Remedial Environmental Impact Assessment Report

Volume 2 of 3 – Main Report

For

UMMERA GRAVEL PIT
MACROOM, COUNTY CORK

Prepared for:
Drimoleague Concrete Works Limited
Bredagh Cross
Drimoleague
County Cork

Prepared by:
Keohane Geological & Environmental Consultancy
Ivy House
Clash
Carrigrohane
County Cork

August 2020

Remedial
Environmental Impact Assessment
Report

Volume 2 of 3 – Main Report

For

UMMERA GRAVEL PIT
MACROOM, COUNTY CORK

TABLE OF CONTENTS

PAGE

LIST OF TABLES

PAGE

LIST OF FIGURES

PAGE

LIST OF PLATES

PAGE

EXECUTIVE SUMMARY

The subject of this remedial Environmental Impact Assessment Report (rEIAR) is the Ummera Gravel Pit, located near Macroom County Cork. The gravel pit is owned and operated by Drimoleague Concrete Works Ltd (DCWL). The rEIAR is prepared in support of the substitute consent application for the existing gravel pit in accordance with An Bord Pleanala (ABP) decision (dated 24 February 2014) to uphold the Council's determination (dated 23 August 2012) requiring DCWL to apply for substitute consent. The application for substitute consent is to be accompanied by a remedial Environmental Impact Statement (rEIS) (now referred to as rEIAR) to be undertaken in accordance with Section 177F of the Planning & Development Act 2010.

Gravel has been extracted from the Ummera site since the 1940's. Murnane & O'Shea Ltd (M&OS) (an affiliate of DCWL) became involved in the site in or around 1978. M&OS leased a portion of the land, including an existing gravel pit, and continued extraction activities at the northwest corner of the site. In 1978, M&OS applied for and secured planning permission for '*Gravel Plant in Existing Pit*' (i.e. a washing plant) – planning number 1365/78 refers. The washing plant installed with the benefit of that planning permission is that still used at the gravel pit. Furthermore, it is the only washing plant at the site, so intensification cannot be said to have occurred. Fluctuations in production down through the years is a function of economic activity.

Prior to the 1978 permission, in 1976, a competitor (Daniel & Sean Lordan) applied for planning permission for '*Opening of Gravel Pit*' nearby and in the same landholding – planning number 375/76 refers. Permission was granted, but was not commenced, so lapsed on 07 April 1981; no gravel extraction occurred within the area subject of planning 375/76 within that 5-year period (i.e. no extraction occurred within the red-line boundary of 375/76).

Since its interest in the site from 1978, M&OS/DCWL has maintained a continuous presence at the Ummera gravel pit.

The Applicant

The applicant for this substitute consent is DCWL. DWCL is based at Bredagh Cross, Drimoleague where it operates a concrete ready-mix and concrete products manufacturing facility. It also operates a few quarries / gravel pits in the West Cork region, including Ummera gravel pit. DCWL is involved in the supply of raw materials for the construction industry in West Cork. These projects require the use of large volumes of concrete, aggregate and concrete products. The supply of such raw materials is critical for the continued development of, for example, residential housing and infrastructure on both a local and regional scale. DCWL meet this demand with the operation of a number of rock quarries, gravel pits and production facilities in West Cork. The company has provided an important service in meeting the development needs of the region.

The Consultants

Keohane Geological & Environmental Consultancy (KGEC) (Ivy House, Clash, Carrigrohane) is a Cork-based consultancy specialising in geological and environmental sciences. In recent years, Keohane Geological & Environmental Consultancy has prepared planning applications and/or EISs for several quarries / gravel pits in Munster.

Atkins
Atkins is a multinational engineering and design consultancy, providing expertise to help resolve complex challenges presented by the built and natural environment. Atkins leads the way across a diverse range of disciplines, including architecture, environment, transport and roads, water, engineering and quantity surveying. Atkins is involved in a wide variety of projects from architects designing the world's tallest buildings to improving the efficiency of major public transport systems. Atkins Ireland currently has offices in Dublin, Cork and Galway. Atkins Ireland possesses a significant breadth of knowledge and depth of skills and experience for the ultimate benefit of our clients. We offer our skills over the full spectrum of client requirements, from one expert for one day to the planning, implementation and long-term management of major projects.

Atkins has provided ecological support in the preparation of the rEIAR for the substitute consent application for Ummera gravel pit. In Ireland, the Atkins Ecology team has developed considerable experience and a proven track record in providing specialist ecological consultancy and undertaking high quality ecological work for a range of clients. Our ecology team provided specialist ecological advice; undertakes ecological assessments and surveys, and provides ecological solutions to meet the project needs and balance the ecological impacts against likely biodiversity gains. In addition to our locally based ecological staff, we can also draw on over 70 professional and experienced ecologists in the UK thus providing access to substantial additional resources and specific environmental expertise to meet the needs and resources required by a given project. Atkins also routinely works with a range of specialist ecological consultants in order to provide our Clients with the expertise appropriate to specific project requirements (e.g. the need to undertake bat surveys).

Damian Brosnan Acoustics
Damian Brosnan is Principal Consultant with Damian Brosnan Acoustics, which specialises in environmental noise, and undertakes projects such as noise impact assessments, predictive modelling, nuisance investigation, and noise management. Damian has a Postgraduate Diploma in Acoustics & Noise Control (Institute of Acoustics, 2009) and an MSc (Distinction) in Applied Acoustics (University of Derby, 2015). He is a member of the Institute of Acoustics (MIOA), and secretary of the Irish IOA branch. He is also a member of Engineers Ireland (MIEI) and a founding member of the Association of Acoustic Consultants of Ireland. Damian has been working in acoustics since 1996, formerly as a Noise Officer with Cork County Council, and as partner with DixonBrosnan Environmental Consultants. To date, he has worked on several hundred noise projects, including a large number of quarry projects. Damian is engaged with continuing professional development through the IOA and Engineers Ireland.

Dr. Charles Mount
Charles Mount is an Archaeologist with more than 30 years' experience of archaeology, cultural heritage and project management. Dr. Mount is a Project Archaeologist with Bord na Móna, where he manages the excavation and post-excavation programme, and the Irish Concrete Federation, where he oversees the archaeological aspects of quarry development. He was formerly Archaeological Officer with the Heritage Council and archaeologist with the Archaeological Survey of Ireland. He is a member of the Institute of Archaeologists of Ireland and the Discovery Programme. Dr. Mount is a graduate of University College Dublin with an M.A, and Ph.D. in Archaeology and he has completed the UCD Diploma course in EIA and SEA Management. He has worked in a variety of archaeological, heritage and management roles within the university, state, semi-state and private sectors. He is license eligible and has directed and participated in archaeological excavations throughout Ireland and Britain. He has managed a wide range of archaeological projects involving specialists drawn from a range of disciplines. He has extensive experience of Environmental Impact Assessment gained over the last 30 years in a wide range of industries in the private and semi-state sectors including extractive, transport, energy, waste, residential and agri-food. He has a research interest in prehistoric archaeology and has published research papers and excavation reports in Irish and international journals, conference proceedings and thematic volumes.

rEIAR Structure

An Environmental Impact Assessment (EIA) is required for the extractive industry which fall within category 19 of the Fifth Schedule Part I, category 2(b) of the Fifth Schedule Part II and category 13(a) of the Fifth Schedule Part II of the Planning & Development Regulations 2001 (S.I. 600 of 2001).

Category 2(b) of the Fifth Schedule Part II states:

'*Extraction of stone, gravel, sand and clay, where the area of extraction would be greater than 5 hectares*'.

Category 13(a) of the Fifth Schedule Part II states:
'Any change or extension of development which would:-

> *(i) result in the development being of a class listed in Part 1 or paragraphs 1 to 12 of Part 2 of this schedule, and*
>
> *(ii) result in an increase in size greater than –*
> - *25 per cent, or*
> - *An amount equal to 50 per cent of the appropriate threshold,*
>
> *whichever is greater.*

It was Cork County Council's determination that the *'quarry development expanded by 3.84ha approx. post 1995……. This expansion results in the quarry being greater than 5ha in surface area and therefore results in an increase in size greater than 25% of the quarry area and 50% of the appropriate 5ha threshold. Accordingly, EIA is required under Class 13 of Part 2, Schedule 5 of the Planning & Development Regulations 2001, as amended'.* Upon review, ABP upheld this determination.

The rEIAR has been prepared using the grouped format structure as recommended in the EPA's '*Guidelines on the Information to be contained in Environmental Impact Statements*[1], '*Advice Notes on Current Practice (in the Preparation of Environmental Impact Statements)'*[2], *'Revised Guidelines on the information to be contained in Environmental Impact Statements'*[3] and '*Guidelines on the Information to be Contained in Environmental Impact Assessment Reports*'[4]. The latter are draft (dated August 2017) and will be reviewed when new regulations transposing Directive 2014/52/EU[5] are published.

Using the grouped format structure, the rEIAR examines each topic as a separate section. Each specialist section refers to the relevant specialist topic using the following general structure:

- The existing / baseline environment.
- Impact assessment of the gravel pit, which addressed the likely significant affects that have occurred, or occurring or likely to occur as a result of the gravel pit operations.
- Impact mitigation which have been implemented at the gravel pit, or which will be implemented to avoid, reduce and/or mitigation impacts that have or are occurring.

The rEIAR is submitted in three volumes:

- Volume 1: Non-Technical Summary
- Volume 2: Main Report
- Volume 3: Appendices

The non-technical summary provides an overview of the work presented in the main body of the rEIAR. It is a shortened and simplified version of Volume 2 but contains all the key information presented in a non-technical format.

Scoping of the rEIAR was developed from the Sixth Schedule of the Planning & Development Regulations 2001, Directive 2014/52/EU and in consultation with the relevant organisations. The main body of the rEIAR describes the development, and examines the impact of the development on the following aspects of the environment:

- Population & Human Health
- Biodiversity
- Land
- Soil
- Water
- Air & Climate
- Cultural Heritage
- Material assets
- Landscape
- Interaction of the Foregoing

For each topic, a screening process was undertaken to identify those topics that are important / relevant to the development – refer to Section 1.4. As discussed in Section 1.4, some aspects of the environment were screened out. For each topic discussed, the impacts (direct and indirect) that have occurred, occurring or likely to occur, and remedial mitigations are discussed where appropriate. Cumulative impacts associated with nearby developments are also assessed, where appropriate.

1. INTRODUCTION

1.1 Legislative Context

The European Court of Justice (ECJ) decision in July 2008 prohibited application for retention permission for developments requiring EIA, except in exceptional circumstances. Section 23(c) of the Planning & Development (Amendment) Act 2010 provided that the planning authority cannot accept a planning application for retention which would have required an EIA, a determination as to whether EIA was required or an appropriate assessment (AA). While Section 23(c) only came into effect on 31 March 2011, planning authorities were instructed not to accept such applications since October 2008.

The ECJ ruling did however allow for the regularising of developments requiring EIA through the substitute consent process. Section 57 of the Planning & Development (Amendment) Act 2010 makes provision for the substitute consent process. In circumstances where the county council serves notice on a developer requiring it to apply to ABP for substitute consent, it must be accompanied by a rEIS (now rEIAR) and / or a remedial Natura Impact Assessment (rNIS). The substitute consent provisions commenced on 21 September 2011.

A special provision ('sunset provision') was made for quarries with retention, EIA and/or AA issues whereby the operators were required to apply for substitute consent without proving exceptional circumstances. Section 75 of Planning & Development (Amendment) Act 2010 inserts a new section (Section 261A) into the 2000 Act which requires each planning authority to assess the status of each quarry in its functional area with regard to EIA / AA compliance, followed by an assessment of its planning status. These assessments were completed by the local authorities in 2012 and determinations issued to affected quarry operators.

1.2 Project Background

Gravel extraction has been ongoing at the Ummera site since the 1940's. This has been confirmed by locals living near the site. The presence of gravels is noted on the Geological Survey of Ireland (GSI) field sheets dating from the 1860's. The 1934 edition of the OSI mapping doesn't indicate the presence of extraction operations, while the 2,500-scale revised edition of 1974 shows extraction operations at the northwest corner of the site. OSI mapping and aerial photography can only confirm that the pit opened between 1934 and 1974. Figure 1-1 shows the site location.

The land comprising Folio CK3263 was owned by Denis McSweeney of Ummera, Macroom and extending to approximately 30ha. The property was in the same folio since 1912. Mr. McSweeney farmed the land. Sometime in the 1940's, gravel extraction commenced at the northern perimeter of the landholding. The pit was operated for a time in the 1950's/1960's by Peter Moynihan.

In 1976 Daniel & Sean Lordan applied for planning permission for '*Opening of Gravel Pit*' nearby and in the same landholding – planning number 375/76 refers. The subject site consisted of one field extending to an area of 3.1ha. Permission was granted, but was not commenced, so lapsed on 07 April 1981; no gravel extraction occurred within the area subject of planning 375/76 within that 5-year period by any operators (i.e. no extraction occurred within the red-line boundary of 375/76). The extent of the 1976 planning application is shown on Figure 1-3.

Murnane & O'Shea Ltd (M&OS) (an affiliate of DCWL) became involved in the site in or around 1978. M&OS leased an area of land, including the existing gravel pit, and continued extraction activities at the site. In 1978, M&OS applied for and secured planning permission for '*Gravel Plant in Existing Pit*' (i.e. a washing plant) – planning number 1365/78 refers. The extent of the 1978 planning and original lease area is shown on Figure 1-3. The washing plant installed with the benefit of that planning permission is that still used at the gravel pit. Furthermore, it is the only washing plant at the site, so intensification cannot be said to have occurred. Fluctuations in production down through the years has been a function of economic activity.

The washing plant and settlement lagoons were installed at the pit in late 1978 / early 1979. The original settlement lagoon is located to the west of the gravel pit and on the opposite side of the road (local road L-3423-20) – between the public road and the Clashavoon Stream. At the request of the South-Western Regional Fisheries Board (now Inland Fisheries Ireland – IFI), settlement lagoons were constructed within the gravel pit in the 1980's. There were concerns that the original lagoon was too close to the stream. While the original lagoon continued to be used, it acted only as a polishing lagoon; it is overgrown and no longer cleaned out.

Between 1978 and 2003, DCWL renewed its lease, naturally expanding the lease area to the east and south as extraction progressed. In 1995/96, the washing plant was relocated within the gravel pit – from the northwest corner to its current location, along with enlargement of the settlement lagoons. The entrance into the gravel pit was also relocated from the northwest corner to its current location around that time. In 2003, DCWL purchased approximately 20.22ha of Folio CK3263 containing the gravel pit and land into which the gravel pit would be expected to be developed.

In July 2003 Cork County Council issued a warning letter to M&OS pursuant to Section 152 of the Planning & Development Act 2000 alleging unauthorised intensification of quarrying activities at the Ummera pit. Fehily Timoney & Co (FTC) responded to the allegation of unauthorised development, refuting same. In January 2004, Cork County Council sent further correspondence claiming a 15-fold increase in the quarrying area since 1978 and a 25-fold increase in extraction rate. Following a meeting with Cork County Council in February 2004, FTC submitted a comprehensive rebuttal of the Council's allegations on 15 March 2004. The Council didn't respond to FTC's submission. DCWL continues to operate a gravel pit at the site.

1.2.1 Section 261 Application

In 2004, DCWL applied to Cork County Council to have the gravel pit registered under Section 261 of the Planning & Development Act 2000 – registration number QR01 refers. The workable area identified in the Section 261 application was the landownership bounded by the public roads – an area of 17ha within a landownership of approximately 20.22ha. Refer to Figure 1-2 showing the Section 261 application map.

Cork County Council published a notice in the Irish Examiner on 18 March 2005 indicting its intention with regard to the quarry registration as follows:

- *To modify and add to conditions relating to the area covered by the permission granted under Ref No. 76/375, and*
- *To require a planning application and submission of an Environmental Impact Statement on the balance of the total quarry area*.

DCWL was notified by the Council in correspondence dated 14 September 2005, indicating it would proceed with its intention as advertised on 18 March and as quoted above. DCWL made a submission to the Council dated 24 October 2005 detailing a number of issues with the Council's intended approach to the quarry registration. Following that submission, Cork County Council changed its intended quarry registration approach. In correspondence dated 28 October 2005, the Council indicted that it:

'*now intends to modify and add to the conditions that were imposed on the QR01 quarry under planning permission ref no. 76/375*'. The rational for this change in approach was '*that there are a significant number of quarries for which registration has been sought and where planning permission has been granted on only part of the active quarry site. We now consider that the appropriate course of action in such cases is to modify and add to condition relating to any relevant previous planning permission*'.

While DWCL didn't agree with the specifics of the approach, it was prepared to operate the gravel pit under imposed planning conditions and environmental controls. It is noted that the permission (76/375) on which the Council intended to use as a vehicle to impose planning conditions had lapsed without being commenced and so should not have been used. DCWL submitted the further information requested by the Council in its 28 October 2005 correspondence.

On 07 September 2006, Cork County Council issued a notice under Section 261 subsection 6 of the Planning & Development Act 2000 of its decision to modify and add conditions (64 No.) imposed under planning permission Reg No 375/76. A number of conditions were appealed to ABP. In June 2007, ABP amended and removed a number of conditions. From June 2007, DCWL operated the gravel pit having regard to conditions imposed on its operation.

1.2.2 Section 261A Process

As outlined in Section 1.1 above, Cork County Council was required (under Section 75 of Planning & Development (Amendment) Act 2010) to assess the status of quarries in its functional area with respect to EIA / AA compliance. On 23 August 2012, Cork County Council issued its decision for Ummera under Section 261A(3) on foot of a determination under Section 261A(2). The determination was that:

> *'Quarry development was undertaken post 1st February 1990 that would, having regard to the Environmental Impact Assessment Directive, have required an environmental impact assessment but that such an assessment was not carried out or made'.*

The reason for the determination was given as:

> *'The quarry development expanded by 3.84 hectares post 1995….This expansion results in the quarry being greater than 5ha in surface area and therefore results in an increase in size greater than 25% of the quarry area and 50% of the appropriate 5ha threshold. Accordingly, EIA is required under Class 13 of Part 2, Schedule 5 of the Planning & Development Regulations 2001, as amended'.*

In September 2012, DCWL made an application to ABP for a review of the Council determination. ABP was requested to quash the Determination and Decision of Cork County Council and to conclude that, without a basis for a determination under Section 261A(2), that No Further Action is the appropriate result of the Section 261A review process with respect to the Ummera site.

On 24 February 2014 following its review, ABP decided to confirm the Council's determination requiring DCWL to apply for substitute consent including a remedial EIS. The Council's determination and ABP's review decision is provided in Appendix 1-1. DWCL sought, and was granted, leave from the high court to apply for judicial review of the ABPs decision in April 2014, with Cork County Council named as a notice party. The case was adjourned a number of times pending the outcome of the 'the McGrath case' as to the constitutionality of Section 261A of the Planning & Development Act 2000 – McGrath Limestone Works v An Bord Pleanala, Ireland and the AG. In March 2020, the case was adjourned generally due to HSE covid 19 restrictions.

Section 177F of the Planning & Development (Amendment) Act 2010 states that a remedial Environmental Impact Statement shall contain the following:

(a) a statement of the significant effects, if any, on the environment, which have occurred or which are occurring or which can reasonably be expected to occur because the development the subject of the application for substitute consent was carried out;
(b) details of —
(i) any appropriate remedial measures undertaken or proposed to be undertaken by the applicant for substitute consent to remedy any significant adverse effects on the environment;
(ii) the period of time within which any proposed remedial measures shall be carried out by or on behalf of the applicant;
(c) such information as may be prescribed under section 177N.

1.3 Pre-Submission Consultation

In the course of the preparation of the rEIAR, KGEC and the specialist sub-consultants contacted a number of organisations and individuals. These are referred to in each section of the rEIAR as appropriate. The organisations contacted are summarised in Table 1-1.

Table 1-1: List of Consultees

Organisation	Response Received
Geological Survey of Ireland, Department of Communications, Climate Action & Environment	Yes
Transport Infrastructure Ireland	Yes
Department of Transport, Tourism & Sport	Yes
Air Quality Section, Department of Communications, Climate Action and Environment	No
Office of Public Works	No
Failte Ireland	No
Cork County Council – Macroom Area Engineer's Office	No
Department of Culture, Heritage and the Gaeltacht - DAU	Yes
Environmental Protection Agency	Yes
Inland Fisheries Ireland	Yes

Responses are provided in Appendix 1-2.

1.4 Scoping

The scoping process determines the areas or aspects, which are important during the environmental assessment of the development. It was used to eliminate those aspects of the environment that are less important. The level of work carried out for each topic reflects the potential impact on that aspect of the environment that may have occurred during the lifetime of the gravel pit, as identified during the scoping process.

An initial scoping of possible impacts of the gravel pit was carried out in accordance with Article 3 of Directive 2011/92/EU as amended by Article 3(1) of Directive 2014/52/EU. The Directive lists 10 areas, which should be assessed:

- Population & Human Health
- Biodiversity
- Land
- Soil
- Water
- Air & Climate
- Cultural Heritage
- Material assets
- Landscape
- Interaction of the Foregoing

The scoping process was based on:

- Examination of documentation relating to the S261 application process for the Ummera gravel pit and other gravel pits / quarries in similar circumstances.
- Examination of documentation relating to the S261A determination and An Bord Pleanala's review.
- The operational experience gained in the past 40 years at Ummera gravel pit.
- Review of available company files and correspondence relating to the gravel pit.
- Experience of the consultants in preparing (remedial) environmental impact assessments for gravel pits / quarries.

The areas identified during the scoping process as being the most significant issues were noise, traffic, dust, groundwater and surface water. The emphases placed on potential impacts following the scoping process are described below:

Population & Human Health
Aspects of population and human health include health & safety, socioeconomics, tourism, noise and air quality. The gravel pit is located on private lands with restricted access. It is and has been operated in accordance with relevant health and safety regulations. It provides employment for one operative, with additional employment provided to ancillary supports such as HGV drivers, mechanics, suppliers etc. As such, there have been no significant impacts affecting human beings in the surrounding environment in terms of health & safety, socioeconomics and tourism. These issues are addressed in Chapter 3. Factors that are considered significant in the context of the gravel pit in terms of population and human health include noise and air quality.

Gravel pit workings can increase background noise levels. For nearby residents, this can be a concern. This topic is addressed in Chapter 5. A noise survey was carried out to assess noise impacts from the extraction and processing activities, with measurements recorded with and without the processing plant in operation.

The operations at the gravel pit has given rise to fugitive dust emissions in the past. This is documented in correspondence submitted to the S261 application. A dust suppression system was installed to dampen down dust in periods of dry windy weather. This issue is addressed in Chapter 6.

Biodiversity
The gravel pit is located in a rural setting dominated by dairy and beef farming. The site of the Ummera gravel pit was formerly grazing land. The gravel pit is not connected with any designated site. Biodiversity is discussed in Chapter 10.

Land
The landholding extends to 20.22ha, most of which is directly used for extraction-related activities – active extraction area, processing area, open storage of aggregate, settlement lagoons, screening berms etc. A small area is still used for agriculture, mainly silage cutting, and an area with old farm buildings. The surrounding lands are dominated by dairy and beef farming. The after-use proposals for Ummera gravel pit are to restore the site back to mainly agricultural use, with some aspects of the gravel pit maintained for biodiversity. This is addressed in Landscape & Visual Impact. Land use is therefore not considered under a separate chapter heading.

Soils
Geology and hydrogeology are important considerations for the Ummera gravel pit. The overburden deposits are a natural non-renewable resource. While the gravel deposit is not classified as an aquifer, groundwater is encountered as springs. The surrounding area is not serviced by mains water, so private wells are used for drinking water supply – both domestic and agricultural supplies. Groundwater is therefore included in this chapter, but with cross reference to surface water where appropriate. These are discussed in Chapter 8.

Water
The gravel pit is in the catchment of the Sullane River, with the Clashavoon Stream forming the western and northern landholding boundary. The Clashavoon Stream is used to abstract water for use at the gravel pit. The Clashavoon Stream and Laney River have good to excellent water quality, with gravel beds that are suitable for salmonid spawning. Washing of gravel has been carried out at the gravel pit since installation of the washing plant in 1978/79. A number of correspondences are on file from the SWRFB (now IFI) relating to concerns on the settlement lagoons and storage of silt. It is also raised in the ABP inspector's report relating to the appeal of the Council's S261A determination. For these reasons, hydrology and surface water are important factors in the assessment and in particular the management of surface water and wash water at the site. This is discussed in Chapter 7.

Air and Climate
Activities at the gravel pit could result in dust emissions from the site, which could affect air quality. Fugitive dust emissions are influenced by local climatic conditions; dry windy weather can exasperate dust emissions, while wet weather will minimise emissions. Good site management can further mitigate against fugitive dust emissions. This issue is addressed in Chapter 6. It is not considered that Ummera gravel pit has had any impact on climate change. If climate change predictions of increased rainfall extremes occur, the runoff from the site will increase. This is addressed in Chapter 7 in the context of the management of water.

Material Assets
Material assets include built services, roads & traffic and waste management. Roads & traffic are considered the primary aspect of interest for the gravel pit. Waste management isn't a significant aspect but is addressed in Chapter 2 – Project Description.

The immediate area of the gravel pit is serviced by undivided local roads. Gravel pits give rise to increased local HGV traffic. The volume of HVG traffic to/from Ummera gravel pit is directly related to the annual extraction rates. Typically, there has been approximately 50,000 tonnes/annum of aggregate produced at the pit. This results in approximately 10 loads per day on average. Most of the aggregate produced has been taken to Bredagh Cross, using local road L-3423-20/0 to access the regional and national road network. Roads & Traffic are addressed in Chapter 4.

Landscape and Visual Impact
Extraction operations at Ummera have been established for over half a century. The operations in their current scale are established since the late 1970's. The main operations are well screened from the nearby local roads and nearby dwellings. There is mature tree growth along the northern, western and south-western perimeters. Screening berms were established around 2005 along the eastern perimeter. Intermittent screening berms are used at the margin of the extraction area for further visual screening. Landscape and visual impact are discussed in Chapter 11.

Cultural Heritage
Disturbance of the ground during topsoil / subsoil stripping and gravel excavations can have an impact on archaeological features – damage to known monuments/features and uncovering of previously unknown archaeology. There are two recorded monuments within the landholding – a fulacht fiadh and a gallan stone. Dr. Charles Mount prepared the archaeological assessment, which is included as Chapter 9.

Table 1-2 shows the organisation of the topics within the rEIAR. It is noted that there are several issues cutting across a few prescribed environmental factors; these are cross referenced where appropriate and discussed in Chapter 12 – Interactions of the Foregoing.

Table 1-2: Organisation of Topics within rEIAR

Prescribed Environmental Factor	rEIAR Chapter Heading	Chapter Number	Topics Addressed
Population & Human Health	Population & Human Health	3	– Demographics – Health & Safety – Socioeconomics – Tourism
	Noise & Vibration	5	– Pit Noise – Cross reference to health
Biodiversity	Biodiversity	10	– Flora, fauna, aquatic ecology
Land	---	---	Land use is addressed in several other chapters including landscape.
Soil	Soils, Geology & Hydrogeology	8	– Overburden – Bedrock – Hydrogeology
Water	Surface Water & Hydrology	7	– Water Quality – Water Use – Runoff Volumes & Treatment Capacity – Flooding
Air & Climate	Air, Climate & Climate Change	6	– Air Quality – Local Climatic Conditions – Climate Change
Material Assets	Material Assets	4	– Roads & Traffic
Cultural Heritage	Architecture, Archaeology & Cultural Heritage	9	– Archaeology – Cultural Heritage – Architecture
Landscape	Landscape & Visual Assessment	11	– Landscape Context – Landscape Character – Views & Prospects

1.5 Contributors

The rEIAR was co-ordinated by Keohane Geological & Environmental Consultancy. Specialist sub-consultants employed with reference to specific portions of the study are summarised in Table 1-3.

Table 1-3: rEIAR Contributors

Company Name	Topic Addressed
KGEC	Overall rEIAR Coordinator Geology, Hydrogeology, Hydrology, Traffic, Landscape
KGEC	Planning Drawings
Atkins	Biodiversity
Charles Mount	Archaeological Impact Assessment
Dixon Brosnan	Noise & Vibration

1.6 Format of rEIAR

An EIA is required for the extractive industry which fall within category 19 of the Fifth Schedule Part I, category 2(b) of the Fifth Schedule Part II and category 13(a) of the Fifth Schedule Part II of the Planning & Development Regulations 2001 (S.I. 600 of 2001).

Category 2(b) of the Fifth Schedule Part II states:

> '*Extraction of stone, gravel, sand and clay, where the area of extraction would be greater than 5 hectares*'.

Category 13(a) of the Fifth Schedule Part II states:

> *'Any change or extension of development which would:-*

(i) result in the development being of a class listed in Part 1 or paragraphs 1 to 12 of Part 2 of this schedule, and

(ii) result in an increase in size greater than –

- *25 per cent, or*
- *An amount equal to 50 per cent of the appropriate threshold,*

whichever is greater.

Annex I and Annex II of Directive 2011/52/EU (as amended by Directive 2014/92/EU) lists projects and activities that require assessment. Annex II refers to quarries and extensions but doesn't give thresholds – these are to be set by the Member States. Directive 2014/92/EU has not yet been transposed, so the limits provided in S.I. 600 of 2001 are used.

As noted, it was Cork County Council's determination that the *'quarry development expanded by 3.84ha approx. post 1995……. This expansion results in the quarry being greater than 5ha in surface area and therefore results in an increase in size greater than 25% of the quarry area and 50% of the appropriate 5ha threshold. Accordingly, EIA is required under Class 13 of Part 2, Schedule 5 of the Planning & Development Regulations 2001, as amended'.* Upon review, ABP upheld this determination.

The rEIAR was prepared having regard to guidelines issued by a number of Government and Industry Agencies, including:

- *Guidelines on the Information to be Contained in Environmental Impact Statements*[1]*.*
- *Advice notes on Current Practice (in the preparation of Environmental Impact Statements)*[2]*.*
- *Revised Guidelines on the information to be contained in Environmental Impact Statements*[3]*.*
- *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports*[4]*.*
- *'Quarries and Ancillary Activities – Guidelines for Planning Authorities', DofEHLG, April 2004*[6]*.*
- *'Environmental Management Guidelines Environmental Management in the Extractive Industry (Non-schedule Minerals)', EPA 2006*[7]*.*
- *'Integrated Pollution Control Licensing, BATNEEC Guidance Note for the Extraction of Minerals', (EPA, 1997)*[8]*.*
- *'Environmental Code', Irish Concrete Federation, October 2005*[9]*.*

The BATNEEC Guidance Notes for the Extraction of Minerals is used only as a reference document. The activity in question is not required to have an IPC licence (now IPPC). However, where appropriate, some of the principles outlined in that document are adopted for the control of emissions from the gravel pit.

The rEIAR has been prepared using the grouped format structure as recommended in the EPA's 'Guidelines on the Information to be contained in Environmental Impact Statements, 'Advice Notes on Current Practice (in the Preparation of Environmental Impact Statements)', 'Revised Guidelines on the information to be contained in Environmental Impact Statements' and 'Guidelines on the Information to be Contained in Environmental Impact Assessment Reports'. The latter are draft (dated August 2017) and will be reviewed when new regulations transposing Directive 2014/52/EU[5] are published.

Using the grouped format structure, the rEIAR examines each topic as a separate section. Each specialist section refers to the relevant specialist topic using the following general structure:

- The existing / baseline environment.
- Impact assessment of the gravel pit, which addressed the likely significant affects that have occurred, or occurring or likely to occur as a result of the gravel pit operations.
- Impact mitigation which have been implemented at the gravel pit, or which will be implemented to avoid, reduce and/or mitigation impacts that have or are occurring.

The rEIAR is submitted in three volumes:

- Volume 1: Non-Technical Summary
- Volume 2: Main Report
- Volume 3: Appendices

The non-technical summary provides an overview of the work presented in the main body of the rEIAR. It is a shortened and simplified version of Volume 2 but contains all the key information presented in a non-technical format.

Scoping of the rEIAR was developed from the Sixth Schedule of the Planning & Development Regulations 2001, Directive 2014/52/EU and in consultation with the relevant organisations. The main body of the rEIAR describes the development and examines its impacts on the aspects of the environment as discussed in Section 1.4.

1.6.1 Technical Difficulties

As the assessment period extends back to 1990, not all information is readily available. For example, HGV traffic during the 1990's is not recorded, so estimates are made.

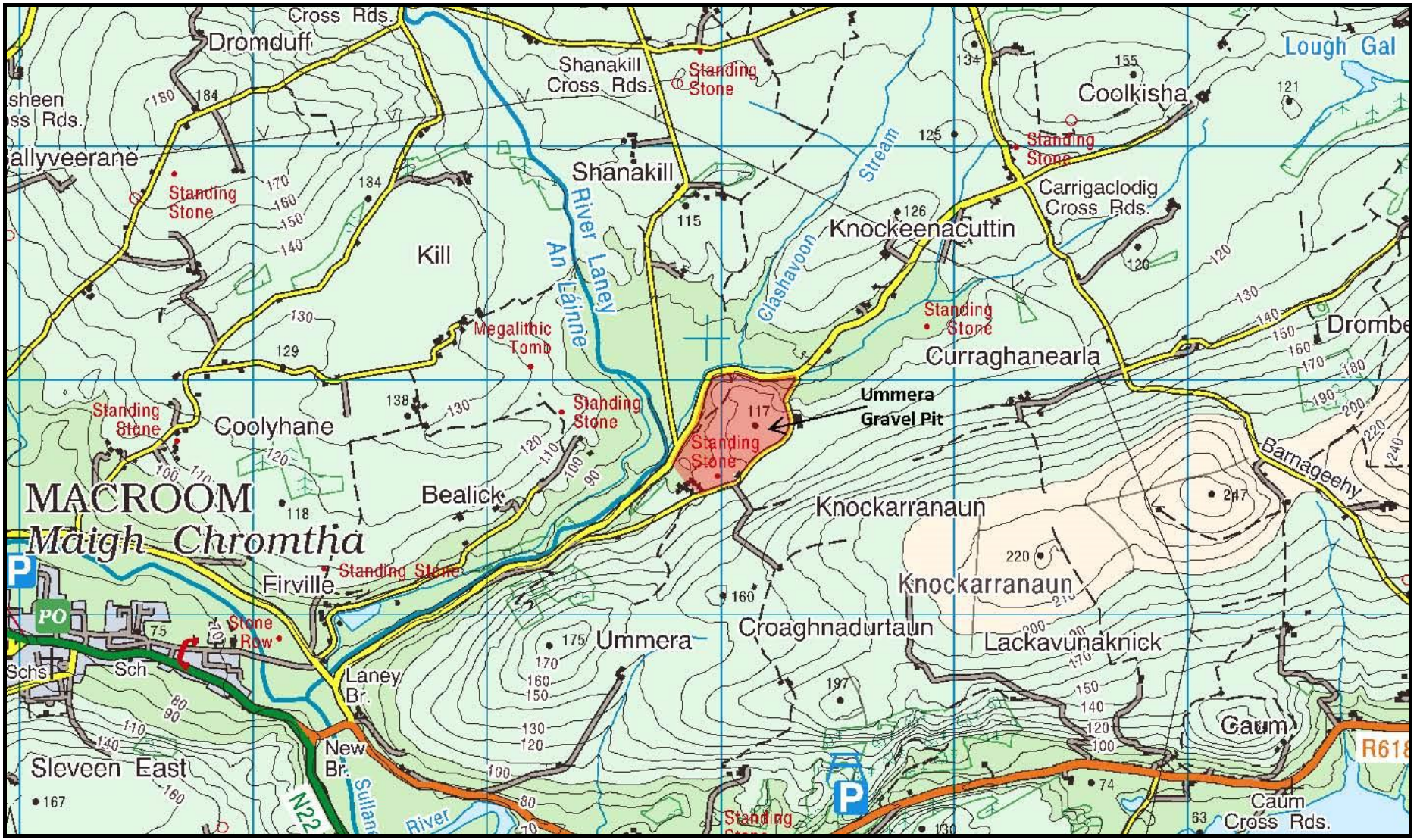


Figure 1-1: Site Location Map

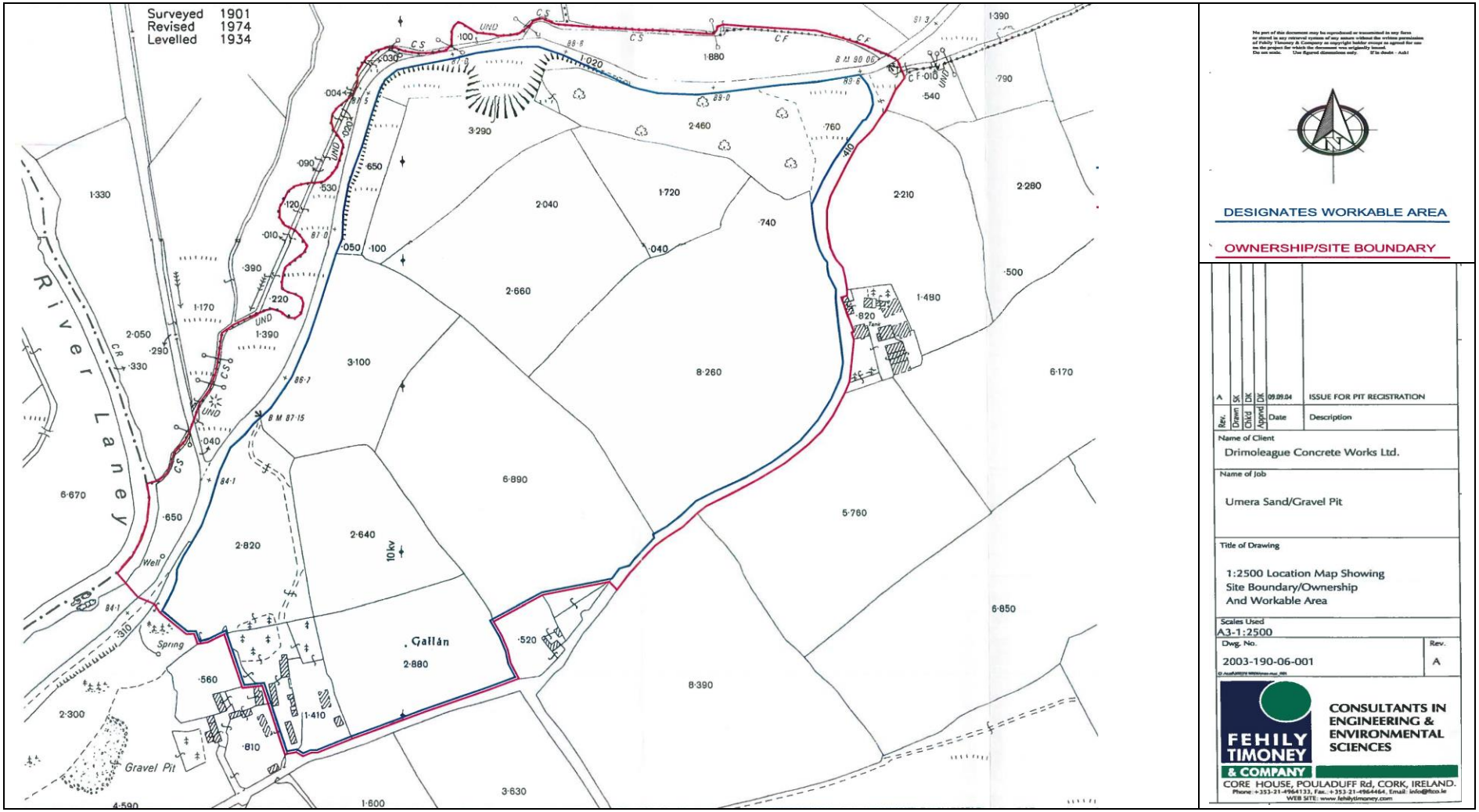


Figure 1-2: Section 261 Application Map

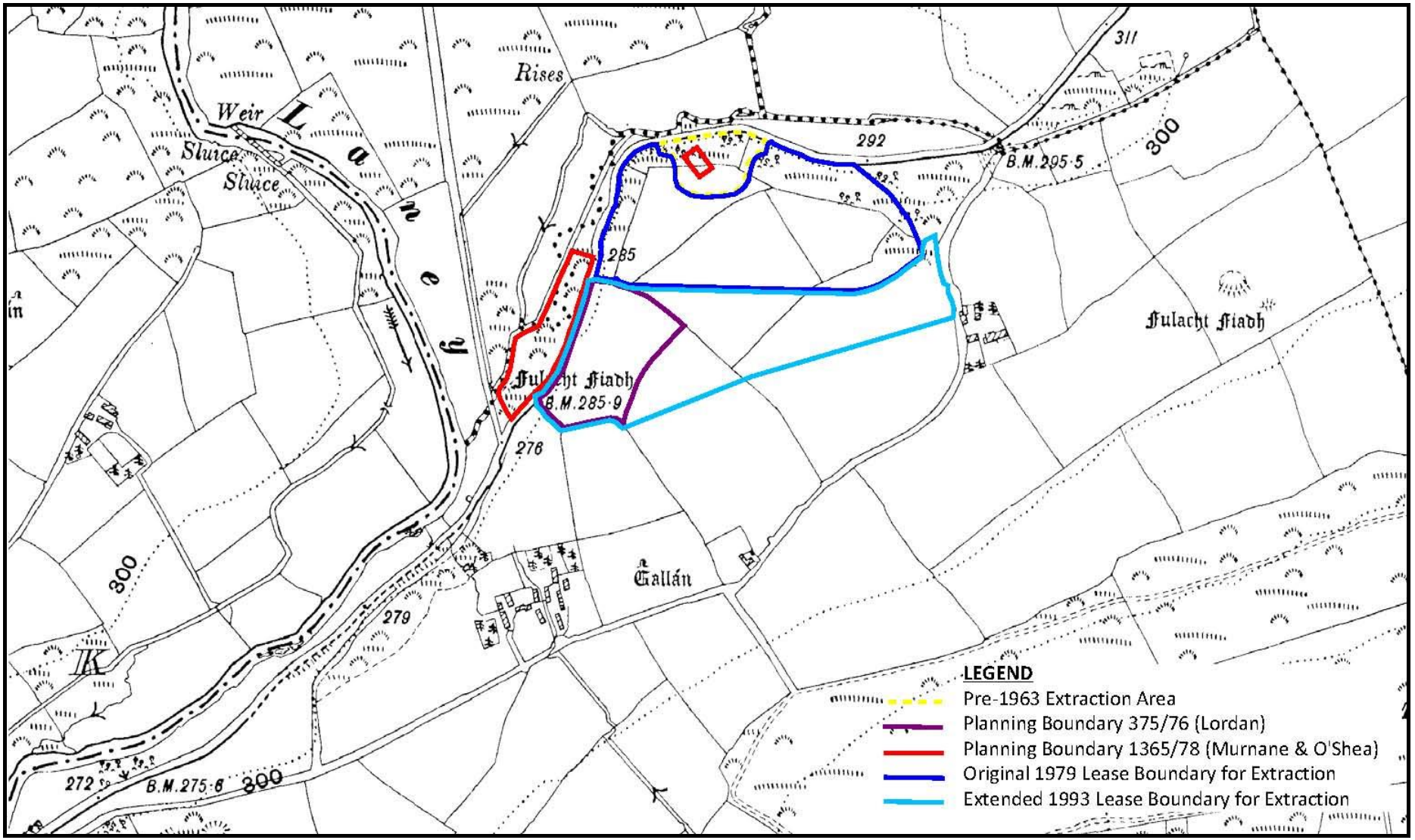


Figure 1-3: Historic Planning & Lease Boundaries

2. DESCRIPTION OF DEVELOPMENT

2.1 Site Setting

The gravel pit is in a rural setting in the townland of Ummera, approximately 2.5km to the northeast of Macroom. The site location is shown on Figure 1-1. The gravel pit is in a landholding of approximately 20.22ha, of which 17ha was included for registration under Section 261 – refer to Figure 1-2. This 17ha of land is not interrupted by any natural or man-made boundaries. The remaining lands in the folio comprise public roads or is separated from the 17ha by public roads. Areas within the 17ha not worked are used for grazing and host the old farmhouse and farm buildings. Part of the landholding is located between the public road and the Clashavoon Stream; the original settlement pond for the gravel pit is located in this area. The surrounding land use is predominantly grazing.

The site is accessed from the National Primary Route N22 via regional road R618, local road L-3423-0 and local road L-3423-20. The pit entrance is from local road L-3423-20.

The site varies in elevation between approximately 85mOD and 115mOD. The site entrance is at an elevation of approximately 85mOD and rises to the east to approximately 115mOD. The floor of the gravel pit is at an elevation of approximately 91mOD.

2.1.1 Settlement Pattern

The settlement pattern in the area is one of scattered farmhouses and once-off housing. There are 14 dwellings within 500m of the land ownership boundary offset. These are listed in Table 2-1 and are shown on Figure 2-1. As shown in Table 2-1:

- There are 5 houses within 500m of the substitute consent boundary.
- Two houses, H1 and H2 are located nearest the substitute consent boundary at approximately 55m and 65m, respectively.

Table 2-1: Houses within 500m of Land Ownership Boundary

House No.	Distance from Landowner Boundary (m)	Distance from Substitute Consent Boundary (m)	Year House Constructed	Comment
H1	5	55	pre-1930's	---
H2	35	65	pre-1913	---
H3	45	160	pre-1842	---
H4	365	505	pre-1974	---
H5	500	730	pre-1995	---
H6	490	650	pre-1913	---
H7	470	630	2003-2004	03/5671
H8	475	625	1987-1988	87/439
H9	455	600	1974-1975	73/3311
H10	100	230	2002-2003	02/3366
H11	155	280	1981-1982	81/1880
H12	395	520	pre-1934	---
H13	480	610	1990-1991	90/1105
H14	500	645	1984-1985	84/2447

2.2 Description of Existing Pit

The activities at Ummera gravel pit consist of extraction of sand & gravel in an area currently extending to approximately 3.4ha, with yard area, settlement ponds and stockpile areas extending to approximately 7.1ha.

Substitute Consent Application Area

Total land holding (folio CK114765F)	= 20.22ha
Section 261 application area	= 17ha
Substitute Consent area	= 10.5ha

The gravel is won using a track-mounted excavator which selects suitable material for processing; silty material is set to one side for later use in restoration. The track-mounted excavator is brought to site periodically to stockpile material near the working face prior to washing. A front-end loader is used to draw material from the working face to the washing plant. Material is tipped into a hopper with a coarse screen that rejects stones greater than 60mm in diameter; smaller material drops onto the conveyor which takes it to the washing plant. Various aggregate sizes are screened and directed into concrete bunkers below the washing plant. The wash water is directed into the settlement ponds carrying silts and fines. This washing plant has been used at the gravel pit since the late 1970's and has been at its current location since the late 1990's. Blasting is not carried out at the pit.

The processes and activities at the gravel pit are summarised as follows:

1. Topsoil and overburden are stripped from the area from which gravel is to be extracted. Stripping is carried out using an excavator. A dumper is used to draw soil around the site if necessary. The topsoil and overburden are used to provide temporary screening around the working area.
2. The deposit is variable in content (variable grain size), so is worked in different areas to achieve the desired blend of aggregate sizes to suit demand. Silt / clay layers occur in the deposit and these are set aside using an excavator.
3. Gravel is loaded into the washing plant using the front-end loader. The washing plant screens the aggregate into a number of size fractions, including sand, 6 to 10mm stone, 10 to 20mm stone, 20 to 50mm stone and 50mm^{+} stone.
4. Silts and fines are carried to the settlement ponds by the wash water. The ponds are cleaned periodically, and the silt is stored to the west and east of the of the ponds where it dries out. The silt will be used for future restoration. Occasionally, there is demand for this silt for use as bedding sand for underground utilities.

The site layout is shown on Figure 2-2. The main elements of the gravel pit are described in the subsection below.

2.2.1 Settlement Ponds

Up to the late 1970's, gravel was only dry screened at the Ummera pit. In 1978, M&OS obtained planning permission for a washing plant and settlement pond. The original settlement pond for the gravel pit was constructed on the western side of the landholding, between the public road and Clashavoon Stream. The pond is shallow (~0.5m deep), U-shaped and approximately 350m long. Wash water is delivered to the pond using a 6-inch diameter PVC pipe.

In the 1980's, the SWRFB (now IFI) requested that steps be taken to reduce the risk of wash water discharge to the stream. New settlement ponds where constructed within the gravel pit at the locations where they are today. In the late 1990's they were enlarged when the washing plant was moved within the pit (to its current location) and as space was created with the progression of extraction. The ponds were modified over time to increase settlement efficiency. The current pond sizes and volumes are provided in Chapter 7. The ponds need to be cleaned out regularly, so water storage volume is lost as the ponds filled with silt. The ponds are separated by raised gravel platforms used for access by machinery during cleaning. In this arrangement, water used for washing was sourced from the Clashavoon Stream, pumped directly to the washing plant.

More recently, the ponds have been re-arranged to improve silt removal and the management of wash water. This has included the division of the ponds to increase flow paths and the interconnection of the ponds with pipework. A new pump was installed at the ponds to recirculate wash water; water is only abstracted from the Clashavoon Stream to top-up the ponds.

Another issue that this rearrangement addresses is the influx of runoff water into the ponds from the elevated ground to the east. In these circumstances, the inflow – outflow of water is not in balance. Excess water is now decanted from the western settlement pond and directed to a pond used to treat runoff water from the western side of the yard area and access road, prior to discharge to the roadside drain.

2.2.2 Site Plant

The plant used on site include:

- A stationary washing plant powered by an electrical motor – see Plate 2-1
- A Volvo front-end loader used for loading raw material into the washing plant and loading trucks.
- A water pump powered by electrical motor located adjacent to the Clashavoon Stream. This pump had been used solely to deliver water to the washing plant but is now used to top up the water recirculation system.
- A second pump powered by electrical motor located in the western pond, adjacent to the site office, to recirculate wash water. It has capacity of 135m^3/hr.
- Track-mounted excavators are hired-in when needed to clean out the settlement ponds, segregate materials at the working face and strip topsoil.

Plate 2-1: View of Washing Plant from the East

2.2.3 Power Supply

The power supply to the site is mains ESB supply. The mains supply is taken from an overhead 10kV powerline that crosses over the western side of the pit. The supply enters the pit from a pole-mounted transformer at the north-western corner of the pit; located adjacent to the original location of the washing plant. An underground cable goes to the electrical panel located adjacent to the site office. There is no back-up generator at the pit. This has been the power supply arrangement to the gravel pit since the late 1970's.

2.2.4 Fuel Storage

Refuelling of site plant takes place in the yard area of the gravel pit. Fuel is stored in a self-bunded plastic tank with 1,300 litre capacity. Plastic drums (20 litres typical) of oil are stored in the body of a small truck used as a storage shed.

2.2.5 Water Usage

Water is used at the gravel pit for washing gravel, as described in Section 2.2.1. Water has also been used for dust suppression; a sprinkler system was installed along the site access road, around the floor of the pit and around the working face of the pit in the late 1990's. Water used for dust suppressed has been sourced from the Clashavoon Stream and stored in a 26m^3 tanker. There are no groundwater supply wells at the gravel pit.

Potable water is brought to site by the site manager for personal use.

2.2.6 Welfare Facilities

The site office and welfare facilities are located in the yard area of the gravel pit, adjacent to the site office. Foul effluent is treated in the on-site septic tank and percolation area.

2.2.7 Working Hours

In the S261 registration form, the hours of operation were indicated as being:

- Weekdays – 07:00 to 18:00
- Saturdays – 07:00 to 16:00

Condition No.3 of the QR01 gives the working hours as:

- Weekdays – 07:00 to 19:00
- Saturdays – 07:00 to 14:00
- No operations on Sunday or Public Holidays

In practice however operations at the pit do not generally commence until 09:00. The closing time is 18:00, with earlier closing times in winter months. The pit generally closes at 13:00 on Saturdays. The longer hours are required for flexibility. The pit will not open on Sundays or Public Holidays. These operating hours are largely in accordance with the DEHLG Quarries & Ancillary Activities – Guidelines for Planning Authorities, April 2004.

2.2.8 Security

The pit entrance gate is locked outside working hours. This is a 2.3m high steel gate. The perimeter of the landholding is fenced with a 1.7m-high timber post and wire security fence. Warning signs are affixed to the fence at intervals warning of the presence of the active gravel pit. The settlement lagoons have been fenced off from the yard area. This fence was damaged during recent rearrangement of the pond layout and has been replaced.

2.2.9 Lighting

There is no flood lighting at the gravel pit. There are lights on the front-end loader. Generally, however, the pit isn't worked after nightfall.

The existing site layout is shown on Figure 2-1.

2.2.10 Waste Management

Waste generated at the gravel pit, and its recycling, recovery or disposal, includes:

- Stripped topsoil / subsoil is reused on site for berm construction and will be used in the final restoration of the gravel pit. Soil has not been taken off site for disposal.
- Silt, which is the waste material from the washing process, is stored on site and will be reused in the restoration of the site.

- Domestic type waste generated by site workers is taken off-site by the workers each day.
- Scrap metal is stored on site and periodically collected by a licensed contractor for recycling.
- Foul effluent from the welfare facilities is treated on site in a septic tank.
- Waste oils and hydraulic fluids are collected in leak-proof containers and removed from the site for re-cycling by a licensed contractor.

2.3 Environmental Monitoring

DCWL has an Environmental Management System (EMS) in place for the operation of the Ummera gravel pit.

Environmental monitoring at the pit has been conducted in the past. Going forward, monitoring will be conducted during the lifetime of the operations to assess the effects on the environment so that operational changes and improvements can be made where appropriate. The proposed monitoring programme will form part of an Environmental Management System (EMS) for the pit is as follows:

1. Dust – twice annually between April and September at 3 locations (D1, D2 and D3) on the site perimeter.
2. Noise – Once annually at 3 noise sensitive locations (N1, N2 and N3) – one-hour intervals.
3. Groundwater – Groundwater level monitored monthly at the site boreholes (BH1 – BH3). Levels at the nearest neighbouring supply wells will also be carried out with permission from the owners – i.e. at H1, H2, H3 and H4.
4. Surface Water – Twice annually at three locations (SW1, SW2 and SW3); upstream and downstream of the site in the Clashavoon Stream and Laney River. Parameters to be tested are:

    a. pH (field measurement)
    b. Temperature (field measurement)
    c. Electrical Conductivity (field measurement)
    d. Dissolved Oxygen (field measurement)
    e. Turbidity (field measurement)
    f. Total Suspended Solids (laboratory analysis)

Monitoring points are shown on Figure 4-1 (noise monitoring locations – N1, N2 and N3), Figure 6-1 (dust monitoring locations – D1, D2 and D3), Figure 7-2 (surface water monitoring locations – SW1, SW2 and SW3), Figure 8-5 (well locations – BH1, BH2, BH3, W1, W2, W3 and W4).

2.4 Lifespan & Restoration

Section 4.9 of the Department Guidelines[6] deals with the lifespan of planning permissions for quarries. It states –

'*Where the expected life of the proposed quarry exceeds 5 years it will normally be appropriate to grant permission for a longer period (such as 10 - 20 years), particularly where major capital investment is required at the outset. In deciding the length of the planning permission, planning authorities should have regard to the expected life of the reserves within the site. The purpose of setting a finite period is not to anticipate that extraction should not continue after the expiry of that period, but rather to enable the planning authority, in conjunction with the developer and environmental authorities, to review changes in environmental standards and technology over a decade or more since the original permission was granted. In considering whether a further permission should be granted, the planning authority should have regard (inter alia) to the following factors:*

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

Ummera gravel pit has been in operation since the 1940's with the current arrangements coming into effect since the late 1970's. Although not directly relevant to the substitute consent application, there are reserves at the site for a further 15 years approximately, so an application (under Section 37L of the EU (Environmental Impact Assessment and Habitats) Regulations 2015) will be made for further development at Ummera. Restoration and after-care of the gravel pit is addressed in Section 3.6 of the Guidelines. It states -

'All proposed extractive development proposals must be accompanied by detailed restoration and after-care plans (although in the case of sites with a long working life, it may be appropriate to establish the need for such plans at the outset, while leaving the details to be agreed either on a phased basis or towards the end of the extractive process). Progressive restoration should be employed where relevant and practicable, e.g. for sand and gravel pits'.

It is proposed to return the Ummera gravel pit to agricultural use after extraction is completed. While it would have been preferable to commence phased restoration of the pit, the nature of the deposits has made this difficult to date; the gravel deposit is not homogeneous. Going forward, phased restoration will need to be implemented to better manage the silt cleaned from the settlement ponds and reduce the area of land with exposed soils. An outline of the restoration proposal is provided in Chapter 11.

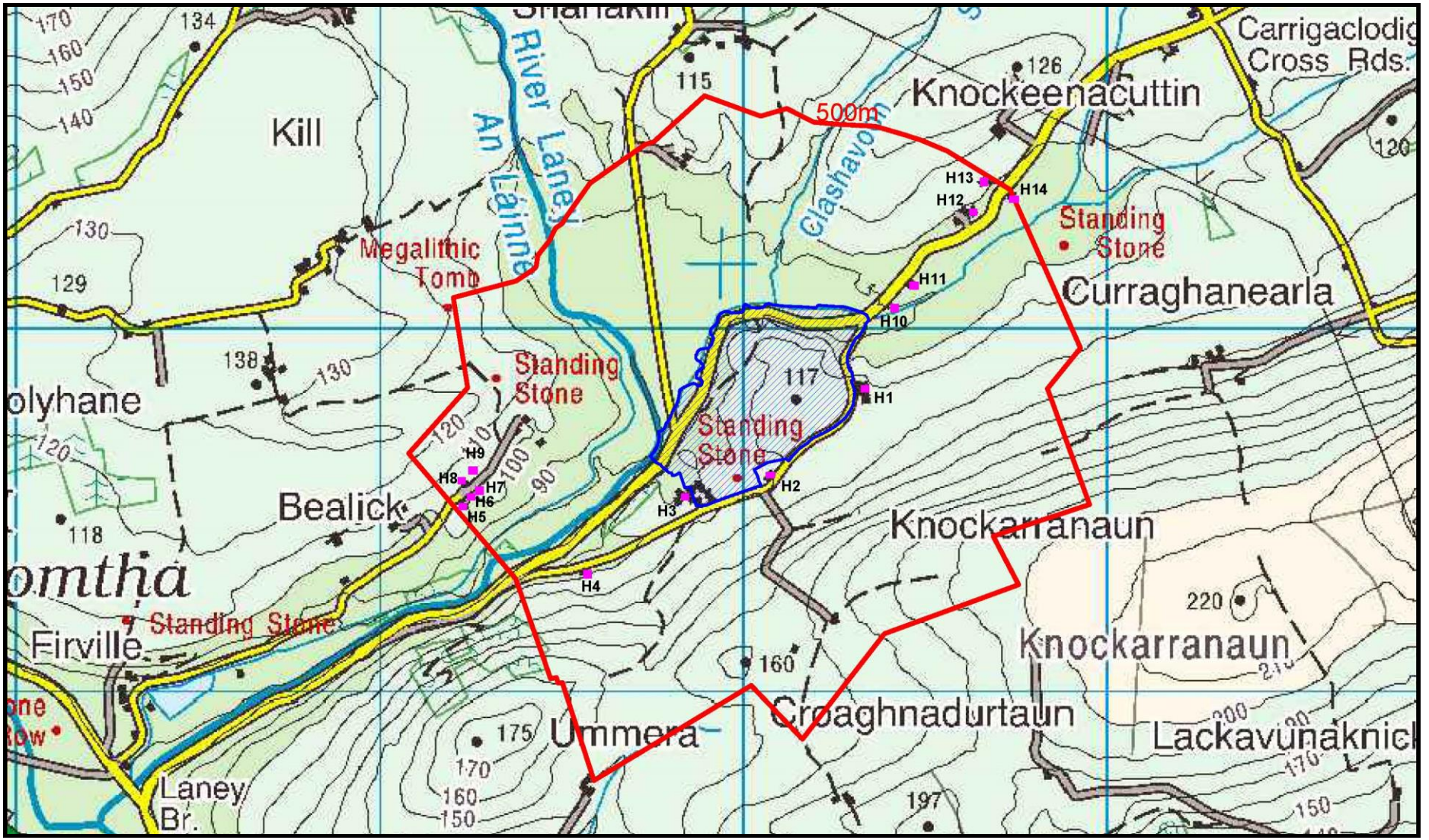


Figure 2-1: House Location Map

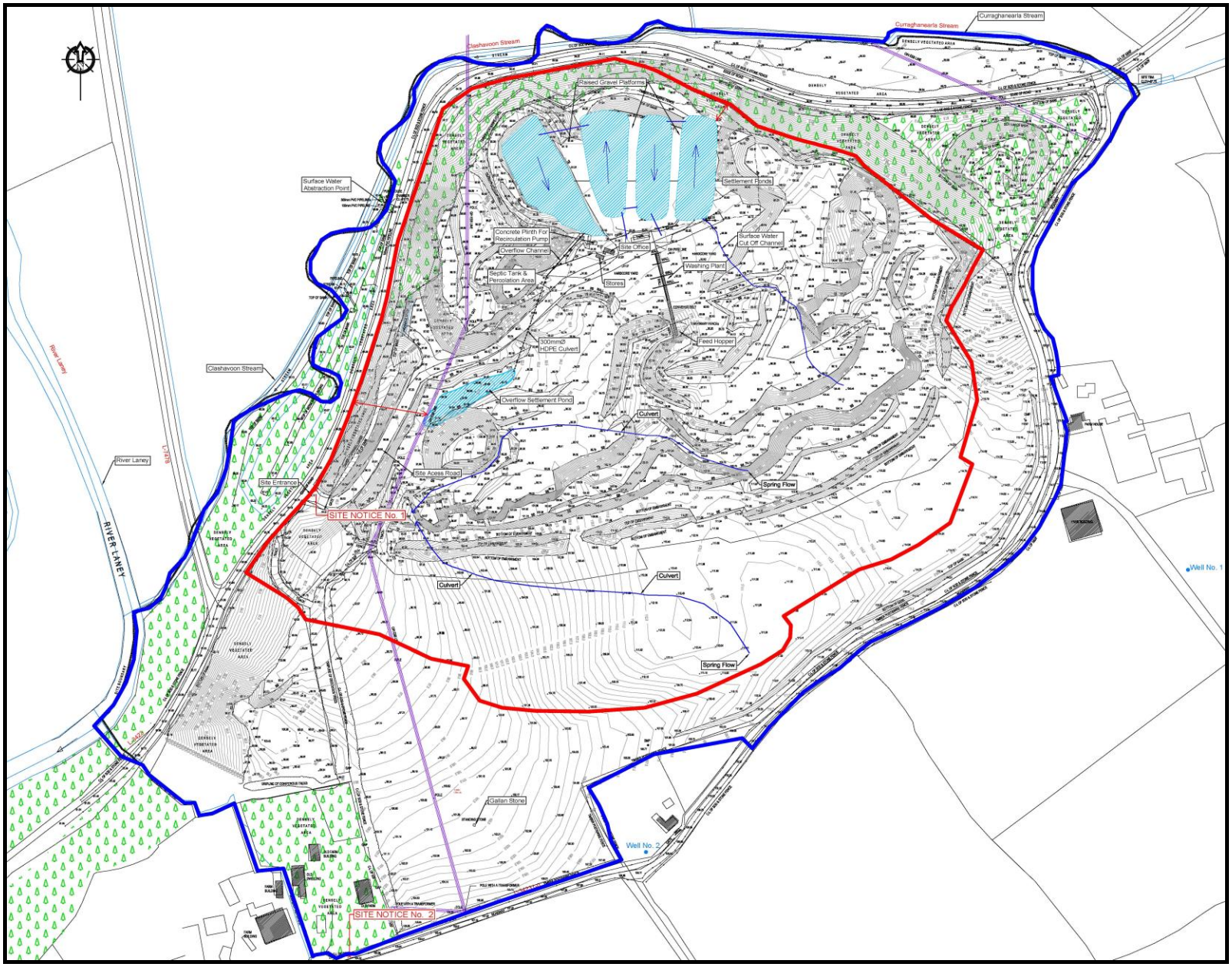


Figure 2-2: Site Layout Map

3. POPULATION & HUMAN HEALTH

This chapter of the rEIAR addresses human beings in the vicinity of the site. It assesses the local population, settlement patterns and human health; the significant effects that have occurred or are occurring associated with the gravel pit on these aspects; and the mitigation measures being implemented or proposed to be implemented to remedy the impacts identified are also presented. The aspects covered include demographics, public health and quarries, socio-economics and tourism. The other areas examined with respect to the effects of gravel extraction on humans are noise (Chapter 5), traffic (Chapter 4), air & climate (Chapter 6) and visual impacts (Chapter 11). Cumulative impacts are discussed where relevant.

3.1 Human Beings in the Existing Environment

Ummera gravel pit is in a rural setting approximately 2.5km to the northeast of Macroom. It is in the electoral division (ED) of Macloneigh, as shown on Figure 3-1. Macloneigh ED is large, extending to 30.7km^2 and wrapping around Macroom Town. The nearest settlements are Macroom, Carrigadrohid and Coachford. The nearest town is Macroom, 2.5km to the southwest. Figure 1-1 (Discovery Series Map No. 79) shows the site location map.

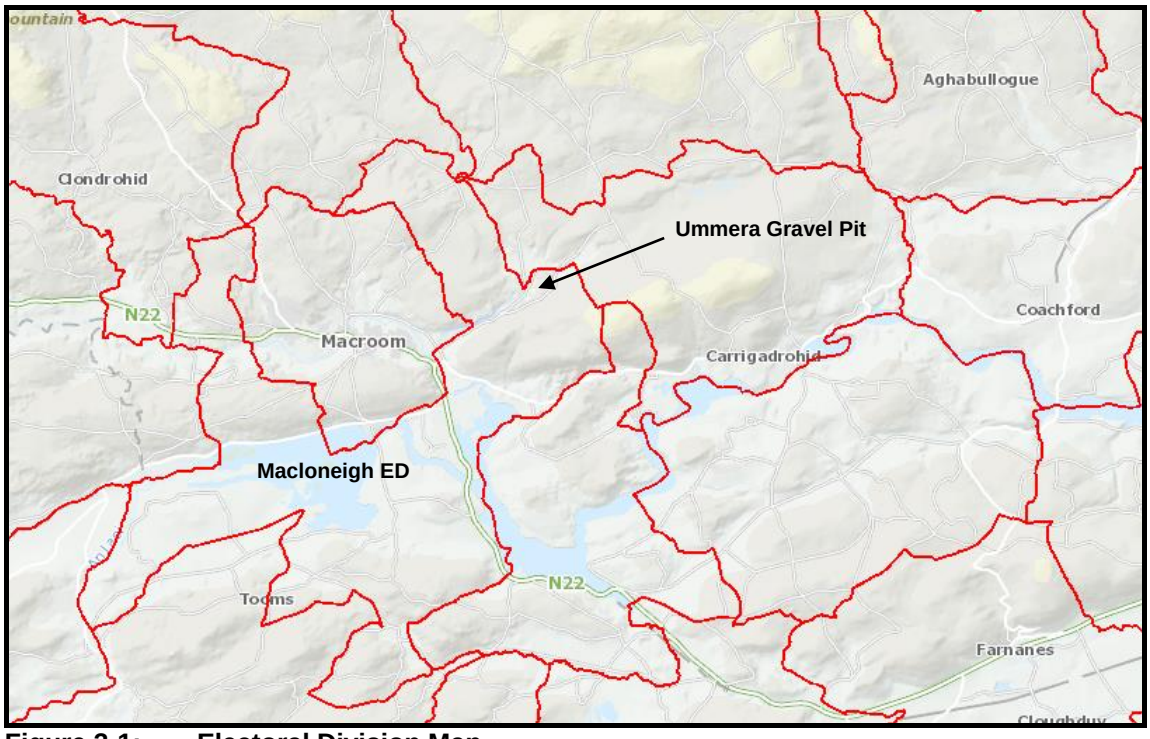


Figure 3-1: Electoral Division Map

According to the Central Statistics Office (CSO), the population of County Cork in 2016 was 417,211, making up 8.76% of entire population of the State. The rural / urban split of the State is 37.3% / 62.7%. The 2016 figures for the State represent a 3.8% increase over the 2011 census population figures, representing a faster growth rate then the period 2006 – 2011 (of 1.6%). The population of County Cork grew by 4.4% over the 5-year period 2011-2016.

The population statistics of Macloneigh ED for the period 1946 to 2016 are summarised in Table 3-1.

Table 3-1: Population Statics for Macloneigh Electoral Division

Census Year	Population			Population Change
	Male	Female	Total	
1946	378	385	763	---
1951	380	373	753	-1.31
1956	421	389	810	7.57
1961	357	341	698	-13.83
1966	336	327	663	-5.01
1971	326	333	659	-0.60
1979	348	340	689	4.55
1981	346	361	707	2.61
1986	351	359	710	0.42
1991	368	367	735	3.52
1996	379	360	739	0.54
2002	401	379	780	5.55
2006	396	408	804	3.08
2011	406	419	825	2.61
2016	418	452	870	5.45

During the assessment period (1990 to present), the population of Macloneigh ED has increased by 18.36%.

3.1.1 Recreation and Amenity

Tourism is recognised in the Cork CDP as playing an important contribution to the socioeconomics of the County and is strongly encouraged. County Cork is recognised as one of the leading tourist counties in Ireland, being the most visited outside Dublin. It is recognised as an important contributor to the local economy. Bord Failte provides figures for 2012 on a county basis (Bord Failte, 2012)[10]. For County Cork, there were 1,228,000 overseas visitors which generated €399M in revenues. Tourism has been identified as an important sector for job creation in the County.

The scenery and natural heritage of County Cork is the primary tourist attraction. There are a range of attractions from mountains, lakes, rivers, rugged coastlines, woodlands etc. with their associated activities including trekking, hill walking, mountaineering, water sports, fishing, sailing etc. The CDP lists '*Fota Wildlife Park, Blarney Castle, Middletown Distillery – Jameson Experience, Cobh Heritage Centre, Kinsale (including Charles Fort), Mizen Head Signal Station, Garnish Island, West Cork Model Railway, Barryscourt Castle, Desmond Castle, Dursey Island Cable Car, Gougane Barra, Cobh Cathedral, Bantry House and Gardens and Doneraile House and Park, Skibbereen Heritage Centre and Mallow Castle*' as key tourist attractions of national importance with and significant visitor numbers. Figure 3-2 shows the key tourist assets in County Cork (Figure 8-1 of the CDP).

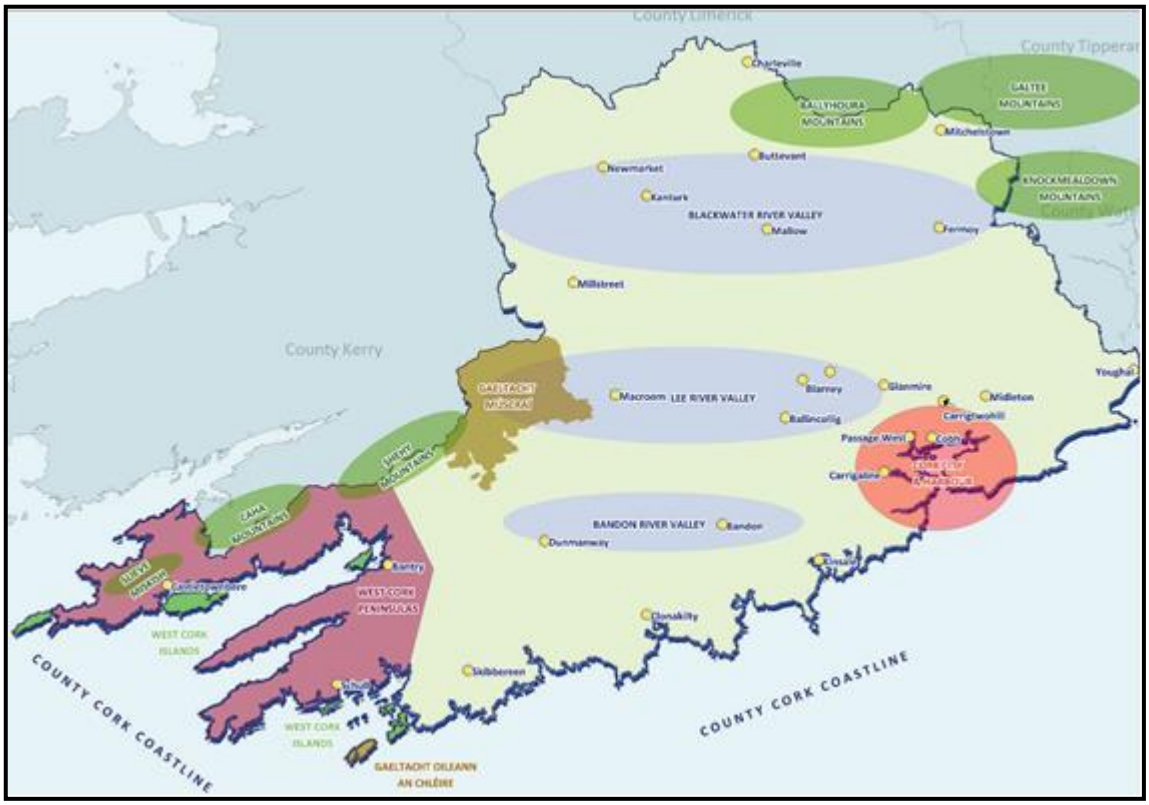


Figure 3-2: Key Tourists Assets in County Cork
Source – Cork County Development Plan 2014

The Ummera gravel pit is located within the Lee River Valley area but is not located along the main tourists' routes through the valley – N22 (Cork to Killarney) or R618 (Blarney to Macroom). The main tourist attractions (Lee Valley, Blarney Castle, Macroom Castle etc) have changed very little during the assessment period (1990 to present).

3.1.2 Settlement Pattern near Site

As noted in Section 2.1.1, the settlement pattern in the area is one of scattered farmhouses and once-off housing. There are 14 dwellings within 500m of the landownership boundary offset. These are listed in Table 2-1 and are shown on Figure 2-1. As shown in Table 2-1, the nearest dwelling is 5m from the ownership boundary and 55m from the substitute consent boundary. Of the 14 occupied dwellings within 500m of the ownership boundary, at least 2 were constructed since 1990.

3.2 Public Health & Extraction Industry

The issues associated with public health and gravel pits relate to noise, air quality and traffic. Noise is discussed in Chapter 5; air quality is discussed in Chapter 6 and traffic is discussed in Chapter 4. The significant effects associated with the gravel pit on these aspects of public health are:

Noise

1. Noise levels are not expected to have exceeded relevant emission limit levels at the nearest receptors during the assessment period. The workings (processes and intensity) at the gravel pit have remained largely unchanged over the assessment period, apart from the natural progression of the working face to the south.
2. Working hours are generally kept to 9am – 5pm during weekdays and 9am to 1pm on Saturday.
3. Potholes occurring in the access road are periodically repaired to reduce truck noises.

It is determined that the workings at the gravel pit have not given rise to noise nuisance for local residence.

Air Quality

1. Dust nuisance has given rise to complaints from the nearest residents located downwind of the gravel pit with respect to the predominant wind direction. These were most pronounced in the late 1990's / early 2000's.
2. A dust suppression system was installed in the late 1990's at the gravel pit, which extended along the access road and along the top edge of the working face. The pipework for this spray system has fallen into disrepair. However, dust emissions in recent years has not given rise to complaints.
3. Fugitive dust emissions from the gravel pit are monitored. Results generally indicate compliance with emission limit values.
4. The material processed is washed, so doesn't give rise to dust emissions. The finer product is stored in concrete bins and protected from wind. The coarser material is stored in the open, but too large to give rise to dust emissions. Dried silt is the greatest risk of fugitive dust emissions. A programme for using this silt in site restoration will be implemented within 18 months to reduce areas exposed to wind erosion.
5. In addition, it is intended to pave the access road from the site entrance to the site office. This will be kept clean, so HGVs entering/leaving the site are less likely to give rise to fugitive dust emissions. A speed limit of 15kph will be imposed for traffic accessing the gravel pit. This will be completed within 4 months.

Traffic

1. The entrance to the gravel pit has good sight lines for HGVs entering from and leaving to the south – the predominant direction of travel.
2. DWCL HGVs access the regional / national road network within 2.1km.
3. There is warning signage at the approach to the pit entrance and an additional sign will be erected further south for traffic on the southern approach to give greater warning.

3.3 Impacts Assessment

3.3.1 Health and Safety

The pit manager has been / is responsible for safety issues on site. Potential hazards may occur in an active gravel pit from construction and operation practices and include:

- Equipment/plant movement around the gravel pit.
- Working near open water (i.e. working near the settlement ponds or Clashavoon Stream).
- Truck traffic to and from the gravel pit.
- Personal injury.
- Noise from plant and machinery.
- Fire.
- Failure of working faces / silt stockpiles.

While the gravel pit is located on private lands and unauthorised access is discouraged, it is possible for unauthorised access to the gravel pit.

3.3.2 Socio-Economics

The gravel pit directly employs 1 fulltime worker, 2 additional workers on occasion and (indirectly) up to 5 drivers employed by DCWL to draw aggregate from the gravel pit. These numbers have remained reasonably consistent over the assessment period. Some of the workers live locally, so directly support the local economy. The aggregates produced directly supports the local construction industry.

3.3.3 Recreation, Amenity & Tourism

The gravel pit is in a rural settling distant from any population centres, local amenities (GAA clubs, churches, schools, parish halls, etc.) or tourist destinations. No direct or indirect significant impacts on tourism or local amenities have occurred, are occurring or are envisaged to occur in the future. It is not visible from any of the tourist assets in the Mid Cork area. The amenity of each residence could potentially be impacted by extraction activities by way of HGV traffic, noise and dust. These are discussed in detail in Chapters 4, 5 and 6, respectively.

3.4 Existing Mitigation Measures

3.4.1 Health and Safety

The approach to ensuring safe and healthy working conditions for employees at the gravel pit that has been implemented at the site are summarised as follows:

- Identifications of hazards associated with each activity.
- Assessment of risk associated with each hazard.
- Provision of safety training and instruction.
- Provision of protective equipment.
- Consultation with employees on health and safety matters.
- Obtaining copies of sub-contractor's health and safety plans.
- Auditing by an independent safety consultant.

Security at the site to deter unauthorised access include security gate, perimeter fencing and warning signage. The settlement ponds were fenced off with a 1.8m-high chain-link fence. This has been damaged during recent works at the settlement ponds and has been replaced. An earthen berm has been constructed along the southern side of the ponds to stop vehicles.

3.4.2 Socio-Economics

No mitigation measures have been deemed necessary for socio-economics.

3.4.3 Recreation, Amenity & Tourism

No significant impacts have occurred or are occurring, so no mitigation has been implemented.

3.5 Human Beings - Remedial Mitigation Measures

No remedial mitigation measures are required for socio-economics, recreation or amenity & tourism. With regard to health & safety, it is necessary to:

- Erect appropriate warning signs regarding deep water and soft ground on the fencing around the settlement ponds. This will be done within 2 months.
- Erect additional warning signs around the site perimeter advising the public of potential danger and to keep out. This will be done within 2 months.

3.6 Conclusions on Human Beings

The Ummera gravel pit has not had a significant negative impact on human health or population in the local area. Fugitive dust emissions have given rise to nuisance and complaints in the past and a sprinkler system was installed to address this. The population has seen a consistent increase during the assessment period and a number of new houses have been built near the gravel pit since 1990. Remedial mitigation measures will be implemented to reduce the potential impacts on dust emissions and health & safety.

4. MATERIAL ASSETS

This chapter of the rEIAR addresses roads and traffic in the existing environment. It assesses the local road network and traffic patterns; the significant effects that have occurred or are occurring associated with the gravel pit traffic; and the mitigation measures being implemented or proposed to be implemented to remedy the impacts identified are also presented. The assessment relates to impacts which may have arisen since February 1990.

4.1 Existing Road Network

The nearest national road to the Ummera gravel pit is the N22, which runs in an east-west direction approximately 3km to the south of the gravel pit. The N22 is scheduled to be upgraded in 2020-2022 with the construction of the Macroom Bypass; this work has commenced. The gravel pit is accessed from the N22 using the regional road R618 (Macroom – Coachford road) and local road L-3423. The entrance to the gravel pit is from local road segment L-3423-20 – see Plate 4-1. This road passes between the gravel pit (extraction area) and the original settlement ponds used previously for treating wash water; and also forms the northern boundary of the pit. Local road L-34231-0 forms the eastern and south-eastern boundary of the gravel pit. The road network is shown on Figure 4-1. HGV traffic from the gravel pit generally turns left (south) from the gravel pit, travelling towards the N22. Most of the gravel extracted is taken the DCWL's production facility in Bredagh Cross, Drimoleague. This has been the case since the 1990's.

The L-3423 / R618 junction is the first major junction encountered by HGV traffic exiting the gravel pit. The junction is at the outside of a 90º curve in the R618, so sightlines are good at this junction; visibility to the left (east) is approximately 160m and visibility to the right (south) is approximately 150m. Plate 4-2 shows the views at this junction for traffic entering the R618. DCWL HGVs travel to the N22, travel east to the R587 and head south through Kilmichael and into Dunmanway and from there to Bredagh Cross, Drimoleague. The junctions shown in Plates 4-1 and 4-2 have changed very little since 1990.

Plate 4-1: View of Pit Entrance from Local Road L-3423 – Looking North

Plate 4-2: View of L-3423 / R618 Junction from Local Road

4.1.1 Traffic Counts

DCWL engaged Abacus Transport Surveys to carry out a traffic count for the gravel pit in 2007. The traffic count was conducted on 16 January at the junction (L-3423 / L-7478 junction) just south of the pit entrance between 07:00 and 19:00. Six movements were recorded as shown in Plate 4-3. The hourly movements are summarised in Table 4-1. The detailed 2007 traffic count data is provided in Appendix 4-1.

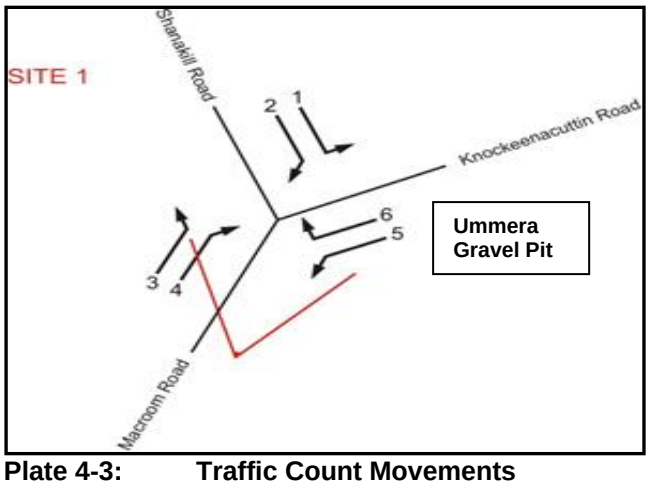


Plate 4-3: Traffic Count Movements

Table 4-1: Summary of Traffic Count Data – January 2007

Time Period	Movement												Total
	1		2		3		4		5		6		
	HGV	Other	HGV	Other	HGV	Other	HGV	Other	HGV	Other	HGV	Other	
7 – 8	0	0	0	3	0	1	0	0	0	14	0	0	18
8 – 9	0	0	2	7	0	4	2	5	0	20	0	0	40
9 – 10	0	0	1	3	1	3	3	19	2	29	0	1	62
10 – 11	0	0	0	2	0	3	0	9	1	16	0	0	31
11 – 12	0	0	0	2	0	6	2	17	1	13	0	0	41
12 – 13	1	1	1	3	1	2	1	20	2	14	1	2	50
13 – 14	0	1	0	3	1	5	0	11	1	9	0	0	31
14 – 15	1	0	0	2	0	7	2	11	3	7	2	0	36
15 – 16	3	0	0	2	0	2	0	21	1	17	2	0	48
16 - 17	2	0	1	2	1	8	1	9	2	10	3	0	39
17 – 18	0	0	1	6	0	11	1	18	1	14	0	0	52
18 - 19	0	0	0	2	0	7	0	32	0	6	0	0	47
TOTAL	7	2	6	32	4	59	12	172	14	169	8	3	495

Notes:

1. 'Other' refers to cars, buses and light good vehicles, which would generally not be associated with the gravel pit.

The total daily traffic flow through the junction during the day was 495 vehicles, with peak flows occurring between 09:00 – 10:00 in the morning. Traffic flow volumes fell into late morning with a slight spike approaching lunchtime and peaking again between 17:00 and 18:00. During the hours of peak traffic volumes, most of the traffic travelled straight through the junction along the L-3423, passing the pit entrance. Approximately 10.3% of the traffic are HGV's of which 50.9% are likely to be associated with Ummera gravel pit; the number of HGVs entering/existing the pit were not recorded, but those making movement 4 and 5 are assumed to be pit traffic, but this likely overestimates gravel pit HGV traffic.

The traffic count was repeated on 30 May 2019 between 07:00 and 19:00 at the same location, with the same movements recorded. Traffic entering and leaving the gravel pit was noted. The count data is summarised on Table 4-2. The 2019 traffic count data is provided in Appendix 4-2.

Table 4-2: Summary of Traffic Count Data – May 2019

Time Period	Movement												Total
	1		2		3		4		5		6		
	HGV	Other	HGV	Other	HGV	Other	HGV	Other	HGV	Other	HGV	Other	
7 – 8	0	0	3	9	0	2	0	2	1	17	0	0	34
8 – 9	0	2	0	6	0	6	1	9	0	22	0	1	47
9 – 10	0	0	0	13	1	12	0	11	0	26	0	1	64
10 – 11	0	2	2	12	0	8	2	16	1	10	0	2	55
11 – 12	0	0	0	9	0	6	1	19	2	28	0	0	65
12 – 13	0	0	0	3	1	6	0	24	0	18	0	2	54
13 – 14	0	0	1	5	0	10	1	20	0	25	1	0	62
14 – 15	0	2	0	7	0	4	0	13	1	23	0	0	49
15 – 16	0	0	0	7	1	8	0	27	0	15	0	0	58
16 - 17	0	0	0	7	1	16	0	21	0	11	0	2	58
17 – 18	0	0	1	5	3	17	0	24	0	17	0	0	67
18 - 19	0	0	0	6	0	11	0	23	0	22	0	0	62
TOTAL	0	6	7	89	7	106	5	209	4	234	1	8	676

A further traffic count was carried out on 08 October 2019 when schools were opened. The traffic count replicated the count of May 2019. The count data is summarised on Table 4-3. The 2019 traffic count data is provided in Appendix 4-2.

Table 4-3: Summary of Traffic Count Data – October 2019

Time Period	Movement												Total
	1		2		3		4		5		6		
	HGV	Other	HGV	Other	HGV	Other	HGV	Other	HGV	Other	HGV	Other	
7 – 8	0	0	3	7	0	3	0	2	1	16	0	0	32
8 – 9	0	1	0	8	1	6	1	9	0	25	0	1	52
9 – 10	0	0	0	12	1	9	1	11	0	27	0	1	62
10 – 11	0	2	2	10	0	5	3	16	1	10	0	2	51
11 – 12	0	0	1	8	0	8	1	16	3	19	0	0	56
12 – 13	0	0	0	2	2	6	0	18	0	9	0	1	38
13 – 14	0	0	1	4	0	9	2	17	0	22	1	0	56
14 – 15	0	1	0	6	0	4	1	12	0	21	0	0	45
15 – 16	0	0	0	7	1	7	2	21	0	10	0	0	48
16 - 17	0	0	0	9	1	14	2	17	0	7	0	2	52
17 – 18	0	0	1	6	3	16	0	20	0	18	0	0	64
18 - 19	0	0	0	6	0	11	0	22	0	18	0	0	57
TOTAL	0	4	8	85	9	98	13	181	5	202	1	7	613

The traffic counts in 2019 show a 36% (May) and 24% (October) increase in traffic movements over the 12-year period between the count dates. There is a reduction in the 'other' vehicle types between May and October, which is attributed to the absence of agricultural activity. Traffic counts for the L-3423 between 1990 and 2007 are not available.

Traffic associated with the gravel pit during the 2019 counts included:

- 2 No. workers' vehicles accessing the gravel pit at 09:00 and leaving at 17:00.
- 2 No. and 4 No. HGV loads in May and October, respectively.
- 2 No. and 1 No. tractor trailer loads in May and October, respectively.
- 1 No. car with trailer in both May and October.

4.1.2 Site Entrance

The current entrance to the gravel pit was created in the 1990's using an existing agricultural entrance. The original pit entrance was located at the northwest corner of the pit with limited sightlines in both directions. The current access road to the gravel pit from local road L-3423-20 is unpaved. The entrance is just north of the junction of the L-3423-0 and L-7478. The L-3423 has an 80kph speed limit. The sightlines at the pit entrance are approximately 220m to the north and 70m to the south. Ideally, these would be 160m for a road with a speed limit of 80kph. Plate 4-4 shows the views at the pit entrance. Sightlines for HGVs entering the pit from the south are good, with visibility of approximately 220m. Hedgerow maintenance is carried out to maintain the slight line distances.

The gate is set back 18m from the road edge allowing a HGV pull off the road safety if the gate is closed.

Warning signage was erected at the approaches to the entrance since DWCL commenced using it in the 1990's – see Plate 4-5.

Plate 4-4: Views from Site Entrance Looking North and South

Plate 4-5: Warning Signage on Approach to Entrance – from North & South

4.1.3 Road Safety

Collison data is available online from the Road Safety Authority – http://www.rsa.ie/en/RSA/Road-Safety/RSA-Statistics/Collision-Statistics/Ireland-Road-Collisions/. Plate 4-6 shows all collisions in the vicinity of Ummera gravel pit for the period 2005 to 2015 and categorised as Fatal, Serious and Minor. Plate 4-7 shows the collisions for the same period but involving only goods vehicles. The year 2005 is the earliest collision data available from this online source.

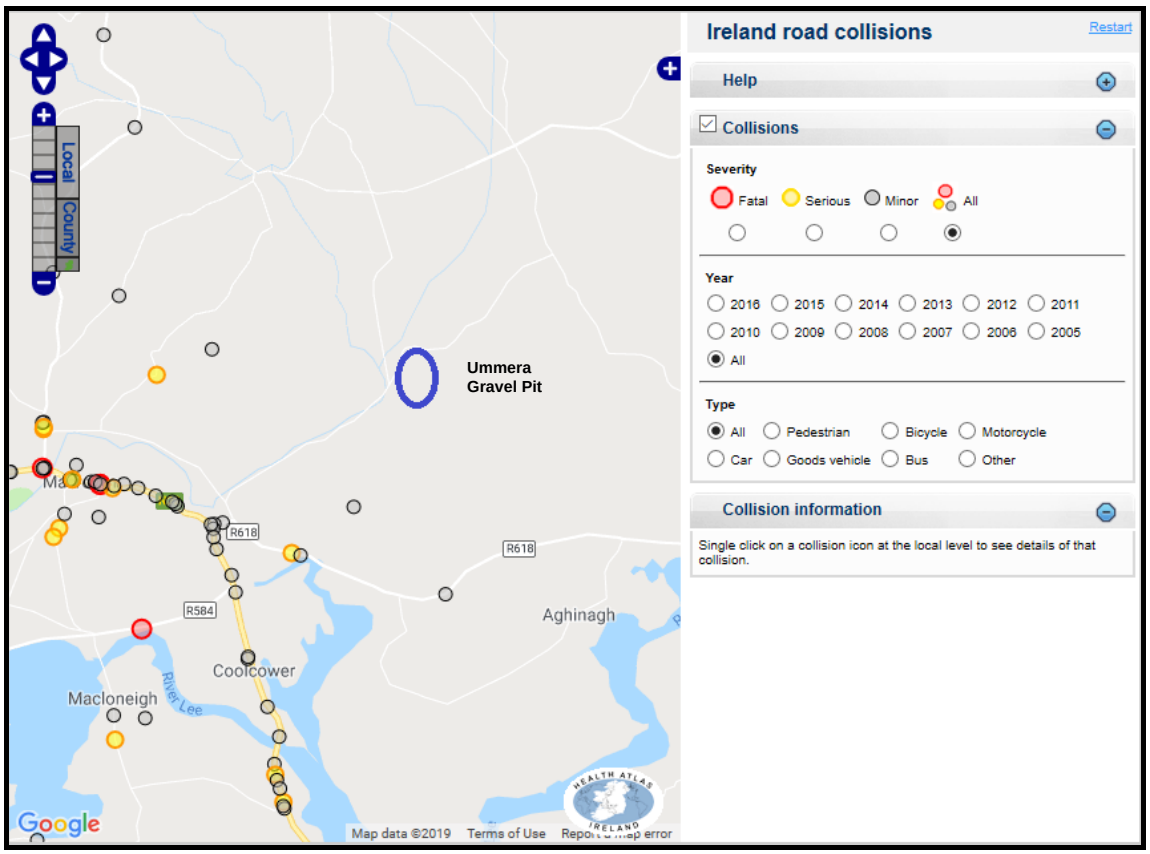


Plate 4-6: RSA Collison Data for Period 2005-2015, All Vehicles

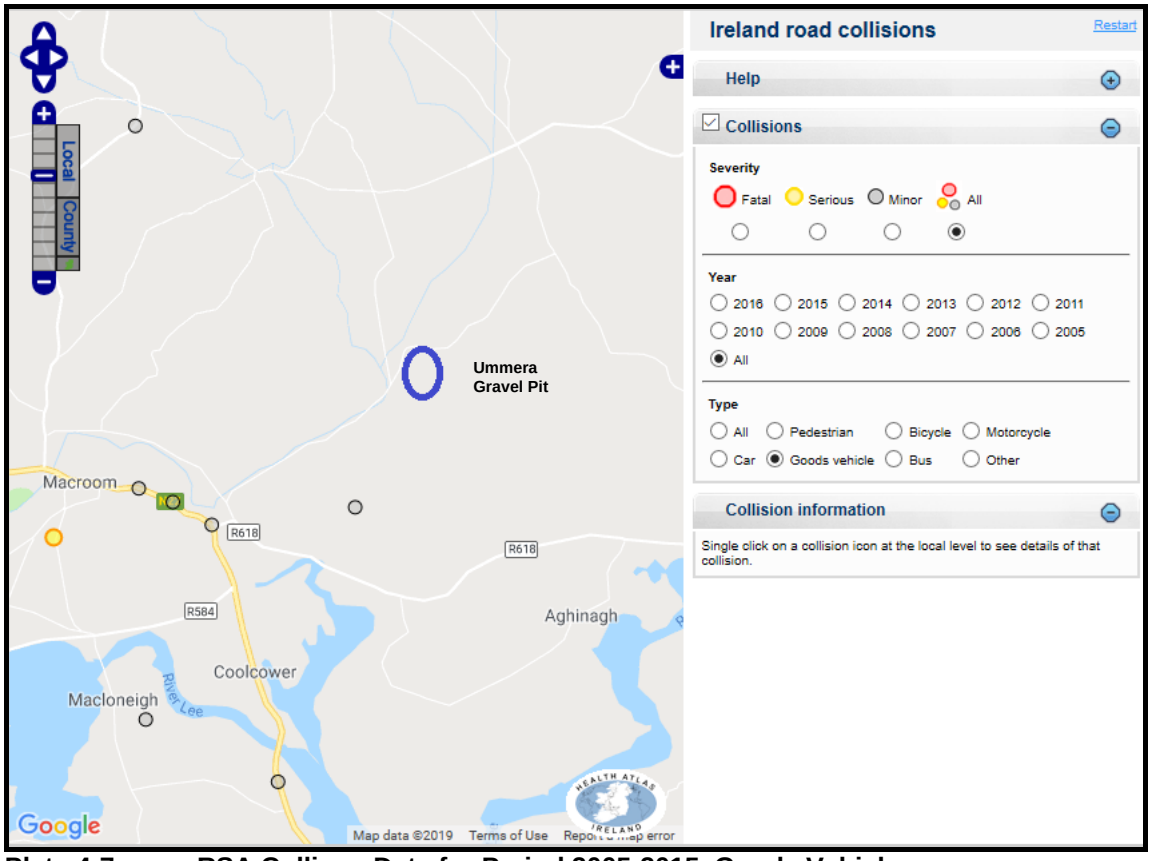


Plate 4-7: RSA Collison Data for Period 2005-2015, Goods Vehicles

As seen on Plates 4-6 and 4-7, there have been no recorded collisions on the local road (L-3423) servicing the gravel pit. Four minor collisions are recorded near the N22 / R618 junction, one of which involved a goods vehicle. It has been confirmed with DCWL that none of the collisions involved HGVs from the gravel pit.

The RSA was contacted for collision data available pre-2005. It provided a spreadsheet with data for County Cork for the period 1996 to 2004, inclusive. The data was filtered for collisions in the area defined by 129,000 / 69,000 in the southwest and 141,000 / 77,000 in the northeast. Within this area there were 104 collisions recorded in the 9-year period. These collisions are shown on Plate 4-8.

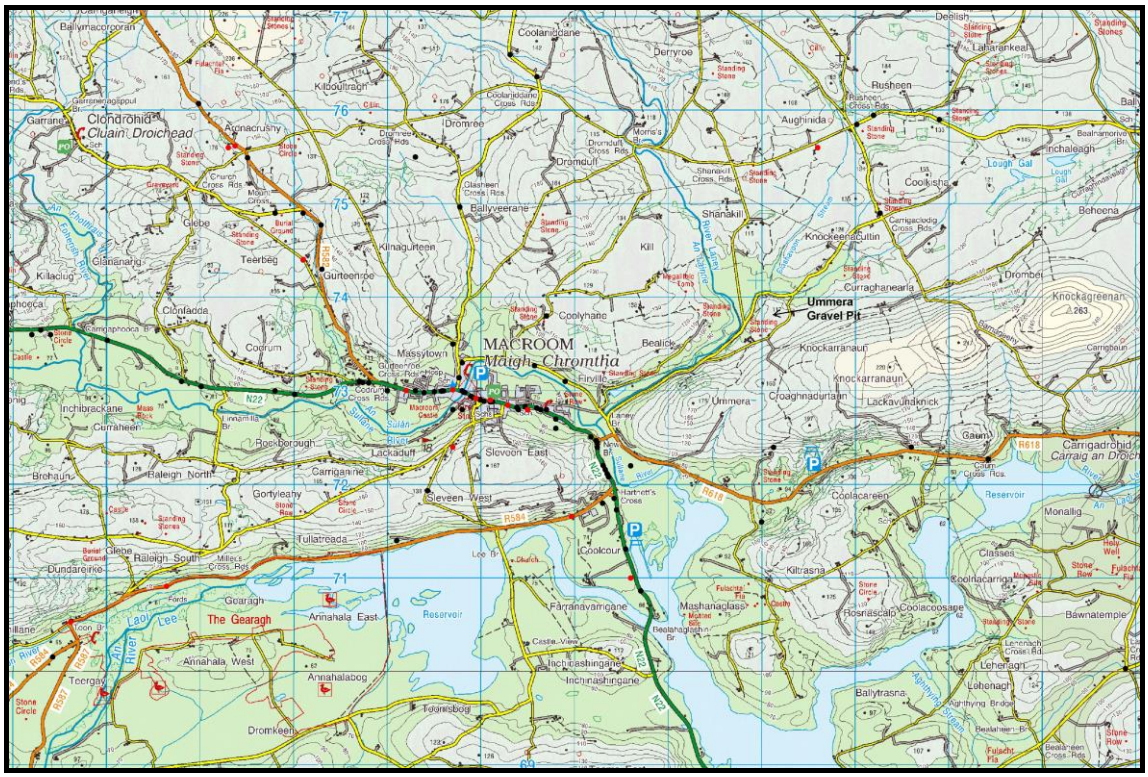


Plate 4-8: RSA Collison Data for Period 2005-2015, All Vehicles
Note: Collisions involving goods vehicles shown as red dots.

As shown on Plate 4-8, no accidents were recorded on the local road servicing the gravel pit. Most of the accidents involving goods vehicles occurred on the N22 in Macroom Town, which have no connection with the gravel pit. Three are recorded along the R584 (which is on the route to Bredagh Cross) but did not involve DCWL trucks.

4.2 Impact Assessment

The gravel pit generates a small volume of HGV traffic on local road L-3423 – up to 10 loads (20 movements) per day typically. Spread over an 8-hour day, this equates to between 2 and 3 HGV movements per hour. These volumes are representative of HGV traffic over the lifespan of the gravel pit and is considered an insignificant traffic impact. Lower HGV traffic volumes would have occurred during the economic downturn between 2008 and 2013. It is noted that the HGV traffic associated with the gravel pit doesn't conflict with the peak traffic movements recorded on the L-3423 – i.e. car traffic between 08:00 and 09:30 and 16:30 to 18:00.

The low volumes of HGV traffic have not impacted significantly on the quality of the local road.

Sight lines at the pit entrance are below ideal distances, however, most of HGVs enter the gravel pit from the south from which drivers have sight distances of 220m and similarly for HGV traffic leaving the pit (and going south).

4.3 Existing Mitigation Measures

The site entrance into the gravel pit was relocated from its original location in the 1990's. This entrance provides improved sightlines for HGVs entering and leaving the gravel pit and also improves sight stopping distances for traffic passing the site. The ditch to the south of the entrance has been battered back to improve sight distances and the hedgerows are cut periodically to remove obstructions and maintain sight distances.

While most of the other traffic is local or commuter traffic and familiar with the presence of the Ummera pit, warning signs are in place on the approaches to the site for drivers unfamiliar with the area.

4.4 Remedial Measures

The following remedial measures are proposed to improve traffic safety for the gravel pit:

1. The access road into the gravel pit will be paved with associated improvements to drainage at the entrance. This will be done within 4 months of the substitute consent / further development approval.
2. A second warning sign will be erected 150m south of the site entrance on the L-3424; the existing sign is 50m from the pit entrance and greater warning to drivers unfamiliar with the area will improve traffic safety. This will be done within 4 months of the substitute consent / further development approval.

4.5 Conclusions on Roads & Traffic

The Ummera gravel pit generates a small volume of HGV traffic on local road L-3424, typically less than 10 HGV loads per day. While the volume of aggregate removed from the gravel pit has fluctuated with economic activity, the volume of HGV traffic has remained below 10 loads per day for the assessment period 1990 – 2019. The presence of the gravel pit and associated HGV traffic hasn't resulted in collisions, likely a result of local users being aware of its presence and the possibility of meeting HGVs on the local road network. Additional warning signs will improve road safety, particularly for users unfamiliar with the area.

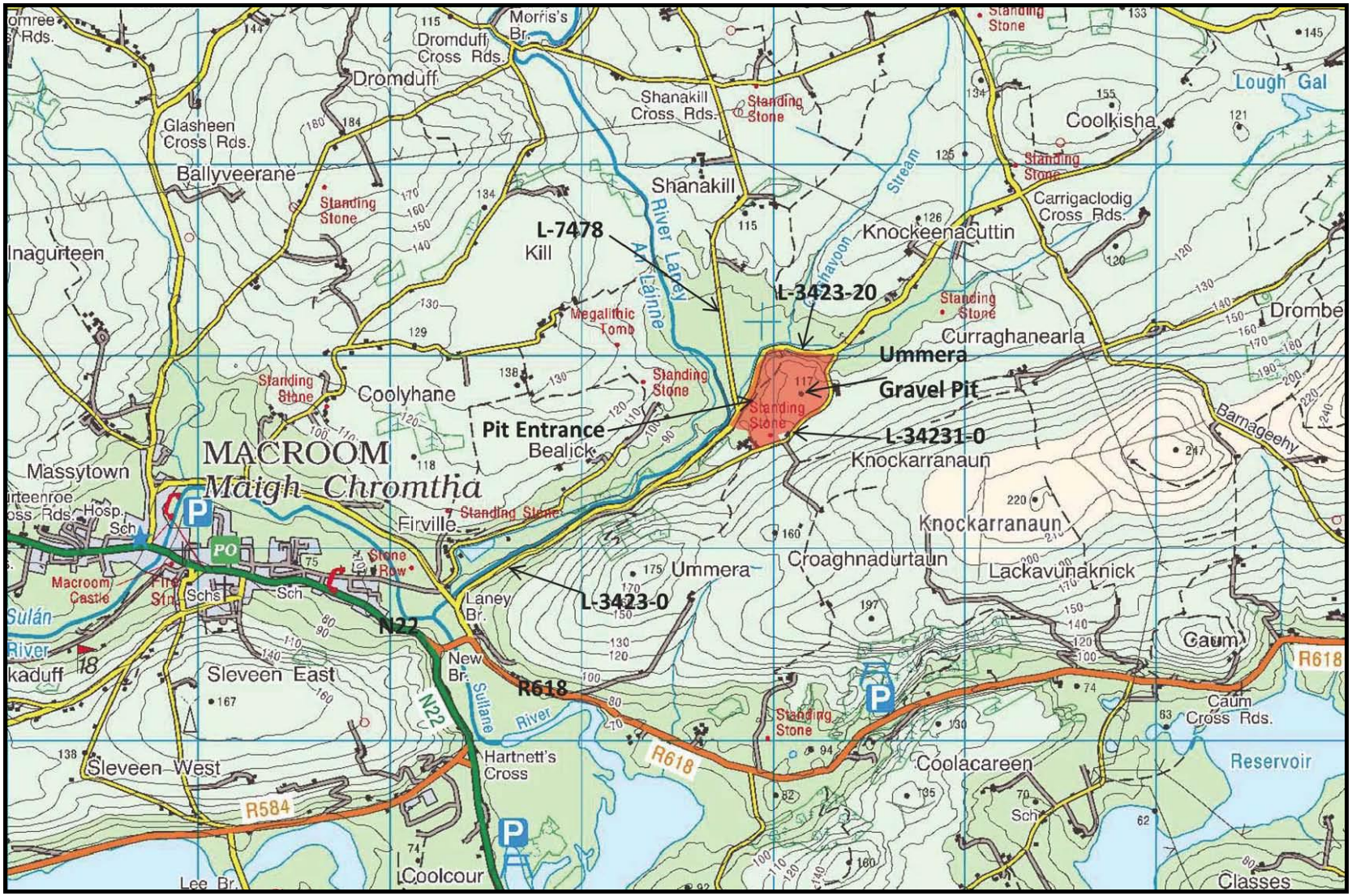


Figure 4-1: Road Network Near Ummera Gravel Pit

5. NOISE

5.1 Introduction

Damian Brosnan Acoustics was instructed by KGEC, on behalf of its client DCWL, to carry out an assessment of potential historic noise impacts with respect to the gravel pit at Ummera, Macroom. The assessment is required for inclusion in a rEIAR to be included with an application to An Bord Pleanála for substitute consent. The assessment relates to impacts which may have arisen since the February 1990 opening of the substitute consent window specified by the Planning & Development (Amendment) Act 2010.

No specific guidance exists as to the content of the noise chapter of a rEIAR. Section 177F of the amended Planning & Development Act 2001, introduced by the Planning & Development (Amendment) Act 2010, merely states that a remedial impact statement shall contain:

- A statement of the significant effects, if any, on the environment, which have occurred, or which are occurring, or which can reasonably be expected to occur, because the development was carried out.
- Details of any appropriate remedial measures undertaken, or proposed to be undertaken, by the applicant for substitute consent to remedy any significant adverse effects on the environment.
- Details of the period of time within which such proposed remedial measures shall be carried out

On the basis of the above, the following objectives were identified:

- Identify noise criteria relevant to the assessment period.
- Summarise the local soundscape and identify noise sensitive receptors.
- Identify current and historic noise sources associated with the development.
- Determine likely noise levels arising at offsite receptors throughout the assessment period.
- Determine noise impacts at receptors during the assessment period by reference to identified criteria.
- Identify noise issues, if any, which should have been addressed previously and/or require attention now.

As sand and gravel extraction operations typically do not give rise to groundborne vibration, vibration has been scoped out of this assessment.

The assessment has been undertaken with reference to the following:

- *Advice notes for preparing environmental impact assessment reports* (EPA, 2015, draft).
- *Guidelines on the information to be contained in environmental impact assessment reports* (EPA, 2017, draft).
- *Quarries & ancillary activities: Guidelines for planning authorities* (Department of the Environment, Heritage & Local Government, 2004).
- *BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites Part 1: Noise* (British Standards Institution, 2014).

5.1.1 Statement of Authority

The assessment was undertaken by Damian Brosnan, who has the following qualifications and experience:

- BSc (Honours) 1993 (University College Cork).
- Postgraduate diploma in Acoustics & Noise Control 2009 (Institute of Acoustics).
- MSc (Distinction) in Applied Acoustics 2015 (University of Derby).
- Certificate of competence in workplace noise risk assessment (Institute of Acoustics).
- Member of Institute of Acoustics (MIOA) & secretary of Irish IOA branch.
- Founding member of Association of Acoustic Consultants of Ireland (AACI).
- Member of Engineers Ireland (MIEI).
- Engaged with continuing professional development through IOA & EI.
- Working in noise since 1996, and has worked on several hundred noise projects.
- 1996-2001: Noise Officer with Cork County Council.
- 2001-2014: Partner with DixonBrosnan Environmental Consultants, specialising in EIA.
- 2015--: Principal at Damian Brosnan Acoustics.

5.2 Criteria

Prior to the 1990 start of the substitute consent window, there was little or no noise guidance available with respect to quarrying emissions or indeed any other environmental noise emissions. The first World Health Organisation (WHO) noise guidance document (*Environmental Health Criteria 12*) had been published ten years previously, in 1980, and included the following conclusions:

> *Data from surveys of community noise annoyance lead to the recommendation that general daytime outdoor noise levels of less than 55 dB(A) Leq are desirable to prevent any significant community annoyance.*
>
> *Daytime noise limits in the region of 55 dB(A) Leq might be considered as a general environmental health goal for outdoor noise levels in residential areas.*

Although a forerunner to *British Standard BS 4142:2014 Methods for rating and assessing industrial and commercial sound* (2014) had been in existence since 1982, the standard was not commonly applied in Ireland at that time. It follows that the only absolute noise criterion generally available around 1990 was the WHO 55dB daytime recommendation. While the WHO report was chiefly used to inform policy and guidance documents, the stated 55dB criterion was gradually adopted by regulatory bodies including local authorities, and thus often formed the basis of noise limits included in conditions attached to planning permission.

The introduction of the Environmental Protection Agency Act in 1992 led to the formation of the Environmental Protection Agency (EPA) which immediately began to issue various environmental guidance documents. Although the documents specifically related to industrial activities regulated by the EPA, the absence of any other environmental guidance saw their application to activities outside the EPA's remit. Their first noise guidance document, issued in 1995 (*Guidance note for noise in relation to scheduled activities*), specified a daytime noise limit of 55dB, in line with the 1980 WHO recommendation. This limit was subject to a 5dB penalty where noise could be shown to be tonal or impulsive.

During the following years, both WHO and EPA guidance documents were updated. The WHO's 1980 document was replaced by *Guidelines for community noise* in 1999, while the EPA's 1995 document was revised in 2006, and replaced altogether in 2012. Each revision, including those currently in force, continues to recommend the 55dB daytime noise criterion. In addition, EPA guidance continues to refer to application of a penalty where noise emissions are tonal or impulsive. The 55dB criterion has now become widely accepted as an appropriate daytime limit for commercial operations including quarrying. It follows that this criterion has been the most relevant limit since the opening of the substitute consent window in 1990.

The only Irish noise guidance specifically issued in the past with respect to quarries was *Quarries & ancillary activities: Guidelines for planning authorities*, produced in 2004 by the then Department of the Environment, Heritage & Local Government (DOEHLG). The purpose of this document was to provide guidance to local authorities in connection with the 2005-2007 quarry registration process as set out in Section 261 of the Planning & Development Act 2000. The DOEHLG document drew on guidance presented in EPA report number MS-2000-M1, subsequently published in 2006 and titled *Environmental management guidelines: Environmental management in the extractive industry (non-scheduled minerals)*. Both documents again recommended a daytime noise limit of 55dB, identical to the limit presented in earlier EPA and WHO documents. For the first time, however, the DOEHLG guidelines specified the measurement index ($L_{Aeq\ 1\ h}$, equivalent to the average noise level, from all sources, measured over one hour), and the measurement location (at noise sensitive receptors). It was additionally recommended that audible tonal and impulsive components be minimised.

The 55dB criterion is identical to that included in quarry registration QR01 (relating to planning permission 375/76) issued on 07 September 2006 by Cork County Council, as modified by An Bord Pleanála. Condition 36 of the registration states:

> *Noise levels emanating from the proposed development when measured at the site boundaries shall not exceed 55dBa (30 minute Leq) between 08.00 hours and 18.00 hours, Monday to Friday inclusive and 08.00 and 1400 hours Saturday excluding public holidays. Noise emissions shall not exceed 45dBa (30 minute Leq) at any other time. Measurements shall be made in accordance with I.S.O. Recommendations R.1996/1 "Acoustics – Description and Measurement of Environmental Noise, Part 1: Basic quantities and procedures".*
>
> *If the noise contains a discrete, continuous tone (whine, hiss, screech, hum, etc.), or if there are distinct impulses in the noise (bangs, clicks, clatters or thumps), or if the noise is irregular enough in character to attract attention, a penalty of +5dBA shall be applied to the measured noise levels and this increases level shall be used in assessing compliance with the specified levels.*

From the foregoing, it is apparent that a 55dB daytime limit is the most suitable criterion with respect to the applicant's gravel pit since the 1990 opening of the substitute consent window. This criterion is consistent with that typically applied by local authorities when granting planning permission for quarry developments, and is identical to that recommended by the EPA in their latest noise guidance document *NG4 Guidance note for noise: Licence applications, surveys and assessments in relation to scheduled activities* (2016).

The 55dB criterion identified above may be applied to a measurement interval of 1h, as recommended by the DOEHLG document, or 30 minutes, as specified by Condition 36. In keeping with contemporary quarrying practice, an interval of 1h is applied in this assessment, applicable at offsite receptors. It is noted that the criterion relates to the specific $L_{Aeq\ 1\ h}$ parameter i.e. the noise level specifically attributable to all sources at the DWCL site, and thus excludes extraneous offsite sources such as traffic.

5.3 Study Site

Local road L-3423 runs northeast from Macroom through the townland of Ummera. Approximately 2.2km from Macroom, the road curves around the northern side of the DCWL Ummera pit (see Figure 5-1). A small third-class road 1.3km in length curves around the southern side of the site, connecting to the L-3423 at both ends. The applicant's holding occupies a large portion of the land between the two roads. At this location, the ground elevation rises gently south-eastwards, and extraction has been carried out into the slope.

The northern and western boundaries of the DCWL site are formed by local road L-3423. The southern boundary of the quarry working area adjoins pasture in the DCWL holding, beyond which lies the third-class road. Both roads converge outside the eastern boundary of the site

Figure 5-1: Ummera Gravel Pit - DCWL holding shown Yellow

There are no receptors on the applicant's holding, and no receptors directly adjoin the pit working area. The nearest receptors (refer to Figure 5-2) are as follows:

- Two dwellings northeast of the converged roads outside the northeast corner of the site, the nearer of which lies 250m from the pit area. Several dwellings lie further northeast.
- A farmhouse on the third-class road, 55m from the working area. This represents the closest receptor.
- A cottage 140m south of the working area.
- A farmhouse 85m southwest of the site boundary, and 200m southwest of the working area.
- A cottage 540m southwest of the working area.
- Several dwellings also to the southwest, the nearest of which is 680m from the working area.
- The nearest receptor to the north is 720m from the site.
- The nearest receptor to the south lies over 1.4km from the site.

Figure 5-2: Noise Receptors near Gravel Pit
Note: Dwellings are circled in white; former third-party batching plant circled in yellow.

A review of historic Ordnance Survey of Ireland and Google imagery (refer to Figures 5-3 to 5-6) indicates that all dwellings circled in Figure 5-2 predate 1995, with two exceptions – refer to Table 2-1. However, for the purposes of this assessment, it is assumed that all dwellings have been in existence throughout the duration of the 1990-2019 assessment period.

Land use in the local area is predominantly agricultural, with the chief exception being the DCWL sand and gravel workings. The chief noise sources present in the local environment are DCWL operations, agricultural activity and road traffic. Road traffic noise occurs intermittently throughout the day from the L-3423 and from road traffic to the north which is audible over the plain. N22 traffic to the south is audible during quieter periods.

Figure 5-3: 1995 OSi Aerial Photograph

Figure 5-4: 2000 OSi Aerial Photograph

Figure 5-5: 2005 OSi Aerial Photograph

Figure 5-6: 2018 Google Aerial Photograph

5.4 Residual Soundscape

No historic residual noise data are available i.e. noise data in the absence of DCWL operations. In order to quantify the residual soundscape, a daytime noise survey was undertaken 24 October 2019 while the DCWL washing plant was not operating. Although the DCWL loader was in limited use during the survey, there was minimal offsite impact, and measured levels are considered representative of the residual soundscape.

Monitoring was undertaken at four locations (Figure 5-7, photographs 1-4, Table 5-1) representing the nearest receptors. Survey details, equipment specifications and weather conditions are listed in Appendix 5-1. Time history profiles are presented in Appendix 5-2. Noise data are presented in Table 5-2. Residual $L_{AF90\ 15\ min}$ levels were 33-35dB at N2-N4. Levels were slightly higher at N1 (38dB) due to a nearby watercourse. The soundscape at all four locations was dominated by local and distant road traffic and bird song/calls.

Figure 5-7: Noise Monitoring Stations

Plate 5-1: N1, Looking NE towards Public Road

Plate 5-2: N2, Looking E towards Farmhouse

Plate 5-3: N3, Looking NE

Plate 5-4: N4, Looking W towards Dwellings in Distance

Table 5-1: Noise Station Details

Ref.	ITM NGR	Location	Reason for selection
N1	537307 574078	Adjacent to road junction outside NE corner of site	To represent dwellings 100 m further NE
N2	537237 573893	Field on E side of quarry	To represent farmhouse 30 m E
N3	537018 573691	Field on S side of quarry	To represent cottage 40 m SE
N4	536877 573792	W corner of quarry	To represent dwellings 680 m WSW

Table 5-2: Residual Noise Data (dB)

Station	N1			N2			N3			N4		
	$L_{Aeq\ T}$	$L_{AF10\ T}$	$L_{AF90\ T}$	$L_{Aeq\ T}$	$L_{AF10\ T}$	$L_{AF90\ T}$	$L_{Aeq\ T}$	$L_{AF10\ T}$	$L_{AF90\ T}$	$L_{Aeq\ T}$	$L_{AF10\ T}$	$L_{AF90\ T}$
0745-0800	50	55	39	-	-	-	-	-	-	-	-	-
0800-0815	46	48	39	-	-	-	47	53	35	-	-	-
0815-0830	51	56	40	44	48	36	43	48	36	-	-	-
0830-0845	51	55	39	43	47	34	44	47	35	-	-	-
0845-0900	50	55	39	45	49	38	45	49	38	-	-	-
0900-0915	52	56	39	44	46	41	41	44	38	-	-	-
0915-0930	50	55	39	42	44	40	42	43	36	-	-	-
0930-0945	48	51	38	42	42	40	47	51	36	-	-	-
0945-1000	47	51	38	43	46	40	43	47	34	-	-	-
1000-1015	51	53	37	43	45	39	43	46	33	38	41	33
1015-1030	50	54	37	42	45	39	42	46	33	39	42	33
1030-1045	48	50	37	43	47	34	48	51	36	44	48	34
1045-1100	47	51	37	41	45	33	47	50	32	42	46	32
1100-1115	47	51	37	43	47	34	46	51	32	43	47	32
1115-1130	48	48	36	39	43	32	47	52	33	39	41	32
1130-1145	45	50	36	39	41	31	42	45	33	40	43	31
1145-1200	49	53	36	39	42	31	46	50	32	41	45	33
1200-1215	47	51	36	38	41	32	42	46	32	42	44	32
1215-1230	46	49	37	37	39	33	40	45	33	-	-	-
1230-1245	47	51	36	39	41	30	38	40	31	-	-	-
1245-1300	49	50	37	40	44	32	38	41	32	-	-	-
Average	**48**	**52**	**38**	**41**	**44**	**35**	**44**	**47**	**34**	**41**	**44**	**33**

Given that (a) the chief determinant of residual noise levels is traffic, (b) a substantial change in traffic volume is required before a perceptible change in noise levels occurs, and (c) traffic noise levels are unlikely to have altered significantly in the study area since 1990, it follows that measured residual $L_{AF90\ 15\ min}$ levels are likely to be reasonably representative of levels throughout the 1990-2019 period.

A remedial noise impact assessment requires a comment on the likely progression of local noise levels over the course of the development's history, in the absence of the actual development. A review of historic satellite imagery (Figures 5-3 to 5-6) indicates minimal changes in the local area, apart from land improvement works. Noise levels are unlikely to have altered appreciably over the assessment period. As the L-3423 is not a major commuter route, and does not connect any settlements to Macroom or national route N22, the road is unlikely to have seen major changes in traffic patterns.

It is understood that a concrete production facility operated at a site 440m north-northwest of the Ummera gravel pit during the assessment period. The location is shown in Figure 5-2. It is understood that the facility operated during the period 1988-2010. Given the separation distance, it is unlikely that noise emissions from same altered the residual soundscape in the vicinity of receptors surrounding the gravel pit, and cumulative noise impacts are unlikely to have occurred.

5.5 Noise History

At the beginning of 1990, DCWL operated the Ummera sand and gravel pit through a lease arrangement. By this time, the pit had been in use for several decades, and washing had been undertaken for over 10 years. The washing plant was located near the northwest corner of the pit. Extraction was confined chiefly to the northern end of the site, where aggregates were extracted at the working face using a mid-sized front-end loader, and transported by the loader directly to the washing plant. The loader was also used to manage aggregate stockpiles around the site, and to load sporadic trucks and tractor-trailers. The washing plant was powered by a mains electrical supply, eliminating the need for a generator.

By 1995, sufficient aggregates had been removed from the northern end of the site that the washing plant could be moved to a more suitable position, and the plant was relocated to its current location. Apart from this change, extraction continued as before, with the front-end loader used to ferry aggregates from the working face to the washing plant. The working face gradually moved southwards through the site over the following 20 years. As with all sand and gravel pits, extraction was undertaken at a number of locations within the site in order to optimise use of the deposit. In due course, the working face reached its current southern extremity, and extraction has in recent years been concentrated at the northeast side of the site. No other changes have occurred in the interim.

At intervals, typically once per year, a mid-sized tracked excavator has been imported to the site in order to remove and stockpile overburden ahead of the working face. This event has typically lasted one week each time.

The number of truck loads exported has been relatively steady throughout the assessment period, with 10 truck loads typically exported each day on average, equivalent to one per hour. Thus, the likely average traffic activity at any stage during the period 1990-2019 was two movements per hour.

On site plant sources since 1990 are described in Table 5-3. The loader and trucks were replaced at intervals as required. The excavator used on site was selected each year by the firm contracted for overburden removal. The washing plant has remained unchanged throughout the period, apart from its 1995 relocation.

Table 5-3: Onsite plant sources

Plant	Usage	Location
Washing plant	Used continuously throughout working day	On low ground near N corner prior to 1995; relocated to current position in 1995
Mid-sized front-end loader	Used almost continuously throughout working day	1 Around washing plant area; 2 Between plant and working face; 3 Between plant and stockpile area
Mid-sized tracked excavator	Imported once per year for approx. one week each time; used almost continuously throughout working day during each event	Ahead of contemporaneous working face
Trucks	10 loads exported per day on average,	Tracking between entrance and stockpile area

Operating hours permitted by Condition 3 of QR01 are listed in Table 5-4. However, during the assessment period working hours are generally 09:00 to 17:00 Monday to Friday and 09:00 to 13:00 on Saturdays. It is apparent that operations at the site have been consistently at a low intensity, with only one employee based on site most of the time.

Table 5-4: Operating Hours

Day	Hours
Monday-Friday	07:00 to19:00
Saturday	07:00 to 14:00
Sunday & public holidays	Closed

5.6 Noise Emissions

DCWL noise sources, listed in Table 5-3 above, have seen minimal changes over the 1990-2019 period. Changes which have occurred are as follows:

- The washing plant was relocated in 1995 to its current position. Thus, the plant has been operating at the same position for most of the assessment period. No other changes have occurred, apart from replacement of parts when necessary.
- The front-end loader has been replaced as required during the period. Each loader has been mid-sized, and therefore similar in noise output to its predecessor.
- While various tracked excavators have been imported to remove overburden, each model has been mid-sized and thus similar in noise output.

- Truck noise emissions have reduced gradually over the assessment period in line with tightening emission standards.

It is evident from the foregoing that changes in the noise regime have been minimal since 1990. The only change of potential significance has been the relocation of the working face from the north to the south, and currently to the east. As operations at the face are minimal, consisting of intermittent loader visits, the resulting change in noise impacts has also been minimal. In this regard, it is noted that the onsite noise source of greatest significance is the washing plant.

No historic noise data are available for the site. Given the minimal changes in the noise regime since 1990, it is considered that current noise levels are reasonably indicative of historic emissions. It is similarly considered that current impacts at offsite receptors are similar to impacts which have arisen historically. It follows that measurement of noise levels in 2019 provides a reasonable representation of impacts throughout the 1990-2019 period. It is worth adding here that, given the current location of the working face on the eastern site of the site, measurement of current levels will represent a worst-case scenario due to the proximity of receptors to the northeast corner of the site.

To this end, noise levels in the vicinity of the DCWL site were measured during daytime hours on 31 October 2019. Monitoring was undertaken at the four stations described in Section 5-4 above, representing the nearest receptors. Survey details, equipment specifications and weather conditions are listed in Appendix 5-3. Noise data recorded are presented in Table 5-5. During the survey, noise emissions arose from the following sources:

- Washing plant in continuous use.
- Loader in almost continuous use.
- Occasional truck movements.

Measured $L_{AF90\ T}$ levels are representative of audible emissions from the DCWL washing plant which were continuous and steady throughout the survey. Loader emissions, where audible, were generally insufficient to affect measured parameters due to their low audibility and low occurrence. Noise data may be summarised as follows:

- At N1, the washing plant was slightly discernible continuously. Measured $L_{AF90\ T}$ levels were not representative of washing plant emissions due to continuous intrusion from a nearby watercourse. The washing plant contribution was thus less than the measured $L_{AF90\ 1\ h}$ range of 36-37dB. The loudest loader movements were slightly audible here.
- The washing plant was continuously audible at a low level at N2, and measured $L_{AF90\ 1\ h}$ levels of 39-42dB are representative of the plant, with the 3dB variation attributable to plant load. The loader was also slightly audible here at intervals.
- The washing plant was barely discernible at N3. Measured $L_{AF90\ 1\ h}$ levels of 30-32dB here were not representative of plant emissions due to distant N22 traffic audible to the south. The loader was slightly audible here on occasion.
- The washing plant was slightly audible continuously at N4, where measured $L_{AF90\ 1\ h}$ levels of 35-38dB were representative of plant emissions. Loader movements were also slightly audible here. $L_{Aeq\ 1\ h}$ levels at N4 were dominated by road traffic outside the boundary.

Measured data indicate that audible washing plant emissions currently give rise to specific $L_{Aeq\ T}$ levels less than 40dB at N1, N3 and N4. At N2, the nearest station to the operations area, washing plant levels rise to 42dB. Loader operations generate negligible contributions due to their low amplitude and infrequent occurrence. It is likely that historic noise emissions from the DCWL gravel pit were relatively similar. No tones or impulses were noted in site emissions.

Table 5-5: Residual Noise Data (dB)

Station	N1			N2			N3			N4		
	$L_{Aeq\ T}$	$L_{AF10\ T}$	$L_{AF90\ T}$	$L_{Aeq\ T}$	$L_{AF10\ T}$	$L_{AF90\ T}$	$L_{Aeq\ T}$	$L_{AF10\ T}$	$L_{AF90\ T}$	$L_{Aeq\ T}$	$L_{AF10\ T}$	$L_{AF90\ T}$
0900-0915	-	-	-	-	-	-	37	40	27	41	44	29
0915-0930	-	-	-	42	46	36	35	38	31	42	45	38
0930-0945	49	50	36	43	47	39	38	40	32	44	47	40
0945-1000	50	54	36	45	48	39	36	38	30	42	45	39
0900-1000	**-**	**-**	**-**	**-**	**-**	**-**	**37**	**39**	**30**	**43**	**45**	**35**
1000-1015	46	49	35	45	48	40	37	37	29	42	44	39
1015-1030	47	52	36	44	47	42	34	38	29	42	45	38
1030-1045	47	50	36	45	48	42	36	39	31	42	44	38
1045-1100	47	50	36	43	44	42	35	36	30	41	44	38
1000-1100	**47**	**51**	**36**	**44**	**47**	**42**	**36**	**38**	**30**	**42**	**44**	**38**
1100-1115	48	53	36	44	46	40	37	39	32	42	45	38
1115-1130	45	48	36	41	43	38	36	39	29	41	43	36
1130-1145	45	47	35	44	47	39	40	43	30	43	46	37
1145-1200	46	48	36	45	48	40	36	40	31	41	44	36
1100-1200	**46**	**49**	**36**	**44**	**47**	**39**	**38**	**41**	**30**	**42**	**45**	**36**
1200-1215	48	53	36	41	43	39	37	38	33	39	40	35
1215-1230	47	51	36	41	43	39	37	41	32	36	38	34
1230-1245	48	51	38	48	50	44	40	42	34	40	43	35
1245-1300	49	53	37	46	48	42	39	42	33	40	42	36
1200-1300	**48**	**52**	**37**	**45**	**49**	**39**	**38**	**41**	**32**	**39**	**41**	**35**
1300-1315	48	53	36	43	45	41	37	39	31	38	39	35
1315-1330	46	49	36	44	46	41	38	41	31	36	38	34
1330-1345	50	51	36	44	46	41	40	40	32	40	43	35
1345-1400	44	47	37	46	49	44	35	38	32	40	43	36
1300-1400	**47**	**50**	**36**	**45**	**47**	**41**	**38**	**39**	**31**	**39**	**41**	**35**
1400-1415	44	46	37	46	47	43	37	39	33	39	41	36
1415-1430	49	53	38	46	48	44	37	40	32	39	42	36
1430-1445	48	52	38	47	50	42	36	39	33	41	43	37
1445-1500	49	49	37	40	42	38	36	37	31	37	39	34
1400-1500	**48**	**51**	**37**	**46**	**49**	**39**	**36**	**39**	**32**	**39**	**41**	**35**
1500-1515	43	43	37	44	47	40	36	38	33	42	45	36
1515-1530	-	-	-	44	47	40	37	39	32	39	42	34
Average 1 h	**47**	**50**	**36**	**45**	**48**	**40**	**37**	**39**	**31**	**40**	**43**	**35**

5.7 Impact Assessment

Noise levels measured 31 October 2019 indicate that specific $L_{Aeq\ 1\ h}$ levels attributable to DCWL operations are lower than 40dB at three stations surveyed. At a fourth station, specific $L_{Aeq\ 1\ h}$ levels rise to 42dB. These levels are considered reasonably representative of specific $L_{Aeq\ 1\ h}$ levels at these locations throughout the 1990-2019 assessment period.

An $L_{Aeq\ 1\ h}$ limit of 55dB is considered relevant to the DCWL site since 1990, applicable at receptors. Measured data indicate that $L_{Aeq\ 1\ h}$ levels attributable to DCWL operations are markedly lower than the 55dB criterion at present, and are likely to have been considerably lower than the criterion throughout the 1990-2019 period.

$L_{Aeq\ 30\ min}$ levels attributable to DCWL levels are currently less than the 55dB limit set out in Condition 36 of quarry registration QR01 which applies to the site, and are likely to have complied with this limit throughout the period 1990-2019.

Impacts may also be assessed by reference to residual noise levels. Noise data recorded 24 October 2019 indicate that residual $L_{AF90\ 15\ min}$ levels are 33-35dB at three of the stations, rising to 38dB at a fourth. These levels are likely to be representative of residual levels across the study site since 1990.

A comparison between specific and residual noise levels indicates that DCWL operations give rise to a marginal increase over residual levels, and this is likely to have been the situation since the 1990 opening of the substitute consent window. On this basis, noise impacts are currently minimal, and are likely to have been minimal since 1990. It is added here that specific $L_{Aeq\ 1\ h}$ levels were measured at four locations at or close to the DCWL boundary, and levels at receptors are likely to be lower.

5.8 Population & Human Health

Many noise standards and guidance documents published by various authorities over the last three decades have been informed by criteria recommended by the WHO. Their first noise guidance document issued in 1980 concluded that a daytime $L_{Aeq\ T}$ limit around 55dB may be considered a suitable environmental health goal for external noise levels in residential areas, and that levels below 55dB are 'desirable to prevent any significant community annoyance'.

Building on extensive research in the interim, the 1999 WHO document *Guidelines for community noise* includes more specific guidance. The recommended outdoor daytime criterion with respect to serious annoyance remains at 55dB, with 50dB added as an indicator of moderate annoyance, both as façade LAeq16h levels. The 55dB daytime criterion recommended by the 1999 WHO document appears frequently in various guidance documents, including EPA guidance. The 55dB limit discussed in Section 5-2 above is ultimately derived from the WHO guidance.

Although the WHO notes that 50dB is an indicator of moderate annoyance, regulatory authorities typically do not apply a 50dB limit to daytime operators. This is most likely linked to the differing time intervals: the 55and 50dB WHO criteria relate to a 16 h day, whereas quarry noise limits are usually specified over 1 h. Thus, compliance with a 55dB limit for each hour of a 9-10 h quarry day is likely to facilitate compliance with a 50dB limit over a 16 h day.
On the basis of the above, it is considered that a 55dB $L_{Aeq\ 1\ h}$ limit provides a sufficient degree of protection to human health. $L_{Aeq\ 1\ h}$ levels attributable to the DCWL sand and gravel pit are comfortably below this criterion, and thus no adverse impacts on the local population or on human health arise at present or are likely to have occurred after 1990.

5.9 Mitigation

Measured noise data indicate that specific DCWL levels are considerably below the indicated 55dB criterion at off-site receptors and are likely to have remained consistently below the criterion since the 1990 opening of the substitute consent window. No mitigation measures are specifically warranted. However, the applicant proposes to apply the general noise mitigation measures below within six months of the issue of planning consents by the Board:

- All plant on site, both fixed and mobile, will be maintained in accordance with manufacturer's recommendations. In particular, exhaust and silencer systems will be maintained in a satisfactory condition. Timeframe: Ongoing.
- Any plant introduced to the site will not be excessively noisy. Where possible, noise data provided by the supplier will be consulted. Timeframe: Ongoing.
- It is recommended that use of truck and plant horns on site is prohibited, including on the pit access road. Timeframe: Ongoing.
- The access road will be paved (within four months) and will be maintained in a satisfactory condition, such that any potholes which could generate rattles in empty truck bodies are repaired promptly. Timeframe: Ongoing.

5.10 Summary of Effects

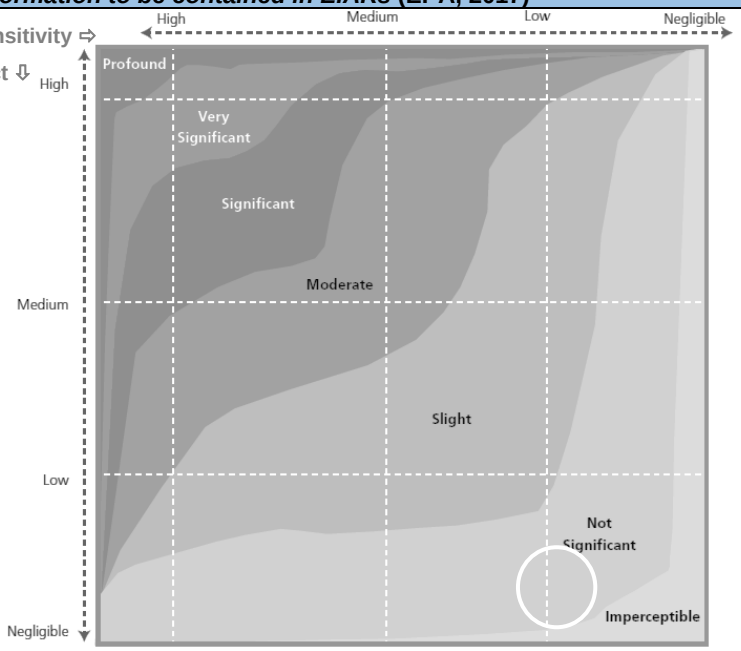
Impacts and effects are summarised in Table 5-6. No cumulative impacts are identified. The current and historic impacts are determined to be neutral to slight adverse, due to low amplitude, frequency of occurrence, and soundscape context.

Table 5-6: Assessment of Impacts & Effects

From *Draft guidelines on the information to be contained in EIARs* (EPA, 2017)
Quality Adverse at nearest receptors, due to slight audibility. Neutral at more distant receptors. *May be: **positive** (improves soundscape); **neutral** (no perceptible changes); **adverse** (reduces quality of soundscape)*
Significance Imperceptible at distant receptors. Not significant to slight at receptors close to the boundary. *May be: **imperceptible** (capable of measurement, but without significant consequences, <2 dB change); **not significant** (causes noticeable changes to soundscape, but without significant consequences, 2-4 dB change); **slight** (causes noticeable changes to soundscape without affecting its sensitivities, 4-6 dB change); **moderate** (alters soundscape in manner consistent with existing and emerging baseline trends, 6-10 dB change); **significant** (alters soundscape due to source character, magnitude, duration or intensity, 10-15 dB change); **very significant** (significantly alters soundscape due to source character, magnitude, duration or intensity, 15-20 dB change); **profound** (obliterates soundscape, >20 dB change)*
Extent Local only, with site emissions likely to be audible at less than five receptors. *Refers to: development area size, receiving area affected, number of receptors affected, proportion of population affected*
Context Conforms with soundscape, as pit has been worked since 1940s. *Refers to: conformity or contrast with existing & emerging soundscape*
Probability Not applicable – pit has been worked for decades. *May be: **likely** (reasonably expected to occur); **unlikely** (reasonably expected not to occur)*
Duration Long term. *May be: **momentary** (seconds or minutes); **brief** (<1 day); **temporary** (<1 year); **short term** (1-7 years); **medium term** (7-15 years); **long term** (15-60 years); **permanent** (>60 years)*
Frequency Monday-Friday. *Refers to: occurrence of impacts*
Reversibility Historic impacts cannot be reversed. Impacts may be reversed at any time in the future. *May be: **reversible** (may be undone in the future); **irreversible** (cannot be undone following onset, thus permanent)*
Indirect impacts None identified. Truck movements exceptionally low in context of traffic volumes. *Refers to: secondary impacts not directly attributable to development, often removed from site*
Cumulative impacts None identified. *Refers to: combined impacts with other projects or sources*
Worst case impact No critical noise mitigation measures in place at present or historically, and no such measures required. *Refers to: situation where mitigation measures substantially fail*
Indeterminable impacts None likely. *Refers to: situation where full consequences of change in soundscape cannot be described*
Residual impact

From *Draft guidelines on the information to be contained in EIARs* (EPA, 2017)

On the basis of the foregoing, the overall residual impact is circled white in the diagram.



Summary of effects

Historic and current impacts considered to be slight adverse at nearest receptors, and neutral at more removed receptors. Impacts are unlikely to have been greater at any time since 1990.

Refers to consequence of impacts

5.11 Glossary of Terms

Ambient	Total noise environment at a location, including all sounds present.
A-weighting	Weighting or adjustment applied to sound level to approximate non-linear frequency response of human ear. Denoted by suffix A in parameters such as $L_{Aeq\,T}$, $L_{AF10\,T}$, etc.
Background level	A-weighted sound pressure level of residual noise exceeded for 90 % of time interval T. Denoted $L_{AF90\,T}$.
Decibel (dB)	Unit of noise measurement scale. Based on logarithmic scale so cannot be simply added or subtracted. 3 dB difference is smallest change perceptible to human ear. 10 dB difference is perceived as doubling or halving of sound level. Examples of decibel levels are as follows: 20 dB: very quiet room; 30-35 dB: night-time rural environment; 55-65 dB: conversation; 80 dB: busy pub; 100 dB: nightclub. **Throughout this report noise levels are presented as decibels relative to 20 µPa**.
Effect	Consequence of an impact.
Emissions	Noise originating from source under consideration, spreading spherically, hemispherically or otherwise into surrounding environment.
Fast response	0.125 seconds response time of sound level meter to changing noise levels. Denoted by suffix F in parameters such as $L_{AF10\,T}$, $L_{AF90\,T}$, etc.
Free field	Measurement position removed from acoustically reflective surfaces other than ground.
Frequency	Number of cycles per second of a sound or vibration wave. Low frequency noise may be perceived as hum, while whine represents higher frequency. Range of human hearing approaches 20-20,000 Hertz.
Hertz (Hz)	Unit of frequency measurement.
Immissions	Inward noise received at receptor, whether from all sources (ambient) or source under consideration (specific).

Impact	Change resulting from an action, such as implementation of a project.
Impulse	Noise which is of short duration, typically less than one second, sound pressure level of which is significantly higher than background.
Interval	Time period T over which noise parameters are measured at position. Denoted by T in $L_{Aeq\ T}$, $L_{AF90\ T}$, etc.
$L_{Aeq\ T}$	Equivalent continuous sound pressure level during interval T, effectively representing average A-weighted noise level of ambient noise environment.
$L_{AF10\ T}$	Sound pressure level exceeded for 10% of interval T, usually used to quantify traffic noise.
$L_{AF90\ T}$	Sound pressure level exceeded for 90% of interval T, usually used to quantify background noise. May also be used to describe noise level from continuous steady or almost-steady source, particularly where local noise environment fluctuates.
Noise sensitive location	Any dwelling house, hotel or hostel, health building, educational establishment, place of worship or entertainment, or any other facility or area of high amenity which for its proper enjoyment requires absence of noise at nuisance levels.
Residual level	Noise level remaining when specific source is absent or does not contribute to ambient.
Soundscape	Acoustic environment as perceived, experienced or understood by listeners, taking context into account.
Specific level	$L_{Aeq\ T}$ level produced by specific noise source under consideration during interval T, measured directly or by estimation or calculation.
Tone	Character of noise caused by dominance of one or more frequencies which may result in increased noise nuisance.

In this report units are generally presented using US National Institute Of Standards & Technology guidelines.

6. AIR QUALITY, CLIMATE & CLIMATE CHANGE

This chapter of the rEIAR addresses air quality and climate in the existing environment; extraction activities can potentially impact on local air quality associated with the release of dust and particulates from exhaust fumes of diesel engines (HGVs, mobile quarry plant). It assesses the significant effects that have occurred or are occurring on air quality and climate as a result of the gravel extraction activities. The mitigation measures being implemented or proposed to be implemented to remedy the impacts identified are also presented.

6.1 Local Climate

The long-term weather patterns at the site reflect regional conditions affecting the south Munster area. These patterns are predominantly low fronts from the west and southwest in winter months and more settled conditions during the summer months.

The nearest synoptic station to the site, for which 30-year monthly averages is available, is located at Cork Airport, approximately 30km to the southeast of the site. The grid co-ordinates for this station are W665662. It is situated at an elevation of 154mOD, approximately 50m higher than the Ummera gravel pit. Table 6-1 gives a summary of average mean temperatures, humidity, rainfall etc. based on a 30-year period between 1981 and 2010 for Cork Airport.

Table 6-1: Climatic Data from Cork Airport Synoptic Station

Monthly & Annual Mean And Extreme Values 1981-2010													
TEMPERATURE *(degrees Celsius)*	***Jan***	***Feb***	***Mar***	***Apr***	***May***	***Jun***	***Jul***	***Aug***	***Sep***	***Oct***	***Nov***	***Dec***	***Year***
mean daily max.	8.2	8.3	9.9	11.8	14.4	17.0	18.7	18.5	16.5	13.2	10.3	8.5	12.9
mean daily min.	3.0	3.1	4.0	4.9	7.4	10.0	11.8	11.8	10.2	7.7	5.2	3.7	6.9
mean	5.6	5.7	6.9	8.4	10.9	13.5	15.3	15.2	13.3	10.5	7.8	6.1	9.9
absolute max.	16.1	14.0	15.7	21.2	23.6	27.5	28.7	28.0	24.7	21.4	16.2	13.8	28.7
absolute min.	-8.0	-4.7	-4.3	-2.3	-0.9	3.7	6.7	5.3	2.3	-0.9	-3.3	-7.2	-8.0
mean no. of days with air frost	4.6	4.1	1.8	1.2	0.0	0.0	0.0	0.0	0.0	0.2	1.2	3.6	16.7
mean no. of days with ground frost	12.8	11.8	9.7	7.8	2.1	0.1	0.0	0.0	0.5	2.4	7.3	11.0	65.3
RELATIVE HUMIDITY ***(%)***													
mean at 0900UTC	89.8	89.4	87.8	83.1	80.6	81.3	83.2	85.4	88.4	90.1	90.7	90.5	86.7
mean at 1500UTC	83.7	78.9	75.5	71.3	70.9	71.5	72.9	72.8	75.4	80.4	83.4	85.4	76.8
SUNSHINE ***(hours)***													
mean daily duration	1.8	2.4	3.3	5.3	6.2	5.8	5.4	5.2	4.3	3.0	2.3	1.7	3.9
greatest daily duration	8.5	10.0	11.5	13.6	15.5	16.0	15.3	14.4	11.9	10.3	8.7	7.6	16.0
mean no. of days with no sun	10.1	7.9	6.3	3.1	2.1	2.5	2.0	2.6	3.6	6.4	8.6	11.9	67.1
RAINFALL ***(mm)***													
mean monthly total	131.4	97.8	97.6	76.5	82.3	80.9	78.8	96.8	94.6	138.2	120.0	133.1	1227.9
greatest daily total	45.7	49.9	55.2	34.2	34.9	59.7	73.2	60.9	58.9	52.1	47.9	41.9	73.2
mean no. of days with >= 0.2mm	20	17	19	16	15	14	15	15	16	19	19	19	204
mean no. of days with >= 1.0mm	16	13	14	11	12	10	10	11	11	15	14	15	152
mean no. of days with >= 5.0mm	9	6	5	5	5	5	5	5	5	8	7	8	73
WIND ***(knots)***													
mean monthly speed	12.1	12.0	11.6	10.3	10.1	9.4	9.0	9.0	9.4	10.7	10.9	11.6	10.5
max. gust	78	83	70	62	59	49	57	54	58	75	66	80	65.9
max. mean 10-minute speed	52	54	43	40	40	33	40	38	39	48	46	56	44.1
mean no. of days with gales	2.3	1.8	1.3	0.3	0.3	0.0	0.1	0.2	0.3	1.0	1.2	1.9	10.8
WEATHER ***(mean no. of days with..)***													
snow or sleet	3.1	3.1	2.0	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.3	2.2	11.3
snow lying at 0900UTC	0.7	0.5	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	2.0
hail	1.0	1.1	1.4	1.9	0.7	0.2	0.1	0.0	0.1	0.3	0.2	0.4	7.4
thunder	0.2	0.1	0.1	0.1	0.6	0.5	0.8	0.3	0.0	0.4	0.1	0.1	3.3
fog	7.8	6.8	8.5	7.5	7.6	7.6	8.4	8.8	9.1	8.7	7.6	8.4	96.8

In addition, there is a rainfall gauge station located in Macroom (Cahirbaroule). Rainfall data is provided in Table 7-1. As shown on Table 7-1, the rainfall at the Macroom station is similar to the long-term 30-year averages for Cork Airport.

The mean annual wind speed for the site is approximately 3.6m/sec at 20m height. This is based on the ESBI wind speed maps available on the SEAI website www.seai.ie.

6.2 Air Quality in the Existing Environment

The EPA's Air Quality Index for Health (AQIH) for Ireland provides an indicator of air quality across the Country. Ummera gravel pit is located in Zone 80 of Region 6 (Rural West) and has an air-quality index of 3. The AQIH has a scale of 1 to 10, with 1 being Good air quality and 10 being Very Poor air quality. The AQIH is based on the measurement of five parameters. Table 6-2 lists the parameters and the range for Good air quality with an index score of 3.

Table 6-2: Good Air Quality Index Concentrations

Parameter	Units	Index 3 Air Quality Range
Ozone gas	µg/m^3 (8-hour mean)	67 – 100
Nitrogen dioxide gas	µg/m^3 (1-hour mean)	135 – 200
Sulphur dioxide gas	µg/m^3 (1-hour mean)	60 – 89
$PM_{2.5}$ particles	µg/m^3 (24-hour mean)	24 - 35
PM_{10} particles	µg/m^3 (24-hour mean)	34 - 50

Note
1. The highest (worse) concentration determines the air quality index.

The EPA maintain a network of ambient air quality monitoring sites across the Country, most of which are in urban environments. The closest to the site are located near Cork City. The most relevant parameter for the extractive industry are $PM_{2.5}$ particles and PM_{10} particles. Statutory Instrument No 180 of 2011 (Air Quality Standards Regulations) transposes the Ambient Air Quality and Cleaner Air for Europe (CAFÉ) Directive (2008/50/EC) in Irish legislation. The current limits (to protect human health) for $PM_{2.5}$ are 25µg/m^3 (annual mean), reducing to 20µg/m^3 (annual mean) in 2020. The limits for PM_{10} are 50µg/m^3 (24-hour mean), not to be exceeded more than 35 times per year and 40 µg/m^3 (annual mean).

Generally, the levels of dust in the countryside are low (<20 mg/m^2/day). From the walkover survey of the site, there is no indication of dust deposition along the boundary vegetation. Dust monitoring has been conducted at the gravel pit at three monitoring locations – D1, D2 and D3 - using Bergerhoff dust gauges as per the German VDI 2119 Standard Method '*Measurement of Dustfall*'. D1 is located at the eastern side of the pit near house H1; D2 is located at the southern end of the site near house H2 and D3 is located near the site entrance. These are shown on Figure 6-1, with results summarised in Table 6-3.

Table 6-3: Summary of Dust Monitoring Results

Monitoring Period	D1 (mg/m^2/day)		D2 (mg/m^2/day)		D3 (mg/m^2/day)	
	Total	Inorganic	Total	Inorganic	Total	Inorganic
14 Jan to 11 Feb 2006	84	26	31	6	29	8
25 April to 24 May 2006	<5	<5	5	<5	<5	<5
25 Aug to 23 Sept 2006	91	50	131	93	---[1]	---[1]
14 May to 14 June 2007	362	152	137	80	1,380[1]	1,007[1]
04 Sept to 03 Oct 2007	153	112	50	39	119	100
04 Oct to 044 Nov 2019	10.55	7.22	14.45	5.56	94.5	62.8

Note:-
1. Sample D3 vandalised.

The emission limit value for dust deposition is 350mg/m^2/day as set by the Council for the site – refer to Condition 12 of QR01. The dust analysis evaluates the organic and inorganic fraction. It is the inorganic fraction that would originate from the extraction activities. Taking the inorganic fraction as originating from site activities, the dust deposition has varied from <5 to 152mg/m^2/day at D1; <5 to 93mg/m^2/day at D2; and from <5 to 100mg/m^2/day at D3. A higher value was recorded at D3 but is due to vandalism of the sampling container.

Dust is considered to include any solid matter emanating from the gravel pit or from plant and vehicles serving it, which is borne on the wind. Dust from a gravel pit is produced from the drying of silt and fines and the movement of vehicles through the site. The size of particulates typically ranges from 1 to 75 µm. The significant cause of dust emission and dispersion from a site is wind.

The EPA sets a total dust (soluble and insoluble) deposition limit of 350mg/m^2/day (as specified by the TA Luft Guidelines). This limit is also cited in the DofEHLG Guidelines. The inorganic (insoluble) fraction is attributed to the extraction activities, while the organic fraction is likely attributable to other factors, such as insects, dust from agricultural activities (hay / straw cutting) etc.

6.3 Impact Assessment

The principal sources of air-borne emissions, particularly suspended particulates, from the gravel pit has occurred from the following activities:

- Stripping of the topsoil/overburden.
- The front-end loader hauling gravel from the working face.
- Stockpiling of the material.
- Stockpiling of silt.
- Movement and loading of the haulage trucks.

Dust emissions arise when an operation causes particulate matter to become airborne. This airborne dust is then available to be carried downwind from the source. The amount of dust generated and emitted from a working site and the potential impact on surrounding areas varies according to the following:

- The type and quantity of material and working method.
- Climate/local meteorology and topography i.e. wind speed and direction and annual rainfall amounts / patterns.

The stripping of topsoil/overburden has had the potential to cause dust emissions. The greatest potential impact will be short-term i.e. during excavation. However, topsoil/overburden in storage can be eroded by wind. Stripped soil is stored in berms along the edge of the working face. These berms vegetate naturally with grass within a relatively short time.

As the processing of the gravel uses water, dust emissions from the processing plant is not an issue. Dust emissions can arise from stockpiles or aggregate and from HGV coming / going from the site. Potential dust particles generated from these activities within the site are expected to comprise of larger dust particulates (i.e. above 30µm). The maximum distance such particulates are likely to travel is 30 to 60m. Smaller dust particles will remain airborne for longer thus dispersing over a wider area. Particulates below 30µm-diameter, and particularly below 10µm, only form a small fraction of dust emitted from gravel pits.

The non-respirable dust fractions (i.e. >10 µm) may generate an indirect impact if dust deposition outside the site boundary continues over a period of time without amelioration (e.g. staining of vegetation). Short-term impacts may occur from visible dust clouds being generated during windy dry weather events.

Respirable dust fractions (i.e. below 10µm-diameter) potentially effect respiratory and cardiovascular systems. S.I. No. 271 of 2002 relating to limit values for particulate matter in ambient air indicates a 24-hour percentile (90.4%) limit value of 50µg/m^3 PM_{10}.

Transportation of aggregates both within the site and off site has the potential to generate dust. Haulage on roadways can result in both windborne dispersion and also transfer of dust from the site. This dust nuisance may result in visual staining and soiling of nearby vegetation and buildings.

Residents of the nearest house (H1) noted nuisance dust deposition at their property in the late 1990's / early 2000's. They also noted that dust nuisance has not been an issue in recent years. The operations at the pit have not changed in any significant way, so it is not clear why this is the case; the sprinkler system was installed in the late 1990's following complaints. It may be that as trees matured along the western boundary of the gravel pit, they protected the site from the prevailing wind direction. Plate 6-1 shows the gravel pit in 2005 (Summer) and 2020 (Winter) viewed from the west. Although taken in Winter with no foliage on the trees, it is evident that they provide greater shelter from the wind.

Plate 6-1: View of Gravel Pit from West – a) 2005 and b) 2020

6.4 Existing Mitigation Measures

Several dust suppression mitigation measures have been employed at the gravel pit. These are as follows:

- The processing of aggregate is a wet process, so dust doesn't arise from the fixed plant.
- Stripped soil is stored at the top edge of the working face. These temporary berms are allowed to vegetate naturally, which reduces potential for wind erosion. The berms also shelter the working areas from wind.
- Trees were planted along the western boundary of the site. As these trees matured, they provide visual screening of the site and shelter from the predominant wind direction. In addition, mature trees at the southwest corner and northern boundary have been maintained.
- A sprinkler system was installed at the site that extended along the access road, around the perimeter of the yard area and along the top of the working face on the eastern side of the gravel pit. In recent years this has fallen into disrepair.
- A speed limit of 15kph is enforced at the site for all HGV.
- A dust monitoring programme has been implemented at the site.

It is noted that the Macroom area is subject to high rainfall. The long term (30-year average) monthly rainfall for this area of Cork is approximately 1,200mm. The high level of rainfall will naturally suppress dust emissions from the gravel pit. As noted in Table 6-1, Cork Airport has 152 days per year with greater than 1mm rainfall.

6.5 Remedial Mitigation

The access road into the gravel pit is currently unpaved. This road will be paved from the public road to the yard area. The road will be kept clean, so will not be a source of dust emissions. With this road paved, it is less likely that soil would be tracked onto the public road, which would give rise to off-site dust emissions. This road will be paved within 4 months of the grant of substitute consent and further development approval.

6.6 Conclusion on Air and Climate

Strict adherence to operational procedures incorporating best practice will ensure dust migration from the site will be minimised. The topographical and local climatic factors will result in the majority of airborne dust generated at the site being deposited within the site boundary. In addition, the environmental monitoring programme will highlight elevated dust emissions so that mitigation measures can be reviewed, or new ones introduced.

Figure 6-1: Dust Monitoring Location Map

7. HYRDOLOGY & SURFACE WATER

This chapter of the rEIAR addresses hydrology and surface water in the existing environment. It assesses the significant effects that have occurred or are occurring on hydrology and surface water environments as a result of the gravel extraction activities. The mitigation measures being implemented or proposed to be implemented to remedy the impacts identified are also presented.

7.1 Existing Environment

The landholding is located within the South Western River Basin Management District and within Hydrometric Area No 19 – Lee, Cork Harbour and Youghal Bay. Hydrometric Area No 19 includes the surface catchment drained by the River Lee and all streams entering tidal water in Cork Harbour and Youghal Bay and between Knockaverry and Templebreedy, Battery, Co. Cork.

The gravel pit is in the IE_SW_Laney_040 Water Management Unit, and within the catchment of the Clashavoon Stream – refer to Figure 7-1. This catchment extends to an area of 15.6km^2. The Clashavoon Stream rises in Derryroe, approximately 3km to the north of Ummera. It flows in a southerly direction and is joined by a number of smaller streams, including one (Curraghanearla Stream) that joins just north of the gravel pit. The Clashavoon Stream joins with the Laney River near the southwestern corner of the landholding. The Laney River flows southwest just west of local road L-3423. It joins with the Sullane River near Bealick Mills. The confluence of the Sullane River with the River Lee is located approximately 3km to the south of Ummera at Coolcour. This waterbody has an overall 'High' river waterbody status and is classified by the WDF as 'not at risk'.

There are no designated sites within the vicinity of the site which could be in hydraulic connection with the gravel pit. The closest downstream sites are the Lee Valley pNHA (downstream of Inniscarra Dam) and the Great Island Channel SAC, approximately 40km to the east of Ummera.

There are no streams flowing through the gravel pit. Drainage from the landholding is generally in a westerly direction towards the Clashavoon Stream and Laney River. Surface water flows from the site consist of rainwater runoff and flows from springs encountered during excavations. Surface water runoff flows to the on-site settlement ponds or drains from the site via the roadside drain. Water entering the settlement ponds is recirculated for washing gravel. Roadside drainage exits the gravel pit at the site entrance, follows roadside drainage at the public road where it is culverted under the L-3423 into a small densely vegetated swale. The swale is approximately 65m long and discharges to the Laney River. Groundwater springs in the southern section of the extraction area flow across the site, infiltrate back into the gravel or exit the site to the roadside drain on the L-3423 just south of the site entrance. Local site drainage and surface water features are shown on Figure 7-2.

The gravel pit extracts water from the Clashavoon Stream for use at the washing plant. This water is recirculated through the settlement ponds. There are two hydrometric gauging stations on the streams and rivers draining the site - http://gis.epa.ie/Envision; one is located on the River Laney upstream of its confluence with the Clashavoon Stream (station name Kill) at co-ordinates 136400 / 74300; the other is on the Sullane River, upstream of its confluence with the Laney River (station name Macroom). The recorder gauging station on the Laney River is just upstream of the confluence with the Clashavoon Stream. The dry weather flow at this gauging station is reported as 0.12m^3/sec and the 95%tile flow is 0.27m^3/sec. The catchment area is 84.3km^2, giving a specific dry weather flow and 95%tile flow of 1.4 and 3.2 litres per second per km^2 of catchment. The catchment of the Clashavoon Stream at the pump intake is approximately 12km^2. This gives an estimated dry weather flow and 95%tile flow of 17 litres/sec and 38.4litres/sec, respectively.

Using the online EPA Hydrotool, the 95%tile flow for the Clashavoon Stream (to its confluence with the Laney River) is 0.033m^3/sec for the 11.2km^2 catchment. This is in line with the estimates from the Laney River gauging station. The Hydrotool report is provided in Appendix 7-1.

7.1.1 Runoff Estimates

The nearest synoptic weather station to the site is Cork Airport (W665662), 30km to the southeast of the site at an elevation of 154mOD. The mean monthly rainfall for Cork Airport synoptic station is summarised in Table 7-1. The long-term average rainfall for Cork Airport is 1,227.9 mm/annum for 1981 to 2010. An extreme rainfall event of 73.2mm/day was recorded during the 30-year period 1981 to 2010. The nearest rain gauge station is located at Macroom (Cahirbaroule) 4km to the north, at an elevation of 165mOD. The station has been operational since 2013. Monthly totals for 2017 and 2018 are also provided in Table 7-1. The lower elevation of the site suggests that annual rainfall would be in region of 1,200mm, which is in accordance with the rainfall isopleths map prepared by Met Eireann.

Table 7-1: **Monthly and Annual Average Rainfalls (mm)**

Cork Airport													
Year	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Annual**
1961 - 1990	148	116	97	70	84	68	65	90	97	126	109	137	**1,207**
1981 - 2010	131.4	97.8	97.6	76.5	82.3	80.9	78.8	96.8	94.6	138.2	120	133.1	**1,227.9**
Greatest Daily Total – Cork Airport													
1981 - 2010	45.7	49.9	55.2	34.2	34.9	59.7	73.2	60.9	58.9	52.1	47.9	41.9	**73.2**
Macroom (Cahirbaroule)													
2017	97.9	132.3	121.3	21.2	71.1	113.1	99.7	78.6	144	133	107.2	155.9	**1,275.3**
2018	225.8	86.4	143.2	189	75.4	32.5	40.7	31.8	---	76.2	233.3	271.1	**---**

There was no rainfall depth recorded for September 2018 and data recorded for only 6 months in 2019. The catchment characteristics are quantified as soil type 2 (good winter rain acceptance potential). The runoff co-efficient of the site is estimated at 0.37. The potential for soakage is good in these gravel deposits. Based on the mean annual rainfall for the Ummera area, the incident rainfall on the 20.22ha landholding is approximately 242,640m^3 per annum.

7.1.2 Surface Water Quality

There are a number of EPA surface-water monitoring stations on the Sullane River and its tributaries. The closest one downstream of the gravel pit is on the Laney River, just upstream of its confluence with the Sullane River – refer to Figure 7-1. The 2018 EPA Q-value for this location is Q4-5, indicating high water quality status. The other EPA monitoring station on the Laney River is upstream of the Clashavoon Stream confluence. It too has a 2018 Q-value of Q4-5, indicating that the operations at the gravel pit are not impacting water quality in the intervening river section.

To determine the water quality of the Clashavoon Stream adjacent to the gravel pit three surface water samples (SW1 to SW3) were collected, as follows:

- SW1: Clashavoon Stream, upstream of gravel pit.
- SW2: Clashavoon Stream, downstream of original settlement ponds at bridge.
- SW3; Laney River, downstream of gravel pit and downstream of drain discharge to river.

Samples were collected on 28 May, 02 July and 05 November 2019. The surface water samples were analysed for a suite of parameters. The results are summarised in Table 7-2. Sample points are shown on Figure 7-2. Laboratory reports are provided in Appendix 7-2.

Table 7-2: Summary of Surface Water Sample Results

Parameter	Units	Sample ID								
		SW1			SW2			SW3		
		28/5/'19	02/7/'19	5/11/'19	28/5/'19	02/7/'19	5/11/'19	28/05/'19	02/7/'19	5/11/'19
Ammonia (NH3)	mg/l, N	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Nitrate	mg/l, N	5.1	5.56	3.63	5.2	5.56	3.77	2.3	2.4	2.41
Nitrite	mg/l, N	0.008	---	0.017	0.002	---	0.0173	0.003	---	<0.0152
Orthophosphate	mg/l, P	<0.1	<0.1	0.0294	<0.1	<0.1	0.03	<0.1	<0.02	<0.02
Orthophosphate	mg/l, PO_4	---	0.108	---	---	<0.1	---	---	<0.1	---
BOD	mg/l	<4	<1	1.15	<4	<1	1.18	<4	<1	1.4
DO	O_2 (mg/l)	10.05	---	10.6	10.22	---	10.9	10.27	---	10.6
TSS	mg/l	<10	<2	<2	18	<2	<2	16	<2	2.45
pH	pH Units	7.41	---	7.67	7.2	---	7.68	7.38	---	7.43
Total Nitrogen	mg/l, N	5.55	---	4.03	5.69	---	4.15	2.88	---	2.62
Total Phosphorous	mg/l, P	<0.1	---	0.0556	<0.1	---	0.0574	<0.1	---	0.0393

The Clashavoon Stream has 'High' water quality status (WFD Status 2010-2015) with the objective of maintaining this water quality status. It is not classified as being 'At Risk'. The following surface water quality limits apply:

1. BOD
    a. Good Status river waterbody - <2.6mg/l (95%tile). There is no limit for moderate status.
2. Ammonia
    a. Good Status river waterbody - <0.140mg/l (95%tile)
3. Orthophosphate
    a. High Status river waterbody - <0.045mg/l (95%tile)
    b. Good Status river waterbody - <0.075mg/l (95%tile)
4. Dissolved Oxygen
    a. Lower Limit – 95%ile >80% saturation
    b. Upper Limit – 95%ile <120 saturation
5. pH
    a. Soft Water 4.5 < pH <9.0
    b. Hard Water 6.0 < pH < 9.0

The results collected indicate that the Clashavoon Stream has good water quality, as indicated by the results for SW1 and SW3.

The main parameter of interest from the extraction activities is suspended solids. The results indicate that the site activities are not impacting on water quality at the time of sampling. The suspended solids concentration at the downgradient sample locations range from is <2mg/l to 18mg/l.

7.1.3 Surface Water Usage

The immediate area around the site is not serviced by mains water. Private wells are used for domestic and agricultural demands. Cork County Council has a drinking water abstraction point on the River Lee at the Inniscarra Dam, approximately 18km downstream of the site. There are no known private abstraction points downstream of the site.

7.1.4 Flooding

The site does not flood. It is not located within the flood zones as shown in the Macroom LAP (2017). Some parts of the L-3423 and L7478 are shown as being susceptible to flooding, but this does not impact on the gravel pit. Flooding extent is shown on Plate 7-1.

Plate 7-1: Flooding Extent for Clashavoon Stream & Laney River
Source – Cork County Council Macroom LAP 2017
Flood Zone A extent shown blue
Flood Zone B extent shown magenta

7.2 Impact Assessment

As noted, the area is not serviced by mains water. Each dwelling uses a bored well for water supply. There are no wells downgradient of the gravel pit with respect to groundwater flow direction (interpreted to be to the west and southwest to the Clashavoon Stream and Laney River). Excavations have not interfered with private supply wells near the gravel pit. Excavations have encountered groundwater springs, but there is no indication that this has affected the supply wells near the gravel pit; this is discussed further in Chapter 8.

Much of the incident rainfall on the site will infiltrate into the gravel deposits. However, surface water runoff from the site does occur. The activities and processes that have occurred and / or are occurring at the gravel pit that could potentially impact upon surface water are as follows:

- Since the installation of the washing plant, water has been abstracted from the Clashavoon Stream. A small weir has been created with boulders at the abstraction point to maintain water depth for the pump intake. This creates a small backwater upstream of the weir and creates an obstruction to the clear passage of fish.
- Wash water is recirculated at the gravel pit, with the water returned to the pump intake point. This has posed a risk of releasing silt to the Clashavoon Stream. Review of historical correspondence indicates that the SWFB / IFI has queried pollution incidents, potentially originated from the gravel pit.
- Storm water runoff from exposed soils and stockpiles with subsequent sediment loading of the site drains. This is occurring also for runoff from the site access road which is unpaved.

- Groundwater springs have been encountered at the gravel pit. These are interpreted to be perched groundwater on low permeability layers found within the gravel deposit – refer to Chapter 8. When flowing (in Winter months), these increase the surface water discharge from the gravel pit.
- The storage and use of diesel and hydrocarbons on site present a risk to surface water quality. No pollution incidents associated with hydrocarbons has occurred at the gravel pit.

7.3 Existing Mitigation Measures

The following measures are employed at the gravel to avoid and / or mitigate potential impacts on the surface water environment:

1. The original settlement pond installed at the gravel pit was augmented with additional ponds in the late 1980's following discussions with SWRFB. These were further improved in late 1990's when the washing plant was relocated from its original, to its position.
2. Additional improvements to the recirculation of wash water have been carried out as discussed in Chapter 2. These include:
    a. Rearrangement of ponds to improve silt removal.
    b. Use of a second pump to recirculate wash water from the main ponds.
    c. Addition of a surface water retention pond to treat runoff from the yard area and overflow from the settlement ponds when inflow from rainfall runoff occurs.

    The capacity of the ponds within the gravel pit proper is estimated at 14,790m^3. The washing plant uses approximately 800m^3/day, giving a retention time in the ponds of approximately 18.5 days (which increases to 21 days when weekends are factored).
3. The improvement in the recirculation of wash water has limited the volume of water abstracted from the Clashavoon Stream.
4. Hydrocarbons are stored in self-bunded above-ground storage tank.
5. Domestic wastewater is treated with an on-site septic tank and percolation system.

7.4 Remedial Measures

The following remedial mitigation measures are proposed to improve the surface water management at the gravel pit and to avoid / reduce impacts that might occur:

1. A concrete refuelling pad will be installed which will contain any spills during refuelling.
2. The storage of fuel and hydrocarbons will be improved. This will include the construction of a bunded storage shed adjacent to the refuelling pad. The diesel storage tank will be relocated to this shed as will the storage of oils.
3. Any maintenance or repairs to the mobile plant will be carried out on the concrete pad.
4. A spill kit will be kept in the front-end loader.
5. The access road into the site will be paved as far as the yard area. This will incorporate a concrete channel for roadside drainage. The access road will be kept clean, so runoff of silt-laden water doesn't occur.

The proposed measures (1 to 4) will be carried out within 6 months of the grant of substitute consent and further development approval. The access road will be paved within 4 months.

7.5 Conclusions

Surface water management has been improved over the assessment period and in recent years to minimise the risk of polluting the Clashavoon Stream. Runoff water from the gravel pit is treated in the on-site settlement ponds prior to recirculation or discharge from site. Additional improvements are proposed to further reduce the risk to the receiving waters. Surface water management will be kept under review and improvements made when necessary.

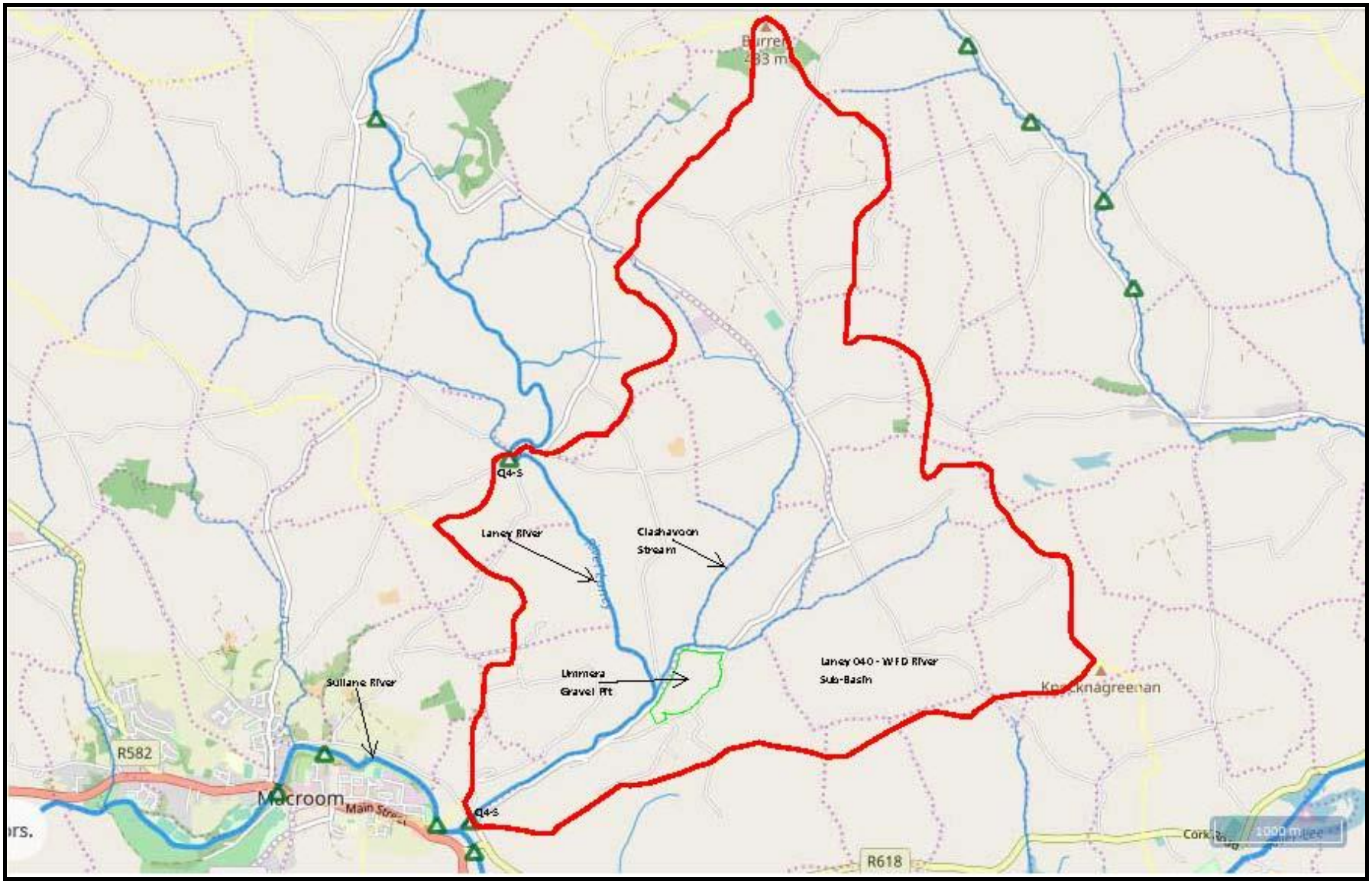


Figure 7-1: Catchment of Laney 040 - WFD River Sub-Basin

Figure 7-2: Local Surface Water Drainage

8. SOILS, GEOLOGY & HYDROGEOLOGY

This chapter of the rEIAR addresses geology and hydrogeology in the existing environment. It assesses the significant effects that have occurred or are occurring on the geological / hydrogeological environment as a result of gravel extraction. The mitigation measures being implemented or proposed to be implemented to remedy the impacts identified are also presented.

8.1 Methodology

The assessment of the impacts on geology and hydrogeology involved:

1. Desk study, including a review of available published literature.
2. Collection of data from Government departments including the Geological Survey of Ireland (GSI).
3. Site walkover.
4. Monitoring of water levels at site boreholes and neighbouring wells.

The assessment was prepared having regard to the Institute of Geologists of Ireland guidelines[11].

The literature reviewed as part of the desk study included:

1. Geology of Kerry-Cork, Geological Survey of Ireland (GSI), 1997[12].
2. Soils Association of Ireland and their Land Use Potential, M. J. Gardiner and T. Radford, National Soil Survey of Ireland, 1980[13].
3. Directory of Active Quarries, Pits, and Mines in Ireland, GSI 2014[14].
4. 2014 Cork County Development Plan.
5. Memoir of Localities of Minerals of Economic Importance and Metalliferous Mines in Ireland, The Mining Heritage Society of Ireland, 1998[15].
6. Original 6-inch field mapping sheets – www.gsi.ie .
7. Geophysical Survey to Estimate Sand & Gravel Reserves at Ummera, Macroom Co Cork[16].

Walkover surveys took place on a number of occasions throughout 2019 to supplement walkover surveys carried out previously at the gravel pit. During the site walkovers, inspections were conducted of the exposed faces of the gravel pit and measurements made of groundwater levels at site boreholes and at neighbouring wells.

8.2 Existing Geology

The geology at the site is established based on available published literature, files/records made available from the GSI, GSI online web-mapping and site walkover.

8.2.1 Overburden Geology

The soils of the site are mapped as Brown Podzolics within the Rolling Lowland physiographic division. These typically comprise 60% brown podzolics, 20% acid brown earths and 20% gleys. The parent material is sandstone and Lower Avonian shale glacial tills. This soil association makes up 6.31% of the country, mostly occurring in mid, south and east County Cork.

The detail subsoil mapping for the area is taken from the GSI web-mapping. The area is dominated by tills and gravels deposited during glaciation and alluvium and peat deposited/developed post glaciation. Elevated ground in the area is mapped as having bedrock at / near ground surface.

There is evidence of at least two glaciations affecting the southwest of Ireland during the Pleistocene Epoch (1.6M years – 10,000 years ago). During the last glaciation, ice was centred to the south of the MacGillycuddy Reeks and extended radially outwards. Glaciation that affected the Macroom area resulted in ice movement eastwards from the Reeks. This resulted in the creation of glacial features such as roches moutonnees, corries and meltwater channels.

The sediments deposited from the glaciers and its meltwaters are tills and gravels. Tills derived chiefly from Devonian sandstones (TDSs) dominate the wider area. Glaciofluvial sands and gravel (GDSs) occur at the Ummera pit and predominately in the valleys of the Lee and Laney rivers. Isolated pockets of fen peat (FenPt) and blanket peat (BkPt) deposits occur scattered throughout the wider area. Geophysical survey carried out in 2003 interprets 10 to 15m of sand/gravel in the central area of the landholding, thinning to <5m towards the southern boundary. The overburden geology is of the area is shown in Figure 8-1.

8.2.2 Bedrock Geology

The geology of this area is taken from the Geological Survey of Ireland (GSI) report – Geology of Kerry-Cork (GSI, 1997). This area of County Cork is underlain by the Devonian and Carboniferous-aged rocks belonging to the Old Red Sandstone Magnafacies. This magnafacies has been subdivided into a number of regions with different stratigraphic successions. The Ummera site straddles two regions; Central Cork succession on the southern and eastern parts of the site and the Southern Derrynasaggart Mountains succession at the northern part of the site (under the settlement lagoons). The bedrock formations represented by these successions is summarised in Table 8-1. Bedrock geology is shown on Figure 8-2.

Table 8-1: Summary of Bedrock Geology in Macroom Area

Southern Derrynasaggart Mountains Succession	**Central Cork Succession**
Toe Head Formation [cross-bedded sandstone & mudstone]	Gyleen Formation [red siltstone and subsidiary sandstone]
Castlehaven Formation [purple mudstone, siltstone, sandstone	
Gun Point Formation [green sandstone and purple sandstone]	Ballytrasna Formation [dusky-red to purple mudstones with subordinate pale-red sandstones]
Caha Mountain Formation [purple and green siltstones and sandstones]	
Gortanimill Formation [green sandstone and purple siltstone]	
Slaheny Sandstone Formation [cross-bedded sandstone & siltstone]	
Bird Hill Formation [purple sandstone & siltstone]	Gortanimill Formation [green sandstone and purple siltstone]

The bedrock formation underlying most of the gravel pit is the Ballytrasna Formation of the Central Cork Succession. The Ballytrasna Formation is Devonian in age. It is characterised by dusky-red to purple coloured mudstone and siltstone with subordinate fine-grained pale-red sandstones. The formation varies in thickness from 360m to 1,500m. No bedrock outcrop has been observed on the site.

The north-western part of the site is underlain by the Caha Mountain Formation. The Caha Mountain Formation is Devonian in age. It consists of purple siltstones and fine-grained parallel and cross-laminated sandstones. It is 2,150m thick at its type location near Glengarriff.

Following deposition, the bedrock was uplifted and compressed during the Variscan Orogeny resulting in the folding and faulting seen today. This is dominated by northeast-southwest trending anticlines and synclines.

8.2.3 Economic Geology

The aggregate at the gravel pit is used primarily in the manufacture of concrete at DCWL's facility at Bredagh Cross, Drimoleague. It is tested for its suitability of use in these concrete products. It is also purchased by third parties for other uses.

According to the Directory of Active Quarries, Pits and Mines in Ireland, there no active quarries / gravel pits within the immediate vicinity of the site. A small number of old gravel workings are located within approximately 1km of the pit. There are a number of gravel pits to the east of Ummera along the Bride River valley, just west of Ballincollig. There is no history of mining within the site or within the immediate vicinity of the site.

8.2.4 Geological Heritage Sites

In conjunction with the National Parks and Wildlife Service (NPWS), the GSI has been identifying sites of geological interest (geological heritage sites) across the Country since 1998. Sites are being categorised under 16 geological themes, such as economic geology, karst, Devonian, coastal, Quaternary, etc. These sites are being designated as Natural Heritage Areas or of importance at a County level. Cork County Council has developed a list of sites of geological interest for inclusion in the 2014 County Development Plan. It is an objective of the County Development Plan (Objective HE 2-6) to:

> '*Maintain the conservation value of those features of areas of geological interest that are listed in Volume 2, Chapter 3 Nature Conservation Areas, of the plan, and to protect them from inappropriate development'*.

Table 3-8 of Volume 2 of the County Development Plan lists 103 sites of geological interest in County Cork. The GSI was contacted for information on the nearest sites to the gravel pit. The closest is The Gearagh on the River Lee, approximately 8km to the southwest. It is designated under the 'Fluvial and Lacustrine Geomorphology' theme for its unique part of a formerly much larger floodplain with a forested anastomosing channel system.

The gravel pit itself is not listed as being an Area of Geological Interest. All of these sites are greater than 5km from the gravel pit and there is no connectivity. As such the development has not and will not have any direct or indirect impact on geological heritage sites.

8.2.5 Existing Hydrogeology

The Caha Mountain Formation underlying the north-western part of the site is classified by the GSI as PL – Poor Aquifer, bedrock which is generally unproductive except for local zones. The Ballytrasna Formation is classified by the GSI as LI - Locally Important Aquifer - bedrock which is moderately productive only in local zones. The gravels underlying the site are not classified as an aquifer. Groundwater springs have been encountered during excavations. These are interpreted to be perched water table siting on low permeability silts and clays encountered in the deposits. Bedrock aquifers are shown on Figure 8-3.

According to the GSI web-mapping, there are no wells within 500m of the gravel pit. The closest are located approximately 700m to the north of the gravel pit in Shanakill. Wells included in the GSI database are shown on Figure 8-3. These wells are used for domestic supply with yields in the range of 20 to 45m^3/day.

The GSI well database is not comprehensive as not all boreholes drilled are reported to them. A door-to-door survey identified six wells near the gravel pit. Details of wells identified are summarised on Table 8-2.

Depth to groundwater was measured in the four bored wells at neighbouring dwellings – houses H1 to H4 (well numbers correspond to house numbers used on Figure 2-1). The other wells identified are too distant from the gravel pit and separated by hydraulic barriers so can't be impacted by activities at the gravel pit. Three shallow boreholes were installed at the pit to measure groundwater levels. Wells are shown on Figure 8-5.

Table 8-2: Summary of On-Site + Neighbouring Wells

Well ID	Total Depth (m)	Depth to GW (m)	Top of Well Liner Elev. (mOD)	GW Elev. (mOD)	Comments
W1	36.4	4.2	114.81	110.61	serves H1 and farm
W2	90.1	0.14	108.14	108.00	serves H2
W3	17.4	1.31	122.86	121.55	serves H1 and farm
W4	>45	12.81	NM	~81.19	serves H4
W12	NM	NM	NM	NM	serves H10, H11 and H12 and farm
W13	NM	NM	NM	NM	serves H13
BH1	5.98	5.05	93.60	88.55	In yard – dry after installation
BH2	3.85	1.08	85.95	84.87	near site entrance
BH3	2.69	2.14	98.13	95.99	south end of extraction area

Note:
1. The measuring point for neighbouring supply wells is the top of the steel liner.
2. The measuring point for on-site boreholes is the top of the black HDPE casing.

Groundwater flow direction is this area is interpreted to be to the west - southwest, with discharge to the Clashavoon Stream. The groundwater levels and interpreted groundwater flow are shown on Figure 8-5.

8.2.6 Groundwater Usage

The area is not serviced by mains water. Houses and farms near the gravel pit use bored / dug wells for drinking water supply. The GSI database doesn't show any wells within approximately 700m of the gravel pit (refer to Figure 8-4), however, additional wells were identified during door-to-door surveys – refer to Table 8-2 and Figure 8-5.

There are no drinking water protection zones in the vicinity of the site. The closest is the Coachford public supply (consisting of two bored wells), approximately 8km to the east of the gravel pit. There is no hydrological connection between the gravel pit and the Coachford supply wells.

8.2.7 Groundwater Vulnerability

The groundwater vulnerability at the gravel pit is mapped by GSI as High. For soils with high permeability, such as sand and gravels, this indicates thicknesses of greater than 3m – refer to GSI Groundwater Protection Schemes[17]. Aquifer vulnerability is shown on Figure 8-6.

8.2.8 Groundwater Quality

Groundwater was not monitored as part of the assessment. The site is located in the Ballinhassig West Groundwater Body. This groundwater body is rated as having 'Good' status for 2010-2015 under the water framework directive.

8.3 Impact Assessment

The working of the gravel pit has resulted in the stripping of topsoil and subsoil with the removal of sand and gravel for beneficial use over a footprint area of approximately 8ha. The depth of gravel removed during the earlier periods of extraction can only be estimated at between 5 and 10m as no topographical survey is available prior to 2007. The removal of the sand & gravel is a permanent direct impact. The stripping of the overburden and topsoil is a long-term direct, but a reversible impact with the future restoration of the site.

The removal of subsoil and gravels has resulted in an increased vulnerability of the underlying bedrock aquifer. The area is rated as having a High aquifer vulnerability, and although the vulnerability ranking may not have increased, the absolute vulnerability has increased over the footprint of the extraction area. This is a permanent direct negative impact.

The use of the on-site mobile plant has required on-site storage of diesel and refuelling. There has been the potential for diesel to leak or spill, contaminating the underlying soils and groundwater. However, no diesel spillage at the site have been recorded, so impact to soil or groundwater quality has not occurred. The continued storage of diesel at the site, and the refuelling of site plant on an unpaved yard area, does however present an on-going risk.

There is a septic tank and percolation area at the site compound. The welfare facilities have been used by only one worker, so the volume of wastewater generated is less than 30 litres per day, so the impact is not significant.

While groundwater springs have been encountered at the gravel pit, the measurement of groundwater levels at the three nearest upgradient wells (two of which are adjacent to the gravel pit) doesn't indicate that these supply wells have been affected. There is no groundwater abstraction at the gravel pit.

8.4 Existing Mitigation Measures

The impacts on the soils, geology and hydrogeology cannot be remedied by avoidance. Reduction and remedy measures are employed, and will continue to be employed, to limit the impacts. These include:

1. Stripped topsoil and overburden are used on site for long-term and temporary screening berms. In the long-term, stripped topsoil / overburden and silts generated from the washing process will be used in site restoration.
2. To mitigate the risk of fuel spillage to the environment, diesel is stored in a self-bunded fuel storage tank.
3. Surface water is recirculated from the on-site settlement ponds in a closed system, topped up by runoff water from the pit floor and water abstracted from Clashavoon Stream. There is no groundwater abstraction.
4. Monitoring of groundwater levels at neighbouring wells has commenced and will continue with permission from landowners.

8.5 Remedial Measures

The following remedial mitigation measures are proposed to improve the geology / hydrogeology environment at the gravel pit and to avoid / reduce impacts that might occur:

1. A concrete refuelling pad will be installed which will contain any spills during refuelling.
2. The storage of fuel and hydrocarbons will be improved. This will include the construction of a bunded storage shed adjacent to the refuelling pad. The diesel storage tank will be relocated to this shed as will the storage of oils.
3. Any maintenance or repairs to the mobile plant will be carried out on the concrete pad.
4. Restoration of worked out areas of the gravel pit will commence to reduce the area of exposed soils and reduce aquifer vulnerability.

The proposed measures (1 to 3) will be carried out within 6 months of granting substitute consent and further development approval. Restoration will commence within 18 months. As the site is distance from any geological heritage sites, no remedial measures are required in this regard.

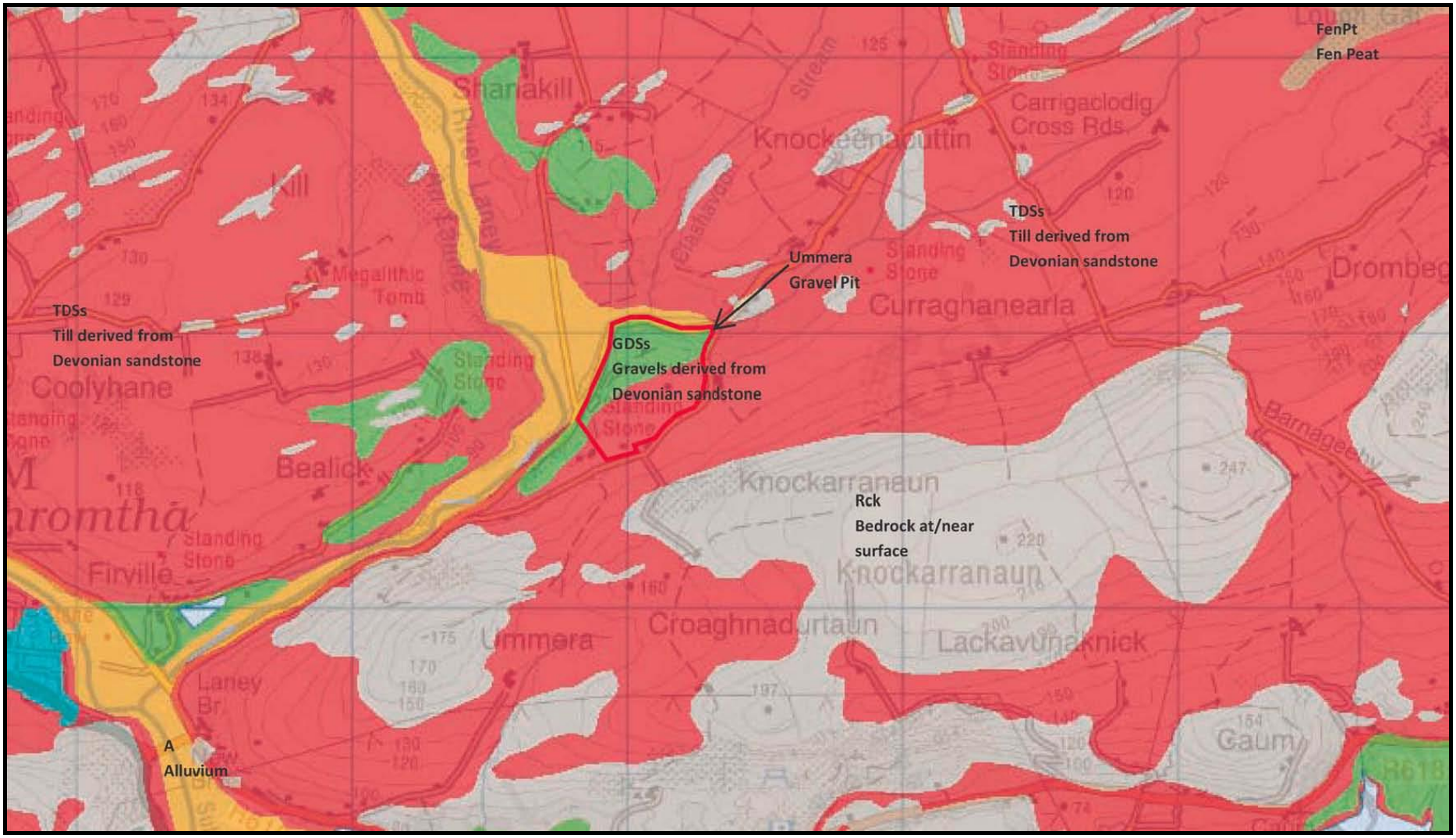


Figure 8-1: Overburden Geology Map

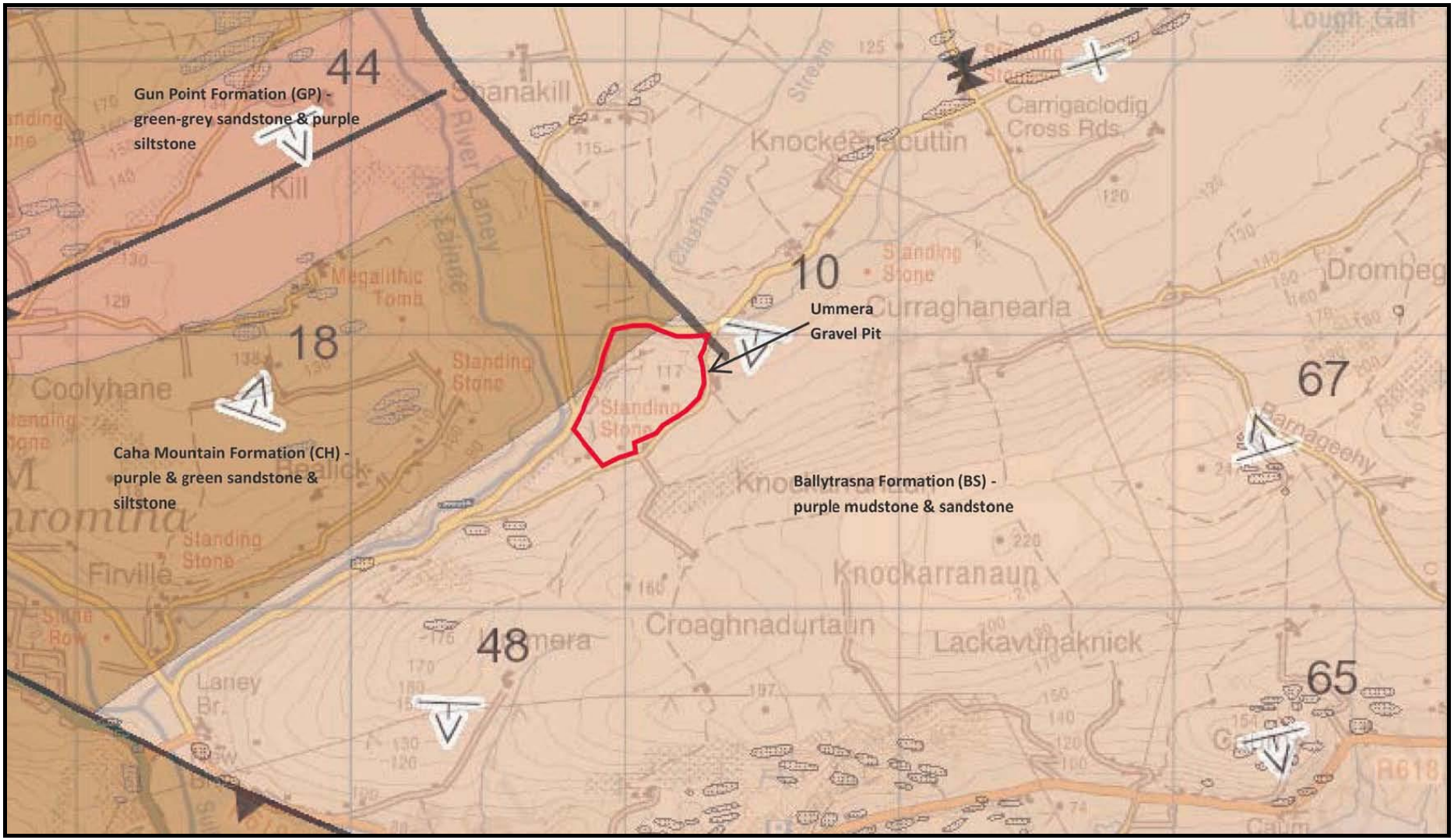


Figure 8-2: Bedrock Geology Map

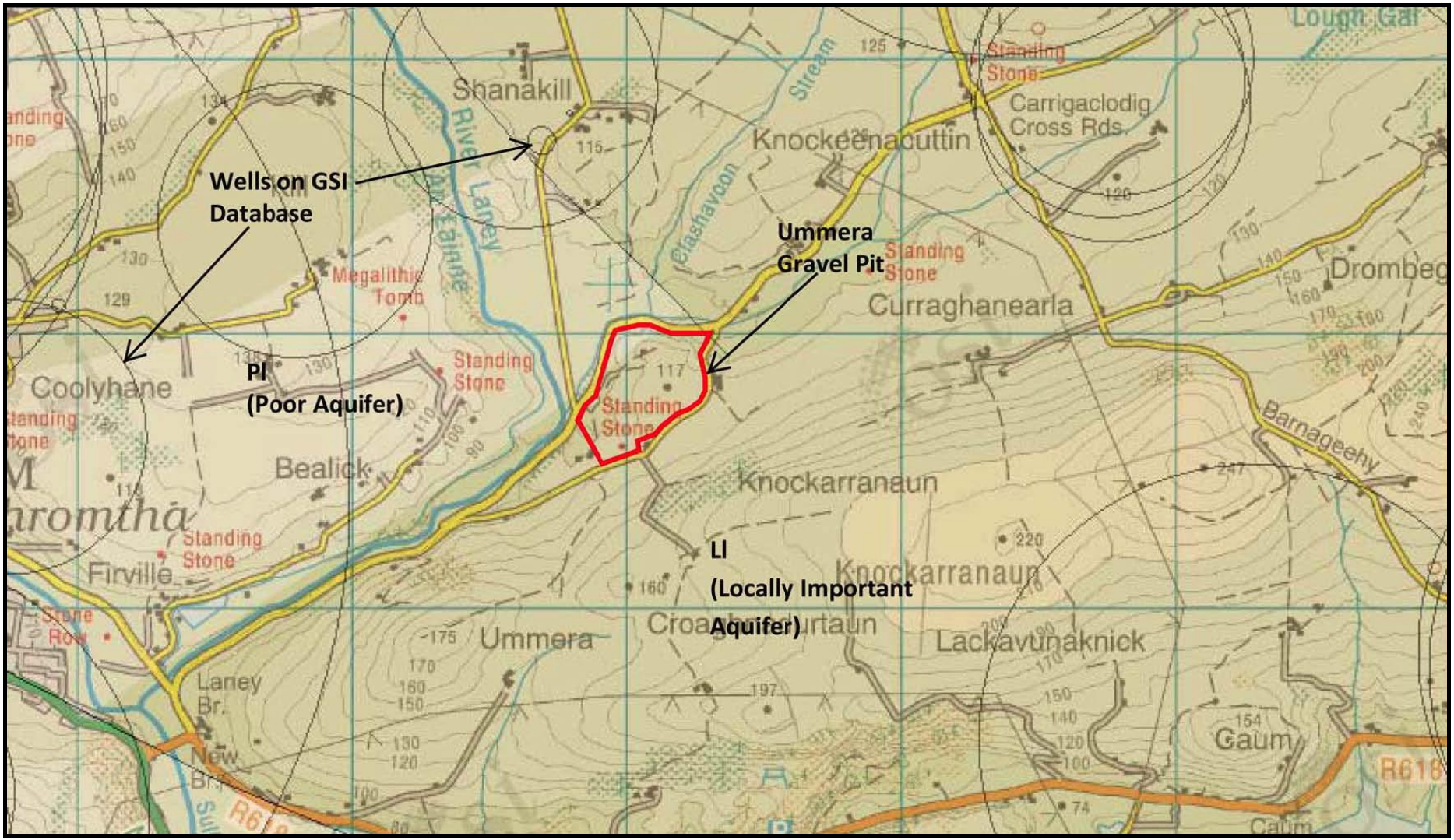


Figure 8-3: Bedrock Aquifer Map

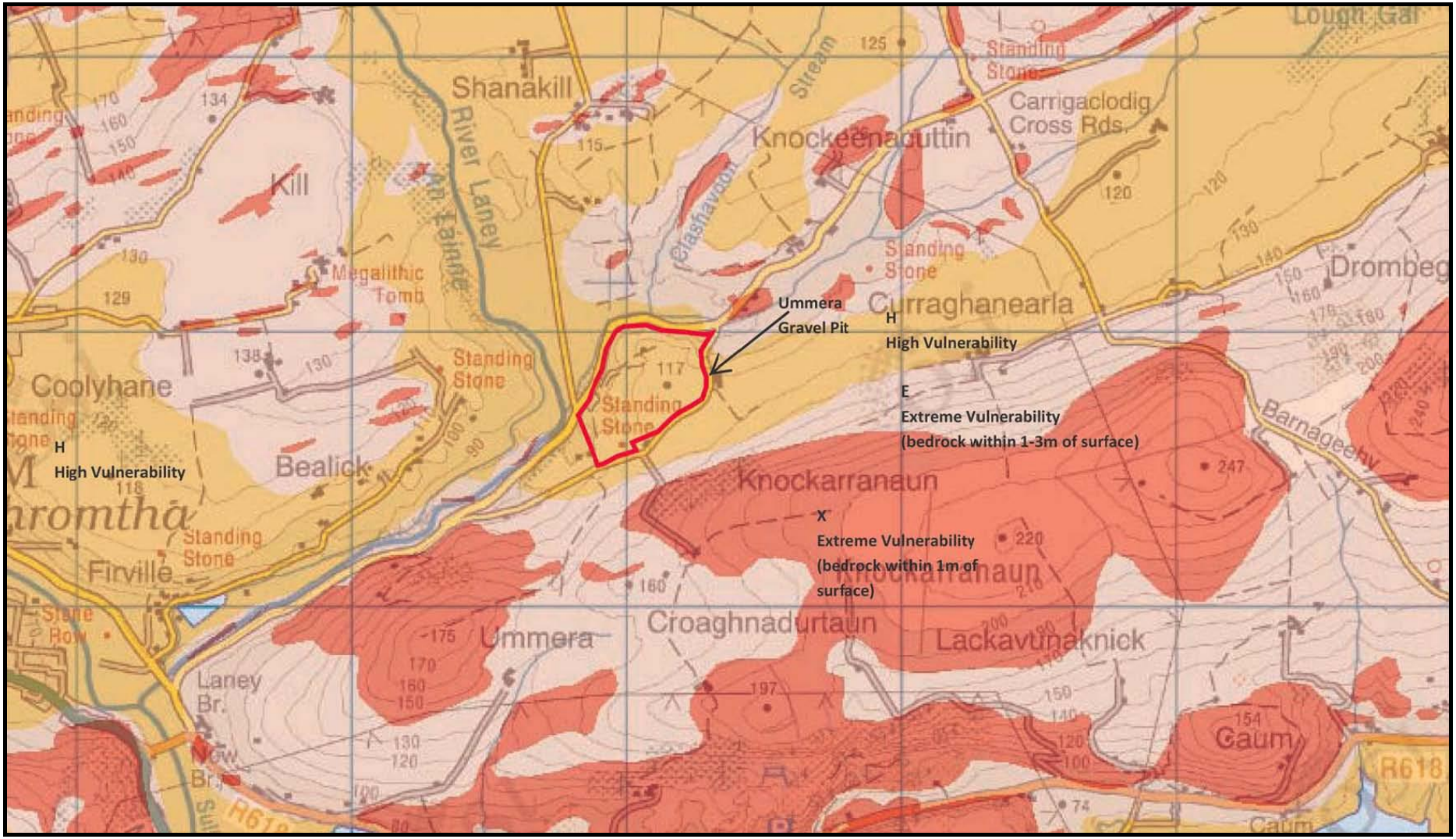


Figure 8-4: Aquifer Vulnerability Map

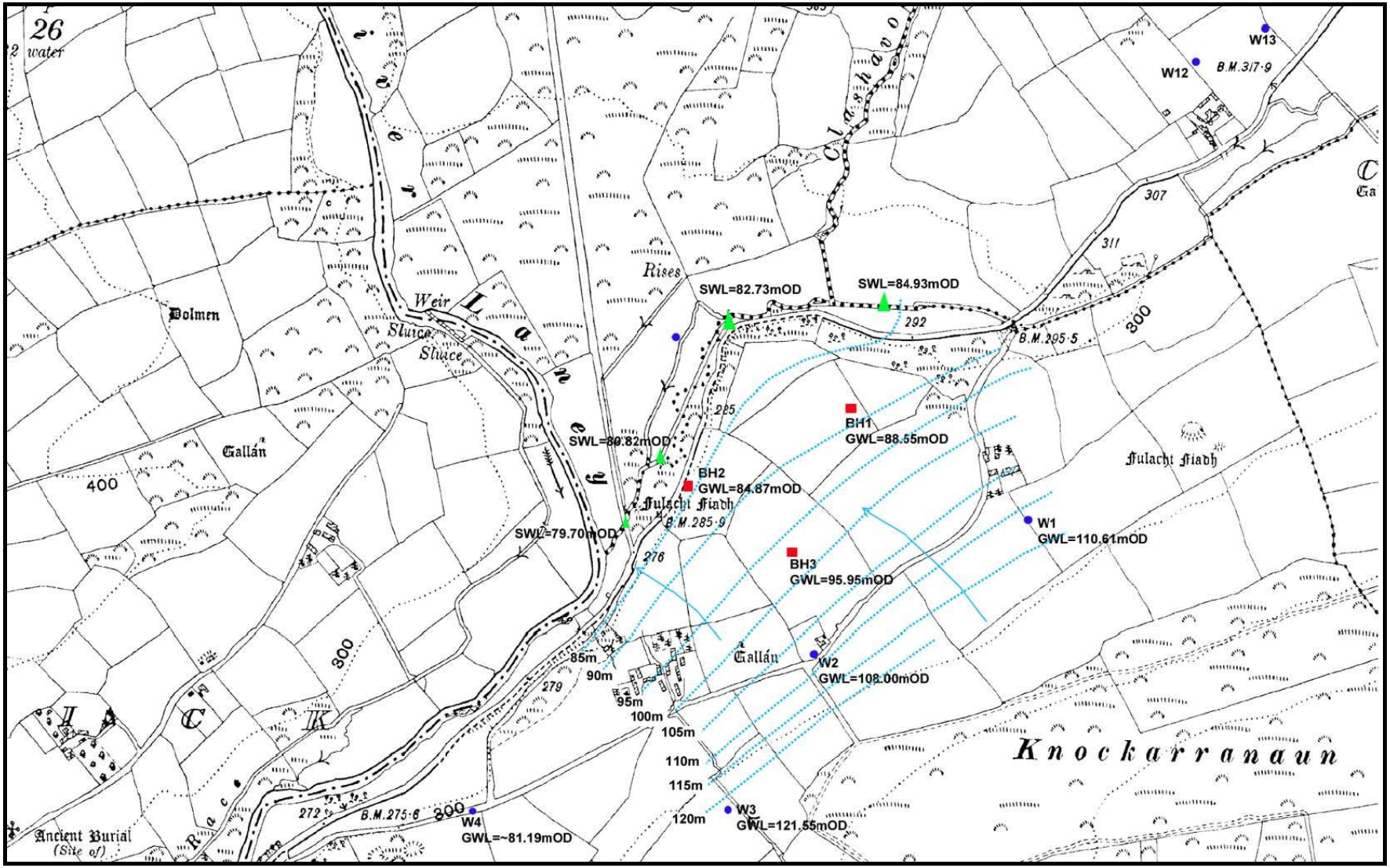


Figure 8-5: Groundwater Flow Map

9. ARCHITECTURAL, ARCHAELOGICAL & CULTURAL HERITAGE

9.1 Introduction

This Remedial Environmental Impact Assessment has been undertaken to assess the significant effects, if any, on the archaeology, cultural heritage and architecture which have occurred or are occurring or can reasonably be expected to occur because of sand and gravel extraction carried out by the applicant on land in the townland of Ummera, County Cork. A wide variety of paper, cartographic, photographic and archival sources was consulted. All the lands of the substitute consent area were visually inspected.

An impact assessment and mitigation strategy has been prepared. The assessment has been undertaken to assess the significant effects, if any, on the archaeology, cultural heritage and architecture which have occurred or are occurring or can reasonably be expected to occur because of gravel extraction carried out in the substitute consent area, while a mitigation strategy has been designed to remedy any significant adverse effects on cultural heritage.

The assessment was prepared by Dr. Charles Mount who has more than twenty years of cultural heritage assessment experience. He holds B.A., M.A. and Ph.D. degrees in archaeology as well as a professional diploma in EIA and SEA Management and is a member of the Institute of Archaeologists of Ireland.

9.2 Methodology

This study which complies with the requirements of Directive EIA 2014/52/EU is an assessment of the known or potential cultural heritage resource within a specified area and includes the information that may reasonably be required for reaching a reasoned conclusion on the significant effects of the project on the environment, taking into account current knowledge and methods of assessment. It consists of a collation of existing written and graphic information in order to identify the likely context, character, significance and sensitivity of the known or potential cultural heritage, archaeological and structural resource using an appropriate methodology (EPA 2002 and 2003).

The study involved detailed investigation of the cultural heritage including the archaeological, architectural and historical background of the proposed development site and the surrounding area up to 1km from the development. The study area is indicated on Figure 9-1. This area was examined using information from the:

- Record of Monuments and Places (RMP) of County Cork.
- The Sites and Monuments Record.
- The Cork County Development Plan 2014-20 including the Record of Protected Structures.
- The National Inventory of Architectural Heritage.
- Aerial photographs.
- Excavation reports.
- Cartographic.
- Documentary sources.

A field assessment was carried out on 10 October 2019 to identify and assess any known archaeological sites and structures and previously unrecorded features, possible finds and structures within the substitute consent area.

9.3 Existing Environment

9.3.1 The Landscape

The substitute consent area is situated in mid County Cork, c.2.5km northeast of the town of Macroom and c.1.8km northeast of the R618 road in a river valley with higher ground to the south. It is situated on coarse loamy drift with siliceous stones that overlays compact drift with siliceous stones.

9.3.2 Archaeological and Historical Development of the Study Area

The following is a brief summary of the archaeological and historical development of the study area and the main types of sites and monuments that are known from the surrounding landscape. The information is drawn from the assessment. It is intended to indicate the types of sites and monuments known to be present in the study area as well as the pattern of landholding and to place this material in its cultural heritage context. The substitute consent area is situated in the townland of Ummera, the parish of Aghinagh and the barony of Muskerry East. Note the spellings of place names varied throughout history, the historical spellings are used here.

Prehistoric Period
Prehistoric activity in the study area is indicated by a range of monument types. There is a wedge tomb in Bealick townland (RMP CO071-020----) dating from the Chalcolithic. There is also an Early Bronze Age burial cist in Bealick townland (RMP CO071-018002-) that contained cremated remains accompanied by an encrusted urn and a vase food vessel (O'Kelly 1944, Ó Ríordáin and Waddell 1993, 94). Fulacht fia, prehistoric mounds of heated stone, are known from Curraghanearla (RMP CO071-031----), Shankill (RMP CO071-026----) and Ummera (RMP CO071-059001- and CO071-059002-) townlands. There are also several standing stones known from the study area in Bealick (RMP CO071-019 ----), Coolkisha (CO071-028----), Curraghanearla (RMP CO071-030----) and Ummera townlands (RMP CO071-057----).

Early Medieval Period
The study area is situated in the barony of East Muskerry. The barony of East Muskerry was known in the early Medieval period as the cantred of Múscraige Mittíne after the sept who controlled it. The cantred was ruled by the Uí Bercháin and Uí Blaithmeic septs and the Ua Donducáin and Ua Flainn Kings (MacCotter 2008, 157-8). Settlement in the Early Medieval period is indicated by the presence of enclosed farmsteads known as ringforts. There is a ringfort known in the study area in Ummera townland (RMP CO071-059001-). Two souterrains, underground chambers, that are contemporary to ringforts probably indicated the existence of another ringfort in Ummera townland (RMP CO071-056001- and CO071-056002-). The holy well (RMP CO071-009----) and ritual bullaun stone (RMP CO071-010----) in Kill townland may indicate a medieval ecclesiastical site in the vicinity.

The Later Medieval Period
Following the submission of Dermot MacCarthy King of Desmond to King Henry II in 1171 and the occupation of the city of Cork, Robert fitz Stephen and Milo de Cogan used the city as a base to occupy the Kingdom of Desmond. After they defeated Dermot MacCarthy, he granted them 7 cantreds of Desmond. In 1207 Richard de Cogan (son of Milo de Cogan's brother, Richard) was granted Múscraighe Mittaine by King John, which embraced the present baronies of East and West Muskerry and Barrett's.

The process of Norman infeudation is normally associated with the construction of timber castles, known as Motte and Baileys. However, there are no Motte castles known from the study area. In Ireland the manor houses of local lords were sometimes enclosed by rectangular moats and are referred to as moated sites. They are a useful indicator of Anglo-Norman settlement. However, there are no moated sites in the study area. Anglo-Norman influence in the study area was short-lived. In 1353 Cormac McCarthy, King of Desmond, was granted lands around Macroom and his son Diarmaid became lord of Muskerry (Ó Murchada 1993, 216).

The Post-Medieval Period
The McSweeneys were granted Mashanaglashy, which included Ummera, by McCarthy Lord of Muskerry in 1584 and appear to have built the tower house in the southern part of the townland (RMP CO071-096002). The Down Survey records that in 1641 Ummera townland was part of Mashanaglashy which was held by Owen McSweeney from the Earl of Clancarty, Donough MacCarthy (http://downsurvey.tcd.ie) and he is recorded as holding it in the Civill Survey of 1654-6 (Simington 1942). The Fifteenth Annual Report from the Commissioners of Public Records of Ireland (1825, 356) records that in 1703 Richard Gumbleton of Lismore held Ummerie formerly, part of the estate of Donogh late Earl of Clancarty. The lands later passed to H.A. Bushe and then to the architect Sir Thomas Deane of Dundanion Castle, Cork (http://landedestates.nuigalway.ie). Lewis' *Topographical Dictionary* (Ahinagh, or Aghinagh, a parish) records that c.1837 Ummera was still held by Thomas Deane.

9.3.3 Buildings

Designated structures
The Cork County Development Plan 2014-20 was examined as part of the baseline study for this section of the rEIAR. The review established that there are no structures listed in the Co. Cork Record of Protected Structures situated within the substitute consent area or the study area.

Non-designated structures
The National Inventory of Architectural Heritage (NIAH) which is maintained by the Dept of Culture, Heritage and the Gaeltacht was examined as part of the baseline study for this section of the rEIAR on 25 September 2019. The review established that there are no additional structures listed in the NIAH situated within the substitute consent area or the study area.

9.3.4 Field Inspection

On 10 October 2019 fieldwork was carried out to identify any additional non-designated structures of heritage interest in the vicinity of the substitute consent area. This involved assessing all upstanding structures that are marked on the 1938 edition of the six-inch Ordnance Survey mapping within 100m of the application area (see Figure 9-1). There is an upstanding farmhouse with associated outbuildings and a cottage situated within this area that are not of heritage interest (see below).

1. Ummera - Three-bay, two-storey house with hipped slate roof and two chimneys and rendered walls. New porch and windows and extension to the rear. Part of a farmyard consisting of outbuildings of random rubble construction, some with corrugated roofs (see plate 9-1).
   No heritage interest.

2. Ummera - Two-bay, two-storey cottage with slate roof and single chimney with modern extension to rear (see plate 9-2).
   No heritage interest.

9.4 Archaeological Assessment

Recorded Monuments
There are no Recorded Monuments situated within the substitute consent area (see Appendix 9-1). The substitute consent area is partly within the zone of notification of a Fulacht fia. This is described in the RMP as:

CO071-058---- UMMERA Fulacht fia
On E side of stream, in sand and gravel works. Shown on 1938 OS 6-inch map as circular mound. No visible surface trace.

The monument is in an area that was granted planning permission by Cork County Council for settlement ponds in 1978 (Planning reg. No. 1365/78). The site of the monument was visited on 10 October 2019 as part of the assessment. There is no visible indication of the monument in the location indicated in the Record of Monuments (Plate 9-3). The monument is not impacted as the site of the monument is not within the substitute consent area but situated c.25m to the west on the far side of the local road L3423-20.

The substitute consent area is also partly within the zone of notification of a Standing stone. This is described in the RMP as:

CO071-057---- UMMERA Standing stone
In pasture, on S-facing slope. Stone (H 1.25m; 0.89m x 0.2m) is subrectangular in plan, long axis WNW-ESE (see Plate 13.4).

The site of this monument is situated c.70m south-west of the substitute consent area. As the monument is not within the area of substitute consent and the buffer zone established by condition 61 of the Quarry Registration (QR01) as modified by an Bord Pleanála (04.QC2002, see Planning history below) has not been developed, the monument is not and will not be impacted by the development.

The closest Recorded Monument externally is a Ringfort. This is described in the RMP as:

CO071-059001- UMMERA Ringfort – rath
In pasture. Arc of hachures SE->SW depict bank on 1938 OS 6-inch map, broken line SW->SE completes circle enclosing oval area. Circular, slightly raised area (diam. 23m) enclosed by low earthen bank in parts (int. H 0.3m; ext. H 0.4m). According to local information, known as the fort field. Fulacht fiadh (CO071-059002-) c. 20m to SE of enclosure.

This monument is situated c.270m east of the substitute consent area and is considered too far distant to be directly or indirectly impacted. The remaining Recorded Monuments in the study area are considered too far distant to have been or be impacted by the development.

Sites and Monuments Record
A review of the Sites and Monuments Record which is maintained by the Dept. of Culture, Heritage and the Gaeltacht at http://webgis.archaeology.ie/historicenvironment/ on 24 September 2019 indicated that there are no additional sites listed in the application area or the study area.

Cartographic Sources
The Ordnance Survey 1st and 3rd edition six-inch maps of the area were examined. This analysis did not indicate any previously unrecorded archaeological sites or monuments.

Place Name Evidence
The place names were extracted from the cartography in order to facilitate the search for structures and monuments and small finds, to help identify any unrecorded monuments or structures, to search for any published papers and documents related to the study area and to assist in the study of the historical development of the area. The English translations of the townland names of the study presented in Table 9-1 are based on the Placenames Database of Ireland. The analysis did not indicate any additional cultural heritage material in the substitute consent area.

Table 9-1: English Translations of Townland Names

Townland Name	English Meaning
Bealick	ford of the flagstone
Coolkisha	corner of the hurdle
Curraghanearla	the earl's moor
Kill	church
Knockeenacuttin	hillock of commonage
Lackavunaknick	flagstones at the foot of the hill
Shanakill	old church
Ummera	a ridge

Aerial Photographs
Examination of the Ordnance Survey 1995, 2000 and 2005 imagery as well as Google Earth imagery from 2009, 2013 and 2018 and Bing maps imagery from 2011 did not indicate any additional cultural heritage or archaeological sites.

Other sources
Examination of archaeological corpus works on prehistoric artefacts (Harbison 1969, Eogan 1965, 1983, 2000) and pottery (O' Ríordáin and Waddell 1993) and Iron Age material (Raftery 1984) did not reveal any additional material.

9.4.1 Previous Assessments

Examinations of the Excavations Bulletin www.excavations.ie indicated that there have been no licensed archaeological excavations carried out in the study area.

The existing gravel pit was the subject of an archaeological impact assessment carried out as part of quarry registration in accordance with Section 261 of the Planning & Development Act 2000 (QR01) in February 2006 by Margaret Shine for Sheila Lane & Associates. The assessment noted that the Fulacht fia site (RMP CO071-158) was inaccessible due to dense undergrowth. The assessment recommended that the standing stone (RMP CO071-158) should be preserved *in situ* within a 20m buffer zone.

On the 12 June 2006 Catryn Power, the Cork County Archaeologist, wrote to the Planning Department Cork County Council and stated:

'*MS14*
Buffer Zone Condition
The development should be located no closer than 20m to the nearby archaeological monument (s). This buffer zone should be established by a suitably qualified archaeologist.
No construction works, stockpiling of topsoil etc, or any development, or landscaping and/or planting should take place within the 20m buffer zone. No trees, plants etc should be removed from the buffer zone.'

On the 29 May 2006 Finola McDonald of the Development Applications Unit, Department of the Environment, Heritage and Local Government wrote to the County Secretary, Cork County Council and stated:

'*It is noted that the proposed development is within the zone of archaeological potential established around the Recorded Monument CO071:057, a standing stone, which is subject to statutory protection in the Record of Monuments and Places established under section 12 of the National Monuments (Amendment) Act 1994.*

We will have no objection from the archaeological perspective to this development proceeding, provided that the following is included as a condition in any grant of planning permission that may issue;

"*No groundworks for constriction or landscaping shall take place within 30 metres of the external perimeter of monument number CO071:157, a standing stone.*

Should planting take place within this buffer zone only plants with shallow root systems should be chose"

Reason: To ensure the continued preservation (either *in situ* or by record) of places, caves, sites, features or other objects of archaeological interest"'

The farm structures at south-west also photographed and conserved by record as part of the archaeological assessment. On 28 June 2006 Louise Harrington, The Cork County Heritage Officer wrote to the Planning Department Cork County Council and stated:

'*I visited this site on the 26th June 2006. I note the archaeological record of the existing disused farmhouses. This will suffice as conservation by recording. The buildings are not protected structures nor would they be worthy of designation. There are no other architectural heritage issues on this site*.'

9.4.2 Planning History

The existing gravel pit commenced as a pre-1964 development. It was granted planning permission by Cork County Council in 1976 (PL 76/375 – the Lordan permission) and 1978 (PL1365/78 – the M&OS washing plant permission). The gravel pit was registered in accordance with Section 261 of the Planning & Development Act 2000 (QR01) in September 2004. Cork County Council modified and added to the conditions imposed under 76/375 in September 2006. Condition 61 stated that:

'*No groundworks, development/construction works, stockpiling of topsoil/spoil or landscaping shall take place within 30m metres radius of the external perimeter of monument CO071:057, a standing stone. This buffer zone of 30m radius shall be established by a suitably qualified archaeologist and no trees plants, etc. shall be removed from within this buffer zone*.'

A number of the conditions, including No. 61, were appealed to an Bord Pleanála in October 2006 (04.QC2002). In June 2007, An Bord Pleanála issued its decision, in relation to condition 61 the Inspector's report stated:

'Condition 61 - No works (whatsoever) to take place within 30m of Standing Stone
A 20m buffer was requested by the Heritage unit of the Authority and the company consider that sufficient. This requirement was in line with the recommendation of the company's own archaeologist.
Inspector's Recommendation
The condition, as drafted, would not appear to have had a specific site in mind. This standing stone is in the middle of an open pasture field with no trees or plants other than grass in the vicinity. I consider that fencing off appropriately an area of 20m radius will protect the standing stone.'

In its decision, An Bord Pleanála modified condition 61 to the following:

'61. No works shall take place within a 20 metre radius of the external perimeter of monument number CO071:057, a standing stone. The area shall be appropriately protected.
Reason: To ensure the continued preservation of this object of archaeological interest.'

9.4.3 Field Inspection

A field inspection was carried out on 10 October 2019. This involved an inspection of all the lands of the substitute consent area (see Plates 9-5 to 9-6).

The entire substitute consent area has been extracted to subsoil levels (Plate 13-6). There is no visible indication of any cultural heritage material.

9.5 Impact of the Development

There are no direct or indirect impacts on any known items of archaeology, cultural heritage or buildings of heritage interest in the substitute consent area or the vicinity.

9.6 Worst case scenario

No worst-case scenario has been identified.

9.7 Remedial Measures

No impacts on any known items of archaeology, cultural heritage or buildings of heritage interest in the substitute consent area or the vicinity have been identified and no remedial measures are required.

9.8 Conclusions and Recommendations

There are no known items of cultural heritage, monuments or buildings of heritage interest known from the substitute consent area or vicinity. There are no direct or indirect impacts on any known items of cultural heritage, archaeology or buildings of heritage interest in the substitute consent area or the vicinity and no remedial measures are required.

9.9 Bibliography

Commissioners of Public Records of Ireland 1825. Fifteenth Annual Report. Appendix 'Abstracts of The Conveyances from the Trustees of the Forfeited Estates and Interests in Ireland in 1688', 348-96.

Cork County Council 2014. County Development Plan 2014-20.

DAHGI 1998. Recorded Monuments Protected under Section 12 of the National Monuments (Amendment) Act, 1994. County Cork.

Eogan, G. 1965. *Catalogue of Irish Bronze Swords.* Dublin.

Eogan, G. 1983. *Hoards of the Irish Later Bronze Age*. Dublin.

Eogan, G. 2000. *The Socketed Bronze Axes in Ireland*. Prähistorische Bronzefunde, abteilung IX, band 22.

EPA 2002. *Guidelines on the information to be contained in Environmental Impact Statements.*

EPA 2003. *Advice Notes on Current Practice (in the preparation of Environmental Impact Statements*)

Heritage Council 1999. *The role of the Heritage Council in the Planning Process.* Kilkenny.

MacCotter, P. 2008. *Medieval Ireland*. Dublin.

O'Kelly, M.J. 1944. Excavation of a Cist-Grave at Bealick, Macroom, Co. Cork. The *Journal of the Royal Society of Antiquaries of Ireland*. Seventh Series, Vol. 14. 228-229.

Ó Murchada, D. 1993. Gaelic land tenure in County Cork: Uíbh Laoghaire in the seventeenth century. In P. O'Flanagan and C. Buttimer (eds) Cork History and Society. Dublin, 213-48.

Ó Ríordáin, B and Waddell J. 1993. *The Funerary Bowls and vases of the Irish Bronze Age.* Galway.

Orpen, G.H. 1911-20. *Ireland under the Normans.* 4 Vols. Oxford.

Otway-Ruthven, A.J. 1980. *A History of Medieval Ireland*. London.

Raftery, B. 1984. *La Tène in Ireland*. Marburg.

Sweetman, D. 1999. *The Medieval Castles of Ireland*. Dublin.

Waddell, J. 1990. *The Bronze Age burials of Ireland*. Galway

Waddell, J. 1998. *The Prehistoric Archaeology of Ireland*. Galway.

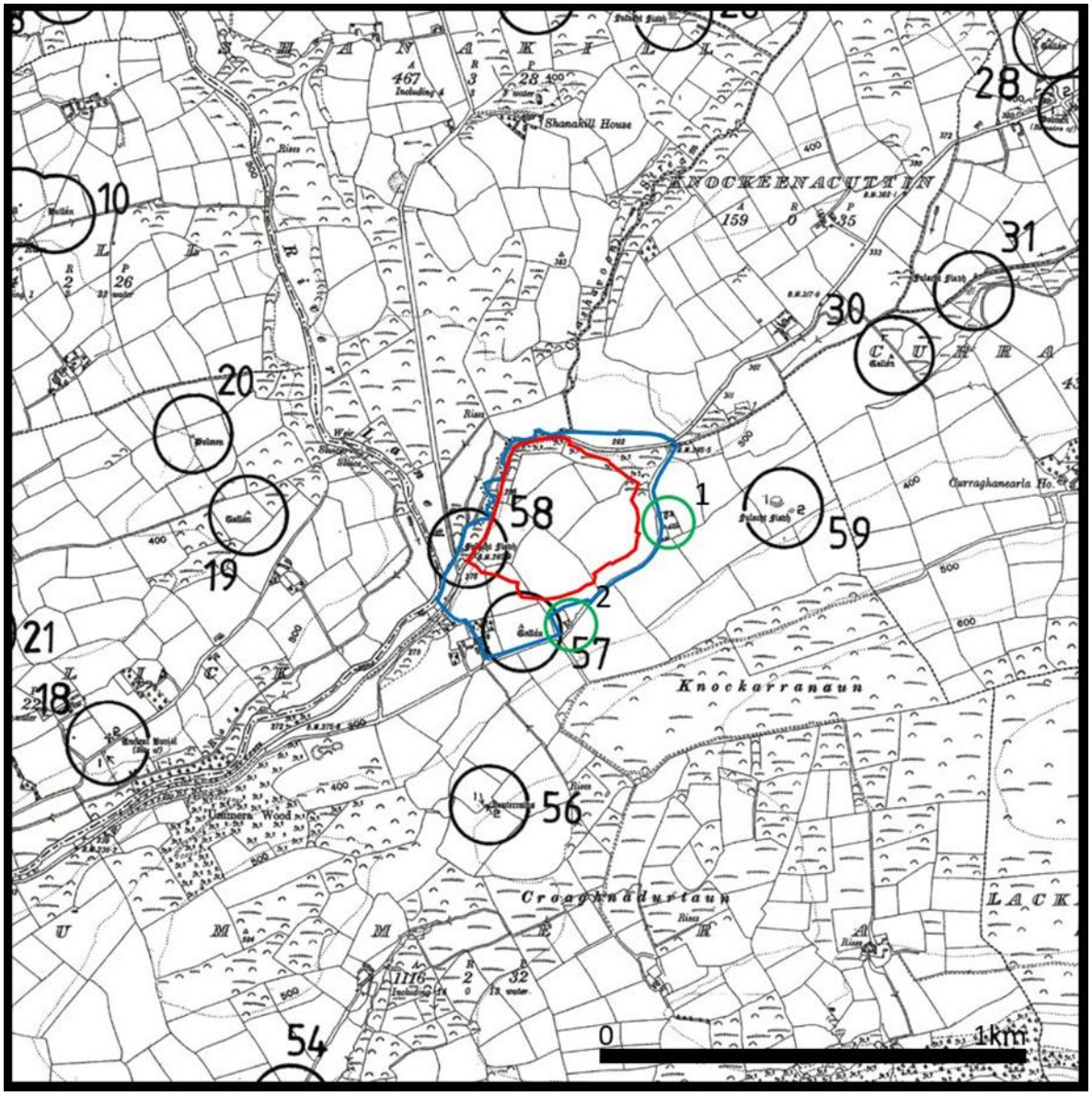


Figure 9-1: Record of Monuments for County Cork

Notes:

The assessment study area superimposed on the Record of Monuments for Co. Cork. The land under the control of the applicant is indicated with the blue line. The substitute consent area is outlined in red. Recorded monuments are indicated with black circles. The upstanding structures situated within 100m are indicated with green circles.

Plate 9-1: View of Structure 1 Looking Northeast

Plate 9-2: View of Structure 2 Looking Northwest

Plate 9-3: View of CO071-058----Location: Fulacht fia Looking Southwest

Plate 9-4: View of CO071-057----Location: Standing Stone Looking West

Plate 9-5: Aerial View of Substitute Consent Area
Source - 2018 Google earth image

Plate 9-6: Panoramic View of Substitute Consent Area Looking West

10. BIODIVERSITY

10.1 Introduction

This chapter identifies, quantifies and evaluates the effects of historical extraction activities and potential effects that may have occurred, are occurring or may occur in the future as a result of these activities on habitats species and ecosystems in the surrounding environment. It considers impacts to ecological receptors, mitigation measures being implemented and remedial mitigation to be implemented to offset or reduce the identified impacts.

The development is the Ummera gravel pit where extraction and processing of sand & gravel has taken place since the 1940's. Ummera gravel pit is located within predominantly agricultural lands in the townland of Ummera; 2.5km northeast of Macroom town (see Site Location Map, Figure 1-1). The existing gravel pit is bound by the Clashavoon Stream and its associated woodland to the north and west.

The sand & gravel is won by excavator and front-end loader and is processed on site using a washing / screening plant. A full description of the site activities is provided in Chapter 2.

10.1.1 Description of the Existing Quarry

See Chapter 2 for full description of the historical and the ongoing activities at the Ummera gravel pit.

10.2 Methodology

The methodology used to carry out the survey of the Site, to evaluate the ecological value and to prepare the biodiversity chapter is outlined in this section.

10.2.1 Desk Study

A desk study was carried out to collate the available existing ecological information on the gravel pit. Available literature on the Site (the landholding) was reviewed to inform the field work and impact assessment. A review of available mapping and aerial photography was undertaken using Bing maps.

The Environmental Protection Agency (EPA) Envision mapping[1] system was used to identify any hydrological connection between the proposed project and Natura 2000 sites.

The National Biodiversity Data Centre (NBDC) was accessed for information on protected habitats and species known from the 2km grid squares W37R and W37S within which the site is located (last accessed 25th October 2019). Only records for the past 10 years are included within this report as older records are unlikely to still be relevant given their age and the changes in land management that has occurred in the intervening period. Bat records within 2km of the survey area were also reviewed using the NBDC website.

[1] http://gis.epa.ie/Envision

Birds of Conservation Concern in Ireland (BoCCI), published by Bird Watch Ireland and the RSPB NI, is a list of priority bird species for conservation action on the island of Ireland. (Colhoun and Cummins, 2013). The BoCCI lists birds which breed and/or winter in Ireland and classifies them into three separate lists (Red, Amber and Green) based on the conservation status of the bird and hence their conservation priority. Birds on the Red List are those of highest conservation concern, those on the Amber List are of medium conservation concern and those on the Green List are not considered threatened.

The conservation status of mammals within Ireland and Europe is evaluated using one or more of the following documents; Wildlife Acts (1976 - 2012), the Red List of Terrestrial Mammals (Marnell *et al*., 2009) and the EU Habitats Directive 92/43/EEC.

10.2.2 Consultation

Historic correspondence from South-Western Regional Fisheries Board (SWRFB), now known as Inland Fisheries Ireland (IFI), on historical activities at Ummera were reviewed as part of this assessment. The following is a summary of all correspondence provided by DCWL to Atkins Ecology:

06 October 1986
SWRFB visited site and noted washing discharging to the Laney River causing serve coloration, noting a non-operational water circulation pump as the main cause. SWRFB requested operator to ensure that '*any further discharges are adequately contained onsite and recirculation is effected immediately'.*

02 September 1987
SWRFB detailed in February 1987 a discharge of fine silt on developing salmon ova and mortalities of salmon ova. The SWRFB identified the Ummera gravel pit as a potential source of silt depositing noting previous correspondence. The SWRFB requested the removal of silt from settlement ponds and noted the loose nature of the sediment bank which causes deposits to fall into the river. Finally, a recommendation was made that '*an alternative site away from the river be used for further dumping of settled solids and that the banks of the existing area be compounded or recessed from the riverbank. This would ensure that further deposits do not enter the river under any conditions*'.

24 July 2006
In response to the Section 261 application on behalf of the DWCL the SWRFB wrote to Cork County Council informing the Council that information provided '*confirms the stream to be dammed with boulders. The Board would ask that conditions be attached which will ensure the removal of the dam and ensure the free passage of fis*h'.

10.2.3 Zone of Influence

The '*zone of influence*' for a project is the area over which ecological features may be subject to significant effects because of the project and associated activities. This is likely to extend beyond the project site, for example where there are ecological or hydrological links beyond the site boundaries. The zone of influence will vary for different ecological features depending on their sensitivity to an environmental change (CIEEM, 2018).

It follows that given the nature of the development at Ummera, the zone of influence will be limited to the development site and immediate environs as well as areas connected via hydrological pathways (ground or surface water) and landscape features such as hedgerows and treelines.

Determining the potential for impacts and the zone of influence is based on the source-pathway-receptor chain principle and involves assessing likely significant effects on ecological receptors within the zone of influence in relation to three pathways:

- Surface water
- Groundwater
- Land & Air

10.2.4 Ecological Field Surveys

A summer and winter site visit were carried out on 19 July 2019 and 05 December 2019. A phase 1 habitat survey of the active gravel pit void, as well as surrounding lands within DCWL ownership were surveyed. The findings of this survey work are presented in Section 10.4. This describes habitats and species which are present on or adjoining the gravel pit. The impact assessment is provided in Section 10.5.

Any fauna, (i.e. terrestrial mammals, birds and invertebrates), noted during this survey were also recorded. During the site walkover in July and December 2019, the site was assessed in particular for the presence and signs of badger (*Meles meles*) activity. While the July site walkover was carried out outside of the optimum survey period for badger all field boundaries were accessible and clearly visible during the walkover; these were checked again in December 2019 for the presence of badger.

Bats
A specialist bat activity survey was carried out by Caroline Shiel B.Sc., Ph.D at Ummera gravel pit on 27 July 2019. One surveyor conducted an emergence watch at the site office. The second surveyor conducted an emergence survey of the farm buildings at the southern edge of the landownership. The locations of the dawn survey were decided following a walking transect survey with hand-held bat detectors. Based on bat activity at the site, the dawn surveys took place within vicinity of the settlement ponds, within the grass field to the south of the extraction area and along a mature treeline on the south-western landownership boundary near the old farm buildings.

Additionally, two no. Songmeter and four no. bat detectors were set up on site to remotely monitor bat activity at two locations overnight. These units were programmed to run from 20 minutes before sunset to 20 minutes after sunset. The first Songmeter was placed on an earthen bank at the settlement pond at the northern end of the site. The second location selected was on a track in the centre of the site. This track was lined with immature scrub willow.

On the night of 27 June 2019, two surveyors conducted emergence surveys at dusk, followed by walked transects of the site. Dawn surveys were conducted on the morning of 28 June 2019 to record any bats returning to roosts prior to sunrise. Equipment used included a Pettersson D240X time expansion bat detector, a Pettersson D200 heterodyne detector and an Echometer Touch Pro detector plugged into an ipad.

One surveyor conducted an emergence watch at the site office. The second surveyor conducted an emergence survey at the southern edge of the extraction area to investigate if bats were commuting from the farm buildings in the southwestern corner of the DWCL land holding. The dusk surveys commenced 20 minutes before sunset and lasted 1.5 hours.

Result of the bat surveys carried out at Ummera are summarised in Section 10.4 (see Appendix 10-1 for full report).

10.2.5 Aquatic Ecology

An aquatic survey and sampling were carried out on 05 November 2019. No heavy rainfall had occurred for approximately 4 days prior to sampling. Macroinvertebrate samples were taken at two sites; downstream and upstream of the surface water abstraction point. The two sampling sites are located on the Clashavoon Stream (EPA Name: Bealick) and the grid references for the sampling sites are given below. The riverbank between the two sampling sites was walked and any notable observations were recorded.

Samples were taken using a standard hand-held net (250mm width, mesh size 1mm) and comprised a 2-minute 'kick' sample with 1-minute 'stone wash'. The samples were live sorted for a minimum of 20 minutes and identified on the bankside. Macroinvertebrates were identified and abundances recorded to the level required for the Small Stream Risk Score (SSRS) method (Ryan *et al*., 2015). Taxa that are excluded from the SSRS were also identified and recorded.

The abundance classes set out in the SSRS methodology are as follows:

- 1 - 5 individuals = 1
- 6 - 20 individuals = 2
- 21 - 50 individuals = 3
- 51 – 100 individuals = 4
- 101+ individuals = 5

Table 10-1: Location of Macroinvertebrate Sampling Sites

Site No.	Location description	Grid reference (ITM)
Site 1	Downstream of discharges abstraction point.	536783 / 573857
SW abstraction point	Pump house and outfall on left riverbank upstream of man-made weir.	536873 / 574029
Site 2	Upstream of discharges abstraction point.	536969 / 574115

Freshwater Pearl Mussel (Margaritifera margaritifera)
At sites 1 to 3, the stream was assessed for the presence of Freshwater pearl mussel (FWPM) potential habitat and potential for host fish to occur in the stream. Ecological pressures such as hydrological regime modification, land use and pollution sources were also noted within the catchment. The potential of FWMP to occur within this habitat is further discussed in Section 10.4.

10.2.6 Evaluation Ecological Receptors

The evaluation and impact assessment within this report has been undertaken with reference to relevant parts of the 2018 *Guidelines for Ecological Impact Assessment in the United Kingdom and Ireland. Terrestrial, Freshwater, Coastal and Marine* - developed by the Chartered Institute of Ecology and Environmental Management (CIEEM, 2018).

The importance of an ecological feature should be considered within a defined geographical context. The following frame of reference has been used in this case, relying on known / published accounts of distribution and rarity where available, and professional experience:

- International (European).
- National (Ireland).
- Regional (Munster).
- County (Cork)
- Townland (Ummera).
- Local (intermediate between the Site and Townland).

Ecological features can be important for a variety of reasons and the rationale used to identify them is explained in the text. Importance may relate to, for example, the quality or extent of the site or habitats therein; habitat and / or species rarity; the extent to which such habitats and / or species are threatened throughout their range, or to their rate of decline.

10.2.7 Determining Ecologically Significant Effects

The Guidelines (CIEEM, 2018) define an ecologically significant impact as an impact (negative or positive) on the integrity of a defined site or ecosystem and/or the conservation status of habitats or species within a given geographic area.

The integrity of a site is the coherence of its ecological structure and function, across its whole area, which enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified (CIEEM, 2018). Best scientific professional judgement has been used in some cases, to assess the significance of predicted effects in line with National Roads Authority Guidelines for Assessment of Ecological Impacts of National Road Schemes, (NRA, 2009).

10.2.8 Precautionary Principle

The evaluation of significant effects should always be based on the best available scientific evidence. If sufficient information is not available, further survey or additional research may be required. In cases of reasonable doubt, where it is not possible to robustly justify a conclusion of no significant effect, a significant effect should be assumed. Where uncertainty exists, it must be acknowledged.

10.2.9 Mitigation

Where significant impacts have been identified, the mitigation hierarchy has been considered, as suggested in the 2018 EcIA Guidelines (CIEEM, 2018) which sets out a sequential approach of avoidance of impacts where possible, application of mitigation measures to minimise unavoidable impacts and then compensation for any remaining impacts. Once avoidance and mitigation measures have been applied, along with any necessary compensation measures, and opportunities for enhancement incorporated, residual impacts have then been identified.

10.3 Existing Environment

10.3.1 Protected Sites

European Designated Sites

European designated sites comprise of Special Areas of Conservation (SAC) and Special Protection Areas (SPAs). This network of European designated sites is referred to as the Natura 2000 network. SACs are designated for their biodiversity value based on the presence of Annex I habitats and Annex II species listed under the EU Habitats Directive (92/43/EEC). SPAs are designated for the protection of bird species listed on Annex I of the Bird Directive (2009/147/EC).

The Ummera gravel pit is not located within, or directly adjacent to any designated nature conservation areas.

There are 3 no. Natura 2000 sites within 15km of the study site; The Gearagh SAC (000108) (c. 3.5km southeast) The Gearagh SPA (004019) (4.6km southwest) and Mullaghanish to Musheramore Mountains SPA (004162) (c. 6.9km northwest) (Figures 10-1 and 10-2).

The Curraghanearla Stream flows in a general south western direction along the northern-western boundary of the site before meeting the Clashavoon Stream and discharging to the Laney River, southwest of the site. The Laney River enters the River Sullane south of Macroom and out into the Sullane Delta where it is joined by waters flowing from the Gearagh (River Lee) – before entering the River Lee / Carrigadrohid reservoir. From here the River Lee flows towards Cork Harbour where it enters Great Island Channel SAC and the Cork Harbour SPA; 60.6km and 50.75km east of the Ummera gravel pit, respectively. Therefore, the site shares a remote hydrological connection with Great Island Channel SAC and the Cork Harbour SPA.

There is no direct hydrological link to the Gearagh SAC and the Gearagh SPA as these are upstream of the confluence of the Lee and Sullane rivers.

The groundwater flow beneath the gravel pit is not directly connected to the Gearagh SAC / SPA, nor any of the other Natura 2000 sites within 15km. However, the groundwater likely provides baseflow to the Clashavoon Stream and Laney River, therefore a very remote hydrogeological connection exists with the site and Great Island Channel SAC and Cork Harbour SPA.

The Mullaghanish to Musheramore Mountains SPA is located to the northwest of Ummera. Watercourses draining off the SPA join the River Lee west of Macroom and the River Laney upstream of the Ummera gravel pit. Groundwater flow is anticipated to follow a similar pattern. No impacts to Mullaghanish to Musheramore Mountains SPA are expected to have occurred.

Natural Heritage Areas
Natural Heritage Areas (NHAs) are nationally designated sites, which are considered important for the habitat, species or geological heritage. NHAs are legally protected under the Wildlife Amendment Act 2000. Proposed Natural Heritage Areas (pNHAs) are sites that are of significance for wildlife and habitats, but which have not, as yet, been statutorily designated; however, their ecological value is recognised by Planning and Licencing Authorities.

There are no NHAs within 15km of Ummera gravel pit, however 5 no. pNHAs are located within 15km (Figure 10-3). The closest pNHA (Lough Gal pNHA) is located ca. 2.3km northeast of the site. None of the pNHA sites within 15km share connectivity with the gravel pit.

All other sites designated for nature conservation are considered to be outside the potential zone of influence of the gravel pit given the separating distance (see Table 10-2); the absence of surface water pathways linking them; the absence of landscape connectivity; the localised nature of the development and / or its specific characteristics.

Nature Reserves
The Gearagh Nature Reserve is the only Nature Reserve located within 15km of the Site. This site is the largest area of alluvial woodland in Ireland; 300 ha. This site is not within the zone of influence of the project and is not considered further.

Other Non-statutory Designated Sites of Ecological Value
There are no other non-statutory designated sites of ecological value, such as, Wildlife Sanctuary, located within 15km of the gravel pit.

Table 10-2: European Sites within 15km of Ummera

Site	Site no.	Distance	Qualifying Interests	Connectivity
The Gearagh SAC	000108	3.5km southwest	Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] Rivers with muddy banks with *Chenopodion rubri* p.p. and *Bidention* p.p. vegetation [3270] Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*) [91E0] *Lutra lutra* (Otter) [1355]	**No** There is no spatial overlap and no hydrological link between the gravel pit and the Gearagh SAC. This site is screened out and not considered further.
The Gearagh SPA	004019	4.6km southwest	Wigeon (*Anas penelope*) [A050] Teal (*Anas crecca*) [A052] Mallard (*Anas platyrhynchos*) [A053] Coot (*Fulica atra*) [A125] Wetland and Waterbirds [A999]	**No** There is no spatial overlap and no hydrological link between the gravel pit and the Gearagh SPA. Furthermore, the SPA is too remote from the quarry operation at Ummera for there to be negative impacts to birds using the SPA. This site is screened out and not considered further.
Mullaghanish to Musheramore Mountains SPA	004162	6.9km northwest	Hen Harrier (*Circus cyaneus*) [A082]	**No** There is no hydrological link between the gravel pit and Mullaghanish to Musheramore Mountains SPA. Furthermore, the SPA is too remote from the quarry operation at Ummera for there to be negative impacts to Hen Harrier in the SPA. This site is screened out and not considered further.

Table 10-3: NHA and pNHAs within 15km of Ummera

Site	Site Code	Approximate distance	Features of Interest	Connectivity
Lough Gal pNHA	001067	2.3km	The present Natural Heritage Area includes an extensive area of freshwater marsh with abundant willow (*Salix* spp.) scrub invasion. Lesser Marshwort (*Apium inundatum*) and several pondweeds (*Potamogeton* spp.) occur on the lake. Reported a good site for wildfowl, ducks, geese and swans.	**No** No hydrological connectivity or connectivity via land and air pathways. This site is screened out and not considered further.
The Gearagh pNHA	000108	3.5km	Encompassed within The Gearagh SAC and SPA (see Table 10-2).	**No** No hydrological connectivity or connectivity via land and air pathways. This site is screened out and not considered further.
Lough Allua pNHA	001065	14.4km	Areas of alluvial woodland occur to the east of Inchigeelagh. Small islands in the braided river channel support Alder (*Alnus glutinosa*), birch (*Betula* spp.), willow, Hazel (*Corylus avellana*), Ash (*Fraxinus excelsior*), occasional oak, Ivy (*Hedera helix*) and Ramsons (*Allium ursinum*). A small population of FWPM occurs in the permanent channels between these islands.	**No** No hydrological connectivity or connectivity via land and air pathways. This site is screened out and not considered further.
Prohus Wood pNHA	001248	9.7km	This site is a very young wood derived from widespread clearance about forty years ago (1986). The site has not developed much habitat diversity but is developing quite naturally and is of local importance. Birch (*Betula* sp.), Oak (*Querus* sp.) and Holly (*Ilex aquifolium*) are frequent, with some Willows (*Salix* sp.) and Alder (*Alnus glutinosa*) beside streams. At the lower edge thickets of Blackthorn (*Prunus spinosa*) and Hawthorn (*Crateagus monogyna*) occur with some Hazel (*Corylus avellana*).	**No** No hydrological connectivity or connectivity via land and air pathways. This site is screened out and not considered further.
Glashgarriff River pNHA	001055	4.9km	Otters use this site, a species listed under Annex II of the E.U. Habitats Directive as it is threatened in the E.U. Badgers also occur here – this species is internationally important and is listed in the Irish Red Data Book. This site includes one of the few waterfalls in the county. The flora of ferns and nonflowering plants in the glen are of interest. The presence of two protected mammal species adds further importance to the site.	**No** No hydrological connectivity or connectivity via land and air pathways. This site is screened out and not considered further.

10.3.2 Flora and Fauna (Desktop Information)

Protected / Rare Species

The National Biodiversity Data Centre (NBDC) online database[2] was searched for records within and surrounding the site; it was searched for information on protected habitats and species known from the 2km grid squares W37R and W37S within which the site is located. Bat records within 2km of the survey area were also reviewed using the NBDC website. The records returned, dated within the last 35 years, are presented in Table 10-4 below.

Table 10-4: NBDC Database Rare and Protected Flora and Fauna

Species name	Grid square	Date of last record	Source	Designation
Eurasian Badger *(Meles meles)*	W37R	02/06/2016	Mammals of Ireland 2016-2025	Wildlife Acts
Eurasian Badger	W373738	2015	Badger Setts of Ireland Database	Wildlife Acts
Eurasian Red Squirrel (*Sciurus vulgaris*)	W37R	31/12/2012	Irish Squirrel Survey 2012	Wildlife Acts
West European Hedgehog (*Erinaceus europaeus*)	W37R	03/05/2016	Mammals of Ireland 2016-2025	Wildlife Acts

The absence of recent records of species from the NBDC database does not necessarily mean that it does not occur within the area, rather it has not formally been recorded as present. In addition, there are records older than 10 years for Eurasian Badger (*Meles meles*) (2006).

A data request for scientific data was summited to the NPWS for all rare/protected species; rare protected plant data; commonage areas; habitat maps and freshwater pear mussel records. The result of this request can be found in Table 10-5 below.

Table 10-5: NPWS Data Request

Taxon Common Name	Taxon Latin Name	10km Grid Square	Sample Date	Survey Name
Barn Owl	*Tyto alba*	W37	April 2009	Barn Owl Project
Barn Owl	*Tyto alba*	W37	July 2009	Barn Owl Project
Barn Owl	*Tyto alba*	W37	August 2009	Barn Owl Project
Common Frog	*Rana temporaria*	W37	September 2009	Frog IPCC data from National Frog Survey 2011
Common Frog	*Rana temporaria*	W37	March 2010	Frog IPCC data from National Frog Survey 2011
Mudwort	*Limosella aquatica*	W47	September 2014	Miscellaneous Plant Records (2015)

As detailed in Table 10-5 Mudwort (*Limosella aquatica*) was recorded within the 2km grid square of the site. These records largely relate to records from the Gearagh, to the southwest of Ummera. Mudwort is afforded legal protection in Ireland and is listed on the Flora (Protection) Order, 2015. Mudwort is *of least concern* in relation to its conservation status within Ireland (Wyse-Jackson *et al*., 2016).

The NPWS data request included a GIS shapefile of FWPM records in the Lee catchment. However, due to the sensitivity of this species, this data is not included in Table 10-5 or any subsequent figures in this report; FWPM are, however, recorded in the River Laney downstream of the site.

[2] https://maps.biodiversityireland.ie/

A search of Bat Conservation Ireland's database was conducted to identify locations of bat roosts in the vicinity of Ummera. The mid-point of the site was taken as W070388. There are no known bat roosts listed within 1km of Ummera gravel pit (refer to Appendix 10-1).

When the search was extended to 10km from Ummera there were a total of 48 roosts located within the wider area. It was found that apart from roosts at a private residence at Rylane, a Ruined Cottage at Annahalla, Kilmichael, and Rockgrove House Outbuilding, Coachford (11 / 12 years ago) all other records are between 15 and 20 years old. The current status of these roosts is unknown.

Protected Habitats and Species Reported Under Article 17

Under Article 11 of the EU Habitats Directive, each member state is obliged to undertake surveillance of the conservation status of the natural habitats and species in the Annexes to the Directive and under Article 17, to report to the European Commission every six years on their status. NPWS data on annexed habitats were reviewed; there are no records of Article 17 habitats located within the site (i.e. no habitats listed on Annex I of the EU Habitats Directive occur on site).

Annex I Rivers with muddy banks with *Chenopodion rubri* p.p. and *Bidention* p.p. vegetation [3270] has been recorded downstream of the Ummera site (NPWS, 2013).This habitat was recorded on a number of sites found on the banks of the Sullane-Lee inland delta which is referred to as 'the Gearagh' downstream of Macroom (Conaghan & Fuller, 2018). The Ummera gravel pit and connected water courses is also located within a 10km potential distribution grids squares for water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation 3260. However, due to the categorisation of this habitat type the potential distribution covers the entire country therefore this is not a clear indication of presence within the projects' ZoI.

NWPS Article 17 data details the distribution of otter and FWPM within the catchment of the River Laney.

Aquatic Ecology

Surface Water/ Water Quality

On foot of information received by Atkins from DCWL including site layout drawings and correspondence from IFI the historic and current surface water management features at Ummera gravel pit can be summarised as follows.

On viewing the EPA map view, there are no flowing watercourses running through the gravel pit. The Curraghanearla Stream (EPA Code: 19C86) flows in a westerly direction to the north of the site, parallel with the local road bounding the site. The Curraghanearla Stream joins the Clashavoon Stream (EPA name – Bealick Stream) at the northern boundary of the gravel pit. After this confluence the Clashovoon Stream flows in a southerly direction along the western boundary of the site.

The Clashavoon Stream is a 3rd order stream and lies in the Sullane Water Framework Directive (WFD) sub catchment (Sullane_SC_020). The watercourse flows in a south-westerly direction, flowing under a local road, before joining the Laney River (EPA Seg Code: 19_1880) and subsequently the Sullane River. The Sullane River then flows into the Carrigadrohid Reservoir meeting the River Lee flowing from the Gearagh SAC and SPA. The River Lee flows in an eastward direction through the Inniscarra Reservoir, before finally entering transitional waters at Cork City and flowing out into Cork Harbour.

The Clashavoon Stream is not sampled under the EPA's national river monitoring programme; however, the River Laney is sampled by the EPA. EPA sampling stations are located upstream and downstream of the Clashavoon – Laney confluence. The downstream station was last sampled in 2018 and was assigned a biological water quality status of Q4-5; denoting unpolluted waters of satisfactory condition and high ecological status. However, looking at the historical records monitoring at this location shows fluctuation in water quality in the River Laney since monitoring began in 1974 (see Table 10-6). Between 1983-1991 a significant decline in water quality was recorded on the Laney at the downstream station. In recent times the river scored Moderate status for three consecutive samples between 2012 and 2016; only improving lately in 2018.

Approximately 2.4km upstream the Laney-Clashavoon confluence the Laney has been sampled since 1973 by the EPA. This station originally scored High; then fluctuated between Poor-Good from the late 1970's until the mid-1990 and subsequently scoring Moderate every instance since (see Table 10-7). Overall, the scores recorded by the EPA between 1978 and 2018 show that the downstream location has either the same or better water quality than the upstream sampling point indicating that the Ummera gravel pit has not been causing a deterioration in water quality of the Laney River.

Historical Surface Water and Settlement Features

As noted in Chapter 2 the original settlement pond for the gravel pit was constructed on the western side of the landholding, between the public road and the Clashavoon Stream. In their correspondence, the SWRFB noted that the Clashavoon Stream had a stone weir in place at the surface water abstraction point for the gravel pit.

In correspondence from 1986, SWRFB noted problems with a discharge from the site. This is stated to have occurred mainly due to the '*nonoperation of a water recirculation pump*'. It was agreed between the SWRFB agent and the site foreman that settlement ponds would be installed within the gravel pit to more effectively manage recirculation of wash water. Settlement ponds were subsequently constructed within the gravel pit, close to where they are currently.

Historically water was abstracted from the Clashavoon Stream for washing gravel. A new pump was, however, installed at the ponds to recirculate wash water within the gravel pit; as a consequence, water is now only drawn from the Clashavoon Stream to top-up the settlement ponds.

SWRFB requested that silt from the silt ponds should not be placed near the riverbank as it presented a risk of collapsing into the stream. This practice was stopped in or around 1987. All silt from the cleaning of the settlement ponds is stored in the gravel pit.

Current Surface Water and Settlement Features

Previously, wash water from the washing process flowed through the two on-site ponds before discharging under the public road to a U-shaped settlement pond on the western side of road (see Site Layout Drawing). Wash water flowed along this pond back to the water abstraction point. Recent improvement to the ponds' workings has been undertaken to improve wash water management and silt removal – see Chapter 2. These works included:

1. Rearrangement of ponds layout to provide more efficient silt removal. Longer flow paths have been imposed.
2. The rearrangement has resulted in a series of interconnected ponds.
3. A pump has been installed at the settlement ponds to recirculate wash water. The abstraction pump in the Clashovoon Stream will only be used for top-up.
4. Much of the incident rainfall on the northern part of the gravel pit runs into the settlement ponds. This can result in the generation of excess water. Previously, this excess water would flow through the ponds with the risk of discharging silt to the Clashavoon Stream. An overflow has now been installed which will take this excess wash water to a stand-alone overflow settlement pond used to treat rainfall runoff prior to exiting the site via the roadside drain.

The surface water runoff from the site flows to a drain along the access road of Ummera gravel pit and discharges to the Clashavoon Stream (see Figure 7-2). The discharge point is located approximately 40m downstream of the Clashavoon Stream – River Laney confluence. The roadside drain is fed by a settlement pond adjacent to the access road used to treat runoff water from the yard area, access road and overflow from the settlement ponds. Groundwater springs flow through the centre of the site and into a series of small ponds before discharging to the drain on the public road – see Figure 7-2.

Table 10-6: WFD SW Monitoring of Waterbodies within Area (2007-2018)

Waterbody	Waterbody Code	WFD Status 2007-2009	WFD Status 2010-2012	WFD Status 2010-2015	WFD Status 2013-2018
LANEY_030	IE_SW_19L010400	High	High	High	High
LANEY_040	IE_SW_19L010500	High	High	High	Good
Carrigdrohid	IE_SW_19_139	Good	Moderate	Poor	Moderate

Table 10-7: Q-Value recorded on the R. Laney River – 1973- 2018

Year	Q-Value	Status	Q-Value	Status
	09L010400 R. Laney; upstream of Clashavoon confluence		09L010500 R. Laney; downstream of site	
1973	5	High		
1974	5	High	4-5	High
1978	3	Poor	3	Poor
1980	4	Good	4	Good
1983	2	Bad	2	Bad
1986	3	Poor	3	Poor
1988	4	Good		
1991	4	Good	4	Good
1995	2-3*	Poor	4	Good
1998	3-4	Moderate	3-4*	Moderate
2002	3-4*	Moderate	4	Good
2005	3-4	Moderate	4	Good
2007	3-4	Moderate	4	Good
2010	3-4	Moderate	4	Good
2012	3-4	Moderate	3-4	Moderate
2013	3-4	Moderate	3-4	Moderate
2016	3-4	Moderate	3-4	Moderate
2018			4-5	High

Note – Data refers to EPA Segment: 19_2242

As noted in Chapter 2, the original settlement pond for the gravel pit was constructed on the western side of the landholding, between the public road and the Clashavoon Stream. In the mid 1980's, SWRFB (now IFI) requested that steps be taken to reduce the risk of wash water discharge to the stream. New settlement ponds where constructed within the gravel pit at the locations where they are located today.

Physical-chemical water monitoring results provided by KGEC in 2019 detailed no significant difference between samples taken up and downstream of the gravel pit. Results are provided in Table 10-8 below.

Table 10-8: Physico-Chemical Results of 2019 Monitoring

Parameter	Units	Sample ID								
		SW1*			SW2*			SW3*		
		28/5/19	02/7/19	5/11/19	28/5/19	02/7/19	5/11/19	28/05/19	02/7/19	5/11/19
Ammonia (NH3)	mg/l, N	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Nitrate	mg/l, N	5.1	5.56	3.63	5.2	5.56	3.77	2.3	2.4	2.41
Nitrite	mg/l, N	0.008	---	0.017	0.002	---	0.0173	0.003	---	<0.0152
Orthophosphate	mg/l, P	<0.1	<0.1	0.0294	<0.1	<0.1	0.03	<0.1	<0.02	<0.02
Orthophosphate	mg/l, PO4	---	0.108	---	---	<0.1	---	---	<0.1	---
BOD	mg/l	<4	<1	1.15	<4	<1	1.18	<4	<1	1.4
DO	O2 (mg/l)	10.05	---	10.6	10.22	---	10.9	10.27	---	10.6
TSS	mg/l	<10	<2	<2	18	<2	<2	16	<2	2.45
pH	pH Units	7.41	---	7.67	7.2	---	7.68	7.38	---	7.43
Total Nitrogen	mg/l, N	5.55	---	4.03	5.69	---	4.15	2.88	---	2.62
Total Phosphorous	mg/l, P	<0.1	---	0.0556	<0.1	---	0.0574	<0.1	---	0.0393

Notes:
*SW1: Clashavoon Stream, upstream of gravel pit.
**SW2: Clashavoon Stream, downstream of original settlement ponds at bridge.
***SW3: Laney River, downstream of gravel pit and downstream of drain discharge to river.

Groundwater/ Ground Water Quality

The site is located within the Ballinhassig West groundwater body. The site is located within an area of 'High Vulnerability'. On review of the WFD Groundwater designation presented by the EPA the waterbody was found to be Good status (Table 10-9). Groundwater monitoring results provided by the EPA found the waterbody to be Good status. Groundwater seepage from the existing gravel pit drains through the central area of the extraction void. It percolates back into the gravel deposit or passes through a series of small ponds before discharging to a roadside drain. This drain is culverted under the public road and discharges to the Laney River.

Groundwater within the wider Ballinhassig West groundwater body has been classified as being of good status since 2007[3].

Table 10-9: WFD Groundwater Monitoring of Waterbodies (2007-2018)

Ground Waterbody	Code	WFD Status 2007-2012	WFD Status 2010-2015	WFD Status 2013-2018
Ballinhassig West	Ballinhassig West	Good	Good	Good

Aquatic Habitats and Species

There are no on-site watercourses (see Habitats within Section 261A(3) Boundary). Settlement ponds are located within the northern section of the site. Therefore, the potential of the site to support populations of aquatic species is limited to these settlement ponds. Amphibians such as common frog (*Rana temporaria*) and smooth newt (*Lissotriton vulgaris*) are known to use quarry ponds (Meehan, 2013); while ponds such as those on site can provide suitable habitat for these species, silt levels are such that they are unlikely to be currently used.

The River Laney was noted to support good stocks of brown trout (*Salmo trutta*) and with high levels of biodiversity noted in the N22 Baile Bhuirne – Macroom EIS (McCarty Hyder, 2009). The Laney is not sampled for fish species under IFI WFD monitoring. A 2014 IFI report describes the Sullane as a riffle and glide dominated habitat, over a substrate of cobble and gravel. Brown trout was the most abundant species recorded, with salmon the second most frequently encountered; minnow, stone loach and 3-spined stickleback were also recorded during electro-fishing at the Sullane Bridge (125926 074028). The Sullane River scored Good for ecological status for 2014 WFD monitoring (Kelly et al., 2014).

Within the project zone of influence, the Clashavoon Stream and connected waterbodies hold the greatest potential to host surface water dependant habitats and species. The Sullane River, of which the River Laney is a tributary, is located within the River Lee catchment and is under the management of the ESB. The establishment of two dams downstream of Macroom at Carraigadrohid and Inniscarra in the 1950's resulted in salmon stocks reducing significantly. The impact of the scheme was immediate and was related to poor quality water (large quantities of decomposing vegetation causing deoxygenation) discharging to the lower river from the newly flooded reservoirs. Within five years of construction, the River Lee stock of salmon had collapsed (ESB, 2013). A hatchery has operated at Carrigadroid since 1956 releasing smolt and parr downstream of Inniscarra dam.

In 2005, IFI found that fish stocks in the Inniscarra Reservoir were dominated by a large population of small to medium sized bream (*Abramis brama*), with healthy stocks of perch (*Perca fluviatilis*), roach x bream hybrids (*Abramis brama* x *Rutilus rutilus*), with rudd (*Scardinius erythrophthalmus*) and pike (*Esox lucius*) also present. IFI sampling carried out at the Inniscarra Reservoir in August 2015 found Perch was the most abundant fish species recorded, followed by roach, roach x bream hybrids, bream, gudgeon (*Gobio gobio*), eels (*Anguilla anguilla*), brown trout, pike and small numbers of salmon (*Salmo salar*) (Kelly *et al*., 2015). Brook lamprey (*Lampetra planeri*) has been recorded as spawning in the Sullane (Kurz and Costello, 1999).

There are no records for Freshwater White-clawed Crayfish (*Austropotamobius pallipes*) from the Sullane catchment. Crayfish tend to occupy river systems located in limestone catchments; due to the bedrock at Ummera it is very unlikely populations of crayfish occur here (Demers et al. 2005).

[3] Groundwater Quality Status https://www.catchments.ie/maps/

Freshwater Pearl Mussel (Margaritifera margaritifera)
The waterbodies draining the site are located within the Lee Lower *Margaritifera* Sensitive Area - designated by NPWS as a catchment of other extant populations[4], meaning there are known records of FWPM in this catchment. FWPM is protected under the Wildlife Act (1970-2000) and then secondly, as an Annex II & V species under the Habitats Directive and is extremely vulnerable to deterioration in water quality.

NPWS records indicate a small population of FWPM downstream of the gravel pit on the main channel of the River Laney (Segment Code: 19_1880) just downstream of the Clashavoon – Laney confluence (Source: NPWS Dataset Accessed 2020). No FWPM were noted on the section of the Clashavoon, which runs along the western boundary of the gravel pit, during site surveys for this assessment.

Downstream, live populations of FWPM were recorded between 1987-2006 at the Laney-Sullane confluence (Source: NPWS dataset); however, during field survey work in 2007 by E. Moorkens, only dead shells were found here. A survey was carried out in 2018 along the proposed N22 corridor which included the site of the Laney-Sullane confluence. The surveyor found no mussels at this location however the survey effort terminated at the Laney Bridge and did not extend into the upper reach of the watercourse were live mussels have been recorded in the past (Hibernica, 2018).

Invasive Species
Non-native invasive species should be considered as a potential risk to ecological diversity on site and its environs. The European Communities (Birds and Natural Habitats) Regulations 2011 S.I. 477 detail the legal context regarding the introduction and dispersal of certain non-native invasive plants and animals. Section 49 and 50 of the Regulations specify that it is an offence to disperse or spread any plant species or associated vector material listed on the 3rd Schedule of the Regulations.

No species listed under the 2011 Regulations were recorded within the 2km grid square (W37R and WS75) on the National Biodiversity Data Centre database. The closest stand of Japanese knotweed (*Fallopia japonica*) recorded on the NBDC database was located in 2018 at Gearagh, Garranereagh, County Cork (W329707).

10.3.3 Historic Images of the Site

Patterns of land use change between 1995 and 2018 are illustrated in the following series of images sourced from OSi Historic Aerial Photos[5] and GoogleEarth.

[4] http://dahg.maps.arcgis.com/apps/webappviewer/index.html?id=2fae3c393baa4b79b7dfb1e3c19f3fab
[5] Heritage Maps - https://www.heritagemaps.ie/WebApps/HeritageMaps/index.html

Plate 10-1: Aerial Image of Site, 1995
(Source: Heritage Maps)

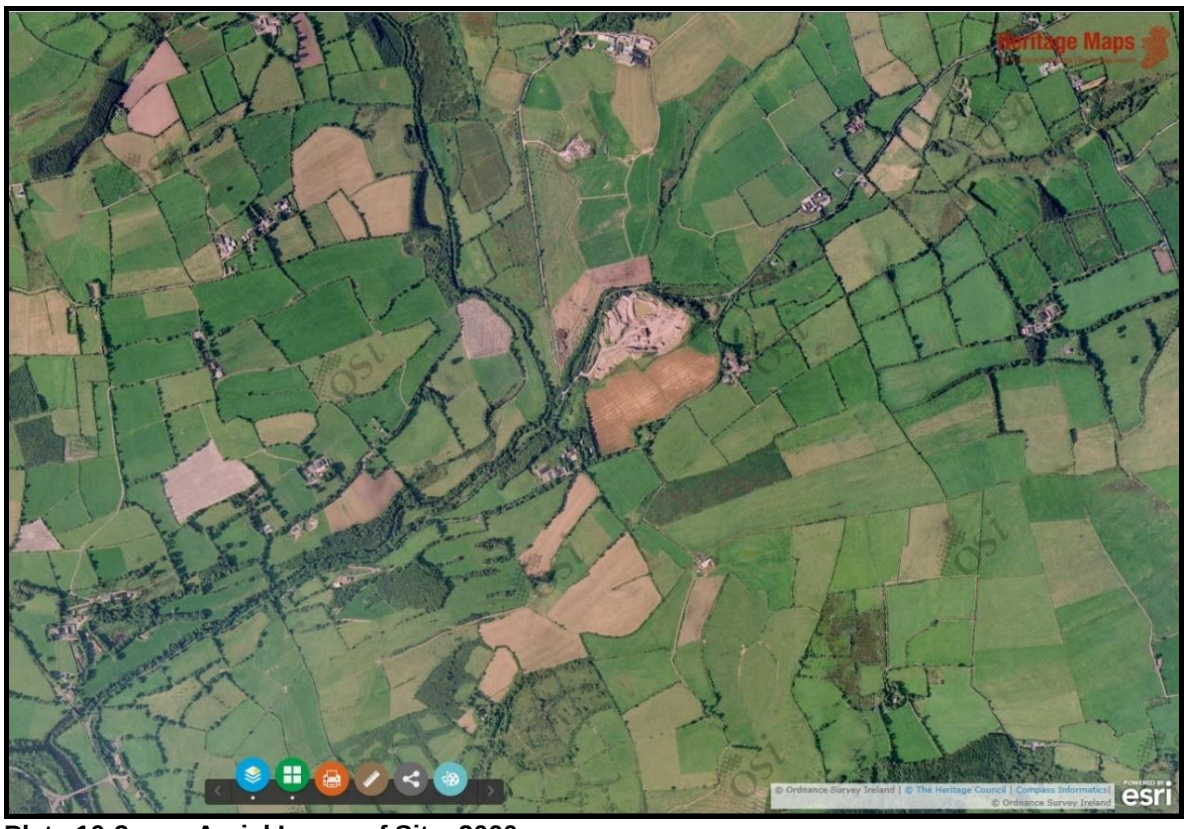


Plate 10-2: Aerial Image of Site, 2000
(Source: Heritage Maps)

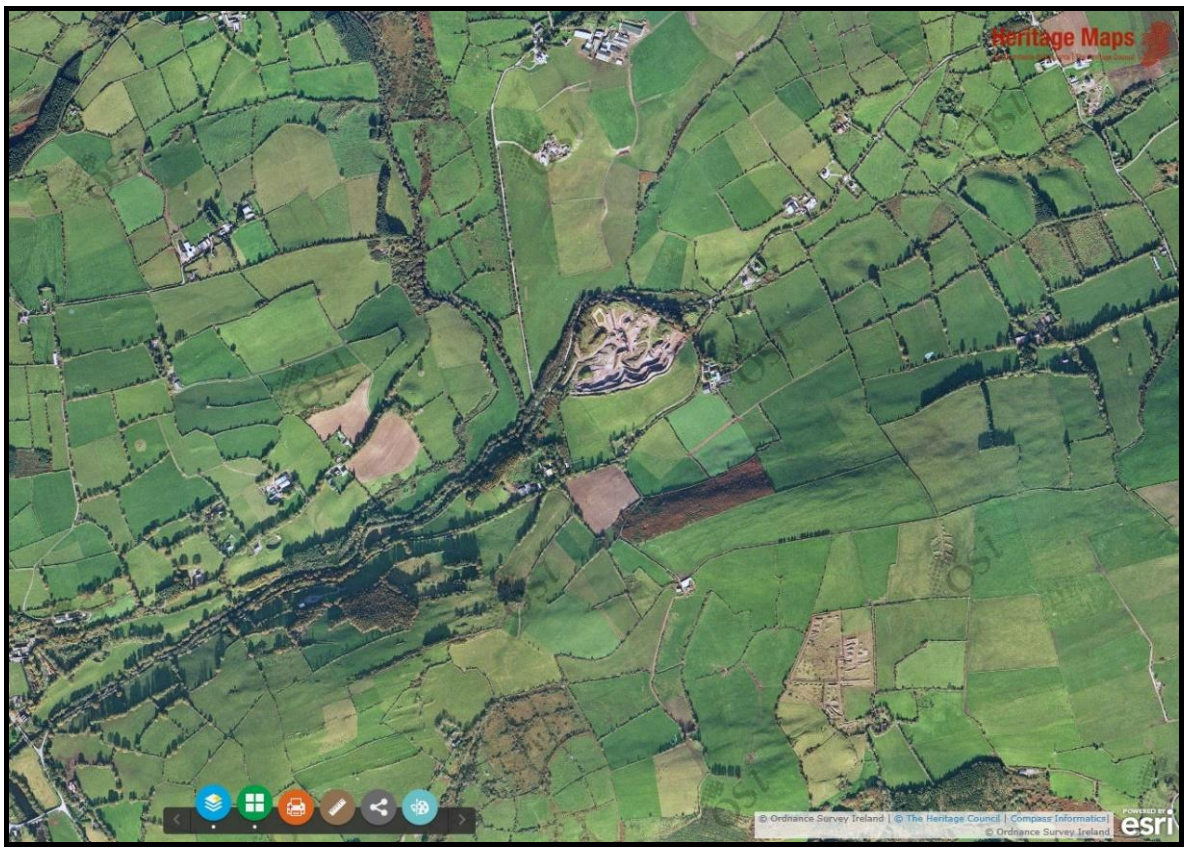


Plate 10-3: Aerial Image of Site, 2005
(Source: Heritage Maps)

Plate 10-4: Aerial Image of Site, 2013
(Source: Google Earth)

Plate 10-5: Aerial Image of Site, 2018
(Source: Google Earth)

10.3.4 Field Survey Results

Habitats within Section 261A(3) Boundary
The habitats within the Site (i.e. area considered for this application for substitute consent under Section 261A(3)(c)) are shown on Figure 10-4 and are individually described and evaluated in the following text. The site's boundary is featured here as a continuous red line and referred to Site Boundary within the text. The approach to determining ecological importance of the Site is set out in Section 10.2 and is based on CIEEM, 2018 guidance.

Active Quarries and Mines (ED4)
This habitat was recorded within the gravel pit around the areas of active gravel extraction, recently deposited heaps of sorted aggregate and spoil along with active tracks and set down areas. ED4 was found to be the most extensive semi-natural habitat on site. The active quarry habitat also contained a large grading machine and loading bays. No vegetation was recorded in this habitat due to the high rates of disturbance. This habitat is of ***negligible ecological significance***. However, active Sand martin (*Riparia riparia*) nest burrow clusters were located at 2 no. locations within the active southern faces on the southern side of the gravel pit; with nests also noted east of the washing plant on an inactive face.

Plate 10-6: Active Quarry Habitat

Spoil and Bare Ground (ED2)

This habitat was recorded within the western section of the Site in the form of an access road to the gravel pit from the public road and unvegetated spoil heaps. The roadway was c. 4 m wide and was made of gravel. The habitat was not vegetated due to the regular traffic from the site. The man-made habitat supports little to no ecological receptors and is of ***negligible ecological significance***.

Plate 10-7: Bare Ground Habitat

Recolonising Bare Ground (ED3)

This habitat was frequently recorded across the gravel pit in the form of spoil heaps and other areas of low disturbance within the site where vegetation has begun to recolonise the exposed /disturbed surfaces. The resulting vegetation was diverse and flower-rich and supported a range of invertebrate species. The spoil heaps to the north of the site compound supported the following species: - frequent common ragwort and heath speedwell along with occasional selfheal, white clover, common centaury, creeping thistle, bramble, greater birds-foot-trefoil, gorse, grey willow, alder, Yorkshire fog, sweet vernal grass, common bent grass, and trailing St John's-wort. Rosebay willowherb, spear thistle, downy birch, sheep sorrel and heartsease occurred rarely. Springy Turf-moss (*Rhytidiadelphus squarrosus*) was abundant in places along with lichen species. The presence of sapling tree species along with bramble and gorse indicates that this habitat is under succession to scrub in the absence of any further disturbance.

Plate 10-8: Recolonising Bare Ground

ED3 habitat was recorded in the southern side of the site in the form of a bank along the edge of the active face of the gravel pit. Creeping thistle, Common ramping fumitory, curled dock, false oat grass and fat hen were frequently recorded. Yorkshire fog, prickly sow thistle, redshank, nettle, common ragwort, creeping buttercup, spear thistle, thyme-leaved speedwell, heartsease, common chickweed, common mouse-ear, black bindweed and knotgrass (*Polygonum* sp.) were occasionally recorded. Shepherd's purse and heath groundsel were rarely recorded.

Plate 10-9: Recolonising Bare Ground

This habitat was also recorded in the northern side of the gravel pit where a large settlement pond had dried out and the former bed of the pond is being recolonised by plants. The pond has since been cleaned out and filled with water. Common ragwort and horsetail (*Equisetum* sp.) were frequently recorded along with American willowherb. Yorkshire fog, prickly sow thistle, marsh ragwort and hoary willowherb were recorded occasionally. Curled dock, reed canary grass and great willowherb occurred rarely. As part of routine quarry operations, the pond has since cleaned out and full of water. These habitats are transient in nature depending on ongoing quarrying operations.

Plate 10-10: Recolonising Bare Ground Habitat

The recolonising bare ground host common species not listed as rare, but which provide a semi-natural habitat which is of some local importance for wildlife and therefore this habitat is classified as local importance (lower value). A third Sand martin colony was located on an inactive quarry face on the eastern side of the gravel pit. Potential importance for nesting Sand Martin is discussed is Section 10.6.4.

Scrub (WS1)

This habitat was recorded across the site and wider landholding (see below) with frequent gorse and bramble along with occasional bracken, grey willow and downy birch. A large area of scrub within the site boundary occurs in the north and western sections of the site, around the edge of the active gravel pit, and where areas of spoil have been left undisturbed. Most of the scrub on site is ca. 3m high and dense. Isolated sections of less dense scrub were also noted within the southern and eastern section of the site growing within areas of recolonising bare ground (WS1/ED3). Scrub is common within the environs of the site; however, it does provide cover and potential nesting habitat for birds and therefore it is classified as being of ***local ecological importance (lower value)***.

Plate 10-11: Scrub Habitat

Willow Dominated Dry Woodland (WN)

Three instances of this habitat were recorded within the site boundary; two wooded areas east of the public road - these areas were located on dry, steeply sloping and uneven ground; a third area of native woodland was found on the opposite side (west) of the public road on the bank of the Clashavoon Stream.

The two wooded areas east of the public road consisted of abundant grey willow along with occasional alder. Downy birch, sycamore and ash occurred rarely. These trees were semi-mature and grew to ca. 6m to 8m tall. The field layer contained frequent bramble, bracken, ivy and nettle. A range of species were recorded occasionally in the field layer, including gorse, greater woodrush, honeysuckle, wood avens, broad buckler fern, creeping buttercup, thyme-leaved speedwell, harts-tongue fern, wood speedwell, bugle and scaly male fern. Common figwort, common ragwort, gorse, selfheal and wood sage occurred rarely.

This habitat does not fit well with any semi-natural woodland categories outlined in Fossitt (2000); it appears to be a successional stage from willow scrub to more open woodland; the ground flora does, however, show some affinities with WN1 / WN2; most likely due to the young age of the woodland. The habitat consists of common species of tree and ground flora and contains small areas of semi-natural habitat that are of some local importance for wildlife. It is therefore considered to be of ***local importance (higher value).*** This habitat is also of importance for bats as it has been identified as excellent foraging site for bat communing through the Clashavoon Stream / Laney River valley; as it makes up a part of a linear habitat connected to the River Laney (this is discussed below).

Plate 10-12: Willow Dominated Dry Woodland (WN)

Plate 10-13: Willow Dominated Dry Woodland (WN)

The third and largest area of native woodland is located along the Clashavoon Stream, west of the public road. This area of woodland consists of frequent grey willow and occasional alder in the canopy along with rarely occurring elder, hawthorn and immature ash in the understory. The field layer includes abundant bramble and frequent ivy. Given this woodland and associated settlement feature (see FL8 habitat below) were established as part of the extraction operations in the late 1970's it would suggest that it should be classified as modified broad-leafed woodland (WD1). However, the ground flora found within this habitat is more typical of native woodland (WN), suggesting that a more natural woodland has become established over time.

Harts-tongue fern, scaly male fern, soft shield fern, broad buckler fern and great horsetail were recorded occasionally. Nettle, wood avens, opposite-leaved golden saxifrage, soft rush, greater woodrush and creeping buttercup were recorded rarely. A settlement pond is located within the habitat with the woodland habitat growing on raised banks (ca. 1-2m) around this structure. No inundation or flooding from the Clashavoon Stream is likely to occur as the adjacent bank rises steeply from the stream edge and the ground level stands ca. 5-6 m above the water level. The trees in the woodland grew to c. 10-15 m high and were all of similar age class.

The habitat consists of common species of tree and ground flora and contains small areas of semi-natural habitat that are of some local importance for wildlife. It is therefore considered to be of local importance (higher value). This habitat holds importance for bats as it has been identified as excellent foraging / commuting area for bats in the valley of the Clashavoon Stream / River Laney.

Plate 10-14: Willow Dominated Dry Woodland (WN) West of Clashavoon Stream

Wet willow-alder-ash woodland (WN6)

A small area of this habitat was recorded just within the northern side of site boundary adjacent to the settlement pond. Alder was abundant along with occasional grey willow. Ash was recorded rarely. The field layer consists of frequent bramble, soft rush and creeping buttercup. Wood horsetail and wood speedwell were frequently recorded along with occasional nettle, wood avens and cleavers. Drainage ditches ca. 1m deep with pipes from the settlement ponds were observed in the habitat. The trees were semi-mature growing to ca. 10 m in height. The pattern and age class of the trees indicates that the trees in this habitat may have been planted to provide screening of the gravel pit from the public road.

This habitat did not correspond to the 'Alluvial forests' (91E0) priority habitat listed on Annex I of the EU Habitats Directive as it does not contain sufficient positive indicator species, as well as the uniform age class of the trees present and absence of mature or dead trees (based on monitoring criteria outlined by Perrin *et al*., 2008). The habitat consists of common species of tree and ground flora and contains small areas of semi-natural habitat that are of some local importance for wildlife namely foraging and nesting birds. It is therefore considered to be of **local importance (higher value).** This habitat holds importance for bats as it has been identified as excellent foraging / commuting area for bats in the valley of the Clashavoon Stream / River Laney.

Plate 10-15: Wet Willow-Alder-Ash Woodland Habitat

Other artificial lakes and ponds (FL8)

This habitat was recorded within the northern and western section of the gravel pit. A large pond used to settle out fine sediment is located close to the northern boundary of the site. During the July site visit, the water was judged to be c. 1 to 2m at the deepest section of the pond and sediment laden. No floating vegetation was observed on the pond.

Plate 10-16: Western Settlement Pond (July 2019)

A second smaller settlement pond is located within the north-western section of the gravel pit; this was dry when viewed in the July 2019 survey and subsequently flooded at the time of the December site visit. No aquatic vegetation was recorded here. This habitat is denoted as ED3 Recolonising bare ground - FL8 Other artificial lakes in the Habitat Map; Figure 10-4.

A third smaller area of ponding surface water was also noted. This was found to be dry during the July 2019 survey and filled with c. 10 - 30 cm during the December 2019 survey. This habitat is denoted as ED3 Recolonising bare ground - FL8 Other artificial lakes on the Habitat Map; Figure 10-4

While the settlement ponds did not support notable aquatic vegetation, standing waterbodies are generally scarce in the agricultural landscape of Cork. When lightly used or restored, such habitats can provide important forging habitat for bats, as well as habitat for invertebrates, amphibians and birds. Such habitat is therefore of ***local importance (lower value).*** However, in their current state they are of **negligible value** (see Plate 10-17).

Plate 10-17: Western Settlement Pond (December 2019)

Habitats Outside and Adjacent to Section 261A(3) Boundary

In line with best practice the lands adjacent to the Section 261A site boundary, but within the ownership boundary, were surveyed and habitats recorded. The following section details habitats recorded outside of the site boundary. The wider area surveyed is referred to here as the Study area.

Dry meadows and grassy verges (GS2)

This habitat was recorded within the southern section of the landholding outside the site boundary but within the land ownership boundary. The species present included abundant false oat grass along with frequent creeping thistle. Common bent grass, Yorkshire fog, common ragwort, creeping buttercup, common mouse-ear and patches of cut leaved cranes-bill were recorded occasionally. Sweet vernal grass, germander speedwell, cocksfoot, common hogweed, white clover and tufted vetch were recorded rarely. The sward was high (c. 60 cm), coarse and lodged in places. During the December 2019 site visit it was noted this field had been cut for silage.

The habitat does not correspond to the 'lowland hay meadows' (6510) habitats listed on Annex I of the EU Habitats Directive due to the absence of high-quality indicator species, insufficient numbers of positive indicator species and excessive cover of negative indicator species based on the monitoring criteria set out in the Irish semi-natural grasslands survey 2007-2012. This is a semi-natural habitat comprised of non-threated plants species, however it is a habitat which hosts foraging areas for invertebrates and mammals and is of high biodiversity in a local context with a high degree of naturalness. Therefore, it is of ***local importance (higher value)***.

Plate 10-18: Dry Meadows and Grassy Verges Habitat

Wet grassland (GS4)

A small area of wet grassland was recorded outside the Site boundary, within the dry meadow habitat, south of the active gravel pit, close to the adjacent cottage. Note this habitat is outside the S261 boundary but is within the land ownership boundary. Soft rush, sweet vernal grass, common bent grass, and Yorkshire fog were recorded frequently. Greater birds-foot-trefoil and jointed rush were recorded occasionally. White clover was recorded rarely. This semi-natural habitat comprised of species common to the area and it serves as a foraging area for local invertebrates and birds. Therefore, is of **local importance (higher value)**.

Plate 10-19: Wet Grassland Habitat

Mixed broadleaved woodland (WD1)

This habitat was recorded immediately outside the gravel pit to the northeast. During the July 2019 survey this habitat was found to consist of frequent downy birch and sycamore with occasional grey willow and ash. This woodland consisted of semi-mature trees growing to c. 8 to 10 m with occasional mature oak (*Quercus* sp.) and ash growing to c. 20 m along the public roadside. This habitat does not contain rare or threated species, nor is it important at a regional level[6]. It does, however, act as an important ecological corridor in the Clashavoon Stream / Laney River corridor; and has been identified an important foraging / commuting area of bats. It is therefore considered to be of ***local importance (higher value).*** Note this habitat is outside the S261 boundary but is within the land ownership boundary.

[6] County Cork Biodiversity Action Plan 2009-2014.

A second area of mixed broadleaved woodland (WD1) was recorded outside the gravel pit; around the ruined farmyard to the west. Here, sycamore was recorded abundantly, in various age classes from sapling to mature. A third section of WD1 woodland was located on the southern section of the public road. Ash was recorded occasionally and a small copse of mature sitka spruce was recorded on the northern boundary of the former farmyard complex. Holly and hawthorn bushes were recorded rarely along with occasional elder. Bramble and nettle were frequent in the field layer along with abundant ivy. Broad buckler fern, creeping buttercup, germander speedwell, ground ivy, navelwort, herb robert, harts-tongue fern, scaly male fern, common hogweed and lesser celandine were recorded occasionally. Foxglove, common ragwort, wood avens and opposite leaved golden saxifrage were recorded rarely. Note this habitat is outside the S261 boundary but is within the land ownership boundary.

A range of ruined and dilapidated stone dwelling and outbuildings as well as corrugated farm sheds were located within this area of scattered trees. The habitat consists of common species of tree and ground flora; is an area of semi-natural habitat of some local importance foraging and nesting birds; forms an ecological corridor with the Laney within other features adjacent to it and therefore considered to be of ***local importance (higher value).*** This habitat lies outside the active gravel pit.

Plate 10-20: Mixed Broadleaved Woodland

Hedgerow (WN1)

A length of hedgerow was recorded along the southern boundary of the study area; it is separated from the site boundary by an area of dry meadow (as shown on Plate 10-21). The species present were bracken which was abundant along with frequent bramble and occasional elder and blackthorn. This feature is not species-rich and is of limited intrinsic ecological value; however, it is some local importance for local wildlife and forms an ecological link between the site and the valley of the Clashavoon Stream / River Laney. It is considered to be ***local importance (higher value).*** Note this habitat is outside the S261 boundary but is within the landownership boundary.

Plate 10-21: Hedgerow - Southern Site Boundary

Another hedgerow was recorded along the northern margin of the wet grassland field in the north of the study site. This hedgerow consisted of frequent hawthorn and bramble as well as occasional grey willow. The bushes were ca. 4-5m high. This feature is not species-rich and is of limited intrinsic ecological value however it has some local importance for local wildlife and forms an ecological link between the site and the valley of the Clashavoon Stream / River Laney. It is considered to be ***local importance (higher value).*** Note this habitat is outside the S261 boundary but is within the landownership boundary.

Plate 10-22: Hedgerow - Northern Site Boundary

Treeline (WL2)

A treeline was recorded along the eastern side of the site; separated from gravel pit by an area of dry meadow and scrub (the latter is located adjacent to the public road). This habitat consists of abundant semi-mature sycamore and leyland cypress along with occasional ash. Blackthorn was recorded frequently growing beneath the mature trees. The trees grew to a height of ca. 10m. Note this habitat is outside the S261 boundary but is within the landownership boundary.

Plate 10-23: Treeline - Eastern Side of the Site

A second treeline was recorded on the southern and western side of the study site where mature ash and sycamore where recorded frequently along with poplar (*Populus* sp.); elder and hawthorn were recorded rarely. This treeline grew to ca. 20m high. Along the boundary of the ruined farmyard the species present included sycamore, which was dominant in the treeline, and ash which was rarely recorded. Blackthorn grew frequently under the treeline along with elder and hawthorn which occurred rarely. The mature trees grew ca. 15-20m high. Note this habitat is outside the S261 boundary but is within the landownership boundary.

Plate 10-24: Treeline on Southern Boundary

Another treeline was recorded adjacent to the Clashavoon Stream on the northern side of the study site and consisted of mature alder trees which were dominant. Immature ash trees occurred rarely. The trees were ca. 10-15m high. Note this habitat is outside the S261 boundary but is within the landownership boundary.

Plate 10-25: Treeline Adjacent to the Clashavoon

A fourth treeline consisted of mature ash which dominated the treeline. This habitat was recorded along the roadside southwest of the quarry entrance. While such habitat is common in the local area, it is of value as it forms an ecological corridor, connecting the southern section of the site and the Clashavoon Stream / Laney River valley. Bats were found to forage around the southern treeline (see below for commentary on significance for bat species).

Neutral Grassland (GS1)

This habitat was recorded outside the site boundary to the southwest and north of the ruined farmhouse and farmyard. The species present included abundant Yorkshire fog, frequent creeping bent grass along with occasional false oat grass. Red fescue was rarely recorded. Creeping buttercup and creeping thistle were recorded frequently. Common ragwort, common nettle, common sorrel and germander speedwell were recorded occasionally. Soft rush, common mouse ear and white clover were recorded rarely.

Areas of disturbed soil due to extensive rabbit burrowing within the field contained field woodrush, ribwort plantain and sheep sorrel. The sward varied between small areas of short cropped vegetation from rabbit grazing but was mostly longer rank areas which were ca. 40 cm high and were lodged and/or tussocky. A change in ground levels in the field indicates that this area may have been used for small scale aggregate extraction in the past. The habitat is species poor and contains indicator species of agricultural improvement (common mouse ear and white clover; O'Neill et al., 2013) and enrichment (nettle). It is likely that this field was previously improved/semi-improved for agriculture when the adjacent farmyard was more active but has now become rank and unimproved in the absence of any management. Scrub habitat was recorded encroaching around the edges of the field. No recent management was observed with rabbit grazing the sole

evidence of any recent grazing. As a result of past patterns of land use, this habitat did not fit well with the semi-natural grassland habitats listed in Fossitt (2000); it has been classified as neutral grassland due to the absence of a mowing regime within the habitat in contrast to the field adjacent to the active gravel pit which is mown for silage bales annually. This habitat contains common species and is a semi-natural habitat of some local importance; it is considered to be of ***local Importance (lower value).*** Note this habitat is outside the S261 boundary but is within the landownership boundary.

Plate 10-26: Neutral Grassland (GS1)

Wet grassland (GS4)

This habitat was recorded outside the gravel pit, on the northern side of the study area between the public road and the Clashavoon stream. The species present consisted of abundant soft rush along with frequent Yorkshire fog, meadowsweet and creeping bent grass. Tufted hair grass, common nettle, red fescue and sharp-flowered rush were recorded occasionally. Yellow flag was recorded rarely. The habitat was unmanaged with the 40-50 cm sward which had grown rank and become lodged. Bramble and bracken dominated scrub was encroaching around the edges of the field. There was no evidence of management of this habitat. This habitat contains common species and is a semi-natural habitat of some local importance; it is considered to be of ***local Importance (lower value).*** Note this habitat is outside the S261 boundary but is within the landownership boundary.

Plate 10-27: Wet Grassland (GS4)

Scrub (WS1)

This habitat was recorded at a number of locations across the study area. Scrub was recorded north of the public road adjacent to the Clashavoon Stream and consisted of frequent grey willow and bramble along with occasional gorse. Bracken and immature alder trees were recorded occasionally. A single mature Sessile oak was recorded. Nearby bramble and bracken dominated scrub encroached around the margins of the wet grassland habitat. Soft rush, yellow flag and Yorkshire fog were also occasionally recorded in the latter. Note this habitat is outside the S261 boundary but is within the landownership boundary.

Plate 10-28: Scrub Adjacent to the Clashavoon Stream

An area of scrub adjacent to the cottage on the southern site boundary consisted of bracken, which was dominant, and blackthorn which occurred occasionally.

Plate 10-29: Bracken Scrub Habitat

Another area of scrub was recorded north of the ruined farmyard complex (within the south-west corner of the study area) and continued down slope and north to the road. The species present consisted of abundant bramble and bracken as well as frequent nettle. Common hogweed, ivy, ground ivy and gorse were recorded occasionally. Creeping buttercup, germander speedwell and scattered bushes of hawthorn, elder, semi mature ash and downy birch were recorded rarely. Note this habitat is outside the S261 boundary but is within the land ownership boundary.

Plate 10-30: Bracken Scrub Habitat

While, such scrub is common in the local area, it is of value as it forms an ecological corridor, connecting the site and the Clashavoon Stream / Laney River valley.

10.3.5 Summary of Habitats within the Gravel Pit

Habitats within the S261 Site Boundary
While the entire landholding has been surveyed for completeness, the following habitat features are located within the footprint of the existing gravel pit, the subject of the S261 substitute consent application (see Habitat Map - Figure 10-4): -

- Active quarries and mines (ED4)
- Spoil and bare ground (ED2)
- Recolonising bare ground (ED3)
- Scrub (WS1)
- Willow dominated dry woodland (WN)
- Wet willow-alder-ash woodland (WN6)
- Other artificial lakes and ponds (FL8)
- FW4 Drainage ditches

Recolonising bare ground (ED3) located on the fringes of the existing gravel pit are categorised as being of local importance (lower value). The remaining habitat are considered to the be local importance lower and higher value.

Summary of Habitats outside S261 Application
The following habitat features are located outside the S261 substitute consent application area:

- Dry meadows and grassy verges (GS2)
- Wet grassland (GS4)
- Mixed broadleaved woodland (WD1)
- Hedgerow (WN1)
- Treeline (WL2)
- Neutral Grassland (GS1)
- Wet grassland (GS4)
- Scrub (WS1)
- Willow dominated dry woodland (WN)
- Depositing lowland river (FW2)

Lands adjoining the proposed site boundary include a diverse range of semi-natural habitats – including dry meadows and grassy verges (GS2); Mixed broadleaved woodland (WD1); wet grassland (GS4); Depositing lowland river (FW2) which are categorised as being of ***local ecological importance (higher value)***.

10.3.6 Invasive / Non-native species

No invasive plant species listed on the 2011 Regulations were recorded on site.

Single butterfly-bush (*Buddleia*) and Russian Comfrey (*Symphytum* x *uplandicum*) plants were reported within the site. Although, butterfly-bush is a considered medium impact invasive species, neither of these species are listed under the 2011 Regulations; furthermore, butterfly-bush flowers are valuable sources of nectar for butterflies.

During the December 2019 survey Montbretia *(Crocosmia X crocosmiflora)* was found on the bank at the edge of the entrance track into gravel pit while Cherry Laurel *(Prunus laurocerasus)* was recorded growing next to the ruined farmhouse. While neither species is listed under Schedule 3 of the Natural Habitats Regulations 2011, Montbretia is considered a medium impact invasive species and Cherry Laurel is listed as a High Impact[7] invasive species.

The locations of invasive / non-native species found on site are listed in Table 10-10.

[7] https://www.biodiversityireland.ie/wordpress/wpcontent/uploads/Invasives_taggedlist_HighImpact_2013RA-1.pdf

Table 10-10: Location of Invasive Species not Listed on the 2011 Regulations

Species	E_ITM	N_ITM	Notes
Buddleia	537109	573982	Single plant c. 1.5m high within gravel pit next to access road.
Russian Comfrey	536997	573682	Single plant in field adjacent to cottage in the southern side of site
Montbretia	536881	573890	On bank at edge of entrance track into gravel pit
Cherry Laurel	536840	573604	Growing next to ruined farmhouse

10.3.7 Fauna

Birds

Birds seen or heard during the walkover survey in July 2019 and December 2019 were noted (as mentioned above, the site was re-walked in December 2019). The diversity of bird species on both survey days was good. The bird species observed on site are listed in Table 10-11.

Table 10-11: Bird Species Recorded on Site

Species	Notes
Rook	Recorded July 2019 and December 2019.
Goldcrest	Recorded December 2019.
Dunnock	Recorded December 2019.
Redwing	Recorded December 2019.
Redpoll	Recorded December 2019.
Hooded crow	Recorded December 2019.
Goldfinch	Recorded December 2019.
Coal tit	Recorded December 2019.
Woodcock	2 no. birds flushed at separate locations from woodland between public road and Clashavoon Stream where settlement feature is located during the December 2019 site visit.
Sand Martin	See coordinates below of active nest burrow clusters in active pit face. Recorded July 2019.
Wren	Recorded July 2019 and December 2019.
Curlew	11 birds in recently cut silage field south of site. Flew off to south. Recorded July 2019.
Willow warbler	Recorded July 2019.
Blue tit	Recorded July 2019 and December 2019.
Chaffinch	Recorded July 2019 and December 2019.
Long tailed tit	Recorded July 2019 and December 2019.
Blackcap	Recorded July 2019.
Redpoll	Recorded July 2019.
Lesser black-backed gull	Flying over and adjacent to site. Recorded July 2019.
Swallow	Recorded July 2019.
Robin	Recorded July 2019 and December 2019.
Kestrel	2 birds flying through the site. Not seen again. Recorded July 2019.
Pheasant	Recorded July 2019.
Pied wagtail	Recorded July 2019 and December 2019.
Blackbird	Recorded July 2019 and December 2019.
Woodpigeon	Recorded July 2019 and December 2019.
Siskin	Recorded July 2019.
Mallard	Female flying in from west, appeared to land in the vicinity of the settlement pond. Recorded July 2019.
Linnet	Recorded July 2019.
Sparrowhawk	Hunting on the south eastern side of the site. Near to sand martin colonies. Recorded July 2019.

Species	Notes
Buzzard	Soaring over site. Recorded July 2019.
Magpie	Recorded July 2019 and December 2019.
Great tit	Recorded July 2019 and December 2019.

Additional Notes:

3 no. Sand Martin Colonies were reported at the following locations: -

- 537109 E 573812 N
- 537153 E 573814 N
- 537173 E 573896 N

Example of Sand Martin Colonies reported at the site

While Woodcock in on the red list of birds of conservation concern (Colhoun and Cummins, 2013); this is for birds breeding in Ireland. There is a large influx of wintering birds to Ireland which are not red listed; the birds seen at Ummera were recorded in December 2019. Curlew are also on the red list as breeding birds; there is no evidence of Curlew breeding in the area. The birds observed in July 2019 were most likely a field feeding flock which may have been migrating through the area.

The majority of birds noted are not of conservation concern (Green listed); while Goldcrest, Sand martin, Lesser-black backed gull, Sparrowhawk, Swallow and Robin are amber listed.

The site is considered to be of ***local importance (higher value)*** for birds.

Mammals

As part of the habitat survey, the field surveyor looked out for signs of mammals, notably badger setts within areas of cover, notably the adjoining hedges, where setts can often occur in the Irish agricultural landscape. Abundant rabbit sign (droppings, burrows, tracks) in area of woodland close to ruined farmhouses and adjacent grassland habitat was recorded during the December 2019 survey. No badger setts were recorded during the December survey. No observations/evidence of Wildlife Act/ European Habitats Directive protected species were noted.

No signs of otter were found on site. Otter is widespread within Ireland and it is likely that they may use the watercourse to forage. The left bank of the Clashavoon Stream provides suitable riparian cover for a potential otter holt, however no otter holts were recorded at or between the two macroinvertebrate sampling sites. Overall, the site is rated as poor to moderate for otter. Otter have been recorded at on the River Laney both upstream and downstream of the Clashavoon – Laney confluence. Details of the mammal survey are provided in Table 10-12.

Table 10-12: Mammal Signs / Species Recorded on Site

Species	E_ITM	N_ITM	Notes
Mammal burrow (prob. Rabbit or fox)	537015	573688	Fresh, partly excavated tunnel. Narrows significantly and possibly terminates quickly below ground. Fox droppings at entrance and nearby in field.
Mammal burrow (prob. rabbit)	536930	573962	Large c. 50cm entrance. c. 30cm burrow into soft sand. Prints in sand into entrance. Probable Rabbit. Live animals seen in immediate vicinity. No evidence of badger recorded.
Fox	536973	574052	Droppings on bed of dried out settlement pond.

The site is considered to be of **local importance (lower value)** for terrestrial mammals.

Bats
During an emergence watch at the site office and farm buildings on the southern boundary of the land holding (i.e. adjoining, but just outside the site) no bat activity was recorded (see Appendix 10-1). The farmhouse to the southwest was not surveyed at this time; it is separated from the gravel pit by trees / woodland and is not affected by ongoing works.

During the walked transects through the site, several Soprano and Common pipistrelles were recorded over the grass field to the south of the gravel pit and along the mature treeline on the south-western boundary of the site.

The dawn survey reported low levels of foraging activity. Soprano and Common pipistrelles were recorded along the mature tree line. No swarming was detected, and no bats returned to roost in the trees prior to sunrise.

Results of Songmeter recordings

- Songmeter at settlement pond – Total no. of calls = 142 calls.
    - 48.6% Common pipistrelle; 23.2% Soprano pipistrelle; 11.3% Brown long-eared; 9.8% Leisler's; 7% Whiskered/Daubenton's.
- Songmeter on track – Total number of calls = 32.
    - 65.63% Common pipistrelle; 31.25% Leisler's; 3.13% Soprano pipistrelle.

Relatively low levels of overnight bat activity were recorded on the Songmeter placed at the settlement pond on site and very low levels of bat activity at the central location of the gravel pit. Ummera gravel pit is not an important foraging site for bats.

Amphibians
As noted above in Table 10-5 Common Frog has been located within the 2km grid square around the site. Froglets were recorded in wet grassland habitat near the abandoned farmyard (ITM: 506744 538606) and wet grassland habitat near spoil heaps (ITM: 506403 / 538569). These grasslands are not located within the active gravel pit. Frogs are common in Ireland and given the low numbers found within the site, this site is of local importance (lower value) for amphibians. The pond within the gravel pit provides sub-optimal habitat for Smooth Newt. Given the high sediment content it is unlikely frogs will use this habitat to breed.

10.3.8 Aquatic Ecology

Site 1
Site 1 is located downstream of the surface water abstraction point. The sampling site is located approximately 30m upstream of the bridge over the Clashavoon Stream. The left (eastern) riverbank is a steep bank approximately 5-6m in height, which is part of a broadleaved wooded area. The wooded area is dominated by willow and alder trees with an understorey of ferns, bramble and ivy. The right (western) riverbank is an agricultural field used for grazing animals. There is fencing along the top of the riverbank with little to no riparian margin present. Grasses, nettle and bramble were present.

The river was 2.5m wide on average and sampling depth was 10 - 20cm. Substrate type in order of dominance was fine gravel, sand, gravel, cobble and silt. Siltation was slight mid-channel with siltation levels moderate at the margins of the channel. In slow flowing areas and pools upstream of site 1, siltation was moderate across the channel. Siltation was evident on marginal vegetation within these areas.

Site 1 was characterised by a riffle - glide sequence, comprising 80% fast glide and 20% riffle. No filamentous algae were recorded at the site. Hemlock water-dropwort (*Oenanthe crocata*) was present.

The contents of the kick sample contained a significant amount of fine detritus material. It is possible that this material is as a result of decaying algal growths during the summer months.

All taxa recorded at the site and their abundances, as defined in the SSRS methodology, are listed in Table 10-13.

Table 10-13: Site 1 Macroinvertebrate Taxa List

Taxon	Relative Abundance Class
Ecdyonurus sp.	2
Leuctra sp.	1
Hydropsychidae	1
Rhyacophilidae	1
Sericostomadidae	1
Glossosomatidae	2
Goeridae	1
Chironomidae	1
Simuliidae	2
Tipulidae	2

Taxon	Relative Abundance Class
Ancylus fluviatilis	1
Sphaeriidae	1
Lumbricidae	1
Lumbriculidae	2
Elmidae (adults)	1
Elmidae (larvae)	2
Gammarus duebeni	4
Baetis rhodani	3

Plate 10-31: Site 1: Sampling Site Downstream of Abstraction Point

Surface Water Abstraction Point

The abstraction point and pumphouse are located on the left (eastern) bank of the Clashavoon Stream. A man-made weir is located immediately downstream of the abstraction point that comprises a number of large boulders. A pool is present along the left bank where the abstraction of surface water occurs. The weir results in a backwater in the Clashavoon Stream for a short stretch upstream of the weir.

Plate 10-32: Man-made Weir on Clashavoon Stream

Plate 10-33: Pumphouse and Water Abstraction Point

Site 2

Site 2 is located upstream of the surface water abstraction point. Site 2 is located approximately 200m upstream of the weir to ensure that backwater effects were not impacting the macroinvertebrate assemblage. The surrounding environment at this site is very similar to Site 1.

The left riverbank is a stone wall that essentially acts as a retaining wall for the adjacent road. The stone wall is covered in bramble, ferns and guelder rose. The right riverbank is an agricultural field for grazing animals, which is the same field that borders Site 1. There is fencing along the top of the

riverbank with little to no riparian margin present. Grasses, nettle, bramble and a hawthorn tree were present.

The river was 2.5m wide on average and sampling depth was 20cm. Substrate type in order of dominance was sand, fine gravel, gravel, cobble and silt. Some of the cobbles were embedded. Siltation was slight within the channel.

The site was characterised by a riffle - glide sequence, comprising 50% fast glide and 50% riffle. No filamentous algae were recorded at the site.

The contents of the kick sample contained a notable amount of fine detritus material, however less than that encountered in the sample at Site 1. It is possible that this material is as a result of decaying algal growths during the summer months.

All taxa recorded at the site and their abundances, as defined in the SSRS methodology, are listed in Table 10-14.

Table 10-14: Site 2 Macroinvertebrate Taxa List

Taxon	Relative Abundance Class
Ecdyonurus sp.	2
Perlodidae	1
Hydropsychidae	2
Rhyacophilidae	1
Glossosomatidae	2
Goeridae	2
Chironomidae	1
Simuliidae	2
Tipulidae	2
Ancylus fluviatilis	2
Sphaeriidae	1
Lumbricidae	1
Lumbriculidae	2
Elmidae (adults)	1
Elmidae (larvae)	2
Gammarus duebeni	4
Baetis rhodani	3

Plate 10.30 Site 2 Sampling Site

Small Stream Risk Scores

SSRS indicates the likelihood of a stream in achieving its Water Framework Directive objectives of 'good' status and thus, the final SSR score can be one of 'Probably not at risk', 'Indeterminate stream may be at risk', or 'Stream at risk'.

The SSRS values for each site are detailed below. The greater value a SSR score is, the less risk associated with that stream not obtaining its WFD objective of 'good' status. As can be seen from Table 10-15, both sites are categorised as being 'at risk'.

Table 10-15: Small Stream Risk Scores

Site No.	SSR score	Category
Site 1	6.4	Stream at risk
Site 2	6.4	Stream at risk

The Clashavoon Stream flows through an agricultural landscape with one-off single residential houses. This landscape setting can result in pressures such as increased riverbank instability and erosion, sedimentation of watercourse substrates, and anthropogenic nutrient inputs that lead to eutrophication (Magette *et al*., 2007; Kelly Quinn *et al*., 2016).

The sampling sites upstream and downstream of the surface water abstraction point are very similar in channel characteristics and macroinvertebrate community composition, with SSR scores the same for both sites. Both sites are categorised as 'at risk', demonstrating that the river is experiencing pressures upstream of the gravel pit.

The main difference between the two sites is the amount of detritus material present in the samples and siltation within the channel. Both factors were greater at the downstream sampling site. Although the increase of these factors was not expressed in the macroinvertebrate community of Site 1, it is possible that the gradient and flow type of the Clashavoon Stream may be compensating for any potential effects from the discharge within the Clashavoon Stream.

The nature of the detritus material in the samples suggests that it is decaying algal material and it is possible that the river experiences algal blooms during summer months when flows are lower and instream temperatures are elevated. County Cork experienced significant rainfall during September and October 2019 and thus, the system would have been flushed out considerably during the 2 months prior to sampling.

Salmonids
The Clashavoon Stream hosts limited valuable adult and juvenile salmonid habitat. As noted above brown trout have been recorded within the Laney and therefore salmonids may enter the Clashavoon Stream, however the presence of the man-made weir is a likely obstruction to fish movements. The substrate composition of fine gravels, sand and moderate siltation presented poor adult salmon spawning habitat with no large accumulations of clean gravels or redds recorded. Some moderate juvenile habitat was present downstream of the man-made weir with small shaded pools present. However, the stream consisted mostly of fast glide and riffle flows with a moderate gradient. As stated, the presence of adult or juvenile salmonids upstream of the man-made weir is unlikely due to the weir acting as an obstruction to fish movements.

Lamprey
The absence of abundant slow-moving pools with silt laden substrates provides poor nursery habitat for juvenile lamprey in the Clashavoon Stream. Similarly, to salmonids, lamprey require physical unobstructed passage upstream through the waterbody. The presence of the man-made weir forms an obstruction to migratory adult and juvenile lamprey. Furthermore, the lack of clean gravel substrates limits the potential of lamprey spawning habitat to poor within the Clashavoon Stream.

Freshwater Pearl Mussel
The Clashavoon Stream does not provide optimal juvenile and adult FWPM habitat. The area of habitat adult and juvenile mussels can occupy and the area of spawning and nursery habitats the host fish can occupy are closely linked. Fish nursery habitat typically overlaps with FWPM habitat. The presence of sand and fine gravels present in the Clashavoon Stream presents an unstable substrate, limits FWPM's ability to anchor into the riverbed.

Water quality data is not collected on the Clashavoon Stream by the EPA. Small stream risk scores calculated as part of this study for sampling stations upstream and downstream of the gravel pit both indicate that the Clashavoon Stream is at Risk of not achieving Good status (i.e. SSR scores, based on sampling of aquatic macroinvertebrates). EPA water quality data (Q-values) is presented from stations on the River Laney upstream and downstream of the confluence with the Clashavoon. These data suggest that water quality downstream of the gravel pit broadly mirror those of the upstream station on the River Laney; with the worst case of water quality (Q2-3, Poor in 1995) noted on the River Laney upstream of the gravel pit. Currently water quality downstream of the gravel pit is Q4-5, High (2018). While, negative impacts on the Clashavoon Stream have been noted, in for example correspondence, from the SWRFB, these data also highlight broader patterns of negative impacts on water quality in the catchment of the River Laney since 1973.

FWPM have been recorded in the River Laney. Apart from limited records there does not appear to have been a systematic survey of FWPM within the full catchment of the River Laney. It is not known if the River Laney FWPM population is a recruiting population. There was no evidence of FWPM in the Clashavoon Stream (2019 field surveys). As noted there have been negative pressures on water quality in the wider River Laney catchment which would have had negative impacts on FWPM within the river. However, it is not possible to identify the relative scale of impact associated with different pressures in the absence of historic data (i.e. agriculture, forestry, septic tanks, road runoff etc.).

As noted, a series of improvements to the water management system and patterns of water abstraction have been implemented at gravel pit since the 1980s to the present day.

Crayfish
Crayfish are not known from the River Lee catchment.

10.4 Impact Assessment

The impacts that have occurred, are occurring, or which can reasonably be expected to occur because of the gravel works at Ummera are considered in this section. This assessment draws on baseline information identified from desk-based study, baseline surveys and evaluation of the ecological features.

10.4.1 Impact on Sites Designated for Nature Conservation

Natura 2000 Sites
The gravel pit at Ummera is not located within or immediately adjoining a Natura 2000 site; i.e. a Special Area of Conservation or a Special Protection Area for birds.

The Gearagh SAC (000108) (c. 3.5km southwest) and The Gearagh SPA (004019) (4.6km southwest) are both located upstream of Ummera on the main channel of the River Lee. Surface waters from the gravel pit enter the Clashavoon Stream, a tributary of the River Laney. The River Laney in turn joins the River Sullane upstream of where it meets the River Lee, in the Sullane Delta, which flows from the west. As the Gearagh SAC and the Gearagh SPA are upstream of the gravel pit, it can't affect the habitats of either designated site.

The Gearagh SAC is designated for floating river vegetation [3260]; rivers with muddy banks [3270]; Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0]; Alluvial forests [91E0] and Otter (*Lutra lutra*) [1355]. Ummera gravel pit does not overlap with the Gearagh SAC; none of the habitats within the SAC would have been, or are currently being, impacted by works at Ummera. None of these habitats have been identified within the gravel pit, or immediately adjoining it. Furthermore, works at the gravel pit would not affect the hydrological regime of the Gearagh which supports such habitats.

Otter are widely distributed within the Lee catchment; and are likely to be using the Clashavoon Stream, River Laney, Sullane River and the River Lee downstream of the site (see e.g. NBDC webviewer). Day-to-day operations of the gravel pit would not have, and currently, do not affect usage of the neighbouring Clashavoon Stream by otter (i.e. works to not limit access to the river; or free passage up / down stream). While otter can use settlement ponds (e.g. Coolbane Quarry, West Cork also operated by DWCL), at present settlement ponds do not provide suitable habitat.

Works at the gravel pit are sufficiently distant from the Gearagh SPA, that bird species for which the SPA have been designated would not be disturbed by associated traffic or noise. In its current condition, the site does not support habitats that the qualifying interests of the SPA would utilise.

Due to the distances and lack of connectivity between the gravel pit and the three Natura 2000 sites (listed in Table 10-2 and discussed in Section 10.3.1), no significant affects have likely occurred, are occurring, or are likely to occur as a result of the gravel pit operations.

Sites of National Importance
The Ummera gravel pit is not located within or immediately adjoining a site of national importance, i.e. a Natural Heritage Area / proposed Natural Heritage Area. The nearest such site, Lough Gal pNHA (001067) and Glashgarriff River (001055) are located on the Glashgarriff River to the northeast of Ummera. The Glashgarriff River is a short river which discharges to the River Lee just below the Carrigadrochid Dam (upriver of Coachford). These are at a significant distance from the gravel pit and it is very unlikely that extraction activities have in the past, or are currently, negatively impacting these sites.

As above, the Gearagh is also proposed for designation as a pNHA (000108); see comments above.

Downstream of the gravel pit the nearest pNHA is located in the River Lee valley, i.e. the Lee Valley pNHA (000094) located downstream of Inniscarra Dam. This pNHA occupies five distinct locations within the River Lee valley, which support a diverse range of terrestrial and aquatic semi-natural habitats. However, the distance between this pNHA and the gravel pit (ca. 30km downstream) is such that it is very unlikely that extraction activities have in the past, or are currently, negatively impacting the River Lee pNHA.

Due to the distances and lack of connectivity between the gravel pit and these pNHAs no significant affects have likely occurred, are occurring, or are likely to occur as a result of the gravel pit operations.

Other Sites
As noted, the Gearagh is also a Nature Reserve; see comments above. No other sites of County or Local Importance have been identified.

10.4.2 Habitats and Flora

This section assesses the ecological impacts arising from the extraction operations at Ummera. This assessment draws on baseline information identified from the preliminary desk-based study, including review of aerial images, and evaluation of the ecological features. Prior to the 2019 surveys, no baseline ecological surveys of the gravel pit were undertaken.

Semi-natural Habitats
In the absence of a time series of ecological baseline surveys, it is difficult to comment with certainty as to the type and extent of ecological impacts on semi-natural habitats within and adjoining the gravel pit over the period of its operation. However, from a review of OSi aerial photographs and heritage mapping it appears that the site would have been dominated by grassland, hedges, treelines, scrub and the neighbouring Clashavoon River valley / riparian woodland. Over time, and in parallel with patterns of agricultural intensification, grassland would have become more improved and intensively managed (moving from GS towards GA1).

At present, the area within the S261 site boundary supports the following range of habitats:

- Active quarries and mines (ED4)
- Spoil and bare ground (ED2)
- Recolonising bare ground (ED3)
- Scrub (WS1)
- Willow dominated dry woodland (WN)
- Wet willow-alder-ash woodland (WN6)
- Other artificial lakes and ponds (FL8)
- FW4 Drainage ditches

While the balance of the site under the Applicant's ownership supports:

- Dry meadows and grassy verges (GS2)
- Wet grassland (GS4)
- Mixed broadleaved woodland (WD1)
- Hedgerow (WN1)
- Treeline (WL2)
- Neutral Grassland (GS1)
- Wet grassland (GS4)
- Scrub (WS1)
- Willow dominated dry woodland (WN)
- Depositing lowland river (FW2)

Habitats on site are predominantly of no more than local ecological importance (higher value). The area of woodland west of the road also originates from planting associated with the extraction activities undertaken in the 1970's.

Therefore, impacts that have occurred, or are likely to be occurring, upon habitats at the gravel pit have most likely included loss of areas of habitat of local ecological value; and replacement over time with a more diverse mix of semi-natural habitats that currently characterise the site.

10.4.3 Fauna

Impacts on fauna within the site mirrors those outlined for habitats. The succession and recolonisation of semi-natural habitats on the margins of the extraction void have provided habitats for greater faunal activity. The areas of woodland and gorse scrub in particular, allows greater cover and refuge for small mammals and passerine birds than would be afforded by grassland / hedges, while they also provide foraging opportunities and an ecological corridor to the wider Clashavoon Stream / Laney River valley for bats. No badger setts are currently located on site.

It is likely that the development of a more varied mix of semi-natural habitats within the site has increased the viability of the site, not only as a refuge, but as a viable habitat for a range of passerine birds and mammal species common throughout the Irish landscape. For example, 2 no. woodcock were recorded on the woodland west of the road in December 2019; as noted this woodland has developed from planting undertaken in the 1970s.

Successive extraction of sand and gravels has exposed areas of vertical sand banks that offer suitable nesting habitat for Sand martin. This is a summer visitor to Ireland and feeds on small insects caught in flight, particularly over water (large numbers are recorded feeding in wetland sites such as the Gearagh). As noted, signs of nesting Sand martin were recorded in the summer of 2019, with one location supporting >30 apparently occupied nests. Moving forward a management plan will be put in place to carefully manage site operations and nesting Sand martin.

Analysis of the OSi aerial photography and heritage mapping suggests that prior to being a gravel pit the site did not support areas of standing water when compared with current conditions. Today's gravel pit supports a variety of areas of standing waters, including settlement ponds. The presence of consistent standing water may be of benefit to local wildlife, especially foraging bats and perhaps passerine birds by providing local abundances of invertebrate prey in the sheltered micro-climate of the extraction void. Such ponds can also be used by amphibians including Common frog and Smooth newt.

Overall, similar to that outlined for impacts to habitats at the site, it is unlikely that significant effects on fauna have likely occurred, are occurring, or are likely to occur as a result of the gravel pit operations. In fact, in some cases (e.g. Sand martin) extraction activities have had positive impacts. To this end, it is conceivable that impacts on fauna at the site have been minor positive.

10.4.4 Aquatic Ecology / Water Quality

As noted, gravel pits can inadvertently create clean water habitats that support diverse assemblages of flora and fauna, including amphibians, macrophytes and invertebrates such as beetles, dragonflies and damselflies. While these habitats may be considered artificially created, and be somewhat ephemeral in nature, they still can hold significant biodiversity value.

The most likely threats to the integrity of a watercourse such as the Clashavoon Stream from a sand and gravel pit, such as Ummera, comes from the discharge of contaminated surface waters; in particular, waters heavily contaminated by silts and fines. Other sources of contamination could include hydrocarbon release from refuelling areas or from wastewater associated with welfare facilities on site.

Water quality data is not collected on the Clashavoon Stream by the EPA. Small stream risk scores calculated as part of this study for sampling stations upstream and downstream of the gravel pit both indicate that the Clashavoon Stream is at Risk of not achieving Good status (i.e. SSR scores, based on sampling of aquatic macroinvertebrates). EPA water quality data (Q-values) is presented from stations on the River Laney upstream and downstream of the confluence with the Clashavoon Stream. These data suggest that water quality downstream of the gravel pit broadly mirror, or slightly better than, those of the upstream station on the River Laney; the worst case of water quality (Q2-3, Poor in 1995) was recorded on the River Laney upstream of the gravel pit. Currently water quality downstream of the gravel pit is Q4-5, High (2018). While, negative impacts on the Clashavoon Stream have been noted, in for example correspondence, from the SWRFB, these data also highlight broader patterns of negative impacts on water quality in the catchment of the River Laney since 1973.

Without a parallel set of data from the Clashavoon Stream (upstream and downstream), it is not possible to disentangle potential impacts from extraction operations, from changing patterns of impacts in the wider landscape (e.g. diffuse agricultural runoff; septic tanks from housing; road runoff and forestry). However, correspondence from the SWRFB highlighted negative impacts on water quality in the early 1980's. Measures were put in place in response to these concerns included redesign of the settlement pond system. Continuing improvements in the surface water management at the gravel pit during the assessment period are described in Chapter 2.

FWPM has been recorded in the River Laney. Apart from limited records there does not appear to have been a systematic survey of FWPM within the full catchment of the River Laney. There was no evidence of FWPM in the Clashavoon Stream (2019 field surveys). As noted there have been negative pressures on water quality in the wider River Laney catchment which would have had negative impacts on FWPM within the river. However, it is not possible to identify the relative scale of impact associated with different pressures in the absence of historic data (i.e. agriculture, forestry; septic tanks; road runoff; quarrying etc.). As noted, a series of changes to the water management system and patterns of water abstraction and discharge have been implemented in site since the 1980s; furthermore, the system of on-site water management is has recently undergone further changes and improvements.

10.5 Existing Mitigation Measures

Ecological mitigation measures undertaken to date generally include the prevention of pollution sources emanating from the site into the Clashavoon Stream (e.g. movement of the settlement ponds in the 1980s following comments received from SWRFB; increasing their size in the late 1990's when the washing plant was moved; and more recently when the ponds were rearranged to improve silt removal and the management of wash water as detailed in Chapter 7. DCWL has an Environmental Management System (EMS) in place for the operation of the Ummera gravel pit. This was adopted in 2005.

The activities carried out at Ummera have had a negligible impact on habitats that are likely to have been of not more than local value. Apart from boundary planting, maintaining mature trees around the boundary and planting woodland west of the road, no specific habitat mitigation measures have been completed in these peripheral areas of the gravel pit. No other ecological remedial measures have been undertaken.

10.6 Remedial Mitigation

Further improvements will be the paving of the access road into the site as far as the yard area. This will be done within 4 months of obtaining substitute consent and further development approval. This will incorporate a concrete channel for roadside drainage. The access road will be kept clean, so runoff of silt-laden water doesn't occur.

Furthermore, improvements are proposed for the storage and dispensing of hydrocarbons (potential sources of contaminants). The improvements proposed are:

- A concrete refuelling pad will be installed which will contain any spills during refuelling.
- The storage of fuel and hydrocarbons will be in a bunded storage shed adjacent to the refuelling pad. The diesel storage tank will be relocated to this shed as will the storage of oils.
- Any maintenance or repairs to the mobile plant will be carried out on the concrete pad.
- A spill kit will be kept in the front-end loader.

The proposed measures will be carried out within 6 months of the grant of substitute consent and further development approval.

Going forward, monitoring will be conducted during the lifetime of the operations to assess the effects on the environment so that operational changes and improvements can be made where appropriate. The proposed monitoring programme will form part of the EMS for the pit and include surface water monitoring. This is important in the context of the presence of FWPM in the River Laney downstream of the site. The EMS will provide for an annual audit of the surface water management effectiveness to ensure that the operations at the gravel pit do not impact on the water quality of the Clashavoon Stream and the River Laney. This will be ongoing.

Moving forward, however, the restoration of the gravel pit upon completion of the works will provide the opportunity to restore habitats on site and to improve its biodiversity value which will have a positive impact in the long-term.

10.7 Bibliography

Bat Conservation Ireland (2010). *Bats and Lighting: Guidance notes for Planners, Engineers, Architects, and Developers*. Available online at - www.batconservationireland.org/.

BCT / ILP (2018). *Bats and artificial lighting in the UK. Bats and the Built Environment Series. Guidance Note 08/18*. Bat Conservation Trust, London.

CIEEM (2017). *Guidelines for Preliminary Ecological Appraisal* (2nd Edition, December 2017).

CIEEM (2018). *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine*. Chartered Institute of Ecology and Environmental Management, Winchester.

CIRIA (2015). *Environmental good practice on site guide (fourth edition) (C741).* Construction Industry Research and Information Association.

Colhoun, K. and Cummins, S. (2013). Birds of Conservation Concern in Ireland, 2014-2019. *Irish Birds* 9: 523-544.

Conaghan, J. and Fuller, J. (2018). A survey of the vegetation of the Habitats Directive Annex I habitat Rivers with muddy banks with Chenopodion rubri p.p. and Bidention p.p. vegetation (3270), in Ireland (2018). Unpublished Report to the National Parks and Wildlife Service, DCHG, Dublin.

Demers, A., Lucey, J.,. McGarrigle, M.L., Reynolds, J.D. (2005). The Distribution of the White-Clawed Crayfish, Austropotamobius pallipes, in Ireland. *Biology and Environment: Proceedings of the Royal Irish Academy*, Vol. 105B, No. 2 (August, 2005), pp. 65-69.

Entwhistle, A.C., Harris, S., Hutson, A.M., Racey, P.A., Walsh, A. (2001). *Habitat Management for bats. A Guide for land managers, landowners and their advisors*. JNCC.

Fitzpatrick, U., Murray, T.E., Byrne, A., Paxton, R.J. and Brown, M.J.F. (2006). Regional Red List of Irish Bees.

Fossitt, J.A. (2000). *A guide to habitats in Ireland*. The Heritage Council. Published October 2000.

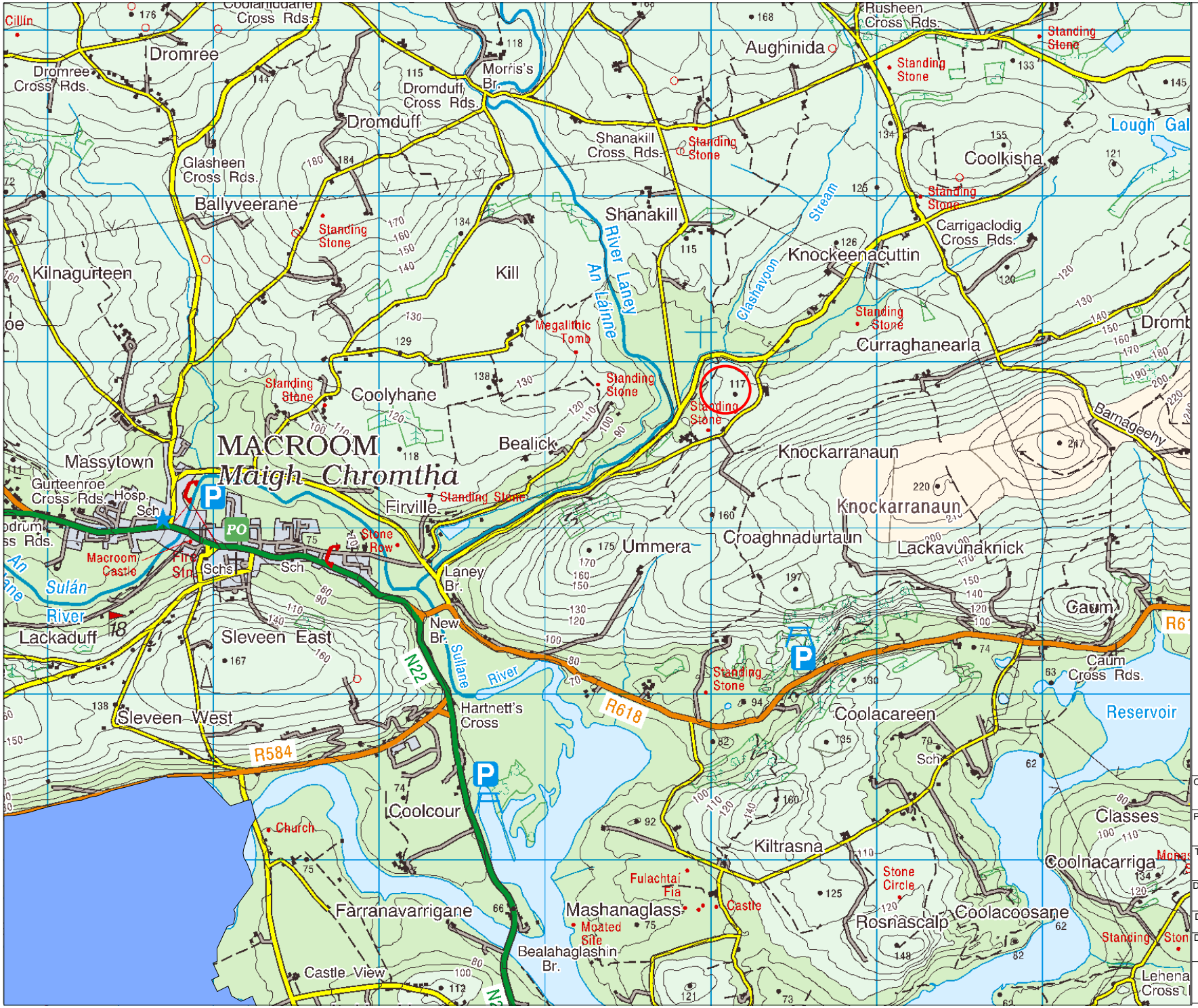
Hibernica Ecology (2018). *N22 Road Corridor Walkover Survey and Recommendations. N22 Baile Buirne – Macroom Road Development Project. Unpublished report.*

Kelleher, C. & Marnell, F. (2006). Bat Mitigation Guidelines for Ireland. *Irish Wildlife Manuals*, No. 25. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland

Kelly, F.L., Connor, L., Matson, R., Feeney, R., Morrissey, E., Coyne, J. and Rocks, K. (2015aa) Sampling Fish for the Water Framework Directive, Rivers 2014. Inland Fisheries Ireland, 3044 Lake Drive, Citywest Business Campus, Dublin 24, Ireland.

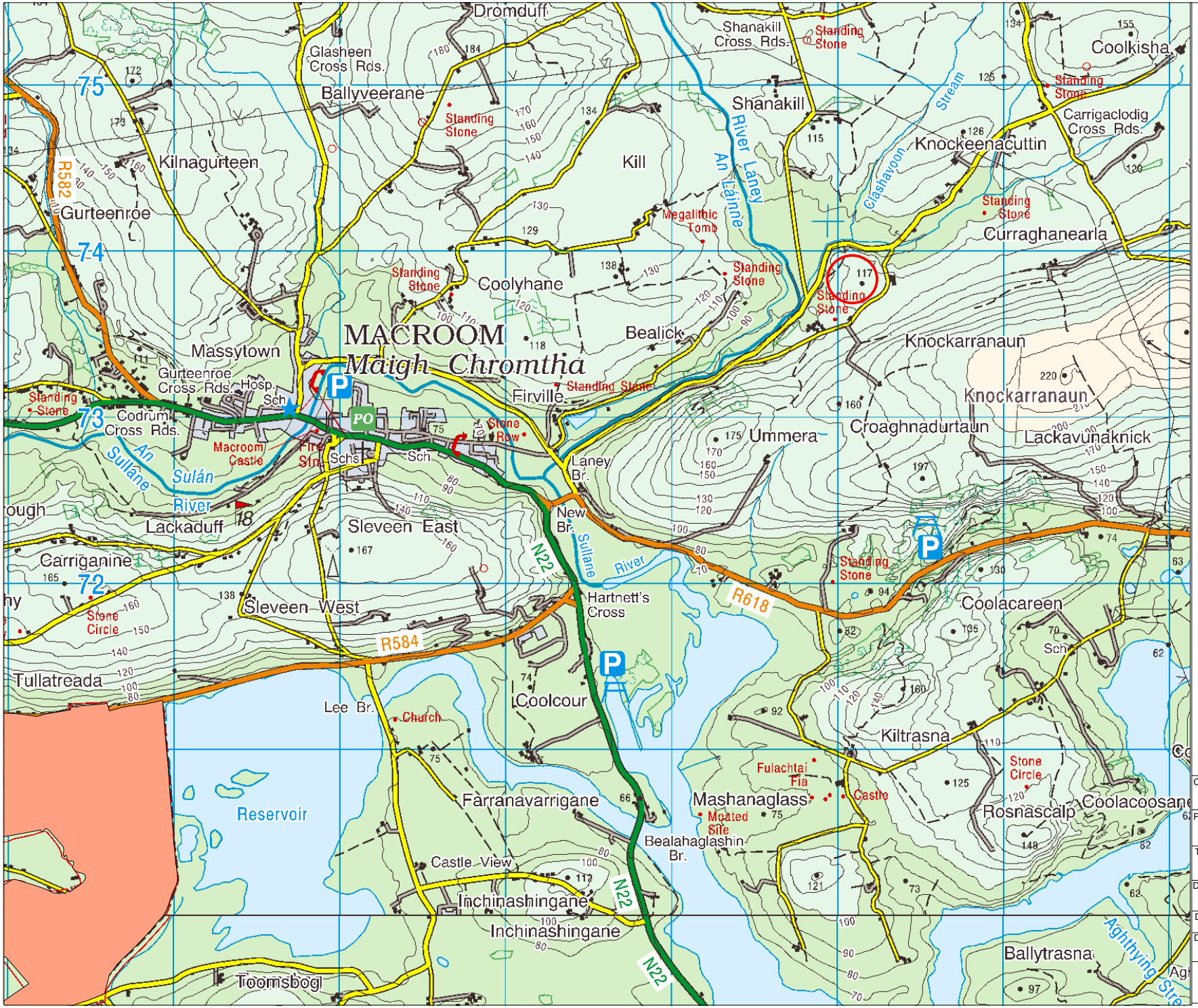
Kelly, F.L., Connor, L., Delanty K., McCloone P., Coyne, J., Morrissey, E., Corcoran W., Cierpial D.,

Matson, R., Gordon P., O'Briain R., Rocks, K., Walsh L., O'Reilly Sinead., O'Callaghan R., Cooney R. and Timbs D. (2016n) National Research Survey Programme Fish Stock Survey Inniscarra Reservoir, August 2015. Inland Fisheries Ireland, 3044 Lake Drive, Citywest Business Campus, Dublin 24
Kurz, I. And Costello, M.J. (1999) *An Outline of Biology, Distribution and Conservation of Lampreys in Ireland. Irish* Wildlife Manuals, No. 5
Marnell, F., Kingston, N. & Looney, D. (2009). *Ireland Red List No. 3: Terrestrial Mammals*. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland.
McCarthy Hyder Consultants (2009). N22 Bail Buirne – Macroom (Bail Buirne to Coolcour) Environmental Impact Statement. Volume 2 Main Text. Doc Ref: NE02426/R9/1Meehan, S.T., *IWT National Smooth Newt Survey 2013 report.* Irish Wildlife Trust. 2013
NPWS (2013). The Status of EU Protected Habitats and Species in Ireland. The Status of EU Protected Habitats and Species in Ireland
NRA (2009). National Roads Authority Guidelines for Assessment of Ecological Impacts of National Road Schemes [ONLINE] Available at: -
https://www.tii.ie/technical-services/environment/planning/Guidelines-for-Assessment-of-Ecological-Impacts-of-National-Road-Schemes.pdf.
Wyse Jackson, M., FitzPatrick, Ú., Cole, E., Jebb, M., McFerran, D., Sheehy Skeffington, M., and Wright, M. (2016). Ireland Red List No. 10: Vascular Plants. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs, Dublin, Ireland.



Client: DWCL		
Project: Ummera Gravel Pit		
Title: Special Areas of Conservation		
Designed/Drawn: POD	Checked: POD	Authorised: POD
Date: 27/02/2020	Date: 27/02/2020	Date: 27/02/2020
Drawing No: 10.1		Rev: 0

ATKINS
Dublin - Tel: 353 - 1 - 890 9000
Cork - Tel: 353 - 21 - 429 0300
Galway - Tel: 353 - 91 786050



N

Gravel Pit Location

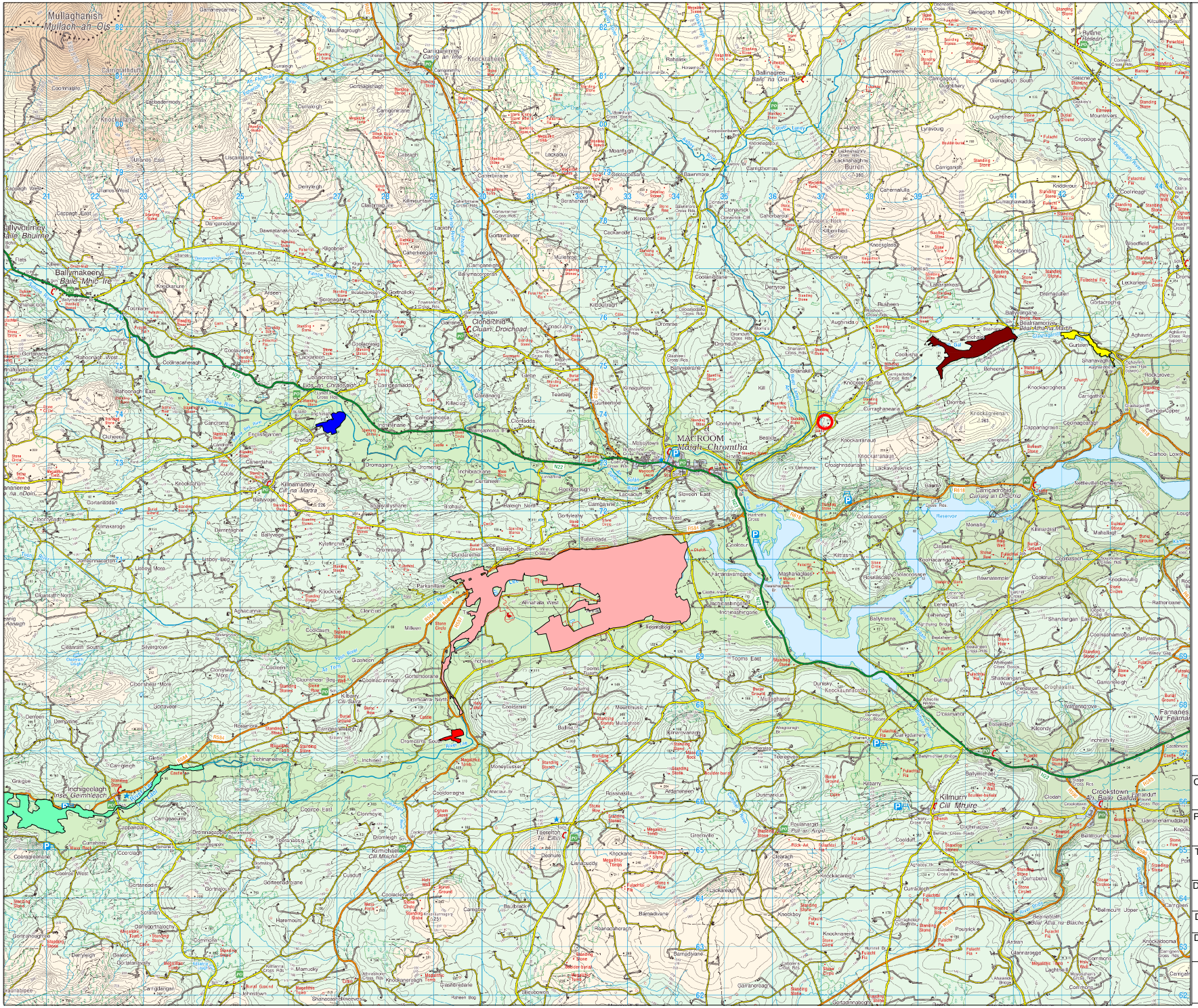
The Gearagh SPA

Client:	DWCL
Project:	Ummera Gravel Pit
Title:	Special Protection Areas

Designed/Drawn:	Checked:	Authorised:
POD	POD	POD
Date: 27/02/20	Date: 27/02/20	Date: 27/02/20

Drawing No: 10.2 Rev: 0

ATKINS
Dublin - Tel: 353 - 1 - 890 9000
Cork - Tel: 353 - 21 - 429 0300
Galway - Tel: 353 - 91 786050



N

- Gravel Pit Location

pNHAs

- Lough Allua
- Prohus Wood
- Boylegrove Wood
- Lough Gal
- Glashgarriff River
- The Gearagh

Client:	DWCL
Project:	Ummera Gravel Pit
Title:	proposed Natural Heritage Areas

Designed/Drawn:	Checked:	Authorised:
POD	POD	POD
Date: 27/02/20	Date: 27/02/20	Date: 27/02/20
Drawing No: 10.3		Rev: 0

ATKINS
Dublin - Tel: 353 - 1 - 890 9000
Cork - Tel: 353 - 21 - 429 0300
Galway - Tel: 353 - 91 786050

Ordnance Survey Ireland Licence No. AR 0082520

Client: Drimoleague Concrete Works Ltd

Project: Ummera Gravel Pit

Title: Habitat Map

Designed/Drawn:	Checked:	Authorised:
CR	PO'D	PO'D
Date: 18/08/20	Date: 18/08/20	Date: 18/08/20

Drawing No: Figure 10.4

Rev: 2

ATKINS
Dublin - Tel: 353 - 1 - 810 8000
Cork - Tel: 353 - 21 - 429 0300
Galway - Tel: 353 - 91 386 633

11. LANDSCAPE AND VISUAL ASSESSMENT

This chapter provides a description of the existing landscape, visual character of the site and its surrounds, and the impact of the gravel pit thereon. The description of the area is based on survey and analysis carried out on site and aerial photography that documents the landscape changes over time. Information regarding the vegetation in the locality is derived from field observations and the biodiversity chapter.

The term landscape refers primarily to the visual appearance of the land, including shape, form and colour, and their interaction to create specific patterns and pictures that are distinctive to particular localities. However, the landscape is not purely a visual phenomenon because its character relies closely on its physiography and its history. Hence, in addition to the scenic and/or visual dimension, there are a whole range of other dimensions, including geology, topography, soils, ecology, archaeology, landscape history, land use, buildings and settlement, architecture, cultural associations and human beings.

This chapter deals with the above in so far as they may determine the landscape and visual characteristics of the locality during the assessment period, and on which the Ummera gravel pit may have had, is having or which can reasonably be expected to have an impact because the gravel pit.

11.1 Existing Landscape

The Ummera gravel pit substitute consent area extends to 10.5ha within a landholding of 20.22ha. It is located in the Laney River catchment on undulating agricultural land within the wider Lee Valley catchment. Surrounding lands are used for intensive agriculture – mainly dairy and beef. Elevations undulate typically between 90 and 200mOD. The site is overlooked from the south and southeast by an east-west trending ridge, which rises to 220mOD. These elevated lands are mostly in grass. Natural woodlands follow the valleys of the Laney and Sullane rivers.

The landscape type for the Ummera area is characterised in the Cork County Landscape Strategy as Valleyed Marginal Middleground (Macroom and Environs) (Type 13a). This landscape type is found between Ballyvourney and Macroom. Ummera is situated at the southeast corner of the landscape type, which is defined by the elevated ridges to the southeast of the gravel pit. The adjoining landscape type to the southeast is Hilly River and Reservoir Valleys (Type 8).

The landscape comprises low rounded hills of Old Red Sandstone enclosing fairly broad undulating river valleys. While there is generally an appearance of roughness in this landscape type, the area in the immediate environs of Ummera are less so, with good quality agricultural land prevailing.

There are three landscape character areas within this landscape type – Kilmichael, Macroom and Ballynagree. Ummera is situated within the Macroom landscape character – Broad Middle Valley of semi-rugged mosaic hills and rock outcrop, which is located in the centre of the landscape.

The site is not located within a ‘High Value Landscape’ as defined in the 2014 CDP. The high value landscape coincides with the Lee valley to the southeast. The gravel pit is not visible from any of the scenic routes in the wider area. The nearest scenic route is the R618 between Leemount (Carrigrohane) and Macroom (via Coachford). These designations came into effect prior to the assessment period.

Due to undulating topography and mature trees, views of the gravel pit are limited; only some overburden stockpiles are visible.

11.2 Scope of Impacts

The Ummera gravel pit has and will continue to have an impact on the landscape and visual character of the surrounding areas, and in the main these impacts will be perceived as negative. However, as the gravel pit has been operational for many decades it is now considered part of the landscape, not an intrusion into it. Changes have and will continue to arise primarily from:

- The removal of existing agricultural lands.
- Continued extraction operations.
- Temporary storage of aggregates and silt washings.
- Construction of site infrastructure, such as screening berms.

These changes have and will impact primarily on residences and roads adjacent to the east side of the gravel pit and the more distant views from the west along local road L-7478. The gravel pit is not considered to have any significant impacts on views from other perspectives.

11.3 Impact Assessment

Visual impact may occur by means of intrusion and/or obstruction where these terms are defined as follows:

Visual Intrusion: Impact on view without blocking, and
Visual Obstruction: Impact on view involving blocking thereof.

Visual impacts by means of intrusion or obstruction on a particular view, may be viewed as positive, neutral or negative and can be rated as follows:

- **Little/None** arises where the development is adequately screened by existing landform, vegetation or built environment.
- **Low** arises where views affected by the development form only a small element in the overall panorama.
- **Moderate** arises where an appreciable segment of the panorama is affected or where there is an intrusion into the foreground.
- **High** arises where the view is significantly affected, obstructed or so dominated by the development as to form the focus of attention.

For the purposes of this appraisal, the visual impact is evaluated for the current situation. It is considered that this represents the visual impact at or near its maximum. In the early 1990's the visual impact is likely to have been much less as the gravel pit would have had a smaller footprint and as such less visible from the surrounding landscape. As the gravel pit expanded during the assessment period, the visual impact was offset by the increased screening provided by trees growing along the boundaries.

11.4 Impacting Features of the Gravel Pit

11.4.1 Removal of Agricultural Land

Of the 20.22ha that make up DCWL's landholding, the substitute consent area extends to 10.5ha. The remainder of the landholding comprises agricultural land, the old farmhouse and farmyard and the lands to the west and north of local road L-3423-20. The old farmhouse is surrounded by mature trees and is derelict. The agricultural lands are used for silage, with a small area at the north of the landholding (between the road and stream) unused.

The removal of agricultural land has been ongoing since gravel extraction commenced at Ummera. The pit has advanced to the south from the northwest corner since the 1940's. The progress is well documented since 1995 when OSi aerials became available. Aerial photography for 1995, 2000, 2005 and 2018 are provided in Plates 11-1 to 11-4, which demonstrate the progression of gravel extraction by approximately 5.5ha over the assessment period. It is apparent from the 1995 and 2000 aerial photographs that internal hedgerows were removed by the farmer (previous owner) during this period.

Plate 11-1: 1995 OSi Aerial Photograph

The 1995 aerial photograph is black & white, so detail is difficult to discern. The following is noted:

- The gravel pit occupies 3 or 4 fields, with four large agricultural fields to the south and southeast still used for farming with field boundary hedgerows intact.
- The gravel pit is accessed from the northwest corner. As such, the operations in the gravel pit are in view from this short section of public road.
- The currently used site access is constructed but is believed to be used by the farmer to access the agricultural lands.
- The washing plant is located at the northwest corner of the gravel pit and likely to be in clear view from the public road. Settlement ponds appear to be present to the southwest of the washing plant.
- The northeast corner of the landholding is used for silt deposition.
- The trees along the northern road boundary have been maintained.

Plate 11-2: 2000 OSi Aerial Photograph

The following is noted from the 2000 aerial photograph:

- The gravel pit occupies much the same area as that seen in the 1995 aerial photograph; extraction has moved 20 to 30m to the south.
- The hedgerows in the agricultural fields to the south and southeast have been removed.
- The gravel pit is accessed from the southwest corner, with the entrance at the northwest corner closed off. The berms constructed at the former entrance are not yet vegetated.
- The washing plant has been moved into the gravel pit – to its current location. It would therefore have been less visible from the public road. A settlement pond has been constructed within the gravel pit.
- Vegetation is developing over the silt deposited at the northeast corner of the landholding.
- The trees along the northern road boundary have been maintained and provide good screening. There is a berm along the western boundary with shrubs developing.

Aerials for 2005 and 2018 show a progression of extraction to the south. Note that the 2012 OSI aerial (on the www.osi.ie) appears to be the same image as the 2005 aerial.

Plate 11-3: 2005 OSi Aerial Photograph

Plate 11-4: 2018 Google Aerial Photograph

The removal of agricultural land is long-term, reversible and may be perceived as a negative visual impact. The provision of screening berms, perimeter tree planting and maintaining mature trees around the perimeter of the landholding has softened the visual impact of the progressive loss of grazing land. In the long-term, the extraction area will be restored back to agricultural use. While the removal of agricultural land will be perceived as negative, the mitigation measures that have been implemented has resulted in a moderate impact reducing to little/none over the assessment period for views towards the gravel pit – i.e. the maturing of screen planting at the gravel pit.

11.4.2 Extraction Operations

The area of extraction has extended to approximately 8ha, increasing steadily since extraction commenced at Ummera, partially demonstrated in Plates 11-1 to 11-4. During the assessment period of 1990 to 2019, it is estimated that approximately 500,000m^3 of sand and gravel has been removed from the Ummera pit. This is only an estimate as records of loads is not available.

The principal visual impacts have arisen from the removal of soil and grassland as extraction progresses. Near views of the operations will be limited to areas to the east and southeast of the gravel pit. The nearest view being from a dwelling to the east, located along the local road that goes around the eastern side of the pit. The visual impact has been greatest when temporary screening berms are constructed around new extraction areas. Until vegetation has established, these berms contrast strongly with the intervening agricultural fields. The impact has decreased from low to little/none as berms vegetate and planting established.

11.4.3 Site Infrastructure

Site infrastructure at the gravel pit has been largely unchanged since 1990. It consists of a fixed washing plant and site offices and stores. As noted, it was moved in the late 1990's. Since its relocation, this infrastructure isn't visible from the public roads, so has not given rise to visual intrusion.

Mobile plant is occasionally visible moving around the pit from some aspects, but this has not given rise to a significant visual intrusion.

11.5 General Impact on Landscape Character

Any change in a land use has a corresponding impact on the landscape character of an area. In this instance, the Ummera gravel pit has formed part of the local landscape for many decades. Over the assessment period of 1990 to 2019, the gravel pit has steadily expanded from a footprint of approximately 4.2ha (estimated for 1990) to the substitute consent footprint of 10.5ha. This impact is the gradual change from pasture to extraction area / bare ground. Screening berms and screen planting has been carried out over this period, along with retaining mature trees, to soften the visual impact.

The degree of the visual impact occurring has therefore changed over the life of the gravel pit. However, the degree of impact is strongly dependent on the perceptions of the surrounding population. As the gravel pit operations were well established at the site in 1990 (DCWL would have been established at Ummera since 1978), the perceived impacts have been much less than that of a greenfield site. The continued acceptance of extraction operations at Ummera will be largely dependent on good site management, maintenance of effective screening provided by trees and berms, and control of emissions (namely noise and dust).

Overall, the gravel pit is well screened from the surrounding area and the overall impact on landscape in little/none negative long-term impact, but reversible with the restoration of the site to agricultural use.

11.6 General Impact on Visual Character

The visual impacts can be discussed in terms of the two generalised viewing areas. The first is the views of the site from the low-lying areas to the southwest and west of the site. From these areas, the topography and mature trees along the pit perimeter limit views into the gravel pit. Local road L-3424 runs along the valley of the Laney River as far as the site entrance and then follows the Clashavoon Stream passed the site. The road is bordered by mature trees for most of its length past the site, so views are restricted. The topography rises sharply along the eastern side of the L-3424, so this further restricts views into the site. The clearest views of the gravel pit are for a short section of the L-3424 approaching the site from the north. Views from the west are more open towards the gravel pit. Again however, the mature trees along the western side of the pit and around the original settlement pond provide effective screening. Stockpiles and the top of the working face do break the treeline betraying the presence of the gravel pit. However, on balance, the rural character of the area defined by mature trees around farmyards and along the river valleys is largely uninterrupted by the gravel pit and the impact occurring is considered little/none.

Viewing areas to the east of the site are from local road L-34231-0. This road runs along the eastern and southern perimeter of the site. While the hedgerow is not dense and views into the site are available, the screening berms block views of the processing plant and aggregate stockpiles. The berms do not however block views of the landscape beyond the gravel pit. As such, the rural character of the area is not interrupted by the gravel pit and the impact occurring is considered little/none.

11.7 Photographic Illustration

To assess the visual extent of the gravel pit, a number of photographs were taken from locations in the surrounding area. These selected views illustrate the location and visibility of the gravel pit. The selected locations for photographic illustrations are shown on Figure 11-1 and were:

View 1: From Local Road L-7478 Looking East Toward Gravel Pit
View 2: From Local Road L-3423-20 Looking South Toward Gravel Pit
View 3: From Local Road L-34231-0 Looking North Toward Gravel Pit
View 4: From Farm Lane Looking North

Photographs are provided in Figures 11-2 to 11-5.

11.8 Visual Impact on Views from Residence & Roads

Fourteen house locations (i.e. those within 500m of the ownership boundary) were identified for assessment of visual impact. Of these houses, two were considered to have a moderate visual intrusion, 8 have a slight visual intrusion and 5 houses have none (refer to Section 11.3 for explanation of terms).

Two of the houses identified had minor level of visual obstruction. The overall results of the assessment are illustrated in Table 11-1.

Table 11-1: Results of Assessment

Residence Location Reference	View No. where relevant	Distance from Substitute Consent Boundary (m)	Visual Intrusion	Visual Obstruction
H1	N/A	55	Moderate	Yes (Berm)
H2	N/A	65	Moderate	Yes (Berm)
H3	N/A	160	None	None
H4	N/A	505	None	None
H5	N/A	730	Slight	None
H6	N/A	650	Slight	None

Residence Location Reference	View No. where relevant	Distance from Substitute Consent Boundary (m)	Visual Intrusion	Visual Obstruction
H7	N/A	630	Slight	None
H8	N/A	625	Slight	None
H9	N/A	600	Slight	None
H10	View No. 2	230	Slight	None
H11	N/A	280	Slight	None
H12	N/A	520	None	None
H13	N/A	610	None	None
H14	N/A	645	None	None

Along the local road L3423 to the west of the gravel pit, there are no views into the gravel pit. The topography naturally rises sharply from the road, so it is likely that views of the site have always been obstructed. For the local road L34231-0 running around the eastern and southern perimeter of the site, the screening berms have progressively moved closer to the road resulting in obstruction of views.

11.9 Existing Mitigation

DCWL has carried out the following measures to mitigate visual impacts during the lifetime of the gravel pit:

1. Relocation of the washing plant into the gravel pit, screening it from view from public roads and surrounding areas.
2. Construction of perimeter screening berms.
3. Provision of perimeter screen planting and maintaining existing mature boundary trees.

11.10 Remedial Mitigation

DCWL will prepare a site restoration plan and commence progressive restoration of the gravel pit. Much of the site will be returned to agricultural use, with some areas retained for ecological diversity. These areas will include:

1. The original settlement pond between the road and Clashavoon Stream will be left.
2. Perimeter screen planting will be maintained.

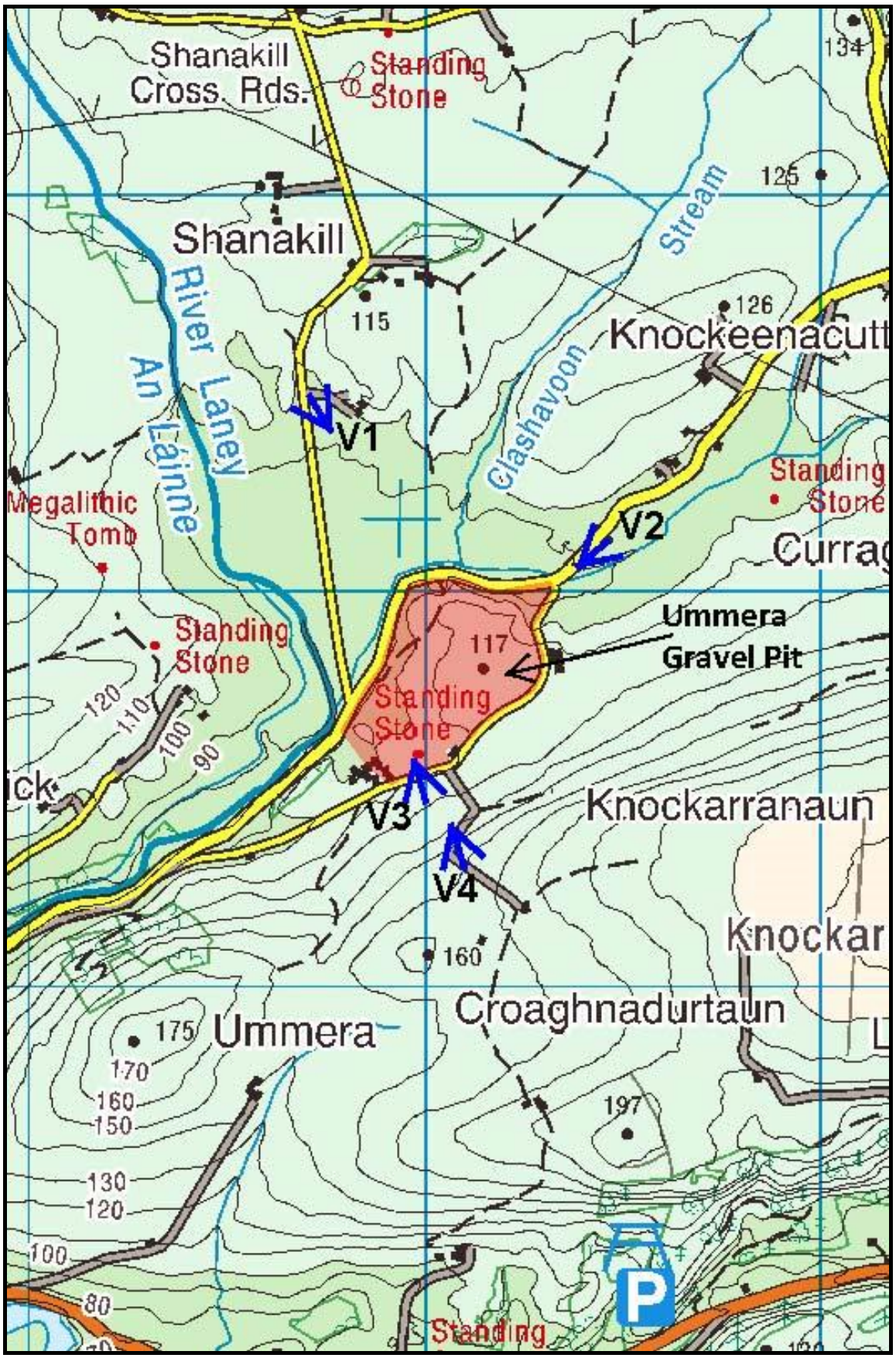


Figure 11-1: View Point Location Map

Figure 11-2: View No.1 – From Local Road L-7478 Looking East

Figure 11-3: View No.2 - From Local Road L-3423-20 Looking South

Figure 11-4: View No.3 - From Local Road L-34231-0 Looking North

Figure 11-5: View No.4 - From Farm Lane Looking North

12. INTERACTION OF THE FOREGOING

The impacts that have occurred, are occurring or which may occur as a result of the development of the Ummera gravel pit have been assessed for the various aspects of the environment, as discussed in the preceding chapters. While these assessments are not conducted in isolation, their focus is on the specific aspect of the environment under consideration. This chapter reviews all the aspects of the environment and identifies interactions between them. Table 12-1 summarises these interactions. Each aspect of the environment is listed on the left column and the top row. The interactions are discussed in terms of the direct and indirect impacts associated with the aspect of the environment listed in the column with the aspects of the environment listed across the top row. For example, the impacts of the gravel pit associated with noise are discussed in terms of its interaction, where occurring, with each of the other aspects of the environment. The interaction is therefore not necessarily reciprocal.

Table 12-1: Interaction Matrix

	Roads & Traffic	Noise	Population & Human Health	Air, Climate & Climate Change	Soils, Geology & Hydrogeology	Surface Water & Hydrology	Archaeology & Cultural Heritage	Biodiversity	Landscape & Visual Impact
Roads & Traffic									
Noise									
Population & Human Health									
Air, Climate & Climate Change									
Soils, Geology & Hydrogeology									
Surface Water & Hydrology									
Archaeology & Cultural Heritage									
Biodiversity									
Landscape & Visual Impact									

Legend

- No Significant Interaction
- Positive Interacting Impact
- Negative Interacting Impact
- Neutral Interacting Impact

12.1 Impact Interactions

12.1.1 Roads & Traffic

The traffic associated with the Ummera gravel pit is expected to have remained reasonably constant over the assessment period, with a notable reduction in volumes during the economic downturn between 2008 and 2012. Traffic associated with the gravel pit will increase noise levels slightly and emissions from HGV have a negative impact on air quality. The HGVs using the local road L-3423 will have a negative impact with the local population sharing this road.

12.1.2 Noise

Noise is one of the aspects of the environment considered in terms of its impact on the local population. The operation of the gravel pit has resulted in an increase in noise locally and although within emission limit values are considered a slight negative impact. The noise from the extraction activities may also displace wildlife from the local area.

12.1.3 Population & Human Health

Human beings are discussed in terms of settlement pattern, socioeconomics and recreation and amenity. These aspects of the discussion do not have any significant interaction with other aspects of the environment. The increase in population seen over the assessment period may place demand on the gravel pit for house construction, which is seen as a positive impact.

12.1.4 Air, Climate & Climate Change

No significant interaction has been identified between air, climate and climate change with other aspects of the environment during the assessment period.

12.1.5 Soils, Geology & Hydrogeology

The availability of aggregate and construction materials produced at the gravel pit has contributed to the construct of new houses to meet the demands of an increasing population. Also, with farming being the main economic activity in the area, the availability of construction materials locally for the construction of farm buildings and slatted houses in the last 30 years is seen as a benefit.

The development of the gravel pit has resulted in a greater biodiversity at the site. This is seen as a positive impact.

12.1.6 Surface Water & Hydrology

The on-site settlement ponds are seen as adding biodiversity locally, with the potential for attracting wildlife to the area. For example, bats are thought to feed at the settlement ponds.

12.1.7 Archaeology & Cultural Heritage

No significant interaction has been identified between archaeology and cultural heritage with other aspects of the environment during the assessment period.

12.1.8 Biodiversity

No significant interaction has been identified between biodiversity with other aspects of the environment during the during the assessment period.

12.1.9 Landscape

The landscaping of the site has increased the biodiversity of local area. For example, the planting of trees at the original settlement ponds has provided shelter and foraging opportunities. Also, the exposure of sand in working faces has attracted nesting Sand martins.

13. REFERENCES

[1] Environmental Protection Agency, March 2002. *Guidelines on the Information to be Contained in Environmental Impact Statements*.

[2] Environmental Protection Agency. *Advice Notes on Current Practice in the Preparation of Environmental Impact Statements*.

[3] Environmental Protection Agency, September 2015. *Revised Guidelines on the information to be contained in Environmental Impact Statements* – Draft.

[4] Environmental Protection Agency, August 2017. *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports – Draft*.

[5] European Parliament and the Council of the European Union, 16 April 2014: *Directive 2014/52/EU amending Directive 2011/92/EU on the Assessment of the Effects of Certain Public and Private Projects on the Environment*'.

[6] Department of the Environment, Heritage and Local Government, April 2004. *Quarries and Ancillary Activities – Guidelines for Planning Authorities*.

[7] Environmental Protection Agency, 2006. *Environmental Management Guidelines Environmental Management in the Extractive Industry (Non-schedule Minerals).*

[8] Environmental Protection Agency, *1997. Integrated Pollution Control Licensing, BATNEEC Guidance Note for the Extraction of Minerals.*

[9] Irish Concrete Federation, October 2005. *Environmental Code*.

[10] Bord Failte, July 2013. *Overseas Visitors to Counties in 2012 and Associated Revenue*.

[11] Institute of Geologists of Ireland, September 2002. *Geology in Environmental Impact Statements – A Guide*.

[12] Pracht, M, 1997. *Geology of Kerry-Cork.* Geological Survey of Ireland, Department of Transport, Energy and Communications.

[13] M. J. Gardiner, M. J. and Radford, T, 1980. *Soils Association of Ireland and their Land Use Potential*. National Soil Survey of Ireland.

[14] Geological Survey of Ireland, 2014. *Directory of Active Quarries, Pits and Mines in Ireland – fourth Edition*. Department of Communications, Energy and Natural Resources.

[15]The Mining Heritage Society of Ireland, 1998. *Memoir of Localities of Minerals of Economic Importance and Metalliferous Mines in Ireland*.

[16] BMA GeoServices, March 2003. *Geophysical Survey to Estimate Sand & Gravel Reserves at Ummera, Macroom Co Cork.*

[17] Geological Survey of Ireland *et al*, 1999. *Groundwater Protection Schemes*.