and an assessment of the continued use of the site's ancillary structures for the life of the quarrying activities, prior to the restoration of the entire site.

As previously outlined the site is in the Townland of Tromman some 2.2 kilometres northwest of Rathmolyon Village and some 6.4km south of the town of Trim. The site is bounded to the west by Kilsaran's Tromman Quarry, to the south by the regional road R156 and to the north and east by agricultural fields. The precise location of the site's application area can be seen from Figure 1.1

3.1 Previous Site Activity in the Context of a Substitute Consent Application- The Receiving Environment

As outlined earlier in this EIAR the Board granted leave to apply for substitute consent and the baseline and the format of that report has been detailed.

The unauthorised development of structures was considered to result in the prohibition of EIA development and therefore substitute consent covered the structures plus the collective activities and use of structures across the entire site post the 5th August 2018, leaving this application to seek consent for further quarrying at the site and the associated use of the structures that it is hoped will be authorised under the substitute consent process. The extent of the quarrying site and layout can be seen overleaf and the locations of the structures to be continued to be used, are provided for in the accompanying application drawing KEE-TR04.

Figure 3.1 – (Site Boundary on Aerial base - 27 August 2018)

It is considered that the image illustrates the organised nature of the operational site, which reflects the good management practices. The image illustrates the existing sub-divisions within the site and can described in a north-south progression as follows:

1. concrete product manufacturing activities in the northern extent of the site,
2. historical overburden storage immediately to the south of this area,
3. before the extraction area (quarry void) in the lands between the overburden storage and the cordon sanitaire between extraction activities and the public highway which;
4. contains the head office carparking and tree planted landscaping.

The operation is a mature well-defined site, with a concealed extraction operation and a sophisticated distinct manufacturing area.

3.2 The location and extent of the Site

The overall planning application site extends to some 21.64Ha in extent and is located completely within the Townland of Tromman, near Rathmolyon. The application boundary incorporates the totality of the Applicant's operations.

3.3 Physical and Development Characteristics

3.3.1 Natural Resource Consumption

High purity calcium carbonate mineral has been sourced from Tromman quarry, at a rate of up to a maximum of 250,000 tonnes per annum as prescribed in previous EIS's, and it is proposed that this upper limit capping of extractive activities is to be retained. The phasing of the quarry design incorporates this continued consumption rate and with the relocation of the overburden landform and operating at depths previously considered will provide a reserve life in the order of 37 years.

A proportion of the dry aggregates are sold directly into the marketplace but are also consumed by the added manufacturing processes to include cementitious activities and most recently the production of high purity limestone powders. The introduction of this additional product line is to differentiate the Applicant's operations from other limestone and pre-cast producers and has provided a new market for the company to supply whilst maximising the end use of the high purity resource.

The Company continues to strive to maximise the end use of the high-quality limestone resource with the material used in powders, pre-cast concrete, ready mixed concrete and concrete blocks, in addition to using the high chemical purity of the limestone in pyrite remediation.

3.3.2 Operational Emissions

The self-contained nature of the limestone powder and precast factory units ensures that emissions, either air or noise are reduced to a minimum and kept within appropriate limits. In addition, the manufacturing processes, whether that be the ready mixed concrete, the powdered lime, or the block making facilities are all controlled by the Company's Environmental Management System (held in Appendix 10.1).

3.3.3 Employment

The quarry directly employs 8 employees, directly in the production process, but all activities of the Keegan business are reliant upon the continuation of the high quality resource therefore it is realistic to state that the entirety of the Company workforce now numbering 130 direct employees and the 30 indirect sub-contractors. The direct employees also include the administrative, support staff and professional staff based within the Head Office and some 10 full time skilled operative who compliment the predominantly automated manufacturing processes.

3.3.4 Hours of operation

The quarry and its ancillary processes operate to industry standard hours of 07.00 to 19.00 Monday to Friday and from 07.00-14.00 on Saturdays. The quarry does not operate on Sundays or Bank Holidays.

3.3.5 Waste Management

Reflecting the high purity nature of the limestone resource and the broad range of products produced waste in the quarry is restricted to the overburden removed from the surface of the deposit and small percentage of clay from the natural weathering process of the deposit. This aspect is dealt with in more detail in Section 10 of this report, reflecting the Extractive Waste Statement. The manufacturing processes employed in the northern extent of the site ensure that wastage is kept to an absolute minimum with only the exact amounts of materials being utilised in the production of the product. Therefore, the minimal wastage arising is separated and stored or placed into skips for either recycling or on to a licenced carrier.

3.4 Processes occurring on site

3.4.1 Processes - Quarrying

Quarrying has occurred on the site in accordance with environmentally assessed development control protocols since the first approval in December 1998. The general approach to operations has not varied substantially since this first approval with activities having been confined to the main quarry sinking and storage of overburden in the main store and along the southern boundary to create a landform for tree planting. Therefore, activities have been confined to the disturbed extent and the activities have continued to be operated in accordance with the Board environmentally impact assessed parameters.

The proposed development has been devised to maximise the resource within the confines of the existing site footprint and in doing so remove the overburden landform from the skyline and upon cessation of the proposed development remove completely the external visual impacts of the operation. The plans illustrating this phased development are provided on an aerial photographic base, at the end of this sections as Figures 3.2-3.7 and provide a more illustrative and representative view than the more prescriptively scaled plans that need accompany the application.

3.4.2 Phase 1 (Figure 3.3)

During Phase 1, extraction of the quarry is focussed primarily in the southern margin of the site. The development of quarry faces will require the removal of the building located on the eastern side of the access route into the quarry.

Initially, development of the upper benches is undertaken to progress the quarry faces to their final face position. The current benches are split to a more manageable height, introducing a 64mAOD bench and ensuring that the 43mAOD and 28mAOD

benches are progressed to its final face positions. Appropriate bench widths must be retained to ensure that rock fall can be captured on each bench.

In the northern margin of the quarry, a new access route, able to accommodate haulage vehicles passing, will be constructed into the sinking along the eastern boundary will be developed, from the north-eastern margin of the site at 67mAOD level to the 42mAOD level. Due to a limitation on space, this has been designed at a gradient of 1v:7h. Keegan Quarries should complete a Safe System of Work and Risk Assessment for dealing with steep ramps. A second ramp is also introduced by way of a continuation along the eastern margin of the quarry from the 43mAOD level down to the 28mAOD. Again, due to limited space, this has been designed at a gradient of 1v:8h.

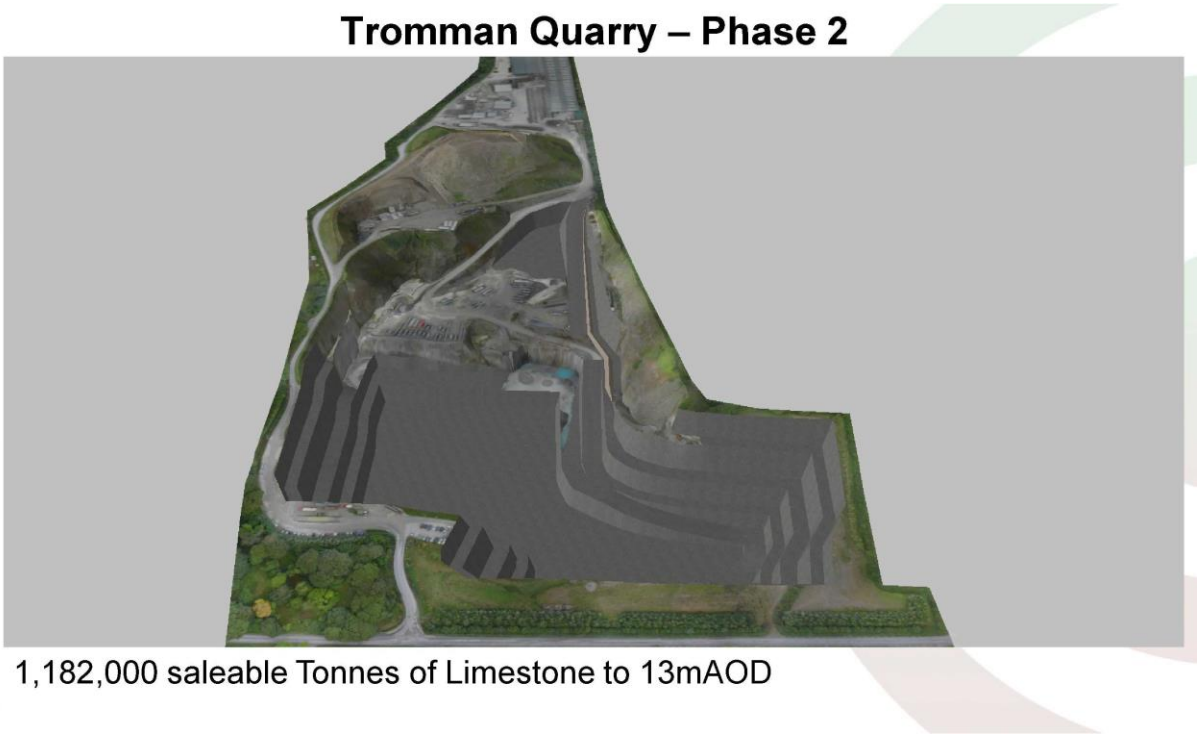
During phase 1, it is indicated that the following volume and tonnage is extracted from Tromman Quarry:

Bench	Volume (m^3)	Tonnage (T)*
64mAOD	222,000	588,000
43mAOD	232,000	615,000
28mAOD	510,000	1,351,000

*2.65 t/m^3 conversion factor applied

3.4.3 Phase 2 (Figure 3.4)

Phase 2 continues the development of the quarry in the southern working zone, increasing the depth of the quarry to 13mAOD, which was previously approved over 80% of the final sinking proposed . An access ramp is proposed to be installed covering a corner on the eastern margin of the quarry excavation. Of note, an access road is also retained on the 28mAOD level to ensure that load and haul vehicles and drill rigs can access the crest of the quarry faces to progress the quarry in a northerly direction in the future. This is illustrated by the two-way arrows , where the grey shading and aerial imagery meet on the 28mAOD level of the quarry.



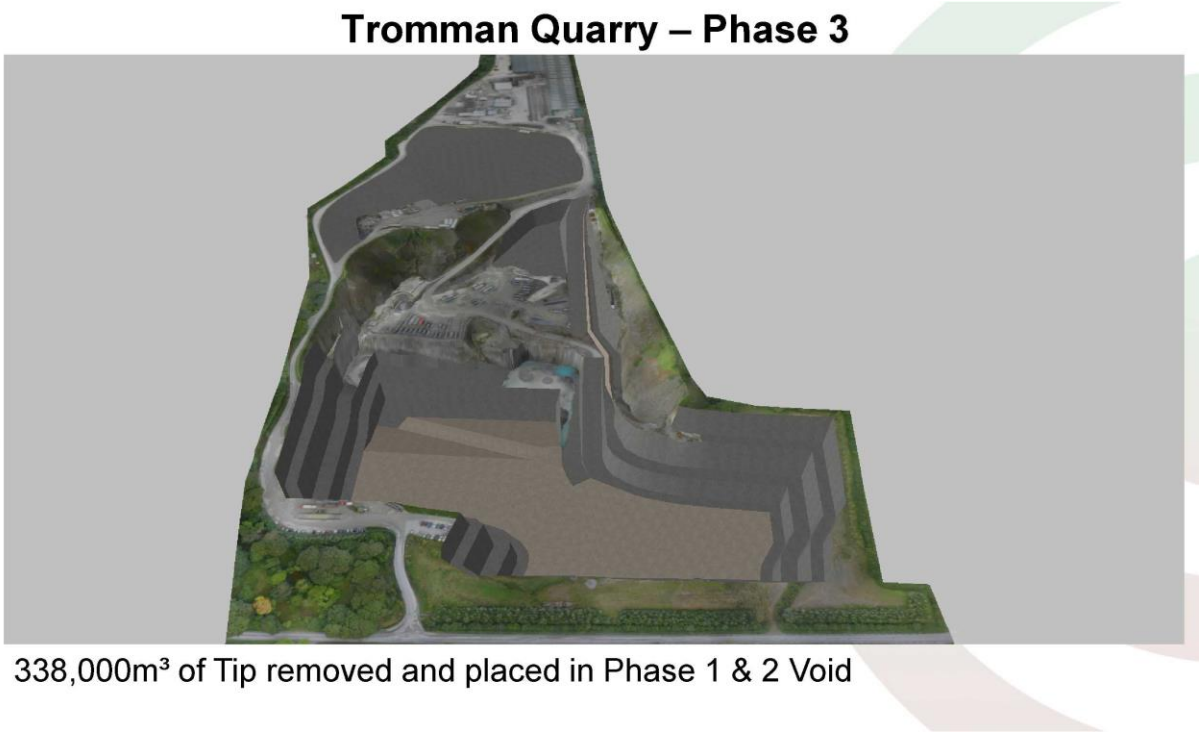
During Phase 2, it is indicated that the following volume and tonnage will be extracted from Tromman Quarry:

Bench	Volume (m^3)	Tonnage (T)*
13mAOD	446,000	1,182,000

*2.65 t/m^3 conversion factor applied

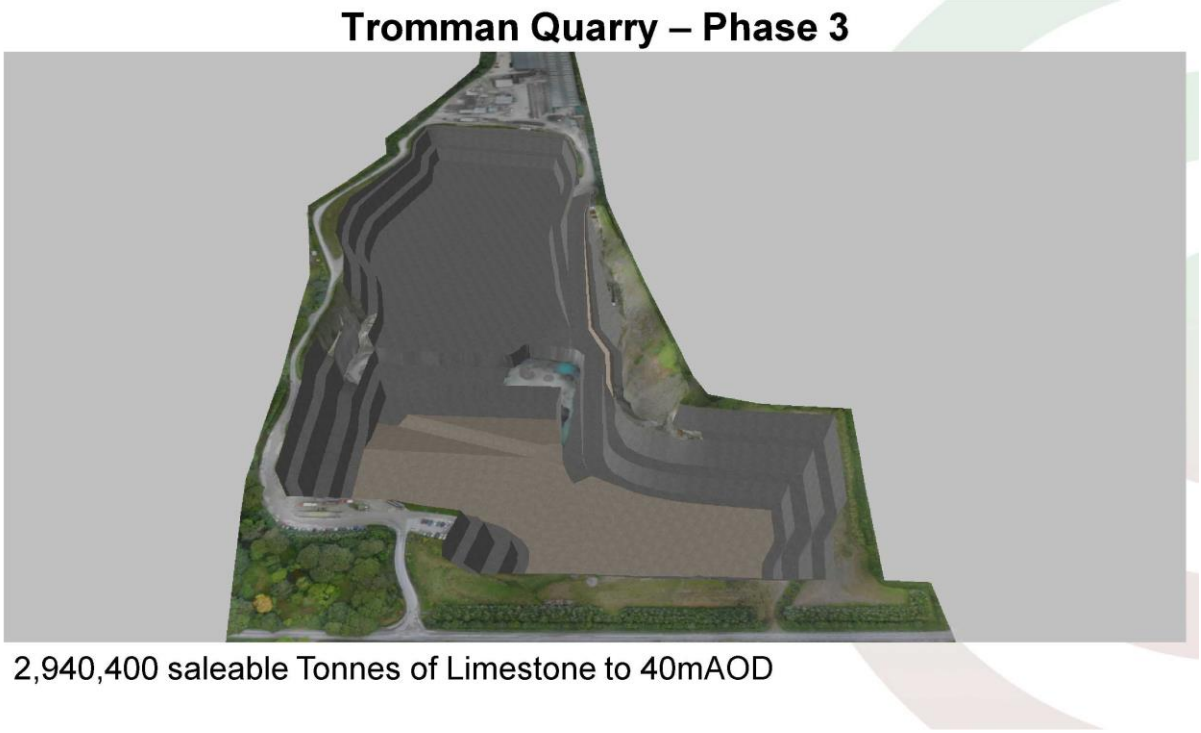
3.4.4 Phase 3 (Figure 3.5)

Over the course of the development of Phase 3, the northern overburden landform is systematically removed and placed into the recently excavated void in the southern margin of Tromman Quarry. It is estimated that around 338,000m^3 of material will have to be lifted from the current tip and moved to its new location. It is proposed that the majority of the 13mAOD bench will be filled up to the 28mAOD level.



In the northern margin of the newly proposed tip, a slope should be constructed to the base of the 13mAOD level at a minimum gradient of 1v:3h, for geotechnical purposes. On this slope, an access ramp is to be constructed to allow access into the northern margin of the 13mAOD sinking. Due to limited space, this ramp has been designed at a gradient of 1v:8h.

During the removal and placement of the overburden, the 67mAOD, 52mAOD and 40mAOD levels will be progressed in a northerly direction, to achieve their maximum extents and therefore the maximum designed footprint of the quarry.



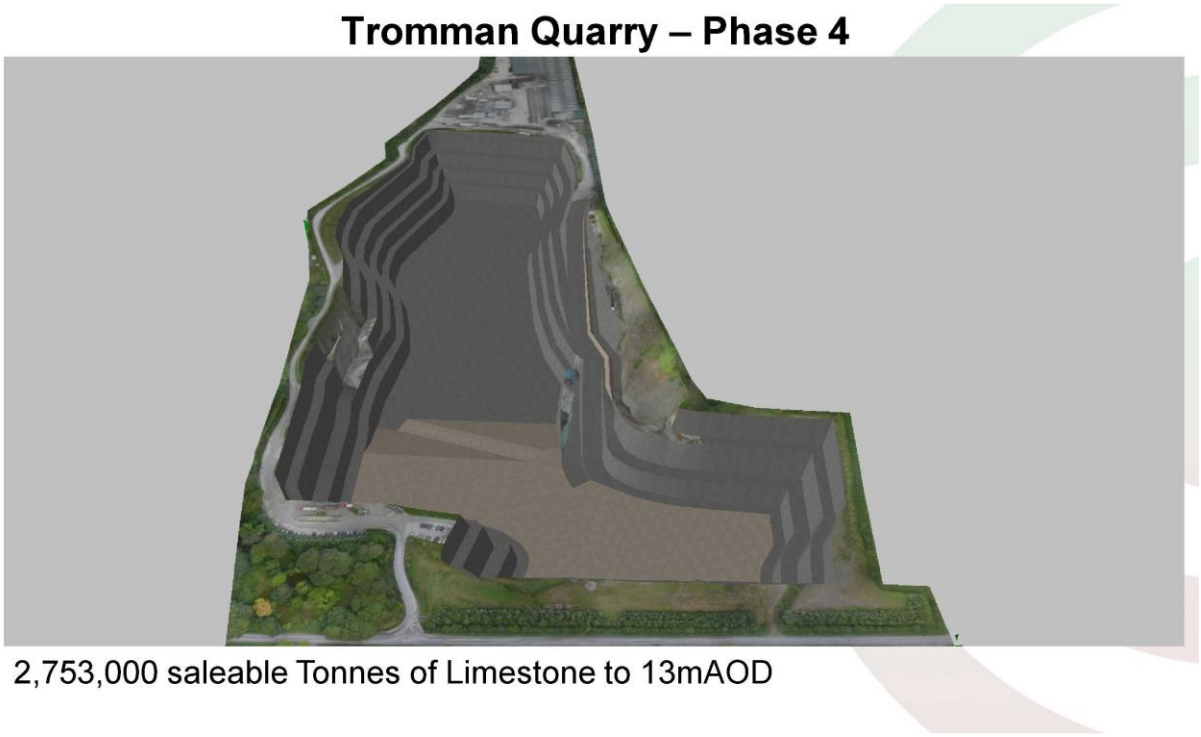
During Phase 3, it is indicated that the following volume and tonnage is extracted from Tromman Quarry:

Bench	Volume (m^3)	Tonnage (T)*
67mAOD	202,000	535,000
52mAOD	522,000	1,383,000
40mAOD	532,000	1,410,000

*2.65 t/m^3 conversion factor applied

3.4.5 Phase 4

Phase 4 continues to progress the lower benches of the quarry in a northerly direction.



During phase 4, it is indicated that the following volume and tonnage is extracted from Tromman Quarry:

Bench	Volume (m^3)	Tonnage (T)*
28mAOD	491,000	1,301,000
13mAOD	548,000	1,452,000

*2.65 t/m^3 conversion factor applied

3.4.6 Drilling and Blasting

The process adopted to produce blast rock for the purposes of processing utilises a fully mobile air drill rig, with drilling being undertaken on average two days every month. The impacts of this drill rig and mitigation measures adopted are outlined in the Air Quality and Noise and Vibration Sections, 7 and 8 respectively.

The blast process involves the controlled filling of the drilled holes with explosive material and the inclusion of detonators and charges. The holes are then detonated

in a tight time sequence to ensure that the potential impact is limited to the equivalent nature of one component hole of the blast.

The measured impacts of historical blasting, which provides an accurate basis for future predictions are considered in detail in Section 8.

3.4.7 Processing of Quarry Material

The processing of material within the site will continue to be undertaken, as with the past decade within the quarry void, with the blast pile being fed into the existing mobile primary jaw crusher, using a loading shovel. This enables the blast material to be reduced to the optimum size for introduction into associated secondary and tertiary mobile screening facilities.

The crushing and screening units are fully mobile and are able to operate on any standard bench removing the requirement for the blast rock to be hauled. The primary reduced material is delivered into a semi fixed secondary and tertiary crushing and screening unit. Modern mobile primary track crushing and screening units are fitted with dust suppression units and enclosures of all potential emission points.

The benefits of mobile plant are numerous, all the loose plant and machinery is track or wheel mounted and follows the active face therefore have no permanent footprint or location. The materials will be stockpiled or transferred by front end loading shovel and there is an obvious reduction in internal haulage from blast pile, in addition to the potential emission points with respect to dust and noise being adjacent to a working face and for the completed development at levels significantly below the level of the surrounding lands, which affords significant natural attenuation. The potential for impact is considered in more detail in Section 7 and 8 of this EIAR.

3.5 The Manufacturing Area of the Site

The added value manufacturing area of the site is fully paved with the northern extent of the site's appearance reflecting the manufacturing nature of the activities.

3.5.1 Processes Concrete Batching Plants

Concrete is manufactured at the plants by mixing Portland cement and other cement graded materials with aggregates, sand and water in controlled proportions.

Sand is imported to site and combined with indigenous limestone dust, sized aggregates drawn from the adjacent quarry area by loading shovel or dump truck and is fed into the reception hopper. Selected aggregates and sand materials fed into the feed hoppers will be proportioned by a weighing system to achieve the desired aggregate content in the mix recipe. The weighed proportioned aggregate batch will then be fed by inclined conveyer into the mixer in sequence, as required by the mixing program, for eventual direct loading as a completed wet batch into a truck mix vehicle.

Alternatively, the batch may be diverted into the dry batch bypass directly into a concrete truck mixer vehicle to eventually complete final mixing after introduction of cement powders and additives.

Bulk cement and other powders stored within sealed and vented silos, will be separately conveyed to dedicated weigh hoppers by sealed screw conveyors for sequenced addition into the mixer or directly into the loading area of a truck mixer to complete the final product. Water and liquid admixture materials may also be separately pumped from adjacent tanks into additional dedicated weighing hoppers for controlled addition into product mix.

3.5.2 Limestone Powder Plant

The Limestone Powder Plant (Calcium Carbonate) process is made up of 3 main elements:

1. Reduction (Crushing);
2. Sizing (Screening) and;
3. Drying.

All 3 activities are undertaken simultaneously, providing for continual blending to provide a tightly specified product.

The raw limestone feed is introduced from the adjacent Tromman Quarry directly into two feed hoppers and comprises:

- An 8mm down product (limestone grit to dust) and;
- a 30mm single sized aggregate.

The two material are introduced simultaneously from their individual feed hoppers to their individual processes. The 30mm material passes along an incline conveyor to a Lanway (Hammer) Mill which reduces the incoming product to a minus 3mm output. Simultaneously the 8mm down is fed by conveyor onto a multi deck screen which divides the material into 4 different sizes:

1. Minus 8mm & plus 6mm;
2. Minus 6mm & plus 3mm;
3. Minus 3mm & plus 1.5mm and;
4. Minus 1.5mm.

All the minus 1.5mm is forwarded directly to the gas fired, fluid bed dryer which super heats the material and dries it to less than 0.1% moisture. The material is then elevated to 3 tumbler screens on top of the silos.

The material is divided into 4 separate powder products at this stage;

1. Greater than 0.25mm,
2. Minus 0.25 & plus 0.50mm,
3. Minus 0.5 & plus 1.50mm and;
4. Less than 1.50mm.

During the drying process, the minus 100µm is removed by an air hood extraction system which is then elevated to a storage silo prior to delivery via tanker to the end user. The materials which are now located in the silos are conveyed from the storage silos, to weigh hoppers prior to loading.

The plant produces 7 different individually sized products, these products can then either be blended to specific requirements for both internal consumption in the high specification precast products or to external customer requirements.

3.5.3 Processes Pre-cast Concrete

The extension to the original precast factory provides a modern state of the art operation to produce twin wall insulated for the paint ready construction process, helping to revolutionise housing construction methods in Ireland. A video of the process from start to finish can be found at the following link, however, the process is summarised below.

https://www.youtube.com/watch?v=X1JxNReZt3A

Firstly, what is noticeable from the process is the airy nature of the structure, low noise emissions and the precise and high-tech nature of the production line; with the general process being fully automated / robotic and Computer Aided Design driven. The designs originate in the Company's Head Office, also based on site, with the design department producing structural designs for final construction purposes.

This design is then forwarded to the host computer at the manufacturing site, which then plots the design on to a steel pallet, to include the detail for any electrical boxes and conduits.

The next station introduces the reinforcement spacers, in preparation for the next stage which is the introduction of the steel rebar from a fully automated robotic station for precision placement, in accordance with the structural requirements of the CAD design.

Following the placement of all reinforcement, spacers and conduits the concrete is ordered from the associated concrete batching plant, all of the aggregates are produced either on site in the case of aggregates or supplemented from the Company's sand and gravel sites in the case of the sand products.

The precision concrete mix process is fully automated and is then batched into a hopper that provides for accurate spreading of the 40N concrete within the waiting panel, which spreads the material on the now oscillating panel that ensures the removal of any air bubbles and ensures a high level of finish, negating the requirement for plastering either inside or out.

The panel then proceeds to the curing chamber, still under the control of the host computer and the second wall is created in exactly the same way before the two walls are joined by a fully automated process and once cured are stored on bespoke delivery trailers for storage, prior to delivery to site.

3.5.4 Vehicle Movements

It is proposed that the site will continue to operate with vehicle movements at a level below the 55 two-way trips per day evaluated during successive applications, which equates to a maximum annual mineral extraction in the region of 250,000 tonnes. With transport being made up of a combination of articulated vehicles, both flat bed lorries, tippers, standard eight-wheel rigid lorries and concrete mixer trucks, these movements are analysed in Section 12.

3.5.5 Discharge and Fuel Storage

It is proposed that the site will continue to operate in an identical fashion to that which has consistently achieved compliance with the prescribed water quality standards. The site is subject to a Discharge Consent Licence and the discharge water will continue to pass through the approved infrastructure in the north east corner of the Site. The efficacy of this facility is discussed in greater detail in Section 6 and Appendix 6.1.

With respect fuel storage, the site operates a two-tier system with road going vehicles being fuelled from the fully bunded and enclosed double skin tanks within the quarry workshop adjacent to the quarry offices.

The mobile plant within the void will continue to be fuelled from a mobile fuel tanker. All the remaining machinery in the quarry void is of a mobile nature and it is intended that fuel should only be within the perimeter of the site during the process of refuelling.

The fuel for the face excavators and primary crusher will be held and delivered via this double skinned tanker system. The operatives have been trained in best practice for refuelling of machinery and also in emergency procedures.

3.6 Decommissioning – Remediation – Restoration (Figure 6.7)

These are considered to include effects from delivering restoration at the end of life, which at the previously assessed and acceptable levels of 250,000tpa would result in a reserve life of 37 years.

In the first instance dealing with the manufacturing area the structures can be decommissioned, with the buildings and structures being of a steel frame specification with cladding being fixed to or into a concrete base. The structures and

plant and machinery can be dismantled, and the remediation completed by the removal of the concrete yard, this would involve rock breaking the yard and removal from site.

It is proposed that the overburden materials will have been moved into their final resting places over Phase 3 and 4 and that the proposed restoration concept allowing for bench and margin treatment and planting, with placement of some overburden resources around the quarry and then for the quarry void to be allowed to flood with anticipated water rebound levels of the order of 65mAOD (+/-2m), see Section 6 for detail, which is still comfortably within the quarry void. In addition it is also proposed to introduce floating islands to increase further the potential habitat diversity on site.

Legend

- 43 — Existing Elevation
- 28 — Development Elevation
- Dual Vehicle Haul Road
- Single Vehicle Haul Road

Quarry Design
CHARTERED QUARRYING CONSULTANTS

Tromman

Quarry Development Plan
Currrent Survey

Drawn By	Scale
APW	**1 : 2000**
Dwg Nº	Paper Size
Figure 3.2	**A3**

Legend

- 43 — Existing Elevation
- 28 — Development Elevation
- Dual Vehicle Haul Road
- Single Vehicle Haul Road

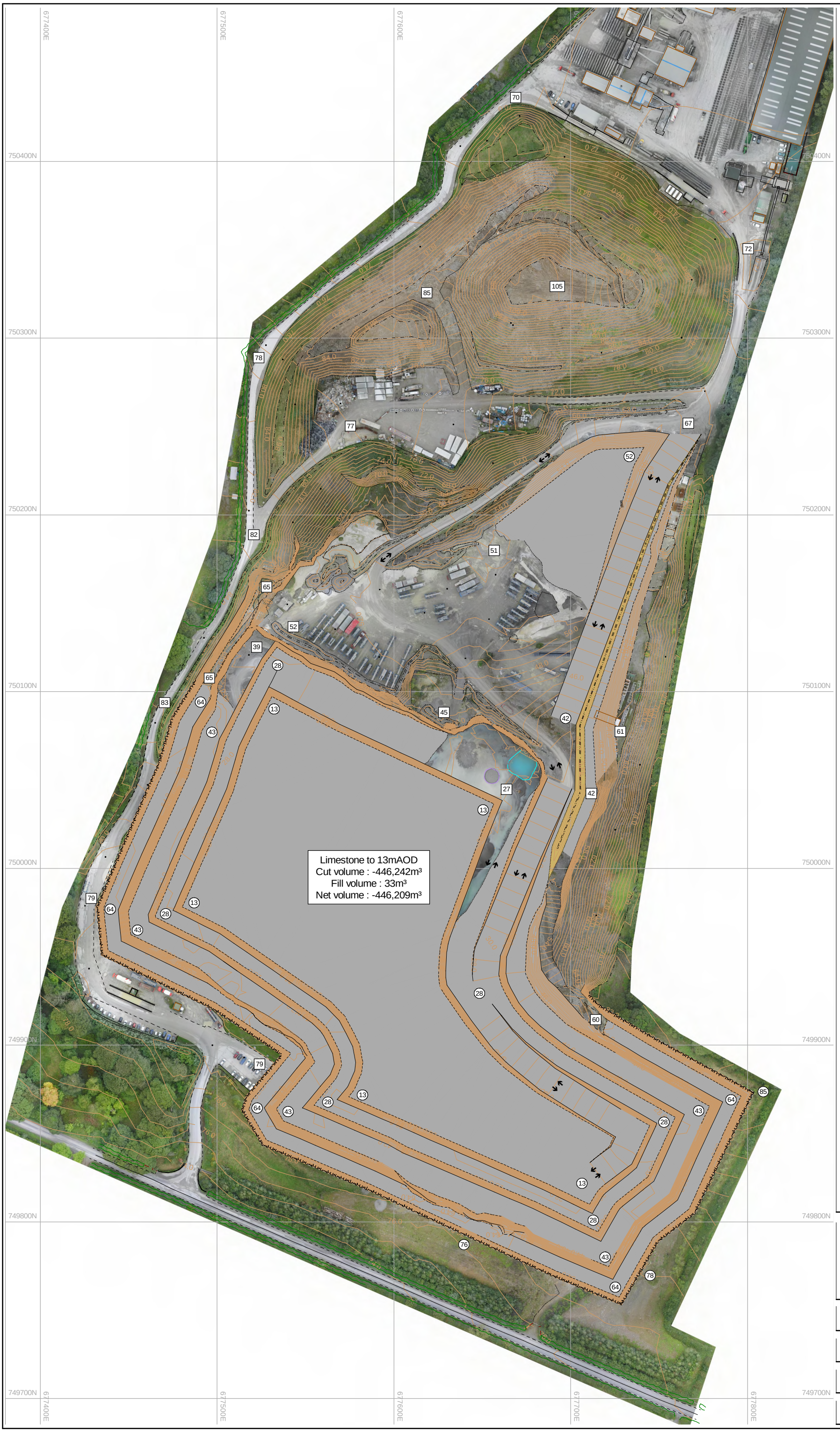
N

Quarry Design
CHARTERED QUARRYING CONSULTANTS

Tromman

Quarry Development Plan
Phase 1

Drawn By	Scale
APW	**1 : 2000**
Dwg Nº	**Paper Size**
Figure 3.3	**A3**



Legend

- 43 — Existing Elevation
- 28 — Development Elevation
- Dual Vehicle Haul Road
- Single Vehicle Haul Road

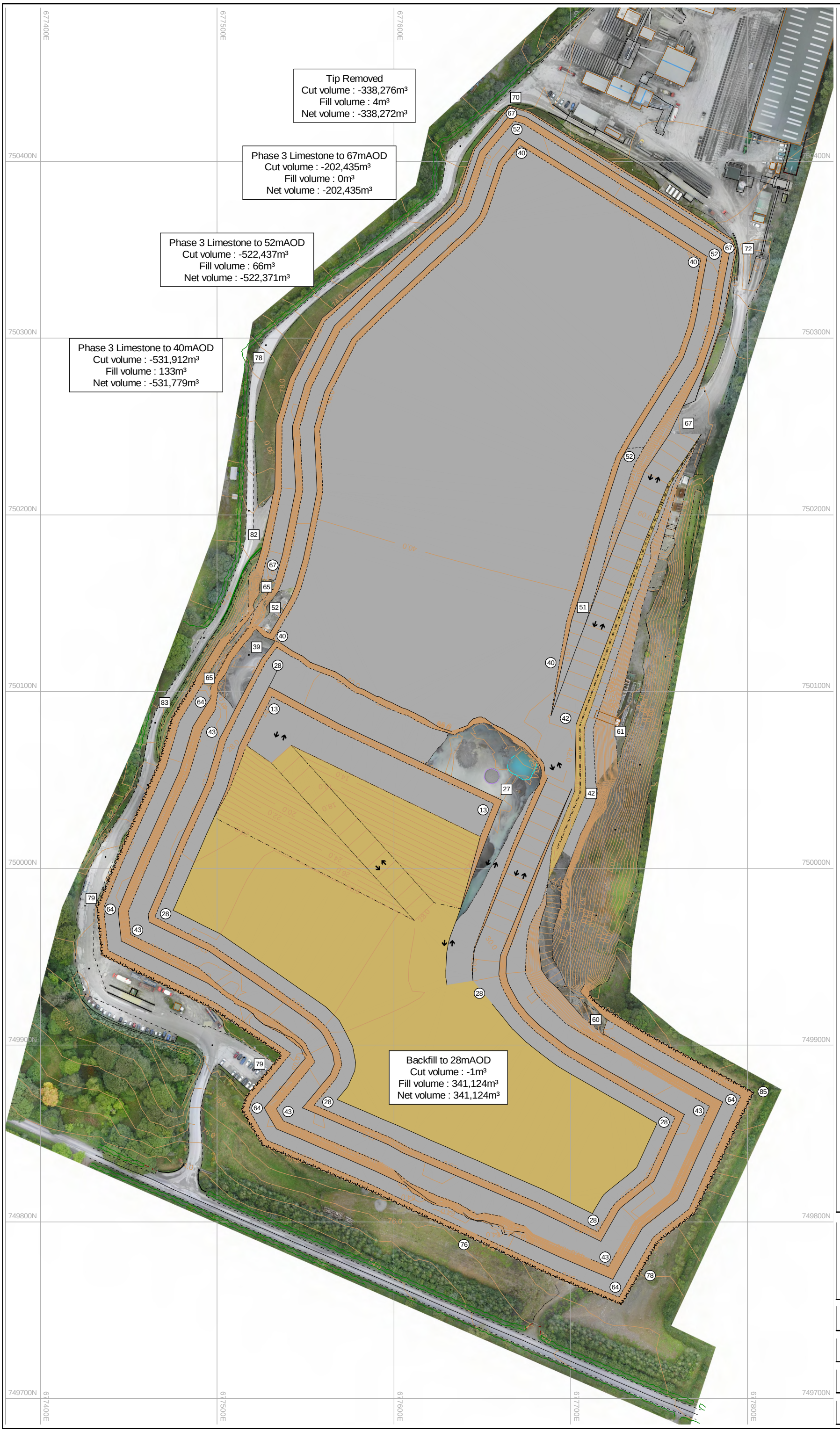
N

Quarry Design
CHARTERED QUARRYING CONSULTANTS

Tromman

Quarry Development Plan
Phase 2

Drawn By	Scale
APW	1 : 2000
Dwg Nº	Paper Size
Figure 3.4	A3



Legend

- 43 — Existing Elevation
- 28 — Development Elevation
- Dual Vehicle Haul Road
- Single Vehicle Haul Road

Tromman

Quarry Development Plan
Phase 3

Drawn By	Scale
APW	**1 : 2000**
Dwg Nº	Paper Size
Figure 3.5	**A3**

Phase 4 Limestone to 28mAOD
Cut volume : -491,261m³
Fill volume : 13m³
Net volume : -491,248m³

Phase 4 Limestone to 13mAOD
Cut volume : -548,781m³
Fill volume : 43m³
Net volume : -548,738m³

677400E 677500E 677600E 677700E 677800E
750400N 750300N 750200N 750100N 750000N 749900N 749800N 749700N

Legend

- 43 — Existing Elevation
- (28) — Development Elevation
- Dual Vehicle Haul Road
- Single Vehicle Haul Road

N

Quarry Design
CHARTERED QUARRYING CONSULTANTS

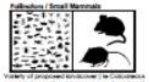
Tromman

Quarry Development Plan
Phase 4

Drawn By	Scale
APW	**1 : 2000**
Dwg Nº	Paper Size
Figure 3.6	**A3**

TARGET FAUNA POST RESTORATION

Pollinators / Small Mammals

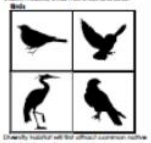


Variety of proposed landcover / ie Calcareous grassland, woodland, hazel copse, & wetland) offer habitats to sustain diverse populations of insect, mollusc, small mammals and birds.

Amphibians

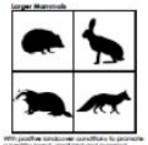
Ponds and wetland areas to be created to attract amphibian species with grassland and hibernacula.

Birds



Directly habitat will the attract common native birds & in time with appropriate management encourage a hierarchy of bird species (incl raptors). Exposed rock faces combine with wetland habitat to offer excellent nesting & feeding ground for thrushes.

Larger Mammals



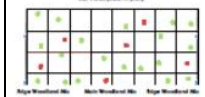
With positive landcover conditions to promote a healthy insect, small bird and mammal population, combined with a balance of woodland, calcareous grassland & wet meadow habitat larger native mammal such as hare, hedgehog, badger & fox will be encouraged.

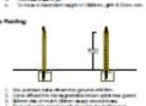
NOTE:
No herbicides or pesticides to be permitted during the establishment or extractive operational stage or after operations have ceased & restoration embedded.

Bats / Red Squirrel

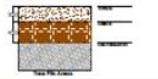
With positive landcover conditions to promote a healthy insect population, combined with roosting and nesting opportunities, protected species such as bat and red squirrel will be encouraged.

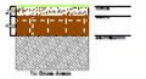
PLANTING DETAILS





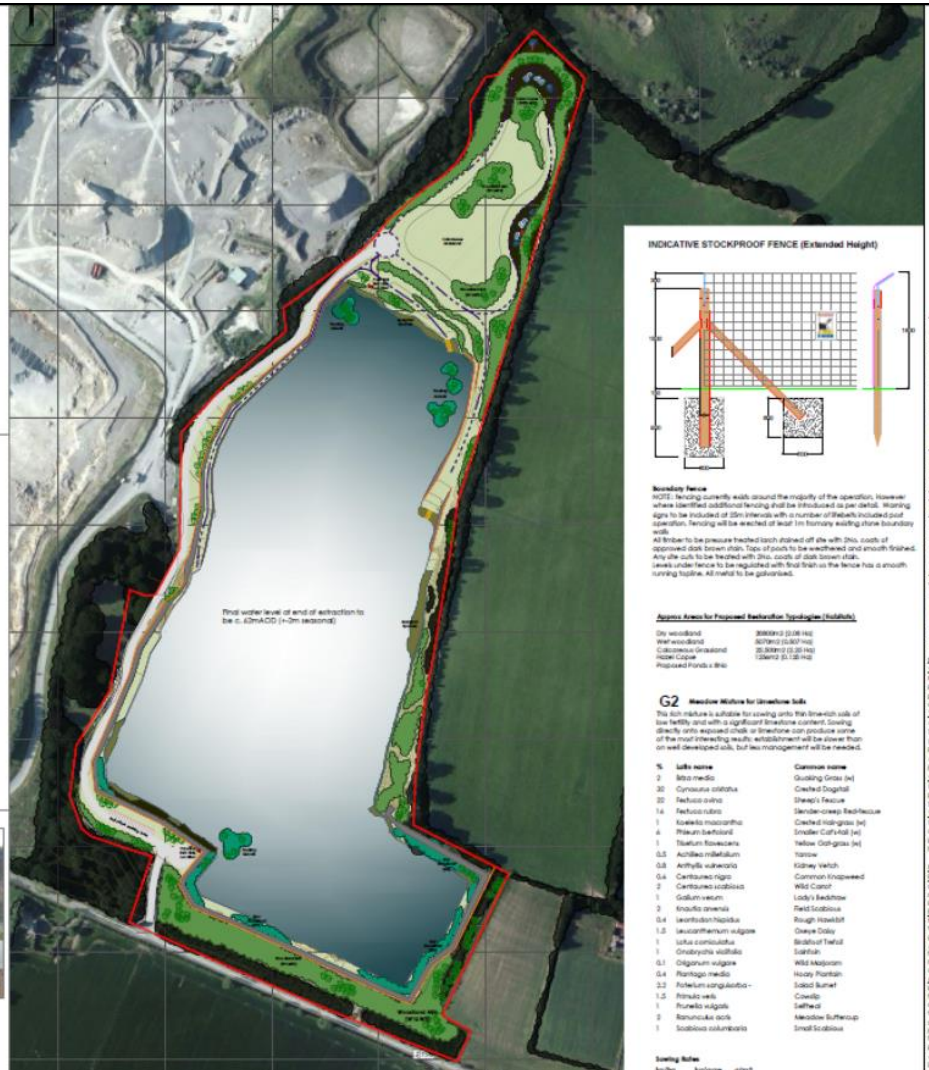
EARTHWORKS DETAILS





Roofing Islands

W3	WET WOODLAND MIX			0.507Ha @2500 Plants Per Ha = 1267No	
%	SPECIES	SIZE	GROWN	HEIGHT/TRANSPL	NUMBER
20	Salix cinerea	40-60cm	BR / Cell	1 + 1 Branched	253
20	Betula pubescens	40-60cm	BR / Cell	1 + 1 Branched	253
20	Alnus glutinosa	40-60cm	BR / Cell	1 + 1 Branched	253
20	Prunus spinosa	40-60cm	BR / Cell	1 + 1 Branched	253
20	Salix fragilis	40-60cm	BR / Cell	1 + 1 Branched	253



INDICATIVE STOCKPROOF FENCE (Extended Height)

Boundary Fence
NOTE : fencing currently exists around the majority of the operation. However where identified additional fencing shall be introduced as per detail. Warning signs to be included at 25m intervals with a number of lifebelts included post operation. Fencing will be erected at least 1m fromany existing stone boundary walls.
All timber to be pressure treated larch stained off site with 2No. coats of approved dark brown stain. Tops of posts to be weathered and smooth finished. Any site cuts to be treated with 2No. coats of dark brown stain.
Levels under fence to be regulated with final finish so the fence has a smooth running topline. All metal to be galvanised.

Approx Areas for Proposed Restoration Typologies (Habitats)

Dry woodland	20000m2 (2.00 Ha)
Wet woodland	50700m2 (5.007 Ha)
Calcareous Grassland	35,500m2 (3.55 Ha)
Hazel Copse	12m2 (1.120 Ha)
Proposed Ponds x 9No	

G2 Meadow Mixture for limestone Soils

This rich mixture is suitable for sowing onto thin lime-rich soils of low fertility and with a significant limestone content. Sowing directly onto exposed chalk or limestone can produce some of the most interesting results; establishment will be slower than on well developed soils, but less management will be needed.

%	Latin name	Common name
2	Bitta media	Quaking Grass (w)
20	Cynosurus cristatus	Crested Dogstail
20	Festuca ovina	Sheep's Fescue
14	Festuca rubra	Slender-creep Red-fescue
1	Koeleria macrantha	Crested Hair-grass (w)
4	Poleum bertolonii	Smaller Cat's-tail (w)
1	Trisetum flavescens	Yellow Oat-grass (w)
0.5	Achillea millefolium	Yarrow
0.8	Anthyllis vulneraria	Kidney Vetch
0.4	Centaurea nigra	Common Knapweed
2	Centaurea scabiosa	Wild Carrot
1	Galium verum	Lady's Bedstraw
2	Knautia arvensis	Field Scabious
0.4	Leontodon hispidus	Rough Hawkbit
1.5	Leucanthemum vulgare	Oxeye Daisy
1	Lotus corniculatus	Birdsfoot Trefoil
1	Onobrychis viciifolia	Sainfoin
0.1	Origanum vulgare	Wild Marjoram
0.4	Plantago media	Hoary Plantain
2.2	Poterium sanguisorba -	Salad Burnet
1.5	Primula veris	Cowslip
1	Prunella vulgaris	Selfheal
2	Ranunculus acris	Meadow Buttercup
1	Scabiosa columbaria	Small Scabious

Sowing Rates

kg/ac	kg/acre	g/m2
40	16	4

W1	MAIN WOODLAND MIX 75%			2.08Ha @2500 Plants Per Ha = 5200No (3900)	
%	SPECIES	COMMON	SIZE	GROWN	TRANSPLANTS	NUMBER
Qr	35	Quercus robur	Oak	40-60cm	BR	1 + 2 Branched	1365
Ps	15	Pinus sylvestris	Scots Pine	40-60cm	BR	1 + 1 Branched	585
Bp	20	Betula pendula	Birch	40-60cm	BR	1 + 1 Branched	780
Ag	15	Alnus glutinosa	Alder	40-60cm	BR	1 + 1 Branched	585
Sa	10	Sorbus aucuparia	Rowan	40-60cm	BR	1 + 1 Branched	390
Pa	5	Prunus avium	Cherry	40-60cm	BR	1 + 1 Branched	195
Fe		Fraxinus excelsior	Ash *	40-60cm	BR	1 + 1 Branched	

W2	WOODLAND EDGE MIX 25%					(1300)
%	SPECIES	COMMON	SIZE	GROWN	TRANSPLANTS	NUMBER
Cs	30	Corylus avellana	Hazel	40-60cm	BR	1 + 1 Branched	390
Cm	15	Crataegus monogyna	Hawthorn	40-60cm	BR	1 + 1 Branched	195
Ps	10	Prunus spinosa	Blackthorn	40-60cm	BR	1 + 1 Branched	130
Ia	10	Ilex aquifolium	Holly	40-60cm	BR	1 + 1 Branched	195
Cf	5	Acer campestre	Field Maple	40-60cm	BR	1 + 1 Branched	65
Le	5	Ulex europaeus	Gorse	40-60cm	BR	1 + 1 Branched	65
Ag	5	Alnus glutinosa	Alder	40-60cm	BR	1 + 1 Branched	65
Ma	5	Malus sylvestris	Crabapple	40-60cm	BR	1 + 1 Branched	65
Vo	5	Viburnum opulus	Guelder Rose	40-60cm	BR	1 + 1 Branched	65
Sci	5	Salix cinerea	Willow	40-60cm	BR	1 + 1 Branched	65

* Due to Ash back there is at time of submission a moratorium on specifying this species, however as resistant strains emerge over the life of this operation it is expected that it will be possible to specify.

LIGHT STANDARD TREES

	TY	SPECIES	COMMON	SIZE grms	HEIGHT	APP. STEM	NUMBER
Qr	St	Quercus robur	Oak	6-8cm	2.5-2.75m	1.5 - 1.8m	As Shown
Bp	Ht	Betula Pendula	Birch	6-8cm	2.5-2.75m	1.5 - 1.8m	
Ag	Ht	Alnus Glutinosa	Alder	6-8cm	2.5-2.75m	1.5 - 1.8m	

Restoration Concept

Restoration of this extractive operation is focused on habitat creation and delivering biodiversity. In addition it has been recognised there is long term potential to accommodate active and passive recreation - Walking, birdwatching, fishing etc.
This site could be assimilated with adjoining lands (particularly through the restoration of the adjoining quarry site to the west) to contribute to regional biodiversity.
Connectivity of this site within a region wide green infrastructure strategy should be explore by the Authorities.
The majority of the subject site will be occupied by water body and surrounded by calcareous grassland and native woodland (Incl Hazel copse). New ponds with wetland areas would also be created. Sections of exposed rock face would remain post operation and offer valuable nesting opportunities for birds (including raptors).
Restoration will be applied progressively on this site, therefore as areas reach their maximum extent of extraction rehabilitation would commence. Long term this site offers potential to create a diverse habitat - with similar examples of former quarry sites having become designated nature reserves.

Soil Management

Much of the soils and overburden layers of this quarry operation have in the past been stripped and relocated on are generally unsuitable for restoration purposes. However some pockets of topsoils remain intact, which can be utilised for future restoration. Where soils (including stored soil) are identified, these should be appropriately transported to areas available for restoration.
Soil Stripping - Stripping should apply guidance from MAFF data sheets.
Soil Storage - Location of stripped soils storage to be agreed on site - Storage berms should be clearly signed & protected. Storage berm height (maximum) 3m.
Handling Soils -
- Aggressive weeds is to be topped and selectively herbicide added as required
- Give notice and obtain instructions before moving topsoil.
- Plant 'select' and use plant to minimize disturbance, trafficking and compaction.
- Contamination: Do not mix topsoil with:
- Subsoil, stone, hardcore, rubbish or material from demolition work.
- Other grades of topsoil.

Surface handling: keep to a minimum. Use or stockpile topsoil as soon as possible after stripping.
Wet conditions: Handle topsoil in the driest condition possible. Do not handle during or after heavy rainfall or when it is wetter than the plastic limitwo 3%. to BS 1377-2.
Spreading Soils-
Temporarily re-disturb/scrag. Broken and remove before spreading topsoil.
Layers - Depth (maximum): 150 mm. - Gently firm each layer before spreading the next.
Depths after timing and settlement (minimum):
- Grass areas - 80mm (excluding wet wildflower grassland areas)
- Planted areas - 150mm. Crumb structure: Do not compact topsoil. Preserve a friable texture of separate visible crumbs wherever possible

Proposed Woodland Planting

Years 1-3: Establishment:
Maintain shrub & woodland areas in a weed free condition (No herbicide application on site).
Prune minor damage back to healthy wood and check for and treat disease. Gap up to replace damaged or failed plant material in accordance with the original planting specification, which shall form part of the management documentation. Check protective fencing, where used, and maintain in good condition.
Year 4-10
As canopies merge, remove guards and stakes and cease weed control.
Thin out weakest specimens every 5 years as planting becomes overcrowded and start to restrict growth.
1 no. basic-level inspection bi-annual by qualified professional (in autumn to coincide with fungal fruiting) to check physiological and biological condition -
At the end of this period determine if thinned to 5 m to maintain continued grassland cover beneath.
Fell d trees to be used to create hibernacula.
Year 11-20:
1 no. basic-level inspection bi annual by qualified arboriculturist (in autumn to coincide with fungal fruiting) to check physiological and biological condition
Thin out weakest specimens every 5 years as planting becomes overcrowded and start to restrict growth.
Year 20+
1 no. basic-level inspection per annum by qualified arboriculturist (in autumn to coincide with fungal fruiting) to check physiological and biological condition.
Interplant gaps and openings with new transplants every 5 years as required. Felled trees to be used to create hibernacula.

Proposed Grasslands

Preparation
Ground preparation should follow the supplier's instructions with the removal of weeds, rubbish and stones of over 5 mm diameter. The seed will be sown following extraction activities during times of sufficient warmth and moisture, ideally in late spring or early autumn.
Post sowing management
Most of the sown meadow species are perennial and will be slow to germinate and grow and will not usually flower in the first growing season. There will often be a flush of annual weeds from the soil in the first growing season. This weed growth is easily controlled by topping or mowing. (No herbicide applied on site)
Avoid cutting in the spring and early summer if the mixture is autumn sown and contains Yellow Rattle, or if the mixture has been sown with a nurse of cornfield annuals. These sown annuals should be allowed to flower, then in mid-summer cut and remove the vegetation. It is important to cut back the annuals before they die back, set seed and collapse this cut will reveal the developing meadow mixture and give it the space it needs to develop.
Management once established
In the second and subsequent years sown areas can be managed in a number of ways which, in association with fertility, will determine the character of the grassland.
On poor shallow soils one or two cuts at the end of the summer, or occasional light grazing, may be all that is required to maintain diversity and interest.
On deeper soils best results are usually obtained by traditional meadow management based around a main summer hay cut in combination with autumn and possibly spring mowing or grazing. Meadow grassland is not cut or grazed from spring through to late July/August to give the sown species an opportunity to flower.
Refinement of options would take by the project ecologist and form part of future management plans.
After flowering in July or August take a 'hay cut' cut back with a scythe, petrol strimmer or tractor mower to c.50mm leave the 'hay' to dry and shed seed for 1-7 days then remove from site.
Mow or graze the re-growth through to late autumn/winter to c.50mm and again in spring if needed.

Legend

Planning Application Boundary
Existing Hedgerows/ Scrub & Woodland
Proposed Dry Woodland Planting (W1 & W2 - H1)
Species Rich Dry Calcareous Grassland (G2)
Proposed Wet Woodland (W3)
Species Rich Wet Calcareous Grassland (G2)
Proposed ponded area profiled & finished suitable for future amphibian habitation
Proposed future birdhide location
Anchored floating islands completed with riparian species
Rock faces to be retained as potential habitat for nesting birds
Approximate location of informal pathways & routes through site
Marginal & emergent species with potential jetty locations
Light Standard Trees
Protective Fencing

client: Keegan Quarries | date: July 19 | scale: 1:1250 @ A1 | by: pm | notes:

Landscape Restoration | MDA Rig 1.12
Tromman Quarry, Rathmoylan, Co. Meath.
mda mullin design associates

4.0 PLANNING POLICY FRAMEWORK

4.1 Introduction

This section considers the development in the context of the following contemporary planning policy sources:

- Meath County Development Plan (2013-2019);
- The National Spatial Strategy (2002-2020);
- Sustainable Development- A Strategy for Ireland (1997);
- National Planning Framework (2018); and
- Regional Planning Guidelines for the Greater Dublin Area 2010-2022.

The level of compliance with the policies and objectives outlined in these documents indicates the suitability of the development from a planning and sustainable development perspective.

4.2 Meath County Development Plan (2013-2019)

The subject site is within the County Meath Administrative Area. The Meath County Development Plan (MCDP) was adopted in December 2012 and came into effect in January 2013. The plan sets out a vision and an overall strategy for the proper planning and sustainable development of the County for a six-year period. It also sets out guiding policies and objectives for the development of the County in terms of physical growth and renewal, economic, social and cultural activity, and environmental protection and enhancement.

It is noted that the Development Plan for the period 2019 to 2025 is being prepared with the first step in the Pre-Draft Public Consultation phase taking place in January and February 2017. The Stage 2 Draft stage consultation is yet to take place. Given that the plan is still in the early stages of preparation it is not considered any further at this point.

4.2.1 Extractive Industry Policies

Section 10.12 of the MCDP states that:

"Meath contains a variety of natural resources such as building raw materials in the form of sand, gravel, stone reserves including high purity limestones and shale used in cement and magnesia manufacture and base metal deposits. The potential of these resources to underpin construction output and provide employment and economic growth in the local and regional economy is recognised as is the need to exploit such resources in an environmentally sound and sustainable manner".

The plan states how the goal in the County in relation to the extractive industry is:

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

The development at the site is considered to accord with this goal in that it assists with delivering a supply of aggregate which contributes towards growth in both the County and the wider region. As demonstrated through this EIAR, no significant effects can reasonably be expected to occur in the future in terms of environmental, traffic and social impacts. As a result, the development is considered to accord with the County Council's goal in relation to the extractive industry.

The MCDP lists 7 policies (Policies RD POL 21- 27) which are to be considered when assessing proposals related to the extractive industry. Each of the policies are considered in turn below.

Policy RD POL 21 states:

"To ensure that projects associated with the extractive industry carry out screening for Appropriate Assessment in accordance with Article 6(3) of the E.C. Habitats Directive, where required".

An Appropriate Assessment screening exercise has been undertaken by Woodrow Sustainable Solutions and as a result a Natura Impact Statement (NIS) has been prepared, this is a standalone document to the EIAR. The NIS concludes that

"it can be concluded in the light of best scientific knowledge, that there will be no significant effects, either individually or in combination with other plans or projects, adversely affecting the conservation interests or conservation objectives of the River Boyne and Blackwater SAC and the River Boyne and Blackwater SPA, i.e. the integrity of these, or any other Natura 2000 sites. It is therefore concluded that the proposal will not, beyond reasonable scientific doubt, adversely affect the integrity of any European Site (Natura 2000 site) either directly or indirectly."

The development is therefore considered to accord with Policy RD POL 21 of the MCDP.

Policy RD POL 22 states:

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

The development site consists of an existing quarry, used for the winning and working of the Waulsortian and Lucan limestone formations with ancillary manufacturing development linked with the working of the mineral won at the site, including a pre-cast concrete products factory, Limestone Powder Plant, block yard

and concrete batching plants. As detailed at Section 9 of this EIAR, the development will not be expected to result in any significant effects in terms of visual impact, indeed the removal of the overburden landform is anticipated to provide a positive outcome. As detailed at various sections of this report (See Water Environment; Noise; Dust; Ecology; Traffic Sections), the development is not predicted to result in any additional and therefore significant impacts in the future. The development is therefore considered to accord with **Policy RD POL 22** of the MCDP.

Policy RD POL 23 states:

"To support the extractive industry where it would not unduly compromise the environmental quality of the county and where detailed rehabilitation proposals are provided".

As detailed throughout this Report, the development has not resulted in any significant effects which have occurred, nor can reasonably be expected to occur in the future upon the environment. It can therefore be demonstrated and concluded that the proposal will not unduly compromise the environmental quality of the county.

In terms of rehabilitation proposals the application seeks the rmediation of the margins of the site and ultimate restoration of the manufacturing area the flooding of the quarry void.

The development is therefore considered to accord with **Policy RD POL 23** of the MCDP.

Policy RD POL 24 states:

"To seek to ensure that the extraction of minerals and aggregates minimise the detraction from the visual quality of the landscape and do not adversely affect the environment or adjoining existing land uses".

As detailed at Section 9 of this report and above under Policy RD POL 22 the development is considered to accord with **Policy RD POL 24** of the MCDP.

Policy RD POL 25 states:

"To ensure that the extractive industry and associated development minimises adverse impacts on the road network in the area and that the full cost of road improvements, including during operations and at time of closure, which are necessary to facilitate those industries are borne by the industry itself".

As detailed at Section 12 of this report, the development has consistently operated within prescribed operational limits over a 30 year period, with the highways operating at levels substantially below capacity and the proposal promotes no intensification of activities, therefore, is considered to accord with **Policy RD POL 25** of the MCDP.

Policy RD POL 26 states:

"To ensure that all existing workings shall be rehabilitated to suitable land uses and that all future extraction activities will allow for the rehabilitation of pits and proper land use management. The biodiversity value of the site should be considered in the first instance when preparing restoration plans. Where land filling is proposed, inert material is the preferred method. Each planning application shall be considered on a case by case basis and where relevant will be dealt with under the relevant regional Waste Management Plan".

As detailed in Sections 9 and 11 of this report, it is proposed that the application has developed further the previously consented restoration consents which will maximise delivery of biodiverse habitats. The development is therefore considered to accord with **Policy RD POL 26** of the MCDP.

Policy RD POL 27 states:

"To ensure that development for aggregates / mineral extraction, processing and associated processes does not significantly impact in the following areas: Existing & Proposed Special Areas of Conservation (SACs);

i. Special Protection Areas (SPAs);
ii. Natural Heritage Areas and Proposed Natural Heritage Areas;
iii. Other areas of importance for the conservation of flora and fauna;
iv. Areas of significant archaeological potential;
v. In the vicinity of a recorded monument, and;
vi. Sensitive landscapes
vii. World Heritage Sites".

As demonstrated in the Ecology, Archaeology and Landscape and Visual Sections of this report, the development is not considered to give rise to any unacceptable impacts upon any of the designations identified above. As a result, the development is considered to accord with **Policy RD POL 27** of the MCDP.

4.2.2 Economic Development Policies

The MCDP includes a range of other policies which indirectly impact upon the development. A summary of the policies and a brief analysis of each is provided below.

Policies ED POL 1- 50 relate to economic development in the County. The aim of the policies is to build on and enhance the competitiveness and attractiveness of County Meath in order to make it one of Ireland's prime locations for indigenous and foreign economic and employment generating investment in accordance with the objectives and recommendations of the Economic Development Strategy for County Meath 2014-2022.

The policies primarily relate to zoning for economic uses and focussing economic development around strategic growth towns and corridors. Policy **ED POL 6** states:

"To recognise the contribution of rural employment to the continued and sustainable growth of the economy and to promote this continued growth by encouraging rural enterprise generally, especially those activities that are resource dependent, including energy production, extractive industry, small scale industry and tourism in a sustainable manner and at appropriate locations".

The existing operations (stone, powders; precast concrete products, concrete block manufacture and ready mixed concrete) at Tromman provide direct employment for some 130 staff and a further 30 full-time sub-contractors with a direct wage bill and associated contractors wage bill approaching €8.1M. Keegan Quarries, making a significant contribution to the rural Meath economy and providing a highly skilled workforce. A significant amount of the Company's total revenue stream is now derived from export sales to the UK, bringing external revenue into the Meath Economy. Such is the importance of the export market that the recent growth and expansion in the business, has seen internal investment focussed on satisfying the demands of this area.

The development at the site has been necessary in order to retain existing employment at the site and allowed for the continued supply of mineral and manufacturing of products associated with the extraction of the mineral won at the site.

Policies **ED POL 7 and 8** state that Council will encourage developments which generate significant freight movements to locate close to the national road network. Due to the nature of minerals, they can only work where they are found. In this instance, the impact of vehicle movements to and from the site have been previously assessed with past EIA's and considered acceptable. As detailed within the traffic section of this EIAR the development is not considered to have resulted in significant effects and no intensification of vehicle movements is proposed.

Policy **ED POL 17** states that Meath Co Co will seek:

To promote rural economic development by recognising the need to advance the long term sustainable social and environmental development of rural areas and encouraging economic diversification and facilitating growth of rural enterprises.

The operation at Tromman provides an alternative rural economic enterprise away from agriculture and the agri-foods sector. In terms of social development, the population of Meath showed an increase of 5.9% from the 2011 to the 2016 census. The employment generated across the group has increased from less than 40 people in 2010 to over 100 in 2019. These jobs are vital to the local economy.

The 2016 census showed the average travel time of commuting workers in Ireland is 28.2 minutes. Meath however, due to the high numbers of people commuting to Dublin, had the highest commuting time of 34.6 minutes. Creating employment and generating economic activity in areas within the County, provides significant social and environmental benefits, as people do not need to spend longer travelling to places of employment outside the County. Upon analysis of the Keegan Group workforce the majority of employees work and live within a 10 km radius of travel. The operations at Tromman have allowed for sustainable patterns of working and travelling.

Policy **ED POL 19** states:

“To recognise the contribution of rural employment to the overall growth of the economy and to promote this growth by encouraging rural enterprise and diversification generally and to promote certain types of rural enterprise, especially those activities which are rural resource dependent, including renewable energy production, food production / processing and the extractive industries”.

The significant contribution that the Applicant’s business makes to the rural economy, as one of the specifically recognised industry sectors in this policy has been set out above and for that reason, it is not considered necessary to repeat.

Policies **ED POL 20 and ED POL 21** relate to the expansion of existing authorised industrial or business enterprises in the countryside and states that these will normally be permitted provided that the development would not result in negative impacts. As demonstrated throughout this report, the development would not result in either physical expansion beyond the existing quarry site footprint and no form of intensification is proposed.

Policies **ED POL 30-45** seek to promote sustainable tourism within the County and resist development would conflict with this. As demonstrated in this report, the development would not result in any significant adverse effects upon the environment. For example, the impact upon cultural heritage assets which may form tourist attractions has been assessed as part of the EIA. The impact upon the highway network has also been assessed.

For the reason already stated above, the development is considered to accord with the economic development policies of the MCDP.

4.2.3 Social Development Policies

The social development policies named within the MCDP seek to develop a society based on equality, inclusion and participation for all, with each individual having a right to live their life in a pleasant, safe environment with access to necessary services and facilities to fulfil their aspirations and potentials.

The policies seek to deliver social infrastructure such as community facilities; public space and schools and support the implementation of serval social inclusion strategies. The policies also seek to deliver education infrastructure; childcare and healthcare facilities; sports and leisure facilities; libraries; arts and cultural facilities.

The policies are of little relevance to the development, other than to note that the delivery of all the above-named infrastructure is dependent upon an adequate supply of aggregate and building materials. The Applicant's quarry remains a key supplier of

aggregate and value-added products, which has indirectly supported the delivery of the social infrastructure described above.

4.2.4 Transportation Policies

Chapter 6 of the MCDP relates to transportation. The Council's aim is to promote and facilitate the provision of the necessary transport infrastructure to fully accommodate existing and future population needs as well as the demand for economic development in an environmentally sustainable manner.

The policies seek to promote the sustainable development of walking, cycling and public transport and allow for the efficient movement of goods and people. The policies also seek to promote road and traffic safety; carry out improvements when required and address traffic problems where they arise.

As detailed in the Traffic Chapter (12), HGV movements from the site have been previously assessed and subsequently permitted. The proposed development has been demonstrated to not result in intensification and therefore no significant effects can reasonably be expected to occur in relation to highway traffic or safety. The site has utilised an approved access and adequate car parking is available for staff and visitors within the site.

The development is therefore considered to accord with the transportation policies of the MCDP.

4.2.5 Water, Drainage and Environmental Services Policies

The MCDP seeks to develop, protect, improve and extend water, wastewater, surface water and flood alleviation services throughout the county and to prioritise the provision of water services infrastructure to complement the overall strategy for economic and population growth and to achieve improved environmental protection.

Policy **WS POL 2** states that it is the policy of Meath Co Co:

"To develop, protect, improve and extend water, wastewater, surface water and flood alleviation services throughout the county and to prioritise the provision of water services infrastructure to complement the overall strategy for economic and population growth and to achieve improved environmental protection".

As demonstrated at the Water Environment Section (6), the development has operated within compliance levels and it has been calculated that, if permitted, will not result in any significant impacts upon the ground or surface water environments with the management systems in place to control drainage and flood risk at the site.

Policy POL1 relates to air and noise quality. The aim of the policy to maintain air and noise quality in the county. Regular dust and noise monitoring have been undertaken at the site during the course of operations. As detailed in the Noise and Air Quality Sections of this report, the development will not result in any significant impacts by virtue of dust or noise.

Given the above, the development is considered to accord with the Water, Drainage and Environmental Services policies of the MCDP.

4.2.6 Cultural and Natural Assets

The MCDP seeks to protect, conserve and enhance the heritage of Meath. Policies CH POL 1-20 seek to protect the setting of designated monuments and protected structures and discourage development which would lead to a loss of, or cause damage to, the character, the principal components of or the setting of heritage assets.

As detailed in the Landscape and Visual Section of this Report, the development has been assessed from sensitive receptors within the local vicinity. The section demonstrates that the development will not result in any significant impacts in terms of the landscape setting of views from surrounding sensitive receptors.

The Cultural Heritage section of this report also demonstrates that the development has not given rise to any unacceptable impacts upon any designated heritage assets and that the site has already extended to its maximum extent.

Policies NH POL 1- 26 relate to natural heritage. The aim of the policies is to protect, conserve and enhance the county's biodiversity. As detailed in the Ecology section of this report, the site has been the subject of an ecological impact assessment, prepared by Woodrow Sustainable Solutions. As detailed, the development is not considered to be likely to have any unacceptable impact upon any local, national or international designation.

Policies LC POL 1-3 relate to landscape character. The aim of the policies is to support the National Landscape Strategy and protect the landscape character, quality and local distinctiveness of County Meath. As detailed in the Landscape and Visual impact section of this report, the development has been assessed in terms of its impacts upon the local landscape. The assessment concludes that the development would not result in a significant effect in terms of landscape or visual amenity. As detailed above, the development allows for the restoration of the site, allowing it to assimilate back into the local landscape.

Given the above, the development is considered to accord with the cultural and natural heritage policies of the MCDP.

4.2.7 Rural Development

Chapter 10 of the MCDP seeks to encourage the continued sustainable development of rural communities without compromising the physical, environmental, natural and heritage resources of the County. Many of the policies in the chapter relate to rural housing and agriculture and are therefore of no relevance to the development. The chapter also includes the extractive industry policies as discussed earlier in this section, and therefore are not repeated here.

Policies RD POL 36-43 relate to rural roads. The policies seek to ensure that all accesses on to rural roads are safe and that the carrying capacity and function of rural roads are not prejudiced by development. As detailed in the Traffic section of this report, the access has previously been assessed using the industry standard PICADY software and demonstrates that the access is operating at an insignificant level against the maximum permissible.

Policies RD44 -53 relate to the water environment in rural areas. The aim of the policies is to ensure that development meets the highest standards of environmental protection; that wastewater can be adequately treated; and that suitable treatment and management systems are in place to prevent pollution. As detailed in the Water Environment section of this report and outlined earlier in this section the development is considered to accord with the rural development policies of the MCDP.

4.2.8 Development Management Guidelines and Standards

The MCDP at Chapter 11.14 recognises:

"the importance of the extractive industry in the economic life of the County, and importance as a valuable source of employment in parts of the County".

The plan states that transportation of minerals on public roads must be done in such a manner as not to cause nuisance to other road users. The plan goes on to state that a contribution towards the improvement of public roads serving a proposed and/or existing extractive development which are considered to be inadequate in width, alignment or structure to carry the size and weight of loads proposed as are necessary to safely accommodate such traffic, will be required by the Council as a condition of any permission granted.

As detailed in the traffic section of this report, the surrounding highway network (haulage routes) have been assessed on a number of occasions in the determination

of previous planning applications and EIA's with the existing network operating well within capacity, therefore it is considered that there is no justification in this instance.

The plan states that extractive industry proposals should pay particular attention to the potential for likely significant effects on Natura 2000 sites due to groundwater drawdown or contamination of surface water. As detailed in the Ecology section of this report, the development is not considered to have given rise to any likely significant effects on such sites.

Chapter 11.14 of the plan lists a number of topics, all of which, it states, should be sufficiently assessed in an authoritative manner. As demonstrated throughout this report, all of the topics listed have been sufficiently assessed, with the overall conclusion that the proposed further quarrying development will not result in any significant impacts.

As summarised throughout this section, the development has been demonstrated to accord with the provisions of the MCDP 2013-2019.

4.3 The National Spatial Strategy, 2002-2020

The National Spatial Strategy (NSS) 2002-2020 sets out the long-term planning and development framework context for the future growth and development of the state up until the year 2020. Among its key aims is to

"achieve a better balance of social, economic, physical development and population growth between regions"

The site is located within the Dublin and Mid East Region (Greater Dublin Area).

Section 4.3 of the NSS states:

"Enhancing the competitiveness of the Greater Dublin Area (GDA), so that it continues to perform at the international level as a driver of national development,

means physically consolidating the growth of the metropolitan area i.e. Dublin City and suburbs. At the same time, development in the hinterland of the metropolitan area is to be concentrated in strategically placed, strong and dynamic urban centres i.e. the 'Primary Development Centres' identified in the Strategic Planning Guidelines. These development centres have a unique role in Irish terms, given the scale of the Dublin City region and the need for internal balance between the city and its surrounding counties".

The NSS goes on to state that there are a number of large towns (population over 5,000 people) within the GDA. The Strategy identifies a number of these towns as 'Primary Development Centres' and states that these centres need to aim at a population level that supports self-sustaining growth, but which does not undermine the promotion of critical mass in other regions

The existing site at Tromman is located some 7km from Trim and some 20km from the towns of Navan and Maynooth. Significant economic importance is placed upon all three of the identified towns. Map 5 of the NSS (see overleaf) identifies Trim as a town with an urban strengthening opportunity. Maynooth is identified as a town with a population greater than 5,000 people and Navan is identified as a County Town and Primary Development Centre.

Direct access to all of the towns is available via regional roads. Given the Quarry's geographical location and resource quality, the site can be viewed as significant regional influence both in terms of sustaining the role of Dublin as the main metropolitan area within the region, but also sustaining the role and function of the identified towns, supporting self-sustaining growth as envisaged with the NSS.

Development at the site has been complementary to the urban strengthening opportunity designation of Trim Town through its role as an important generator of affordable and sustainable building materials. The site has experienced significant employment growth over the previous years, sustaining employment in the local area, with knock-on impacts in terms of local expenditure in the town. For the same

reasons, given its proximity, the site has also reinforced development in the town of Maynooth and the Primary Development Centre and County Town of Navan.

The NSS recommends that planning policies should be proactive in catering for future needs including the advance provision of relevant services and infrastructure. The development at Tromman has assisted in sustaining the roles of the identified towns as envisaged by the NSS, thus allowing for sustainable patterns of growth and development patterns within the region.

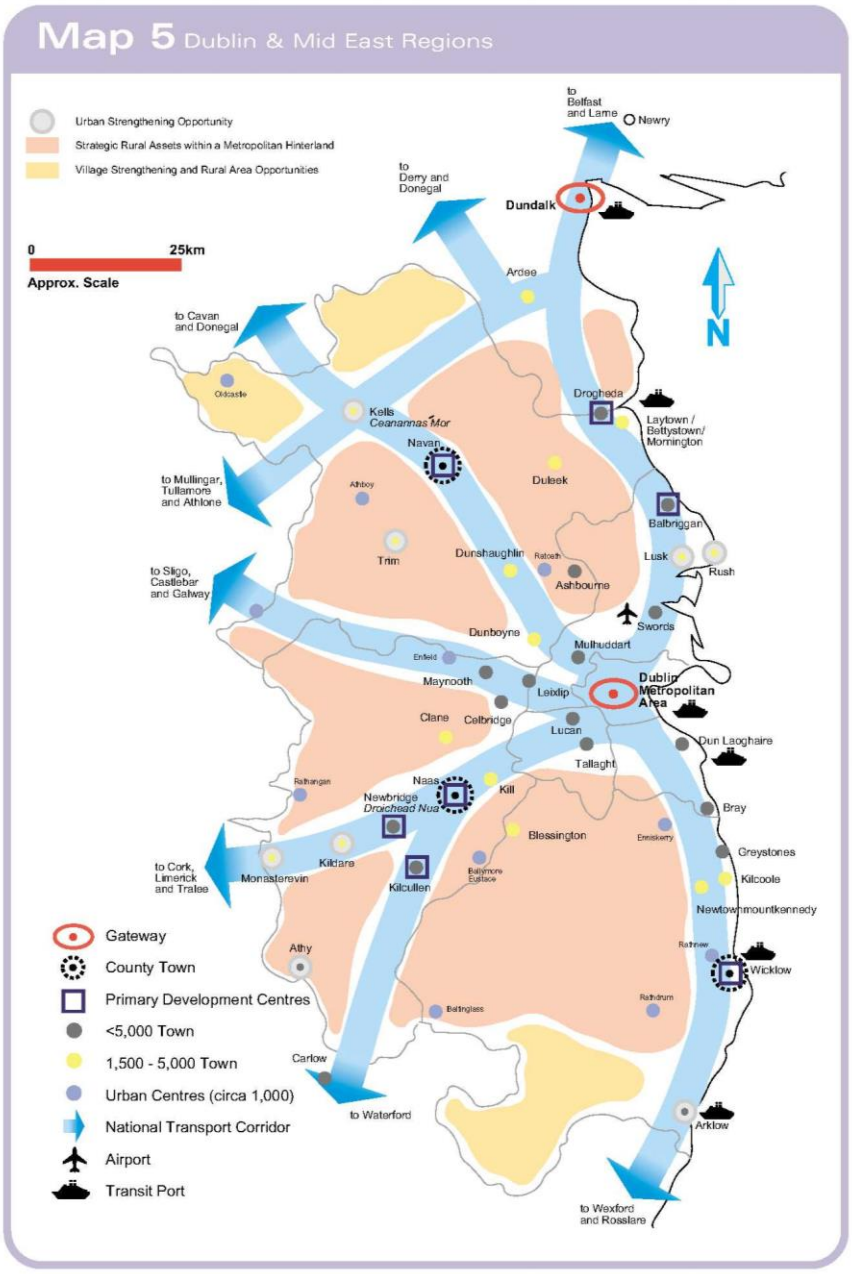


Figure 4.1: NSS Extract Map 5- Dublin and Mid East Regions

4.4 Sustainable Development- A Strategy for Ireland (1997)

The principle of sustainable development is now a fundamental tenet of land use planning policy in Ireland. The document 'Sustainable Development – A Strategy for Ireland', published by the Department of the Environment in 1997 contains a framework for applying the principles of sustainable development to different sectors of the economy.

The general principle of sustainable development has also been enshrined in the Planning and Development Act 2000 (as amended) and in County Development Plans prepared in recent years, including the MCDP.

In this context, the development has been influenced by these policies and has sought to provide an appropriate methodology to maximise the exploitation of local resources.

There are several sections and policy recommendations outlined in the Sustainable Development Plan which are reviewed in the context of the proposal, as set out below.

The 'Strategic Framework' section outlined in the plan attempts to put in context perceived incongruities whereby on the one hand, there is a fundamental requirement to meet the present day needs in a sustainable way while on the other hand equally ensuring equity in access to, and use of resources, as well as equitable opportunities to participate in decision-making processes all with an overriding goal to achieve economic and social progress.

Within the *priorities for action* identified within the Strategic Framework are:

- a balance between the conservation and utilisation of resources;
- concrete action on the basis of practical programmes and clear targets and;
- an ability to measure and monitor sustainable development performance.

Accordingly, the Government's priorities within the framework of the Strategy are to:

- undertake a high level of environmental protection so that renewable resources are conserved and not depleted beyond their renewable rates;
- ensure that non-renewable resources are used prudently and efficiently with a strong emphasis on the use of substitute resources, where practicable
- and the concentration of critical natural capital on the needs of the future;

The Environment and Economic Development Chapter of the strategy quotes:

"Ireland should replace the traditional adversarial approach that presents industrial development and environmental protection as opposites. The new approach should simultaneously maintain high environmental quality and promote a competitive enterprise sector" - Forfas, Shaping our Future.

The Extractive Industries section accepts that quarrying for stone, gravel, sand, crushed rock, etc is based on an ultimately finite resource, stating that products are used mainly in the construction industry, both as crushed rock and for the production of cement. The strategy also notes that ground limestone is also used in agriculture.

The strategy goes on to state that whist in principle raw materials for the quarrying industry are not in short supply, the environmental impacts, require greater consideration. In certain cases, demand for aggregates for use by the construction industry could be met in some degree by recycling and reuse of construction/demolition waste.

It should be noted that due to irregular supply patterns and inconsistencies in material quality, recycled aggregate materials are often not suitable for a range of uses. As detailed earlier in this report, the mineral extracted at the quarry at Tromman is a high purity limestone, therefore replacing the mineral with recycled aggregate is just not an option in the majority of value added products produced at the Site.

Given the above, the development is considered to accord with the provisions of the Sustainable Development Strategy for Ireland.

4.5 National Planning Framework, 2018

The National Planning Framework (NPF) is the Government's high-level strategic plan for shaping the future growth and development of the country to the year 2040.

The NPF describes how 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.

The NPF goes on to state that aggregates and minerals extraction will continue to be enabled where this is compatible with the protection of the environment in terms of air and water quality, natural and cultural heritage, the quality of life of residents in the vicinity, and provides for appropriate site rehabilitation.

National Policy Objective 23 seeks to:

"Facilitate the development of the rural economy through supporting a sustainable and economically efficient agricultural and food sector, together with forestry, fishing and aquaculture, energy and extractive industries, the bio-economy and diversification into alternative on-farm and off-farm activities, while at the same time

noting the importance of maintaining and protecting the natural landscape and built heritage which are vital to rural tourism".

In terms of rural development, the NPF describes how the spatial, social and economic disparities between rural areas are a reflection of the fact that stronger rural areas tend to be located in a geographically advantageous place, and also have the human and social capital to address their needs and respond effectively to emerging opportunities and strategies.

The application site is considered to be strategically well placed in order to serve both domestic and export markets, including the local market and the Greater Dublin Area. The site also benefits from a good human and social capital, as demonstrated by the current operations at the Quarry.

National Policy Objective 15 is to:

"Support the sustainable development of rural areas by encouraging growth and arresting decline in areas that have experienced low population growth or decline in recent decades and by managing the growth of areas that are under strong urban influence to avoid over-development, while sustaining vibrant rural communities".

The development has contributed towards achieving sustainable growth in a rural location and sustaining vibrant local communities within Meath, asoutlined in Section 14.0.

Given the above, the development is considered to accord with the provisions of the Sustainable Development Strategy for Ireland.

4.6 Regional Planning Guidelines for the Greater Dublin Area 2010-2022

The Greater Dublin Area (GDA) includes the geographical area of Dublin City, Dun Laoghaire- Rathdown, Fingal, South Dublin, Kildare, Meath, and Wicklow and incorporates the regions of both the Dublin Regional Authority and the Mid-East Regional Authority. The guidelines aim to direct the future growth of the Greater Dublin Area over the medium to long term and works to implement the strategic planning framework set out in the NSS.

In respect of the winning and working of minerals, Section 5.4.3 of the Guidelines state:

"Extractive industries are essential to the economy in terms of supply of aggregate materials for the construction sector, delivering transport infrastructure projects, and for the export market. There is, however, potential for conflict in the operation of these industries with wider environmental considerations. The role of the planning system is therefore to regulate, promote or control the exploitation of natural resources taking into account these other issues".

As demonstrated throughout this Report, the development has allowed for the best use of a finite resource to be made whilst ensuring that the development has not resulted in significant effects upon the environment.

The guidelines reference calls for the re-use or recycling of 85% Construction and Demolition (C and D) waste by 2013. As detailed earlier in this section, given the high quality of the resource at the Tromman site, the use of recycled aggregates is not considered appropriate for the operations at the site.

The guidelines go on to state that:

"In assessing applications for extractive industries, considerations and impacts as they relate to the objectives of the Water Framework Directive (and therefore River Basin Management Plans) and other EU Directives (such as those regarding wildlife and habitats) should be central to the decision-making process. Secondary impacts such as increased HGV traffic on adjoining communities and screening are key issues, and the use of levies to compensate the surrounding areas through investment in local social and other infrastructure is supported".

All of the impacts as described within the guidelines have been assessed in full within this report and the supporting appendices. Given the above, the development is considered to accord with the provisions of the Regional Planning Guidelines for the Greater Dublin Area.

4.7 Summary and Conclusions

The subject site is within the Meath County administrative area. The Meath County Development Plan (2013-2019) is the current statutory Development Plan for the area. As demonstrated, the development is considered to accord with the policies of the County Development Plan.

The development has allowed for the significant economic and social benefits generated by the site in terms of employment, investment and prosperity to be sustained without posing an unacceptable impact upon the environment, as detailed within this report. The development has complemented the role of local towns, supporting Trim as an urban strengthening opportunity.

The products manufactured at the site and aggregates produced have supported economic growth across the Dublin and mid-east region.

The development has been demonstrated to accord with the relevant local and national planning policy provisions. The development has maximised the potential of the finite natural resource found at the site without posing an unacceptable impact upon the environment and as such, the development is considered to accord with the

three dimensions of sustainable development and therefore is in accordance with the proper planning and sustainable development of the area.

PART III - ENVIRONMENTAL IMPACT ASSESSMENT

5.0 GEOLOGICAL ASSESSMENT

5.1 Author

This geological review section and the production of the quarry designed has been prepared by Mike Williams MGeol (Hons), MSc, MCSM, FGS, C.Geol, EurGeol, MIQ.

As a Senior Engineering Geologist with QuarryDesign Mike has an Integrated Masters in Geology from the University of Leicester and a Master of Science in Mining Engineering from Camborne School of Mines (University of Exeter). He is a Chartered Geologist and Fellow of The Geological Society of London. He was previously employed by Aggregate Industries where he was responsible for quarrying processes from drilling and blasting through to crushing and screening. He has also spent three years as an Exploration Geologist working in the Afar Desert in Ethiopia.

5.2 Geological Setting Baseline

The area around Keegan's Tromman Quarry has been mapped by the Geological Survey of Ireland at a scale of 1:100,000 (Figure 5.1). The mapping indicates that the site is split across two formations the Lucan and Waulsortian Limestone formations with the quarry activities having operated almost exclusively within the more recent Lucan Formation, which were deposited during the Carboniferous period.

However, previous work undertaken by Minerex Environmental Limited in support of application TA900976 and the associated EIS stated that although the "bedrock mapping compiled by the GSI (Ref. 7.5), the active quarry area is underlain by Waulsortian Limestones in the northwest and the Lucan Formation in the southeast.

The Waulsortian Limestones are generally pale grey, poorly bedded pure limestone with distinctive cavity structures. The Lucan Formation comprises dark grey, well bedded, cherty limestones and calcareous shales.

Based on field observations, the active quarry, including the proposed extension area, is considered to be underlain by the Waulsortian Limestones and not the Lucan Formation as published. The Waulsortian Limestones in the active quarry area were observed to contain cavities and weathering features synonymous with karstification, particularly in the current lower bench."

This assessment reflected the author's assessment of the resources on site and it is considered that the site operates within the Waulsortian Limestone formation. Waulsortian limestone typically comprises pale-grey and very fine-grained carbonates, which display mudstone to wackestone depositional textures. The pale colouration reflects the relative purity of the carbonate matrix, which contains very little to no argillite and is essentially composed of lime mud. The strata at site generally dips at a low angle to the west, although can be locally steep.

The geological mapping of the area indicates that the Waulsortian Limestone around Tromman Quarry is an outlier where the surrounding Lucan Formation was deposited more recently.

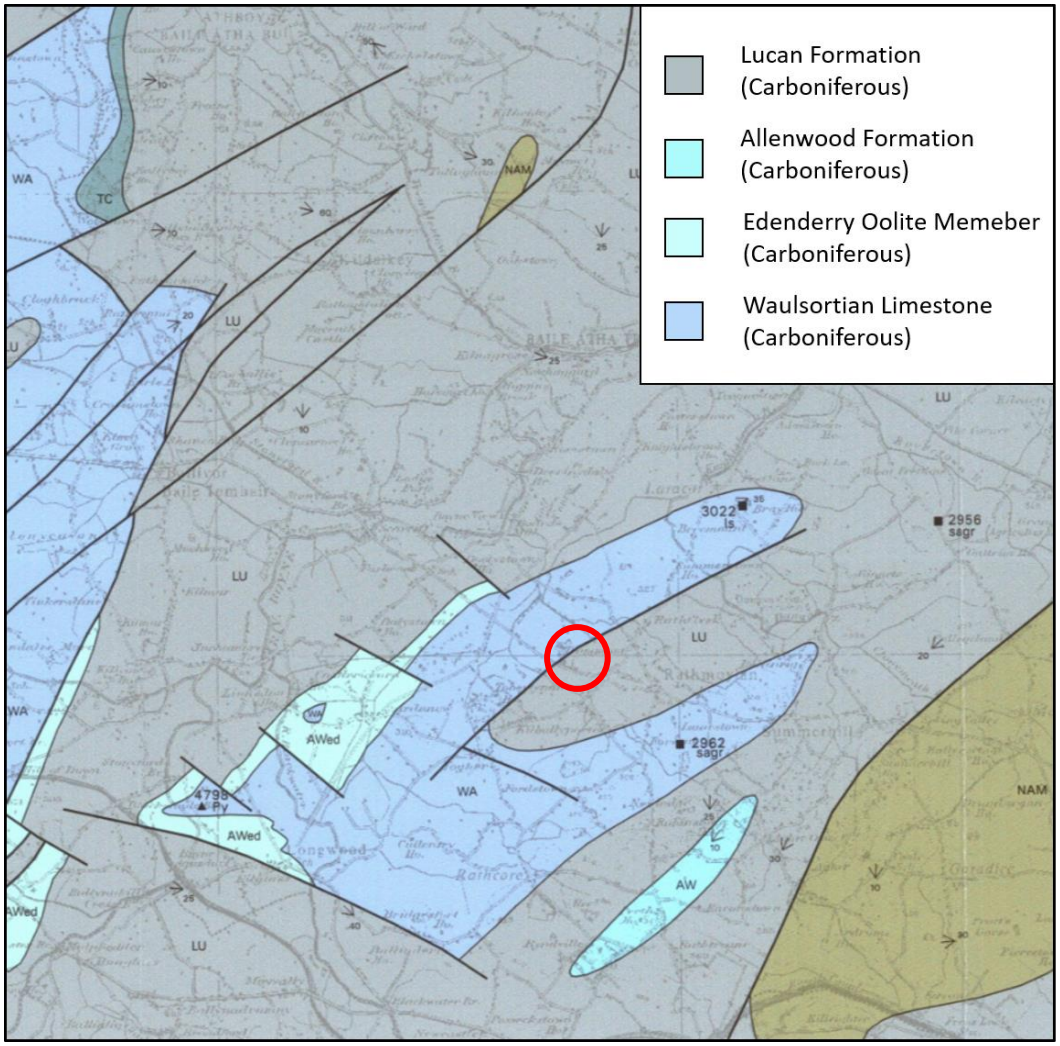


Figure 5.1: Geology of Meath (Sheet 13) 1:100,000 scale (not to scale). Solid Geology of area around Tromman Quarry, published by the Geological Survey of Ireland.

5.3 Geotechnical Setting Baseline

QuarryDesign visited the quarry on the 29th October 2018 to inspect the site to gain an appreciation of the geological and geotechnical aspects of the quarry. In terms of geotechnics, there was little of concern at Tromman and it is felt that the current practice of developing quarry faces at 75° is appropriate.

5.4 Direct Geological Impacts

Quarrying, by definition, requires the excavation and removal of the mineral deposit, thereby producing a permanent impact on the local bedrock environment within the footprint of the proposed quarry development.

The likely impacts on the geology, associated with the proposed development include; periodic blasting and excavation, processing and the removal from the site of the limestone.

5.5 Residual Impacts

The development proposes to develop the existing excavation development in the south to its maximum southern and eastern planning boundaries. Topsoil and overburden will need to be removed to achieve this.

Furthermore, in the northern margin of the quarry, a tip which has been previously been developed will need to be re-located to allow ongoing extraction in the northern margin of the quarry.

5.6 Mitigation Measures

The designs for the site have been based upon the site visit on the 29th October 2018 where there were no obvious geotechnical problems observed at the site and therefore the current face angle of 75° has been adopted, however the face heights have been reduced to a maximum of 15m with appropriate bench widths to allow Rock Traps with a width equal to ¼ the quarry face height and a height equal to 1/8 the face height to be installed.

The proposed receptor of the tip, currently situated in the northern margin of the site, is in the future quarry void. Therefore, upcoming visual impacts in the area would be reduced.

5.7 Conclusions

It is considered that the scale of the proposed development will result in the site continuing to have a limited impact at a local level on the geological environment. Impacts of the proposed quarrying and associated activities will have an insignificant impact on the Waulsortian Limestone as a whole.

6.0 WATER ENVIRONMENT

The full version of the Hydrogeological and Hydrological Assessment is included in the Environmental Statement Part 3 as Appendix 6.1; below is an executive summary prepared by the Author.

6.1 Author of the Report

The Hydrogeological and Hydrological Assessment was prepared by BCL Consultant Hydrogeologists Limited, a specialist consultancy with extensive experience within the aggregates, cement, building products and landfill sectors. BCL has provided specialist services and advice to the extractive industry since 2000. During this time, experience has been gained from involvement in the study of hydrogeological and hydrological systems in connection with planning matters at over 100 quarries throughout Ireland and the United Kingdom.

Henry Lister, the author of this report, is a Director of the Company and has over 25 years' experience in completing Hydrogeological and Hydrological Assessments. This has included the assessment of numerous mineral extraction planning applications, the review of mineral permissions (ROMPs) and substitute consents and associated remedial assessments.

6.2 Introduction

The Proposed Development (the subject of the current planning application) involves a lateral extension to encompass the overburden landform abutting the northern end of the existing void. In addition, the quarry face will be advanced some 20-25 m along the bulk of the western margin. In this way, the extraction area would be enlarged by some 2.55 Ha.

The development proposals do not involve any deepening below 13 maOD, which is the previously approved depth permitted under PL17.206702 (PA ref. TA/30334).

There will be no lateral extension to the south or east beyond what is already permitted under PL17.235960 (and PA ref. TA/900976).

6.3 Baseline Conditions

All ingress waters (groundwater and rainfall runoff) collecting in the quarry sump are pumped out of the void and are directed through settlement tanks and discharged into a ditch upon the northern margin of the concrete products yard, as covered by Trade Effluent Discharge Licence Ref. 04/2. This ditch gently descends to the northwest to its confluence with the Rathmolyon Stream, which is 200 m downstream from the quarry discharge point.

The discharge channel incorporates a V-Notch weir, fitted with data logger that has been in operation since 8th April 2019, taking head measurements every 15 minutes. Averaged across the monitoring period, the daily discharge rate equates to 1,350 m^3/day, with a standard deviation of 260 m^3/day.

This is a worst-case estimation of flow rate because the V-notch comprises a broad concrete weir, which would have a higher roughness coefficient than a thin-plate weir; and therefore the head measurements would be more elevated.

With this in mind, the bulk of the data is expected to be broadly consistent with the licensed rate (1,400 m^3/day), which was set in 2004.

Water samples have been collected from the discharge point on a regular basis and submitted for laboratory analysis in order to demonstrate compliance with the water quality limits specified in the consent.

The Rathmolyon Stream flows from east to northwest, passing 150 m standoff to the north of the Site and then running alongside the northern boundary of the neighbouring (Kilsaran's) quarry. Some 550 m downstream from the northwest limit of Kilsaran's quarry, the stream turns to the north and follows this direction to its

confluence with the Knightsbrook River (5-6 km downstream from the Site) and onwards to the River Boyne.

At the opposite/southern end of the Site, the land drops away gently towards a second watercourse, Tromman Stream. Tromman Stream passes 400 m to the south of the Application Area, at closest approach. The watercourse makes a very gentle descent westwards then northwards, maintaining 400-450 m standoff from the quarries. As it passes to the northwest of Kilsaran's quarry, it enters the uppermost section of the River Boyne & Blackwater SAC-SPA.

The protected section of the Tromman Stream is some 950m standoff to the northwest of the Applicant's quarry. At this point, the two streams (Tromman and Rathmolyon) run parallel to each other, separated by a strip of farmland (less than 100 m in width). This stretch of the Rathmolyon Stream was inspected during the water features survey completed by BCL; there is no evidence of any connection between the two watercourses.

Likewise, SLR Consulting Ireland inspected the same two streams in 2017 and reported that "there is no surface water connection between the two".

Furthermore, please refer to An Bord Pleanála (ABP) report, reference number 17.QV.0182:

(j) the apparent error made by the planning authority's advisors with respect to the existence of a proximate hydrological link between the receiving waters of the surface and ground waters discharged from the site and the nearby River Boyne and River Blackwater Special Area of Conservation, site code 002299, (no such link exists),

(k) the actual hydrological distance to the River Boyne and River Blackwater Special Area of Conservation, site code 002299, which is in excess of nine kilometres from the site,

17.QV.0182 **An Bord Pleanála** **Page 3 of 5**

The Office for Public Works (OPW) flood mapping provides further confirmation that there is no surface water link between the Rathmolyon Stream and the Tromman Stream (http://www.floodinfo.ie/map/floodmaps/).

On this basis, the evidence presented above is in conflict with Point 7.3.2 in the Inspector's Report ABP-303334-19, dated 14th March 2019. It is argued that Point 7.3.2 should be withdrawn from the ABP report.

The quarry is developed within a sequence of limestone beds of Lower Carboniferous age. The Project Geologist has indicated that the Site operates within the Waulsortian Limestone formation, having found no evidence in the quarry void of the faulted contact with the Lucan Formation (as shown on GSI mapping).

GSI literature classifies the Waulsortian Limestone as a "Locally important aquifer, moderately productive only in local zones" *i.e.* lower status than the Lucan Formation ("Locally important aquifer, generally moderately productive").

The groundwater level assessment (focussing on historic, present day and predicted drawdown) has been conducted on the basis that there is no hydraulic barrier between the two formations, irrespective of the precise location of the faulted contact.

Groundwater level data (collected at Site piezometers and local water supply boreholes) has been utilised to provide an indicative illustration of the cone of depression / amount of drawdown (m) that has occurred between 2003 and 2019 as a cumulative consequence of the widening and deepening of the two quarries (and the associated dewatering operations).

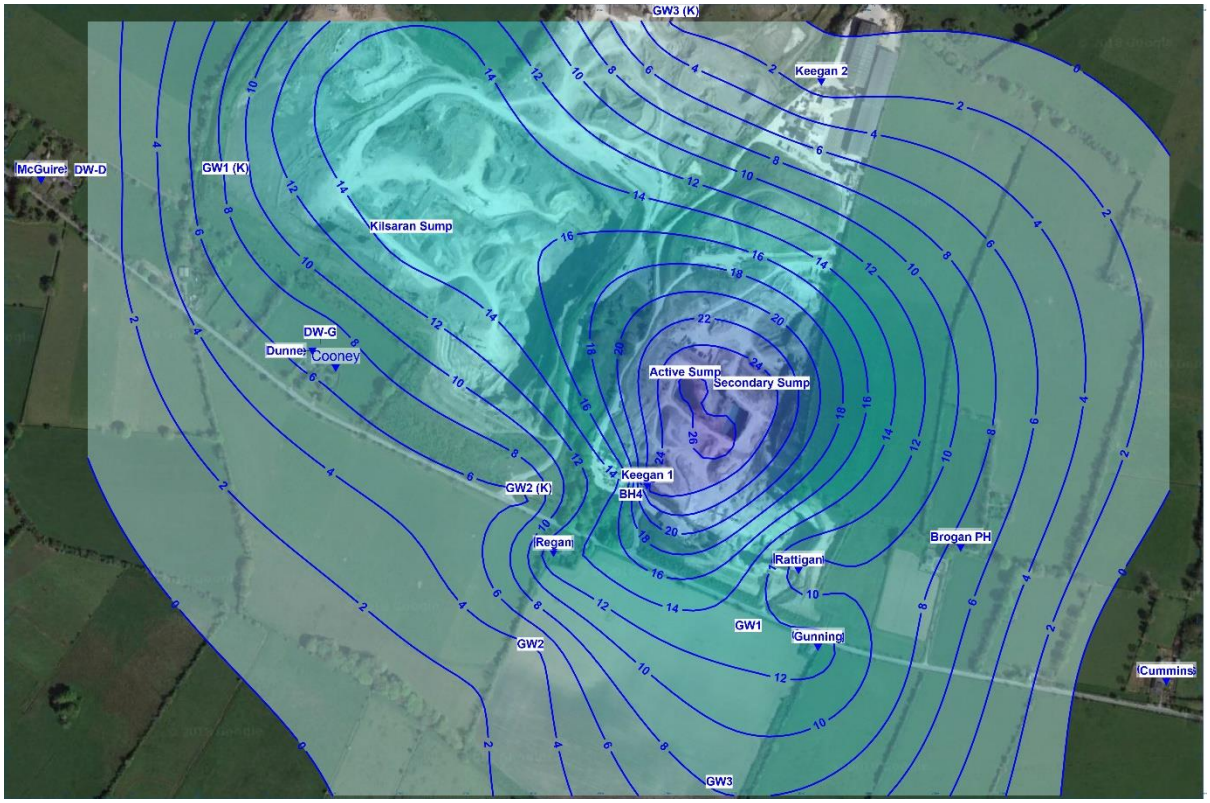


Figure 6.1 Illustration of the Cone of Depression from dewatering 2003-19.

From the data available, it is considered that the bulk of the drawdown had occurred between 2003 and 2009. This is consistent with the conceptual understanding of the limestone formations at this location, where “the majority of groundwater flow will occur in the upper 10m, comprising a weathered zone of a few metres and a connected fractured zone below this. Where the limestone is less karstified, the flow systems will be shallower and more diffuse”. Thus, the more extensive drawdown would be expected to have occurred when working the upper benches.

Groundwater quality samples were collected on 10th April 2019 at the following locations: Regan, Cummins, Brogan Shallow Chamber, Keegan 1, Keegan 2, GW1 and GW3. There is no evidence of any quarry-related impact upon groundwater quality at the Present Day.

6.4 Potential and Predicted Environmental Impacts / Effects

In proposing to advance westwards by 20-25 m, this will be working into the narrow spine of land separating the two quarries (the Applicant's quarry and Kilsaran's quarry), where the limestone strata will have already been dewatered as a result of being sandwiched between the deepest sinking in each quarry.

In terms of potential hydrological receptors, the northerly extension will involve working in closer proximity to Rathmolyon Stream. Any drawdown-related impact upon this stream would be counterbalanced by the consented discharge process, whereby (in a continuation of existing practice) water from the quarry sump will be directed into the at-risk section of stream in accordance with the Discharge Licence.

The current dewatering operation has involved suppressing groundwater level in the quarry void by some 40 m. The Proposed Development will involve an additional 14 m depth of dewatering at the quarry sump.

The cumulative radius of influence at Present Day, where the two quarries are taken together, is *circa* 400 m. This is based upon actual observed distance-drawdown readings, as measured at Site piezometers and local boreholes.

The best estimate of the predicted radius of influence at the proposed development is likely to be in the region of 550 m, which is about 150 m greater than that observed in the current quarry setting.

Given the hydrogeological characteristics of the Limestone Formations, the collection of further monitoring data (groundwater levels in the Site piezometers and local boreholes; and flow readings at the V-notch weir) will mean that these findings can be reviewed and refined as the development progresses.

The surface hydrology and ecology of the closest section of Tromman Stream (leading into the SAC-SPA) is not considered to be in continuity with the limestone aquifer. Full detail of the hydrological status of Tromman Stream is presented in the

SLR 2017 Appeal Submission to ABP (*Planning application ref: TA 170519. 1st Party Appeal of Conditions 2 & 36, SLR. Dated 10th April 2018*):

The geological profile recorded at Kilsaran's borehole DW-H demonstrates that "the Tromman Stream is underlain by glacial till, which in turn is underlain by unsaturated Shale bedrock. The watertable in the limestone bedrock is at depth and does not contribute to the baseflow of the Stream. There is no hydraulic continuity between the groundwater in the bedrock as encountered at the quarry, and the Tromman Stream. Therefore, the Tromman Stream and associated SAC will not be impacted by the drawdown of the groundwater table in the limestone bedrock at depth".

The protected section of the Tromman Stream is some 950 m standoff to the northwest of the Applicant's quarry. At this point, the two streams (Tromman and Rathmolyon) run parallel to each other, separated by a strip of farmland (less than 100m in width). There is no evidence of any connection between the two watercourses. The water being discharged from the quarries into Rathmolyon Stream does not merge with the protected section of Tromman Stream.

During storm events (if rainfall exceeds the capacity of the sump), there is temporary and shallow ponding across the deepest sinking. In the design storm (6-hour duration and 100-year return period) with the quarry at its maximum extent, the water would spread across a large part of the floor without exceeding 20-25 cm depth, although there would be local deepening at the sump. There is no risk of runoff from the quarry void escaping on to neighbouring land.

6.5 Mitigation of Impacts

The best estimate of the predicted radius of influence at the proposed development is likely to be in the region of 550 m, which is about 150 m greater than that observed in the current quarry setting. It is not possible to provide a more accurate quantification of the likely increase in drawdown at local water supplies because of the heterogeneity of the limestone formations.

In the event that a borehole is not meeting demand as a result of quarry-related dewatering drawdown, the fall-back position would be the provision of a replacement supply *e.g.* mains water; or a group scheme, with the option of installing a reservoir tank filled by quarry abstraction (subject to requisite treatment). The quarry operators would have to cover the costs for mains water usage at any property where the water supply is affected by the cumulative quarry development.

The operation of mobile and fixed plant presents a risk of pollutants entering groundwater as a result of hydrocarbon spillage or leakage on Site. Experience has demonstrated that the risk of such a pollution incident will continue to be minimised by adhering to the Oil Care Code (as described in the main report).

The implementation of the treatment systems, engineering measures and monitoring protocol advanced to protect groundwater quality will, in turn, serve to safeguard the surface water environment and water supplies.

The quarry operator will need to lodge an application to vary the existing licence in order to allow for an increased rate of dewatering in line with the Proposed Development.

The current licensed rate is 1,400 m^3/day (equivalent to 60 m^3/hr); the estimated ingress rate at the final development is in the region of 2,750 m^3/day (115 m^3/hr). The stream has been subject to appropriate assessment to confirm that it has sufficient capacity.

6.6 Residual Impacts

The pre-quarrying groundwater level is taken to be *circa* 65 maOD +/-2m.

At the time of restoration, quarry dewatering operations would be terminated and the quarry void would fill with water to form a lake.

It is considered that a lake level of some 65 maOD +/-2m (subject to seasonal variation) would be established within the abandoned workings.

If a borehole supply is failing to meet demand as a result of quarry dewatering, it is envisaged that the supply will be restored when the quarry is allowed to flood with water at the cessation of extraction. At this time, the quarry operators would no longer be responsible for the costs of supplying water to these properties.

However, the quarry operators would continue to be responsible for providing an alternative supply in the unlikely event that the well/borehole failed to recover when the quarry working is finished.

6.7 Conclusions

On the basis of baseline study and subsequent impact assessment, there are considered to be no over-riding hydrological or hydrogeological related reasons why the Proposed Development should not proceed in the manner described by the Application.

This conclusion assumes that any permission, if granted, should be conditioned by implementation and adherence to any relevant recommendations advanced within the full assessment and other such conditions that may be reasonably imposed by the Planning and Regulatory Authorities.

Examining the Inspector's Reports (ABP) relating to previous planning submissions at the Application Site and Kilsaran's Quarry, it is evident that the findings of the risk assessment need to be verified by committing to a comprehensive programme of hydrometric monitoring, which will be conducted throughout the operational life of the quarry.

Any shortfalls, highlighted by the previous ABP reports, have been addressed by expanding the hydrometric monitoring scheme that is now in operation.

7.0 AIR QUALITY & CLIMATE

7.1 Introduction

This Air Quality & Climate Impact Assessment has been prepared to accompany the planning application for the proposed further development of the 21.64Ha quarry site including the extraction of limestone from an area of 14.3Ha using conventional drilling and blasting techniques and mineral reduction using mobile crushing and screening to a depth of 13mAOD and the continuation of use of the ancillary works and structures referenced under substitute consent application PL17.305049 for the life of the quarry, and the restoration and rehabilitation of the whole quarry site.

This Air Quality & Climate Impact Assessment report has been prepared by Mervyn Keegan to be included as a standalone section within the larger EIAR . Mervyn Keegan is a Director of the environmental consultancy, AONA Environmental Consulting Ltd. Mervyn Keegan's areas of professional expertise are in Noise Control & Acoustics and Air Quality & Odour consultancy, including Air Quality & Climate impact assessment and mitigation design. Mervyn Keegan has over 20 years of environmental consultancy experience. Mervyn is a full member of the Institute of Acoustics, with a Bachelor of Science Degree (Applied Sciences), a Master of Science Degree (Environmental Science) and a Diploma in Acoustics in Noise Control. AONA Environmental Consulting Ltd. is an independent consultancy specialising in Environmental Impact Assessment and Licensing. Mervyn Keegan has prepared in excess of ten Noise & Vibration and Air Quality & Climate impact assessments annually for quarry developments in the Republic of Ireland, Northern Ireland and the UK in the last 15 years and is an expert in the awareness and understanding of the relevant legislation and guidance that pertains to best practise in such assessments. Mervyn Keegan has appeared as an Expert Witness at oral hearings, public inquiries and legal hearings. Mervyn Keegan has produced Noise, Air Quality & Odour Impact Assessment reports to assess the impacts of a range of development types including roads, residential developments, industrial developments, quarries and mines and wind energy developments among others.

The Air Quality & Climate Impact Assessment has addressed the further development of the 21.64Ha quarry site including the extraction of limestone from an area of 14.3Ha using conventional drilling and blasting techniques and mineral reduction using mobile crushing and screening to a depth of 13mAOD as well as emissions from the associated structures and the impacts of the adjacent Kilsaran operation.

The site is located in the townland of Tromman, 2.2 kilometres northwest of Rathmolyon Village and 6.4km south of the town of Trim. The site is bounded to the west by Kilsaran's Tromman Quarry, to the south by the regional road R156 and to the north and east by agricultural fields. The precise location of the site's application area can be seen from Figure 1.1.

7.2 Methodology

7.2.1 Impact Assessment Methodology

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

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

7.2.2 Relevant Guidelines & Standards

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

"There are currently no Irish statutory standards or EPA guidelines relating specifically to dust deposition thresholds for inert mineral/aggregate dust. (See, however, the Air Quality Standards Regulations 2002 for measurement standards). There are a number of methods to measure dust deposition (such as the Frisbee method) but only the German TA Luft Air Quality Standard relates a specific method (i.e. Bergerhoff) of measuring dust deposition with dust nuisance. On this basis it is recommended that the following TA Luft dust deposition limit value be adopted at site boundaries near quarry developments:
Total dust deposition (soluble and insoluble): 350 milligram per square metre per day (when averaged over a 30-day period).

Best practice dust control measures should be proposed by the applicant".

On the basis of the above, the following limits apply to the operation of the quarry and associated manufacturing activities and will continue to apply during the proposed development;

Total dust deposition (soluble and insoluble): 350 mg/m^2/day (when averaged over a 30-day period).

Planning Condition 15 of the Planning Permission Ref. TA/900976 requires the operator to monitor and record dust deposition levels. No dust deposition limits are specified.

7.2.3 Dust Deposition Impact Assessment

In quarries, dust typically becomes airborne due to the action of wind on material stockpiles and other dusty surfaces, or when thrown up by mechanical action, for example the movement of tyres on a dusty road or activities such as blasting, drilling, screening, etc. There are many types of particulate matter (PM) that are included in the definition of dust, including variations in terms of size and chemical composition.

A basic classification of particles may be made into those that are easily deposited and those that remain suspended in the air for long periods. This division is useful as

deposited dust is usually the coarse fraction of particulates that causes dust annoyance, whereas suspended particulate matter is implicated more in exposure impacts.

Airborne particles have a large range of diameters, from nano-particles and ultrafine particles (diameters less than 0.1µm) to the very large particles with diameters up towards 100µm. There is no clear dividing line between the sizes of suspended particulates and deposited particulates, although particles with diameters >50 µm tend to be deposited quickly and particles of diameter <10 µm have an extremely low deposition rate in comparison. Therefore, the size of suspended and deposited dust particles affects their distribution and as such requires two very different approaches to sampling these fractions.

Large particles (100µm diameter) are likely to settle within 5-10m of their source under a typical mean wind speed of 4-5 m/s, and particles between 30-100 µm diameter are likely to settle within 100m of the source. Smaller particles, particularly those <10 µm in diameter, have a greater potential to have their settling rate impeded by atmospheric turbulence and to be transported further from their source. Dust emissions are exacerbated by dry weather and high wind speeds. Therefore, the dust deposition impact depends on the wind direction and the relative location of the dust source and receptor.

PM_{10} is the fraction of airborne (suspended) PM which contains particles of diameter less than 10µm. PM_{10} includes all particles, of different sizes and types, which are relevant for potential health effects. PM_{10} can penetrate deep into the respiratory system increasing the risk of respiratory and cardiovascular disorders.

Dust emissions can arise as a result of operational activities, and /or wind erosion of exposed surfaces. The amount of dust that is raised is highly dependent upon a number of interrelated factors, which include:

- The nature of the material;
- The prevailing meteorological conditions;
- The activities being undertaken;
- The influence of any on site mitigation measures.

The British Research Establishment (BRE) has previously published guidelines for ambient background dust deposition rates in different types of districts as follows;

Table 7.1: British Research Establishment guidelines for ambient background dust deposition rates in different types of districts.

Type of District	**Dust Deposition Rate (mg/m^2/day)**
Major city centre, heavy industrial area	1,040
Highly developed large urban area	520
Urban area of limited size with parkland or largely rural surroundings	260
Partially developed area	180
Rural area with little development	130

The immediate area around the Tromman Quarry site can be categorised as a “rural area with little development”/ “partially developed area”. Therefore, it is considered that it is reasonable to assume that the background dust deposition rates for such areas range up to approximately 130 mg/m^2/day.

The prevailing meteorological conditions are the most significant issue which will affect the rate of dust deposition outside of the boundary of a quarry and its associated activities. Therefore, it can be assumed that during the drier months of the year, there is the potential for dust deposition rates to be higher than the annual average dust deposition rate. In order to establish an accurate existing baseline dust deposition level in the area, a 12 month dust deposition survey typically needs to be carried out. Also, as the existing quarry has been in operation in the area for in

excess of 20 years, the existing baseline dust deposition level may be elevated above the normal rural levels. Tromman Quarry has been undertaking continuous dust deposition monitoring in accordance with the requirements of previous planning consents.

7.2.4 Dust Deposition Monitoring Methodology

The dust deposition monitoring locations in proximity to the Tromman Quarry have been determined after consideration of the requirements of German Standard Method VDI 2119 – *'Measurement of Dustfall, Determination of Dustfall using Bergerhoff Instrument (Standard Method) German Institute)*'. Gauges were installed in consideration of requirements relating to location of the gauges relative to buildings and other obstructions, height above ground and sample collection and analysis procedures. Dust deposition monitoring is continuously undertaken using Bergerhoff glass deposition gauges at four monitoring locations at the entrance. Figure 7.1 illustrates the dust deposition monitoring locations.

Figure 7.1: Dust deposition monitoring locations (DDML).

The dust deposition monitoring surveys have been undertaken by Byrne Environmental since 2013 in accordance with the procedure in Standard Method VDI 2119 – *'Measurement of Dustfall, Determination of Dustfall using Bergerhoff Instrument (Standard Method) German Institute'*. The dust deposition monitoring surveys comprise of positioning of four Bergerhoff Dust Deposit Gauges at the locations described for a period of 30 (+- 2) days. After the exposure period is complete, the gauges are removed from the site and transported to an accredited laboratory under a strict chain of custody for analysis. The samples are evaporated down and the dry residue, and the total dust content determined gravimetrically and the result reported in mg/sample. Results are expressed as a dust deposition rate in $mg/m^2/day$ in accordance with the relevant standard.

7.3 Assessment of Baseline Conditions

7.3.1 Baseline Air Quality Data

The background air quality in the area of the development is recognised to be of very good quality and the site is located in the 'Zone D' area, as denoted by the EPA. The EPA has divided the country into zones for the assessment and management of air quality. The zones adopted in Ireland are Zone A, the Dublin conurbation; Zone B, the Cork conurbation; Zone C, comprising 21 large towns in Ireland with a population >15,000; and Zone D, the remaining area of Ireland. Concentrations of air quality pollutants in Zone D are very low and well below the relevant air quality limit values.

There are no other significant air pollutant sources in the area other than the Keegan Quarries Ltd. Tromman Quarry and the Kilsaran Quarries, also referred to as Tromman Quarry directly adjacent to the target site. Background air quality is most likely to be typical rural areas influenced by existing local traffic and agricultural activities, etc.

The Environmental Protection Agency's Air Quality Index for Health (AQIH) provides a scaled number from one to ten that identifies the current air quality currently in a region and whether or not this might affect human health. A reading of ten means the air quality is very poor and a reading of one to three inclusive means that the air quality is good. The AQIH indicates that the area surrounding the Tromman Quarry site is in an area of good air quality.

Rural East	Towns with population less than 5,000, villages and rural areas in Counties Carlow, Cavan, Dublin, Kildare, Kilkenny, Laois, Longford, Louth, Meath, Monaghan, Offaly, Tipperary, Waterford, Westmeath, Wexford and Wicklow.	Corresponds to part of Zone D

Based on the Environmental Protection Agency's Air Quality in Ireland Report 2016, the following background concentrations are likely in the area;

- Nitrogen dioxide (NO_2) – Zone D Average ~ 10 µg/m^3 – Limit Value 40 µg/m^3
- Sulphur dioxide (SO_2) – Zone D Average <5 µg/m^3 – Limit Value 20 µg/m^3 (for the protection of vegetation)
- Particulate Matter (PM_{10}) – Zone D Average ~ 15 µg/m^3 – Limit Value 40 µg/m^3
- Particulate Matter ($PM_{2.5}$) – Zone D Average ~ 8 µg/m^3 – Limit Value 25 µg/m^3

7.3.2 On-going Dust Deposition Monitoring Results

The dust deposition rates outlined below are the same as presented in the Air Quality & Climate Impact Assessment that has been prepared to accompany a Remedial Environmental Impact Assessment Report for an application for Substitute Consent (the Application) at Keegan Quarries Ltd., Tromman, Rathmolyon, Co. Meath.

The surrounding lands can be characterised as rural in nature with land uses in the area identified as agricultural, extractive and single house residential. The extractive industry is an established land use in the surrounding area dominated by the subject site and the adjoining Kilsaran Quarry which borders the Tromman Quarry site to the west. As outlined in Table 7.2, since 1st Quarter 2013, there has been no exceedance of the 350 mg/m^3/day limit value recorded during the dust deposition surveys. The average dust deposition rate is well below the assessment limit for ambient dust impact of 350 mg/m^2/day. This dust deposition monitoring data includes the cumulative impact of the dust from the adjoining Kilsaran Quarry.

Table 7.2: Quarterly Dust Deposition monitoring survey results since 1st Quarter 2013 until the 3rd Quarter of 2018 at Keegan Quarries Ltd., Tromman, Rathmolyon, Co. Meath.

Period	Date	D1 (South)	D2 (East)	D3 (West)	D4 (North)
Qtr 1 2013	07/01/2013-07/02/2013	89	125	98	<45
Qtr 2 2013	03/06/2013-03/07/2013	88	64	172	49
Qtr 3 2013	02/09/2013-03/10/2019	<88	98	98	98
Qtr 4 2013	05/11/2013-03/12/2013	89	110	116	179
Qtr 1 2014	03/02/2014-03/03/2014	<53	<53	<53	<53
Qtr 2 2014	21/04/2014-21/05/2014	49	74	108	54
Qtr 3 2014	02/09/2014-02/10/2014	<49	<49	<49	<49
Qtr 4 2014	05/11/2014-04/12/2014	63	95	<51	52
Qtr 1 2015	17/01/2015-17/02/2015	<53	<53	<53	<53
Qtr 2 2015	18/05/2015-18/06/2015	<49	59	<49	137
Qtr 3 2015	01/09/2015-30/09/2015	<49	93	79	54
Qtr 4 2015	30/09/2015-30/10/2015	<49	<49	<49	<49
Qtr 1 2016	01/03/2016-01/04/2016	<48	<48	<48	<48
Qtr 2 2016	01/06/2016-30/06/2016	123	79	<49	<49
Qtr 3 2016	30/06/2016-26/07/2016	<57	<57	<57	<57
Qtr 4 2016	03/10/2016-03/11/2016	<48	<48	<48	<48
Qtr 1 2017	01/03/2017-30/03/2017	<51	<51	<51	<51
Qtr 2 2017	02/05/2017-03/06/2017	<46	<46	<46	<46
Qtr 3 2017	02/08/2017-1/09/2017	<49	<49	<49	<49
Qtr 4 2017	01/10/2017/-01/11/2017	<48	<48	<48	<48
Qtr 1 2018	04/01/2018-04/02/2018	<48	<48	152	124
Qtr 2 2018	04/05/2018-05/06/2018	<46	<46	<46	<46
Qtr 3 2018	02/07/2018-02/08/2018	48	62	214	76
Limit Value		**350 mg/m^2/day**			

7.4 Existing Air Quality & Dust Impacts

7.4.1 Existing Manufacturing Impacts

The results of the quarterly dust deposition surveys incorporate dust deposition impacts from the associated manufacturing installations. The results of the quarterly dust deposition surveys, primarily at DDML 4 assess the dust deposition impact from

the northern area of the Tromman Quarry site, including the cumulative impact from the adjoining Kilsaran Quarry. This allows for the assessment of the present site layout with the erection of the pre-cast manufacturing unit on the eastern side of the concrete yard and the internal arrangement of the concrete block making yard and storage, reverting to its existing central location. No dust deposition results in excess of 350 mg/m^2/day were recorded in or adjacent to this location in the last 5 years.

7.4.2 Existing Quarrying Impacts

The results of the quarterly dust deposition surveys address the existing extraction operations that post-date the extended appropriate period for the quarrying operations that Meath County Council consider to be unauthorised. The results of the quarterly dust deposition surveys, primarily at DDML 1, 2 and 3, including the cumulative impact from the adjoining Kilsaran Quarry, assess the dust deposition impact from the quarry area of the Tromman Quarry site. No dust deposition results in excess of 350 mg/m^2/day were recorded at these locations in the last 5 years.

7.4.3 Existing Cumulative Impacts

The results of the quarterly dust deposition surveys at DDML 1, 2, 3 and 4, including the cumulative impact from the adjoining Kilsaran Quarry, address the quarry extraction operations that post-date the extended appropriate period for the quarrying operations that Meath County Council consider to be unauthorised and the associated industrial structures and operations in the northern area of the site. No dust deposition results in excess of 350 mg/m^2/day were recorded at these locations in the last 5 years.

7.5 Predicted Impacts from the Proposed Development

The assessment to consider the impacts that can be expected to occur in the future as a result of the further development of the 21.64Ha quarry site including the

extraction of limestone from an area of 14.3Ha using conventional drilling and blasting techniques and mineral reduction using mobile crushing and screening to a depth of 13mAOD is outlined below. This considers the significant effects, or impacts, that can reasonably be expected to occur as a result of further quarrying and the continued operation of the ancillary structures and buildings. It is envisaged that the proposed continuation of use of the site together with the proposed development, in line with the environmental parameters previously assessed, would continue to be environmentally acceptable.

It is reasonable to suggest that there would be no change anticipated from the continuation of the associated manufacturing operations on the site, i.e. existing dust deposition rates will remain the same.

The extraction of limestone from an area of 14.3Ha using conventional drilling and blasting techniques and mineral reduction using mobile crushing and screening to a depth of 13mAOD with associated HGV traffic movements as per the current rates of extraction is likely to result in similar dust deposition rates in proximity to the quarry site. If anything, it is reasonable to expect that future dust deposition rates should be lower as the development descends to lower depths allowing for increased attenuation of windblown dusts by higher quarry walls.

Wind speed and direction have the greatest potential impact on dust deposition impacts in proximity to the site. The predominant wind direction is from the south-west quarter, with winds from the south to west direction occurring most frequently. The properties to the north-east of the site, i.e. downwind of the prevailing wind direction are in excess of 1 Km away from the quarry void and therefore, highly unlikely to experience a dust nuisance impact at such distances.

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

and surrounding vegetation. Therefore, the risk of nuisance dust impacts occurring is considered unlikely.

The cumulative dust deposition impacts from the associated structures in the northern area of the Tromman Quarry site, the adjacent Kilsaran Quarry dust emissions and the proposed extraction operations have been assessed. The dust deposition impacts are most unlikely to result in an exceedance of the 350 mg/m^2/day limit at the Tromman Quarry boundary locations.

Dust deposition impacts from de-commissioning of the quarry site including the regrading of the benches in the existing extraction area and subsequent infill with groundwater may result in short-term dust deposition impacts. Such activities will include movement of overburden, internal bund construction, restorative planting works, de-commissioning of plant and equipment, etc. Typically, such works will be carried out during an 8 week window per annum. These short-term works will be implemented in accordance with the proposed restoration concept for the site.

7.6 Mitigation Measures

The following dust mitigation measures are employed to minimise operational impacts. The aim of these mitigation measures is to minimise the release of dust to the environment. Outlined in detail below are the dust suppression measures which are currently employed, and will continue to be employed, at the Tromman Quarry site.

7.6.1 Operating and Dust Mitigation Measures:

The site manager has overall responsibility for insuring that operations within the Tromman Quarry site comply with the requirements of any planning authorisation. The site has at its disposal a suitable water bowser and associated water supply to allow for dampening down of the site when windblown dust from its surface arises. This is in very regular use on site. The occurrence of potential wind-blown dust is

weather dependent but suitable facilities are available to minimise windblown dust from the site surfaces.

Dust mitigation measures are undertaken in accordance with the Environmental Management System for Keegan Quarries Ltd. Trammon Quarry dated August 2019, as prepared by Byrne Environmental. Section 4.5 Air Quality of the EMS outlines dust and air quality mitigation measures that are adhered to on site.

7.6.2 Access Roads, Site Roads and Vehicles Loading Activities & Movements:

The objective of these procedures is to minimise the creation and release of dust generated by transportation activities carried out during both access to and movements within the site. This includes minimising dust from transport vehicles entering and leaving the facility.

- Regular attention is paid to cleaning dust material from all roadways, hard surfaced areas and working areas of the facility. Dust from cleanup is re-incorporated into the stockpile. This is done during every lull in operations and at the end of each working period.
- Roadways and other areas where vehicles are regularly moving are kept clean, by sweeping or by wetting;
- When loading vehicles, the following procedures are adhered to:
    - No overloading of vehicles or containers resulting in either peaks of cargo or overspill onto the working areas or roadways.
    - Keep fall heights of the material into the transport vehicles to a minimum.
- Strictly applied, suitable on-site speed limits are set, displayed and observed for the movement of all vehicles (10 mph)
- A suitable underbody and wheel wash is provided. This is surrounded by a smooth hard surface extending to the site exit. All vehicles pass through and spend sufficient time for effective cleaning in the washing facility before

leaving the site. Supervision is provided to ensure that this is carried out effectively.

7.6.3 Stockpiling Operations

The aims of these procedures are to ensure that materials are stockpiled only within the designated process working areas and any release of dust to atmosphere is minimised.

- Stockpiling and offloading operations to the processing plant and equipment is co-ordinated in such a way as to minimise the potential for double handling of material.
- Unloading of materials within the facility is carefully planned to ensure minimum exposure to winds, thereby reducing dust emission to air.
- The aims of the stockpiling procedure is to ensure that management of the stockpile is conducted in such a way that releases of dust to atmosphere are minimised.
- Stockpile areas are clearly and physically delineated to deter vehicles from running over mineral extract at the stock edge.
- Stockpiles are managed to ensure that the profile of material will minimise wind whipping.
- During any stockpiling, stockpiles are profiled and compacted by flattening out peaks and ridges and when partially worked, are re-contoured to prevent ridges or overhanging falls.
- Whenever possible, settled stockpiles are not be broken into when the wind is likely to lift newly exposed dry dust. When this is unavoidable, effective dust control methods are implemented.
- Prior to carrying out any stock handling operations, the dust suppression equipment is checked to ensure that it is working properly.

7.6.4 Monitoring & Reporting

- A high standard of housekeeping is maintained on site.
- Systems for monitoring processes, responding to and reporting pollution incidents have been devised. This information is kept in a logbook, together with information regarding equipment failure, periods of significant dust emissions off-site and the inspection of roadways, together with any remedial action taken.
- Any complaints received from neighbouring properties are logged and appropriate actions taken to reduce the potential for further complaint.

7.7 Monitoring

Dust monitoring will continue to be carried out on a quarterly basis by Byrne Environmental at the existing monitoring locations, previously agreed with the Planning Authority. If the level of dust is found to exceed the dust deposition limits as outlined above as 350 mg/m^2/day, at the perimeter of the site, immediate action will be taken, and additional mitigation measures will be incorporated to control any dust emission.

7.8 Conclusion

The potential for any dust arising from the proposed extraction of limestone using conventional drilling and blasting techniques and mineral reduction using mobile crushing and screening to a depth of 13mAOD with associated HGV traffic movements as per the current rates of extraction at the Tromman Quarry site has been assessed. It is considered that the potential for nuisance impact has been and is limited to the immediate vicinity of the existing activities, even without dust suppression measures in operation, because of the quarried materials predominantly coarse nature. The potential for nuisance dust impacts is considered to be negligible at the nearest sensitive receptors and dust deposition monitoring results of the existing exposed quarried surfaces and associated industrial activities to the north of

the site indicate very low dust deposition levels at the site entrance and along the site boundary.

The impacts that have occurred, are occurring and will occur with the proposed extraction of limestone using conventional drilling and blasting techniques and mineral reduction using mobile crushing and screening to a depth of 13mAOD with associated HGV traffic movements as per the current rates of extraction at the Tromman Quarry have been assessed and do not give rise to any significant environmental impact. Given that ongoing monitoring has confirmed operations consistently have cumulatively operated below the guideline figure provided for in the DOEHLG 2 004 recommended levels, it is considered reasonable to predict that the further quarry and ancillary operations within the existing site footprint, albeit at greater depths will continue to comply with the outlined limits.,.

Any residual dust deposition impacts resulting from the future de-commissioning and restoration of the quarry will be of a short duration and all potential dust impacts from the Tromman Quarry site are considered to be reversible i.e. the risk of impact will cease on completion of quarrying and restoration of the site. This outcome has been previously assessed and remains valid within the proposed restoration concept.

8.0 NOISE AND VIBRATION

8.1 Introduction

This Noise & Vibration Impact Assessment has been prepared to accompany the planning application for the proposed further development of the 21.64Ha quarry site including the extraction of limestone from an area of 14.3Ha using conventional drilling and blasting techniques and mineral reduction using mobile crushing and screening to a depth of 13mAOD and the continuation of use of the ancillary works and structures referenced under substitute consent application PL17.305049 for the life of the quarry, and the restoration and rehabilitation of the whole quarry site.

This report has been prepared by Mervyn Keegan to be included as a standalone section within the larger EIAR. Mervyn Keegan is a Director of the environmental consultancy, AONA Environmental Consulting Ltd. Mervyn Keegan's areas of professional expertise are in Noise Control & Acoustics and Air Quality & Odour consultancy, including impact assessment and mitigation design. Mervyn Keegan has over 20 years of environmental consultancy experience. Mervyn is a full member of the Institute of Acoustics, with a Bachelor of Science Degree (Applied Sciences), a Master of Science Degree (Environmental Science) and a Diploma in Acoustics in Noise Control. AONA Environmental Consulting Ltd. is an independent consultancy specialising in Environmental Impact Assessment and Licensing. Mervyn Keegan has prepared in excess of ten Noise & Vibration and Air Quality & Climate impact assessments annually for quarry developments in the Republic of Ireland, Northern Ireland and the UK in the last 15 years and is an expert in the awareness and understanding of the relevant legislation and guidance that pertains to best practise in such assessments. Mervyn Keegan has appeared as an Expert Witness at oral hearings, public inquiries and legal hearings. Mervyn Keegan has produced Noise, Air Quality & Odour Impact Assessment reports to assess the impacts of a range of development types including roads, residential developments, industrial developments, quarries and mines and wind energy developments among others.

The Noise & Vibration Impact Assessment has addressed the further development of the 21.64Ha quarry site including the extraction of limestone from an area of 14.3Ha using conventional drilling and blasting techniques and mineral reduction using mobile crushing and screening to a depth of 13mAOD as well as noise from the associated structures included within the previous substitute consent application and the impacts of the adjacent Kilsaran operation.

The site is located in the townland of Tromman, 2.2 kilometres northwest of Rathmolyon Village and 6.4km south of the town of Trim. The site is bounded to the west by Kilsaran's Tromman Quarry, to the south by the regional road R156 and to the north and east by agricultural fields. The precise location of the site's application area can be seen from Figure 1.1.

8.2 Methodology

8.2.1 Impact Assessment Methodology

The assessment of the noise and vibration impacts has been undertaken as follows:

- Reference to historical noise and vibration surveys at the nearest noise sensitive locations, to establish the current ambient noise levels in the area (See above).
- Noise levels have been recorded in close proximity to the existing concrete manufacturing and quarrying activities on-going in the existing Tromman Quarry site. Subsequently, an accurate sound power level for these sources has been determined to allow for accurate noise prediction modelling
- A prediction of the specific noise levels at the surrounding residential properties from the existing and proposed concrete manufacturing and quarrying activities at the Tromman Quarry site using CadnaA noise prediction software.

- A comparison of the measured existing noise levels at N1 and N2 and the predicted noise levels at the surrounding residential properties (Noise Sensitive Receptors [NSR's]) against relevant guidelines.

The Figures referenced throughout this section constitute a important element of the assessment and as such are held in Appendix 8.1 separate to the section to allow for ease of access to the reader, that the text and the visual analysis can be viewed side by side, much in the same way as having two screens on a PC.

8.2.2 Relevant Guidelines & Standards

The noise and vibration impact assessment has been undertaken with regard to the following established standards and guidelines to determine the impact of the proposed Tromman Quarry site activities on the surrounding noise environment and assess for the potential for noise disturbance at existing noise sensitive receivers in the locality:

- Quarries and Ancillary Activities, Guidelines for Planning Authorities, April 2004, Department of the Environment, Heritage and Local Government. (DoEHLG Guidance)
- Environmental Management Guidelines Environmental Management in the Extractive Industry (Non-Scheduled Minerals), Environmental Protection Agency (2006).
- EPA – Guidelines on the Information to be Contained In Environmental Impact Assessment Reports - Draft August 2017

The Quarries and Ancillary Activities, Guidelines for Planning Authorities states that following with regard to the control of noise and blasting;

'Control of noise: Noise-sensitive uses in the vicinity of a quarry, such as dwellings, schools, hospitals, places of worship or areas of high amenity, require that the amount of noise be minimised. The sensitivity to noise is usually greater at night-time (20.00 to 08.00) than during the day, by about 10 dB(A). Many quarries are situated in areas of low background noise and it is appropriate to consider this when setting

noise limits. In general, it can be expected that complaints will result where the noise from quarrying and associated activities are between 5 to 10 dB above the background noise levels. In areas of higher background noise levels, the EPA recommends that ideally, if the total noise level from all sources is taken into account, the noise level at sensitive locations should not exceed a L_{Aeq} (1 hour) of 55 dB(A) by daytime and a L_{Aeq} (15 minutes) of 45 dB(A) by night-time. Audible tonal or impulsive components in noise emissions (e.g. the reversing siren on a lorry, required for safety reasons) can be particularly intrusive, and such components should be minimised at any noise-sensitive location.

It may be necessary to raise the noise limits to allow temporary but exceptionally noisy phases in the extraction process, or for short-term construction activity which cannot meet the limits set for routine operations, e.g. the construction of baffle mounds, which bring long-term environmental benefits.

The developer may be required to carry out noise surveys to measure noise levels at the site boundary near sensitive locations, as agreed in advance with the planning authority. Surveys should be carried out in accordance with the EPA's "Environmental Noise Survey – Guidance Document" (2003). Noise monitoring should be carried out on a quarterly basis (or as otherwise agreed), and commenced prior to the commencement of development. The results should be reported to the planning authority within 3 weeks (or as agreed). 95% of all noise measured shall comply with the specified limit values. No individual noise measurement should exceed the limit values by more than 2 dB(A).

Control of blasting: Nearby residents (e.g. within 500 meters) need to be given advance notice when blasting operations are due to take place, which should only be carried out between 09.00 and 18.00 hours, Monday to Friday (except in emergencies or for health and safety reasons beyond the control of the developer). Similarly, such residents should be given the "all clear" signal by means of sirens or other agreed measures when blasting has been completed.

The EPA recommends that to avoid any risk of damage to properties in the vicinity of a quarry, the vibration levels from blasting should not exceed a peak particle velocity of 12 millimeters per second as measured at a receiving location when blasting

occurs at a frequency of once per week or less. In the rare event of more frequent blasting, the peak particle velocity should not exceed 8 millimeters per second. The nature of the underlying rock can influence the way blast vibrations are transmitted through the ground to locations outside the site, so it is important that such information (including predicted vibration levels in adjacent noise-sensitive receptors) be submitted with the planning application where relevant.

Blast noise is characterised by containing a large proportion of its energy within a frequency that is below the normal hearing range and is therefore termed "air overpressure." The EPA recommends that blasting should not give rise to air overpressure values at the nearest occupied dwelling in excess of 125 dB(Lin)$_{max.\ peak}$ with a 95% confidence limit.

The developer should carry out blast monitoring (groundborne vibration and air overpressure) for each blast. The monitoring locations should be as agreed within the planning authority and shall be established prior to the commencement of blasting. The results should be reported to the planning authority on a regular agreed basis. Groundborne vibration levels measured at the nearest occupied dwelling should not exceed the specified limit values. 95% of all air overpressure levels measured at the nearest occupied dwelling shall conform to the specified limit value. No individual air overpressure value should exceed the limit value by more than 5 dB(Lin)'.

As outlined in the Environmental Management Guidelines Environmental Management in the Extractive Industry (Non-Scheduled Minerals), Environmental Protection Agency (2006), the Environmental Protection Agency (EPA) has produced a Guidance Note for Noise in Relation to Scheduled Activities (EPA, 1996). It deals in general terms with the approach to be taken in the measurement and control of noise, and provides advice in relation to the setting of noise Emission Limit Values (ELV) and compliance monitoring. In relation to quarry developments and ancillary activities, it is recommended that noise from the activities on site shall not exceed the following noise ELVs at the nearest noise-sensitive receptor:

- Daytime: 08:00–20:00 h $L_{Aeq\ (1\ h)}$ = 55 dB(A)
- Night-time: 20:00–08:00 h $L_{Aeq\ (1\ h)}$ = 45 dB(A)

Note:

- 95% of all noise levels shall comply with the specified limit value(s). No noise level shall exceed the limit value by more than 2 dB(A).
- On-site activities should be permitted during night-time hours where they comply with the noise ELVs (e.g. heating up of asphalt plants, loading of materials).
- Where existing background noise levels are very low, lower noise ELVs may be appropriate.
- Audible tones or impulsive noise should be avoided at night.
- It is also appropriate to permit higher noise ELVs for short-term temporary activities such as construction of screening bunds, etc., where these activities will result in a considerable environmental benefit.
- In relation to blasting activities within quarry development, it is recommended that the following vibration and air overpressure ELVs are adopted and applied at the nearest vibration and air overpressure sensitive location (e.g. a residential property):

  Ground-borne vibration: Peak particle velocity = 12 mm/s, measured in any of the three mutually orthogonal directions at the receiving location (for vibration with a frequency of less than 40 Hz)

  Air overpressure: 125 dB (linear maximum peak value), with a 95% confidence limit.
- Normal hours of blasting should be defined (e.g. 09:00–18:00 h Monday to Friday), and provision should be included to permit blasting outside these hours for emergency or safety reasons beyond the control of the quarry operator.
- It is recommended that quarry operators provide advance notification of blasting to nearby residents through use of written notes, signage at site entrance, telephone, or warning sirens (or a combination of these methods).

On the basis of the above, the following noise limits are suggested to be retained for the further operation of the quarry site, including the extraction of limestone from an area of 14.3Ha using conventional drilling and blasting techniques and mineral reduction using mobile crushing and screening to a depth of 13mAOD as well as noise from the associated structures and the impacts of the adjacent Kilsaran operation.

***The equivalent sound levels attributable to all on-site operations associated with the development shall not exceed 55 dB(A) L_{eq} over a continuous one hour period between 0700 hours and 1900 hours on Monday to Friday inclusive, and 0700 hours and 1400 hours on Saturday, when measured at any noise sensitive receptor. Sound levels shall not exceed 45 dB(A) at any other time*.**

8.2.3 CadnaA Noise Prediction Modelling Methodology

CadnaA has been developed to allow detailed noise predictions to be undertaken in accordance with:

- ISO 9613-2:1996 Acoustics – Attenuation of sound during propagation outdoors – Part 2 General methods of calculation.
- BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites. Noise

The CadnaA noise prediction model allows for noise from all sources entered into the model to be undertaken simultaneously. The noise model can take topographical effects, ground absorption, screening effects, reflections and focusing effects, among others, into consideration. The modelling software calculates noise levels based on the emission parameters and spatial settings that are entered. The model calculates the propagation of the sound from each noise source and produces a noise level contour map and graphics in proximity to a facility with colour coded noise level contours. Model parameters, sources, and settings have been incorporated into the

model as detailed in Table 8.1. The noise model has been produced to verify the noise readings taken on the existing Tromman Quarry site and confirms that the model is representative of the current on site operations and provides an accurate verifiable prediction at all noise sensitive receptors in the vicinity of the existing Tromman Quarry site. Thus, the noise prediction model provides an appropriate level of confidence when assessing specific noise impact from the proposed development of the Tromman Quarry site.

On 7th February 2019, a site noise survey was undertaken with source specific noise level readings taken in close proximity to the main noise sources on the existing Tromman Quarry site, which will continue to operate during the proposed development. This allowed for the generation of accurate sound power levels for all main noise sources on the site. For the purposes of noise impact assessment, the Sound Power level (L_W) was determined by measuring the Sound Pressure Level (L_P) at a specific distance from the noise source and assuming a Directivity Index (Q) of 2, i.e. hemispherical propagation, using the following equation;

$$L_W = L_p + \left|10 \cdot \log\left(\frac{Q}{4\pi \cdot r^2}\right)\right|$$

Table 8.1: Modeling Parameters, Sources and Assumptions

Parameter	Source	Details
Horizontal distances – Quarry and surrounding area	Quarryplan	Scaled drawings in AutoCAD format.
Quarry Dimensions	Quarryplan	Scaled drawings in AutoCAD format.
Receiver Locations	AONA Environmental	In outdoor amenity areas adjacent to nearest residential properties @ 1.5m height.
Plant types, location & Sound Power Level	Quarryplan / site operator.	Source noise measurements were undertaken in close proximity to plant and equipment and within buildings on site. This allowed for an accurate Sound Power Level L_w to be assigned to active plant.

Ground Absorption	AONA Environmental	A Ground Absorption Rate – G = 0.5 has been used in the model, which is appropriate for the surrounding land type.

8.3 Assessment of Baseline Noise & Vibration Conditions

8.3.1 On-going Noise Compliance Monitoring

Table 8.2 summarises the noise monitoring surveys that have been undertaken from 2013 until 2019 by Byrne Environmental at Tromman Quarry. The noise monitoring surveys were carried out to record and assess the noise impacts that the quarry site activities have on the local receiving noise environment and to assess compliance with site relevant Planning Conditions *(Planning Permission Ref. TA/900976 Condition 12).* The noise monitoring surveys have been conducted in accordance with *ISO 1996-2, 2017 Acoustics – Description, Measurement and Assessment of Environmental Noise* and with reference to the 2016 EPA publication, *"Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4).*

The Tromman Quarry site is located in the townland of Tromman approximately 2.2 km west of Rathmolyon village set back from the R156 Regional Road. The surrounding lands can be characterised as rural in nature with land uses in the area identified as agricultural, extractive and single dwelling houses (residential). The extractive industry is an established land use in the surrounding area dominated by the subject site and the adjoining Kilsaran Quarry which borders the Tromman Quarry site to the West.

Condition 12 of Planning Permission Ref. TA/900976 states that *"site noise shall not exceed 55dB(A) $L_{Aeq,T}$ during 08:00hrs – 18:00 hrs Monday to Saturday and 45 dB(A) $L_{Aeq,T}$ at any other time when measured at any noise sensitive premises in the locality". This is an absolute limit that is applied to all extractive sites and is taken from the Guidelines Quarries and Ancillary Works etc*

The recorded $L_{Aeq,T}$ values at N1 and N2 at the boundary of the Tromman Quarry site from 2013 until 2019 consistently comply with the specified limit value and are consistent with previous noise survey results. Typically at N1 and N2, the subjective commentary states either *'Quarry noise faintly audible'* or *'Quarry noise not audible'* at N1 and N2. Therefore, it is confirmed that the existing quarrying and concrete manufacturing operations at the Tromman Quarry, to include the operations of the ancillary works and structures referenced under application PL17.305049 for the life of the quarry are not having a significant noise impact at the nearest residential properties to the site. The noise monitoring at this location is inclusive of the cumulative noise impacts from the Tromman Quarry site and Kilsaran Quarry directly adjacent to the Tromman Quarry site and conversely the data that Kilsaran have provided reflects the Keegan operations, as presented below.

Table 8.2: Noise monitoring survey results from 2013 until 2019 at Keegan Quarries Ltd., Tromman, Rathmolyon, Co. Meath.

Period	Location	Date	Time	$L_{Aeq, 60min}$	$L_{A90, 60min}$	$L_{A10, 60min}$	Notes
Qtr 1 2013	N1	07/02/2013	14:30	48	44	52	Quarry noise faintly audible
	N2	07/02/2013	15:45	57	50	59	Quarry noise not audible
Qtr 2 2013	N1	27/06/2013	10:35	49	44	55	Quarry noise faintly audible
	N2	27/06/2013	11:45	55	52	63	Quarry noise not audible
Qtr 3 2013	N1	03/09/2013	15:15	49	40	51	Quarry noise faintly audible
	N2	03/09/2013	14:00	56	48	60	Quarry noise not audible, Road traffic dominant
Qtr 4 2013	N1	02/12/2013	14:35	47	39	51	Quarry noise faintly audible
	N2	02/12/2013	16:00	54	48	62	Quarry noise not audible, Road traffic dominant
Qtr 1 2014	N1	03/02/2014	12:00	53	43	59	Quarry noise faintly audible
	N2	03/02/2014	10:10	50	45	57	Quarry noise not audible
Qtr 2 2014	N1	10/06/2014	15:30	55	47	64	Quarry noise faintly audible
	N2	10/06/2014	13:45	53	48	61	Quarry noise audible
Qtr 3 2014	N1	02/09/2014	10:10	53	43	63	Quarry noise faintly audible
	N2	02/09/2014	11:25	55	49	68	Quarry noise audible
Qtr 4 2014	N1	24/11/2014	14:15	54	50	62	Quarry noise faintly audible
	N2	24/11/2014	15:30	56	51	65	Quarry noise audible
Qtr 1 2015	N1	17/02/2015	09:10	50	41	60	Quarry noise faintly audible
	N2	17/02/2015	10:35	53	46	63	Quarry noise audible
Qtr 2 2015	N1	18/06/2015	14:00	59	38	62	Quarry noise not audible
	N2	18/06/2015	14:10	53	39	60	Quarry noise faintly audible

Qtr 3 2015	N1	30/09/2015	16:45	60	45	65	Quarry noise not audible
	N2	30/09/2015	15:10	54	44	61	Quarry noise faintly audible
Qtr 4 2015	N1	30/10/2015	11:05	58	48	63	Quarry noise not audible
	N2	30/10/2015	09:50	52	46	60	Quarry noise faintly audible
Qtr 1 2016	N1	01/03/2016	08:30	58	49	63	Quarry noise not audible
	N2	01/03/2016	11:05	52	46	55	Quarry noise faintly audible
Qtr 2 2016	N1	03/06/2016	09:45	60	52	66	Quarry noise not audible
	N2	03/06/2016	11:15	55	50	62	Quarry noise faintly audible
Qtr 3 2016	N1	05/09/2016	08:15	58	50	71	Quarry noise not audible
	N2	05/09/2016	11:00	53	48	65	Quarry noise faintly audible
Qtr 4 2016	N1	03/11/2016	11:05	50	46	53	Quarry noise faintly audible
	N2	03/11/2016	10:00	60	52	68	Quarry noise not audible
Qtr 1 2017	N1	30/03/2017	08:35	53	49	60	Quarry noise faintly audible
	N2	30/03/2017	09:55	57	50	63	Quarry noise not audible
Qtr 2 2017	N1	02/05/2017	11:05	51	46	55	Quarry noise faintly audible
	N2	02/05/2017	09:00	56	49	58	Quarry noise not audible
Qtr 3 2017	N1	15/08/2017	08:10	53	42	59	Quarry noise faintly audible
	N2	15/08/2017	09:20	57	49	62	Quarry noise not audible
Qtr 4 2017	N1	10/11/2017	08:25	55	50	66	Quarry noise faintly audible
	N2	10/11/2017	10:30	58	50	68	Quarry noise not audible
Qtr 1 2018	N1	04/02/2018	11:45	53	48	55	Quarry noise faintly audible
	N2	04/02/2018	13:50	60	53	65	Quarry noise not audible
Qtr 2 2018	N1	05/05/2018	14:15	52	46	59	Quarry noise faintly audible
	N2	05/05/2018	15:35	57	52	72	Quarry noise not audible
Qtr 3 2018	N1	02/08/2018	10:30	51	55	48	Quarry noise faintly audible
	N2	02/08/2018	08:45	53	55	50	Quarry noise not audible
Qtr 1 2019	N1	04/02/2019	10:35	51	45	58	Quarry noise faintly audible
	N2	04/02/2019	11:45	52	47	68	Quarry noise not audible

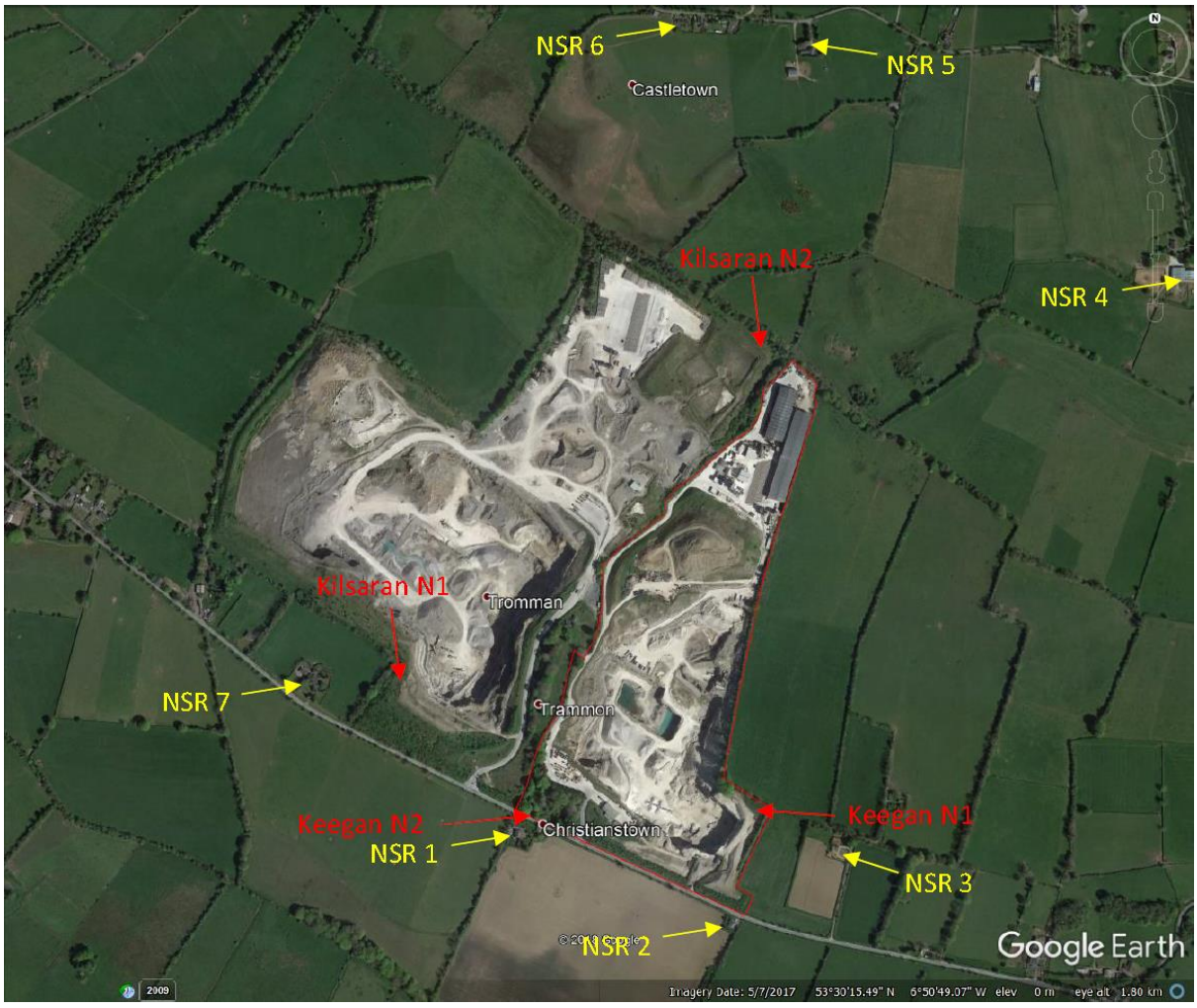
Table 8.3 summarises the available periodic noise monitoring surveys that have been undertaken since November 2014 at Kilsaran Quarry directly adjacent to the Tromman Quarry site. The noise monitoring survey results indicate the cumulative noise from the operation of the two adjacent quarries is not having a significant noise impact at the nearest residential properties to the sites.

Table 8.3: Periodic Noise monitoring survey results since November 2014 until November 2017 at Kilsaran Quarries directly adjacent to Keegan Quarries Ltd., Tromman, Rathmolyon, Co. Meath.

Period	Location	Date	$L_{Aeq, 60min}$	$L_{A90, 60min}$	$L_{A10, 60min}$
Qtr 4 2014	N1	20/11/2014	47.6	48.9	45.4
	N2	20/11/2014	51.1	52.8	42.8
Qtr 2 2015	N1	16/07/2015	50.8	52.5	47.1
	N2	16/07/2015	53.6	54.1	44.9
Qtr 4 2015	N1	04/12/2015	52.8	44	41.1
	N2	04/12/2015	55	45.5	40.2
Qtr 1 2016	N1	19/02/2016	59.7	61.9	54.2
	N2	19/02/2016	56	56.7	50.5
Qtr 4 2016	N1	04/11/2016	49.9	52.9	44.1
	N2	04/11/2016	47.7	50	41.5
Qtr 1 2017	N1	04/11/2017	49.2	51.9	42.8
	N2	04/11/2017	45.9	46.8	43.3

The Council approved noise monitoring survey locations are adjacent to each of the quarry site's operational boundary and in proximity to the nearest residential properties to each of the Tromman Quarry sites both Kilsaran and Keegan operated as presented in Figure 8.1.

Figure 8.1: Noise monitoring locations and Noise Sensitive Receiver (NSR) locations in proximity to the nearest residential properties to the Keegan Quarries Ltd. site in Tromman, Rathmolyon, Co. Meath and at the Kilsaran Quarry directly adjacent to the Keegan Quarries Ltd. site.



8.3.2 Vibration Compliance Monitoring

In accordance with best practice, vibration monitoring with the use of a vibrograph has been undertaken for every blast since 2013 at the nearest residential properties to the Tromman Quarry site. The vibration monitoring locations and results are provided in Table 8.4. The blast monitoring locations relate to the most proximate residential properties to the extraction operations.

The DoEHLG Guidance provides a limit for ground-borne vibration: Peak particle velocity = 12 mm/s, measured in any of the three mutually orthogonal directions at the receiving location (for vibration with a frequency of less than 40 Hz). The DoEHLG Guidance provides a limit for Air overpressure: 125 dB (linear maximum peak value), with a 95% confidence limit. These limits are not exceeded by current blast practices.

Table 8.4: Vibration monitoring results for every blast since 2013 at the nearest residential properties to the Tromman Quarry site.

Date	No of Holes	Total Charge (kgs)	No of Delays	MIC (kgs)	Peak Particle Velocity (mm/sec)			Plan distance to blast (m)	Air-Overpressure (dBL)	Bearing of Ins to Blast	Location
					H (mm/sec)	T (mm/sec)	V (mm/sec)				
29/01/2013	60	7390	60	125	2.00	2.50	2.10	310	125	43º	Regan
21/03/2013	34	8102	59	160	8.90	9.50	3.60	200	113	340	Damian Montague
05/06/2013	43	10750	43	285	7.49	8.34	5.21	220	123.9	E	Keegans House
28/08/2013	75	4830	75	95	5.08	4.95	2.92	226	116.7	E	Keegans House
30/09/2013	32	7434	64	135	2.54	1.52	1.21	240	125.5	83^0	Regans Gateway
09/12/2013	59	9485	59	170	2.16	1.97	1.40	310	119.9	33^0	Gateway to Regans
28/02/2014	49	6061	49	125	2.70	2.10	2.20	290	115	39^0	Regan
09/04/2014	66	6115	66	140	2.26	1.52	2.28	300	113.1	55^0	Regan
16/05/2014	15	4767	30	200	6.22	3.49	3.49	250	123.9	178°	Regan
26/06/2014	125	5068	125	45	2.29	1.14	1.78	270	114.2	100°	Gateway to Regans
16/07/2014	19	5776	36	195	7.62	4.57	2.47	250	121.2	68	Regan
17/09/2014	23	7835	46	180	6.70	3.90	3.60	230	125	98°	Mr. Regan
28/10/2014	20	6113	40	150	7.37	3.30	3.94	240	122.9	100°	Gateway to Regans
08/12/2014	72	7335	72	150	4.06	3.23	3.30	405	113	170	Regan Residence
26/01/2015	50	6155	49	145	4.06	2.98	3.74	300	118.9	56^0	Regans
18/03/2015	31	8400	54	180	3.60	2.30	2.10	290	132	275°	Mr. Collins
08/06/2015	78	7930	82	200	2.10	1.70	1.70	290	130	275°	Keegan Residence
24/07/2015	44 (43)	7037	43	175	4.51	3.49	3.49	290°	115.2	219°	Keegans Residence
23/09/2015	47	9492	68	170	1.77	2.03	1.58	270	124.3	110°	Regan
13/11/2015	29	8855	55	180	4.63	2.79	2.34	270	120	99°	Regan
14/01/2016	39	5749	39	160	3.11	1.56	2.85	260	119	56°	Regan Residence
27/01/2016	27	6319	54	180	2.54	1.71	2.73	395	124.3	95°	Regan
22/02/2016	31	9282	62	180	3.30	2.03	2.28	310	117.9	99°	Regans Residence
15/04/2016	20	6546	39	175	1.77	1.52	1.77	330	125.9	89°	Regan Residence
18/05/2016	26	7392	2	165	2.22	1.01	1.46	330	123.7	98°	Regan
23/06/2016	36	9010	72	150	5.20	5.20	4.00	230	123.4	39°	Regan Residence
15/07/2016	29	8374	53	170	9.33	7.23	5.71	260	115.2	103°	Regan
25/08/2016	43	6015	43	165				290		679°	Did not trigger
23/09/2016	27	8985	29	345	3.30	2.00	2.20	300	23.7	99°	Regan Residence
25/10/2016	52	8500	52	170	2.79	3.55	2.85	310	123.8	062°	Regan Residence
22/11/2016	40	6950	40	187.5	2.30	1.20	1.30	300	115.7	65°	Regans
06/12/2016	52	8844	52	175	3.30	2.90	2.50	290	114.6	66°	Regan Residence
18/01/2017	26	8007	52	165	3.10	1.50	1.80	300	117.9	99°	Regan Residence
16/02/2017	31	8227	62	150	2.09	1.84	1.52	310	95.9	102°	Regan Residence
29/03/2017	31	8230	61	155	2.28	1.65	1.65	280	112.8	91°	Regan Residence
10/05/2017	32	9860	64	180	2.80	1.60	2.30	270	106.5	142°	Regan Residence
16/06/2017	52	6752	52	140	1.95	2.60	2.92	350	94	184°	Regans Residence

10/07/2017	45	13277	90	145	10.47	6.79	6.03	260	104.9	87°	Regan Residence
04/09/2017	40	7019	40	185	5.65	4.76	3.55	300	95.9	65°	Regan Residence
02/10/2017	19	5910	38	170	8.95	5.77	6.28	200	103.5	102°	Regan Residence
03/11/2017	47+42	7910	99	175	2.64	3.36	3.93	320	94.3	119°	Regan Residence
08/11/2017	29	6355	29	275	9.84	5.58	9.90	180	91	84°	Regan Residence
04/01/2018	59+11	7,749	62	180	4.88	2.28	1.77	270	117.9	119°	Regan Residence
29/01/2018	23+61	9,765	84	170	3.45	3.17	3.61	270	124	57°	Regan Residence
26/02/2018	62+31	11,025	93	180	2.22	1.65	2.22	350	115.9	091°	Regan Residence
05/04/2018	65	7,966	65	165	3.42	3.93	4.12	220	91.5	84°	Regan
03/05/2018	44	7,420	44	180	4.00	2.70	2.50	327	119.2	50°	Regans
28/05/2018	78	9,805	76	165	2.28	2.34	2.09	200	97.5	35°	Regan Residence
27/06/2018	51	7,690	51	155	2.79	3.42	2.73	280	120	47°	Regan Residence
23/07/2018	62	9,236	62	180	1.95	1.39	2.03	290	126.1	84°	Regan Residence
27/07/2018	44	6,425	44	177.5	0.82	1.20	0.63	340	97.5	91°	Regans Residence
23/08/2018	61+2	10,242	63	175	4.31	4.00	5.77	260	116.9	50°	Regan Residence
13/09/2018	64	11,500	64	210	3.17	2.60	2.41	300	117.2	84°	Regans Residence
15/10/2018	53	9,105	53	175	3.55	2.79	3.49	280	119.7	71°	Regan Residence
07/11/2018	24+50	6,348	74	210	1.39	1.58	1.58	260	115.8	81°	Regan Residence
19/11/2018	38	7,475	30	265	1.77	1.39	1.71	300	120.9	44°	Regan Residence
14/12/2018	56	8,459	56	170	4.57	2.54	2.34	260	120.1	75°	Regan Residence
23/01/2019	10,330	73	290	2.00	1.84	1.84	4085	290	122.3	43°	Regan
12/02/2019	8,170	49	183	3.66	2.98	5.58	4088	270	116.6	67°	Regan Residence
13/03/2019	10,088	41	300	2.20	1.71	1.71	4084	290	118.5	84°	Regans

8.4 Existing Noise & Vibration Impacts

The existing noise and vibration impacts outlined below are the same as presented in the Noise & Vibration Impact Assessment that has been prepared to accompany a Remedial Environmental Impact Assessment Report for an application for Substitute Consent (the Application) at Keegan Quarries Ltd., Tromman, Rathmolyon, Co. Meath. Given that the proposal does not seek to introduce any additional operations then these are considered to be representative of the impacts that can be anticipated.

8.4.1 Existing Concrete Manufacturing Noise Impacts

A noise prediction model has been prepared which addresses the associated industrial structures that Meath County Council consider to be unauthorised including the electrical substation, 2 no. batching plants and hopper, storage bays and the industrial unit are outlined in Table 8.5. This noise prediction model primarily assesses the source specific noise impact from the northern area of the Tromman Quarry site, which allows for the assessment of the present site layout with the erection of the pre-cast manufacturing unit on the eastern side of the concrete yard and the internal arrangement of the concrete block making yard and storage, reverting to its existing central location.

The sound power level (L_W) of the noise sources included in this noise prediction model are as follows:

Point Sources:

Name	L_W dB(A)
7 Unloading Site #1	104.0
19 Concrete Plant	110.0
6 Drying Plant	95.0

Line Sources:

Name	L_W dB(A)
Conveyor - Screening Plant	105.2
Conveyor - Batching Plant	104.8

Area Sources:

Name	L_W dB(A)
PP TA 20408 - Precast Plant #1	86.3
17 Precast Plant #2	87.6

Vertical Area Sources:

Name	L_W dB(A)
Shed 5	99.0
9 Screening Plant	105.7
10 Crushing Plant	102.1
11 Hopper Feed	98.4
17 Precast Plant #2	86.8
PP TA 20408	109.2
PP TA 20408	85.2

Table 8.5: Predicted noise levels from the associated industrial structures at the Tromman Quarry site (See Figure 8.2)

Name	**Predicted Noise Level**	**Receiver Height (m)**	**Coordinates**		
			X (m)	**Y (m)**	**Z (m)**
NSR 1	29.0 dB(A)	1.50	277437	249809	74.43
NSR 2	30.1 dB(A)	1.50	277800	249667	77.64
NSR 3	39.6 dB(A)	1.50	277971	249789	83.53
NSR 4	40.5 dB(A)	1.50	278562	250851	74.41
NSR 5	40.5 dB(A)	1.50	278168	251207	71.50
NSR 6	41.1 dB(A)	1.50	277922	251182	71.50
NSR 7	33.7 dB(A)	1.50	277086	250061	74.99
Limit	**55 dB(A)**				

NSR 1 corresponds to Noise Monitoring Location N2 (i.e. the house southwest of site adjacent site entrance gate). The predicted noise level of 29 dB(A) at NSR 1 indicates that the associated industrial structures in the northern area of the site are not having a significant noise impact at properties to the south of the Tromman Quarry site. Relative to the measured noise level at this location these activities are having no impact. The predicted noise level of 41 dB(A) at NSR 6 to the north of the site is not a significant daytime noise level relative to the quarry noise limits during daytime.

8.4.2 Existing Quarrying Noise Impacts

A noise prediction model has been prepared to address the existing extraction operations and are presented in Table 8.6. The sound power level (L_W) of the noise sources included in this noise prediction model are as follows:

Point Sources:

Name	L_W dB(A)
Crushing and Screening Plant	120.0
Drill Rig	115.0

Moving Line Sources:

Name	L_W dB(A)		Moving Pt. Src	
	Type	Value	Number per hour	Speed (km/h)
Komatsu Loaders	PWL-Pt	105	60.0	10.0
HGV Deliveries	PWL-Pt	105	12.0	10.0

Table 8.6: Predicted noise levels from the existing extraction operations in the Tromman Quarry site. (See Figure 8.3)

Name	**Predicted Noise Level**	**Receiver Height (m)**	**Coordinates**		
			X (m)	**Y (m)**	**Z (m)**
NSR 1	43.5 dB(A)	1.50	277437	249809	74.43
NSR 2	44.2 dB(A)	1.50	277800	249667	77.64
NSR 3	40.7 dB(A)	1.50	277971	249789	83.53
NSR 4	34.7 dB(A)	1.50	278562	250851	74.41
NSR 5	32.9 dB(A)	1.50	278168	251207	71.50
NSR 6	31.6 dB(A)	1.50	277922	251182	71.50
NSR 7	35.1 dB(A)	1.50	277086	250061	74.99
Limit	**55 dB(A)**				

NSR 1 corresponds to Noise Monitoring Location N2 (i.e. the house southwest of site adjacent site entrance gate). The predicted daytime noise level of 43.5 dB(A) at NSR 1 indicates that the quarrying noise sources are not having a significant noise impact at properties to the south of the Tromman Quarry site relative to the quarry noise limits during daytime.

8.4.3 Existing Cumulative Noise Impacts

The cumulative existing noise impacts have been calculated in accordance with the approach outlined above and the results of the cumulative noise prediction model to assess the in combination effects of the manufacturing structures in Tromman Quarry site and the quarrying operations are presented in Table 8.7. The sound power level (L_W) of the noise sources included in this noise prediction model are as outlined above.

Table 8.7: Predicted noise levels from the manufacturing structures in Tromman Quarry site and the existing extraction operations in the Tromman Quarry site. (See Figure 8.4)

Name	**Predicted Noise Level**	**Receiver Height (m)**	**Coordinates**		
			X (m)	**Y (m)**	**Z (m)**
NSR 1	43.7 dB(A)	1.50	277437	249809	74.43
NSR 2	44.3 dB(A)	1.50	277800	249667	77.64
NSR 3	43.2 dB(A)	1.50	277971	249789	83.53
NSR 4	41.5 dB(A)	1.50	278562	250851	74.41
NSR 5	41.2 dB(A)	1.50	278168	251207	71.50
NSR 6	41.6 dB(A)	1.50	277922	251182	71.50
NSR 7	37.5 dB(A)	1.50	277086	250061	74.99
Limit	**55 dB(A)**				

The predicted cumulative daytime noise level of 43.7 dB(A) at NSR 1 indicates that the cumulative noise from quarrying and the associated industrial structures are not

having a significant noise impact at properties to the south of the Tromman Quarry site relative to the quarry noise limits during daytime.

The cumulative noise from the associated structures in Tromman Quarry and the existing extraction operations have been assessed. The sound level from these noise sources do not result in an exceedance of the planning condition noise limits at the nearest residential receiver locations, as set out in Condition 12 of TA/900976 and is in accordance with the relevant Guidelines outlined in Section 8.2.1 above. This analysis is confirmed by the monitoring results provided to the Meath County Council by Keegan Quarries Limited and Kilsaran independently, under their ongoing periodic monitoring.

8.4.4 Existing Vibration Impacts

The drill rig operations and blasting for the quarrying process take place a maximum of twice per month. The drilling using an air drill and compressor operates for approximately two days every month. During the noise survey on 7th February 2019, the drill rig was in operation on the quarry floor, with a noise level of approximately 97 dB(A) at 1m from source.

All neighbours are notified in advance of upcoming blasting dates and times. Blasting of the rock results in an instantaneous noise impact. However, this is a very short – term noise impact and results in an instantaneous increase in noise levels during daytime hours with immediate reversion back to preceding noise levels. A typical sound level from blasting, measured at 15 m from the source is 94 dB(A) (Hoover 1996). Table 8.8 outlines the predicted noise levels in the vicinity of an active blasting site. The accepted reduction in noise levels with distance from a blast is based on the assumption that the sound level drop off rate equates to 6 dB per doubling of distance.

Blasting parameters including PPV and Air Overpressure have been set by the EPA for all quarrying proposed operations in Ireland.

Table 8.8: Estimated Blasting Noise in the vicinity of the quarry.

Distance to receiver (m)	Sound Level At Receiver Location dB(A)
15	~ 94
30	~ 88
60	~ 82
120	~ 76
240	~ 70
480	~ 64
960	~ 58

As indicated in Table 8.8, sensitive receivers within approximately 500m of the blasting site could be exposed to instantaneous noise levels of approximately 65 - 70 dB(A). However, these blasts result in very short – term instantaneous noise impact at all residential receivers in the vicinity of the quarry and do not constitute a significant noise impact.

It is considered that as the continued activities will replicate those that have already taken place the levels of vibration likely to be experienced at the receptor properties will not to be significant in environmental terms. Blast monitoring information has been provided for a 5 year period. Accordingly, it is considered reasonable to assume that as the levels are within acceptable parameters throughout this period, then it is likely that this will continue to be achieved.

The blast monitoring results indicate levels that fall below the limits prescribed by the DoEHLG in their relevant guidance. The results indicate that during the last 5 years presented compliance has been absolute with the measured peak particle velocities and air-overpressure less than the limits prescribed. Therefore, it is considered that there any potential vibration impact in relation to the on-going blasting is negligible.

The operational site as outlined in previously considered Environmental Impact Statements employs the following general blast design control measures to ensure compliance with recommended standards.

- The optimum blast ratio is maintained and the maximum instantaneous charge is optimised.
- Explosive charges are properly and adequately confined by a sufficient amount and quality, of stemming.
- Accurate face surveys (profiling) are undertaken to assist with blast design and specification..
- No blasting is carried out outside 10:00 – 18.00 hours on working days (Monday to Friday). There is no blasting carried out on Saturdays, Sundays or public holidays.
- All nearby dwellings are given advance notice of blasting.

8.5 Predicted Noise & Vibration Impacts from Proposed Development

8.5.1 Predicted Noise Impacts

The noise prediction assessment to consider the impacts that can be expected to occur in the future as a result of the further development of the 21.64Ha quarry site including the extraction of limestone from an area of 14.3Ha using conventional drilling and blasting techniques and mineral reduction using mobile crushing and screening to a depth of 13mAOD is outlined below. Noise prediction modelling has been undertaken for the s.37L application for extraction at the quarry site to assess specific future quarrying noise impacts.

The future proposed extraction is likely to be in accordance with noise level predictions assessed for existing extraction at the quarry site, and if anything future noise levels should be lower as development descends to lower depths allowing for increased attenuation by quarry walls.

It is reasonable to suggest that there will be no change anticipated from the continuation of the associated manufacturing operations on the site, i.e. existing

noise emissions will remain the same in this area to the north of the quarry void on the site.

Noise levels have been predicted during periods of extraction when the excavation, crushing and screening and the drill rig operations are on-going in Phases 1 – 4 of the quarry development. The predicted noise levels are indicative of worst-case continuous on site activity over a 1 hour period with an indicative location for the excavation, crushing and screening and the drill rig operations during each phase represented in the noise prediction models.

Outlined in Table 8.9 are the predicted noise levels that will occur at the noise sensitive receivers from the worst case assumption that over a 1 hour period the Extraction Area, which includes the excavation, crushing and screening, the loading of a lorry and 6 lorry movements / hour on the proposed site access road as well as the drill rig operations are all on-going concurrently. The CadnaA noise model outputs are shown in Figures 8.5 – 8.12.

Table 8.9: Predicted noise levels from the proposed quarrying activities only in the Tromman Quarry site (See Figures 8.5 – 8.8)

Name	**Predicted Noise Level dB(A) from quarrying activities only**			
	Phase 1	**Phase 2**	**Phase 3**	**Phase 4**
NSR 1	41.6	41.6	43.6	42.6
NSR 2	48.7	45.5	45.7	45.1
NSR 3	38.3	39.9	39.7	39.1
NSR 4	33.1	28.2	27.9	27.8
NSR 5	25.4	24.6	28.3	27
NSR 6	26.9	25.5	29.1	28.2
NSR 7	33.2	33.2	34.2	34
Limit	**55 dB(A)**			

Table 8.10: Predicted noise levels from the cumulative operation of the proposed quarrying activities and the associated manufacturing operations in the Tromman Quarry site (See Figures 8.9 – 8.12)

Name	**Predicted Cumulative Noise Level dB(A) including the associated manufacturing operations in the Tromman Quarry site**			
	Phase 1	**Phase 2**	**Phase 3**	**Phase 4**
NSR 1	41.8	41.8	44.8	44.1
NSR 2	49	46.2	46.4	45.9
NSR 3	42.2	43	43	42.7
NSR 4	38.6	37.7	37.7	37.5
NSR 5	38	37.9	38.2	38.1
NSR 6	39.1	39	39.2	39.1
NSR 7	36.2	36.2	38.6	38.5
Limit	**55 dB(A)**			

As shown in Table 8.9, the predicted noise levels at the noise sensitive receiver locations due to the proposed quarrying activities are in accordance with suggested noise limit of 55 dB(A) during the worst-case 1 hour period with an indicative location for the excavation, crushing and screening and the drill rig operations during each phase represented in the noise prediction models. The predicted noise levels are in line with noise levels which are presently experienced when similar quarrying operations are in operation.

As shown in Table 8.10, the predicted noise levels at the noise sensitive receiver locations due to the proposed quarrying activities including the associated manufacturing operations in the Tromman Quarry site are in accordance with suggested noise limit of 55 dB(A) during the worst-case 1 hour period with an indicative location for the excavation, crushing and screening and the drill rig operations during each phase represented in the noise prediction models. The predicted noise levels are in line with noise levels which are presently experienced when similar quarrying and manufacturing operations are in operation.

8.5.2 Decommissioning Impacts

Should existing quarrying and associated manufacturing operations on the site cease, noise levels from de-commissioning of the industrial structures in the northern area of the Tromman Quarry site and / or the regrading of the benches in the existing extraction area and subsequent infill with groundwater will be short-term noise impacts. Such activities will be subject to a higher noise limit of 70 dB(A) as distinct from normal site operations. Such activities may include overburden removal, bund de-construction, restoration works, de-commissioning of plant and equipment, etc. Typically, such works will be carried out during an 8 week window per annum.

8.6 Monitoring

Quarterly noise monitoring surveys such as have been undertaken since January 2010 by Byrne Environmental at the Tromman Quarry site will continue. The noise monitoring surveys will continue to be carried out to evaluate and assess the noise impacts that the quarry site activities have on the local receiving noise environment and to assess compliance with standards contained within the former Planning Conditions *(Planning Permission Ref. TA/900976 Condition 12).* The noise monitoring survey will continue to be conducted according to *ISO 1996-2, 2017 Acoustics – Description, Measurement and Assessment of Environmental Noise* and with reference to the 2016 EPA publication, *"Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4).*

8.7 Conclusions

The quarterly noise monitoring surveys that has been undertaken by Byrne Environmental at Tromman Quarry typically reports that *'Quarry noise faintly audible'* or *'Quarry noise not audible*'. The periodic noise monitoring surveys that have been undertaken since November 2014 at Kilsaran Quarry directly adjacent to the Tromman Quarry site indicate the cumulative noise from the operation of the two

adjacent quarries is not having a significant noise impact at the nearest residential properties to the sites. Therefore, the existing operations at the Tromman Quarry, as predicted in Noise Impact Assessments accompanying previously submitted Environmental Impact Statements, is not having a significant noise impact at the nearest residential properties to the site. The additional structures in the period post 2013 have not noticeably altered the monitored noise levels at the surrounding noise monitoring locations and the predicted noise levels due to the cumulative noise from the operation of the quarry void and the associated manufacturing operations of the Tromman Quarry site indicate that the current operations have not and are not having a significant noise impact at the nearest residential properties. The ongoing noise and vibration monitoring has confirmed operations consistently have cumulatively operated below the guideline figure provided for in the DOEHLG 2004 recommended levels.

The existing noise and vibration impacts that are occurring and are proposed to continue to occur from the quarrying activities including the associated manufacturing operations in the Tromman Quarry site have been assessed using noise prediction modelling. The assessment indicates that the specific noise levels from the existing and proposed quarrying activities including the associated manufacturing operations do not give rise to any significant environmental impact and cumulatively do not exceed the guideline figure provided for in the DOEHLG 2004 recommended levels.

With reference to the existing vibration target levels as provided for in the DoEHLG Guidance, the site has operated in full compliance for the past 5 years, and in all likelihood will continue to do so. If the site is required to be restored and the structures removed there is no opportunity for significant impact as a result of blasting. This outcome has been previously assessed and remains valid within the extant restoration concept.

9.0 LANDSCAPE

9.1 Introduction

This Section has been prepared by Mullin Design Associates, Chartered Landscape Architects, as a standalone Landscape and Visual Impact Assessment Report to establish potential landscape and visual impacts/effects arising from proposed extractive and ancillary operations associated with an existing hard rock quarry at Tromman, Co. Meath.

The report has been drafted and overseen by Pete Mullin, BA (Hons) CMLI, Chartered Landscape Architect and principal of Mullin Design Associates. Pete has produced over 100 Landscape and Visual Impact Assessments during 25 years in the sector.

This study has been structured in the following subsections:

- Methodology – explanation of how the assessment has been undertaken, with reference to methodology, terminology, assessment criteria, and planning policy.
- Receiving Environment - or Landscape and Visual Context – baseline description, classification and evaluation of the existing landscape character containing the application site and an assessment of visual amenity, with identification of visual receptors.
- Project Description – description of aspects of the proposed development which have the potential to cause a landscape and/or visual effect and measures which will be incorporated to mitigate or avoid greater potential effects.
- Assessment of Impacts – an outline of potential landscape and visual impacts with proposed mitigation measures and cumulative impacts.
- Residual Impacts and impact summary.

The Figures referenced throughout this section constitute a important element of the assessment and as such are held in Appendix 9.1 separate to the section to allow for ease of access to the reader, that the text and the visual analysis can be viewed side by side, much in the same way as having two screens on a PC.

9.2 Methodology

9.2.1 Method of Assessment & Guidelines

The assessment of the landscape and visual impacts for this development are based on the most up to date guidelines provided by The Landscape Institute, 'Guidelines for Landscape and Visual Impact Assessment', (3rd Edition) 2013, and 'The Countryside Agency and Scottish Natural Heritage – Landscape Character Assessment Guidance for England and Scotland' 2002.

The EPA are currently revising the Guidelines and Advice Notes, therefore the assessment also follows the Draft Revised Guidelines on Information to be contained in Environmental Impact Assessments August 2017.

Reference has been made to Meath County Council Development Plan 2013 – 2019 and specifically the Meath Landscape Character Assessment, Section (Section 8 LCA parts 7-13) which provide a baseline landscape description.

As recommended the landscape and visual assessment incorporates both desk and field-based studies and has been compiled and interpreted by an experienced landscape professional.

9.2.2 Assessment Sequence

The Landscape & Visual Assessment was undertaken in the following stages:

- Desk Study (Stage 1)
  1 Analysis of Baseline data, maps and plans;
  2 Consultation of Policy Documentation;
  3 Zone of Visual Influence (Theoretical);
  4 Identification of Potential Visual Receptors;

- Field Study
  5 Confirmation of Visual Receptors;
  6 Photo Survey from Visual Receptors;
  7 Zone of Visual Influence (Actual/Field);
  8 Confirmation of Landscape Character;
  9 Establish Landscape Sensitivity;

- Desk Study (Stage 2)
  10 Analysis of Field Survey data;
  11 Viewpoint Analysis;
  12 Consider Mitigation and,

- Desk Study (Stage 3)
  13 Report Preparation.

9.2.3 Assessment Criteria

The aim of this landscape and visual impact assessment is to identify, evaluate and predict potential key effects arising from the proposed development. The assessment combines sensitivity with predicted magnitude of change, to establish the significance of residual landscape and visual effects. These are based on pre-defined criteria as set out in Tables 9.1 to 9.5 below.

Table 9.1 - Landscape Sensitivity Criteria

Class	Criteria
High	Landscape characteristics or features with little or no capacity to absorb change without fundamentally altering their present character. Landscape designated for its international or national landscape value. Outstanding example in the area of well cared for landscape or set of features.
High-Medium	Landscape characteristics or features with a low capacity to absorb change without fundamentally altering their present character. Landscape designated for regional or county-wide landscape value where the characteristics or qualities that provided the basis for their designation are apparent. Good example in the area of reasonably well cared for landscape with notable landscape features.
Medium	Landscape characteristics or features with moderate capacity to absorb change without fundamentally altering their present character. Landscape designated for its local landscape value or a regional designated landscape where the characteristics and qualities that led to the designation of the area are less apparent or are partially eroded or an undesignated landscape which may be valued locally – for example an important open space. An example of a landscape or a set of features which is neutral or mixed character.
Medium-Low	Landscape characteristics or features which are reasonably tolerant of change without detriment to their present character. No landscape designation present or of medium to low local value, or an example of a common or un-stimulating landscape or set of features and conditions.
Low	Landscape characteristics or features which are tolerant of change without detriment to their present character. No designation present or of low local value. An example of monotonous unattractive visually conflicting or degraded landscape or set of features.

Table 9.2 - Visual Sensitivity Criteria

Class	Criteria
High	Users of outdoor recreational facilities, on recognised national cycling or walking routes or in national designated landscapes. Dwellings with views orientated towards the proposed development.
High-Medium	Users of outdoor recreational facilities, in locally designated landscapes or on local recreational routes that are well publicised in guide books. Road and rail users in nationally designated landscapes or on recognised scenic routes, likely to be travelling to enjoy the view.
Medium	Users of primary transport road network, orientated towards the Development, likely to be travelling for other purposes than just the view. Dwellings with oblique views of the proposed development.
Medium-Low	People engaged in active outdoor sports or recreation and less likely to focus on the view. Primary transport road network and rail users likely to be travelling to work with oblique views of the Development or users of minor road network.

Low	People engaged in work activities indoors, with limited opportunity for views of the Development. Road users on minor access roads travelling for other purposes than just the view.

Table 9.3 - Landscape Magnitude Criteria

Class	Criteria
Very High	Very extensive, highly noticeable change, affecting most key characteristics and dominating the experience of the landscape; and, Introduction of highly incongruous development.
High	Extensive, noticeable change, affecting many key characteristics and the experience of the landscape; and, Introduction of many incongruous elements.
Medium	Noticeable change to a significant proportion of the landscape, affecting some key characteristics and the experience of the landscape; and Introduction of some uncharacteristic elements.
Low	Minor change, affecting some characteristics and the experience of the landscape to an extent; and, Introduction of elements that are not uncharacteristic.
Very Low	Little perceptible change.

Table 9.4 - Visual Magnitude Criteria

Class	Criteria
Very High	The development would dominate the existing view.
High	The development would cause a considerable change to the existing view over a wide area or an intensive change over a limited area.
Medium	The development would cause moderate changes to the existing view over a wide area or noticeable change over a limited area.
Low	The development would cause minor changes to the existing view over a wide area or moderate changes over a limited area.
Very Low	No real change to perception of the view. Weak, not legible, and/ or indiscernible.

Table 9.5 - Categories of Landscape and Visual Significance of Effect

Degree of significance	Description of Landscape Effect	Description of Visual Effect
Major	Substantial alteration to elements/features of the baseline (pre-development) conditions. Notably affect an area of recognised national landscape quality. Substantial alteration to the character, scale or pattern of the landscape.	Major/substantial alteration to elements/features of the baseline (pre-development) conditions. Where the proposed development would cause a very noticeable alteration in the existing view. This would typically occur where the proposed development closes an existing view of a landscape of regional or national importance and the proposed development would dominate the future view.
Moderate-Major	This category is a combination of descriptions of Major listed above and Moderate below. These combinations are discussed within the assessment of each landscape or visual receptor when they occur.	
Moderate	Alteration to elements/features of the baseline conditions. Affects an area of recognised regional landscape quality. Alteration to the character, scale or pattern of the local landscape.	Alteration to one or more elements/features of the baseline conditions such that post development character/attributes of the baseline will be materially changed. This would typically occur where the proposed development closes an existing view of a local

		landscape and the proposed development would be prominent in the future view.
Moderate-Minor	This category is a combination of descriptions of Moderate listed above and Minor below. These combinations are discussed within the assessment of each landscape or visual receptor when they occur.	
Minor	A minor shift away from baseline conditions. The Development partially changes the character of the site without compromising the overall existing landscape character area.	A minor shift away from baseline conditions. This occurs where change arising from the alteration would be discernible but the underlying character / composition / attributes of the baseline condition will be similar to the pre-development. It would also occur where the proposed development newly appears in the view but not as a point of principal focus or where the proposed development is closely located to the viewpoint but seen at an acute angle and at the extremity of the overall view.
Negligible	No or very little change from baseline conditions. Change not material, barely distinguishable or indistinguishable.	Where there is no discernible improvement or deterioration in the existing view.
No Effect	The Development would not affect the landscape receptor.	The Development would not affect the view.

The significance of identified landscape and visual effects is established through a simple matrix, which measures the magnitude of change against landscape or visual sensitivity. The resulting impacts are classed Major, Moderate-Major, Moderate, Minor, Negligible/None.

Therefore as the sensitivity of a landscape increases from Low to High, and the Magnitude of Change increases from Very Low to Very High the predicted impacts also increase.

The example matrix table below is used to summarise the findings from the criteria tables. By combining sensitively (along the top) with predicted magnitude of change (along the side) a predicted impact/ effect is reached. This format is applicable to both landscape impacts and visual impacts.

Example Matrix (Professional judgement applied at every stage of assessment and matrix only used to check consistency.)		Sensitivity				
		High	**High / Medium**	**Medium**	**Medium - Low**	**Low**
Magnitude	**Very High**	Major	←→	Major	←→	Mod-major
	High	Major	←→	Mod-major	←→	Moderate
	Medium	Mod-major	←→	Moderate	←→	Minor
	Low	Moderate	←→	Minor	←→	Negligible
	Very Low	Minor	←→	Negligible	←→	Negligible / None

Intermediate sensitivity ratings (as per the criteria) would lead to a series of effects that lie between those stated above if a matrix was applied to the assessment. Professional judgement is then used to determine the degree of effect. e.g high-medium sensitivity combined with medium magnitude would equate to a Moderate+ effect and a decision needs to be made to determine if this effect is Moderate or Moderate-Major. Intermediate magnitude ratings can also be arrived at during the assessment and a similar method is also applied here.

Effects above Moderate are considered Significant (presented in dark grey in the example matrix).

Where intermediate effects are arrived at, particular care should be taken at the upper and lower limits of the significance threshold i.e. between Moderate and Moderate-Major (presented in lighter grey in the example matrix).These effects may require additional explanation as to why the decision was made to judge the effect as either significant or not significant.

In addition to the impacts which sensitivity combined with the magnitude of change generate, there are a number of other factors which are taken into account when preparing the landscape and visual assessment.

Development is often viewed as permanent and/or perceived to have a negative impact, it is therefore important to emphasise that change created by development can result in beneficial outcomes, and may also be temporary, short-term or indeed reversible.

This assessment also considers and identifies both the 'Type' and 'Duration' of the potential impacts. The following terminology has been used were appropriate.

9.2.4 Type of Visual Impacts

- **Beneficial**: A positive impact which will improve or enhance the landscape character or viewpoint.
- **Neutral**: A neutral impact which will neither enhance nor detract from the landscape character or viewpoint.
- **Adverse**: A negative impact which will have an adverse effect on the existing landscape character or viewpoint.

9.2.5 Duration of Impacts

- **Temporary**: Impacts lasting one year or less.
- **Short–term**: Impacts lasting one to seven years.
- **Medium-term**: Impacts lasting seven to twenty years.
- **Long-term**: Impacts lasting twenty to fifty years.
- **Permanent**: Impacts lasting over fifty years.

9.3 Receiving Environment

The Landscape is about the relationship between people and place. Understanding the character of a landscape allows us to identify its 'sense of place', and what distinguishes it from other places. All landscape has economic, social and

environmental value; landscape characterisation provides a mechanism and baseline from which landscapes can be valued and their sensitivity and capacity to accommodate various development typologies gauged. Collectively this information assists with positive decision making when considering future appearance and function. This section establishes the landscape and visual context (or baseline) of the proposed development.

9.3.1 Desk Study

Desk studies generally involve analysis and interpretation of available print material relating to a sites context and the proposed development within that context. It is a way of focusing the study prior to detailed field work and landscape investigation. In this instance, variable scale Ordnance Survey maps and satellite imagery were studied along with 3D Data Terrain Models. In addition, the Meath CC Landscape Character Assessment was also consulted.

Although general in nature the desk study stage of the project assists in the clarification of the following considerations;

- **The general topography, vegetative cover, visible ground water, and sites of potential historic or cultural interest.**
  Study of the available map information indicated that the site is located on a localised elevation in a gently undulating area.
  OSi 1:50000 indicates that within 5km radius of the site there is a significant cover of coniferous forestry (approx. 2.5km to the West of the site) and several other blocks of deciduous woodland interspersed throughout the area.
  Several historic/archaeological sites of note including Churches and Mounds have been highlighted within 5km around the application area. Specific impacts on these elements should be separately assessed. However their presence is noted within the landscape and visual section due to potential for them to be visitor attractions and therefore become key visual receptors.

- **Identification of primary investigation area or Zone of Theoretical Visual Influence (ZTVI).**

  Given the sites topography, it was expected that there would be open views to the site from positions to the North and South.

  Although the ZTVI is calculated and generated using topographical data, it is generally accepted that such models do not necessarily reflect the actual visual catchment on the ground, it is therefore crucial that the topographically generated ZTVI is refined through detailed site survey and analysis.

- **The potential relationship between the development and any residential settlements, dwellings and the surrounding transportation network.**

  Although not all dwellings are individually identifiable on the OSi 1:50000 map, it is sufficiently detailed for the desk study to reveal that the site is located in an area which has a relatively low population concentration.

  Population is concentrated in the village of Rathmoylan and elsewhere as sporadic ribbon settlements primarily located along the surrounding minor roads.

- **Landscape & Visual Designations, Protected areas and significant viewpoints.**

  The site does not lie within a landscape designation.

  The Co. Meath Development Plan 2013-2019 undertook a landscape character assessment survey and divided the county into 'Landscape Character Areas' (LCA); the site is located on the boundary of the 'Central Lowlands' running to the South West and on the Western boundary of Rathmoylan Lowlands' (Co. Meath Development Plan 2013 – 2019; Landscape Character Assessment Section; Section 8, LCA Parts 7-13)

  The site is located approximately 3km to the South West of the Boyne River Valley (LCA)

9.3.2 Field Study

Desk studies are important to establish the basic approach to landscape and visual assessment and setting out principle issues/ areas to be investigated. However, it is only through field work that an accurate understanding of potential influence of a proposed development can be fully determined.

Most importantly field study helps to clarify the eye level visual envelope of the development. This exercise refines the computer generated ZTVI models to more accurately reflect the actual visual envelope of the development.

The area was visited and surveyed during Winter/Spring with foliage cover at its lightest.
It should be noted that as foliage cover increases through Spring into Summer the subject site would potentially be less visible. The influence of foliage cover has been broadly factored into the findings, with a worst case scenario considered – i.e vegetation cover at its lightest.

In addition to the information revealed during the desktop analysis, the field study work investigated and considered a number of critical issues, which have been factored into the assessment conclusions:

- Confirmation of the landscape character and sense of place, quality and value of the surrounding;
- Localised topography variation and woodland / hedgerow cover.
- Effects of localised planting, stone wall, earthworks and boundaries associated with residential properties;
- Relationship of other operations throughout in the area
- Consideration of operations in low light conditions
- Potential eye level perceptions (Local residents – Frequent, Passive Tourism - Occasional ;

- General landscape dynamic (assessing the potential pressures and evolution of surrounding landscape)

9.3.3 Baseline Study – Site description

The subject site almost entirely occupied by an existing quarry operation with a variety of ancillary operations.

9.3.4 Baseline Study - Landscape Character

As outlined above a broad landscape characterisation study of County Meath has been prepared and is contained within the County Meath Development Plan 2013 – 2019. The site sits on the border of two landscape characterisation areas within that study; the Central Lowlands, and the Rathmoylan Lowlands.

The relevant information has been studied and extracted from this document and is included below.

Central Lowlands

LCA 6 Central Lowlands

Large lowland landscape with rolling drumlins interspersed with numerous large estates and associated parkland. Thick wooded hedgerows and some conifer plantations. Deep roadside ditches and banked hedgerows are a common feature. In more remote areas farmland is less well-managed with rough pasture, overgrown hedgerows and less woodland. Farmland is in a variety of scales and squares divided by hedgerows which are usually clipped to eye-level, but less well-managed away from roads. The North East of the area deep and shallow well-drained soils have been developed for agriculture with estate landscapes more prevalent.

Land Uses

- Mix of small-medium rough pasture fields
- Beech stands
- Sand and gravel quarries

Boundary Determinants

- Deep roadside ditches
- Banked hedgerows
- Eye-level clipped hedges

Landscape Value :	Exceptional	Very High	**High**	Moderate	Low
Landscape Sensitivity:	High	**Medium**	Low		
Landscape Importance:	Regional				

9.3.5 Baseline Study - Visual

When establishing the extent of a development proposals visibility there are a number of recognised stages:

- The first is generally conducted through desk study via. utilisation of digital terrain models or printed mapping to generate a ZTVI. This provides the assessor with a worst-case scenario of potential visibility, recognising that the exercise does not account for potential screening influence of vegetation, manmade structures or indeed low level localised topographical variation.
- With ZTVI prepared, the next stage is to consider potential visual receptors. Again, this can initially be carried out as a desk study to identify potential properties, road intersections, historic sites or OSi marked viewpoints etc which may be important to the assessment.
- The next stage generally is to test and refine desk study analysis in the field. Consideration of the surrounding landscape from a high point within the proposed development site is often a logical starting point for field work. From an elevated location, the assessor (comparing with ZTVI mapping) can identify points in the wider landscape from which the site is most likely to be visible. This exercise is known as intervisibility and forms the basis of defining the actual visual envelope.
- The final stage is to consider visibility of the subject site from the surrounding landscape. This generally involves assessment and photography from fixed key locations as identified, along with sequential views experienced along pedestrian and vehicle routes.

It would obviously be impossible (indeed unnecessary) to assess potential visibility from every angle or potential viewpoint. Therefore, the recognised practice is to identify a selection of viewpoints considered representative of a range of views and viewer types, including residences, transport routes, recreational routes, visitor attractions, main landscape character types and a variety of distances, aspects, elevations, extents, and sequential routes. These are known as ‘key visual receptors’ and provide a reliable sample of impressions across the study area. Based on field survey and analysis, Figure 9.2 illustrates the identified ZTVI created by the proposed development with Figure 9.3 illustrating the location of key visual receptors identified for the study. It should be noted as a basic visual principal, any type of

development in the landscape will become less perceptible with distance. This simply equates to a reduction of the significance of potential visual impacts as one moves further away. The following distance categories have been considered appropriate.

Viewpoint Distance 0-2km

It is generally accepted that a development located approximately 2km or less from a viewer would be close enough to allow identification of significant detail. Any positions within this range with open uninterrupted views of a development would generally receive the greatest visual impacts.

Viewpoint Distance 2-5km

At this distance, visibility of a development site becomes more general, with viewers in open uninterrupted positions able to identify general form, colour/tone and textural contrast, but losing the more focused detail achievable from closer positions. Effects at this distance are generally less than those found between 0-2km.

Viewpoint Distance 5-15km+

Beyond 5km visual prominence quickly diminishes. Certain circumstances/light conditions etc. have potential to allow certain types of development and material finishes to be perceived. The development increasingly becomes part of the general background/distance views. Upwards of 15km distance and developments quickly become minor features within the landscape and considered imperceptible to the average human eye. The development in effect becomes part of the general background/distance views.

The visibility assessment in this case has concentrated on publicly accessible areas primarily within the first (0-2km) and most sensitive distance category.

The level topography, frequency and density of boundary hedgerows and woodland blocks and even existing buildings may greatly reduce the potential extent of visibility

of the proposed development. Careful consideration is therefore required at fieldwork stage.

It is important to note that the ZTVI (Figure 9.2) illustrates two key elements associated with the development proposals, namely:-

The ZTVI associated with the removal of an existing large overburden tip centrally located within the site and areas for future extraction.

Figures 9.4 to 9.11 illustrate the key visual receptors identified for the study.

The visibility assessment in this case has concentrated on publicly accessible areas primarily within the first distance category (0-2km).

The undulating topography, frequency and density of hedgerows combined with clusters of woodland vegetation greatly reduce the potential extent of visibility, however, there remain several stretches of minor public road from which portions of the proposed development could be witnessed.

As illustrated in Figure 9.2 the Zone of Theoretical Visual Influence of the existing large overburden tip is relatively far reaching, contrasting with the relatively compact ZTVI generated by the proposed areas of extraction.

Views from local roads L80141 & L80140 present most opportunity to encounter views of the site.

9.4 Description of Development

Whilst Section 3 provides a detailed description of the development the application in landscape terms is considered to cover three primary elements which,h form the focus of this assessment:-

1. Lateral & vertical extension of extraction area (all within the footprint of the existing quarry operations)
2. The removal of a large existing overburden tip (c.30m high) centrally located within the site and;
3. Comprehensive restoration scheme

9.5 Assessment of Impacts

9.5.1 Summary of Landscape Impacts

Landscape assessments attempt to measure the sensitivity of specific landscape resources and describe the significance of changes to that landscape occurring as a result of a proposed development. More importantly, they should also identify opportunities during the design process focused on minimising potential landscape and visual impacts (mitigation) through positive iterative design intervention. This can include exerting influence on the development layout and arrangement, determining sympathetic approaches to realising the development proposal, i.e. suggested phasing, massing, buffer planting etc.

Landscape and visual impacts are intrinsically linked; therefore, measures to reduce landscape impacts such the introduction of green infrastructure will generally assist with reduction of visual impacts and vice versa.

It is understood that development of this type results in permanent change and may fundamentally alter the appearance of a landscape. However, it should be clarified that, altered appearance does not necessarily equate to long-term / permanent negative impacts to landscape character. It is therefore essential that a holistic view is taken with proposals of this nature, not only assessing the potential impact during the operational phases, but critically how it will also appear when fully restored with landscape proposals fully implemented and matured.

The Meath Landscape Character Assessment broadly describes and classifies the distinctive landscapes within the county, providing a valuable tool to aid decision making by planners and other interested parties.

However, it is generally accepted that large scale, characterisation of this type presents some limitations. Within each identified character area there can be localised variability of landscape conditions which cannot be identified at a large scale. For example, it would not be unusual find pockets of very high or very low landscape value within a landscape character area generally classified as having an overall landscape value of medium.

Further refinement of each LCA is acknowledged within chapter 8 of the Meath Development Plan which states:

'it is only possible to define actual capacity on a case by case basis because it will vary according to the type and form of development, its location in relation to the landscape area in question and its visibility from it'.

In this instance the landscape character and value of the lands surrounding the subject site have been directly influenced by the presence of quarry operations for several decades. Therefore, whilst the general landscape character of the region is classified as high value, it is considered to be moderate to low value at a more localised / site level.

Table 9.7 - Landscape Sensitivity Summary (within visual envelope)

Consideration Factor	Comment	Significance
Landscape designation	The application site is not located within a designated landscape, or Area of Constraint on Mineral Development.	Whilst this is a pleasant landscape of local value, it is not considered of national or international importance
Landscape scale	The presence of mature hedgerows and woodland blocks, combine to create a closed and relatively small scale landscape character	This landscape scale is a typical characteristic of this LCA. The existing structural planting serves to increase the landscapes capacity.
Landscape quality	The surrounding landscape is considered of moderate quality.	The landscape, although overall of reasonable quality, cannot be considered to be pristine or unable to accommodate development.
Landscape value	The site is currently of little landscape or amenity value.	The application site is almost entirely occupied by extractive operations with the exception of peripheral areas where structure planting has been retained or introduced
Landscape distinctiveness & rarity	The site is composed of existing quarry operation.	This landscape is not considered rare.
Public ownership and popularity	The site and much of the surrounding area is under private ownership.	The site and the immediate surrounding area contain few public recreation resources.
Landscape capacity	The site is located in a low-lying landscape with mature hedgerows and clusters of woodland which increase the potential capacity to accommodate the proposal.	The screening potential of the level topography and existing vegetation, raises the capacity of the area to accommodate development.

Weighing up the various complex factors as outlined in the Criteria Tables above, and in particular the application sites location out with any recognised landscape designation area, natural screening created by topography and the very low numbers of impacted population, and potential for additional mitigation including a comprehensive restoration scheme it is concluded that the landscape sensitivity of the area should be generally classed as **Medium-Low**

(Definition from Table 9.1 Landscape Sensitivity Criteria)

Medium-Low - Landscape characteristics or features which are reasonably tolerant of change without determent to their present character;

No designation present or of little local value;

An example of an un-stimulating landscape or set of features

Landscape sensitivity is combined with the magnitude of change generated by a development to establish the overall impact / effect.

In addition to the Criteria Tables, magnitude of change will be influenced by the following:

- Potential for mitigation.
- Development typology
- Duration of development
- Existing precedence of quarrying / processing operations in the area.
- The population numbers impacted are considered low.
- Full decommissioning and restoration proposed.

With reference to Table 9.3 Landscape Magnitude Criteria it is considered that the development fall within the **Low** category as defined below:-

Low - Minor change, affecting some characteristics and the experience of the landscape to an extent; and
Introduction of elements that are not uncharacteristic.

Table 9.8 - Assessment of landscape impacts

		Sensitivity				
		High	**High - Medium**	**Medium**	**Medium - Low**	**Low**
Magnitude	**Very High**	Major	←→	Major	←→	Mod-major
	High	Major	←→	Mod-major	←→	Moderate
	Medium	Mod-major	←→	Moderate	←→	Minor
	Low	Moderate	←→	**Minor**	←→	Negligible
	Very Low	Minor	←→	Negligible	←→	Negligible

Therefore, with **Low** landscape sensitivity combined with **Medium** magnitude of change it is considered that the proposal development would generate a **Minor** impact on the landscape character post construction.

9.5.2 Summary of Visual Impacts

Visual impacts have been illustrated by assessment from specific viewpoints. Figures 9.4 to 9.11 illustrate key identified visual receptors, with potential visual impacts assessed from these positions. Refer to these figures for detail. Table 9.9 below provides a summary of visual impacts from each of the selected viewpoints.
These viewpoints are representative of worst-case scenario views of the proposed development. Therefore, it is important to emphasise that as viewers move away from these receptors, the magnitude of change and potential visual effects will generally diminish.

Table 9.9 - Summary of Visual impacts

Viewpoint No.	Receptor Type	Visual Sensitivity	Magnitude of Change	Effect /Impact
Viewpoint 1	Public Road - Sequential	Medium-Low	Very Low	Negligible
Viewpoint 2	Public Road - Sequential	Medium-Low	Low	Negligible
Viewpoint 3	Public Road - Sequential	Low	Medium	Minor
Viewpoint 4	Public Road - Sequential	Low	Medium	Minor
Viewpoint 5	Public Road - Sequential	Low	Medium	Minor
Viewpoint 6	Private Road - Sequential	Low	Medium	Minor
Viewpoint 7	Public Road - Sequential	Low	Medium	Minor
Viewpoint 8	Public Road - Sequential	Low	Medium	Minor

Predicted visual effects arising from the proposals at the selected visual receptors range from **Negligible** to **Minor**

9.5.3 Proposed Mitigation Measures

The purpose of mitigation is to avoid, reduce and where possible remedy or offset, any significant negative (adverse) effects on the environment arising from a

proposed development. If good environmental planning and design principles are applied, together with a flexible approach to design, a high degree of mitigation can be built into the scheme from the outset, which can thereby reduce the extent or scale of adverse effects.

9.5.4 Mitigating Landscape and Visual Impacts

The primary focus of this assessment is the potential landscape and visual effects generated by the removal of an existing visually prominent overburden tip and additional extension of extraction laterally and horizontally.

- The reduction and gradual removal of the overburden tip is considered of significant benefit in landscape and visual terms. Removal will greatly reduce the visual influence exerted by historic quarrying activities at this site.
- Restoration to commence at the earliest opportunity in all areas were extraction or operations associated with extraction are no longer occurring.

9.5.5 Lighting Mitigation During Operations

The key opportunities to mitigate lighting impacts by implementing best practice during operations will include:

- Lighting to be switched off when not required specifically for operational activities or required for security or health and safety;
- The programme of works will take into account the location of sensitive receptors.
- Glare caused by poorly directed security and flood lighting will be minimised by positioning lights to <70 degrees and directing into the centre of the site.
- Light spill will be minimised by avoiding poorly sighted lights on the boundary of the site;
- Sky glow will be minimised by use of modern flood lights with appropriate shields to avoid light spilling upwards.

9.5.6 Cumulative Effects

Cumulative effects of the proposed development have been considered and divided into two types :-

- Intra-project Cumulative impacts (i.e Combined impact from other environmental subjects; and
- Inter-project Cumulative impacts (i.e Combined impact from other developments in the study area).

9.5.7 Intra-project Cumulative Impacts arising from the Proposed Development

These effects are typically interactive, i.e arising from the combined action of a number of different environmental topic areas. For example, the removal of trees not only have potential to generate landscape and visual impact, but can also have an ecological impact.

There are a number of topic areas where interaction impacts can occur cumulatively with Landscape and Visual

Key interactive effects with Landscape and Visual at this site are:

Noise /Air Quality

Potential noise and air quality impacts are generally most prevalent during operational phases. Whilst these would have no visual impacts, they can alter people's perception of the areas landscapes character. Measure to minimise noise and air quality impacts will reduce perceived landscape character impacts.

Natural Heritage

With the exception of a number of existing hedgerows around the boundaries, the Natural heritage value associated with the site is relatively limited. Section 11 the ecological section of the EIAR provides detail and recommendations.

The proposed landscape restoration offers a significant positive opportunity to improve the ecological diversity through habitat creation.

9.5.8 Inter-project Cumulative impacts arising from other Planning Applications

As well as interactive as outline above, cumulative effects may arise from the combined effects of other developments in the vicinity. Whilst there are a number of quarry operations within the region, it is considered that only the adjoining quarry to the west of the application site presents potential for cumulative impact.

Given the close proximity of these operations, from a number of locations (particularly to the north) visually both can viewed as a single operation.
The proposed removal of the large overburden form the subject site will have a net positive impact and reduce the overall cumulative impacts currently associated with the operations.

9.6 Residual Impacts

In addition to the consideration of the operational layout and sequence, the implementation of landscape proposals as illustrated in the submitted landscape planning drawings will support the appropriate integration and final restoration
It is expected that a relatively small area surrounding the site would experience residual glimpsed and partial views of the development although with the eventual removal of the large central overburden and reinforcement of boundary screening

were possible, impacts from operations would be lower than they have been historically at this site

Landscape sensitivity associated with this site is considered **Medium / Low**.

In terms of magnitude of change this will be **Low**. Once extraction is complete and restoration fully implemented, the magnitude of change will diminish further, resulting in **Minor** impact to the landscape character area.

Selected visual receptors are considered representative of typical views of the proposed development site. As illustrated and described in Figures 9.4 – 9.11 visual sensitively at receptors range from **Medium-Low to Low**.

Visual effects during operations are set out in Table 9.9.
The effects range from **Minor to Negligible**

It should be noted as viewers move away from these key receptors visual sensitivity and magnitude of change diminish, resulting in visual impacts over the majority of the Zone of Theoretical Visual Influence (ZTVI) being in the **Negligible** range.

9.6.1 Limitations and Assumptions

There were no limitation encountered or assumption made during the compilation of this assessment.

10.0 WASTE MANAGEMENT

10.1 General

Given that this EIAR is considering the totality of the project there are two distinct operational types and therefore two distinct waste streams, the first covering the waste arising from the extraction activities that principally revolve around plant and machinery wastes associated with routine maintenance and repairs and potential accidental fuel and oil spillages and the extractive waste that is an inevitable consequence of quarrying that is covered specifically by the Extractive Waste Regulations and secondly that waste that can arise from the ancillary manufacturing facilities that operate on the larger site as a result of the availability of the high quality mineral resource.

10.1.1 General Site Waste Management (Mitigation)

In the first instance the totality of the activities that are taking place on site are covered by the Site's Environmental Management System, updated 2019 – Appendix 10.1, that was originally promoted as part of the application and EIS that covers the Southern half of the site namely TA900976 and the associated Board decision PL17.235960.

With regard to waste management and control the company's EMS continues to provide as follows:

"The controls and mitigation measures for minimising the quantities of wastes generated and for minimising the potential impacts of storage and disposal of wastes are summarised as follows:

1. *Waste oil from maintaining vehicles and plant machinery and hazardous wastes are stored in a designated bunded storage area pending disposal by a licensed waste disposal contractor;*
2. *Wherever possible materials from site construction activities and from workforce management and administration that are able to be recycled will be separated at source;*
3. *Small containers will be strategically located close to offices, canteens and similar areas to separate useful paper, cardboard, wood, glass, plastics and metals;*
4. *Operational activities including the delivery of materials will result in the generation of wastes such as wood off-cuts, plastic and cardboard packaging, shipping pallets and metals. Waste and materials separated for recycling will be collected on a monthly basis and transferred to storage containers in a designated Waste Storage Area on the site;*
5. *Inspection of storage facilities for wastes and recyclables will be done on a daily basis.*
6. *All general waste that is unable to be separated or is otherwise not suitable for recycling will be collected for off-site disposal by licensed waste disposal contractors at regular intervals. Records of quantities of wastes disposed of or sent off-site for recycling and the contractor used will be kept as outlined in procedure EMS-008.*
7. *In order to ensure that site staff properly segregate waste materials, it is the responsibility of the Quarry Manager to ensure all staff are trained and made responsible for ensuring site housekeeping and the proper segregation of waste;*
8. *The following classes of materials are segregated into individual storage containers;*

Waste oils / greases / paints
Wood
Plastics
Glass

Cardboard / Paper
Domestic refuse
Metal
Contaminated soil (generated by oil spills etc)
Waste aggregate materials segregated into different size categories
Waste concrete / blocks
Batteries
Rubber conveyor belts

9. *All segregated wastes will be collected and sent for reuse or recycling by a suitable licensed waste contractor.*
10. *Suitable licensed waste contractors will be employed by Keegan Quarries Ltd to ensure that waste materials which cannot be reused or recycled at the site are collected and correctly disposed of at a waste licensed facility*.

10.1.2 Extractive Waste

The activities relating to quarrying are not considered to give rise to any specialist requirements and they can be managed by a series of Good Housekeeping measures as part of an overall waste management strategy outlined above from the Environmental Management System.

The effectiveness of these systems is illustrated by the general appearance of the quarry, the quarry waste products being limited to overburden storage and the quality of the monitored water, discharged from the site as outlined in Chapter 6.

The inert indigenous waste associated with the extraction process is considered and presented within the Extractive Waste Regulations 2009 – Compliance Statement held as Appendix 10.2.

10.2 Residual Impacts

The continuation of further quarrying activities is considered unlikely to give rise to any potential waste management related impacts if the existing measures continue to be employed on site. Following the extractive period, it is proposed that promoted restoration concept for the quarry, see Figures 3.1 onwards in Section 3, which would result in a water body and associated edged treatment and planting. In addition, the proposal promotes he removal and remediation of the northern element of the site that constitutes the manufacturing area. It is considered with the continued application of the adopted standards within the Company's Environmental Management System that this would not give rise to any potential waste management related impacts.

10.3 Conclusions

The continued implementation of an Environmental Management System, updated 2019 containing waste management measure and the compliance with the Extractive Waste Regulations 2009 will continue to ensure that the propose development will not result in a significant impact throughout the stages of development.

11.0 ECOLOGY

11.1 Overview

The full version of the Ecological Impact Assessment (EcIA) for this proposal is included within the Environmental Statement Part 3 as Appendix 11.1, below is the Executive Summary prepared by the Authors.

Woodrow Sustainable Solutions Ltd (Woodrow) was appointed to undertake an EcIA on behalf of Quarryplan and their client Keegan Quarries Ltd. This report provides a detailed ecological assessment to inform the production of the Environmental Impact Assessment Report (EIAR), which will accompany a planning application (the Application) seeking to secure planning consent for further mineral extraction at Tromman Quarry, Tromman, Rathmoylon, Co. Meath.

11.1.1 Quality assurance

The EcIA report has been compiled by Mike Trewby B.Sc, PGDip MCIEEM and has been checked and approved by Will Woodrow M.Sc. M.Sc. (Arch) CEcol MCIEEM.

Mike is a Senior Ecologist with Woodrow Sustainable Solutions Ltd (Woodrow) and is full member of Chartered Institute of Ecology and Environmental Management (CIEEM). He has 20 years of fieldwork and research experience in the field of ecology. Since 2011 he has worked as an ecological consultant and regularly carries out ecological impact assessments and monitoring for a range of developments and projects. This report has been approved by Will Woodrow. Will is a Director at Woodrow. He is an experienced ecologist with over 30 years of experience in ecological surveys and assessment. Will is a full member of CIEEM and is a Chartered Ecologist.
As members of CIEEM, Mike and Will are required to abide by a strict code of professional conduct in all aspects of this work.

11.1.2 Purpose of ecological impact assessment

The EcIA can be considered as having following aims:

- Establish the ecological baseline for the development or activity and determine the ecological value of the features identified;
- Provide an objective and transparent assessment of the ecological impacts of the development or activity in terms of national, regional and local policies relevant to nature conservation;
- Recommend mitigation measures to avoid, reduce and remedy any ecological impacts identified;
- Identify any residual impacts of the development or activity post-mitigation;
- Demonstrate that a development or activity will meet the legal requirements relating to habitats and species.

11.1.3 Legislative and policy context

This report has been undertaken with full account of legislation, policy and guidance relating to species and habitat protection, importance and survey protocol. The guiding legislation, policy and guidance includes the following:

- EU Habitats Directive 92/43/EEC, European Communities (Natural Habitats) Regulations 1997, European Communities (Birds and Natural Habitats) Regulations 2011
- Environmental Impact Assessment Directive (2011/92/EU)
- Environmental Impact Assessment Directive (2014/52/EU)
- EU Birds Directive 79/409/EEC
- Meath County Development Plan 2013-2019 adopted 17th December 2012 – see Section 8.4.2 Natural Heritage

- EPA (2015). Revised Guidelines on the information to be contained in Environmental Impact Statements. Draft report. Environmental Protection Agency, Dublin
- CIEEM (2016) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal. Chartered Institute of Ecology and Environmental Management (CIEEM)

11.2 Impact assessment methodology

The impact assessment methodology applied, follows the Chartered Institute of Ecology and Environmental Management 'CIEEM' guidance (CIEEM 2018) The following list provides a useful summary of the process for undertaking an EcIA, as detailed in this CIEEM guidance document.

11.2.1 Identifying ecological features within the zone of influence

Information acquired during the desk-study and field surveys determines the ecological features potentially affected by the proposed development, and as such occur within its 'zone of influence'. The zone of influence depends on the likely impacts of the proposed development or activity and the presence of ecological connections that provide a pathway for such impacts to an ecological feature of interest which is sensitive to such impacts. Any such ecological connections are described below.

11.2.2 Evaluating ecological features within the zone of influence

Those ecological features within the zone of influence such as nature conservation sites, habitat or species are evaluated in geographic hierarchy of importance. The following categories are used (adapted from NRA 2009).

Importance	Criteria
International Importance	'European Site' including Special Area of Conservation (SAC), Site of Community Importance (SCI), Special Protection Area (SPA) or proposed Special Area of Conservation. Proposed Special Protection Area (pSPA). Site that fulfils the criteria for designation as a 'European Site' (see Annex III of the Habitats Directive, as amended). Features essential to maintaining the coherence of the Natura 2000 Network Site containing 'best examples' of the habitat types listed in Annex I of the Habitats Directive. Resident or regularly occurring populations (assessed to be important at the national level) of the following: Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; and/or Species of animal and plants listed in Annex II and/or IV of the Habitats Directive. Ramsar Site (Convention on Wetlands of International Importance, especially Waterfowl Habitat 1971). World Heritage Site (Convention for the Protection of World Cultural & Natural Heritage, 1972). Biosphere Reserve (UNESCO Man & The Biosphere Programme) Site hosting significant species populations under the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals, 1979). Site hosting significant populations under the Berne Convention (Convention on the Conservation of European Wildlife and Natural Habitats, 1979). Biogenetic Reserve under the Council of Europe. European Diploma Site under the Council of Europe. Salmonid water designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988, (S.I. No. 293 of 1988).
National Importance	Site designated or proposed as a Natural Heritage Area (NHA). Statutory Nature Reserve. Refuge for Fauna and Flora protected under the Wildlife Acts. National Park. Undesignated site fulfilling the criteria for designation as a Natural Heritage Area (NHA); Statutory Nature Reserve; Refuge for Fauna and Flora protected under the Wildlife Act; and/or a National Park. Resident or regularly occurring populations (assessed to be important at the national level) of the following: Species protected under the Wildlife Acts; and/or Species listed on the relevant Red Data list. Site containing 'viable areas' of the habitat types listed in Annex I of the Habitats Directive.
County Importance	Area of Special Amenity. Area subject to a Tree Preservation Order. Area of High Amenity, or equivalent, designated under the County Development Plan. Resident or regularly occurring populations (assessed to be important at the County level) of the following: Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; Species of animal and plants listed in Annex II and/or IV of the Habitats Directive; Species protected under the Wildlife Acts; and/or Species listed on the relevant Red Data list. Site containing area or areas of the habitat types listed in Annex I of the Habitats Directive that do not fulfil the criteria for valuation as of International or National importance. County important populations of species; or viable areas of semi-natural habitats; or natural heritage features identified in the National or Local BAP; if this has been prepared. Sites containing semi-natural habitat types with high biodiversity in a county context and a high degree of

Importance	Criteria
	naturalness, or populations of species that are uncommon within the county. Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level.
Local Importance (Higher Value)	Locally important populations of priority species or habitats or natural heritage features identified in the Local BAP, if this has been prepared; Resident or regularly occurring populations (assessed to be important at the Local level) of the following: Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; Species of animal and plants listed in Annex II and/or IV of the Habitats Directive; Species protected under the Wildlife Acts; and/or Species listed on the relevant Red Data list. Sites containing semi-natural habitat types with high biodiversity in a local context and a high degree of naturalness, or populations of species that are uncommon in the locality; Sites or features containing common or lower value habitats, including naturalised species that are nevertheless essential in maintaining links and ecological corridors between features of higher ecological value.
Local Importance (Lower Value)	Sites containing small areas of semi-natural habitat that are of some local importance for wildlife; Sites or features containing non-native species that is of some importance in maintaining habitat links.

Only Important Ecological Features (i.e. those features evaluated as being of Local Importance (Higher Value) or greater) within the zone of influence are assessed with respect to potential impact.

11.2.3 Significant effects on important ecological features

For the purpose of EcIA, ‘significant effect’ is an effect that either supports or undermines biodiversity conservation objectives for those ecological features which have been identified as being an important feature of the site (“Important Ecological Features”). Conservation objectives may be specific (e.g. for a designated site) or broad (e.g. national/local nature conservation policy). As such effects can be considered significant in a wide range of geographic scales from international to local. Consequently, ‘significant’ effects are qualified with reference to the appropriate geographic scale (CIEEM 2018).

11.2.4 Assessment of residual impacts and effects

After characterising the potential impacts of the development and assessing the potential effects of these impacts on the 'Important Ecological Features', mitigation measures are proposed to avoid and / or mitigate the identified ecological effects. Once measures to avoid and mitigate ecological effects have been finalised, assessment of the residual impacts and effects is undertaken to determine the significance of their effects on the 'Important Ecological Features'.

11.2.5 Assessment of cumulative impacts and effects

Cumulative effects can result from individually insignificant but collectively significant actions taking place over a period of time or concentrated in a location (CIEEM 2018). Different types of actions can cause cumulative impacts and effects. As such, these types of impacts may be characterised as:

- Additive/incremental – in which multiple activities/projects (each with potentially insignificant effects) add together to contribute to a significant effect due to their proximity in time and space (CIEEM 2018).
- Associated/connected – a development activity 'enables' another development activity e.g. phased development as part of separate planning applications. Associated developments may include different aspects of the project which may be authorised under different consent processes. It is important to assess impacts of the 'project' as a whole and not ignore impacts that fall under a separate consent process (CIEEM 2018).

11.3 Ecological survey methodology

Surveys of the terrestrial ecology at the site were undertaken following specific guidelines for the relevant target species outlined below. The importance of the habitats and species present is evaluated using the Chartered Institute of Ecology

and Environmental Management Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal (CIEEM 2018). This guidance document outlines an accepted approach for the evaluation of impacts from such developments.

11.3.1 Desk based review of biological records

Assessment of the 2013-18 baseline conditions were based on a desk-based review of ecological and hydrological sections within the EIS (May 2009), updated in 2019 (BCL Hydrogeologists Ltd) for the quarry extension, along with viewing of sequential ortho-imagery.

For the additional baseline (2018-2019) assessment, a desk-based review of biological records for the area was undertaken utilising information available from the National Biodiversity Data Centre (NBDC).

11.3.2 Surveys undertaken

The site was visited twice during 2018 and twice in 2019 on the following dates:

- Visit 1: 28th August 2018 Surveyor: Kate Bismilla
- Visit 2: 16th October 2018 Surveyor: Mike Trewby
- Visits 3-4: 18-19th June 2019 Surveyor: Mike Trewby

Ecological surveys undertaken included habitats, terrestrial mammals, bats (foraging and roosting), breeding birds, amphibian and protected invertebrate suitability, and alien invasive species.

11.3.3 Limitations

The 2019 surveys, undertaken within optimal timing for breeding birds, bats and habitats, complemented the 2018 surveys. Given the location of the development, the habitats present on the site and the long-established nature of the development, it is considered that the desk-based and ecological field surveys conducted in 2018 and 2019 were optimal and therefore sufficient to assess the ecological impacts.

11.4 Designated sites with potential ecological / hydrological connections to the development

11.4.1 Natura 2000 sites

The revised EPA Draft Guidelines (EPA August 2017) states in section 3.3.5 that:
"*A biodiversity section of an EIAR, for example, should not repeat the detailed assessment of potential effects on European sites contained in a Natura Impact Statement, but it should refer to the findings of that separate assessment*".

This approach has been adopted and the conclusions of the NIS (Woodrow, 2019) are referenced. No part of the application site lies within a designated Special Area of Conservation (SAC) or Special Protection Area (SPA). As a result of hydrological connections two Natura 2000 sites were brought through to Stage 2 Appropriate Assessment.

The Natura 2000 sites and the Qualifying Interests assessed were:

- River Boyne and River Blackwater SAC - Qualifying Interests:
- Alkaline fens
- *Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno - Padion*, *Alnion incanae*, *Salicion albae*)
- River lamprey (*Lampetra fluviatilis*)

- Otter (*Lutra lutra*)
- Salmon (*Salmo salar*)

- River Boyne and River Blackwater SPA - Qualifying Interests:
- Kingfisher (*Alcedo atthis*) – breeding

The concluding statement of the NIS (Woodrow 2019b) is as follows:

This Natura Impact Statement has identified the particular types of effect that have potential for adverse impact on the integrity of the River Boyne and Blackwater SAC and the River Boyne and Blackwater SPA. The statement identifies mitigation measures that will ensure avoidance of these effects; so that the structure and functions of the SAC and SPA are not affected, thus demonstrating that mitigation was sufficient to avoid adverse impact throughout the time periods of the development assessed. These mitigation measures are set out in Section 6. The implementation of these control measures on site means that it can be concluded in the light of best scientific knowledge, that there will be no significant effects, either individually or in combination with other plans or projects adversely affecting the conservation interests or conservation objectives of the River Boyne and Blackwater SAC and the River Boyne and Blackwater SPA, i.e. the integrity of these, or any other Natura 2000 sites.

This has been concluded for the following reasons:

- *Limited connectivity to any Natura 2000 Site (a linear hydrological connection of 10 km to the River Boyne and Blackwater SAC and River Boyne and Blackwater SPA via a drain that largely only takes dewatering arisings from the quarry;*
- *The contained nature of quarrying and manufacturing operations with the site;*
- *Environmental controls employed, including an on-site Environmental Management System updated 2019.*

This Natura Impact Statement has identified the particular types of effect that have potential for adverse impact on the integrity of the River Boyne and Blackwater SAC and the River Boyne and Blackwater SPA. The statement identifies mitigation measures that will ensure avoidance of these effects; so that the structure and functions of the SAC and SPA are not affected, thus demonstrating that mitigation will be sufficient to avoid adverse impact due to the proposed development assessed. These mitigation measures are set out in Section 6. The implementation of these control measures on site means that it can be concluded in the light of best scientific knowledge, that there will be no significant effects, either individually or in combination with other plans or projects adversely affecting the conservation interests or conservation objectives of the River Boyne and Blackwater SAC and the River Boyne and Blackwater SPA, i.e. the integrity of these, or any other Natura 2000 sites.
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- *The contained nature of quarrying and manufacturing operations with the site;*
- *Environmental controls employed, including an on-site Environmental Management System.*

11.4.2 Natural Heritage Areas

No part of the application site lies within an NHA or pNHA. There is one NHA within 15 km of Tromman Quarry and six pNHAs. These sites are located between 2 to 14 km from the quarry and there is considered to be no ecological or hydrological connectivity between these sites and the quarry.

11.5 Baseline conditions

11.5.1 Site location

The site is located in the townland of Tromman, Rathmolyon in Co. Meath. The site extends on the northern side of the R156 Rathmolyon-Ballivor road. It is situated

approximately 2.2 km northwest of Rathmolyon Village, 6.4 km south of Trim and 9 km north of Enfield. It lies within a rural setting and rolling hills dominate with pastural agriculture and patches of arable production being the prominent feature of the landscape. There is another quarry directly adjacent to Tromman Quarry which is operated by Kilsaran.

11.5.2 Ecological baseline

Site visits undertaken in October 2018 and June 2019 provide the information for the baseline ecological conditions. The results of these surveys are provided in the sections below.

Terrestrial mammals

Site visits showed evidence of badgers utilising the site during visits, including a network of well-worn paths indicative of regular use by badgers, a badger latrine, an isolated badger scat and foraging activity. No active badger setts were located within the site or adjacent to the site. A single disused burrow was located within the woodland outside the southern boundary of the site - the dimension, while relatively narrow would have facilitated access by badgers, but could have been excavated by rabbits, which were active in parts of the site.

Bats

Bat surveys were undertaken on the night of 18th-19th June 2019 by means of a transect, static bat detectors and a roost emergence survey. These surveys revealed the presence of common and soprano pipistrelle, Leisler's bat, brown long-eared bat, and Myotis species at the site. As would be expected, activity was generally concentrated around the more suitable habitats on the periphery of the site, with limited activity within the core disturbed or built-up parts of the site. There was no roost recorded on site.

Birds

Birds recorded during the site visits were mostly common, widespread species including (* indicates breeding behaviour observed): lesser black-backed gull, raven*, hooded crow, rook, jackdaw, magpie, wood pigeon, feral pigeon, starling, swallow*, house martin, sand martin, wren, robin, goldcrest*, blackcap*, whitethroat*, chiffchaff*, willow warbler*, great tit*, coal tit*, blue tit*, blackbird*, song thrush*, mistle thrush, pied wagtail, meadow pipit*, chaffinch*, goldfinch*, linnet*, yellowhammer*. In addition, there is a territorial pair of peregrines at the site, which are likely to be using the site, or the adjacent quarry for breeding. A raven nest was also located at the site. The only Red listed species of conservation concern (Colhoun & Cummins 2013) recorded during site visits were meadow pipit and yellowhammer. The hedgerows on the periphery of the site, in close proximity to cereal fields have the potential to offer nest sites for yellowhammers and a singing male was recorded at the south-eastern boundary of the site. One, possibly two, pairs of meadow pipit were nesting on the suitably vegetated lower levels of the large spoil heap in the centre of the site.

Reptiles and amphibians

A search of the NBDC database found that the only reptile or amphibian records for the 10-km squares covering Tromman Quarry were for common frog (*Rana temporaria*). It is likely that any standing water within the site will be inhabited by frogs during the breeding season. The settlement tanks on the eastern boundary of the site, were assessed as unsuitable for smooth newt (*Lissotriton vulgaris*) breeding ponds.

Flora and habitats

No rare plants listed under the Flora Protection Order 1999 were located within Tromman Quarry during site walkover and data searches (NBDC).

The following habitat types were recorded as occurring within the site:

- FL8 Other artificial lakes and ponds
- W4 Drainage ditches

- GA2 Amenity grassland
- WD1 (Mixed) broadleaved woodland
- WS1 Scrub
- WS2 Immature woodland
- WS3 Ornamental/ non-native scrub
- L1 Hedgerows
- WL2 Treelines
- ED2 Spoil and bare ground
- ED3 Recolonising bare ground
- ED4 Active quarries and mines
- BL2 Earth banks
- BL3 Buildings and artificial surfaces

The location of these at the site is shown in Figure 8.1

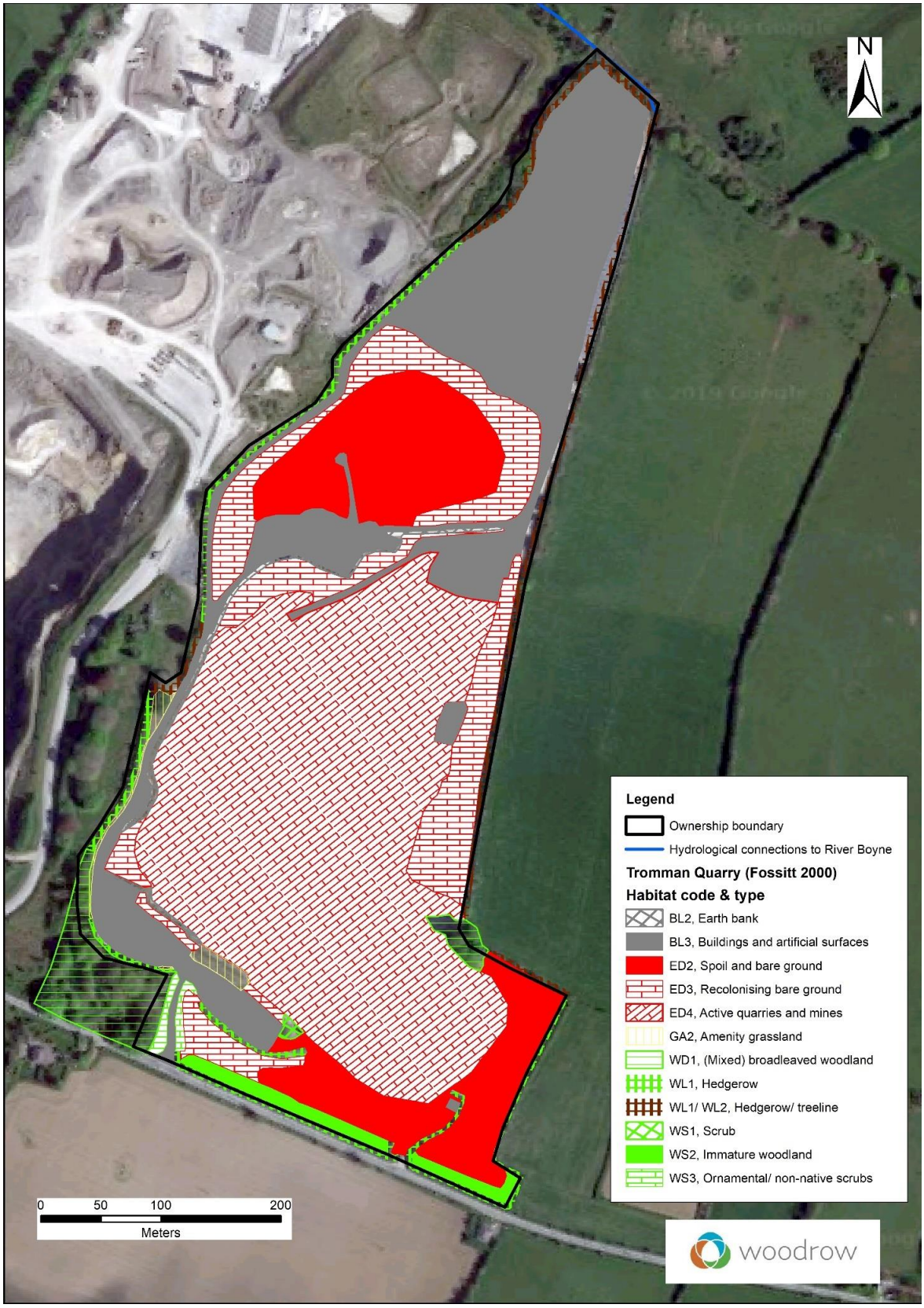


Figure 11.1. Habitat types mapped in Tromman Quarry, as classified in Fossitt (2000)

Invasive species

No high impact invasive plant species (as listed by NBDC) were recorded during the site visits. Likewise, there were no plant species recorded on Third Schedule applying to non-native species subject to restrictions under Regulations 49 of S.I. No. 477/2011 - European Communities (Birds and Natural Habitats) Regulations 2011.

The non-native species identified as currently occurring within Tromman Quarry that pose a potential risk of spreading and infecting quarried product are traveller's-joy, buddleia and possibly sycamore.

11.6 Evaluation of important ecological features within the zone of influence

Table 11.1 below summarises the Important Ecological Features of interest within the zone of influence of the development. Habitats and species which have been assessed to be of Local Importance (Higher Value) or above within the application site.

Table 11.1. Important Ecological Features and their Evaluation

Important Ecological Feature	Evaluation
Designated Areas	
River Boyne and River Blackwater SAC River Boyne and River Blackwater SPA	International Importance
Habitat	
WD1 (Mixed) broadleaved woodland	Local Importance (Higher Value)
WS1 Scrub	Local Importance (Higher Value)
WS2 Immature woodland	Local Importance (Higher Value)
WL1 Hedgerows	Local Importance (Higher Value)
WL2 Treelines	Local Importance (Higher Value)
BL2 Earth banks	Local Importance (Higher Value)
Species	
General Bird Assemblage	Local Importance (Higher Value)
Badger	Local Importance (Higher Value)
Bats	Local Importance (Higher Value)

Invasive Alien Species (IAS) are considered within the impact and mitigation sections below.

11.7 Impact assessment of important ecological features within the zone of influence

The Ecological Impact Assessment is undertaken in this section. The methodology set out in Section 11.2 is applied to Important Ecological Features which have been identified and described in Section 11.5 and evaluated in Section 11.6. All impacts are described in the absence of mitigation.

11.7.1 Contamination of surface water / ground water

Without mitigation, quarrying operations near water have an associated risk of pollution from fuel spillages, oil leakages and other accidents with potential to lead to serious impacts causing the contamination of surface water run-off and the degradation of water quality in the vicinity of the site and consequently impacting the habitats and species present in any affected waterbody.

Without mitigation, the stripping of vegetation, ground disturbance and storage of stripped soils near watercourse increases the risk of material being washed into watercourses during periods of heavy and prolonged rainfall or flood events, with potential impacts on water quality through increased turbidity levels and sedimentation, as well as the potential mobilisation of a variety of substances that may be contained within the soils. Quarrying operations also have the potential to cause alterations to localised groundwater levels and surface water flows through the extraction of activities, dewatering and discharge of water.

At this site, without appropriate control measures, contaminants would enter the drain along the northern boundary of the site, which is hydrologically linked, although distantly (*c*. 10 km) to the River Boyne and River Blackwater SAC and SPA.

11.7.2 Potential impacts on Designated Sites

River Boyne and Blackwater SAC and River Boyne and Blackwater SPA fall within the potential zone of influence because of the existing hydrological link and the potential for impact on water quality on the site, and consequent impact on the Qualifying Interests.

The NIS (Woodrow 2019) concluded that the distance of the hydrological link to Natura 2000 sites downstream of the development (*c*. 10 km) in combination with the existing and proposed control measures, mean that there is no potential for adverse impacts on the integrity of the River Boyne and Blackwater SAC or the River Boyne and Blackwater SPA.

11.7.3 Potential impacts on flora and habitats

Habitat loss and fragmentation

Habitat loss incurred as part of preparatory works for the south-eastern quarry expansion (vegetation stripping) and replacement planting along the southern boundary, occurred within the consented timeframe for quarrying (2011 to 2017), i.e. pre-August 2018. As this loss has been previously assessed for ecological impacts, it does not form part of this report. Vegetation stripping in preparation for expansion of the eastern and southern quarry faces had largely been completed pre-August 2018; however, recommencement of quarrying activities will require the removal of 60m of non-native beech hedgerow in the south-east of the site, as well as the removal of a garage.

Quarry expansion to the south, north and west will result in the loss of small patches of WS2 Scrub that have colonised the upper levels of the quarry faces. There will be no further loss of WS2 Scrub on the south-eastern quarry face, as vegetation has not yet colonised these recently quarried faces.

Dust deposition on flora

Quarrying activities generate dust and in the absence of mitigation, dust emissions have the potential to exceed permitted levels. Fugitive dust is typically deposited within 10 to 200 m of the source; the greatest proportion of which, comprising larger particles (> 30 microns) is deposited within 100 m. Large amounts of dust deposited on vegetation over a prolonged period results in adverse effects on plant productivity, which can lead to the degradation of sensitive habitats. Prevailing weather conditions have a bearing on how much dust is generated and deposited, with factors such as rainfall suppressing the agitation of dust which may also have a cleansing effect, washing deposits off foliage.

Dust deposition starts to affect the more sensitive species at levels above 1000 mg/m^2/day, which is significantly higher than the upper limit permitted under the previously set planning conditions for the site –350 mg/m^2/day. Based on previous adherence with these limits the impact on flora in the vicinity of the quarry will be minimal and in addition there are no dust sensitive terrestrial habitats adjacent to the development.

Non-native and invasive plant species

No high impact invasive plant species (as listed by NBDC) were recorded during the site visits at Tromman. Likewise, there were no plant species recorded on Third Schedule applying to non-native species subject to restrictions under Regulations 49 of S.I. No. 477/2011 - European Communities (Birds and Natural Habitats) Regulations 2011. Several amber listed non-native species of plant were recorded including, snowberry (*Symphoricarpos albus*), traveller's-joy (*Clematis vitalba*), buddleia (*Buddleja davidii*) and sycamore (*Acer pseudoplatanus*).

11.7.4 Potential impacts on Fauna

Disturbance to fauna

As outlined above (under habitat loss), much of the preparatory work for quarry expansion (vegetation removal and stripping of overburden) has already been

undertaken; and as such, there will be minimal direct disturbance to fauna resulting from habitat loss – see sections under birds and protected mammals below.

Quarrying activities, along with the resultant potential ecological disturbance factors including noise, vibration and movement (machinery and human operatives) have been well-established at Tromman Quarry over the last *c*. 18 years. As such, any fauna occurring in the area will have become habituated to disturbance factors emanating from the site and species particularly sensitive to disturbance are likely to have been displaced previously.

Given the minimal levels of lateral expansion and that all quarrying activity will be restricted to the existing quarry void and the northern spoil heap, no additional significant impacts are predicted to occur during the operational lifespan of the quarry.

Birds

The linear features on the periphery of the site (hedgerows/ treelines/ drains/ steams) provide nesting and foraging habitat for birds. These features will be retained throughout the operational phase of the quarry. The garage and a short section of beech hedgerow (*c*. 60 m) in the south-east of the site will be removed. The hedge provides potential nesting and foraging habitat for a small number of birds; and robins, song thrushes and blackbirds were recorded in the area during 2019 breeding season. The interior of the garage, which only recently became accessible (2019 breeding season) currently provides nest sites for swallows and there is potential for other species like jackdaw and starling to use the building.

Demolition of the garage and removal of the beech hedge will result in the loss of nesting habitats for a relatively small number of relatively common and widespread bird species. To ensure that direct disturbance of breeding birds is avoided, restrictions will be required involving the appropriate timing of removal of the beech hedge and garage (i.e. demolition/ removal outside of the breeding season: 1st March to 31 August)

Peregrine were exhibiting territorial behaviour in the area. A breeding site within Tromman Quarry was not confirmed and the pair may have been nesting in the adjacent quarry. Peregrine nest on the ledges of cliffs and tall buildings. Cliffs in quarries are increasingly being utilised by breeding peregrines and have facilitated the expanding breeding range of this species in Ireland. The species' conservation concern in Ireland is currently listed as Green; as breeding numbers have recovered from historic declines (Coulhoun & Cummins 2013).

Non-active cliffs faces will be available within the quarry throughout the operational lifespan of quarrying activities, and cliffs will be retained as part of the restoration plans. This will have a positive impact for peregrine falcons and other cliff nesting birds including kestrels, ravens, jackdaw and rock pigeons.

It is not considered that quarry expansion poses any significant impacts upon the local bird population.

Protected mammals - Bats

The linear features on the periphery of site provide foraging habitat for bats. These features on the outer edges of the site will continue to be retained throughout the operational phase of the quarry.

The garage and a short section of beech hedgerow (*c*. 60 m) in the south-east of the site will be removed. The hedge is likely to provide a short length of foraging habitat for bats; however, in the context of substantial areas of similar habitats existing on the periphery of the site and in the surrounding area, the potential loss of foraging habitat is deemed to be insignificant at a local level. A roost emergence survey conducted at the garage in June 2019 did not locate any roosting bats.

No new lighting regimes is proposed; and therefore, impacts from increased Lux levels on roosting bats was discounted as is the potential loss of foraging habitat.

Protected mammals - Badgers

During surveys conducted in 2018 and 2019 there was minimal badger activity recorded within the site and most of the activity was limited to animals foraging along periphery of the site. No resting places were located. The areas targeted for quarry expansion to the east, south and west are inherently unsuitable for badgers to excavate setts, as the overburden has been stripped or steep rocky slopes/cliffs provide no suitable substrate.

The spoil heap currently sitting above the proposed northern quarry extension does offer suitable substrate for badgers and there is a risk that badgers will move into the area without appropriate management of vegetation cover. Translocation of the spoil would then result in disturbance to badger resting places. However, given the current context of the site, with ample foraging and sett building opportunities in the environs, the impact is assessed as minimal.

Cumulative Impacts

There will not be any habitat fragmentation as a result of the resumption of quarry activities, with linear features around the site (such as hedges, treelines and drains) being retained. Therefore, there is not considered to be any potential for cumulative impacts in this regard.

Disturbance on breeding birds, bats and other fauna have been considered to be absent or not significant and are not considered to contribute to wider disturbance to a significant extent.

Cumulative water quality impacts relate to both localised impacts on the Knightsbrook stream and downstream impacts on the River Boyne and River Blackwater SAC and SPA. The potential for cumulative impacts on the River Boyne and River Blackwater SAC and SPA in this respect is dealt with in the Natura Impact Statement (NIS, Woodrow 2019), which details that the stretch of the Knightsbrook stream that the site flows into (Knightsbrook_020) is characterised as ‘Good Status’ under the Water Framework Directive Monitoring (2010-2015), which is better than

the downstream waterbodies, or downstream waterbodies inflowing into the Knightsbrook stream. This demonstrates that it is not contributing to a cumulative degradation of water quality.

In addition, it is noted that water samples have been collected from the quarry discharge point on a regular basis and submitted for laboratory analysis in order to demonstrate compliance with the limits specified in the discharge consent (Trade Effluent Discharge Licence Ref. 04/2) and that this has not been breached.

There are no other issues that are considered to be relevant with respect to potential in-combination impacts for this site.

11.8 Proposed Mitigation and Enhancement Measures

This section of the report aims to outline mitigation and/or enhancement measures, which aim to avoid, reduce and compensate for effects on Important Ecological Features within the zone of influence of the proposed development.

11.8.1 Mitigation for potential impacts in water quality

Without existing mitigation in place, future quarrying activities have the potential to have significant effects on ecological receptors within the zone of influence of the development, through impacting water quality. The Environmental Management System 2019 (EMS) for the site provides the list of mitigation measures to control against contamination of surface water and ground water, whereby protecting watercourses in the local area.

All quarry surface runoff and groundwater (pumped from quarry sump) are held in a primary settlement tank to remove suspended solids. It is then pumped up to the approved drainage infrastructure in the pre-cast concrete manufacturing facility. After passing through the three-stage settlement tanks, the water is directed from these

tanks into a concrete culvert that runs underground along the eastern boundary of the facility and releases the water into a *c*. 30 m section of 10-50 mm crushed rock berm. As covered by Trade Effluent Discharge Licence Ref. 04/2, the water is finally discharged into the drain on the northern boundary of the site, via a V-Notch weir that has been fitted with a data logger (08-Apr-19) and takes head measurements every 15 minutes.

There are very specific conditions attached to this discharge licence, detailing permitted volumes for discharge, as well as permitted chemical and physical composition of discharged waters. In order to demonstrate compliance with the limits specified in the consent, water samples must be collected from the discharge point on a regular basis and samples submitted for laboratory analysis.

With these requirements in place as mitigation, the risk to local watercourses and ground waters becoming contaminated as a result of resumption of extraction is considered to be low, given historical compliance with the limits of the discharge licence and that there were no reported incidents during this monitoring period. During restoration of the quarry, de-watering activities would cease, meaning that discharge and flow into the northern drain would also cease, further diminishing any hydrological link between the site and the drown stream SAC / SPA.

11.8.2 Mitigation for potential impacts on habitats

Mitigation by Avoidance / Reduction

Resumption of quarrying activities will not significantly impact on any habitats on the periphery of the site, such as hedgerows, treeline and drains, as these areas will be avoided when quarrying resumes.

No high impact invasive plant species (as listed by NBDC) were recorded during the site visits at Tromman. Likewise, there were no plant species recorded on Third Schedule applying to non-native species subject to restrictions under Regulations 49

of S.I. No. 477/2011 - European Communities (Birds and Natural Habitats) Regulations 2011.

There is potential for dust deposition to supress plant productivity and lead to degeneration of sensitive habitats. As detailed in Environmental Manage System (EMS) for Keegan Quarries, existing control measures are in place and are employed throughout the site to suppress the generation of dust and ensure that threshold levels are not exceeded. Ongoing monitoring of dust deposition for activities within the Tromman Quarry site confirms that operations have consistently and cumulatively operated below the 350 mg/m^2/day guideline figure provided for in the DOEHLG 2004 recommended levels. As such, it can be concluded that dust generation relating to operational activities is adequately controlled and the impact on flora in the vicinity of the quarry will be minimal. In addition, there are no sensitive terrestrial habitats adjacent to the development.

Mitigation by Compensation

No significant impact on habitats are anticipated to result from the proposed resumption of quarrying activities at Tromman; and therefore, mitigation by compensation is not required.

11.8.3 Mitigation for potential impacts on breeding birds

Mitigation by Avoidance / Reduction

No woody vegetation, shrubs, trees or scrub, will be cleared within the breeding bird season (1st March – 31st August inclusive). To avoid disturbance to breeding birds, removal of the beech hedgerow in the south-east of the site will be scheduled to be undertaken outside of the breeding season, (i.e. September to February). Likewise, to avoid disturbance to nesting birds, work to demolish the garage will be scheduled for outside of the bird breeding season.

Peregrines are known to become habituated to a range of human activity, including quarrying; however nesting birds can be sensitive to disturbance in the early stages

of the breeding season (late March to early May). If nesting in the Tromman Quarry, implementation of minimal blasting schedule over this early period will limit disturbance to breeding peregrines. The following measures will be employed to protect nesting peregrines:

There will be no blasting within 150m of any peregrine nest while active. Blasting within the quarry will be limited to twice per month during the breeding season (March to June inclusive).

Mitigation by Compensation

No significant impact on foraging or breeding birds is anticipated to result from the proposed resumption of quarrying activities at Tromman; and therefore, mitigation by compensation is not required.

11.8.4 Mitigation for Potential Impacts on Bats

Mitigation by Avoidance / Reduction

None of the potential bat roosts identified on the periphery of the site (ivy clad trees) will be removed during the operational phase of the quarry. A bat emergence survey of the garage (18-Jun-19), which is scheduled to be demolished to facilitate quarry expansion, found that no bats were utilising the building. As such, no bat roosts will be impacted by the proposed resumption of quarrying at Tromman. In the interim, there is a chance that the garage may become adopted by roosting bats; and therefore, prior to removal, the building should be inspected by a suitably experienced and licenced bat surveyor to confirm that the building is still vacant. Before removal it is advised that at the end of August the door and other entry points should be boarded up to limit access.

Removal of a short length of beech hedgerow will potentially remove bat foraging and commuting habitat within the site. This loss has already been compensated for as part of a previous consent, through the planting of trees along the southern boundary. The only other potential foraging habitats for bat that will be lost during the

operational phase of the quarry will be small patches of scrubs lost periodically as the faces expand. Over time these areas will be re-colonised and scrub loss is considered temporary.

Mitigation by Compensation

No significant impact of foraging or roosting bats is anticipated to result from the proposed resumption of quarrying activities at Tromman; and therefore, mitigation by compensation is not required.

Enhancement Measures

A restoration plan has been produced for the proposal (detailed in Section 3 of the EIAR and shown in outline in Figure 11.2 to follow). This outlines that the site restoration will result in the following (approximate) areas:

- Floating islands 0.507 Ha
- Dry woodland 2.08 Ha
- Wet woodland 0.507 Ha
- Calcareous Grassland 2.25 Ha
- Hazel Copse 0.125 Ha
- Ponds x 8No
- With the remainder being to open water.

The water level is expected maintain at approximately 65m AOD following cessation of operations, with the top of the quarry banks on the southern and western areas varying from 75m to 85m AOD. This will result in cliffs surrounding the quarry, following restoration, of 11-21m. This will mean that parts of the site will remain suitable for nesting peregrine.

The overall impact of site restoration will be positive. The site would be restored for nature conservation through planting and natural regeneration, the range and extent of habitats occurring on the site will be increased including, grasslands, transitional

scrub, woodland and a lake surround by rocky cliffs, which will provide opportunities for a range species.

Once quarrying activities cease, disturbance factors including light pollution dissipate and vegetation cover regenerates, connectivity through the site will be improved and more sensitive species will re-colonise the area. Species of conservation interest, including bats and peregrine, that occupied the site during the operational phase of the development will not be negatively impacted by the site remediation process. Cliffs providing nesting ledges for peregrines, and other species of bird such as kestrels and ravens will be retained. Foraging and commuting bats in particular will benefit from an increase in vegetation cover within the site. Areas of spoil within the site have the potential to be used by badgers for excavating setts.

Residual impacts and effects on important ecological features

Negative residual impacts are limited from negligible to minor long-term impacts. These are not considered to be ecologically significant. As shown in Table 2 below residual impacts will not result in any significant effects on Important Ecological Features within the Zone of Influence.

Figure 11.2: Overview of restoration proposals (see section 3 for details)

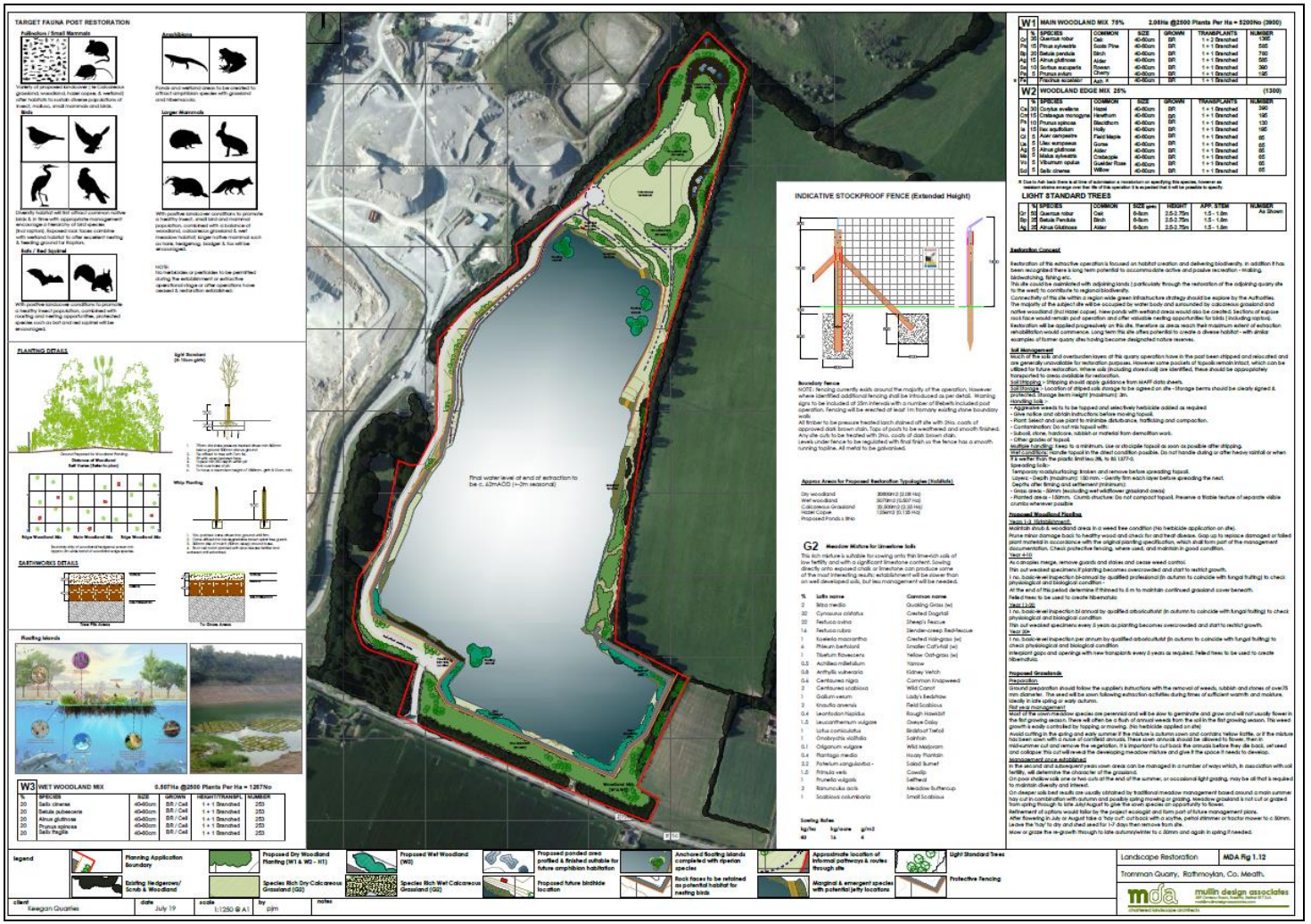


Table 11.2. Summary of potential impacts, potential effects, mitigation undertaken and residual effects

Important Ecological Features	Evaluation	Potential Impact	Potential Effect	Potential Significance	Mitigation / Compensation Undertaken	Significance of Residual Effect
River Boyne and Blackwater SAC	International	Pollution due to suspended solids and chemicals entering watercourses connecting to site	Impact on habitats sensitive to pollution and species either sensitive to pollution or relying on prey that are sensitive to pollution.	Potentially significant (though site is some 10km away, by limited hydrological link, from SAC)	Environmental Management System (EMS) applied since 2009, updated 2019.	Not significant
River Boyne and Blackwater SPA	International	Pollution due to suspended solids and chemicals entering watercourses connecting to site	Impact on habitats sensitive to pollution and species either sensitive to pollution or relying on prey that are sensitive to pollution.	Potentially significant (though site is some 10km away, by limited hydrological link, from SPA)	Environmental Management System (EMS) applied since 2009, updated 2019.	Not significant
(Mixed) broadleaved woodland	Local (higher)	Habitat loss and fragmentation	Reduction in woodland habitats and connectivity with site	Significant at the local level	Existing woodland on site not targeted for removal	Not significant
Scrub	Local (higher)	Habitat loss	Loss of cover within the site	Significant at the local level	Planting of hedgerows and for screening belts to be undertaken	Not significant
Immature woodland	Local (higher)	Habitat loss	Loss of cover within the site	Significant at the local level	Immature woodland along southern boundary not targeted for removal	Not significant
Hedgerows	Local (higher)	Permanent loss of hedgerow	Loss of, or damage to sections hedgerow leading to reduced connectivity and loss of foraging habitat and cover for	Significant at the local level	Hedgerows on site not targeted for removal.	Not significant

Important Ecological Features	Evaluation	Potential Impact	Potential Effect	Potential Significance	Mitigation / Compensation Undertaken	Significance of Residual Effect
			breeding fauna			
Treeline	Local (higher)	Permanent loss of treeline	Loss of, or damage to sections treeline leading to reduced connectivity and loss of foraging habitat and cover for breeding fauna	Significant at the local level	Existing treelines on site not targeted for removal	Not significant
Earth banks	Local (higher)	Permanent loss of habitat - cover for birds / small mammals	Loss of cover for fauna	Significant at the local level	Existing earth banks on site not targeted for removal	Not significant
Birds	Local (higher)	Habitat loss / disturbance	Potential for loss or disturbance of nesting sites	Significant at the local level	Minimal blasting schedule during the early stages of the breeding season (late March to early May) to limited disturbance to peregrines. There will be no blasting within 150m of any peregrine nest while active. Blasting within the quarry will be limited to twice per month during the breeding season (March to June inclusive). No woody vegetation, shrubs, trees or scrub, will be cleared within the breeding bird season (1st March – 31st August inclusive).	Not significant
Badger	Local (Higher)	Removal of foraging habitat Colonisation of spoil targeted for relocation	Reduction in access to feeding areas. Accidental disturbance of badger setts	Significant at the local level	Planted areas within the site may provide foraging habitat For spoil stored on site and where due to be translocated, ensure that scrub cover	Not significant

Important Ecological Features	Evaluation	Potential Impact	Potential Effect	Potential Significance	Mitigation / Compensation Undertaken	Significance of Residual Effect
					is discouraged through regular cutting.	
Bats (foraging only)	Local (Higher)	Removal of potential foraging habitat.	Potential disturbance/ displacement to foraging bats.	Significant at the local level	Planting on southern boundary of site will provide some opportunities for common species (such as common pipistrelle and soprano pipistrelle).	Not Significant
Invasive Alien Species (IAS)	-	Potential for spread around site and then dispersal through transportation of quarried materials	Spreading of IAS would be to the detriment of native species and habitats. Species recorded are low impact IASs	Not Significant		Not significant

11.9 Conclusions

Based on the collation of the above information, it is considered that further quarrying activities, as proposed, at Tromman will have a low adverse ecological impact via permanent habitat removal, which will then be negated by the proposed landscaping and planting as part of site restoration works.

None of the habitats on this site are particularly rare or of significant ecological importance on a national or European scale. The site holds habitats that are likely to be locally important for foraging and commuting species in the wider area such as birds and mammals (including bats).

Given the existing habitats, and the permitted post-operational remedial landscaping and planting works – it is considered that the development shall result in a short to medium term adverse ecological impact during operation, which shall be managed by implementing best practice mitigations measure at the site. Post-operation the site will be managed for wildlife and recreation.

12.0 TRAFFIC

12.1 Background

A full traffic impact assessment specifically assessing quarrying activities has been carried out as recently as November 2009, by Roughan & O'Donovan Consulting Engineers (RDCE) for application TA900976 and the associated Board decision PL17.235960. The consecutive assessments covering a number of applications as cited in Section 2 have also analysed the prevailing traffic movements in the context of the existing road infrastructure, with Picady junction analysis, vehicle number counts and haul route analysis.

However, in this particular instance it is essential to consider the impact of vehicle movements that have occurred from the quarry site in the context of baseline, given the site's presence and consistent level of activity over a 30 year period, thus inexorably forming part of the local highways activity.

Therefore, any assessment of the future activity levels and its potential for impact, is required to be measured against the previous levels of activity, in order to establish whether there is intensification and potential for significant impact.

From the commencement of operation of the original Meath County Council planning consent 97-1868 in 1998, Tromman Quarry has operated at a permitted ceiling rate of up to 250,000 tonnes per annum (tpa). Since the original assessment there have been considerable alterations to on site production techniques and heavy goods vehicles load capacity. The purpose of this section is to evaluate the traffic activity, associated with the existing and predicted sales composition, generated from the further operation of the existing quarry within the established upper limit of 250,000tpa.

12.2 Historical Vehicle Movements – Baseline

The figures analysed by RDCE related to the immediately preceding sales years, which are widely acknowledged to have seen the highest operating levels for Irish quarries, with Tromman being no different.

Accordingly, sales figures have been provided by Keegan Quarries Limited in consecutive Environmental Impact Statements from the year 2000 up until the most recent application in December 2016 and consistently the vehicular activity levels associated with an upper limit of 250,000tpa of aggregate production has been assessed as a worst-case scenario. The most concise analysis of the worst-case scenario is provided by RDCE in section 12.3.2 of the aforementioned EIS where they outline:

"The existing site extracts up to 250,000 tonnes of crushed stone per annum. The proposed development will not increase the rate of extraction of crushed stone per annum from the site. It is proposed that 100,000 tonnes of crushed stone be used in the block making plant and pre-cast unit factory. There will be no additional trips generated by the removal of raw material from the site and any external trips. The number of heavy vehicle trips the entire development will generate has been calculated as follows:

- *HGV trips are evenly distributed throughout the day;*
- *Inbound HGV trips equal outbound HGV trips;*
- *110 existing trips by heavy goods vehicles (HGVs) per day (two-way, i.e. 55 loads);*
- *Assuming operation between 07:00 and 19:00 a total of 9 heavy goods vehicle trips per hour (two-way);*
- *Employee trips to and from the site are evenly distributed between east and west;*
- *80% employees arrive during the peak hour;*
- *Employee outbound trips during the peak hour equals 10% employee inbound trips"*

It follows that any vehicle movement activity at levels less than those assessed with 250,000tpa, some 55 two way movements (110 trips), will cause less of an impact and no form of intensification / additional impact can be forthcoming.

The findings of traffic count data confirms that heavy goods vehicles make up approximately 10% of all vehicle movements on the surrounding network over a 24 hour period and that the existing access at Tromman Quarry has been operating at levels that “well within capacity with no queuing or delay under the anticipated traffic flows”.

12.2.1 Haul Routes

Given that the proposal is for further quarrying the existing haul routes used by Keegan Quarries remain valid and in line with those previously agreed with Meath County Council’s Roads Department at the time of the last extraction permission and are shown in Figure 12.1, there will be no additional haul routes utilised.

- Approximately 40% of Keegan Quarries’ custom is generated along the N3 corridor;
- 40% is generated along the N4 / M4 corridor west of Enfield and;
- the remaining 20% of custom is accounted for by the Dunboyne area and the N4/M4 east of Kilcock.

HGV traffic will continue to follow these specified and evaluated routes to their destinations.

12.2.2 Site Access

The impact of the proposed development at the existing access to Keegan Quarries has been assessed using PICADY software developed by the

Transport Research Laboratory of the UK for the capacity assessment of priority junctions. Based on the previous assumptions made in regard to the traffic generated by the development a summary of the PICADY results is shown in Table 12.2 below.

Table 12.1 Summary of PICADY Results

	AM Peak Hour			PM Peak Hour		
	RFC	Queue Length (veh)	Average Delay (min/veh)	RFC	Queue Length (veh)	Average Delay (min/veh)
R156 East	0.01	0.0	0.05	0.02	0.0	0.03
R156 West	0.00	0.0		0.00	0.0	
Existing Access	0.05	0.0		0.03	0.1	

RFC – Ratio of Flow Capacity

A priority junction is considered to operate within capacity when the RFC is less than 0.85. The PICADY analysis shows that the highest RFC will be 0.05, well below the recommended maximum of 0.85. These results show that the existing entrance will operate well within capacity with no queuing or delay under the anticipated traffic flows.

The upgrading of the site's entrance through cutting back vegetation to improve sightlines and adding a sprinkler system to the avenue will have positive impact on the safety of the R156 road. See Figure 12.2 at the end of this Section.

12.3 Vehicle Movements associated with Further Quarrying

Accordingly, for the purpose of the analysis of further quarrying it is considered appropriate to revisit the historic output levels presented as part of REIAR from the baseline date of 2013, promoted by the Board under the previous application, until present.

These figures provide an accurate representation as to how the limestone that has been extracted and processed from Tromman Quarry is utilised prior to sale and the nature of the vehicle type associated with each product type, which is presented and analysed in Table 12.2 and 12.3 respectively below.

Sales by Product	**Unit by Product**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019 YTD**
RMC	m3	3282	4330	7421	8903	10554	17656	10514
Blocks	tonnes	4052	15787	20041	22748	25660	26290	15700
Aggregates	tonnes	23291	30351	40601	60054	80207	85151	40567
Agg's Pre-Cast	tonnes	14708	20195	34865	31184	24584	31635	14178
Lime	tonnes	3509	4158	3828	5293	6152	4739	2890
RMC	*tonnes (m3x2)*	*6564*	*8660*	*14842*	*17806*	*21108*	*35312*	*21028*
	Total annual Aggregate tonnages	**52124**	**79151**	**114177**	**137085**	**157711**	**183127**	**94363**

Table 12.2 Sales analysis of product by type and equivalent aggregate consumption.

Sales by Product	2018	Av.Load Capacity	Annual Loads	Daily Loads
RMC	17656	7	2522	10
Blocks	26290	19	1384	5
Aggregates	85151	25	3406	13
Agg's Pre-Cast	31635	27	1171	4
Lime	4739	27	177	1
				33

Table 12.3 – Analysis of worst-case scenario year (maximum output) over the baseline timeframe to provide daily vehicle movement figures.

12.4 Impacts

What is understood from the analysis undertaken for the preceding REIAR and illustrated in Table 12.2 is that extraction output, in line with economic recovery nationally has steadily risen from a historic low in 2013 over the subsequent five-year period to levels of about 70-75% of levels previously assessed and approved under TA/30334 An Bord Pleanála Reference Number: PL 17.206702. The impacts were assessed against daily vehicle movements of 110 (20 tonne payload) vehicle movements per day.

What is apparent from the figures above is that in response to changing market demands the business has responded with a shift in sales makeup with a move to lower volumes but higher value products, which ties in with the development of the northern manufacturing area, over the preceding 5 year period. This has also coincided with the requirement for greater delivery efficiency with a greater proportion of loads being delivered by articulated vehicle, with a 30-tonne payload.

This has resulted in the number of vehicles being utilised for delivery having dropped to a figure in the region of 60% of the number assessed in 2009/10 and whilst the extraction volumes are operating at levels of 70-75%. It is acknowledged that the move away from standard dry aggregate sales results

in incoming deliveries associated with the manufacturing element, this forms a very small percentage of the vehicle movements and therefore the impacts associated with the transfer of aggregate production in to value added products, rather than direct dry aggregate sales, along with a change in the hgv fleet can be said to be have a seen a significant reduction of vehicle movements on the public highway and therefore a positive impact.

12.5 Impacts

The proposed continuation of the recent peak year's activity levels, will result in projected vehicle movements at levels less than those previously assessed, 55 two-way vehicle movements and constituting part of the existing baseline.

Therefore, there will be no intensification of use of the site access, or indeed along the haul routes to be associated with the further (continuation of) activities and therefore no significant impact can be attributed.

12.6 Mitigation

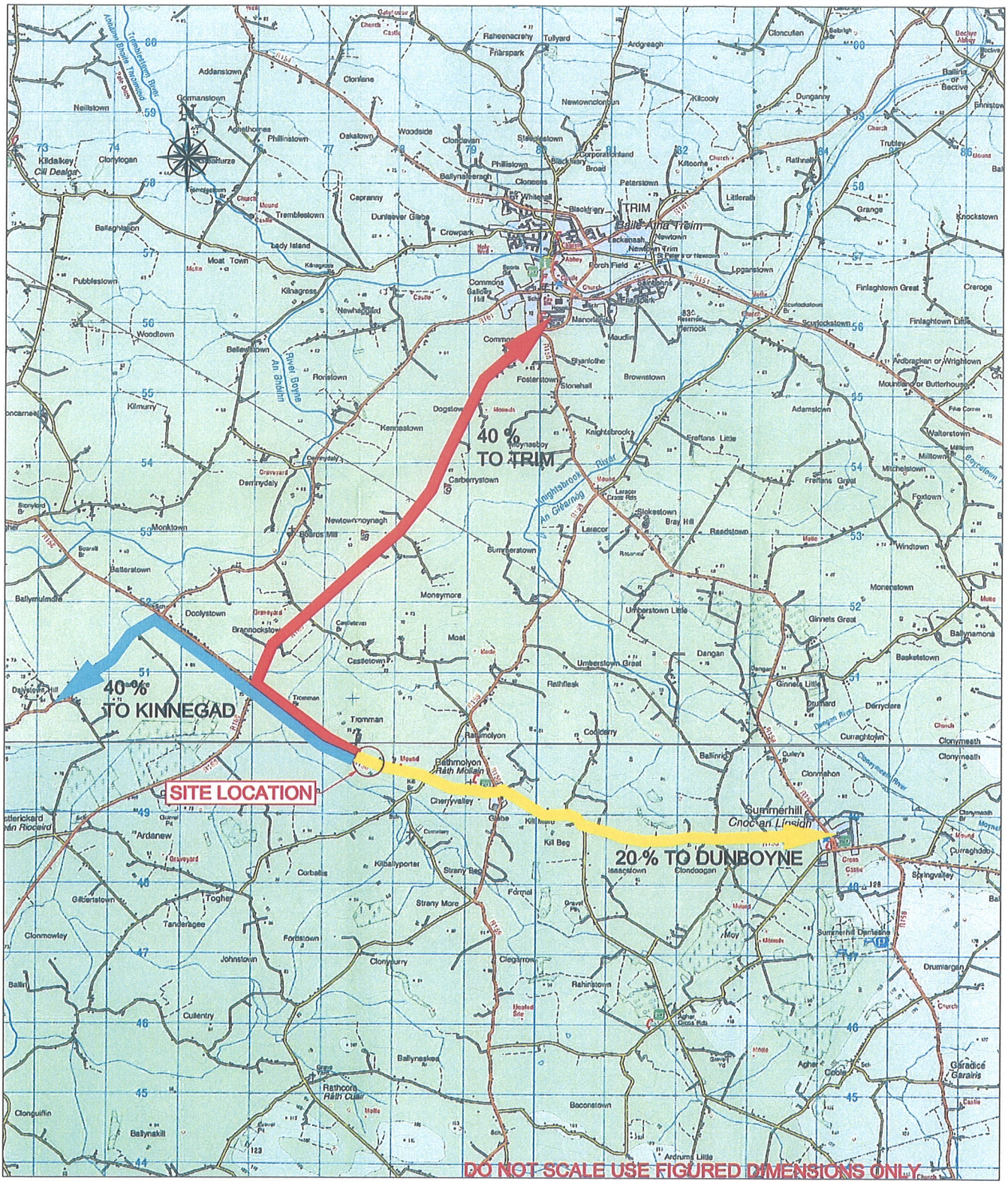
The main mitigatory measure with respect to vehicular movements has been driven by the revised business practices at Tromman quarry and the steady increase in vehicle load capacity, resulting in fewer vehicle movements.

In addition, the site access will continue to implement the access improvement recommendations as provided for in Figure 12.2 at the end of this Section.

12.7 Conclusions

Development of the range of products being sold from the quarry, linked directly to the manufacturing element of the site has resulted, in combination with the vehicle pay loads increasing, in the number of vehicles being utilised for delivery having dropped to a figure in the region of 60% of the number assessed in 2009/10 and whilst the extraction volumes are operating at levels of 70-75%.

It is acknowledged that the move away from standard dry aggregate sales results in incoming deliveries associated with the manufacturing element, however, this forms a very small percentage of the vehicle movements and therefore the impacts associated with the transfer of aggregate production in to value added products, rather than direct dry aggregate sales, along with a change in the hgv fleet can be said to be have a seen a significant reduction of vehicle movements on the public highway and therefore a positive impact.



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Project Title	TRAMMON QUARRY			
Drawing Title	HAUL ROUTES			
Date NOV '06	**Scale** NTS	**CAD File** 06140.02	**Project No.** 06.140	
Drawn JOR	**Checked** RMR	**Approved** SMG	**Drawing No.** Fig. 12.1	**Rev.** -

NOTE:

1 BOUNDARY TREATMENT AT ENTRANCES TO BE SET BACK FROM EDGE TO ACCOMMODATE SIGHT.

2 REFER TO LANDSCAPING AND VISUAL SECTION FOR DETAILS OF BOUNDARY TREATMENT.

PHOTO 1 – VIEW TO RIGHT FROM EXISTING ACCESS

PHOTO 2 – VIEW TO LEFT FROM EXISTING ACCESS

TRUCK WASH
WELL
PUMP HOUSE
WEIGHBRIDGE
HEDGE
CONTROL CABIN
RIGHT SIGHTLINE FROM EXISTING ACCESS
EXISTING SIGHTLINES 80m
HEDGES TO BE CUTBACK TO PROVIDE 160m SIGHTLINE SEE PHOTO 1
YIELD MARKINGS AS PER FIG 7.2 (T.S.M.)
P.U.V. FENCE
2.4m SETBACK
LEFT SIGHTLINE FROM EXISTING ACCESS
EXISTING SIGHTLINES 110m
HEDGES TO BE REMOVED OR RELOCATED TO PROVIDE 160m SIGHTLINE SEE PHOTO 2.
DITCH
100mm WHITE LINE
2m MARK/2m GAP
SITE BOUNDARY
PALISADE FENCE
OFFICES
WORKSHOP
ROAD DIESEL + BUNDING TANK
GREEN DIESEL + BUNDING TANK
STEAM CLEANER
SEPTIC TANK
PERCOLATION AREA
YARD

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No.	Revision	Date	By	Chk'd	App'd
B	Revised Access Arrangements	01/04/09	GTM	GTM	SMG
A	New Access Arrangement	23/11/07	PW		

Stage	Date	App'd
PRELIMINARY		
APPROVAL		
TENDER		
CONSTRUCTION		

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Designed:	Checked:	Approved:	Status:
RMR	SMG	SMG	PRELIMINARY

Project Title: TRAMMON QUARRY

Drawing Title: PROPOSED ACCESS - LAYOUT & SIGHTLINES

Drawn:	Job No:	Drawing No:	Rev:
JOR	06.140	Fig 12.2	B

Scale: (A1)	Date:
1:500 (A1)	NOVEMBER '08

DO NOT SCALE USE FIGURED DIMENSIONS ONLY

13.0 NATURAL RESOURCES

13.1 Aggregate Material

A requirement exists in the form of the E.C. Directive, and also prescribed in the Regulations that due regard be addressed to the likely significant direct and indirect consequences that a development proposal would have on the environment which might result from the use of natural resources.

Aggregate, limestone powders and the variety precast and ready mixed concrete products are all derived from naturally occurring, finite resources as discussed in Section 5.

The of the type of limestone operated in Tromman quarry is a high purity calcium carbonate limestone permitted the broadest range of end uses as illustrated by the wide range of manufacturing facilities at the site.

It is considered that the proposed project will not to give rise to a significant reduction in the volume of resource in Meath or even specifically as previously outlined with Waulsortian Formation.

The excavated material will be processed on site and used in various other building material processes. Global environmental issues like fossil fuel use and alternative energy sources are matters subject to national/international treaties and agreements.

They are considered outside the scope of this statement, as the cumulative contributions of this particular development to such matters are insignificant in a national context.

The Applicant intends conserving the natural resources by maximising the resource potential by way of ensuring that the end use is maximised, thus

achieving the most prudent and efficient use of this high-quality non-renewable resources.

13.2 Soil

All soils had been removed within the northern manufacturing area and the extraction area, resulting in there being no opportunity for impact on soil resource. Therefore, the impact upon the soils is considered to be complete and as the land has been permanently removed from agriculture, it is a permanent loss.

13.3 Impacts

Limestone is intended to be extracted at the rates outlined in Table 12.2 with a maximum ceiling of 250,000tpa, providing fro a resource life of 37 years, this is a permanent removal. However, as outlined in Section 5 this is considered to be an inconsequential volume when consider in the context of the complete formation.

The proposed development would also see the removal of the large overburden mound / soil making material that is currently immediately to the south of the manufacturing zone and the use of the same in lake margin treatment. The impact on limestone resource would be negligible in the context of the formation and the impact on soils is consider neutral given that limited volumes of soil would be repositioned to affect ultimate beneficial restoration.

13.4 Conclusion

The impact on the geological resource that could occur as part of the proposed development is permanent but minimal in the extent to which the volume affects the Waulsortian Formation and therefore is not considered significant.

There is no further soil stripping for the development proposed, the impact upon soils is considered to be complete and as the land has been permanently removed from agriculture, it is a permanent loss.

There is no further impact on Soil resources proposed as part of this development and the main body of the site is proposed to revert to a water body with treatment utilising some soils and overburdens at the margins and in the floor.

14.0 SOCIO-ECONOMIC IMPACTS

14.1 Introduction

This section considers the impact of the proposed development in the context of population/settlement, employment and other socio-economic effects.

14.1.1 Social Importance of the development

The existing operations (stone, powders and fill; Precast and concrete block manufacture) at Tromman provide direct employment for some 130 staff and a further 30 full-time sub-contractors with a direct wage bill and associated contractors wage bill approaching €8.1M. Keegan Quarries, making a significant contribution to the rural Meath economy and providing a highly skilled workforce. A significant amount of the Company's total revenue stream is now derived from export sales to the UK, bringing external revenue into the Meath Economy. Such is the importance of the export market that the recent growth and expansion in the business, has seen internal investment focussed on satisfying the demands of this area.

The Keegan Group of companies make a significant contribution to the economic prosperity of County Meath. The population of Meath showed an increase of 5.9% from the 2011 to the 2016 census. This is higher than the State overall, which increased by 3.8% over the same period. The employment generated across the group of companies is vital to the local economy. Figure 14.1, shows the employee numbers over recent years, indicating steady growth.

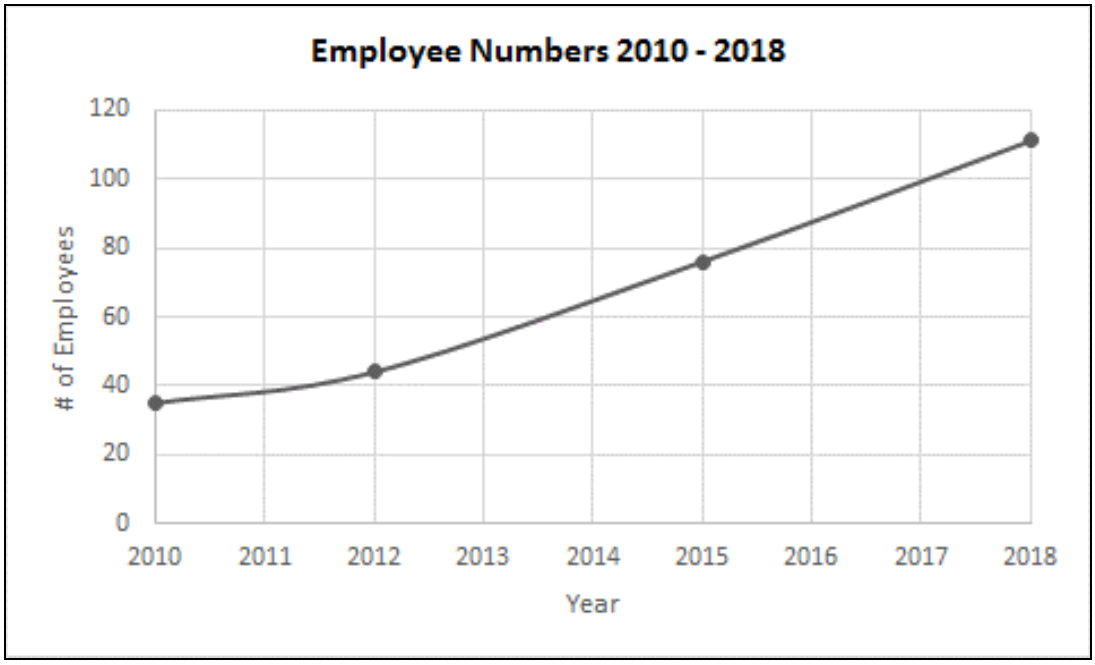

Figure 14.1 – Keegan Group - Employment Figures

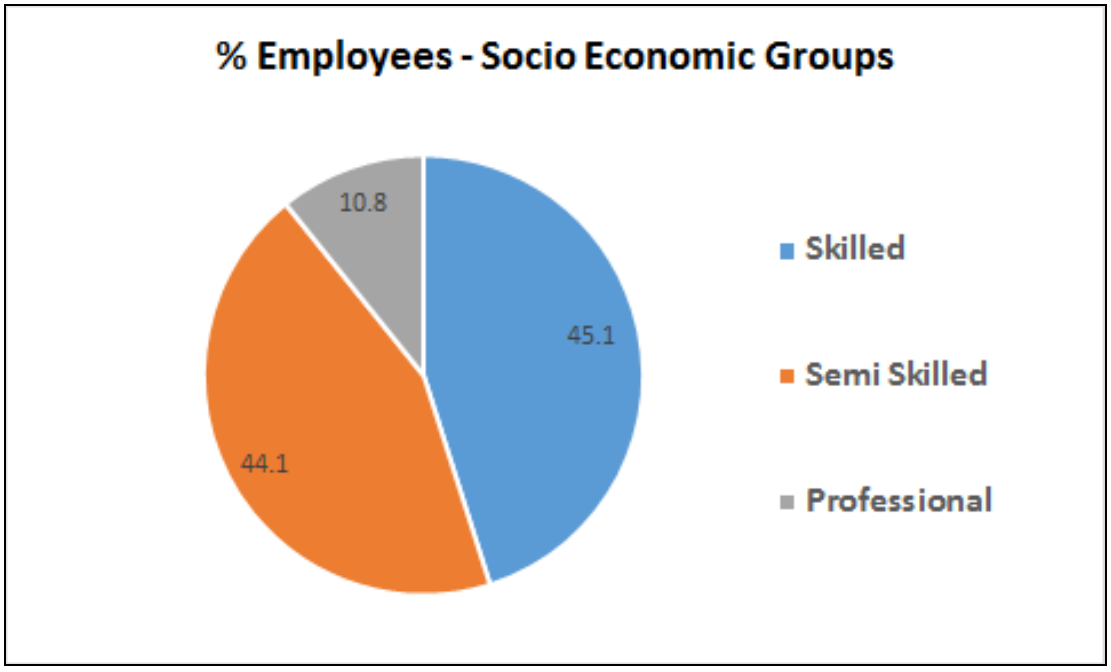

Figure 14.2 – Employment by percentage of Socio-Economic Groups

Whereas Figure 14.2 illustrates the ranges of socio-economic groups and skill sectors that are employed by The Keegan Group at the Tromman facility, highlighting the breadth of skills covered, extending beyond those normally expected in a traditional extraction site.

14.1.2 Local Employment

The 2016 census showed the average travel time of commuting workers in Ireland is 28.2 minutes. Meath however, due to the high numbers of people commuting to Dublin, had the highest commuting time of 34.6 minutes. Creating employment and generating economic activity in areas outside of Dublin, provides significant social and environmental benefits, as people do not need to spend hours commuting to Dublin for well remunerated employment. Upon analysis of the Keegan Group workforce the majority of employees work and live within a 10km radius of travel, as shown in Figure 14.3.

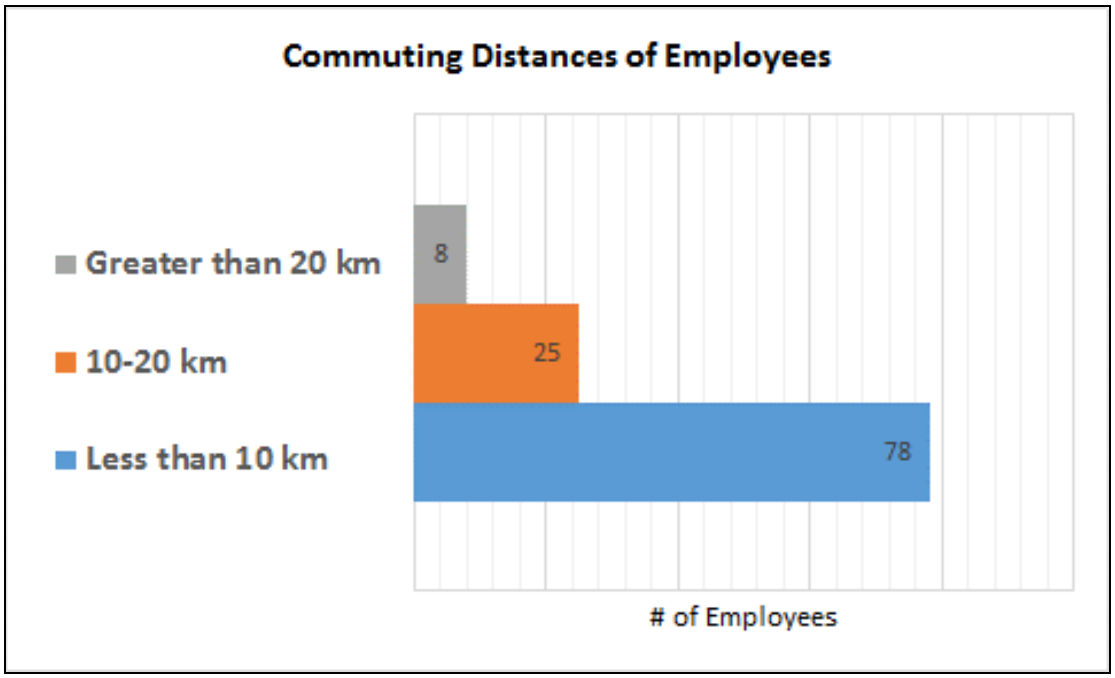

Figure 14.3 Employee average commuting distance to Tromman Quarry

14.1.3 Contribution to National housing stock.

It is widely reported that the provision of affordable housing is reaching the stage of crisis. The manufacturing facilities at Tromman Quarry are providing

fast track off site solutions along with a full range of complimentary materials for the construction of housing.

With the creation of the Land Development Agency the Government has challenged the Agency to build 150,000 new homes over the next 20 years in accordance with Project Ireland 2040.This will put a huge strain on planned mineral deposits, although it is expected that a large number of these will be constructed using the innovative modular twin wall system adopted at the Tromman site, demand for more traditional building materials manufacture on site is also anticipated to remain high.

CSO Census 2016 results show that the population of Ireland increased by 3.8% over 5 years (2011 – 2016) and displayed a continuous growth since 1991 illustrated in Figure 14.4. A recent report by the Housing Agency

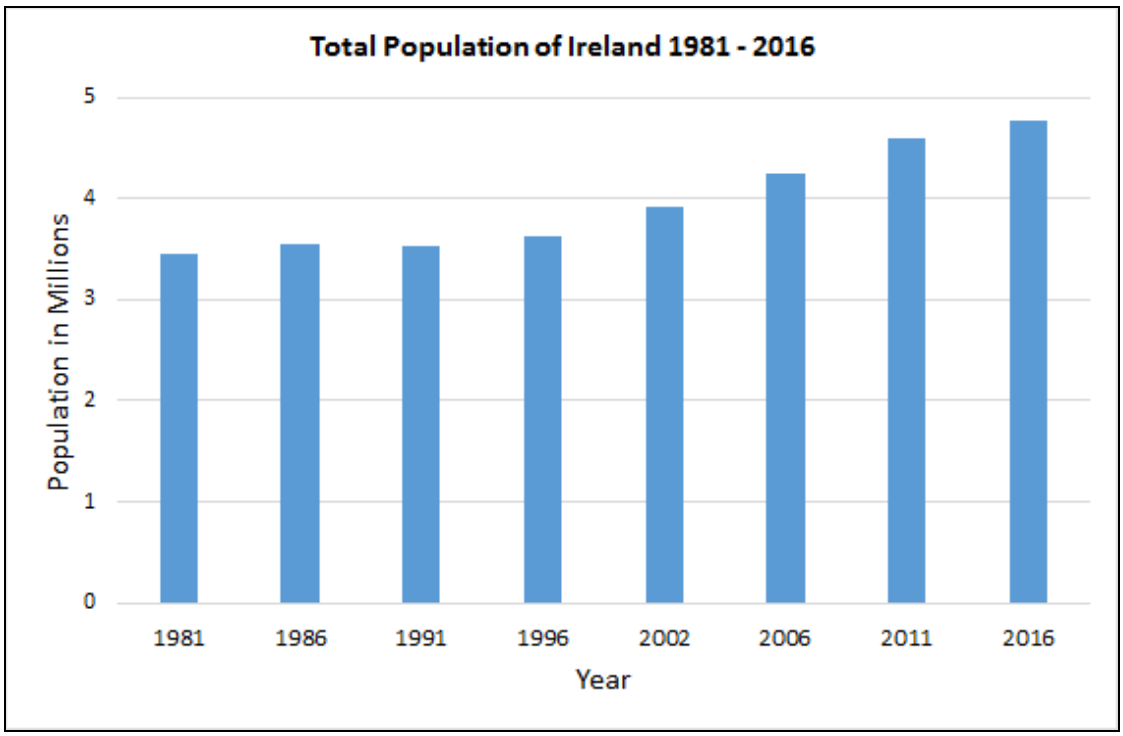

Figure 14.4 – Population Growth in Ireland

(Housing Supply Requirements, Feb 2017) on the projected demand for housing in urban settlements resulted in an estimate of a minimum housing

requirement (MHR) of 81,118 homes between the years 2016 - 2020. Dublin City and Suburbs alone account for 74% of this requirement.

Figure 14.5 represents the number of residential units that are projected to be required at a minimum to cater to the growing needs of the area per annum, at a National level and Dublin City & Suburbs.

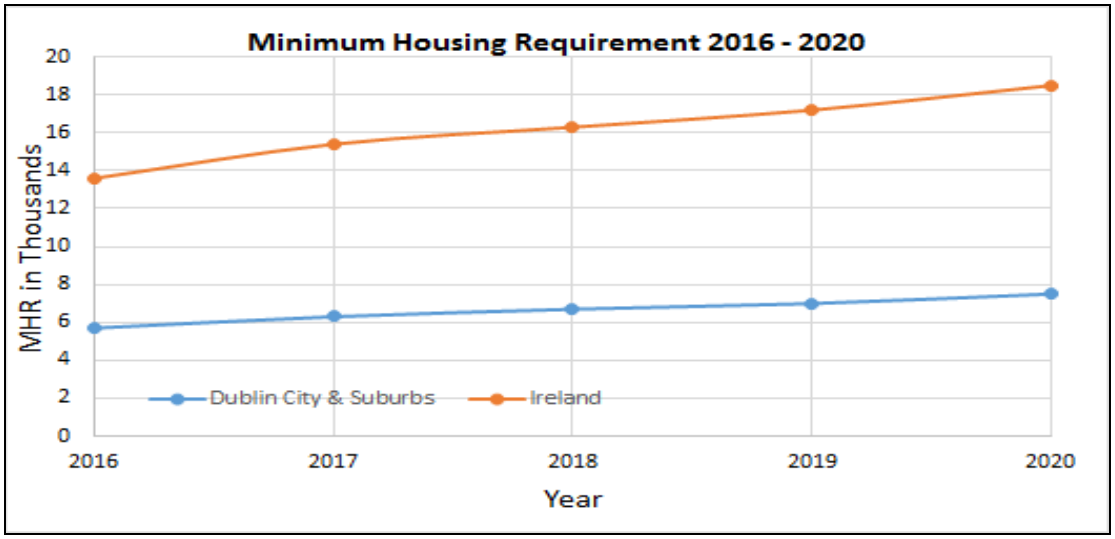

Figure 14.5 – Minimum Housing Requirement

The Mineral Products Association (MPA; trade association for aggregates in the UK) estimates that 50 tonnes of aggregate are required for the construction of a typical house. With the widely recognised unprecedented demand for housing, naturally the demand for aggregate to construct the housing units reflects this demand. Based on the Housing Agency's MHR figures, 1.79 million tonnes of aggregate will be required for the years 2019 & 2020.

It is of vital Socio-Economic importance that a steady and adequate supply of aggregate in Ireland is maintained, attempting to satisfy society's long-term housing requirements.

14.1.4 Socio Economics and the import of Export Markets

Tromman quarry is a high-quality mineral resource and it must be utilised to its full value, with properties that make it ideal for high quality finishes and for export markets.

Without the continued operation of the quarry the Company's export business, which is focussed on the Tromman products would collapse. "Success in export markets is crucial to the long-term growth of Irish businesses and the Irish economy. Support for companies focused on growth through international sales is a priority for Enterprise Ireland." Enterprise Ireland have been fully supportive of Keegan Precast operations and have been involved in developing new products and markets over the recent years.

14.2 Economic Impacts from business development.

Keegan Quarries have invested in product diversification over the last five years at Tromman Quarry to help the business out of recession. As a result, turnover has increased by 53% over the past 5 years, reflecting the transition to the manufacture of higher value products and employment levels have also grown during this period from 90 direct employees to the current level of 130 direct employees, with the associated annual wage bill rising to a current level of some €8.1M. This is a tangible positive impact in this rural location in Meath which assists in diminishing the daily commute towards Dublin. The introduction of the additional capacity and precast twin wall factory facility has further opened up export markets to the company. As an example, the completion of the new Swansea University Halls of residence Phase 1 and 2 contracts being constructed during this period, bringing important external revenue into the region.

Figure 14.6 – Phase 1 Swansea Halls of Residence Projects

Further quarrying would maintain the supply of the primary resource to the added value manufacturing element of the Site which has maintained the competitive capabilities of the business with continued sales growth anticipated in these value added products and an associated reduction in dry sales, thus maximising the end use of the high purity resource.

Therefore, the continuity of supply would underwrite the existing business model, furthermore, it is understood that efforts are being made to grow the value-added element of the business further which would require additional associated employment.

The business has ensured, in addition to wages, the continuation of expenditure into the local economy and the payment of business rates and taxes. Therefore, the socio-economic impacts are positive. It is considered that the significance of the continued prosperity in the Meath Council area should not be understated and the potential, for continued socio-economic contributions from the delivery of continuation of supply, acknowledged.

14.3 Conclusions

The quantifiable socio-economic contribution of the Tromman operation is known and the importance at a local, regional and on a national level through export business is established.

The high purity limestone resource at Tromman Quarry underpins the added value manufacturing elements of the Keegan Groups business, the loss of this resource would have serious ramifications upon the business with wholesale contraction of the business and the associated employment levels. The socio-economic impacts of such action are considered to be significant.

The proposed alternative is the continuation of the business model as currently experienced, with the anticipated growth of the value-added element of the business and the associated prosperity and the continued delivery of the €8.1M wage bill and associated support of 130 families in the Meath County Council area.

It is considered that the significance of the continued prosperity in the Meath Council area should not be understated and the potential, for continued socio-economic contributions from the delivery of continuation of supply, acknowledged.

15.0 CULTURAL HERITAGE

Archaeological evaluations have previously been prepared to cover the totality of the application site, as part of the consolidation application and EIS in 2004 and then most recently prepared by Arch- Tech Limited for the 2009 EIS to accompany application TA900976 and the associated Board decision PL17.235960.

Archaeology, like geology in this instance does not alter in the intervening timeframe post the submission of those documents and it is considered unnecessary to revisit and update the previously accepted report.

All soils have already been removed from the operational areas of the site, resulting in there being no opportunity for impact on Cultural Heritage Assets going forward in these active zones.

15.1 Potential Impacts

However, what is not known with absolute certainty is whether the interface between topsoil and subsoil remains intact below the overburden storage mound, accordingly it is proposed that during phases 3 and 4 and the removal of the overburden landform that the mitigation proposed in the 2004 Environmental Impact Statement, where appropriate remains valid for the footprint.

15.2 Mitigation

Given that the opportunity to undertake any advanced assessment works, such as geophysical assessments or trial trenching has been lost as a result of the consent to store overburden on the area, currently occupied by the landform (RPL17.206702). It is proposed that once the original ground levels are approached when removing overburden for placement in the quarry floor

that a qualified archaeologist should be employed, to established whether an interface between topsoil and subsoil remains intact.

In the eventuality that this is the case it is further recommended that any further earthmoving works, at this interface, be monitored by a qualified archaeologist. This will ensure the early identification of any archaeological remains which may be revealed during such operations and ensure that such remains are appropriately recorded prior to removal. In the event of the discovery of archaeological remains during monitoring, all works must cease in the vicinity until a decision is made by the Department of Culture, Heritage and the Gaeltacht in relation to the resolution of the archaeology on the site. These recommendations could involve revision of plans in order to ensure avoidance or excavation depending on the significance of the remains uncovered and on the likely impact that the proposed development will have on them.

15.3 Conclusion

It is concluded that there is no potential for there to be any impacts upon cultural heritage during further operations until the point at which former ground levels below the existing overburden landform, during phases 3 to 4.

Whilst it is unclear whether any archaeological remains have the potential to exist, it is considered appropriate to employ an appropriate mitigation measure at the point at which the interface is reached in order to establish the same.

16.0 INTER-RELATIONSHIP OF THE FOREGOING

16.1 Clarification of Information Requirements

The purpose of this Section is to review the inter-relationships, where they exist, of the elements that were deemed to have the potential to have a likely and significant effect and have been the subject of Sections 5 – 15 of this Statement and the Appendices.

It is considered that all of the significant areas have been reviewed in detail and any likely impacts have been recorded and mitigation measures proposed where applicable.

All interactions have been discussed in the relevant Sections and where appropriate in greater detail within the individual Specialist Reports held as Appendices. It is considered that to regurgitate these relationships in this Section would be unnecessarily wordy and be contrary to the EPA Guidelines that suggests EIAR's should be focussed.

However, for ease of reference and to indicate the natural overlap between Sections and the topics that have been considered in each Section, Table 16.1 below illustrates the areas of commonality within each Section with respect to the ten topic areas, as provided for by the Regulations.

Table 16.1											
SECT.	SECTION HEADINGS IN EIAR	Human Health	Biodiversity	Population	Soil	Water	Air	Climate	The Landscape	Material Assets	Cultural Heritage
5.0	Geological Assessment				√	√				√	
6.0	Water Environment	√	√	√	√	√		√		√	
7.0	Air Quality & Climate	√	√	√	√	√	√	√		√	
8.0	Noise & Vibration	√	√	√							√
9.0	Landscape	√	√	√					√	√	√
10.0	Waste Management	√	√	√	√	√		√	√	√	
11.0	Ecology		√		√	√	√		√		
12.0	Traffic	√		√	√	√	√	√			
13.0	Natural Resources	√	√	√	√	√	√			√	
14.0	Socio-Economic Impacts	√		√					√		√
15.0	Cultural Heritage	√							√	√	√