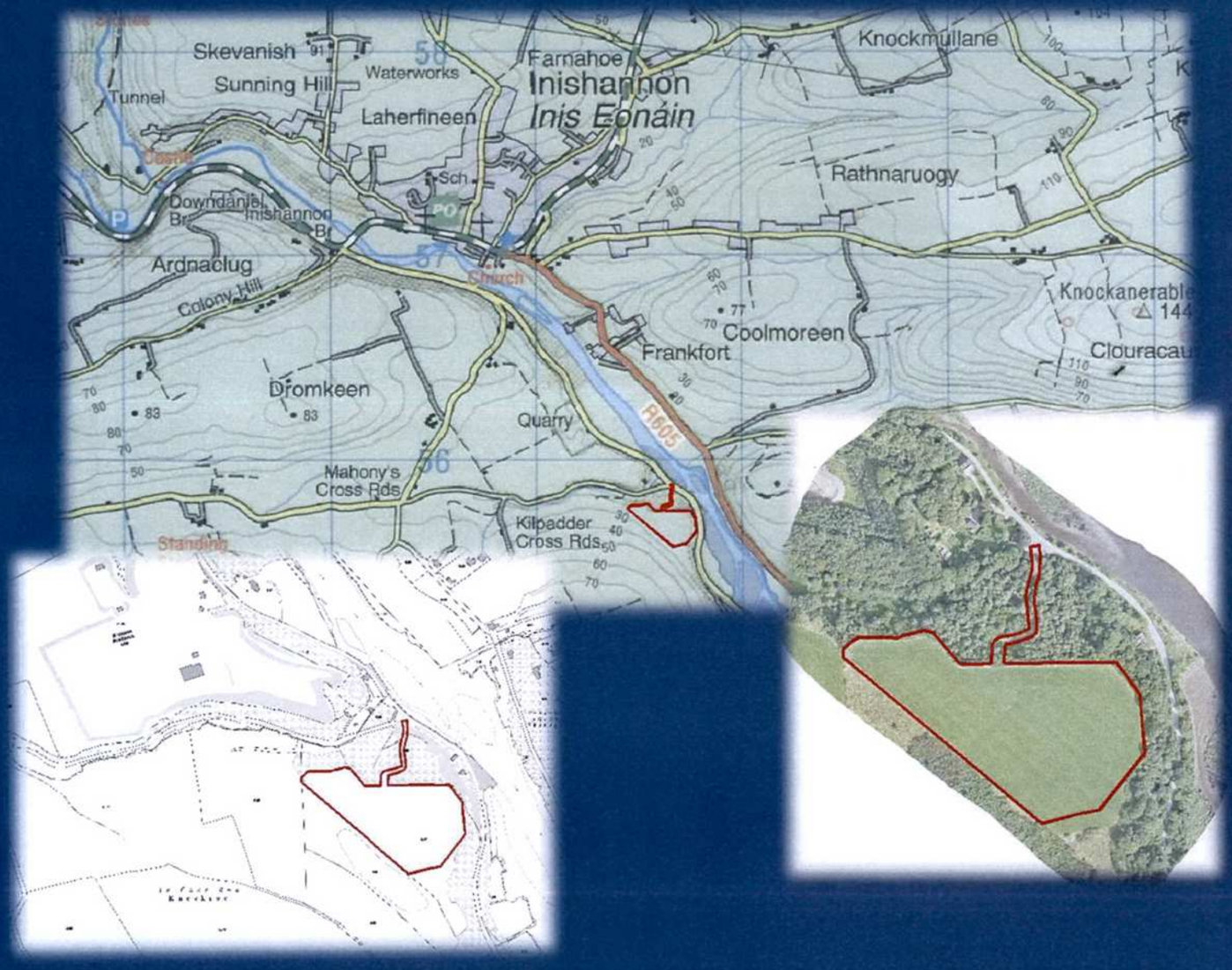
KEOHANE READYMIX LTD.

Sand & Gravel Extraction
Knockroe, Bandon, Co. Cork.

Environmental Impact Assessment Report



Planning Department
11 APR 2025
County Hall
Cork

APRIL 2025

Prepared by:
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7 Dundrum Business Park,
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SLR

Planning Department
11 APR 2025
Cork County Council
County Hall
Cork

Sand & Gravel Extraction

Knockroe, Bandon, Co. Cork

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

APRIL 2025

Prepared By:

SLR Consulting Ireland

With contributions from:

Dr. Charles Mount
PMCE

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1. INTRODUCTION
2. PROJECT DESCRIPTION
3. ALTERNATIVES
4. POPULATION AND HUMAN HEALTH
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8. AIR QUALITY
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Introduction

1.1 This Environmental Impact Assessment Report (EIAR) has been prepared in support of a planning application for sand & gravel extraction at Knockroe, Bandon, Co. Cork. The site location is shown on Figure 1-1.

1.2 For the purposes of this EIAR, the area of c. 4.0 ha within the red line boundary on Figure 1-2 is referred to as 'the application area' and the wider land interest is shown as the blue line boundary on Figure 1-2.

1.3 The proposed development is located in the townland of Knockroe (refer to Figure 1-2). It comprises:

- Extraction of sand & gravel over an area of c.3.5 Ha.
- Extraction by dry working to 2 metres above the groundwater level, at a maximum rate of 100,000 tonnes per year.
- Transport of the extracted sand & gravel to the adjacent Dromkeen Pit (Plan. Ref. 23/04780) for use in concrete production;
- Upgrading of the existing internal access road and use of the existing access onto the local road L3204.
- Provision of wheelwash and welfare unit (c.8.3 sq.m).
- Restoration of the lands to agricultural and natural habitat use;
- All within an application area of c.4.0 hectares.

1.4 Permission is sought for 15 years plus two years for final restoration (total duration of seventeen years). Further details of the proposed development are provided in Chapter 2 of this EIAR.

1.5 This Environmental Impact Assessment Report has been prepared in accordance with Section 177 of the Planning and Development Act 2000, as amended and Part 10 of the Planning and Development Regulations 2001, as amended. An Appropriate Assessment Screening Report has also been prepared in support of the planning application and is provided as a separate document.

Key Aspects of the Proposed Development

1.6 The key aspects of the proposed development are summarised below:

- The design of the scheme retains the natural woodland and the existing face of the historical sand & gravel pit to maximise topographic and visual screening, and to eliminate any potential significant landscape / visual impacts.
- The development will involve extraction of sand & gravel only, by dry working above the groundwater level. No processing of sand & gravel will take place on the site. There will be no processing plant located on the site. Provision is made for a wheelwash and a small welfare unit.
- The sand & gravel extracted will be transported by road a short distance (c. 0.5km) to the adjacent Dromkeen Pit for use in concrete production. Dromkeen Pit has planning permission for importation of sand & gravel for use in concrete production. There will be no public access to the site.

- The working hours will be limited to 09.00 to 17.00 Monday to Friday only. These working hours are shorter than the standard operating hours for the sector and can be implemented as the supply is for internal KRL use only (i.e. not bound by customer delivery obligations). There will be no site activity on Saturdays, Sundays or public holidays.
- The annual extraction rate will be low, a maximum of 100,000 tonnes per year, generating a maximum of one to two heavy goods vehicle (HGV) trips per hour. There will be no other HGV traffic associated with the development.
- During operation the only site activity will be a loading shovel loading sand & gravel onto one HGV truck travelling back and forth from Dromkeen Pit.
- The sand & gravel from Knockroe will be used in conjunction with the existing deposits at Dromkeen, to provide a secure supply of concrete aggregates for the business. It will not result in any increase in overall traffic from the Dromkeen Pit and Concrete Plant operations.
- Through the design / layout of the development for extraction only; the limited working hours; and the low extraction rate / low traffic generation Keohane Readymix Ltd. will ensure any potential impacts are minimised and will not impact on the residential amenity of the area.
- There will be no fuel storage or vehicle maintenance carried out at the site. Site machinery and vehicles will be re-fuelled and maintained at the adjacent Dromkeen Pit facility.
- There will be no groundwater abstraction or discharge off-site to surface waters from the proposed development.
- The land will be restored to agricultural and natural habitat afteruse on a phased basis.

The Applicant

1.7 Keohane Readymix is a family-owned enterprise employing approx. 120 people within Co. Cork at the company's locations at Ballygurteen, Kilmore Brinny, Fourcuil and Kilronan. In operation for over four decades, the company has competed against large multi-national companies and others in the Cork area and remains a significant competitive force and large regional supplier of aggregates and concrete products to the construction industry and various authorities in the wider area.

1.8 The sand & gravel from the Knockroe will be used to produce high specification concrete aggregates; plaster / mortar sands; drainage materials and Irish Water specification backfill materials. These products also comply with the relevant national standards.

1.9 The company has a strong reputation for good environmental management and health & safety practices across all of its locations, including winning awards at national level.

1.10 Keohane Readymix hold leasehold title to the lands that comprise this planning application.

Location And Context

Site Location

1.11 The proposed development is located approximately 6km east of Bandon and 2km south of Innishannon in Co. Cork, refer to Figure 1-1.

1.12 The lands are bounded by woodland / local roads to the north and east; and woodland / agricultural lands to the south and west. The Bandon River is located on the eastern side of the L3204 local road flowing in a southerly direction, refer to Figures 1-1 and 1-2.

Surrounding Land Use

1.13 The surrounding landuse is predominantly woodland and agricultural grazing land (refer to Figure 1-3). There is a history of sand & gravel extraction in the area the existing Dromkeen sand & gravel pit and concrete plant operated by Keohane Readymix Ltd. located c. 200metres to the north of the site.

1.14 There are a number of residential dwellings located along the local county roads to the north and east of the site.

EIA Screening

1.15 Part 1 and Part 2 of Schedule 5 of the Planning and Development Regulations 2001 (as amended) set out the forms of development that require an environmental impact assessment report (EIAR).

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

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

1.17 Paragraph 2 of Part 2 of Schedule 5 refers to extractive industry and part (b) of that section states that the following requires an EIA

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

1.18 The proposed development relates to the extraction of sand & gravel over an area of 3.5 Ha. On a precautionary basis, a sub-threshold environmental impact assessment has been undertaken and an environmental impact assessment report (EIAR) prepared for the proposed development.

Environmental Impact Assessment Report

1.19 An Environmental Impact Assessment Report shall include the following[1]:

- A description of the development;
- A description of the aspects of the environment likely to be significantly affected by the proposed development, and, in particular:
  - Population and human health, biodiversity;
  - Land and soil, water, air (including noise and vibration), climatic factors and the landscape;
  - Material assets, including architectural, archaeological and cultural heritage ; and infrastructure (roads & traffic);
  - The interrelationship between the above factors.

[1] Schedule 6 of the Planning and Development Regulations 2001 (as amended)

- A description of the likely significant effects of the proposed development arising from the existence of the proposed development, the use of natural resources, the emission of pollutants, the creation of nuisances and the elimination of waste.

1.20 This EIAR is prepared in accordance with the 2014 EIA directive and *Guidelines on the Information to be contained in Environmental Impact Assessment Reports* published in 2022 by the Environmental Protection Agency.

1.21 The EIAR is sub-divided into fifteen chapters, which are outlined below.

Chapter 1

1.22 This chapter provides an introduction to the proposed development and a brief explanation of the aims and format of the EIAR. It also identifies the various professional consultants who have contributed to the EIAR.

Chapter 2

1.23 This chapter provides a description of the proposed development within the overall site and the application area, including the proposed restoration scheme.

Chapters 3 to 15

1.24 These chapters provide detailed information on all aspects of the existing environment; a statement of the likely significant effects, if any, of the development that is the subject of the planning application.

1.25 They are grouped under the following chapters:

- Chapter 3: Alternatives
- Chapter 4: Population and Human Health;
- Chapter 5: Biodiversity;
- Chapter 6: Land, Soils & Geology;
- Chapter 7: Surface Water & Groundwater;
- Chapter 8: Climate;
- Chapter 9: Air Quality;
- Chapter 10: Noise;
- Chapter 11: Material Assets;
- Chapter 12: Cultural Heritage;
- Chapter 13: Landscape;
- Chapter 14: Traffic;
- Chapter 15: The Interaction of the Foregoing.

1.26 The associated references, plates, figures and appendices are provided at the end of each chapter.

1.27 A *"Non-Technical Summary of the Environmental Impact Statement"*, incorporating all of the above chapters, is provided as a separate and self-contained document.

Contributors

1.28 The contributors who have assisted in the preparation of this Environmental Impact Assessment Report are identified in Table 1-1 below. Each contributor has the appropriate qualifications, experience and competence for their topic.

Table 1-1: Main Contributors to Environmental Impact Assessment Report

Personnel	Qualification	Experience
Tim Paul	Chartered Mineral Surveyor & Chartered Engineer (CEng, MIEI, MICE, MSCSI, MRICS, MIQ)	Tim is a chartered mineral surveyor and chartered engineer with over 25 years' experience in providing strategic development advice, mineral reserve valuation, minerals planning & EIA / EIAR; mine waste management; and transactional due diligence services for mining and minerals developments in Ireland and internationally. He was co-author of the EPA (2006) Environmental Management Guidelines for the Extractive Industry (Non-Scheduled Minerals).
Michael Bailey	Associate Ecologist (MIEEM)	Michael Bailey holds a BSc. in Biology and Ecology from the University of Ulster and an MSc. in Quantitative Conservation Biology from the University of the Witwatersrand in Johannesburg. He has extensive experience in ecological studies and assessments across a range of sectors in Ireland and of agricultural, mining and renewable energy projects across Africa. He is a member of the Chartered Institute of Ecology and Environmental Management (MCIEEM). Mike currently carries out baseline surveys; EIA / EIAR (Biodiversity topic) and Appropriate Assessments (Stage 1 Screening and Stage 2 NIS).
Peter Glanville	Technical Director (BA, MSc, PhD, MIQUA, MIRLOGI, PGeo MIGI)	Peter is a hydrologist, quaternary geologist and geographical information scientist specialising in hydromorphology, fluvial geomorphology and GIS across a range of infrastructure projects. Peter currently works in a variety of industries including mining, minerals and quarrying covering sand & gravel resource assessment; flood risk assessment and EIA / EIAR (Land Soils & Geology and Hydrology topics). Peter is a Professional Geologist registered with the IGI.
Dominica Baird	Principal Hydrogeologist (BSc, MSc, PGeo, CGeol EurGeol FGS)	Dominica is a chartered hydrogeologist with fifteen years' consultancy experience. Since 1998, Dominica has practised hydrogeology, contaminated land and groundwater risk assessment in London, Edinburgh and Dublin and has since led contaminated land, water resources and due diligence projects. She undertakes groundwater monitoring programmes; hydrogeological risk assessments and EIA / EIAR (Hydrogeology / Groundwater topic). Dominica is listed on the IGI's register of professional hydrogeologists.
Dr. Charles Mount (Archaeology Sub Consultant)	Project Archaeologist (M.A., Ph.D., M.B.A., Dip. EIA & SEA Mgmt., M.I.A.I.)	Charles Mount is a project archaeologist and Environmental Impact Assessment consultant with more than 25 years' experience. He is a Board Member and Newsletter Editor of the Institute of Archaeologists of Ireland and licensed by the National Monuments Service.

Personnel	Qualification	Experience
Anne Merkle	Associate Landscape Architect (Dipl.-Ing. (FH) LA, MILI. Tech. Arbor. A.)	Anne has 20+ years' experience working for landscape consultancies in Ireland. Her main expertise is the preparation of Landscape and Visual Impact Assessments (LVIA) for a wide range of projects, including wind farms, powerlines, geothermal energy plants, quarries / sand & gravel pits and mixed developments. She has been involved at every stage of the LVIA process, from site surveys to report writing and preparation of figures and photo sheets. Anne undertakes tree surveys and carries out EIA / EIAR (Landscape & Visual topic). She has specific experience and expertise in the preparation of restoration schemes for pits and quarries.
Aly Gleeson **(PMCE – Traffic Subconsultant)**	Director BSc MEng MBA RSA Cert CEng FIEI	Aly Gleeson is a Chartered Engineer and a Fellow of Engineers Ireland (FIEI). Aly graduated with an Honours Degree in Civil Engineering from the University of Glamorgan (UK) in 1999, with an Honours Master's Degree in Civil Engineering from the University of Auckland (NZ) in 2014, an MBA from the Technological University Dublin in 2018, and received a Certificate of Professional Competence in Road Safety Audits from University College Dublin in 2016. Mr. Gleeson has in excess of twenty years' experience in the planning & design of road & transportation projects as well as experience in traffic & transports assessments and the independent evaluation of road projects from a road safety perspective (e.g. road safety audits, road safety inspections, collision monitoring audits). He has worked on projects in Ireland, the UK, New Zealand, and Qatar.

1.29 Keohane Readymix personnel assisted in the preparation of the EIAR by providing supporting information on the operation of the development and undertaking reviews of each EIAR chapter.

Difficulties Encountered With EIAR Compilation

1.30 This Environmental Impact Assessment Report was compiled on the basis of published regional and local data and site-specific field surveys. No difficulties were encountered in compiling the required information.

Consultations

1.31 Consultations undertaken as part of preparing the EIAR are described in chapters 3 to 15.

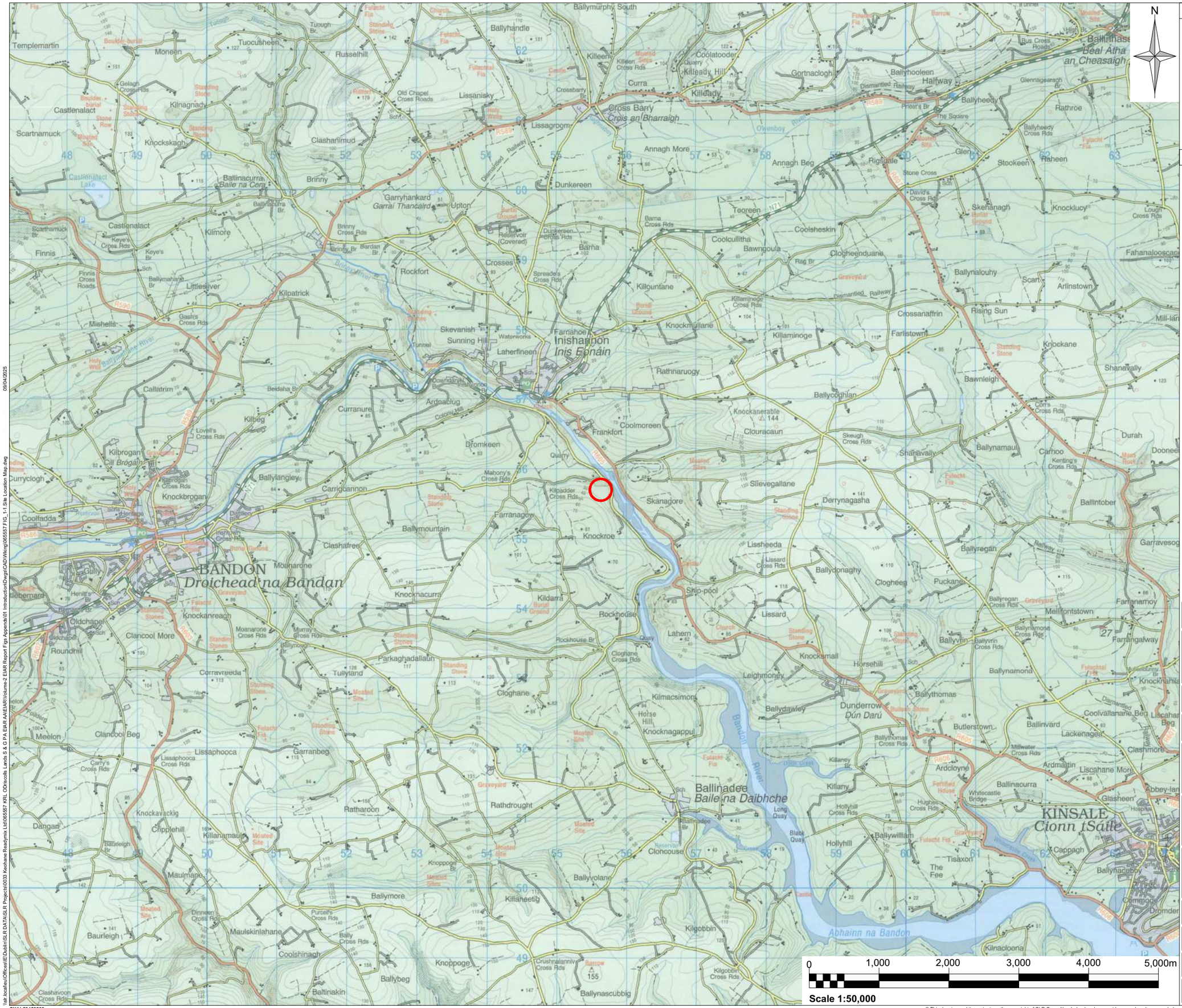
References

Environmental Protection Agency (2022) Guidelines on the Information to be 'Contained in Environmental Impact Assessment Reports'.

Planning and Development Act 2000 (as amended)

Planning and Development Regulations 2001 (as amended)

Figures


Ballymurphy South
Templemartin
Tuocusheen
Moneen
Ballyhandle
Russelhill
Killeen
Coolatooder
Killeady Hill
Killeady
Curra
Cross Barry
Crois an Bharraigh
Gortnaclogh
Ballyhooleen
Halfway
Ballyheedy
Beal Atha an Cheasaigh
Rathroe
Castlenalact
Kilnagnady
Scartnamuck
Knockskagh
Clashanimud
Lissanisky
Lissagroom
Annagh More
Annagh Beg
Rigsdale
Stookeen
Raheen
Castlenalact Lake
Ballinacurra
Baile na Cora
Brinny
Garryhankard
Garraí Thancaird
Upton
Dunkereen
Teoreen
Coolcullitha
Coolsheskin
Bawngoula
Clogheenduane
Skeranagh
Knocklucy
Castlenalact
Kilmore
Finnis
Rockfort
Crosses
Barna
Killguntane
Ballynalouhy
Scart
Arlinstown
Littlesilver
Kilpatrick
Mishells
Skevanish
Sunning Hill
Farnahoe
Inishannon
Inis Eonáin
Knockmullane
Killaminoge
Farlstown
Crossanaffrin
Rising Sun
Knockane
Shanavally
Rathnaruogy
Callatrim
Ardnaclug
Curranure
Kilbeg
Coolmoreen
Frankfort
Ballycoghlan
Knockanerable
Clouracaun
Bawnleigh
Durah
Kilbrogan
Cill Bhrogáin
Dromkeen
Ballylangley
Carrigannon
Knockbrogan
Slievegallane
Skanagore
Derrynagasha
Ballintober
Coolfadda
Farranagow
Ballymountain
Knockroe
Lissheeda
Ballyregan
Clashafree
BANDON
Droichead na Bandan
Moanarone
Knocknacurra
Kildarra
Rockhouse
Lissard
Ballydonaghy
Clogheeg
Puckane
Ship-pool
Knocknagreanagh
Oldchapel
Knockanreagh
Clancool More
Roundhill
Parkaghadallaun
Tullyland
Cloghane
Leighmoney
Knocksmall
Horsehill
Ballymamona
Ballythomas
Dunderrow
Dún Darú
Ballydawley
Kilmacsimon
Horse Hill
Knocknagappul
Butlerstown
Ballinvard
Lackenagea
Coolvallanane Beg
Meelon
Clancool Beg
Lissaphooca
Garranbeg
Ardcloyne
Ardmartin
Liscahane More
Ballinacurra
Whitecastle Bridge
Killany
Ballinadee
Baile na Daibhche
KINSALE
Cionn tSáile
Glasheen
Rathdrought
Ratharoon
Knockavackig
Dangan
Cripplehill
Killanamaud
Hollyhill
Ballywilliam
Cappagh
Tisaxon
The Fee
Ballynacubby
Maulmane
Ballyvolane
Killaneetig
Ballymore
Kilgobbin
Abhainn na Bandon
Kilnacloona
Dromder
Maulskinlahane
Baurleigh
Dinneen's Cross Rds
Coolshinagh
Knoppoge
Ballybeg
Baltinakin
Ballynascubbig
Crushnalanniv Cross Rds
Kilgobbin Cross Rds
Ballyfeard
Meelon
Lissaphooca Cross Rds
Carry's Cross Rds
Finnis Cross Roads
Keye's Cross Rds
Gash's Cross Rds
Lovell's Cross Rds
Kilbrogan Cross Rds
Knockbrogan Cross Rds
Insmown Cross Rds
Moanarone Cross Rds
Murray's Cross Rds
Brinny Cross Rds
Dunkereen Cross Rds
Barna Cross Rds
Spreade's Cross Rds
Reservoir (Covered)
Waterworks
Laherfineen
Downdinnel
Inishannon Br
Beidaha Br
Cutcrew Mill
Mahony's Cross Rds
Kilpadder Cross Rds
Lissard Cross Rds
Ballyvirin Cross Rds
Ballynamona Cross Rds
Millwater Cross Rds
Hughes Cross Rds
Hollyhill Cross Rds
Skeugh Cross Rds
Corr's Cross Rds
Kenting's Cross Rds
Ballyregan Cross Rds
Mellifontstown
Farranamoy
Farrangalway
Garravesoge
Lough Cross Rds
Fahanalooscan
Mill-lan
Abbey-lan
Shanavally
Ballynamaul
Carhoo
Doonee
Clashmore
Ballyregan
Lissard
Lahern
Rockhouse
Cloghane
Kilmacsimon
Ballinadee
Ballydawley
Ballythomas
Dunderrow
Killany
Ballinacurra
Ardcloyne
Butlerstown
Ballinvard
Lackenagea
Liscahane More
Glasheen
Abbey-lan
Ballynacubby
Commoge
Dromder
Kilnacloona
Tisaxon
The Fee
Cappagh
Hollyhill
Ballywilliam
Knockavackig
Dangan
Cripplehill
Killanamaud
Maulmane
Ballyvolane
Killaneetig
Ballymore
Kilgobbin
Maulskinlahane
Baurleigh

N

EXISTING SITE & GRAVEL PIT
AND CONCRETE PLANT

0 200 400 600 800 1000m

Scale 1:10,000

Notes:

1. EXTRACT FROM TAILTE EIREANN 6 INCH SCALE DIGITAL MAPPING.

Legend:

LAND INTEREST BOUNDARY

PLANNING APPLICATION AREA (c.4.0 Hectares)

Rev	Amendments	Date	By	Chk	Auth

SLR

www.slrconsulting.com

Drawing Status & Suitability Code
FINAL

Client
KEOHANE READYMIX LTD.

Project
SAND & GRAVEL PIT
KNOCKROE, BANDON, CO. CORK

Drawing Title
SITE LOCATION MAP

Scale	SLR Project No.
1:10,000 @ A3	065557.00001

Designed	Drawn	Checked	Authorised
EW	EW	TP	TP
Date 04/25	Date 04/25	Date 04/25	Date 04/25

Drawing Number
FIGURE 1-2

Rev.
1

\\ar.local\eu\Offices\IE\Dublin\SLR DATA\SLR Projects\0033 Keohane Readymix Ltd\065557 KRL ODriscolls Lands S & G PA EIAR AA\EIAR\Volume-2 EIAR Report Figs Appendi\01 Introduction\Dwgs\CAD\Wking\065557.FIG_1-2_Site Location Map.dwg

09/04/2025

CYAL50450233

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Notes:

1. SURVEY CARRIED OUT BY ASM IRELAND - 30/08/2024

Legend:

- LAND INTEREST BOUNDARY
- PLANNING APPLICATION AREA (c.4.0 Hectares)
- EXTRACTION AREA (c.3.5 Hectares)
- EXISTING BOREHOLE (BH3)
- CONTOURS (40 m)

N

Local Road L6070

LOCAL ROAD L3204

EXISTING INTERNAL ACCESS

River

WOODLAND

WOODLAND

WOODLAND

Agricultural Lands

BH1

BH2

BH3

0.20

2.66

8.27

1.06

6.454

0 25 50 75 100 125m

Scale 1:1,250

Rev	Amendments	Date	By	Chk	Auth

SLR

www.slrconsulting.com

Drawing Status & Suitability Code: **FINAL**

Client: KEOHANE READYMIX LTD.

Project: SAND & GRAVEL PIT
KNOCKROE, BANDON, CO. CORK

Drawing Title: EXISTING SITE LAYOUT

Scale		SLR Project No.
1:1,250	@ A3	065557.00001

Designed	Drawn	Checked	Authorised
EW	EW	TP	TP
Date 04/25	Date 04/25	Date 04/25	Date 04/25

Drawing Number: **FIGURE 1-3**

Rev. **1**

\\dr localfeu\Office\IE\Dublin\SLR DATA\SLR Projects\00033 Keohane Readymix Ltd\065557 KRL CDriscolls Lands S & G PA EIAR AA\EIAR\Volume-2 EIAR Report Figs Appends\01 Introduction\Dwgs\CAD\Wking\065557 FIG_1-3 Existing Site Layout.dwg 09/04/2025

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PROPOSED DEVELOPMENT **1**

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Rate of Extraction & Duration of the Development 2

Site Screening & Operational Landscaping 2

Removal of Topsoil / Subsoil 2

Site Drainage 2

Method of Extraction 3

No Processing 3

Working Hours 3

Employment 4

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Site Access 4

Site Security 4

Site Roads & Parking 4

Wheelwash 4

Ancillary Facilities 4

Fuel and Oil Storage 5

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PROPOSED ENVIRONMENTAL CONTROLS **5**

General 5

Dust Control 5

Noise Control 6

Traffic Control 6

Litter Control 7

Odour Control 7

Vermin Control 7

Bird Control 7

Fire Control 7

PROPOSED ENVIRONMENTAL MONITORING 7
General & Environmental Management System (EMS) 7
Dust Deposition Monitoring 8
Groundwater Water Monitoring 8
Noise Monitoring 8
PROPOSED RESTORATION SCHEME 9
Restoration to Agricultural and Natural Habitat Afteruse 9
Restoration Phasing, Levels and Soil Thickness /Volumes 9
Final Restoration 9
Long Term Safety and Security 10
Long Term Stability of Pit Faces 10
Long Term Surface Water and Groundwater 10
Decommissioning Machinery & Ancillary Facilities 10
Aftercare and Monitoring 10

FIGURES

Figure 2-1: Existing Site Layout
Figure 2-2: Proposed Site Layout
Figure 2-3: Existing / Proposed / Restored Cross Sections
Figure 2-4: Phasing Layout
Figure 2-5: Proposed Landscape & Restoration Plan
Figure 2-6: Vegetation Removal Plan

APPENDICES

Appendix 2-A Environmental Management System (EMS) Structure

Existing Site

2.1 The application site extends to c. 4.0 hectares and currently comprises agricultural lands with an area of woodland to the north. There is an existing access off the local road L3204 and internal haul road into the woodland area, refer to Figure 2-1.

2.2 Site levels over the existing agricultural land range from 21.5 to 26 mOD, with average ground levels being 23 to 24.5 mOD. The land levels fall away steeply to the north and west into the woodland area of the historical sand & gravel pit to a level of c. 3.0 to 5.0 mOD on the local road L3204.

Proposed Development

Development Overview

2.3 The proposed development comprises:

- Extraction of sand & gravel over an area of c.3.5 Ha.
- Extraction by dry working to 2 metres above the groundwater level, at a maximum rate of 100,000 tonnes per year.
- Transport of the extracted sand & gravel to the adjacent Dromkeen Pit (Plan. Ref. 23/04780) for use in concrete production;
- Upgrading of the existing internal access road and use of the existing access onto the local road L3204.
- Provision of wheelwash and welfare unit (c.8.3 sq.m).
- Restoration of the lands to agricultural and natural habitat use;
- All within an application area of c.4.0 hectares.

2.4 The proposed development being applied for under this planning application is shown on Figure 2-2, with existing and proposed cross-sections shown on Figure 2-3. Works will take place within an overall application area of c. 4.0 hectares.

2.5 The proposed operational period is 15 years plus 2 years to complete final restoration (total duration sought c. 17 years).

Extraction Area

2.6 The proposed development will comprise sand & gravel extraction from existing agricultural lands c 3.5 hectares, refer to Figure 2-2.

Phasing Plan

2.7 The phasing of the development is shown on Figure 2-4. The landscaping proposals detailed on Figure 2-5 Proposed Landscape & Restoration Plan will be undertaken at the start of the Phase 1.

2.8 A small area of vegetation will need to be cut back / removed at the existing site access and along parts of the internal access road that will be upgraded as part of the initial works in Phase 1. Details are provided on Figure 2-6 Vegetation Removal Plan.

2.9 Phase 1 will comprise removal of topsoil and subsoil from the eastern part of the extraction area and extraction of sand & gravel. The soil stripped from the Phase 1 area will be temporarily stored in the Phase 2 area pending use in the phased and final restoration works.

2.10 Phase 2 will comprise use of the stripped soil temporarily stored in the Phase 2 area for progressive restoration of the Phase extraction area. Soil tripped from the Phase 2 area will be temporarily stored in the Phase 1 area pending use in the final restoration.

Restoration (Reinstatement to Agricultural and Natural Habitat Use)

2.11 The extraction area will be restored to agricultural and natural habitat use (refer to Figure 2-5). Further restoration details are provided in the Proposed Restoration Scheme section of this chapter.

Aggregate Reserve Assessment

The total recoverable reserve of sand and gravel from within the proposed extraction area is assessed at c. 0.9 million tonnes.

Rate of Extraction & Duration of the Development

2.12 The extraction rate is estimated to be up to a maximum of 100,000 tonnes per year. Depending on market demand, and assuming an average extraction rate of 60,000 tonnes per year the duration of the extraction will be up to c. 15 years. Allowing a further two years for final restoration this would equate to a total development duration of c. 17 years.

Site Screening & Operational Landscaping

2.13 The existing site is partially screened from the surrounding roads by existing mature hedgerows and trees along the eastern, northern and western site boundaries. An operational landscaping and planting scheme has been designed to provide additional screening around the perimeter of the proposed development, refer to Figure 2-5 Proposed Landscape & Restoration Plan. This includes planting schedules for native tree planting and native hedge planting. It will be undertaken at the start of Phase 1.

Removal of Topsoil / Subsoil

2.14 Topsoil / subsoil will be removed as each phase of extraction area is developed. Soil stripping will be undertaken using a mechanical excavator and loaded directly onto dump trucks for haulage to the designated temporary soil storage, refer to Figure 2-6.

2.15 The maximum height of any temporary soil storage areas will be three metres.

2.16 Soils will be reused in the restoration of the lands to agricultural use, refer to the Proposed Restoration Scheme section of this chapter.

Site Drainage

2.17 Rain falling across the application site percolates down through the existing ground surface as recharge to groundwater.

2.18 The final pit floor level will be maintained at 2 metres above the groundwater level. Surface water collecting in the pit floor will percolate naturally into the underlying ground.

2.19 There will be no off-site discharges to the Bandon River located to the east of the site.

2.20 A hydrological / hydrogeological assessment has been carried out to determine what the requirements are for the proposed development, with regard to a water regime. It addresses mitigation measures to eliminate and/or minimise the potential impacts, if any, on surface water and groundwater. These measures will be incorporated into the pit design and operation, (refer to EIAR Chapter 7 – Water).

Method of Extraction

Dry Working

2.21 Dry working extraction (i.e. above the groundwater table) will use an excavate, load and haul method. An excavator will be used to extract the sand & gravel materials from the working face and load them onto a truck for transport to the existing Dromkeen Pit operated by Keohane Readymix Ltd., for use in concrete production.

Blasting – None Required

2.22 No blasting is required for sand & gravel extraction and no such operations will be carried out at the proposed development. No rock will be extracted.

Onsite Machinery

2.23 The machinery used for the construction (soil stripping stage) and restoration will comprise 1 no. excavator and 1 no. dump truck. During pit operation the only plant used on site will be 1 no. loading shovel to excavate and loa the extracted sand & gravel onto a single truck for transport to the adjacent Drumkeen Pit for use in concrete production.

No Processing

2.24 There will be no processing of sand & gravel on the site. Extracted sand & gravel will be transported by road to the adjacent Dromkeen Pit for use in concrete production.

Working Hours

2.25 Keohane Readymix Ltd. (KR) has operated the Dromkeen Pit in Innishannon since 1983. KRL are part of the community, and the applicant will not jeopardise the reputation they have built over this period.

2.26 With respect to the local residents and hospitality businesses, the proposed working hours for sand & gravel extraction operations at the site are 09.00 hours to 17.00 hours Monday to Friday. No working will take place on Saturdays, Sundays or Public Holidays.

(Note: These reduced working hours (from typically 07.00 to 19.00 on weekdays and 07.00 to 14.00 on Saturdays) will be implemented at the site as it is only extracting sand & gravel for use in concrete production at the adjacent Dromkeen Pit and will not be bound by delivery times required for external customers in the wider construction sector).

Employment

2.27 The development will provide direct employment for up to 2 people during the construction / restoration stages (soil stripping / restoration to agricultural use) and 1 person during the operational stage (extraction) phase. This employment will be secured for the duration of the development.

Site Infrastructure

2.28 The layout of the site infrastructure is shown on Figure 2-2.

Site Access

2.29 There is an existing access to the site from the L3204 local road. This existing access to the site will be used. All truck traffic turns left on exiting the site and travels north on the L3204 road for c.0.5km to the Dromkeen Pit.

2.30 The access will be surfaced with suitable gradients / drainage to ensure that no surface water drainage flows from the site onto the public road network.

2.31 The existing internal road from the site access to the proposed extraction area will be used. It is well screened by the existing woodland area that will be retained.

Site Security

2.32 The boundaries of the site will be fenced with a combination of stock-proof fencing and mature hedgerows. The site boundary will be inspected on a regular basis and maintained as required under the Safety, Health & Welfare at Work (Quarries) Regulations 2008.

2.33 Appropriate warning signs will be displayed at visible locations along the boundary at appropriate intervals.

2.34 The entrance to the site has lockable gates to prevent unauthorised access outside of the working hours.

Site Roads & Parking

2.35 The existing internal road will provide the access to the extraction area. It will be upgraded and resurfaced to eliminate the risk of mud / dirt being transported onto the public road.

2.36 A designated car parking area will be available for staff and visitors adjacent to the site welfare unit.

Wheelwash

2.37 A wheelwash will be provided and this will continue in use for the duration of the proposed development, refer to Figure 2-2 for wheelwash location.

Ancillary Facilities

2.38 A self-contained welfare unit will be provided on site, refer to Figure 2-2. It will include a recirculating chemical toilet, water storage and bottled drinking water. The unit will be maintained on a regular basis under contract. Staff will also use the existing office and welfare facilities at the adjacent Dromkeen Pit.

Fuel and Oil Storage

2.39 There will be no fuel or oil storage at the site. All machinery will be re-fuelled and maintained at the adjacent Dromkeen Pit owned and operated by Keohane Readymix Ltd.

2.40 Spill kits and spill kit training will be provided on site to contain / manage any limited accidental spillages in the unlikely event that they arise from the machinery used on site.

Extractive Waste Management

2.41 Topsoil and subsoil stripped from the site will be stored and reused for the restoration of the lands to agricultural use.

2.42 All sand & gravel extracted at the site will be transported to the adjacent Drumkeen site for processing. There will be no extractive waste arising on site.

Proposed Environmental Controls

General

2.43 Extraction and restoration activities at the application site require a number of environmental controls to eliminate or minimise the potential nuisance to the public arising from the site operations. The environmental control measures implemented at the site are outlined in the following sections.

2.44 Any additional control measures, over and above those outlined below, which may be conditioned on foot of the proposed planning application, will also be implemented.

Dust Control

2.45 The proposed development is for extraction of sand & gravel only. No processing – crushing or screening will take place on the site resulting in a significantly lower potential for dust generation compared to a conventional pit / quarry operation.

2.46 In dry, windy weather conditions, site activities may give rise to limited dust generation. In order to control dust emissions, the following dust prevention and suppression measures will be implemented:-

- Where required during dry weather water mist will be sprayed from a tractor drawn bowser on dry exposed surfaces (e.g. the section of local road between the site and the Dromkeen Pit, and site internal road), in line with current practice at the Dromkeen Pit. The bowser and water for dust suppression will be sourced from the Dromkeen Pit;
- All HGV vehicles exiting the site will be routed through a wheelwash. This will minimise the transport of fines by HGVs over the access / egress road and the public road network.

2.47 In line with current practice at the Dromkeen Pit the amount of dust or fines carried onto the public road network will be further reduced by periodic sweeping of internal paved site roads and surrounding public roads, if required.

2.48 A dust deposition monitoring programme will be implemented as part of the environmental monitoring programme. Monitoring results will be submitted to Cork County Council.

2.49 Dust management and mitigation measures will be implemented in accordance with the ICF (2004), DoEHLG (2004), and EPA (2006) environmental guidelines for the sector, refer to EIAR Chapter 8 – Air Quality.

Noise Control

2.50 The proposed development is for extraction of sand & gravel only. No processing – crushing or screening will take place on the site resulting in a significantly lower potential for noise generation compared to a conventional pit / quarry operation.

2.51 The sources of noise located within the planning application area will be related to machinery operation only.

2.52 The potential for noise generation from the planning application area is significantly reduced by the natural screening (topographic and retained woodland / vegetation) that is maximised in the pit design / phasing.

2.53 In addition to the above the following good house-keeping measures are in place to reduce noise emitted from machinery as much as possible:

- Loading of HGV with sand & gravel will minimise drop heights.
- Reversing sirens on machinery will be sensor-controlled and used in conjunction with reversing cameras to reduce noise.
- All machinery used are CE certified for compliance with EU noise control limits;
- The machinery will be regularly maintained. This will include regularly checking any muffler systems and servicing or replacing as required. Servicing required will be undertaken at the adjacent Dromkeen Pit garage facility. It will also ensure any loose or damaged panels or covers that suppress noise are fixed or replaced immediately;

2.54 Existing noise management and mitigation measures will be implemented in accordance with the ICF (2004), DoEHLG (2004) and EPA (2006) environmental management guidelines for the sector, refer to EIAR Chapter 10 – Noise.

2.55 A noise monitoring programme will be implemented at the site as part of the environmental monitoring programme. Monitoring results will be submitted to Cork County Council.

Traffic Control

2.56 The existing site access will be used. The sand & gravel from Knockroe will be blended with the sand & gravel material from Dromkeen Pit leading to a relatively low annual extraction rate from the proposed development.

2.57 Based on a maximum annual pit output of 100,000 tonnes per year from the proposed development , and the short transport distance (c. 0.5km) to the adjacent Dromkeen Pit, the road haulage fleet will comprise 1 no. heavy goods vehicle (HGV) – for aggregate haulage.

2.58 The maximum number of HGV movements will be one to two HGV trips per hour based on a maximum annual total output of 100,000 tonnes per year, 50-week year, 5.day week ,8-hour day and 30 tonne (sand & gravel) HGV loads.

2.59 Keohane Readymix Ltd. will contribute to the cost of maintenance of the road network and are agreeable to an appropriate special contribution being attached to any future grant of planning permission in relation to same. It is proposed to pay any such contribution on a phased basis, the details of which will be agreed with the Planning Authority.

Litter Control

2.60 As the proposed development will be free of litter, the daily operational activities are unlikely to give rise to problems with windblown litter. Accordingly, there is no requirement to implement any specific litter control measures at the site.

2.61 In the unlikely event that any litter waste is identified, it will be immediately removed off-site to an authorised waste disposal or recovery site.

Odour Control

2.62 As the sand & gravel extraction and restoration activities at the site will not involve biodegradable materials, they will not emit odorous gases and will not give rise to odour nuisance. Accordingly, no odour control measures will be required at the site.

Vermin Control

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

Bird Control

2.64 As the proposed developments will be free of putrescible (food / kitchen) waste, site activities are highly unlikely to attract scavenging birds such as gulls and crows for the duration of works. Accordingly, no specific bird control measures will be required at the site.

Fire Control

2.65 As the proposed development will be free of flammable materials which could create a major fire or explosion risk, on-site extraction activities will not present a significant fire risk for the duration of the extraction and restoration operations. Accordingly, there is no requirement to implement specific fire control measures at the site.

2.66 In the unlikely event that a fire does occur, the local fire station in Bandon will be contacted and emergency response procedures will be implemented.

Proposed Environmental Monitoring

General & Environmental Management System (EMS)

2.67 An environmental management system (EMS) will be implemented at the site, refer to Appendix 2-A for details of the proposed EMS structure

2.68 An environmental monitoring programme will be implemented at the site covering dust deposition, noise, groundwater levels and groundwater quality, refer to further details below. This monitoring programme will be continued (and adapted where required) for the duration of the development. The environmental monitoring programme will comply with requirements in conditions attached to any planning permission granted by Cork County Council.

2.69 Environmental sampling, monitoring and testing is generally undertaken by external consultants on behalf of KRL as and when required. Records of environmental monitoring and testing will be held on-site and forwarded to Cork Co. Council as required.

Dust Deposition Monitoring

2.70 Dust deposition monitoring will be carried out at two dust monitoring stations, D1 and D2, refer to Figure 8-1.

2.71 The dust monitoring gauges are located on the site boundary closest to potentially sensitive receptors located beyond the site boundary. It is proposed that the dust monitoring stations will remain in place for the duration of extraction and processing operations at the site and be monitored on a monthly basis from April to October inclusive. The Bergerhoff Method for measuring dust deposition will continue to be used. The dust deposition monitoring results will be assessed for compliance with the the DoEHLG (2004) / EPA (2006) recommended total dust deposition threshold of 350 milligrams per day (averaged over a 30-day period) measured at the site boundary.

2.72 Dust monitoring locations shall be reviewed and revised where and as/when necessary. The results of the dust monitoring will be submitted to Cork County Council on a regular basis for review and record purposes.

Groundwater Water Monitoring

2.73 The following monitoring activities will be carried out to demonstrate that the development is not having an adverse impact on the surrounding water environment.

- Groundwater levels will be monitored on a quarterly basis in three existing on-site boreholes (refer to Figure 7-1).
- Groundwater quality will be monitored by sampling and testing samples from two of the boreholes BH1 and BH3 on an annual basis.

2.74 The results of the water monitoring will be submitted to Cork County Council on a regular basis for review and record purposes

Noise Monitoring

2.75 Noise monitoring will be carried out at three noise monitoring stations, N1, N3 and N4, refer to Figure 10-1.

2.76 It is proposed that the noise monitoring survey will be carried out for the duration of extraction and processing operations at the site on a six-monthly basis. The noise monitoring results will be assessed for compliance with the daytime noise threshold limit of 55 dB(A)LAeq (1 hour) at noise sensitive locations recommended in the EPA (2006) Environmental Management Guidelines for the sector.

2.77 Noise monitoring locations shall be reviewed and revised where and as/when necessary. The results of the noise monitoring will be submitted to Cork County Council on a regular basis for review and record purposes

Proposed Restoration Scheme

Restoration to Agricultural and Natural Habitat Afteruse

2.78 The principal activity which will be undertaken at the application site is the extraction of sand and gravel with final restoration of the lands to an agricultural and natural habitat afteruse. This restoration afteruse is a beneficial afteruse listed in the EPA Guidelines: 'Environmental Management in the Extractive Industry' (2006).

2.79 The restoration plan as set out on Figure 2-5 has been prepared by SLR Consulting and approved by KRL (the Applicant).

2.80 Prior to grass seeding all areas to be restored to agricultural land will be stone picked, then promptly seeded, using a mix suitable to create pasture. When this operation is completed the dry working areas will fully revert back to agricultural land and will blend in with the surrounding landscape.

2.81 The side slopes of the extraction area will be left for natural regeneration (similar to the existing faces in the historical pit working area to the north. Pockets of native trees will be planted in the north-western part of the extraction area, refer to Figure 2-5 for details, including the native tree planting schedule.

Restoration Phasing, Levels and Soil Thickness /Volumes

Restoration Phasing

2.82 Figure 2-4 Phasing Plan shows the phased development of the site including the soil stripping and phased restoration stages for the site.

Soils Available for Restoration / Volumes / Soil Thickness and Restored Level

2.83 Soils stripped from the site as part of the extraction process will be available for use in restoration. The in situ volume of soil available will be c. 24,500 m3.

2.84 Allowing for bulking during excavation and placement, this will equate to an average soil thickness of c. 1.0 metre over the excavated area to be restored. This soil volume is sufficient for restoration to agricultural use and the restored level will be c. 1.0 metre above the final extraction levels.

Final Restoration

2.85 As part of the final restoration of the overall site, all machinery will be removed. It is envisaged that this final restoration will take 2 years, following permanent cessation of extraction.

2.86 Prior to grass seeding all areas to be restored to agricultural land will be stone picked, then promptly seeded, using a mix suitable to create pasture. When this operation is completed the Restoration Management & Supervision

2.87 KRL will clearly define the management responsibility for the site restoration work and will ensure that this person has the necessary information (from the planning application) and authority to manage the whole restoration process. Relevant staff will be briefed on the scheme and will be supervised / controlled. A system of record keeping for the key restoration activities will be put in place.

Long Term Safety and Security

2.88 The existing boundary fences and hedgerows will be maintained in a stock proof state of repair.

2.89 All components of the barrier system of the site protection outlined above will remain in place after extractive/processing operations have permanently ceased. This combined with the secure and locked entrance gates to the development will prevent unauthorised third-party access.

Long Term Stability of Pit Faces

2.90 The restored pit slopes will be constructed at stable angles, ensuring the long-term stability of slopes and faces.

Long Term Surface Water and Groundwater

2.91 The surface water run-off will continue will percolate naturally to ground. There is no requirement for any active long-term surface water or groundwater management at the site.

Decommissioning Machinery & Ancillary Facilities

2.92 Machinery, the welfare unit and the wheelwash will be removed from site on permanent cessation of the extraction activity. Machinery will either be used by Keohane Readymix on other sites or be sold as working machinery or scrap.

2.93 There will be no fuel, oil storage tanks and / or effluent treatment system on site. There will be no potential for fuel, oil or sewage to cause long-term water pollution following completion of extraction activities.

Aftercare and Monitoring

2.94 There will be no on-going requirement for monitoring noise, dust or water after extraction has ceased.

2.95 Monitoring and maintenance will be undertaken over the two-year final restoration period to ensure that the restored agricultural land use is successful.

Figures

Figure 2-1: Existing Site Layout

Figure 2-2: Proposed Site Layout

Figure 2-3: Existing / Proposed / Restored Cross Sections

Figure 2-4: Phasing Layout

Figure 2-5: Proposed Landscape & Restoration Plan

Figure 2-6: Vegetation Removal Plan

Notes:

1. EXTRACT FROM TAILTE EIREANN DIGITAL MAPPING 1:2,500 SCALE, MAP. NO. 6578

Legend:

- LAND INTEREST BOUNDARY
- PLANNING APPLICATION AREA (c.4.0 Hectares)
- EXTRACTION AREA (c.3.5 Hectares)
- CROSS SECTION LOCATION
- EXISTING BOREHOLE (BH3)
- CONTOURS (40 m)

Keohanes Quarry

Boat

LOCAL ROAD L3204

Local Road L6070

EXISTING INTERNAL ACCESS

River Bandon

Sceach nGabha Skanago

WOODLAND

WOODLAND

WOODLAND

Agricultural Lands

BH1

BH2

BH3

SECTION A-A'

SECTION B-B'

SECTION C-C'

SECTION D-D'

1.47

0.21

0.25

4.45

0.20

2.66

1.27

5.45

8.27

1.06

1.39

3.69

N

0 20 40 60 80 100 120 140 160 180 200m

Scale 1:2,000

Rev	Amendments	Date	By	Chk	Auth

SLR

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Drawing Status & Suitability Code: **FINAL**

Client: KEOHANE READYMIX LTD.

Project: SAND & GRAVEL PIT
KNOCKROE, BANDON, CO. CORK

Drawing Title: EXISTING SITE LAYOUT

Scale	SLR Project No.
1:2,000 @ A3	065557.00001

Designed	Drawn	Checked	Authorised
EW	EW	TP	TP
Date 04/25	Date 04/25	Date 04/25	Date 04/25

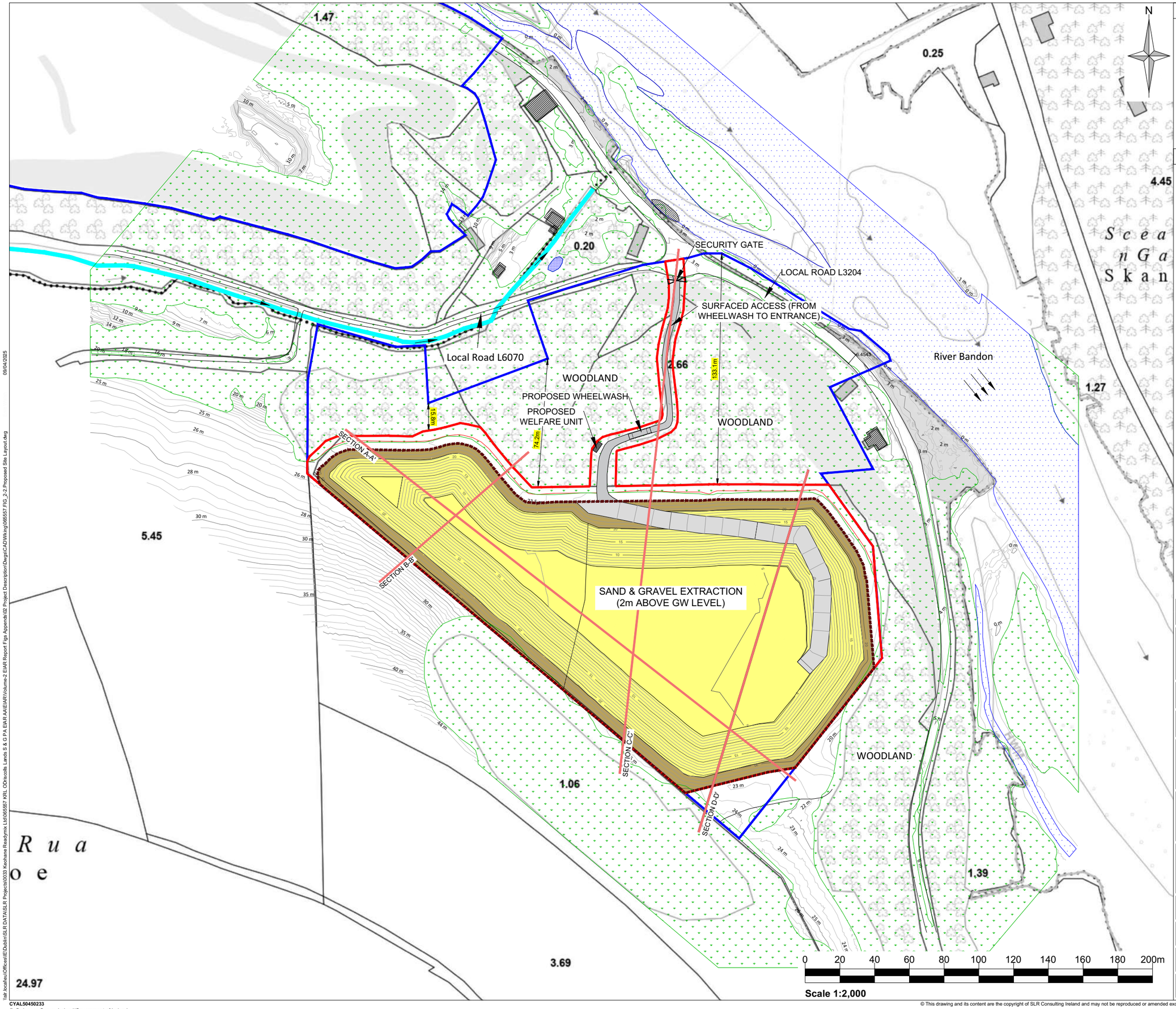
Drawing Number: **FIGURE 2-1** Rev. **1**

\\dir.local\ie\Office\IE\Dublin\SLR DATA\SLR Projects\0033 Keohane Readymix Ltd\065557 KRL ODriscolls Lands S & G PA EIAR AA\EIAR\volume-2 EIAR Report Figs Appends\02 Project Description\Dwgs\CAD\Wking\065557-FIG_2-1 Existing Site Layout.dwg 09/04/2025

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Notes:

1. EXTRACT FROM TAILTE EIREANN DIGITAL MAPPING 1:2,500 SCALE, MAP. NO. 6578

2. REFER TO FIGURE 2-3 FOR CROSS SECTION DETAILS.

Legend:

- LAND INTEREST BOUNDARY
- PLANNING APPLICATION AREA (c.4.0 Hectares)
- EXTRACTION AREA (c.3.5 Hectares)
- CROSS SECTION LOCATION
- CONTOURS

Rev	Amendments	Date	By	Chk	Auth

SLR

www.slrconsulting.com

Drawing Status & Suitability Code: **FINAL**

Client: KEOHANE READYMIX LTD.

Project: SAND & GRAVEL PIT
KNOCKROE, BANDON, CO. CORK

Drawing Title: PROPOSED SITE LAYOUT

Scale		SLR Project No.
1:2,000	@ A3	065557.00001

Designed	Drawn	Checked	Authorised
EW	EW	TP	TP
Date	Date	Date	Date
04/25	04/25	04/25	04/25

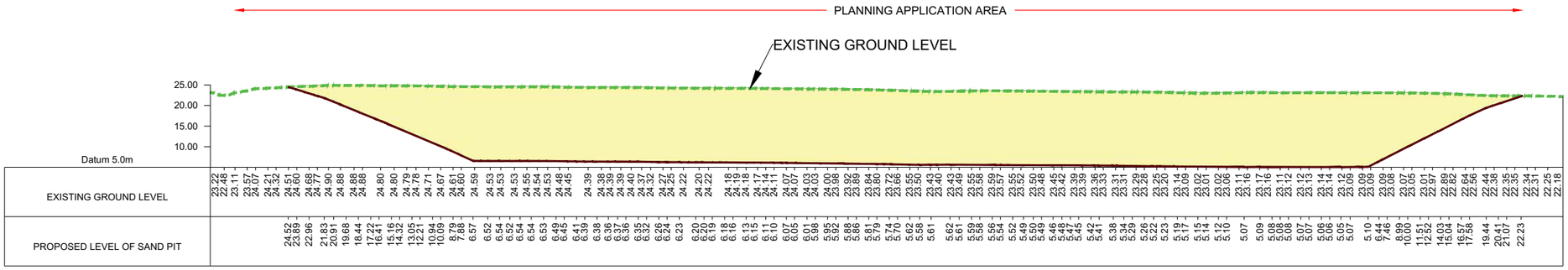
Drawing Number: **FIGURE 2-2** Rev.: **1**

\\slr.local\eu\Offices\IE\Dublin\SLR DATA\SLR Projects\0033 Keohane Readymix Ltd\065567 KRL ODriscolls Lands S & G PA EIAR AA\EIAR\Volume-2 EIAR Report Figs Appends\02 Project Description\Dwgs\CAD\Wking\065567 FIG_2-2 Proposed Site Layout.dwg 09/04/2025

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PLANNING APPLICATION AREA
EXISTING GROUND LEVEL
25.00
20.00
15.00
10.00
Datum 5.0m

| | | |

PHASE 1 : OVERBURDEN REMOVAL

PHASE 1 : SAND & GRAVEL EXTRACTION

PHASE 2 : OVERBURDEN REMOVAL & PROGRESSIVE RESTORATION

FINAL RESTORATION

PHASE 2 : SAND & GRAVEL EXTRACTION & PROGRESSIVE RESTORATION

N

Boat

LOCAL ROAD L3204

Local Road L6070

River Bandon

PHASE 2 AREA

TEMPORARY OVERBURDEN PLACEMENT AREA

TEMPORARY OVERBURDEN PLACEMENT

PHASE 1 AREA

OVERBURDEN REMOVAL 20,000 m³

SAND & GRAVEL EXTRACTION (2m ABOVE GW LEVEL)

OVERBURDEN REMOVAL 12,000 m³

GRADUAL BACKFILLING OF EXCAVATION WITH OVERBURDEN

Rev	Amendments	Date	By	Chk	Auth

SLR

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Drawing Status & Suitability Code
FINAL

Client
KEOHANE READYMIX LTD.

Project
SAND & GRAVEL PIT
KNOCKROE, BANDON, CO. CORK

Drawing Title
PROPOSED PHASING LAYOUT

Scale		SLR Project No.
1:2,500	@ A3	065557.00001

Designed	Drawn	Checked	Authorised
EW	EW	TP	TP
Date	Date	Date	Date
04/25	04/25	04/25	04/25

Drawing Number
FIGURE 2-4

Rev.
1

\\dir.local\ie\Office\IE\Dublin\SLR DATA\SLR Projects\00033 Keohane Readymix Ltd\065557 KRL ODriscolls Lands S & G PA EAR AA\EIAR\Volume-2 EIAR Report Figs Appends\02 Project Description\Dwgs\CAD\Wking\065557 FIG_2-4 Phasing Plan.dwg 09/04/2025

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LANDSCAPE & RESTORATION SCHEME

The landscape and restoration scheme for the proposed sand & gravel pit at Knockroe aims at minimising the visibility of the extraction works during the operational period, as well as restoring the existing and proposed pit areas to a combination of a natural habitat and a agricultural land use. Both are benficial afteruses, as recommended in the 2006 EPA Guidelines - Environmental Management in the Extractive Industry (Non-Scheduled Minerals).

LANDSCAPE PHASE

To be carried out on commencement of the proposed development, consisting of the following elements:

- Retention of all existing trees / scrub / woodland vegetation within the land interest boundary of the applicant, with the exception of a small number of trees / scrub vegetation along the proposed access track (refer to Figure 2-6 Vegetation Removal Plan for further information).
- Native hedge planting along the northern and part of the south-western and eastern boundaries of the proposed extraction area, to mark / secure the edge of the pit slopes, provide habitat linkage and, compensate for the loss of existing trees / scrub.

RESTORATION PHASE

To be carried out on completion of all proposed extraction works, consisting of the following elements:

- Restoration of the pit floor to agricultural grassland. This will be achieved by the removal of any machinery and stockpiles, the spreading of subsoil and topsoil (using material stored on site), the cultivation of the ground in preparation for grass seeding and seeding with a suitable agricultural grass mix.
- The pit slopes will be left at stable angles, using subsoil and topsoil material stored on site. They will then be left to be naturally colonised with locally occurring grass and scrub species (i.e. natural regeneration).
- Planting of two pockets of native trees in the north-western corner of the extraction area to support the natural regeneration of the pit slopes.

GENERAL NOTES

Earthworks: All topsoil will be stripped first and will be stored in temporary stockpiles less than 2m in height. The overburden will be stripped next and stored in separate stockpiles.

Grass Seeding: All grass sowing will take place, whilst suitable weather conditions prevail. The surface preparation and the sowing specifications will be as per the seed manufacturer's instructions.

Tree stock: Both proposed mixes contain locally occurring native species. All of the trees/shrubs are proposed to be supplied as transplants at 40-120cm height, as this type of stock is known to establish more successfully compared to larger stock.

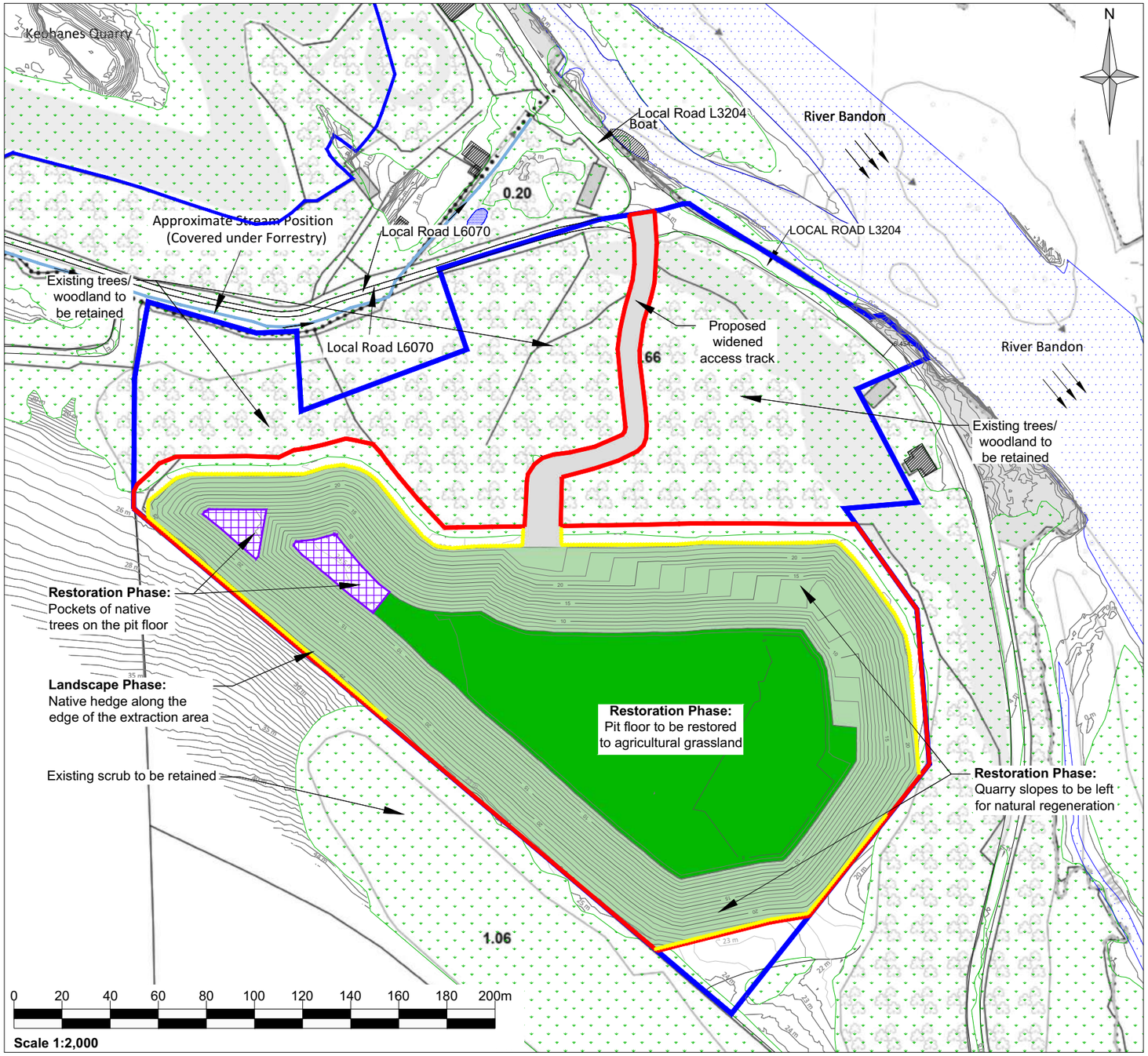
Native Tree Planting: To be planted at 1.5m centres, i.e. 1 plant per 2.25m² (Approx. 800m² in total = 350 plants). Transplants to be planted randomly with no more than 4-8 plants of the same species in a group. All plants to be protected with spiral guards.

Hedge Planting: To be planted as a double row of staggered plants, using 4 plants/meter (40cm between the rows and ca. 25cm between the staggered plants; Approx. 660 lin.m. in total = 2,600 plants). Transplants to be planted randomly with no more than 5 plants of the same species in a row. All plants to be protected with spiral guards.

Planting works: All plant handling, planting and establishment works will be carried out in accordance with current best practice and will take place in the appropriate planting season (e.g. bareroot planting: November to March only) and in favourable weather conditions.

Aftercare: Establishment maintenance will be carried out for 2 years following the planting works (minimum 3 maintenance visits per year; i.e. spring, summer and autumn). This will include weed control, replacement planting where required and the adjustment/removal of spiral guards.

All planting and maintenance works will be carried out by a suitably qualified landscape contractor.



Native Tree Mix

No.	Plant Name	Common Name	Height (cm)	Age/Pot Size	%
Transplants					
20	Alnus glutinosa	Common Alder	60-90	1+1	05
50	Corylus avellana	Hazel	60-90	1+0	15
35	Crataegus monogyna	Hawthorn	60-90	1+1	10
50	Ilex aquifolium	Holly	60-80	2L	15
35	Prunus spinosa	Blackthorn	60-90	1+0	10
20	Quercus robur	Pedunculate oak	60-90	1+1	05
35	Rosa canina	Dog rose	40-60	1+1	10
35	Salix cinerea	Sally	60-120	0+1	10
35	Sambucus nigra	Elder	60-90	1+1	10
35	Sorbus aucuparia	Rowan	60-90	1+1	10

NATIVE HEDGE MIX

No.	Plant Name	Common Name	Height (cm)	Age/Pot Size	%
Transplants					
130	Alnus glutinosa	Common alder	60-90	1+1	05
390	Corylus avellana	Hazel	60-90	1+0	15
780	Crataegus monogyna	Hawthorn	60-90	1+1	30
260	Ilex aquifolium	Holly	60-80	2L	10
520	Prunus spinosa	Blackthorn	60-90	1+0	20
390	Rosa canina	Dog rose	40-60	1+1	15
130	Sambucus nigra	Elder	60-90	1+1	05

Notes:

1. Aerial photo by ASM Ireland, dated August 2024.

Legend:

- Land Interest Boundary
- Planning Application Boundary (c. 4.0 hectares)

Landscape Phase
(to be implemented on commencement of the extraction works)

- Proposed native hedge

Restoration Phase
(to be implemented on completion of extraction works)

- Area to be restored to agricultural grassland
- Area to be left for natural regeneration
- Proposed native tree planting

Rev	Amendments	Date	By	Chk	Auth

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Drawing Status & Suitability Code: **FINAL**

Client: KEOHANE READYMIX LTD.

Project: SAND & GRAVEL PIT
KNOCKROE, BANDON, CO. CORK

Drawing Title: PROPOSED LANDSCAPE AND RESTORATION PLAN

Scale	SLR Project No.
1:2,000 @ A3	065557.00001

Designed	Drawn	Checked	Authorised
CN	CN	AM	AM
Date: 04/25	Date: 04/25	Date: 04/25	Date: 04/25

Drawing Number: **FIGURE 2-5** Rev.: **0**

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\\slr.local\ie\Offices\IE\Dublin\SLR DATA\SLR Projects\00033 Keohane Readymix Ltd\065557 KRL ODriscolls Lands S & G PA EIAR AA\EIAR\Volume-2 EIAR Report Figs Appends\02 Project Description\Dwgs\CAD\Working\065557-FIG_2-5-Restoration Plan.dwg

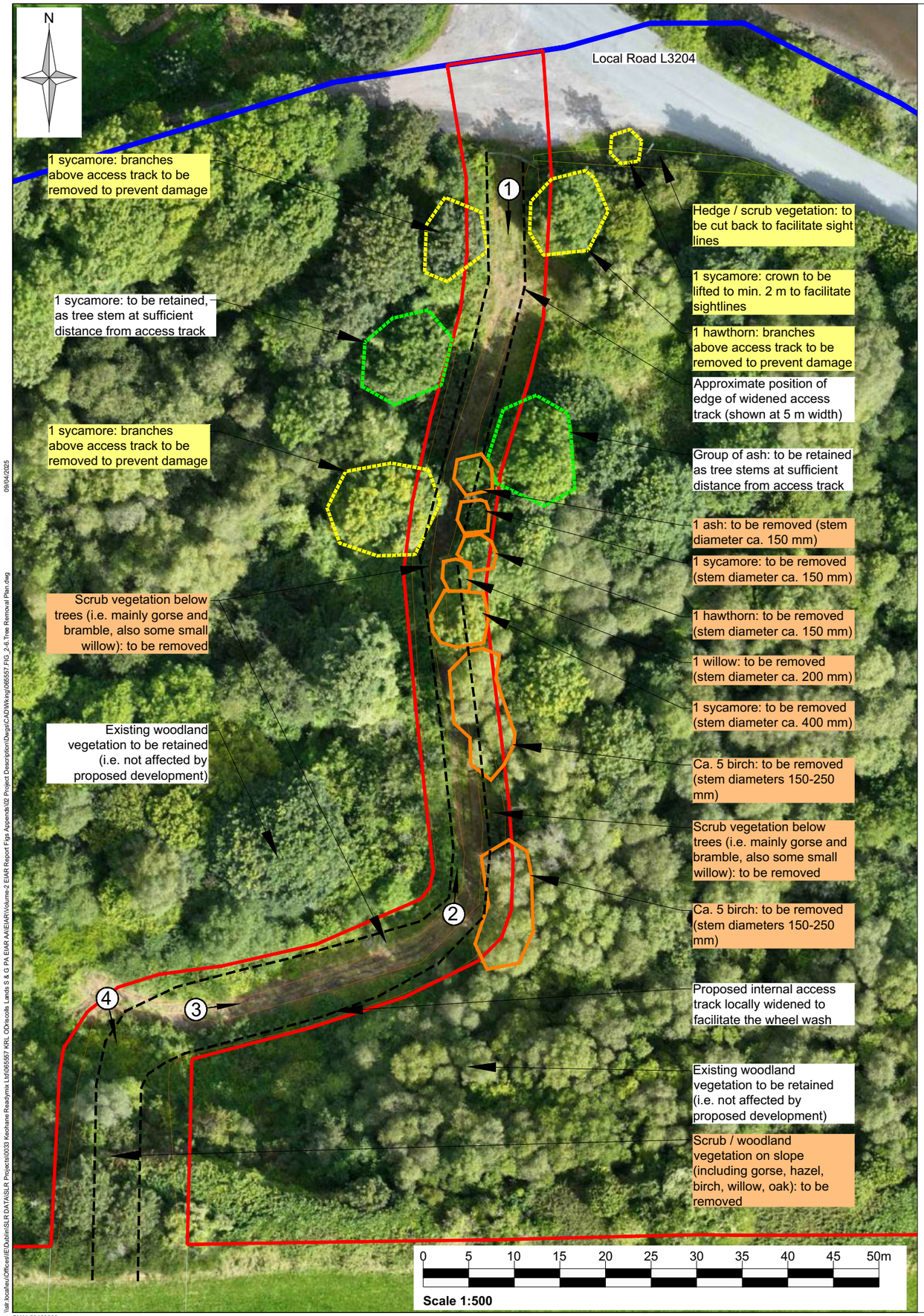




Photo 1: View south, just inside the site entrance (note: trees / scrub vegetation to be removed marked with X, trees to be reduced marked with X)



Photo 2: View north from central point along internal access track (note: trees / scrub vegetation to be removed marked with X, trees to be reduced marked with X)



Photo 3: View east from near western end of internal access track (note: trees / scrub vegetation to be removed marked with X, trees to be reduced marked with X)



Photo 4: View south of former pit slope at location of proposed access ramp into the proposed extraction area (note: the scrub / woodland vegetation on this section of slope, (including gorse, hazel, birch, willow and oak, would be removed)

Notes:

1. Aerial photo by ASM Ireland, dated August 2024.

Legend:

Land Interest Boundary

Planning Application Boundary

Approximate position of widened access track (shown at 4 m width)

Photo locations

Trees / Vegetation to be retained
(Note: All vegetation outside the extent of the proposed widened internal access track will be retained)

Trees in close proximity of the internal access track, but not affected by the proposed works, as at sufficient distance from the edge of the widened access track

Trees / Vegetation to be 'reduced'

Trees requiring branches to be removed / reduced, as indicated on the plan

Hedge / scrub vegetation to the east of the site entrance to facilitate sight lines towards the L3204

Trees / Vegetation to be removed

Trees to be removed as stems along edge of the widened access road and therefore retention is not feasible

Scrub vegetation (mainly gorse and bramble, also some willow) along the edge of the internal access track and woodland vegetation (including gorse, hazel, birch, willow and oak) on the former pit slope to be removed

Rev	Amendments	Date	By	Chk	Auth

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Drawing Status & Suitability Code: **FINAL**

Client: KEOHANE READYMIX LTD.

Project: SAND & GRAVEL PIT
KNOCKROE, BANDON, CO. CORK

Drawing Title: Vegetation Removal Plan

Scale		SLR Project No.
1:2000	@ A3	065557.00001

Designed	Drawn	Checked	Authorised
AM	AM	TP	TP
Date: 04/25	Date: 04/25	Date: 04/25	Date: 04/25

Drawing Number: **FIGURE 2-6** Rev.: **0**

\\slr.local\ie\Offices\IE\Dublin\SLR DATA\SLR Project\065557 KRL OD\scolls Lands S & G PA EIAR AA\EIAR\Volume-2 EIAR Report Figs Appends\02 Project Description\Dwgs\CAD\Wking\065557 FIG_2-6 Tree Removal Plan.dwg 09/04/2025

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Appendix 2-A Environmental Management System (EMS) Structure

EMS Structure

1. Intr0duction
2. Environmental Policy
3. Environmental Aspects
4. Organisation & Management Structure
5. Environmental Monitoring Plan
6. Environmental Management Controls
7. Training, Awareness and Competence
8. Public Communications
9. EMS Documentation
10. Emergency Response (Including Accidental Spillages)
11. Complaints / Non-conformances & corrective Action
12. Annual Environmental Report
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ALTERNATIVE DESIGNS/LAYOUTS **4**
ALTERNATIVE TECHNIQUES & PROCESSES **4**

Introduction

Background

3.1 This chapter of the Environmental Impact Assessment Report (EIAR) considers the topic of Alternatives in relation to the extraction of sand & gravel at Knockroe, Bandon, Co. Cork.

3.2 For the purposes of this EIAR, the area within the red line boundary on EIAR Figure 1-2 is referred to as 'the application area' and the wider landholding (within the blue line boundary as per EIAR Figure 1-2), is referred to as 'the overall site'.

3.3 Further detail on the proposed development and the application site context is provided in Chapter 2 of this EIAR.

Scope of Work / EIA Scoping

3.4 In relation to consideration of alternatives the DoHPLG (2018) Guidelines for Planning authorities and An Bord Pleanala on carrying out Environmental Impact Assessment state:

"4.12 The Directive requires that information provided by the developer in an EIAR shall include a description of the reasonable alternatives studied by the developer. These are reasonable alternatives which are relevant to the project and its specific characteristics. The developer must include the main reasons for the option chosen taking into account the effects of the project on the environment.

4.13 Reasonable alternatives may relate to matters such as project design, technology, location, size and scale. The type of alternatives will depend on the nature of the project proposed and the characteristics of the receiving environment. For example, some projects may be site specific so consideration of alternatives may not be relevant."

Contributors / Author(s)

3.5 This chapter of the EIAR was prepared by Tim Paul (MSc, MRICS, CEng, MIQ), Chartered Minerals Surveyor and Chartered Engineer, SLR Consulting Ireland. Tim works as a planning and environmental advisor on minerals planning / EIA and development in Ireland and internationally. Over the past 20 years he has been responsible for the scoping, preparation and submission of numerous EIA's / EIAR's for sand & gravel pits and quarry developments. Tim was a lead author of the Environmental Management Guidelines for Extractive Industry (EPA, 2006).

Difficulties Encountered

3.6 No limitation or difficulties were encountered in the preparation of this chapter of the EIAR.

Lands At Knockroe, Bandon

3.7 The proposed development is located in an area favourable to extraction activities, due to, *inter alia*:

- Established history of sand & gravel extraction and value-added concrete manufacturing landuse in the area, e.g. the adjacent Dromkeen Pit and the historical sand & gravel extraction activity on the site;
- Proven sand & gravel reserves, noting that these developments are resource tied (i.e. can only be worked where the resource / reserves are present) – refer to EIAR Chapter 6;
- Close proximity to an established concrete facility at Dromkeen Pit, very short haulage distances (c. 0.5km) – refer to EIAR Chapter 14;
- Favourable topography – the scheme design / layout maximises the screening provided by the existing topography and existing woodland;
- Low development costs – the development will comprise extraction of sand & gravel (and restoration) only and will supply the existing concrete facility at Dromkeen Pit.

Do Nothing Alternative

3.8 If the development did not proceed, the site would likely remain in agricultural use and the Applicant would have to source sand & gravel from another site at considerably greater distances from Dromkeen Pit.

Demand for Aggregates / Replenishment Requirements

3.9 The Irish Concrete Federation (ICF) estimates that annual consumption of aggregates in Ireland is now in the region of 60 million tonnes.

3.10 Later this year, ICF will publish a report showing that over the past eight years (2017-2024) the 'replenishment' of aggregate reserves has been running behind annual consumption.

3.11 The report will state that on average, approximately half of the annual consumption has been replenished by means of new planning authorisations. If this pattern continues, the authorised reserves of aggregate will diminish substantially.

3.12 Continued failure to replenish sand & gravel, and rock reserves at anywhere near the same rate as the construction sector demands will diminish the aggregate reserve base upon which the delivery of public infrastructure and new housing is dependent.

3.13 The proposed sand & gravel extraction at Knockroe will secure sand & gravel supply for the Applicant, supplementing the existing reserves at Dromkeen Pit, which is a strategically important facility for the supply of concrete to Cork and the wider region.

Alternative Sources Of Aggregates

3.14 In the medium term there are no real alternatives to the current land-based sources of construction aggregates.

3.15 End of Waste criteria in respect of Construction & Demolition (C & D) materials for limited products and use are currently being implemented. Notwithstanding this, the volume of C&D waste suitable for recycling into secondary aggregates would be considered very low in comparison to the overall demand for aggregates. The demographic spread of the population results in only the large urban centres potentially being capable of generating sufficient volumes of construction and demolition (C&D) waste to justify a commercial operation producing secondary aggregates going forward.

3.16 In the longer term (>25 years), there may be some scope for extraction of sand and gravel from marine sources.

3.17 In the absence of significant volumes of aggregates from recycled / secondary and marine sources, land-based deposits (such as the sand & gravel resources at Knockroe) will continue to be the main source of construction aggregates in Ireland, including the wider Cork Region.

Alternative Locations

3.18 Sand & gravel resources provide the raw materials for concrete aggregates and other construction materials Keohane Readymix are continuously assessing potential lands for sand & gravel extraction, including both lands that could form extensions to their existing sand & gravel pits and lands for new “greenfield” sand & gravel extraction developments.

3.19 The current planning application is for extraction of sand & gravel at Knockroe, Bandon, Co. Cork to supply aggregates for concrete production at their Dromkeen Pit facility.

3.20 At the current time, there is no suitable alternative replenishment reserves available to the applicant in the Innishannon area. It is generally accepted that the overall timeframe for development of a ‘greenfield’ quarry site (from initial site selection, land acquisition, preparation of a planning application and accompanying EIAR, through planning process and site development to extraction of aggregates) takes between 5 and 10 years. On this basis it is important to replenish sand & gravel reserves on a continuous basis.

3.21 Notwithstanding the above, the proposed development would be beneficial in planning terms by eliminating the need for:

- Extracting additional materials from other pits within the county. This would result in faster depletion of aggregate resources at these other locations and potentially result in future intensification of those operations;
- Haulage of materials by road from other pits within the county, with potentially longer haulage distances and increased traffic levels on the wider road network.

3.22 This development is not like a factory for example that can be located at many locations; this is a resource tied development. Aggregates can only be worked where they exist and where the environmental effects of working such resources can be managed to an acceptable level.

3.23 On the basis of the above, it is considered that the proposed sand & gravel extraction at Knockroe, subject to the proposed scheme design (incl. restoration); implementation of best environmental management practice and compliance with appropriate planning controls (i.e. planning conditions and recommended emission limit values for the sector) is consistent with proper planning and sustainable development.

Alternative Designs/Layouts

3.24 The proposed development comprises sand & gravel extraction at Knockroe, Bandon, Co. Cork. Alternative designs and layouts have been considered, and these alternatives have included:

1 Extraction Area: options for maximising the extraction area over the full land interest ownership were considered. The extent of the extraction area has been limited to maximise the benefit of screening from the natural topography (retaining the historical pit face) and existing woodland area.

2 Depth of extraction: the sand & gravel reserves extend below the groundwater level. Consideration was given to extraction below the groundwater level. For this application, the depth of extraction has been limited to 2 metres above groundwater level, and extraction will take place by Dry working (i.e. no extraction below the groundwater level).

Alternative Techniques & Processes

3.25 Keohane Readymix are a company with expertise and experience in the field of sand & gravel extraction, aggregates production, and manufacturing of concrete products. Alternative extraction techniques are not relevant to the proposed development.

3.26 The Applicant uses / will use established industry standard and best practice mechanical extraction techniques to extract sand & gravel. Alternative extraction techniques are not relevant to the proposed development.

3.27 There will be no processing on site. The extracted sand & gravel will be transported a short distance c. (0.5km) to the adjacent Dromkeen Pit for use in concrete production.

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FIGURES

Figure 4-1: Extent of Small Area ID A047230002

Introduction

Background

4.1 This Chapter of the Environmental Impact Assessment Report (EIAR) relates to the potential effects of sand & gravel extraction at Knockroe, Bandon, Co. Cork on population and human health.

4.2 There are a number of sources of effects from the proposed development with potential to impact on population, human health. These include noise, visual, air quality, and traffic. The potential effects on population, human health with respect to air quality, noise, landscape and visual impacts, air quality, and traffic impacts are addressed separately in Chapters 8, 10, 13, and 14 of the EIAR.

4.3 The proposed development is located in the townland of Knockroe (refer to EAIR Figures 1-1 and 1-2). It comprises:

- Extraction of sand & gravel over an area of c.3.5 Ha.
- Extraction by dry working to 2 metres above the groundwater level, at a maximum rate of 100,000 tonnes per year.
- Transport of the extracted sand & gravel to the adjacent Dromkeen Pit (Plan. Ref. 23/04780) for use in concrete production;
- Upgrading of the existing internal access road and use of the existing access onto the local road L3204.
- Provision of wheelwash and welfare unit (c.8.3 sq.m).
- Restoration of the lands to agricultural and natural habitat use;
- All within an application area of c.4.0 hectares.

4.4 The application site extends to c. 4.0 hectares. The existing site and proposed development are shown on EIAR Figures 2-1 and 2-2. The proposed development includes restoration of the lands to natural habitat / agricultural use, refer to EIAR Figure 2-5.

4.5 Throughout this chapter the 'proposed development' refers to the elements of the project for which planning permission is being sought as set out in EIAR Chapter 2 – Project Description.

Scope of Work / EIA Scoping

4.6 The objective of the Directive (Directive 2011/92/EU), as amended by Directive 2014/52/EU, is to ensure a high level of protection of the environment and human health, through the establishment of minimum requirements for environmental impact assessment (EIA), prior to development consent being given, of public and private developments that are likely to have significant effects on the environment.

4.7 In the context of 'population and human health, Article 3.1 states that 'the environmental impact assessment shall identify, describe, and assess in an appropriate manner, in the light of each individual case, the direct and indirect significant effects of a project on a number of factors inclusive of population and human health'.

4.8 In reference to "human health", in the context of implementing the 2014 Directive, the Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (August 2018) refer to European Commission guidance which states that

> *"Human health is a very broad factor that would be highly project dependent. The notion of human health should be considered in the context of other factors in Article 3(1) of the EIA Directive and thus environmentally related health issues (such as health effects caused by the release of toxic substances to the environment, health risks arising from major hazards associated with the Project, effects caused by changes in disease vectors caused by the Project, changes in living conditions, effects on vulnerable groups, exposure to traffic noise or air pollutants) are obvious aspects to study. In addition, these would concern the commissioning, operation, and decommissioning of a Project in relation to workers on the Project and surrounding population"*

4.9 Annex IV point 5(d) also refers to the need for the EIAR to include '*a description of the likely significant effects of the project on the environment resulting from, inter alia:*

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

4.10 On the basis of the guidelines, the scope of this Chapter of the EIAR is limited to a consideration of population, employment, tourism and the economy, amenity and human health in the context of the specialist environmental topics addressed by this EIAR.

Consultations / Consultees

4.11 No external consultations were undertaken in the preparation of this Chapter of the EIAR.

Contributors / Author

4.12 This chapter of the EIAR was prepared by Tim Paul (MSc, MRICS, CEng, MIQ), Chartered Minerals Surveyor and Chartered Engineer, SLR Consulting Ireland. Tim works as a planning and environmental advisor on minerals planning / EIA and development in Ireland and internationally. Over the past 20 years he has been responsible for the scoping, preparation and submission of numerous EIA's / EIAR's for sand & gravel pits and quarry developments. Tim was a lead author of the Environmental Management Guidelines for Extractive Industry (EPA, 2006).

Limitations / Difficulties Encountered

No limitation or difficulties were encountered in the preparation of this Chapter of the EIAR.

4.13 Regulatory Background

Legislation

4.14 There is no specific legislation relevant to this Chapter of the EIAR. Legislation, if any, which is relevant to each pathway (noise, air, soil, water, etc), is addressed elsewhere in this EIAR.

Guidance

4.15 This Chapter of the EIAR has been prepared on the basis of the 'Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment' (Department of Housing, Planning and Local Government, 2018) and *Guidelines on the Information to be contained in Environmental Impact Assessment Reports* by the EPA (2022).

4.16 It also follows the Institute of Environmental Management and Assessment (IEMA) two guidance documents issued in 2022 on the assessment of human health within EIA:

- Effective Scoping of Human Health in EIA; and
- Determining Significance for Human Health in EIA.

4.17 Section 1.11 of the IEMA Guidance on the Effective Scoping of Human Health in EIA recommends that if there is not potential for likely significant population effect, human health should be scoped out of the EIA. The guidance makes clear that the topics of population and human health are separate technical topics. The assessment of socio-economic conditions addressed through the topic of 'Population' provides baseline information on which an assessment of sensitivity of human health can be made, therefore it is considered appropriate that both topics are covered within this chapter.

Receiving Environment

The Proposed Development Site

4.18 The proposed development is located approximately 6km east of Bandon and 2km south of Innishannon in Co. Cork, refer to Figure 1-1.

4.19 The lands are bounded by woodland / local roads to the north and east; and woodland / agricultural lands to the south and west. The Bandon River is located on the eastern side of the L3204 local road flowing in a southerly direction, refer to Figures 1-1 and 1-2.

4.20 The surrounding landuse is predominantly woodland and agricultural grazing land. There is a history of sand & gravel extraction in the area with the existing Dromkeen sand & gravel pit and concrete plant operated by Keohane Readymix Ltd. located c. 200 metres to the north of the site.

4.21 There are a number of residential dwellings located along the roads to the north and east of the site.

Sources of Information

4.22 Baseline information was obtained from the following sources:

- Myplan.ie (http://myplan.ie/index.html);
- Pobal.ie (https://maps.pobal.ie/WebApps/DeprivationIndices/index.html)
- Historic Environment Viewer (http://webgis.archaeology.ie/historicenvironment/);

- Specialist environmental topic chapters of this EIAR;
- Ordnance Survey maps;
- Aerial photography;
- Openstreetmap.org;
- Live Register Statistics;
- Census 2016.

Local Receptors

4.23 EIAR Figures 8-1 and 10-1 show local receptors within 500m of the application boundary for the proposed development. The closest retail outlets, schools and community facilities are concentrated in the nearby towns of Innishannon and Bandon.

Population

4.24 Population relates to the people living in an area. This section provides an overview of the population profile for the study area, Cork County and the State between 2011 and 2022 in order to create a baseline demographic profile of the receiving environment and identify potential impacts on demographic trends arising as a result of the proposed development.

4.25 The study area for the purpose of assessing population has been chosen based on Electoral Division (ED) within which the proposed development is located. This incorporates the **ED of Knockroe.**

4.26 The review of population is based on a **Small Area ID A047230002** (shown in Figure 4.1) and the electoral division of Knockroe. The change in population from 2011 to 2022, as per CSO Census data for the electoral division, County Cork, Munster and the State is also outlined in Table 4.1 below.

Table 4-1: Population Change 2011 - 2022[1]

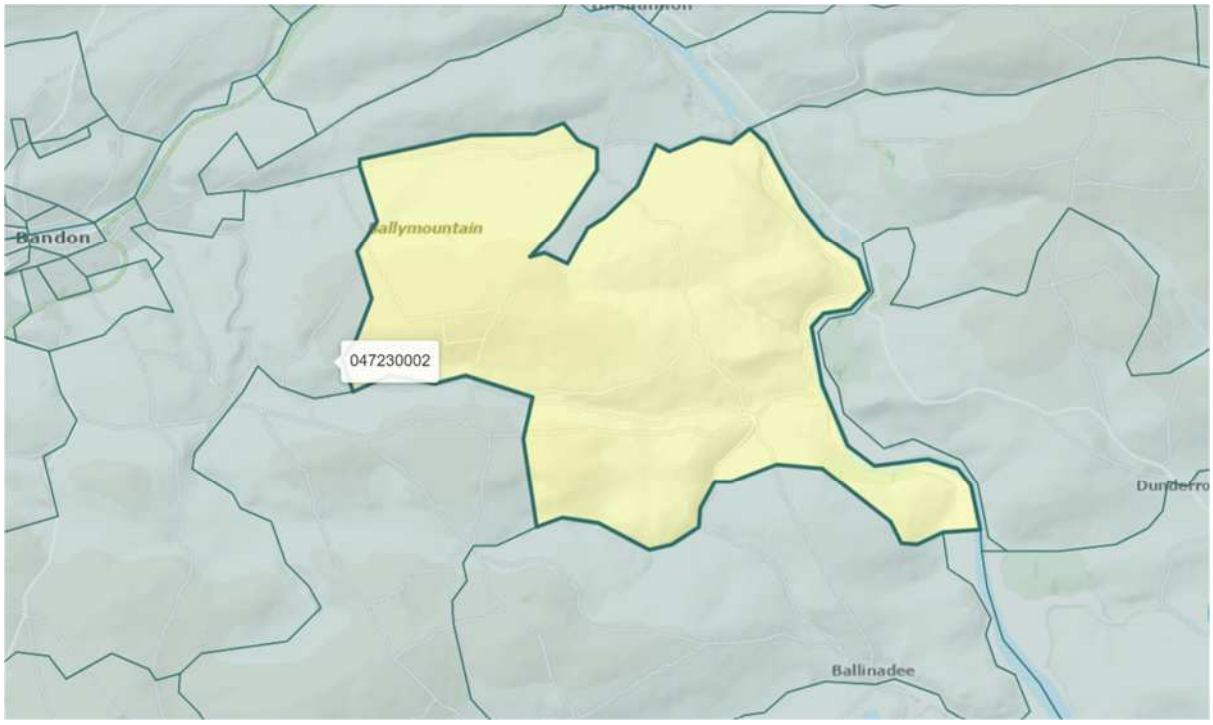
	2011	2016	2022	% Change 2011-2016	% Change 2016-2022
Small area ID A047230002	372	394	445	+6%	+13%
Knockroe ED	690	702	767	+2%	+9%
Co. Cork & Cork City[2]	519,032	542,868	584,156	+5%	+8%
Munster	1,244,088	1,280,020	1,373,346	+3%	+7%
Ireland	4,588,252	4,757,865	5,149,139	+4%	+8%

[1] https://visual.cso.ie/?body=entity/ima/cop/2022

[2] Owing to the expansion of the Cork City administrative boundary between 2016 and 2022 it is more useful to compare Cork City and Cork County population figures across the census periods

4.27 The data presented in Table 4-1 demonstrates that the population of Knockroe ED increased considerably in the period between 2011 and 2016 (2%), and even higher growth occurred from 2016 to 2022 (9%). This is in line with the population trends witnessed across Cork City and County combined, Munster and the State for the same period which experienced a 3-5% growth in population between 2011 and 2016, and a 7-8% growth in the period 2016-2022. The extent of population growth at the more localised level (small area) was higher than the rate observed within all the overarching levels, in particular for the period 2016-2022 when an increase of 13% of the small area population was experienced.

Figure 4-1: Extent of Small Area ID A047230002



Household Statistics

4.28 Table 4-2 sets out the number of households and average household size (in persons) for the State, Cork City, Cork County and Knockroe ED for the 2011, 2016 and 2022 census periods, respectively.

4.29 The total number of households within Knockroe ED increased from 228 to 254 between the 2011-2022 Census, representing an increase of 11.4%. Because of an increase in the Cork City administrative area between the 2016 and 2022 census periods, a direct comparison on total number of households within those areas is not possible. However, within the combined Cork County and City areas, there was a growth of 12.4% in household numbers between 2011 and 2022. Similar but lower growth rates were also recorded for the state with a figure of 11.3% during the same period. In all cases, the growth of household numbers between 2016 and 2022 was higher than between 2011 and 2016.

Table 4-2: Number of Households and Average Household Size 2011-2022

Area	2011		2016		2022	
	No. of Households	Avg. Size (Persons)	No. of Households	Avg. Size (Persons)	No. of Households	Avg. Size (Persons)
State	1,654,208	2.8	1,702,289	2.9	1,841,152	2.8
Cork City	47,163	2.5	49,411	2.5	83,391	2.7
Cork County	140,856	2.8	146,442	2.8	127,971	2.8
Knockroe ED	228	3.0	239	2.9	254	3.0

4.30 The average size of households (in persons) has generally remained constant across all administrative levels between 2011 and 2022. It is likely that the increased average household size in Cork City administrative area is linked with the widened boundary radius from the city centre and thus including more suburban areas. The slightly larger average household size at the ED level is consistent with the higher levels of population growth observed in the area over the census periods.

Age Structure

4.31 The age structure of Knockroe ED recorded in the 2011 and 2022 census is largely in line with that of the national age structure of County Cork as detailed in Table 4-3.

Table 4-3: Percentage of Population per Age Category Census 2016 and 2022

Age	Knockroe ED		Cork City		County Cork		State	
	Pop % 2016	Pop % 2022	Pop % 2016	Pop % 2022	Pop % 2016	Pop % 2022	Pop % 2016	Pop % 2022
0 to 4	7.55	6.91	5.02	3.17	7.51	6.01	6.96	5.74
5 to 9	9.83	8.47	4.80	3.49	8.25	7.24	7.47	6.65
10 to 14	7.98	9.26	4.46	3.64	7.15	8.02	6.71	7.27
15 to 19	4.56	7.17	6.31	3.74	6.45	6.86	6.36	6.56
20 to 24	4.13	4.04	10.12	4.90	4.74	4.88	5.75	5.96
25 to 29	3.70	3.26	9.11	4.80	5.03	4.31	6.46	5.74
30 to 34	6.55	4.30	8.86	4.81	7.02	5.35	7.81	6.45
35 to 39	6.98	6.91	7.37	4.89	8.36	6.99	8.39	7.44
40 to 44	9.69	7.30	6.00	4.72	7.94	8.19	7.72	7.99
45 to 49	7.98	9.13	5.58	4.09	7.27	7.78	7.06	7.25
50 to 54	8.55	6.65	5.99	3.75	6.57	7.01	6.30	6.60
55 to 59	5.27	7.17	5.72	3.65	5.69	6.31	4.62	5.97
60 to 64	5.41	4.69	4.96	3.31	5.03	5.45	5.02	5.30
65 to 69	4.13	4.69	4.56	2.70	4.41	4.84	4.44	4.62
70 to 74	2.99	3.26	3.26	2.33	3.30	4.13	3.41	3.94
75 to 79	3.28	3.13	3.22	1.86	2.27	3.10	2.42	3.00

Age	Knockroe ED		Cork City		County Cork		State	
	Pop % 2016	Pop % 2022	Pop % 2016	Pop % 2022	Pop % 2016	Pop % 2022	Pop % 2016	Pop % 2022
80 to 84	0.71	2.48	2.32	1.28	1.64	1.86	1.70	1.88
85+	0.71	1.17	1.70	1.07	1.35	1.67	1.4	1.64
Total	702	767	125,657	224,004	417,211	360,152	4,761,865	5,149,139

4.32 The age profile of Knockroe ED in 2022 was comprised of a notably larger proportion of people aged 0-19 than Cork City, Cork County or the State. The much lower levels of this age group in Cork City are indicative of typical city demographics. However, the expansion of the Cork City administrative boundary between 2016 and 2022 renders the 2022 age profile data incomparable between 2016 and 2022 for Cork City and County.

4.33 Knockroe ED has a lower population of the ages between 20 and 44 than the State overall, but much higher proportion in the age range 45 to 64. This combined with the higher level of growth observed in the teenage profile in the ED between 2016 and 2022 would indicate a prevalence of older families.

4.34 The proportion of ED residents aged over 65 is broadly in line with that observed at the national level, though the rate of increase in this age range in the period between 2016 and 2022 was almost 6%.

Socio-Economics

4.35 This section provides an overview of the socio-economic, employment and economic activity associated with the receiving environment (Knockroe ED), Cork City, Cork County and the State, in order to provide an understanding of the overall socio-economic profile of the receiving environment.

4.36 Live register data (CSO, 2024) provides information relating to the number of people registering for Jobseekers Benefit, Jobseekers Allowance, or for various other statutory entitlements. The figure is useful to gauge unemployment estimations for an area; however, it is noted that the Live Register data includes part-time workers (working up to three days per week), seasonal workers and casual workers who are entitled to Jobseekers Benefit or Jobseekers Allowance and therefore, cannot be relied upon entirely for conclusive employment data. Table 4-4 notes the live register data for the area.

Table 4-4: Live Register Data for Cork County, Cork City and the State 2017-2024 (yearly average)

	2017	2018	2019	2020[3]	2021	2022	2023	2024
Cork County	23,297	19,341	16,104	16,580	14,311	14,916	14,740	14,026
Cork City	9,962	9,115	6,502	6,782	5,683	6,059	5,849	5,949
State	258,580	220,065	195,370	211,492	175,360	179,876	179.422	170,916

[3] Totals for 2020 do not include persons in receipt of the Pandemic Unemployment Payment (PUP)

4.37 Between 2017-2019, the average number of people on the live register steadily dropped in Cork County, Cork City and the State. Cork City saw the largest proportional drop in registered unemployment with a 35% decrease between 2017 and 2019. Cork County saw a 31% decrease in registered unemployment in the same period and the State's figures showed a 24% decrease in registered unemployment between 2017 and 2019.

4.38 Between 2019 and 2020, numbers on the live register begin to show another rise, likely due to the economic downturn associated with the COVID-19 pandemic. The state witnessed a higher rise in unemployment in 2020 than that within Cork City and Cork County.

4.39 The closest Social Welfare Office to the application site within Cork is in Bandon, which covers the areas of Bandon, Innishannon and the immediate surrounds. According to the February 2025 Live Register statistics, there were 433 persons in the Bandon area on the live register. This figure has relatively consistently been dropping since the latter part of 2022 with the most recent high of 630 persons on the live register in August 2022. This had fairly consistently dropped from previous figures up to 1,624 in July 2010.

4.40 The population of Knockroe and County Cork categorised by occupation[4] at the time of Census 2022 is shown in Table 4.5 below. This shows that the population of the ED is more likely to be engaged in Professional, Managers, Directors and Senior Official and Skilled Trade occupations than the population of the wider county. The population of Knockroe is also slightly less likely to be engaged in Process, Plant and Machine Operative, Administrative, Caring, Elementary or Sales occupations than the County as a whole.

Table 4-5: Population of Knockroe ED and County Cork[5] by Occupation

	Knockroe		County Cork	
Occupation	**No.**	**%**	**No.**	**%**
Managers, Directors and Senior Officials	31	8.7	12,887	7.6
Professional Occupations	97	27.3	33,695	19.8
Associate Professional and Technical Occupations	47	13.2	19,075	11.2
Administrative and Secretarial Occupations	21	5.9	14,558	8.6
Skilled Trades Occupations	68	19.2	28,627	16.8
Caring, Leisure and Other Service Occupations	20	5.6	12,951	7.6
Sales and Customer Service Occupations	13	3.7	9,675	5.7
Process, Plant and Machine Operatives	29	8.2	14,674	8.6
Elementary Occupations	14	3.9	12,595	7.4
Not stated	15	4.2	11,207	6.6
Total	355	100%	69,944	100%

[4]

[5] Census data from Cork County Council is chosen as more representative than Cork City given the rural nature of the site

4.41 The employment make-up of an area is an important element of its socio-economic profile. The CSO Census of Population 2022 shows that employment within Knockroe ED is weighted towards agriculture, forestry and fisheries, manufacturing and public administration than the wider population in Co. Cork, refer to Table 4-6 below. The population of this ED is less likely to be employed in building and construction.

Table 4-6: Persons at Work in Knockroe ED and County Cork by Industry

	Knockroe		County Cork	
Industry	**No.**	**%**	**No.**	**%**
Agriculture, forestry and fishing	30	8.7	10,476	6.5
Building and construction	14	4.0	10,367	6.4
Manufacturing industries	66	19.1	28,798	17.9
Commerce and trade	73	21.1	34,664	21.5
Transport and communications	27	7.8	10,875	6.7
Public administration	23	6.6	7,854	4.9
Professional services	80	23.1	37,711	23.4
Other	33	9.5	20,426	12.7
Total	346	100.00%	161,174	100.00%

Recreation, Amenity and Tourism

4.42 This section provides an overview of the recreation, amenity and tourism value in the immediate area, County Cork and the State in order to assess the potential effects arising from the proposed development.

4.43 Tourism is one of the major contributors to the national economy and is a significant source of full time and seasonal employment, particularly in remote rural areas which lack industry bases. Tourism statistics published by Fáilte Ireland[6] for the South West region are reproduced in Table 4-7 below. Compared to the other regions of Ireland, the tourism sector in the region is extremely strong in terms of both visitor numbers and revenue generated. The South West region is particularly strong in terms of domestic tourism.

Table 4-7: South West Regional Performance (Tourism in 2023)

Region		Britain	Mainland Europe	North America	Other Areas	All Overseas	Northern Ireland	Domestic Trips
South West	Tourists (000s)	407	437	396	81	1,321	56	3,031

6 https://www.failteireland.ie/FailteIreland/media/WebsiteStructure/Documents/Research/Key%20Tourism%20Facts%20and%20Figures%202023/FI_Key-Tourism-Facts-2023_National-Summary.pdf?ext=.pdf

Region		Britain	Mainland Europe	North America	Other Areas	All Overseas	Northern Ireland	Domestic Trips
South West	Tourist Revenue (€M)	226	381	285	70	962	26	839

4.44 Feedback obtained from Fáilte Ireland from visitors reveal hiking and cross country walking as particularly popular amongst visitors to the Country as a whole. The economic importance of sustaining the natural environment is evident in the appeal of this type of activity as well as other outdoor pursuits such as cycling, golf, angling and equestrian activities. Doneraile Park and Blarney Castle & Gardens were the top fee-charging attractions in the Cork area in 2023. Doneraile Park was visited by 523,800 persons and Blarney Castle & Gardens was visited by 470,000 persons.

4.45 The tourism sector was heavily impacted by the Covid emergency in 2020 and has been steadily recovering since. The 'Tourism Barometer' issued by Fáilte Ireland in January 2025 reported that Ireland had mixed results in 2024, with 46% of businesses increasing their revenue in 2024, 18% sustaining the same level and 36% reporting a decrease. Restaurants and cafés reported the most decline.

4.46 In terms of outlook, 39% of businesses expect their visitor levels to be up in 2025, and 42% expect volumes to remain the same.

4.47 The application site is located within the well-known tourist route along the Atlantic coast from Donegal to West Cork marketed as the 'Wild Atlantic Way'. It is a highly regarded tourist destination, well known for its spectacular landscapes, hospitality and potential for a range of adventure activities.

4.48 Recreation and tourism amenities located within 2km of the proposed development are listed below.

- Innishannon House Hotel, Riverbank House and various B&Bs
- Old Church and Tower of St. Mary
- Bandon River (permits and licences for fishing)
- Kilpadder Famine Burial Ground

General Health

4.49 Pobal is an organisation that works on behalf of Government to support communities and local agencies toward achieving social inclusion and development. The organisation produces mapping information including on deprivation indices in order to identify areas in need of social/community investment. The overall levels of deprivation have been based on census data in relation to demographic profile, social class composition and labour market situation. According to the deprivation indices based on 2022 census data, Knockroe ED is categorised as marginally above average (i.e. slightly advantaged).

4.50 Table 4-8 presents the results of the 2022 census in relation to the self-reported health status of Knockroe ED, Cork County and State residents.

Table 4-8 Self-reported Health Status at ED, County and State level

Area	Very Good	Good	Fair	Bad	Very Bad	Not Stated
Knockroe ED	61.0%	27.2%	6.8%	1.2%	0.7%	3.1%
Co. Cork	57.0%	29.6%	7.8%	1.1%	0.3%	4.2%
State	53.2%	29.7%	8.6%	1.4%	0.3%	6.7%

4.51 The information presented in Table 4-8 does not suggest specific vulnerability in health terms in the local area with 88.2% of respondents classifying their health as either very good or good, which is higher than the 86.6% at County and 82.9% at State level.

Impact Assessment

Evaluation Methodology

4.52 The evaluation of effects on employment, the economy, human health and amenity comprises a qualitative assessment based on the quantitative and qualitative analysis of potential effects on the environment undertaken in other chapters of this EIAR. The assessment takes into account a review of relevant literature and professional judgement in relation to impact on population and human health.

Economy

Construction Stage Impacts

4.53 The proposed development is for sand & gravel extraction. Topsoil and subsoil will be retained on site for use in restoration of the lands to agricultural and natural habitat use following cessation of extraction. No construction stage impacts on economy have been identified.

Operational Stage Impacts

4.54 The development of proven sand & gravel reserves at the site is required to ensure that Keohane Readymix has a secure supply of aggregates for concrete production to meet the demands of the market(s) they have built up in the region, including supply, to the local construction industry, infrastructure projects and Local Authorities.

4.55 The proposed development is of strategic importance in relation to the construction of new housing in particular and this is underlined by national objectives in relation to house building. The recently adopted National Planning Framework targets the delivery of 550,000 additional households in Ireland to 2040 (National Policy Objective 32).

4.56 This is a medium-term, direct and positive effect on the local and regional economy.

Employment

Construction Stage Impacts

4.57 The proposed development is for sand & gravel extraction. Topsoil and subsoil will be retained on site for use in restoration of the lands to agricultural and natural habitat use following cessation of extraction. Employment will be secured in line with that outlined under the Operational Stage below.

Operational Stage Impacts

4.58 The development will provide direct employment for up to 2 people and will support the wider Keohane Readymix Ltd. business that employs c. 120 people directly.

4.59 This employment will be secured for the duration of the development. The development will also support further indirect employment through supplier and maintenance contracts.

4.60 This is a medium-term, direct and positive effect on employment.

Post – Operational Stage Impacts

4.61 Following the cessation of operations, the application site will be restored. The cessation of operations after restoration would result in the loss of jobs related to the extraction and restoration operations at the site. In the long term, the closure of the pit will result in a long term negative effect on employment.

Tourism

Construction Stage Impacts

4.62 The proposed development is for sand & gravel extraction. Topsoil and subsoil will be retained on site for use in restoration of the lands to agricultural and natural habitat use following cessation of extraction. No construction stage impacts on tourism have been identified.

Operational Stage Impacts

4.63 The potential for impacts on these tourism assets in relation to landscape and visual impact (scenic routes, protected views etc.) and traffic receptors has been considered in chapter 13 and 14 respectively. These assessments demonstrate that the potential for adverse effects on existing tourism assets is negligible.

Human Health

4.64 The key pathways in relation to human health in this instance are Water (EIAR Chapter 7), Air Quality (EIAR Chapter 8) and Noise (EIAR Chapter 10).

Construction Stage Impacts

4.65 The proposed development is for sand & gravel extraction. Topsoil and subsoil will be retained on site for use in restoration of the lands to agricultural and natural habitat use following cessation of extraction. With implementation of the management and mitigation measures set out in the EIAR chapter 7 Water, Chapter 8 – Air Quality, and Chapter 10 – Noise no significant construction stage impacts on human health are envisaged.

Operational Stage Impacts

4.66 The operational stage of the development relates to the extraction of sand & gravel and the restoration of the overall site to agricultural use and natural habitat.

4.67 During the operational stage, the potential impacts on air, noise, and water may include the following:

- the generation of dust and noise, through the extraction of sand & gravel;
- the generation of noise by the operation of machinery;
- the leakage or spillage of fuels or other materials to soil and, ultimately to groundwater or surface water.

4.68 As outlined in Chapters 7, 8 and 10 of this EIAR, existing best practice mitigation and management measures will be implemented. With implementation of these management measures, the proposed development will not have a significant impact on the water environment; will not have a significant dust deposition impact on human receptors; and will have a negligible noise impact on human receptors / the nearest pNHA.

4.69 On this basis, it is considered that there would be no likely significant effect on human health during the operational stage.

Post – Operational Stage Impacts

4.70 Following restoration, the potential effects on air and noise would cease owing to the cessation of extraction operations, the cessation of machinery operation and the growth of vegetation. The implementation of mitigation measures during the operational stage and the removal of all machinery and ancillary facilities (welfare unit and wheelwash) during restoration will ensure that there would no residual effects on soil and water during the post-operational stage.

Amenity

4.71 The key matters in relation to amenity in this instance are Air Quality (Chapter 8), Noise (Chapter 10), Landscape (Chapter 13) and Traffic (Chapter 14).

Construction Stage Impacts

4.72 The proposed development is for sand & gravel extraction. Topsoil and subsoil will be retained on site for use in restoration of the lands to agricultural and natural habitat use following cessation of extraction. With implementation of the

management and mitigation measures set out in the EIAR chapter 7 Water, Chapter 8 – Air Quality, and Chapter 10 – Noise no significant construction stage impacts on amenity are envisaged.

Operational Stage Impacts

4.73 The operational stage of the development relates to the extraction of sand & gravel and the restoration of the overall site to agricultural use and natural habitat.

4.74 During the operational stage, the potential impacts on air, noise, and water may include the following:

- the generation of dust and noise, through the extraction of sand & gravel;
- the generation of noise by the operation of machinery;
- the leakage or spillage of fuels or other materials to soil and, ultimately to groundwater or surface water.

4.75 As outlined in Chapters 7, 8 and 10 of this EIAR, existing best practice mitigation and management measures will be implemented. With implementation of these management measures, the proposed development will not have a significant impact on the water environment; will not have a significant dust deposition impact on human receptors; and will have a negligible noise impact on amenity.

4.76 On this basis, it is considered that there would be no likely significant effect on amenity during the operational stage.

Post – Operational Stage Impacts

4.77 Following restoration, the potential effects on air and noise would cease owing to the cessation of extraction operations, the cessation of machinery operation and the growth of vegetation. The implementation of mitigation measures during the operational stage and the removal of all machinery and ancillary facilities (welfare unit and wheelwash) during restoration will ensure that there would no residual effects on soil and water during the post-operational stage.

Unplanned Events

4.78 According to the EPA guidelines, unplanned events, such as accidents, can include “spill from traffic accidents, floods or land-slides affecting the site, fire, collapse or equipment failure on the site”. The 2014 EIA directive refers to “major accidents, and/or natural disasters (such as flooding, sea level rise, or earthquakes)”.

4.79 In this instance, the vulnerability of the proposed development to accidents, unplanned events or natural disasters is relatively limited owing to the established nature of the techniques and procedures to be followed, the material to be handled on site and the rural location of the proposed works.

4.80 Unplanned events in relation to the proposed development could potentially relate to:

- instability following the removal and placement of materials;
- spill from traffic accidents;

4.81 The proposed development has been designed in accordance with the health & safety guidelines for the sector, including land stability and is highly unlikely to have any significant impacts on employment, human health or amenity, particularly beyond the site. In addition, the restoration scheme design will ensure that the final slopes are graded appropriately to ensure long term stability.

4.82 Chapter 14 - Traffic of this EIAR concludes that the development will have an imperceptible impact on road / junction capacity on the existing road network, and road safety.

Cumulative / Synergistic Impacts

4.83 The environmental consideration that has the greatest potential for significant cumulative impact on population and human health, and, in particular, on amenity, is traffic. This is assessed and discussed in the traffic impact assessment presented in Chapter 14 of this EIAR. That assessment concludes the traffic generation associated with the development will have an imperceptible impact on road / junction capacity on the existing road network, and road safety.

Transboundary Impacts

4.84 It is not anticipated that the impacts of the proposed development would have any significant transboundary effects on population and human health.

Interaction with Other Impacts

4.85 It is not anticipated that the effects of the proposed development on population and human health would interact significantly with other impacts. The impact of residual effects relating air, noise, water, soil, landscape and traffic on employment, human health and amenity are addressed above.

'Do-nothing Scenario'

4.86 In a 'do-nothing scenario', the land would likely remain in agricultural use.

Mitigation Measures

Construction Stage

4.87 The proposed development is for sand & gravel extraction. Topsoil and subsoil will be retained on site for use in restoration of the lands to agricultural and natural habitat use following cessation of extraction. EIAR Chapter 6 – Land Soils Geology sets out the soil management measures that will be implemented at the site. Management and mitigation measures as set out in the EIAR Chapters 7 - Water, 8 – Air Quality, and 10 – Noise will be implemented during the construction stage.

Operational Stage

4.88 Mitigation measures to be adopted in relation to population and human health during the operational stage will relate to minimising the effect of the development on surrounding local receptors in relation to dust, noise, water, soil, traffic and landscape. The mitigation and management measures to be implemented relate primarily to avoidance, prevention and reduction and are discussed in EIAR Chapters 7 - Water, 8 – Air Quality, 10 – Noise, 13 - Landscape and 14 - Traffic.

Post – Operational Stage

4.89 Consistent with the nature of the proposed final restoration works (returning the lands to beneficial agricultural and natural habitat afteruse) following permanent cessation of extraction activities a number of mitigation measures will be adopted in relation to population and human health during the post-operational restoration works. Such measures will be similar to the mitigation and management measures during the operational stage relate to minimising the effect of the development on surrounding local receptors in relation to air, noise, water, traffic and landscape. These measures relate primarily to avoidance, prevention and reduction and are discussed in EIAR Chapters 7, 8, 10, 13 and 14.

Residual Impact Assessment

Construction Stage

4.90 The proposed development is for sand & gravel extraction. Topsoil and subsoil will be retained on site for use in restoration of the lands to agricultural and natural habitat use following cessation of extraction. With implementation of the management and mitigation measures no significant residual construction stage impacts on population and human health will arise.

Operational Stage

4.91 As shown in Chapters 7, 8, 10, 13 and 14 of this EIAR, the mitigation and management measures would successfully eliminate or reduce the effects of the proposed development during the operational phase to acceptable levels. No further specific mitigation measures are required in relation to population and human health.

Post – Operational Stage

4.92 As shown in Chapters 7, 8, 10, 13 and 14 of this EIAR, the mitigation and management measures would successfully eliminate or reduce the effects of the proposed development during the post-operational phase to acceptable levels. No further specific mitigation measures are required in relation to population and human health.

Monitoring

4.93 As outlined in Chapters 2, 7, 8 and 10 of this EIAR, an environmental monitoring programme will be implemented for the proposed development and will include noise, air quality (dust deposition), and water . On this basis, no further specific monitoring is required in relation to population and human health.

References

Central Statistics Office Census 2011

Central Statistics Office Census 2016

Environmental Protection Agency (2022). *Guidelines on the Information to be contained in Environmental Impact Assessment Reports*. EPA.

Department of Housing, Planning and Local Government (August 2018). *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment*

Department of Housing, Planning and Local Government (February 2018). *Project Ireland 2040, National Planning Framework.*

South West Regional Authority (2010). Regional Planning Guidelines 2010-2022

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INTRODUCTION

5.1 SLR Consulting Ireland was commissioned by Keohane Readymix Ltd., to prepare a Biodiversity chapter which forms part of the Environmental Impact Assessment Report (EIAR) prepared in support of the proposed sand & gravel extraction at Knockroe, Bandon, Co. Cork.

Background

5.2 Keohane Readymix Ltd. intend to apply to Cork County Council for sand & gravel extraction at Knockroe, Bandon, Co. Cork. This Biodiversity Chapter forms part of the EIAR documentation to support the application for planning permission.

General Description of the Site

5.3 The Site is located at Knockroe, Bandon, Co. Cork, approximately 1 km south of the village of Inishannon (approximate Irish Transverse Mercator (ITM) 555594, 555733). It is adjacent to and directly south of an existing sand and gravel pit which is owned by the Client.

5.4 The lands within and surrounding the Site mainly consist of agricultural tillage lands with mixed broadleaved woodland located to the north of the Site and bordering the internal access road. The Bandon River runs in a north-south direction ca. 35 m east of the Site. A tributary stream (EPA Name: Farranagow 20) runs in a west-east direction directly to the north of the Site.

Brief Project Description

5.5 The Project is the proposed extraction of sand and gravel at Knockroe, Bandon, Co. Cork which will comprise the following items:

- Extraction of sand & gravel over an area of 3.5 Ha.
- Extraction by dry working to 2metres above the groundwater level, at a maximum rate of 100,000 tonnes per year.
- Transport of the extracted sand & gravel to the adjacent Dromkeen Pit (Plan. Ref.: 23/04780) for use in concrete production.
- Upgrading of the existing internal access road and use of the existing access onto the local road.
- Provision of wheelwash and welfare unit.
- Restoration of the lands to natural habitat and agricultural use.

5.6 The proposed development being applied for under this planning application is shown on Figure 2-2 in Chapter 2 ‘Project Description’ of the EIAR, with existing and proposed cross-sections shown on Figure 2-3. Works will take place within an overall application area of c. 4.0 hectares.

5.7 The proposed operational period is 15 years plus 2 years to complete final restoration (total duration sought c. 17 years).

Purpose of this Report

5.8 The purpose of this biodiversity chapter is to inform the Planning Application to Cork County Council by Keohane Readymix Ltd. in respect of the proposed sand & gravel extraction. This chapter forms part of the EIAR that will be submitted with the application for permission to assist the competent authority, in this case Cork County Council, to carry out an Environmental Impact Assessment (EIA) of the proposed project.

Evidence of Technical Competence and Experience

5.9 This report was prepared by SLR Project Ecologist Victoria Molloy and SLR Project Ecologist Kieran Moynihan. SLR Associate Ecologist Michael Bailey carried out the technical review for this report.

5.10 Victoria Molloy holds a BSc. in Zoology from the University of Galway. Victoria is a Project Ecologist with over 4 years' experience, and she is a Qualifying Member of the Chartered Institute of Ecology and Environmental Management (CIEEM). Victoria has prepared a range of survey reports and impact assessment reports for a variety of project types including quarries, renewable energy, forestry licence applications, housing, road, and industrial developments. She is also responsible for carrying out ecological surveys to inform these assessments including preliminary ecological assessment (PEA), habitat, ornithological, and marsh fritillary surveys.

5.11 Kieran is a Project Ecologist with over three years of experience in ecological consultancy. He holds a BSc in Ecology from University College Cork (UCC) and has developed a strong foundation in field surveys, impact assessments, and ecological reporting. Kieran has extensive experience conducting ecological surveys across multiple taxa, including vantage point surveys for wintering waders, bat emergence and activity surveys, mammal surveys, and detailed habitat assessments using the Fossitt Level III classification method. His work has contributed to Environmental Impact Assessment Reports (EIARs) and Appropriate Assessments (AAs) for a diverse range of projects, including large-scale industrial developments, major road schemes, and numerous wind farms.

5.12 Michael Bailey BSc (Hons) MSc MCIEEM is an Associate Ecologist with SLR and has worked in ecological consultancy in Ireland and the UK and also internationally since 2003. Michael Bailey holds a BSc. in Biology and Ecology from the University of Ulster and an MSc. in Quantitative Conservation Biology from the University of the Witwatersrand in Johannesburg, South Africa. Michael has prepared ecological reports including biodiversity chapters for EIAR, Appropriate Assessment (AA) screening reports and Natura Impact Statements (NIS) for a wide range of extractive and infrastructure projects in Ireland and the UK. He is a full member of CIEEM.

Legislation and Policy

Legislation

5.13 The following legislation are relevant to this report:

- The EIA Directive (2014/52/EU);
- The Habitats Directive (92/43/EEC);
- The Birds Directive (2009/147/EC);
- European Communities (Birds and Natural Habitats) Regulations, 2011 - 2015.
- The Wildlife Acts 1976 as amended;
- Wildlife (Amendment) Act, 2000, 2010, 2012;
- The Flora (Protection) Order 2015.
- The Planning and Development Acts 2000 to 2020 - PART XAB.

5.14 The details of these legislation are summarised in Appendix A of this report.

National Planning Policy

5.15 The National Biodiversity Action Plan 2023-2030[1] sets out objectives relating to biodiversity.

Local Planning Policy

5.16 The relevant local planning policies have been extracted from Volume 1 of the Cork County Development Plan 2022-2028. These policies are specific to "*Chapter 15: Biodiversity and Environment*" and are concerned with the policies and objectives relating to biodiversity. These are detailed further in Appendix A.

[1] https://www.npws.ie/sites/default/files/files/4th_National_Biodiversity_Action_Plan.pdf (last accessed March 2025)

Methodology

5.17 The methods 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. The assessment methodology for this proposal was developed using the standard professional impact assessment guidance published in 2018 by the Chartered Institute of Ecology and Environmental Management (CIEEM).

Scope of the Chapter

5.18 The scope of this Biodiversity Chapter is to identify potential impacts likely to occur as a result of the proposed sand & gravel extraction at Knockroe, Bandon, Co. Cork, and to determine if the effects on biodiversity are significant in the absence of mitigation. The scope of the report includes the provision of mitigation, compensation and enhancement measures as required.

Study Area

5.19 The study area for the desk study and field surveys were identified through considering the nature of the development, the size and location of the project and the ecological features likely, or known, to be present. The experience gained from working on similar projects was also used to determine that the study area chosen was both sufficiently sized and proportionate for the proposed works.

Baseline Data Collection

Desk Study

5.20 A desk study was carried out to collate the available existing ecological information on the Site. The Site and the surrounding area were viewed using existing available satellite imagery using Google maps[2] and Bing maps[3] .

5.21 The National Parks and Wildlife Service (NPWS)[4] and the National Biodiversity Data Centre (NBDC)[5] online resources were accessed for information on sites designated for nature conservation and on protected habitats and species known from the 2 km grid squares W55M, W55N, W55S, and W55T. Environmental Protection Agency (EPA) Maps[6] were accessed for other environmental information, such as surface water features, relevant to preparation of this report.

5.22 Cork County Council's website[7] was accessed for information on relevant planning policy, while the planning portal[8] was accessed for information on other proposed or permitted developments within the Site and immediate surrounding area.

5.23 Birds of Conservation Concern in Ireland (BoCCI), published by BirdWatch Ireland and the RSPB NI, is a list of priority bird species for conservation action on the island of Ireland. 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, Amber

[2] https://www.google.ie/maps (last accessed March 2025)
[3] https://www.bing.com/maps (last accessed March 2025)
[4] https://www.npws.ie/(last accessed March 2025)
[5] https://maps.biodiversityireland.ie/ (last accessed March 2025)
[6] http://gis.epa.ie/(last accessed March 2025)
[7] https://www.corkcoco.ie/en (last accessed March 2025)
[8] https://planning.corkcoco.ie/ePlan/searchtypes (last accessed March 2025)

List are of medium conservation concern and Green List are not considered threatened. The BirdWatch Ireland website[9] was accessed for information on birds of conservation concern.

5.24 All bird species are protected under the Wildlife Acts 1976 – 2018 and all birds which are Red or Amber-listed on BoCCI or listed on Annex 1 of the Birds Directive are included from records held by the NBDC and NPWS web searches.

5.25 The conservation status of mammals, amphibians, reptiles, fish and protected flora within Ireland and Europe was determined using one or more of the following documents: Wildlife Acts (1976 - 2012), the Red List of Terrestrial Mammals (Marnell et al., 2009), Ireland Red Lists No.5: Amphibians, Reptiles and Freshwater Fish (King et al. 2011), The Flora (Protection) Order, 2015 (S.I. No. 356 of 2015) and the EU Habitats Directive 92/43/EEC.

5.26 The drawings and the full project description are contained within other sections of this EIAR and also informed the desk study. Other chapters of the EIAR reviewed included Chapter 2 – Project Description, Chapter 7 - Water, Chapter 8 - Air and Chapter 13 - Landscape.

Field Surveys

5.27 An ecological field survey was conducted on 22 September 2024 by SLR Senior Ecologist Faolan Linnane to identify the habitats on-site and to determine the baseline ecology of the Site.

5.28 The approach to the field surveys is based on accepted standard practice and methods. Habitats within the study area were classified after '*A Guide to Habitats in Ireland*'[10] and were assessed if they comprise Annex I habitats under the Habitats Directive. The dominant plant species present in each habitat type were recorded during the field surveys and this is considered sufficient to allow accurate classification of the habitats present.

5.29 Incidental sightings or evidence of birds, mammals or amphibians were also noted during the habitat survey and the habitats within the study area were evaluated for their potential to support protected species. Trees or structures suitable for bat roosts and potential suitable bat foraging were noted where they occurred within the study area. Trees or structures within the study area were visually inspected from the ground level for Potential Roost Features (PRFs) where it was considered likely that they may be suitable for use by roosting bats. Potential roosts / roost features and bat foraging habitat were evaluated using the criteria set out in the Bat Conservation Trust (BCT) guidelines[11].

5.30 Invasive species were noted where present. For the purposes of this report "invasive species" are those which are subject to Regulation 49 of the Habitats Directive as listed in Part 1 and Part 2 of the Third Schedule within the Directive.

Limitations

Desk Study

5.31 Desk study data is unlikely to be exhaustive, especially in respect of species, and is intended mainly to set a context for the study. It is therefore possible that important habitats or protected species not identified during the data search do in fact occur within the vicinity of the site. Interpretation of maps and aerial photography has been conducted in good faith, using recent

[9] https://birdwatchireland.ie/(last accessed March 2025)
[10] Fossitt (2000) A Guide to Habitats in Ireland
[11] Collins (2016) Bat Surveys for Professional Ecologists – Good Practice Guidelines

imagery, but it has not been possible to verify the accuracy of any statements relating to land use and habitat context outside of the field study area.

5.32 The lack of ecological records returned in the data search does not conclude the absence of a species. Such an absence of records may simply indicate an under-recording of the area.

5.33 In accordance with CIEEM's Advice Note on the Lifespan of Ecological Reports and Surveys[12], the details of this report will remain valid for a period of 18-months from the date of the survey (i.e., until 22/02/2026). After which the validity of this assessment should be reviewed to determine whether further updates are necessary.

Field Survey

5.34 To determine presence or likely absence of protected species usually requires multiple visits at suitable times of the year. As a result, this survey focuses on assessing the potential of the site to support species of note, which are considered to be of principal importance for the conservation of biodiversity with reference to those given protection under Irish or European wildlife legislation.

[12] CIEEM (2019) Advice Note on the Lifespan of Ecological Reports and Surveys

Assessment Approach

5.35 The ecological evaluation and assessment within this chapter has been undertaken with reference to relevant parts of the 2018 Guidelines for Ecological Impact Assessment in the UK and Ireland developed by the Chartered Institute of Ecology and Environmental Management (CIEEM, September 2018). Although this is recognised as current good practice for ecological assessment, the guidance itself recognises that it is not a prescription about exactly how to undertake an ecological impact assessment (EcIA); rather, they "*provide guidance to practitioners for refining their own methodologies*". For the full guidance, refer to https://www.cieem.net/data/files/ECIA%20Guidelines.pdf.

5.36 The approach to impact assessment also has regard to advice set out in the EPA draft guidelines on the information to be contained in Environmental Impact Assessment Reports (EIAR) published in August 2017.

Important Ecological Features

5.37 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, for example, to 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.

Determining Importance

5.38 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);
- Local (i.e., within circa 5km); and
- Site (limited to the red line boundary of the Site).

5.39 The above frame of reference is applied to the ecological features identified during the desk study and surveys to inform this report.

5.40 In assigning a level of value to the population of a species, it is necessary to consider its distribution and status, including a consideration of trends based on available historical records. Examples of relevant lists and criteria include species of European conservation importance (as listed on Annexes II, IV and V of the Habitats Directive or Annex 1 of the Birds Directive), species protected under the Wildlife Acts 1976 - 2018 and BoCCI.

5.41 The approach to impact assessment, as set out in CIEEM guidelines, only requires that ecological features (habitats, species, ecosystems, and their functions/processes), that are considered to be important and potentially affected by the proposed development are carried forward to detailed assessment. It is not necessary to carry out detailed assessment of receptors that are sufficiently widespread, unthreatened, and resilient to impacts from the proposed development and will remain viable and sustainable.

Impact Assessment

5.42 The impact assessment process involves the following steps:

- identifying and characterising potential impacts;
- incorporating measures to avoid and mitigate (reduce) these impacts;
- assessing the significance of any residual effects after mitigation;
- identifying appropriate compensation measures to offset significant residual effects (if required); and
- identifying opportunities for ecological enhancement.

5.43 When describing impacts, reference has been made to the following characteristics, as appropriate:

- Positive or negative;
- Extent;
- Magnitude;
- Duration;
- Timing;
- Frequency; and
- Reversibility.

5.44 The impact assessment process considers both direct and indirect impacts: direct ecological impacts are changes that are directly attributable to a defined action (e.g., the physical loss of habitat occupied by a species during the construction process). Indirect ecological impacts are attributable to an action, but which affect ecological resources through effects on an intermediary ecosystem, process, or feature (e.g., the creation of roads which cause hydrological changes, which, in the absence of mitigation, could lead to the drying out of wet grassland).

5.45 Consideration of conservation status is important for evaluating the effects of impacts on individual habitats and species and assessing their significance:

- Habitats – conservation status is determined by the sum of the influences acting on the habitat that may affect its extent, structure, and functions as well as its distribution and its typical species within a given geographical area.
- Species – conservation status is determined by the sum of influences acting on the species concerned that may affect its abundance and distribution within a given geographical area.

Significant Effects

5.46 The 2018 CIEEM guidance sets out information in paragraphs 5.24 through to 5.28 of the guidance document which describes the concept of ecological significance. Significant effects are qualified with reference to an appropriate geographic scale, and the scale of significance of an effect may or may not be the same as the geographic context in which the feature is considered important.

5.47 A significant effect, for the purposes of EcIA, is defined as an effect that either supports or undermines biodiversity conservation objectives for ‘important ecological features’ or for biodiversity in general. Conservation objectives may be specific (e.g. for a designated site) or

broad (e.g. national/local nature conservation policy) or more wide-ranging (enhancement of biodiversity). Effects can be considered significant at a wide range of scales from international to local.

5.48 The nature of the identified effects on each assessed feature is characterised. This is considered, along with available research, professional judgement about the sensitivity of the feature affected, and professional judgement about how the impact is likely to affect the site, habitat, or population's structure and continued function. Where it is concluded that an effect would be likely to reduce the importance of an assessed feature, it is described as significant. The degree of significance of the effect takes into account the geographic context of the feature's importance and the degree to which its interest is judged to be affected.

Cumulative Effects

5.49 Cumulative effects can result from individually insignificant but collectively significant actions taking place over a period of time or concentrated in a location. Cumulative effects can occur where a proposed development results in individually insignificant impacts that, when considered in-combination with impacts of other proposed or permitted plans and projects, can result in significant effects.

5.50 Other plans and projects that should be considered when establishing cumulative effects are:

- proposals for which consent has been applied but which are awaiting determination;
- projects which have been granted consent, but which have not yet been started, or which have been started but are not yet completed (i.e., under construction);
- proposals which have been refused permission, but which are subject to appeal, and the appeal is undetermined;
- constructed developments whose full environmental effects are not yet felt and therefore cannot be accounted for in the baseline; or
- developments specifically referenced in a National Policy Statement, a National Plan, or a Local Plan.

Avoidance, Mitigation, Compensation and Enhancement

5.51 Where potentially significant effects have been identified, the mitigation hierarchy has been applied, as recommended in the CIEEM Guidelines. The mitigation hierarchy sets out a sequential approach beginning with the avoidance of impacts where possible, the application of mitigation measures to minimise unavoidable impacts and then compensation for any remaining impacts. Once avoidance and mitigation measures have been applied, residual effects are then identified along with any necessary compensation measures, and incorporation of opportunities for enhancement.

5.52 It is important to clearly differentiate between avoidance mitigation, compensation and enhancement and these terms are defined here as follows:

- Avoidance is used where an impact has been avoided, e.g. through changes in scheme design;
- Mitigation is used to refer to measures to reduce or remedy a specific negative impact in situ;
- Compensation describes measures taken to offset residual effects, i.e. where mitigation *in situ* is not possible; and

- Enhancement is the provision of new benefits for biodiversity that are additional to those provided as part of mitigation or compensation measures, although they can be complementary.

BASELINE ECOLOGICAL CONDITIONS

5.53 This section sets out the current baseline conditions for the ecological features considered within the Site and provides a clear description of the changes that would occur as a result of the proposed development using the findings of the desk study and field survey.

Sites Designated for Nature Conservation

European Sites

5.54 **Table 5-1** and **Figure 5-2** provide a list of and show the European sites which were selected for consideration along with a description of each site and their qualifying interests. European sites are of international importance.

5.55 The AA Screening report (SLR 2025) provided alongside this application as a separate document determined that there are no Source-Pathway-Receptor links and so the proposed development will not give rise to significant effects on any European site (as listed in **Table 5-1**) alone and/or in-combination with other proposed or permitted plans and projects. Therefore, European sites can be scoped out of further consideration.

Table 5-1: Description of European Sites (refer to Figure 5-2)

European Site	Distance[13]	Qualifying Features[14]
Courtmacsherry Estuary SAC (001230)	9.2 km SW	• Estuaries [1130] • Mudflats and sandflats not covered by seawater at low tide [1140] • Annual vegetation of drift lines [1210] • Perennial vegetation of stony banks [1220] • Salicornia and other annuals colonising mud and sand [1310] • Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] • Mediterranean salt meadows (*Juncetalia maritimi*) [1410] • Embryonic shifting dunes [2110] • Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120] • Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]
Courtmacsherry Bay SPA (004219)	9.9 km SW	• Great northern diver (*Gavia immer*) [A003] • Shelduck (*Tadorna tadorna*) [A048]

[13] When measured in a straight line over the shortest distance between the site and European site.
[14] For SPAs, the bird species that are the reason for designation are Species of Conservation Interest (SCIs) and for SACs the habitats and species that are the reason for designation are its Qualifying Interests (QIs). For convenience, the term qualifying features is used here for both SPAs and SACs.
[9] Protected Sites in Ireland | National Parks & Wildlife Service (npws.ie)

European Site	Distance[13]	Qualifying Features[14]
		• Wigeon (*Anas penelope*) [A050] • Red-breasted merganser (*Mergus serrator*) [A069] • Golden plover (*Pluvialis apricaria*) [A140] • Lapwing (*Vanellus vanellus*) [A142] • Dunlin (*Calidris alpina*) [A149] • Black-tailed godwit (*Limosa limosa*) [A156] • Bar-tailed godwit (*Limosa lapponica*) [A157] • Curlew (*Numenius arquata)* [A160] • Black-headed gull (*Chroicocephalus ridibundus*) [A179] • Common gull (*Larus canus*) [A182] • Wetland and waterbirds [A999] • Oystercatcher (*Haematopus ostralegus*) [A130] • Greenshank (*Tringa nebularia*) [A164]
Sovereign Islands SPA (004124)	15.4 km SE	• Cormorant (*Phalacrocorax carbo*) [A017]
Old Head of Kinsale Bay SPA (004021)	16.0 km SE	• Kittiwake (*Rissa tridactyla*) [A188] • Guillemot (*Uria aalge*) [A199] • Fulmar (*Fulmarus glacialis*) [A009] • Shag (*Phalacrocorax aristotelis*) [A018] • Herring gull (*Larus argentatus*) [A184] • Razorbill (*Alca torda*) [A200]
Seven Heads SPA (004191)	16.0 km SW	• Chough (*Pyrrhocorax pyrrhocorax*) [A346] • Cormorant (*Phalacrocorax carbo*) [A017] • Peregrine falcon (*Falco peregrinus*) [A103] • Herring gull (*Larus argentatus*) [A184]
Cork Harbour SPA (004191)	18.7 km NE	• Little grebe (*Tachybaptus ruficollis*) [A004] • Great crested grebe (*Podiceps cristatus*) [A005] • Cormorant (*Phalacrocorax carbo*) [A017] • Grey heron (*Ardea cinerea*) [A028] • Shelduck (*Tadorna tadorna*) [A048] • Wigeon (*Anas penelope*) [A050] • Teal (*Anas crecca*) [A052] • Pintail (*Anas acuta*) [A054]

European Site	Distance[13]	Qualifying Features[14]
		• Shoveler *(Anas clypeata*) [A056] • Red-breasted merganser (*Mergus serrator*) [A069] • Oystercatcher (*Haematopus ostralegus*) [A130] • Golden plover (*Pluvialis apricaria*) [A140] • Grey plover (*Pluvialis squatarola*) [A141] • Lapwing (*Vanellus vanellus*) [A142] • Dunlin (*Calidris alpina*) [A149] • Black-tailed godwit (*Limosa limosa*) [A156] • Bar-tailed godwit (*Limosa lapponica*) [A157] • Curlew (*Numenius arquata)* [A160] • Redshank (*Tringa tetanus*) [A162] • Black-headed gull (*Chroicocephalus ridibundus*) [A179] • Common gull (*Larus canus*) [A182] • Lesser black-backed gull (*Larus fuscus*) [A183] • Common tern (*Sterna hirundo*) [A193] • Wetland and waterbirds [A999] • Whooper swan (*Cygnus cygnus*) [A038] • Gadwall (*Anas strepera*) [A051] • Mallard (*Anas platyrhynchos*) [A053] • Pochard (*Aythya farina*) [A059] • Tufted duck (*Aythya fuligula*) [A061] • Goldeneye (*Bucephala clangula*) [A067] • Coot (*Fulica atra*) [A125] • Ringed plover (*Charadrius hiaticula*) [A137] • Knot (*Calidris canutus*) [A143] • Ruff (*Philomachus pugnax*) [A151] • Spotted redshank (*Tringa erythropus*) [A161] • Green sandpiper (*Tringa ochropus*) [A165] • Turnstone (*Arenaria interpres*) [A169]

(Proposed) Natural Heritage Areas

5.56 NHA and pNHA generally do not form part of the Natura 2000 network (although some Natura 2000 sites are also designated as NHA and pNHA). However, they often provide important roles for locally or nationally important biodiversity.

5.57 There are no Natural Heritage Areas (NHAs) located within 5 km of the Site. There are two proposed Natural Heritage Areas (pNHAs) located within 5 km of the Site and an additional two pNHAs are located either upstream or downstream of the Site via the Bandon Estuary. **Table 5-2** and **Figure 5-3** provide a list of and show the Natural Heritage Areas which were selected for consideration along with a description of each site.

Table 5-2: List of Proposed Natural Heritage Areas (Refer to Figure 5-3)

Proposed Natural Heritage Area	Distance[15] to nearest boundary	Details
Bandon Valley Below Inishannon (001515)	30 m east	*"The Bandon River flows almost due east for much of its course, following a natural synclinal valley that itself extends to Cloyne in East Cork. (…) Four areas of scientific interest are located along the river. This site below Inishannon is the most downstream of the four sites and is located approximately 7km east of Bandon in Co. Cork.* *Below Inishannon the river becomes tidal before it becomes brackish, and extensive reed-beds develop of Common Reed (Phragmities australis), Reed Sweet-grass (Glyceria maxima) and various sedges (Carex spp.). Summer Snowflake (Leucojum aestivum), Yellow Loosestrife (Lysimachia vulgaris) and Sweet-flag (Acorus calamus) occur locally with Smooth-stalked Sedge (Carex laevigata) and Wood Millet (Milium effusum), usually associated with woodlands.* *Shippool Wood is a former separate area of scientific interest which is now joined to the Bandon Valley site. This wood is reported in 1972 in the An Forbas Forbartha report to be a deciduous woodland on the banks of the Bandon River with some oak (Querus spp.) and birch (Betula spp.) and other deciduous species. The woodland has been underplanted with coniferous trees. In 1981 An Foras Forbartha reported the wood in some parts were semi-natural in character and had an ecologically interesting flora and fauna. A recent survey of this woodland found it to be predominantly conifer trees.* *In 1986 the Hairstreak butterfly was reported to occur in Shippool Wood.* *This site is important for its wetlands including the extensive areas of Common Reed and the more diverse areas of wetland vegetation. The general flora surrounding Shippool Wood may also be of interest."*
Bandon Valley Above Inishannon (001740)	690 m northwest 838 m upstream of the Site	*"The Bandon River flows almost due east for much of its course, following a natural synclinal valley that itself extends to Cloyne in East Cork. (…) This site covers a section of the river 3km east of Bandon running approximately a further 4km downstream to Inishannon.* *(…) The woodlands are semi-natural, mostly planted with species such as Sycamore (Acer pseudoplatanus) and Beech*

[15] When measured in a straight line over the shortest distance between the site and European site.

Proposed Natural Heritage Area	Distance[15] to nearest boundary	Details
		(Fagus sylvatica) mixed in with the native oaks (Quercus spp.). Some areas of commercial plantation occur near the railway tunnel and at Drumkeen Wood. The spread of Rhododendron (Rhododendron ponticum) is limited to small areas of the site. *Lower down in the Bandon Valley birdlife is more associated with woodland and involves characteristic species like owls, Sparrowhawk, Woodcock and Jay. Cormorant and Heron fish throughout the river.* *The valley is reported to have Otter in many places, a species listed in Annex II of the E.U. Habitats Directive as it is threatened within the E.U.* *This area is important as it contains an example of oak woodland on steep valley sides. The Bandon Valley is especially valuable for its woodlands and unmodified river bed, which are a rare habitat in a European context."*
Bandon Valley West of Bandon (001034)	7.7 km west 10.4 km upstream of the Site	*"The Bandon River flows almost due east for much of its course, following a natural synclinal valley that itself extends to Cloyne in East Cork. (…) This site covers a section of river approximately 3km in length running downstream to within 1km west of Bandon. The Castlebernard Estate woodlands run along sections of the bank here.* *The banks of the river have old estate woodlands with mature oak (Quercus spp.) and some Ash (Fraxinus excelsior). Rhododendron (Rhododendron ponticum) and Cherry Laurel (Prunus laurocerasus) invasion is occurring but as yet is not widespread.* *Felling of woodlands in this area has recently been widespread and hence greater importance can be placed on the remaining areas.* *The 1986 An Forbas Forbatha report notes that the upper part of the Bandon River, before it sinks into a narrow gorge at Bandon, floods occasionally in winter and at such times attracts birds such as Lapwing and Curlew as well as Mallard and Teal. Cormorant and Heron fish throughout the course of the river.* *The Bandon Valley is reported to have Otters in many places, a species listed on Annex II of the EU Habitats Directive as it is threatened within the EU.* *The main land uses within the site are tree felling and clearing. This has much reduced the area of interest in recent years. Fishing is also important in this area.* *This site is important as it contains remnants of broadleaved oak woodland. The Bandon Valley is especially valuable for its woodlands and unmodified river bed, a rare enough habitat in a European context."*

Proposed Natural Heritage Area	Distance[15] to nearest boundary	Details
James Fort (001060)	10.5 km southeast 14.5 km downstream of the Site	*"James Fort occupies a promontory on the Cork coast, in the middle of Kinsale harbour, opposite the town. Its diamond-shaped enclosure and the slopes down to the sea on the north and east sides are included in this site.* *(…)* *The site is included as an NHA because it is floristically rich with a good number of less common plants, some of them introduced. In addition there is a species-rich meadow of some ecological interest."*

5.58 There is the potential for construction and operational activities, soil stripping and accidental leakage / spillage from vehicles to affect groundwater quality in the groundwater through vertical migration. Bandon Valley Below Inishannon (001515) is the only pNHA which may be indirectly affected by pollution of groundwater.

5.59 There will be no impact on Bandon Valley Above Inishannon (001740) pNHA or Bandon Valley West of Bandon (001034) as these sites are located upstream of the project site. James Fort (001060) is sufficiently distant from the Site not to be affected by the project activities.

5.60 Therefore pNHAs can be is assessed as being of **local (lower) importance**.

Habitats

5.61 Habitats present within the Site, as recorded during the walkover survey, are described in this section. Habitat classification follows that of '*A Guide to Habitats in Ireland*' (Fossitt, 2000). A habitat map for the Site is provided as **Figure 2** at the end of this report.

5.62 No Annex I habitats (under the Habitats Directive) were identified on the Site. The following sections detail each habitat in further detail.

Improved Agricultural Grassland (GA1)

5.63 The majority of the Site is composed of an agricultural field which has been frequently tilled but which at the time of the survey had a thin sward layer composed of grass species comprising GA1 habitat. The sward is dominated by short perennial ryegrass *Lolium perenne* with occasional cock's foot *Dactylis glomerata* and creeping bent *Agrostis stolonifera* present on the fringes of the field. A variety of broadleaved herbs are present in small numbers, also on the fringes, including white clover *Trifolium repens*, dandelion *Taraxacum* agg., curled dock *Rumex crispus*, common ragwort Jacobaea vulgaris, knapweed *Centaurea nigra*, creeping buttercup *Ranunculus repens*, and creeping thistle *Cirsium arvense*.

5.64 This habitat is widespread in Ireland and of limited value to biodiversity. As this field is frequently tilled (**Photograph 5-1**) there are insufficient grasses and sward levels to be utilised by grazing birds such as swans or geese. Therefore, it is assessed as being of negligible importance for biodiversity and can be scoped out of further consideration.

Photograph 5-1: Improved Agricultural Grassland (GA1) on frequently tilled land



Scrub (WS1)

5.65 The Site entrance on the L3204 local road to the north of the Site is comprised of a narrow pathway overgrown with scrub which grades into woodland away from the path. The scrub species include gorse *Ulex sp.*, hawthorn *Crataegus monogyna*, blackthorn *Prunus spinosa*, hazel *Corylus avellana*, elder *Sambucus nigra*, bramble *Rubus fruticosus* agg., immature oaks Quercus spp., birches Betula spp., and willows *Salix* spp. with an understorey of hart's tongue fern *Asplenium scolopendrium*, purple foxglove *Digitalis purpurea,* and ivy *Hedera helix*. There are some clearings along the pathway where some grassland and more open/lightly shaded species are present including cock's foot *Dactylis glomerata*, sweet vernal grass *Anthoxanthum odoratum*, Ju*ncus* spp., knapweed *Centaurea nigra*, red clover *Trifolium pratense*, common eyebright *Euphrasia officinalis*, St. John's wort *Hypericum perforatum*, bird's foot trefoil *Lotus corniculatus*, creeping cinquefoil *Potentilla reptans*, self-heal *Prunella vulgaris*, watermint *Mentha aquatica*, wood rush *Luzula spp.*, and bell heather *Erica cinerea*.

5.66 This habitat is widespread, however if provides some value to local fauna. Therefore, it is assessed as being of **local-level importance**.

Photograph 5-2: Entrance to the Site / Internal Access surrounded by Scrub (WS1)



Mixed Broadleaved Woodland (WD1)

5.67 The scrub grades into broadleaved woodland further away from the internal access leading into the Site. This area is composed of an old quarry void that has been allowed to be re-colonised by woodland and has grown to a canopy height of approximately 15-20 m. This woodland is dominated by downy birch *Betula pubescens* and grey willow *Salix cinerea* with some sycamore *Acer pseudoplatanus*, holly *Ilex aquifolium*, and ash *Fraxinus excelsior* also present. The understorey of the woodland is comprised of a similar species assemblage to that found within the scrub habitat.

5.68 This habitat provides significant value to biodiversity. However, it is located outside the proposed red-line boundary and will not be removed to facilitate the proposed sand & gravel extraction. Therefore, it can be ruled out of further consideration in this report.

Photograph 5-3: Mixed Broadleaved Woodland (WD1) Located to the North of the Site



Species

Desk Study

5.69 The NBDC database was searched for records of rare and/or protected species from the 2 km grid square W55M, W55N, W55S, and W55T within which the Site is located. The records of rare and/or protected species are presented in **Table 5-3** below.

Table 5-3. Rare and/or Protected Species Recorded Within 2 km Grid Squares W55M, W55N, W55S, and W55T

Species	Date of Last Record	No. of Records	Conservation Status	Dataset
Common frog *Rana temporaria*	2023	3	EU Habitats Directive: Annex V Protected Species: Wildlife Act	Amphibians and reptiles of Ireland
Barn swallow *Hirundo rustica*	2020	4	Birds of Conservation Concern: Amber	Birds of Ireland
Common kestrel *Falco tinnunculus*	2011	2	Birds of Conservation Concern: Red	Bird Atlas 2007 - 2011

Common kingfisher *Alcedo atthis*	2020	3	Birds of Conservation Concern: Amber EU Birds Directive: Annex I	Birds of Ireland
Common redshank *Tringa totanus*	2011	1	Birds of Conservation Concern: Red	Bird Atlas 2007 - 2011
Common shelduck *Tadorna tadorna*	1991	1	Birds of Conservation Concern: Amber	The Second Atlas of Breeding Birds in Britain and Ireland: 1988-1991
Common swift *Apus apus*	2023	4	Birds of Conservation Concern: Red	Swifts of Ireland
Eurasian curlew *Numenius arquata*	2011	1	Birds of Conservation Concern: Red	Bird Atlas 2007 - 2011
Eurasian teal *Anas crecca*	2011	1	Birds of Conservation Concern: Amber	Bird Atlas 2007 - 2011
House martin *Delichon urbicum*	2011	1	Birds of Conservation Concern: Amber	Bird Atlas 2007 - 2011
Lesser black-backed gull *Larus fuscus*	2011	1	Birds of Conservation Concern: Amber	Bird Atlas 2007 - 2011
Little egret *Egretta garzetta*	2019	3	Birds of Conservation Concern: Green EU Birds Directive: Annex I	Birds of Ireland
Mallard *Anas platyrhynchos*	2020	6	Birds of Conservation Concern: Amber	Birds of Ireland
Mute swan *Cygnus olor*	2020	4	Birds of Conservation Concern: Amber	Birds of Ireland
Peregrine falcon *Falco peregrinus*	2019	1	Birds of Conservation Concern: Green EU Birds Directive: Annex I	Birds of Ireland
Sand martin *Riparia riparia*	2011	1	Birds of Conservation Concern: Amber	Bird Atlas 2007 - 2011
Spotted flycatcher *Muscicapa striata*	2011	2	Birds of Conservation Concern: Amber	Bird Atlas 2007 - 2011
Stock pigeon *Columba oenas*	2011	2	Birds of Conservation Concern: Red	Bird Atlas 2007 - 2011

Yellowhammer *Emberiza citrinella*	2011	1	Birds of Conservation Concern: Red	Bird Atlas 2007 - 2011
Daubenton's bat *Myotis daubentonii*	2017	48	EU Habitats Directive: Annex IV Protected Species: Wildlife Act	National Bat Database of Ireland
Eurasian badger *Meles meles*	2015	4	Protected Species: Wildlife Act	Atlas of Mammals in Ireland 2010-2015
Eurasian red squirrel *Sciurus vulgaris*	2015	1	Protected Species: Wildlife Act	Atlas of Mammals in Ireland 2010-2015
European otter *Lutra lutra*	2017	3	EU Habitats Directive: Annex II and IV Protected Species: Wildlife Act	Mammals of Ireland 2016-2025
West European hedgehog *Erinaceus europaeus*	2022	6	Protected Species: Wildlife Act	Hedgehogs of Ireland
Wall *Lasiommata megera*	1999	1	Red List Status: Endangered	Butterflies of Ireland pre-2022
Andrena (Micrandrena) semilaevis	1974	2	Red List Status: Vulnerable	Bee Records for Ireland (BWARS)
Brown snail *Zenobiella subrufescens*	1984	2	Red List Status: Vulnerable	All Ireland Non-Marine Molluscan Database
Point snail *Acicula fusca*	1984	2	Red List Status: Vulnerable	All Ireland Non-Marine Molluscan Database
Tree snail *Balea (Balea) perversa*	1984	1	Red List Status: Vulnerable	All Ireland Non-Marine Molluscan Database
Large white-moss *Leucobryum glaucum*	2009	1	EU Habitats Directive: Annex V	Bryophytes of Ireland

Plants

5.70 The data search returned no records of protected or threatened plant species recorded within the 2 x 2 km squares.

5.71 The data search returned the following invasive plant species within the 2 x 2 km squares: Canadian Waterweed *Elodea canadensis*, Giant Knotweed *Fallopia sachalinensis*, Indian Balsam *Impatiens glandulifera* and Japanese Knotweed *Fallopia japonica*. These species are

listed on the Third Schedule list of the European Communities (Birds and Natural Habitats) Regulations 2011 [S.I.477/2011].

5.72 The data search also returned the following plant species within the 2 x 2 km squares: butterfly-bush *Buddleja davidii*, Himalayan honeysuckle *Leycesteria formosa*, and sycamore *Acer pseudoplatanus* which are listed as a risk of medium impact invasive species and cherry laurel *Prunus laurocerasus* which is listed as a risk of high impact invasive species (Kelly *et al*., 2013).

5.73 No invasive plant species listed on the Third Schedule list of the European Communities (Birds and Natural Habitats) Regulations 2011 [S.I.477/2011] were identified on-site.

5.74 The following non-native plant species were identified on-site, all of which are located either along the entrance pathway to the Site or within the woodland to the north of the red-line boundary: cherry laurel *Prunus laurocerasus*, sycamore *Acer pseudoplatanus*, winter heliotrope *Petasites fragrans*, milkflower cotoneaster *Cotoneaster lacteus*, and box-leaved honeysuckle *Lonicera pileata*.

5.75 Only cotoneaster is found along the proposed access road (**Figure 5-1**), and this can be removed mechanically and disposed of such that it will not re-root. There are no other invasives likely to be impacted and therefore they can be ruled out of further consideration.

Invertebrates

5.76 The data search returned the following records of notable invertebrate species within the 2 x 2 km squares: wall butterfly *Lasiommata megera*, *Andrena (Micrandrena) semilaevis,* brown snail *Zenobiella subrufescens,* point snail *Acicula fusca,* and tree snail *Balea (Balea) perversa.* Wall butterfly is listed as endangered, and the other species are listed as vulnerable in the Irish red list for their respective group.

5.77 There are limited valuable habitats for invertebrates located within the Site. The scrub on-site has the potential to provide foraging and refuge opportunities for invertebrates.

5.78 Therefore, the Site is considered to be of **local-level importance** for invertebrates.

Amphibians

5.79 The data search returned records of common frog *Rana temporaria* within the 2 x 2 km squares.

5.80 There are no suitable breeding habitats for amphibians located on-site. The improved agricultural grassland on-site may provide suitable refuge habitat but will be of very limited value due to the heavy grazing on-site reducing the vegetation cover. The woodland and scrub habitats to the north of the Site will likely provide more suitable refuge habitat than the agricultural grassland that will be removed to facilitate the proposed development.

5.81 The nearest potentially suitable breeding habitat for common frog is located approximately 30 m from the Site at the Bandon River.

5.82 Therefore, the Site is considered to be of **local-level importance** for amphibians due to its proximity to potentially suitable breeding habitat.

Reptiles

5.83 The data search returned no records of reptiles within the 2 x 2 km squares.

5.84 The habitats on-site are of limited value to common lizard *Zootoca vivipara* with limited basking opportunities. Therefore, the Site is considered to be of **negligible importance** for reptiles and they have been excluded from further assessment in this report.

Birds

5.85 The data search returned records of various amber and red listed birds within the 2 x 2 km squares (refer to **Table 5-3**) including waterbird species, hirundid species, and birds of prey.

5.86 The improved agricultural grassland on-site may provide limited foraging value to lesser black-backed gull, common kestrel, and peregrine falcon, which has been recorded within the 2 x 2 km grid squares surrounding the Site. However, the agricultural field has been frequently tilled and the poor quality grasses and sward levels means this field has a low value as a foraging habitat for birds. Also, grassland is a common and widespread habitat in the landscape surrounding the Site and there will be no significant loss of foraging habitat for these species.

5.87 The scrub and woodland habitats provide are likely to support a variety of common and widespread passerine birds. The woodland habitats will be retained, however some of the scrub habitat must be removed to construct an entrance into the Site.

5.88 Therefore, the Site is considered to be of **local-level importance** for birds.

Mammals

Bats

5.89 The data search returned Daubenton's bat *Myotis daubentonii* within the 2 x 2 km squares.

5.90 The scrub and woodland habitats may provide suitable foraging habitat for bat species. The woodland habitats will be retained; however a small area of scrub habitat will be removed to upgrade the internal access into the Site.

5.91 Two trees with potential roosting features (PRFs) were identified within the mixed broadleaved woodland through which the existing access road will be upgraded (**Figure 5-1**). PRF #1 and PRF #2 consist of 20 m and 25 m tall sycamores with substantial foliage and ivy cover that may hide potential bat roosting features when viewed from the ground. Both PRFs are assessed as being of low suitability for roosting bats.

5.92 While some of the vegetation in this woodland will have to be removed to facilitate the proposed access road upgrade, neither of the two trees with the PRFs will be affected (see **Figure 5-1**).

5.93 Therefore, the Site is only considered to be of **local-level importance** for bats due to the presence of potentially suitable foraging habitat.

Otter

5.94 The data search returned records of European otter within the 2 x 2 km squares.

5.95 The nearest potentially suitable waterway for otters is located approximately 50 m from the agricultural field at the closest point. The Site is separated from this river by the L3204 local road and a steep bank which is densely vegetated. It is unlikely that breeding otter are present in the vicinity of the Site due to these physical barriers.

5.96 Therefore, the Site is considered to be of **negligible importance** for otters and they have been excluded from further assessment in this report.

Badger

5.97 The data search returned records of Eurasian badger within the 2 x 2 km squares.

5.98 No badger setts or signs of badger activity were noted during the field survey. The habitats on-site are potentially suitable for foraging and breeding badgers. Agricultural grassland is a common and widespread habitat in the landscape surrounding the Site and there will be no significant loss of suitable habitat for badgers.

5.99 Therefore, the Site is considered to be of **negligible importance** for badgers and they have been excluded from further assessment in this report.

Other Mammals

5.100 The data search returned records of Eurasian red squirrel, and west European hedgehog within the 2 x 2 km squares.

5.101 No field signs of other mammal species were noted on-site during the field survey. The extent, location and maturity of the woodland would make this unsuitable for red squirrel and a poor habitat for hedgehog.

5.102 Therefore, other mammals have been excluded from further assessment in this report.

Summary of Important Ecological Features

5.103 **Table 5-4** summarises all important ecological features for which detailed assessment is required. The geographical scale of importance for the ecological features within the Site are summarised along with their legal status and a rationale, where appropriate, for carrying forward any features for detailed assessment.

5.104 All ecological features scoped out from further assessment have been detailed in the previous section.

Table 5-4: Summary of Important Ecological Features Subject to Detailed Assessment

Ecological Feature	Scale at which Feature is Important	Comments on Legal Status and/or Importance
Proposed Natural Heritage Areas	National/Local	• The Site is located approximately 30 m from the Bandon River at the closest point. This river contains three proposed Natural Heritage Areas. • Bandon Valley Below Inishannon (001515) pNHA is located on the section of the Bandon River which flows adjacent to the Site. • Bandon Valley Above Inishannon (001740) and Bandon Valley West of Bandon (001034) pNHAs are located 838 m and 10.4 km upstream of the Site respectively. • Proposed Natural Heritage Areas are protected under policy BE 15-2 of the Cork County Development Plan. This policy states the following: "*Protect all natural heritage sites which are designated or proposed for designation under European legislation, National legislation and International Agreements. Maintain and where possible enhance appropriate ecological linkages between these. This includes Special Areas of Conservation, Special Protection Areas, Marine Protected Areas, Natural Heritage Areas, proposed Natural Heritage Areas, Statutory Nature Reserves, Refuges for Fauna and Ramsar Sites. These sites are listed in Volume 2 of the Plan.*"
Invertebrates	Local	• There is potentially suitable foraging and refuge scrub habitat for invertebrates on-site. • Policy 15-6 of the Cork County Development Plan states: *"Provide for the protection and enhancement of biodiversity in the development management process and when licensing or permitting other activities by: (…) Ensuring that the implementation of appropriate mitigation (including habitat enhancement, new planting or other habitat creation initiatives) is incorporated into new development, where the implementation of such development would result in unavoidable*

Ecological Feature	Scale at which Feature is Important	Comments on Legal Status and/or Importance
		impacts on biodiversity – supporting the principle of biodiversity net gain." • Loss of suitable invertebrate habitat would be considered an "unavoidable impact on biodiversity" and, therefore, should be considered further in this report.
Amphibians	Local	• There is potentially suitable common frog breeding habitat located in the vicinity of the Site. • Common frogs are protected under the Wildlife acts 1976 and subsequent amendments.
Birds	Local	• The scrub and woodland habitats on-site may provide foraging and breeding opportunities for a variety of passerine bird species. • All birds are protected under the Wildlife acts 1976 and subsequent amendments during the breeding bird season (i.e., 1st March to 31st August).
Bats	Local	• e scrub and woodland habitats on-site may provide potential foraging opportunities for bats. • All bats are protected under the Wildlife acts 1976 and subsequent amendments.

Detailed Project Description

Extraction Area

5.105 The proposed development will comprise sand & gravel extraction from existing agricultural lands c 3.5 hectares, refer to Figure 2-2 in Chapter 2 of the EIAR.

Phasing Plan

5.106 The phasing of the development is shown on Figure 2-4 in Chapter 2 of the EIAR..

5.107 Phase 1 will comprise removal of topsoil and subsoil from the eastern part of the extraction area and extraction of sand & gravel. The soil stripped from the Phase 1 area will be temporarily stored in the Phase 2 area pending use in the phased and final restoration works.

5.108 Phase 2 will comprise use of the stripped soil temporarily stored in the Phase 2 area for progressive restoration of the Phase extraction area. Soil tripped from the Phase 2 area will be temporarily stored in the Phase 1 area pending use in the final restoration.

Restoration (Reinstatement to Natural Habitat and Agricultural Use)

5.109 The extraction area will be restored to natural habitat and agricultural use (refer to Figure 2-5 in Chapter 2 of the EIAR.). Restoration will be undertaken on a phased basis and a restoration phasing is shown on Figure 2-4 in Chapter 2 of the EIAR. Further restoration details are provided in the Proposed Restoration Scheme section of this chapter.

Aggregate Reserve Assessment

5.110 The total recoverable reserve of sand and gravel from within the proposed extraction area is assessed at c. 0.9 million tonnes.

Rate of Extraction & Duration of the Development

5.111 The extraction rate is estimated to be up to a maximum of 100,000 tonnes per year. Depending on market demand, and assuming an average extraction rate of 60,000 tonnes per year the duration of the extraction will be up to c. 15 years. Allowing a further two years for final restoration this would equate to a total development duration of c. 17 years.

Site Screening

5.112 The existing site is extensively screened from the surrounding roads by existing mature hedgerows and trees along the eastern, northern and western site boundaries. An operational landscaping and planting scheme has been designed to provide additional screening around the perimeter of the proposed development, refer to Figure 2-5 in Chapter 2 of the EIAR.

Removal of Topsoil / Subsoil

5.113 Topsoil / subsoil will be removed as each phase of extraction area is developed. Soil stripping will be undertaken using a mechanical excavator and loaded directly onto dump trucks for haulage to the designated temporary soil storage, refer to Figure 2-6 in Chapter 2 of the EIAR.

5.114 The maximum height of any temporary soil storage areas will be three metres.

5.115 Soils will be reused in the restoration of the lands to agricultural use, refer to the Proposed Restoration Scheme section of this chapter.

Site Drainage

5.116 Rain falling across the application site percolates down through the existing ground surface as recharge to groundwater.

5.117 The final pit floor level will be maintained at 2m above the high groundwater level. Surface water collecting in the pit floor will percolate naturally into the underlying ground.

5.118 There will be no off-site discharges to the Bandon River located to the east of the site.

5.119 A hydrological / hydrogeological assessment has been carried out to determine what the requirements are for the proposed development, with regard to a water regime. It addresses mitigation measures to eliminate and/or minimise the potential impacts, if any, on surface water and groundwater. These measures will be incorporated into the pit design and operation, (refer to EIAR Chapter 7 – Water).

Method of Extraction

Dry Working

5.120 Dry working extraction (i.e. above the groundwater table) will use an excavate, load and haul method. An excavator will be used to extract the sand & gravel materials from the working face and load them onto a truck for transport to the existing off-site processing plant at the adjacent Dromkeen Pit operated by Keohane Readymix Ltd.

Blasting – None Required

5.121 No blasting is required for sand & gravel extraction and no such operations will be carried out at the proposed development. No rock will be extracted.

Onsite Machinery

5.122 The machinery used for the construction (soil Stripping stage) will comprise 1 no. excavator and 1 no. dump truck. During pit operation the only plant used on site will be 1 no. loading shovel to excavate and loa the extracted sand & gravel onto the tricks for transport to the adjacent Dromkeen Pit for processing. A dozer will be used for the restoration earthworks.

Processing

5.123 There will be no processing of sand & gravel on the site. Extracted sand & gravel will be transported by road to the adjacent Dromkeen Pit for use in concrete production.

Wheelwash

5.124 A wheelwash will be provided and this will continue in use for the duration of the proposed development, refer to Figure 2-2 in Chapter 2 of the EIAR for wheelwash location.

Ancillary Facilities

5.125 A welfare unit (maintained under contract) will be provided, refer to Figure 2-2 in Chapter 2 of the EIAR. Staff will also use the existing office and welfare facilities at the adjacent Dromkeen site.

Fuel and Oil Storage

5.126 There will be no fuel or oil storage at the site. All plant and machinery will be re-fuelled and maintained at the adjacent Dromkeen Pit owned and operated by Keohane Readymix Ltd.

Spill kits and spill kit training will be provided on site to contain / manage any limited accidental spillages in the unlikely event that they arise from the machinery used on site.

Extractive Waste Management

5.127 Topsoil and subsoil stripped from the site will be stored and reused for the restoration of the lands to agricultural use.

5.128 All sand & gravel extracted at the site will be transported to the adjacent Dromkeen site for processing. There will be no extractive waste arising on site.

Proposed Environmental Controls

General

5.129 Extraction and restoration activities at the application site require a number of environmental controls to eliminate or minimise the potential nuisance to the public arising from the site operations. The environmental control measures implemented at the site are outlined in the following sections.

5.130 Any additional control measures, over and above those outlined below, which may be conditioned on foot of the proposed planning application, will also be implemented.

Dust Control

5.131 The proposed development is for extraction of sand & gravel only. No processing – crushing or screening will take place on the site resulting in a significantly lower potential for dust generation compared to a conventional pit / quarry operation.

5.132 In dry, windy weather conditions, site activities may give rise to limited dust generation. In order to control dust emissions, the following dust prevention and suppression measures will be implemented:-

- Where required during dry weather water mist will be sprayed from a tractor drawn bowser on dry exposed surfaces (e.g. the section of local road between the site and the Dromkeen Pit, and site internal road), in line with current practice at the Dromkeen Pit. The bowser and water for dust suppression will be sourced from the Dromkeen Pit;
- All HGV's exiting the site are and will be routed through a wheelwash. This will minimise the transport of fines by HGVs over the access / egress road and the public road network.

5.133 In line with current practice at the Dromkeen Pit the amount of dust or fines carried onto the public road network will be further reduced by periodic sweeping of internal paved site roads and surrounding public roads, if required.

5.134 A dust deposition monitoring programme will be implemented as part of the environmental monitoring programme. Monitoring results will be submitted to Cork County Council.

5.135 Existing dust management and mitigation measures will be implemented in accordance with the ICF (2004), DoEHLG (2004), and EPA (2006) environmental guidelines for the sector, refer to EIAR Chapter 8 – Air Quality.

Noise Control

5.136 The proposed development is for extraction of sand & gravel only. No processing – crushing or screening will take place on the site resulting in a significantly lower potential for noise generation compared to a conventional pit / quarry operation.

5.137 The sources of noise located within the planning application area will be related to machinery operation only.

5.138 The potential for noise generation from the planning application area is significantly reduced by the natural screening (topographic and vegetation) that is maximised in the pit design / phasing.

5.139 In addition to the above the following good house-keeping measures are in place to reduce noise emitted from machinery as much as possible:

- Loading of HGV with sand & gravel will minimise drop heights.

- Reversing sirens on machinery will be sensor-controlled and used in conjunction with reversing cameras to reduce noise.
- All machinery used are CE certified for compliance with EU noise control limits;
- The machinery will be regularly maintained. This will include regularly checking any muffler systems and servicing or replacing as required. Servicing required will be undertaken at the adjacent Dromkeen Pit garage facility. It will also ensure any loose or damaged panels or covers that suppress noise are fixed or replaced immediately;

5.140 Existing noise management and mitigation measures will be implemented in accordance with the ICF (2004), DoEHLG (2004) and EPA (2006) environmental management guidelines for the sector, refer to EIAR Chapter 10 – Noise.

5.141 A noise monitoring programme will be implemented at the site as part of the environmental monitoring programme. Monitoring results will be submitted to Cork County Council.

Traffic Control

5.142 The existing permitted access will continue in use. The sand & gravel from Knockroe will be blended with the sand & gravel material from Dromkeen Pit leading to a relatively low annual extraction rate from the proposed development.

5.143 Based on a maximum annual pit output of 100,000 tonnes per year from the proposed development, and the short transport distance (c. 0.5km) to the adjacent Dromkeen Pit, the road haulage fleet will comprise 1 no. heavy goods vehicle (HGV) – for aggregate haulage.

5.144 The maximum number of HGV movements will be one to two HGV trips per hour based on a maximum annual total output of 100,000 tonnes per year, 50-week year, 5.day week ,8-hour day and 30 tonne (sand & gravel) HGV loads.

5.145 Keohane Readymix Ltd. will contribute to the cost of maintenance of the road network and are agreeable to an appropriate special contribution being attached to any future grant of planning permission in relation to same. It is proposed to pay any such contribution on a phased basis, the details of which will be agreed with the Planning Authority.

Proposed Restoration Scheme

Restoration to Natural Habitat & Agricultural Afteruse

5.146 The principal activity which will be undertaken at the application site is the extraction of sand and gravel with final restoration of the lands to a natural habitat and agricultural afteruse. This restoration afteruse is a beneficial afteruse listed in the EPA Guidelines: 'Environmental Management in the Extractive Industry' (2006).

5.147 The restoration plan is shown on Figure 2-5 in Chapter 2 of the EIAR and planning application drawing PL08. It includes a statement confirming that the plan adheres to any statutory obligations of any relevant legislation, including water pollution, air pollution, waste, litter and planning legislation or legal liabilities under any other enactment or regulations whatsoever. No exemptions are required in relation to the restoration plan.

5.148 The restoration plan as set out on Figure 2-5 in Chapter 2 of the EIAR has been prepared by SLR Consulting and approved by KRL (the Applicant). The landowner has provided a written consent letter for the planning application including the restoration of the lands to beneficial agricultural afteruse.

Restoration Phasing, Levels and Soil Thickness /Volumes

Final Restoration

5.149 It is envisaged that final restoration will take 2 years, following permanent cessation of extraction.

5.150 Prior to grass seeding all areas to be restored to agricultural land will be stone picked, then promptly seeded, using a mix suitable to create pasture. When this operation is completed the dry working areas will fully revert back to agricultural land and will blend in with the surrounding landscape.

Long Term Stability of Pit Faces

5.151 The restored pit slopes will be constructed at stable angles, ensuring the long-term stability of slopes and faces.

Long Term Surface Water and Groundwater

5.152 The surface water will percolate to ground. There is no requirement for any active long-term surface water or groundwater management at the site.

Decommissioning Machinery & Ancillary Facilities

5.153 Machinery, the wheelwash and welfare unit will be removed from site on permanent cessation of the extraction activity. Machinery will either be used by Keohane Readymix on other sites or be sold as working machinery or scrap.

5.154 There will be no fuel, oil storage tanks and / or effluent treatment system on site. There will be no potential for fuel, oil or sewage to cause long-term water pollution following completion of extraction activities.

Aftercare and Monitoring

5.155 There will be no on-going requirement for monitoring noise, dust or water after extraction has ceased.

5.156 Monitoring and maintenance will be undertaken over the two-year final restoration period to ensure that the restored agricultural land use is successful.

Assessment of Effects and Mitigation Measures

5.157 This section sets out the potential impacts and their effects on important ecological features. The information available from the desk study and fieldwork has been used to identify impacts and the significant effects including positive, negative, direct, indirect, and cumulative effects. The potential effects resulting from the proposed development works and proposed mitigation measures are discussed in the following sections.

Potential Impacts

Proposed Natural Heritage Areas

Potential Impacts

5.158 As there is no discharge from the Site and all surface water run-off will percolate to ground, and the Site is separated from the Bandon River by roadside vegetation and the local road there will be no potential for silt to be washed into the river.

5.159 There is a potential pathway for an impact on surface water quality in Bandon Valley Below Inishannon pNHA via groundwater baseflow to the watercourse. However, the potential to affect surface water quality (via fuel / suspended solids) in Bandon Valley Below Inishannon, through groundwater baseflow to the estuary is considered unlikely due to the location of works above the groundwater table and natural filtration through the unsaturated zone. Any accidental fuel leakage / spillage from vehicles would be of very limited extent due to the small volume of fuel.

Proposed Mitigation Measures

5.160 The following mitigation measures are proposed to avoid adverse impacts on Bandon Valley Below Inishannon, pNHA.

5.161 Although the removal of sand & gravel material in the proposed extraction area does not pose a significant threat to groundwater or surface waters of the surrounding area, measures will be implemented to prevent any reduction in the quality of the local aquatic environment which could arise. These management and mitigation measures are in accordance with the good environmental practice.

5.162 The following measures will be implemented at the site to prevent a reduction in surface water and groundwater quality:

- There will be no fuel storage within the proposed extraction area.
- No chemicals or petroleum-based products and chemicals will be stored at the site;
- No mechanical repairs to vehicles shall take place within the sand & gravel pit unless they cannot be moved. Vehicle repairs will continue to be undertaken in the existing covered maintenance shed at the existing KRL site at Inishannon.
- Emergency Response Spill Kits will be kept on site to prevent any accidental leaks of petroleum-based products from reaching groundwater or adjoining surface watercourses to the site. In addition to the dedicated spill kits, the pit staff also maintain a quantity of sawdust on site which can be used to soak up any petroleum-based products if they accidently leak on site; and
- There is a wheel wash facility for all HGV vehicles exiting the site and the internal road between the wheel wash and the public road will be surfaced to prevent trucks carrying material from the site onto the public road with their tyres.

5.163 No surface water will be allowed to drain from the site and enter any waters on, adjacent to or around the site, including the public road.

Significance of Residual Effects

5.164 Under the current development proposals and with the recommended mitigation measures in place, it is assessed that the impacts on proposed Natural Heritage Areas will not be significant.

Invertebrates

Potential Impacts

5.165 The proposed development will require the removal of some of the scrub habitat to the north of the Site. This habitat has the potential to provide suitable breeding, foraging, and refuge for a variety of invertebrate species.

Proposed Mitigation Measures

5.166 Compensatory planting of native hedgerow/scrub will replace the lost scrub habitat, refer to Figure 2-5. This planting is significantly larger than the area that must be removed to facilitate the proposed development.

Significance of Residual Effects

5.167 Under the current development proposals and with the recommended compensation measures in place, it is assessed that the impacts on invertebrates will not be significant.

Amphibians

Potential Impacts

5.168 There is potentially suitable breeding habitat for common frog located approximately 30 m from the Site in and around the Bandon River. There is a potential pathway for surface and groundwater contamination of this breeding habitat. Unmitigated, this project may result in the introduction of silt and suspended solids into this habitat.

Proposed Mitigation Measures

5.169 The mitigation measures proposed to avoid adverse impacts on the aquatic habitats of the Bandon Valley Below Inishannon pNHA, refer to Section 5.163 above, will also ensure there are no potential impacts on common frog breeding habitat.

Significance of Residual Effects

5.170 Under the current development proposals and recommended mitigation measures in place, it is assessed that the impacts on amphibians will not be significant.

Birds

Potential Impacts

5.171 The proposed development will require the removal of some of the scrub habitat to the north of the Site. This habitat has the potential to provide suitable breeding, foraging, and refuge for a variety of passerine bird species.

Proposed Mitigation Measures

5.172 Compensatory planting of native hedgerow/scrub will replace the lost scrub habitat, refer to Figure 2-5. This planting is significantly larger than the area that must be removed to facilitate the proposed development.

5.173 Vegetation removal required for the proposed development (refer to EIAR Figure 2-6) will be undertaken outside the nesting bird season (i.e., vegetation removal will be limited to September to February) in order to avoid risking harm or disturbance to nesting birds. Any vegetation removal that must be undertaken within the nesting bird season must undergo a

nesting bird check by a qualified ecologist. Any nesting birds will be protected by an appropriate buffer to be determined following the nesting bird check.

Significance of Residual Effects

5.174 Under the current development proposals and with the recommended mitigation and compensation measures in place, it is assessed that the impacts on birds will not be significant.

Bats

Potential Impacts

5.175 The proposed development will require the removal of some of the scrub habitat for the internal access upgrade, refer to EIAR Figure 2-6. This habitat has the potential to provide suitable foraging habitat for bat species.

5.176 Two trees within the scrub habitat to the north of the Site were identified as having potential bat roosting features with low suitability (refer to **Figure 5-1**). Both of these trees are outside the red-line boundary and the proposed access route and will not need to be removed. Therefore, there will only be the loss of some immature trees and scrub vegetation along the proposed access route which will not result in the loss of any bat roosting habitat. It will result in the loss of a small area of bat foraging habitat, but this will not significantly reduce the foraging potential of the entire surrounding landscape.

Proposed Mitigation Measures

5.177 Compensatory planting of native hedgerow/scrub will replace the lost scrub habitat, refer to Figure 2-5. This planting is significantly larger than the area that must be removed to facilitate the proposed development.

5.178 If any other mature trees are identified that need to be removed for the development, they must be inspected by a qualified ecologist before felling to assess their suitability for roosting bats.

Significance of Residual Effects

5.179 Under the current development proposals and with the recommended mitigation and compensation measures in place, it is assessed that the impacts on bats will not be significant.

Cumulative Effects

5.180 The following plans were reviewed for strategies and objectives that may act in-combination with the project:

- Cork County Development Plan 2022-2028

5.181 There are no strategies or objectives in the Cork County Development Plan 2022-2028 that are likely to result in significant effects when considered in-combination with the proposed development.

5.182 Cork County Council planning portal was accessed to examine recent (within 5 years) planning applications for potential to act in-combination with the project. The planning applications within 2 km of the Site that were reviewed and none were identified that could lead to cumulative effects on biodiversity.

Summary of Effects

Table 5-5: Summary of Important Features, Effects and Proposed Mitigation

Ecological Feature	Potential Impacts	Proposed Mitigation	Residual Effects
Proposed Natural Heritage Areas	Potential for water quality impacts on pNHAs.	Implementation of good practice environmental management & mitigation measures to protect groundwater / surface waters, refer to Section 5.163.	Not significant
Invertebrates	Loss of potential invertebrate habitat.	Compensatory planting of native hedgerow/scrub to replace lost habitat.	Not significant
Amphibians	Potential for water quality impacts on common frog breeding habitat.	Implementation of good practice environmental management & mitigation measures to protect groundwater / surface waters, refer to Section 5.163.	Not significant
Birds	Loss of potential bird breeding and foraging habitat. Direct impacts on nesting birds during removal of vegetation.	Compensatory planting of native hedgerow/scrub to replace lost habitat. All vegetation removal will be undertaken outside the nesting bird season (i.e., vegetation removal will be limited to September to February). Any vegetation removal that must be undertaken within the nesting bird season must undergo a nesting bird check by a qualified ecologist.	Not significant
Bats	Loss of potential bat foraging habitat. Direct impacts on roosting bats in trees with PRFs.	Compensatory planting of native hedgerow/scrub to replace lost habitat. If any other mature trees are identified that need to be removed for the development, they must be inspected by a qualified ecologist before felling to assess their suitability for roosting bats.	Not significant

Conclusions

5.183 Overall, it is assessed that with the recommended mitigation measures outlined, the proposed development will not have a significant impact on the biodiversity, designated sites, and habitats on the Site. Provided that the proposed works are undertaken in accordance with the proposed design and best practice that is described within this report, significant effects on ecology are not anticipated. As such, the proposed works are in line with environmental and biodiversity planning policy.

References

Byrne, A., Moorkens, E.A., Anderson, R., Killeen, I.J. & Regan, E.C. (2009) Ireland Red List No. 2 – Non-Marine Molluscs. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland.

CIEEM (2019) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine. Chartered Institute of Ecology and Environmental Management, Winchester.

Collins, J. (ed.) (2016). Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn). The Bat Conservation Trust, London

European Commission (2018). Managing Natura 2000 Sites: The Provisions of Article 6 of the 'Habitats Directive' 92/43/EEC.

European Commission (2021) Assessment of plans and projects in relation to Natura 2000 sites - Methodological guidance on Article 6(3) and (4) of the Habitats Directive 92/43/EEC Brussels, 28.9.2021

European Union Birds Directive (2009) Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (codified version).

European Union Habitats Directive, (1992). Council Directives 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora.

Fitzpatrick, Ú., Murray T.E., Byrne, A., Paxton, R.J., & Brown, M.J.F. (2006) Regional Red List of Irish Bees. Queen's University Belfast.

Fossitt, J.A. (2000). A Guide to Habitats in Ireland. Heritage Council, Kilkenny

Fulekar, M.H., Pathak, B. and Kale, R.K. (2014) Environment and sustainable development. New Delhi: Springer Verlag.

Kelly, J., O'Flynn, C., and Maguire, C. (2013). Risk analysis and prioritisation for invasive and non-native species in Ireland and Northern Ireland.

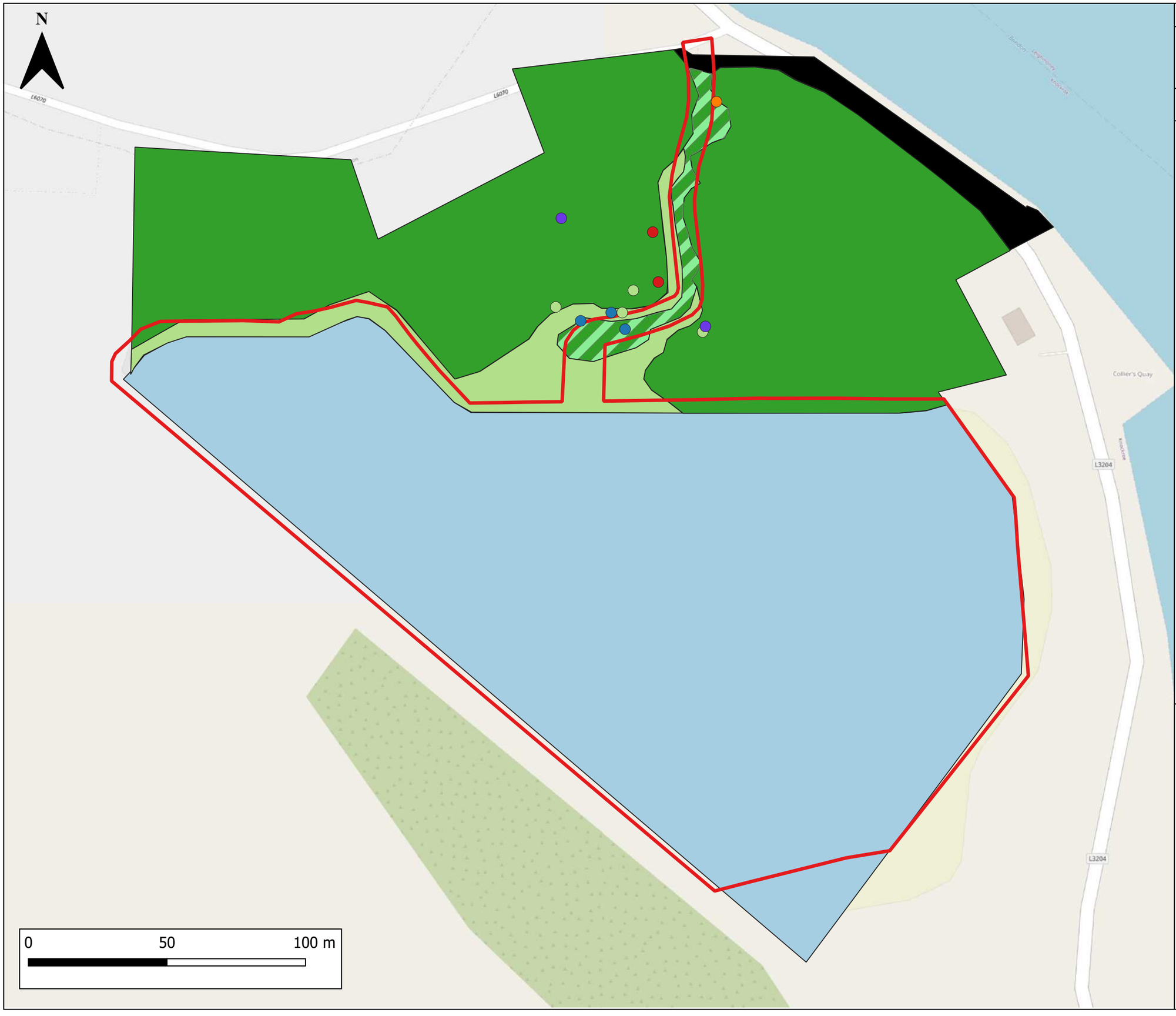
Protected sites in Ireland (no date) Protected Sites in Ireland | National Parks & Wildlife Service. Available at: https://www.npws.ie/protected-sites (Accessed: 20 November 2023).

Drawings

Figure 5-1: Habitat and Key Ecological Receptors (KERs) Map

Figure 5-2: European Sites Map

Figure 5-3: Natural Heritage Areas Map



NOTES

1. Base Mapping: OpenStreetMap © (www.openstreetmap.org/copyright)

LEGEND

- Site Boundary

Key Ecological Receptors

- Box-leaved Honeysuckle
- Cherry Laurel
- Cotoneaster
- Potential Roosting Features
- Winter Heliotrope

Habitats

- BL3 - Buildings and Artificial Surfaces
- GA1 - Improved Agricultural Grassland
- WD3 - Mixed Broadleaved Woodland
- WS1 - Scrub
- Open Scrub Mosaic

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EIAR BIODIVERSITY CHAPTER

Sand and Gravel Pit

Knockroe, Bandon , Co. Cork

Habitat and KERs Map

FIGURE 5-1

Scale: 1:1300 @ A3

Date: APRIL 2025

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N

The Gearagh SPA
The Gearagh SAC
Cork Harbour SPA
Sovereign Islands SPA
Courtmacsherry Estuary SAC
Courtmacsherry Bay SPA
Old Head of Kinsale SPA
Clonakilty Bay SAC
Clonakilty Bay SPA
Seven Heads SPA
Kilkeran Lake and Castlefreke Dunes SAC

0 5 10 km

NOTES

1. Base Mapping: OpenStreetMap © (www.openstreetmap.org/copyright)

LEGEND

- 15 and 20 km Buffers
- Site Boundary
- Special Areas of Conservation (SAC)
- Special Protection Areas (SPA)



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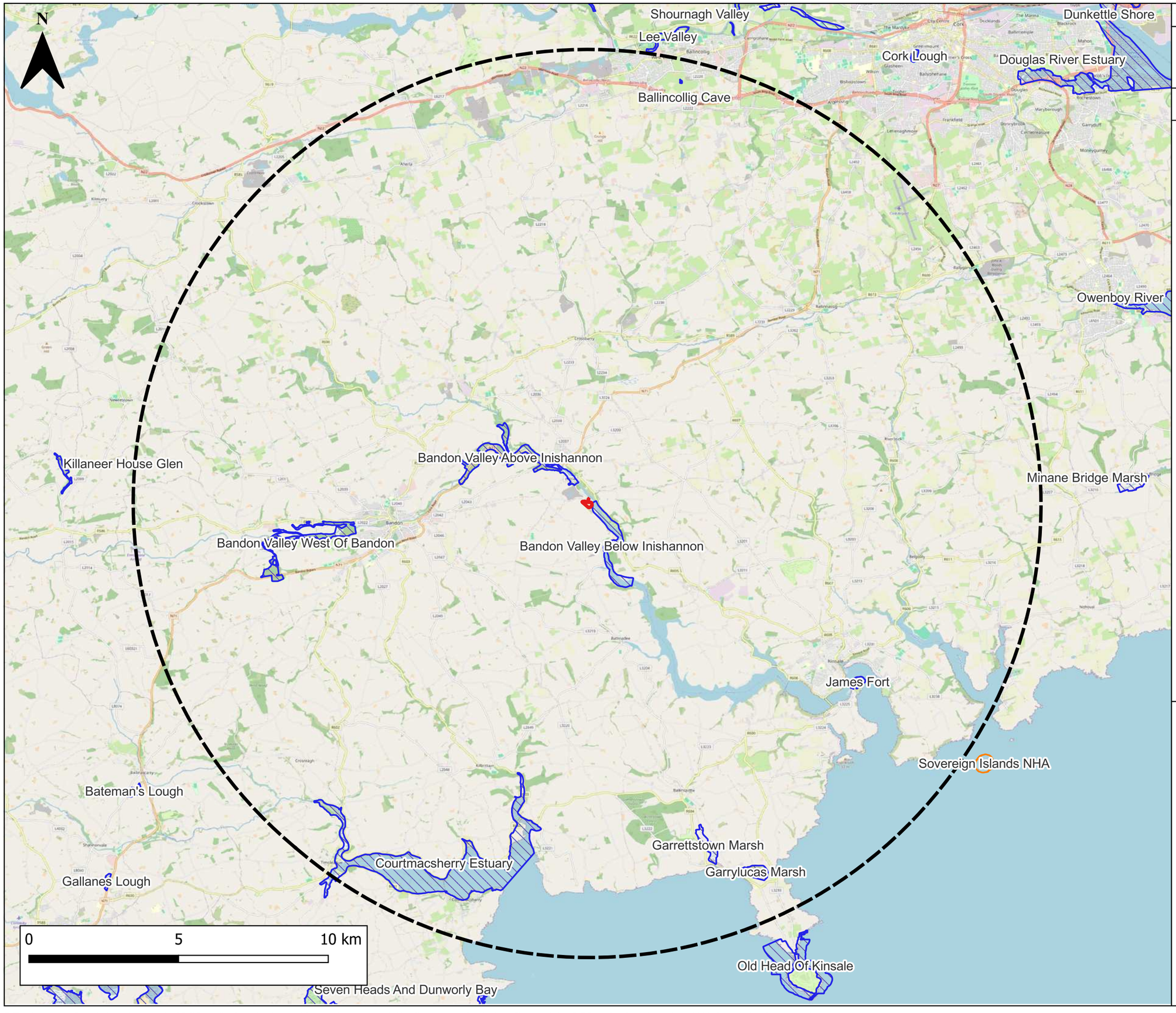
European Sites Map

FIGURE 5-2

Scale: 1:150000 @ A3

Date: APRIL 2025

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NOTES

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LEGEND

- 15 km Buffer
- Site Boundary
- Natural Heritage Areas (NHA)
- Proposed Natural Heritage Areas (pNHAs)



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Natural Heritage Areas Map

FIGURE 5-3

Scale	Date
1:120000 @ A3	APRIL 2025

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Appendix A. Relevant Legislation

Relevant Legislation[16]

EIA Directive

The EIA Directive, Council Directive 85/337/EEC of 27 June 1985 on the assessment of the effects of certain public and private projects on the environment as amended by Council Directive 97/11/EC of 3 March 1997, Directive 2003/35/EC of 26 May 2003 and Directive 2009/31/EC of 23 April 2009, now codified in Directive 2011/92/EU of 13 December 2011 and amended in Directive 2014/52/EU of 16 April 2014, is designed to ensure that projects likely to have significant effects on the environment are subject to a comprehensive assessment of environmental effects prior to development consent being given. The EIA Directive was first transposed into Irish law by the European Communities (Environmental Impact Assessment) Regulations, 1989 (S.I. No. 349 of 1989) which amended the Local Government (Planning and Development) Act, 1963 (and other legislation) to provide for environmental impact assessment.

Habitats and Birds Directive

The Habitats Directive ensures the conservation of a wide range of rare, threatened or endemic animal and plant species. Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora was adopted in 1992 and aims to promote the maintenance of biodiversity, taking account of economic, social, cultural and regional requirements. It forms the cornerstone of Europe's nature conservation policy with the Birds Directive and establishes the EU wide Natura 2000 ecological network of protected areas, safeguarded against potentially damaging developments.

The Natura 2000 network of protected areas is known as Special Areas of Conservation (SAC) and Special Protection Areas (SPA). In general terms, they are considered to be of exceptional importance in terms of rare, endangered or vulnerable habitats and species within the European Community. The requirements of the Habitats Directive have been transposed into Irish law through the European Communities (Birds and Natural Habitats) Regulations 2011 [S.I. No. 477/2011]. This legislation affords protection to both Special Protection Areas and Special Areas of Conservation.

Special Areas of Conservation (SAC) are designated under the Conservation of Natural Habitats and of Wild Fauna and Flora Directive 92/43/EEC (Habitats Directive) which is transposed into Irish law by the EC (Birds and Natural Habitats) Regulations 2011 (S.I. 477 of 2011). Special Protection Areas (SPA) are classified under the Birds Directive (2009/147/EC on the Conservation of Wild Birds). Article 6(3) of the Habitats Directive requires an 'appropriate assessment' to be undertaken for any plan or project that is likely to have a significant effect on the conservation objectives of a Natura 2000 site. An 'appropriate assessment' is an evaluation of the potential impacts of a plan or project on the integrity of a Natura 2000 site, and the incorporation, where necessary, of measures to mitigate or avoid negative effects.

National Legislation

Flora and fauna in Ireland are protected at a national level by the Wildlife Acts 1976 to 2018 and the Floral (Protection) Order 2015. Natural Heritage Areas (NHA) are areas that are considered to be important for the habitats present or for the species of plants and animals supported by those habitats. Under the Wildlife Amendment Act 2000, NHAs are legally protected from damage from the date they were formally proposed for designation. Section 19(1) of the Act states that 'Where

[16] Please note that the summary of relevant legislation provided here is intended for general guidance only. The original legislation should be consulted for definitive information.

there is a subsisting natural heritage area order in respect of any land, no person shall carry out, or cause or permit to be carried out, on that land any works specified in the order or any works which are liable to destroy or to significantly alter, damage or interfere with the features by reason of which the designation order was made'.

In addition, a list of proposed NHAs (pNHAs) was published in 1995 but to date these have not had their status confirmed. Prior to statutory designation, pNHAs are subject to limited protection under various agri-environment and forestry schemes and under local authority planning strategies such as County Development Plans.

Relevant Planning Policy

The planning policy and legislation that is relevant to the development.

Cork County Development Plan 2022-2028

The relevant local planning policies have been extracted from Volume 1 of the Cork County Development Plan 2022 – 2028. These policies are specific to "*Chapter 15: Biodiversity and Environment*" and are concerned with the policies and objectives relating to biodiversity.

BE 15-1: Support and comply with national biodiversity protection policies

a) Support and comply with the objectives of the National Biodiversity Plan 2017-2021 (and any future National Biodiversity Plan which may be adopted during the period of this Plan) as appropriate,

b) Implement the current County Biodiversity Action Plan and any future updated Plan;

c) Support and comply

BE 15-2: Protect sites, habitats and species

a) Protect all natural heritage sites which are designated or proposed for designation under European legislation, National legislation and International Agreements. Maintain and where possible enhance appropriate ecological linkages between these. This includes Special Areas of Conservation, Special Protection Areas, Marine Protected Areas, Natural Heritage Areas, proposed Natural Heritage Areas, Statutory Nature Reserves, Refuges for Fauna and Ramsar Sites. These sites are listed in Volume 2 of the Plan.

b) Provide protection to species listed in the Flora Protection Order 2015, to Annexes of the Habitats and Birds Directives, and to animal species protected under the Wildlife Acts in accordance with relevant legal requirements. These species are listed in Volume 2 of the Plan.

c) Protect and where possible enhance areas of local biodiversity value, ecological corridors and habitats that are features of the County's ecological network. This includes rivers, lakes, streams and ponds, peatland and other wetland habitats, woodlands, hedgerows, tree lines, veteran trees, natural and semi-natural grasslands as well as coastal and marine habitats. It particularly includes habitats of special conservation significance in Cork as listed in Volume 2 of the Plan.

d) Recognise the value of protecting geological heritage sites of local and national interest, as they become notified to the local authority, and protect them from inappropriate development

e) Encourage, pursuant to Article 10 of the Habitats Directive, the protection and enhancement of features of the landscape, such as traditional field boundaries, important for the ecological coherence of the Natura 2000 network and essential for the migration, dispersal and genetic exchange of wild species.

BE 15-6: Biodiversity and New Development

Provide for the protection and enhancement of biodiversity in the development management process and when licensing or permitting other activities by:

a) Providing ongoing support and guidance to developers on incorporating biodiversity considerations into new development through preplanning communications and the Council's guidance document 'Biodiversity and the Planning Process – guidance for developments on the management of biodiversity issues during the planning process' and any updated versions of this advice;

b) Encouraging the retention and integration of existing trees, hedgerows and other features of high natural value within new developments;

c) Requiring the incorporation of primarily native tree and other plant species, particularly pollinator friendly species in the landscaping of new developments;

d) Fulfilling Appropriate Assessment and Environmental Impact Assessment obligations and carrying out Ecological Impact Assessment in relation to development and activities, as appropriate;

e) Ensuring that an appropriate level of assessment is completed in relation to wetland habitats subject to proposals which would involve drainage or reclamation. This includes lakes and ponds, watercourses, springs and swamps, marshes, heath, peatlands, some woodlands as well as some coastal and marine habitats;

f) Ensuring that the implementation of appropriate mitigation (including habitat enhancement, new planting or other habitat creation initiatives) is incorporated into new development, where the implementation of such development would result in unavoidable impacts on biodiversity – supporting the principle of biodiversity net gain.

BE 15-7: Control of Invasive Alien Species

Implement best practice to minimise the risk of spread of invasive alien species, on Council owned or managed land, and require the development and implementation of Invasive Alien Species Management Plans for new developments where required.

BE 15-8: Trees and Woodlands

a) Protect trees the subject of Tree Preservation Orders.

b) Make use of Tree Preservation Orders to protect important trees or groups of trees which may be at risk or any tree(s) that warrants an order given its important amenity or historic value.

c) Encourage the provision of trees for urban shading and cooling in developments in urban environments and as an integral part of the public realm.

d) Preserve and enhance the general level of tree cover in both town and country. Ensure that development proposals do not compromise important trees and include an appropriate level of new tree planting.

e) Where appropriate, to protect mature trees/groups of mature trees and mature hedgerows that are not formally protected under Tree Preservation Orders

BE 15-10: Soils

a) Ensure the protection and conservation of the soils in County Cork by encouraging sustainable management practices and the reuse of brownfield lands.

b) Identify areas of poorer soil in the County acknowledge their potential value for wildlife, and respect their limitations, particularly in terms of their assimilative properties to prevent pollution.

BE 15-11: Contaminated Land

a) Require that prior to permitting development on contaminated sites, developers will carry out a full contaminated land risk assessment to demonstrate:

- How the proposed land uses will be compatible with the protection of health and safety (including the durability of structures and services) during both construction and occupation; and

- How any contaminated soil or water encountered will be appropriately dealt with.

b) In the case of development which requires the removal of soil, stones and invasive species, any removal requires the appropriate permits and disposal to authorised sites.

BE 15-12: Air Quality

a) Monitor air quality and air quality trends in accordance with EU policy directives, preserve good air quality where it exists, and take appropriate action, where required, including the provision of additional air quality monitoring infrastructure in urban areas and along major roads.

b) Radon barriers should be provided in all new developments in compliance with best practice and relevant Building Regulations.

c) Air emissions associated with all new development are to be in line with Environmental Quality Standards as set out in the Air Quality Standards Regulations 2011, or any updated/superseding documents.

BE 15-13: Noise and Light Emissions

a) Seek the minimisation and control of noise pollution associated with activities or development, having regard to relevant standards, published guidance and the receiving environment.

b) Ensure noise-sensitive developments are adequately protected from potential sources of noise (e.g. national roads). New developments should take account of, and mitigate against, any existing noise sources.

c) Support the implementation of Noise Action Plans prepared for the Cork County area.

d) Seek the minimisation and control of light pollution associated with activities of development, having regard to relevant standards, published guidance and the receiving environment and Dark Sky principles.

e) Review and update Cork County Council Policy Guidelines for Public Lighting to take account of impacts of public lighting on wildlife and night skies.

Objective BE 15-14: Waste Prevention and Management

a) Support the policy measures and actions outlined in

- 'A Waste Action Plan for a Circular Economy Ireland's National Waste Policy 2020-2025', and

- Southern Region Waste Management Plan 2015 – 2021, or any successor plans

b) Support circular and climate resilient economy principles and associated strategic infrastructure, prioritising prevention, reuse, recycling and recovery, and to sustainably manage all types of waste by ensuring the provision of adequate waste recovery, recycling and disposal facilities for the county

BE 15-17: Waste Prevention and Management

a) Planning applications for infilling of marginal land through soil importation will be supported where it can be demonstrated that the developments accord with proper planning and sustainable development, ensuring that they are compatible with the protection of environmental resources including water quality, Natura 2000 sites, biodiversity, archaeological and landscape resources.

b) Support will be provided for locating suitable sites within the county for the safe disposal of construction and demolition waste in conjunction with the Southern Waste Region.

c) Construction and Environmental Management Plans (CEMPs)/ Construction and Demolition Management Plans shall be prepared for larger scale projects as set out in paragraph 15.12.24 and

this requirement shall be assessed on a case-by-case basis as part of the development management process.

d) Support the implementation of the recommendations and policies of the National Hazardous Waste Management Plan 2014-2020.

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Introduction

Background

6.1 This chapter of the Environmental Impact Assessment Report (EIAR) provides a description of the existing land, soils and geological setting at the regional and local scale, an assessment of the impact of the proposed development on the land, soils and geological features of the area around the site of Knockroe, Bandon, Co. Cork. The site location is shown on EIAR Figure 1-1.

6.2 The proposed development, situated within an application area of 4.0 hectares, will consist of:

- The development of agricultural land for the extraction of Sand & Gravel over an area of (3.5 Ha.);
- Extraction by dry working to 2 metres above the groundwater table, at a maximum rate of 100,000 tonnes per year;
- Transport of the extracted Sand & Gravel to the adjacent Dromkeen Pit for use in concrete production;
- Upgrading of the existing internal access road and use of the existing access;
- Provision of wheelwash and welfare unit; and
- Restoration of the lands to agricultural use.

6.3 Permission is sought for 15 years plus two years for final restoration (total duration of seventeen years). Further details of the proposed development are provided in Chapter 2 of this EIAR.

6.4 Further details of the proposed development are provided in Chapter 2 of this EIAR.

Scope of Work / EIA Scoping

6.5 This EIAR section is based on a desk study of the proposed extraction area and surrounding lands using published geological data, ground investigation undertaken in March 2025 and site visits carried out by SLR including inspections..

Consultations / Consultees

6.6 No specific pre-application consultations were required for this topic.

Authors

6.7 This EIAR section relating to Land, Soils and Geology was prepared by:

- Peter Glanville - Professional Geologist (EurGeol. PGeo.) and Technical Director with SLR Consulting. Peter is a Quaternary Geologist and has over 25 years' professional experience; and
- Jack Crawley - Associate Hydrogeologist with SLR Consulting.

REGULATORY BACKGROUND

EU Directives

6.8 The following European Union (EU) Directive relate to Land, Soils and Geology at the proposed extraction development site in this EIAR:

- Environmental Impact Assessment Directive (2014/52/EU); and
- European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (S.I. 296 of 2018).

6.9 The EU EIA Directive regulates the environmental impact assessment process and information in this EIAR section.

Irish Legislation

6.10 The following legislation relating to Land, Soils and Geology at the proposed extraction development site in this EIAR:

- No. 349 of 1989, European Communities (Environmental Impact Assessment) Regulations, and subsequent amendments (S.I. No. 84 of 1994, S.I. No. 352 of 1998, S.I. No.; 93 of 1999, S.I. No. 450 of 2000 and S.I. No. 538 of 2001);
- S.I. No. 473 of 2011, European Union (Environmental Impact Assessment and Habitats) Regulations 2011;
- S.I. No. 584 of 2011, European Union (Environmental Impact Assessment and Habitats) (No.2) Regulations 2011;
- The Planning and Development Acts, 2000 as amended; and
- The Planning and Development (Amendment) Act 2010, S.I. 600 of 2001 Planning and Development Regulations and subsequent amendments including, S.I. No. 364 of 2005 and S.I. 685 of 2006.

6.11 The above legislation regulates the information contained in an EIAR and planning at the proposed extraction development site.

Planning Policy and Development Control

6.12 The following Planning Policy and Development Control relating to Land, Soils and Geology at the proposed development site is set out in the Cork County Development Plan 2022 - 2028:

- conservation objectives in relation to natural heritage and landscape, including geology, in the county;
- Regarding Geological Heritage, Objective BE 15-2 of the Plan '*Recognise the value of protecting geological features of local and national interest*';
- The Plan notes that an audit of the Geological Sites of County Cork is underway and that it is expected to be completed within the lifetime of the plan. The planning authority will seek to protect from inappropriate development the sites identified by the audit;
- The plan recognises the importance of soil to the environment and to agriculture in the county;

- Section 6.4.5 of the plan recognises the importance of the extractive industry to the economy of the county, and the need to balance the needs of the building industry with environmental protection.

6.13 The Development Plan contains the following objective in relation to the extractive industry:

- **EC 8-13** which is defined as follows:
  a) Protect and safeguard the county's natural mineral resources from inappropriate development, by seeking to prevent incompatible land uses that could be located elsewhere, from being located in the vicinity of the resource, since the extraction of minerals and aggregates is resource based.
  b) Prepare a Minerals Strategy Plan to support a sustainable extractive industry during the lifetime of the plan.

Guidelines

6.14 This Land, Soils and Geology section of this EIAR has been prepared with regard to the following guidelines:

- Environmental Protection Agency (2022) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports. Environmental Protection Agency.
- DoEHLG (2010) Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities;
- Geological Survey of Ireland, Irish Concrete Federation (2008) Geological Heritage Guidelines for the Extractive Industry;
- Institute of Geologists of Ireland (2013) Guidelines for the preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements;
- National Roads Authority (2008) Environmental Impact Assessment of National Road Schemes - A Practical Guide;
- National Roads Authority (2008) Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes; and
- Good Practice Guide for Handling Soils in Mineral Workings. The Institute of Quarrying (2021).

Receiving Environment

Study Area

6.15 For the purposes of this assessment, the study area comprises the application site and the surrounding area up to 2km reflect the sensitivity of the Land, Soil and Geology; this is in line with the Institute of Geologists of Ireland's (IGI) guidelines (2013).

6.16 The IGI guidelines state that the minimum distance of 2km should be reviewed in the context of the geological environment as well as the scale of development and increased to reflect the sensitivity of the subsurface. The IGI guidelines also state that maps should be sourced to allow for the review of the geological conditions that

exist within a minimum of 2km of the site boundary (from the outer limit of the planning and/or licence area) and presented at a scale of 1:25,000.

6.17 The baseline maps produced in this EIAR are at a scale of 1:25,000 and include an area up to c. 3.5km from the lands under the control of the applicant.

6.18 The existing site layout and application area is shown in Figure 6-1.

Baseline Study Methodology

6.19 The baseline study undertaken for Land, Soils and Geology, here involves a review of published literature and information, the findings from a ground investigation of the proposed site conducted in March 2025, and the context of the site within the surrounding area.

6.20 This chapter describes the receiving environment at and in the immediate vicinity of the site using the available baseline information gathered, specifically the:

- **Context** of the receiving environment - location/ magnitude/ spatial extent and trends of the environmental factors;
- **Character** of the receiving environment - distinguishing aspects of the environment being considered here;
- **Significance** of the receiving environment - the quality, value or designation is assigned to the existing environment; and
- **Sensitivity** of the receiving environment - how sensitive is the aspect of the environment to change.

6.21 The baseline study is a qualitative assessment of the available information based on professional experience and interpretation of the available data.

Sources of Information

6.22 The following sources of information were consulted in the preparation of the receiving environment baseline study for Land, Soils and Geology:

- Geological Survey of Ireland (www.gsi.ie);
- Teagasc soil and subsoil mapping for Irish Forestry Soils Project (www.epa.ie);
- Irish Soils Information System (www.teagasc.ie/soils);
- Irish Geological Heritage Programme (www.gsi.ie); and
- Tailte Éireann (www.tailte.ie).

6.23 There is an old historical disused Cork Co. Council Sand & Gravel Pit at the site entrance which is overgrown with mature vegetation. There is an existing internal haul road from the site entrance leading to the proposed extraction area.

6.24 The exposed faces at the existing adjacent Keohane Readymix Ltd pit at Dromkeen have been inspected and also provide information on the local soils and subsoils (Sand & Gravel) in the area.

Land Baseline

6.25 Within the EIA EU Directive (2014/52/EU) Land is recognised as a ‘natural resource’ and the Directive also refers to the importance of the sustainable use of soil and the need to address the unsustainable increase in settlement areas over

time ('land take'). Therefore, the issues of land as both a natural resource and land take must be considered in an assessment.

6.26 The introduction section to the EU Directive (2014/52/EU) notes that the:

'*final document of the United Nations Conference on Sustainable Development held in Rio de Janeiro on 20-22 June 2012, which recognises the economic and social significance of good land management, including soil, and the need for urgent action to reverse land degradation. Public and private projects should therefore consider and limit their impact on land, particularly as regards land take, and on soil, including as regards organic matter, erosion, compaction and sealing; appropriate land use plans and policies at national, regional and local level are also relevant in this regard'.*

6.27 Land can be considered to be a resource with a beneficial use to society, for example agricultural land use, extractive industry land use or urban residential land use. Unnecessary land take may result in the loss of this resource which has the potential to have adverse social and economic consequences for society. The current land use across the extraction area is agricultural which has a beneficial aspect for society through grassland animal grazing.

6.28 Agricultural land use activities may be considered to be tied activities; tied to the resource present at the site while the type/nature of agricultural activity is also related to the suitability of the soils present.

6.29 The extraction of Sand & Gravel material at the proposed development site is a resource-tied land use activity, as it is dependent on the location and suitability of the Sand & Gravel material for its intended use, which are considered to be a natural resource.

6.30 The Sand & Gravel material is a mineral resource (non-scheduled mineral). The Sand & Gravel material resource at the site has been proven through the operation of the existing pit adjacent pit at Dromkeen and a ground investigation survey within the proposed extraction area.

6.31 The proposed development will result in a temporary loss of c. 4.0 Ha. of agricultural land across the proposed extraction area. In terms of land take, the proposed development will result in a temporary use of the land for Sand & Gravel material extraction and a temporary loss of agricultural lands over the extraction area. The soils at the site will be stripped and stored on site during the extraction of the Sand & Gravel material and will be used for the restoration of the site to return it to a beneficial agricultural after-use.

Land Cover

6.32 The Corine land cover mapping is a standardised inventory of land cover across Europe which is split into 44 different land cover classes. The latest 2018 Corine land cover mapping for Ireland is based on the interpretation of satellite imagery and national in-situ vector data. Land cover is mapped to the standard CORINE classification system and data specifications.

6.33 The Corine land cover mapping (www.epa.ie) reflects land use at the time of survey, in this case the latest available land cover data for Ireland is 2018. The dominant land cover type in the area is Agricultural Pasture, see Figure 6-2.

Soils Baseline

6.34 Soil is defined as the top layer of the earth's crust and is formed by mineral particles, organic matter, water, air and living organisms. Soil is an extremely complex, variable and living medium and its characteristics are a function of parent subsoil or bedrock materials, climate, relief and the actions of living organisms over time.

6.35 Soil formation is an extremely slow process and can take thousands of years to evolve; soil can be considered essentially as a non-renewable resource.

6.36 As the interface between the earth, the air and the water, soil performs many vital functions; it supports food and other biomass production (forestry, biofuels etc.) by providing anchorage for vegetation and storing water and nutrients long enough for plants to absorb them. Soil also stores, filters and transforms other substances, including carbon and nitrogen, and has a role supporting habitats serving as a platform for human activity.

6.37 Soils removed from the area of the existing pit and extraction area will be used at the site for restoration purposes.

National Soils

6.38 The Irish Soil Information System (ISIS) project was undertaken by the EPA and Teagasc and has gathered together existing information and data from soil survey work in Ireland, which has been augmented it with a new field data, leading to the production of a new national soil map at a scale of 1:250,000.

6.39 The ISIS project has identified a number of Soil Associations across Ireland, which are each comprised of a range of individual soil types (or 'Series'), each of them different in properties, with different environmental and agronomic responses. For each soil type, the properties have been recorded in a database maintained by Teagasc.

6.40 The soil associations at the proposed extraction development site are classified as the Ross Carberry Soil Association (ISIS Code 0900e), see Figure 6-3. The Ross Carberry series is described as coarse, loamy drift with siliceous stones and are predominantly well drained soils .

6.41 The Ross Carberry soil association consists primarily of Brown Podzolics and Brown Earths. It is shallow and well-draining, although nutrient poor (Creamer et. al., 2018). It is considered a good agricultural soil, benefiting from periodic liming and nutrient addition. The Ross Carberry soil association is widespread across Ireland, with c. 80% of its occurrence in County Cork.

6.42 Tidal marsh soils are mapped along the River Bandon to the east of the site. This soil type is expected to have similar characteristics to river Alluvium with generally poor drainage. The soils in this association have poor soil drainage, weak structure and are very vulnerable to poaching when grazed.

Subsoils Baseline

Regional Subsoils

6.43 The subsoils across Ireland have been mapped on a national basis by Teagasc as part of the EPA Soil and Subsoil Mapping Project for the Irish Forestry Soils (IFS) project. The subsoil mapping was undertaken at a national basis using existing

Quaternary Geology maps, publications, remote sensing and field mapping and sampling.

6.44 The Quaternary (Subsoil) deposits were deposited during the last 2 million years and essentially comprise the unconsolidated materials overlying bedrock.

6.45 There are two predominant types of quaternary subsoils located in the region of the site:

a. glacial till deposits, which were deposited at the base of glacial ice sheets and comprise heterogenous mixture of clay, Sand & Gravel and boulders; and

b. estuarine silts and clays, associated with the River Bandon located to the east of the site.

6.46 Subsoils in the proposed extraction development site have been mapped under the IFS project as Sand & Gravel derived from Devonian sandstones, see **Figure 6-4**.

Ground Investigation

6.47 A ground investigation comprising three boreholes was undertaken by SLR in March 2025, see Figure 6-1, to confirm the geology at the site. Summary details of the borehole are shown in Table 6-1 and the summary lithology is shown in Table 6-2. The borehole logs are shown in Appendix 6-A. .

Table 6-1: Summary details of site ground investigation boreholes

	GW1	GW2	GW3
Grid Reference (ITM)	E555581 / N555840	E555496 / N555734	E555707 / N555775
Approx. Ground Elevation (m AOD)	7.5	25.50	22.50
Borehole depth (m BGL)	13.5	30.00	28.00
Borehole base (m AOD)	-6.0	-4.50	-5.50
Proven Thickness of Sand & Gravel Material (m)	13.3	6.80	> 28.00
Rock Head (m AOD)	- 5.8	18.70	> -5.5 *(No bedrock encountered)*

Table 6-2: Summary borehole lithology

GW1		GW2		GW3	
0 to 13.3m	Silty SAND & GRAVEL with frequent cobbles and boulders. With Very clayey SAND & GRAVEL at the base	0 to 0.7m	Topsoil overlying sandy silty CLAY	0 to 0.3m	Topsoil
		0.7m to 6.8m	Slightly silty SAND & GRAVEL with frequent cobbles and boulders	0.3m to 28m	Slightly silty, SAND & GRAVEL, with frequent cobbles and boulders.

GW1		GW2		GW3	
13.3m to 13.5m	LIMESTONE bedrock	6.8m to 30m	Shaley, weathered LIMESTONE MUDSTONE bedrock becoming less weathered with depth.		*No bedrock encountered in BH GW03*

6.48 The March 2025 ground investigation confirms the significant thickness of sand & gravel deposits on the site, consistent with the information from the adjacent Dromkeen Pit, and the existing exposed pit face on site (currently restored through natural recolonisation). Sand & gravel deposits extend to below -5.5 m AOD over the site to a maximum thickness of at least 28m (refer to borehole GW3). The thickness of the Sand & gravel material thins along the western boundary of the site, with a thickness of c. 6m (refer to borehole GW2).

Bedrock Geology

6.49 No bedrock will be extracted at the site as part of the proposed development.

Regional Setting

6.50 Regionally, the proposed site lies within the upper Devonian and lower Carboniferous Cork Group, see Figure 6-5.

Local Detail

6.51 Geological Survey of Ireland (GSI) 1:100,000 mapping shows the proposed extraction development site is underlain by a bedrock comprising the Kinsale Formation, see Figure 6-5.

6.52 The Kinsale Formation is characterised by grey mudstones and mud dominant lithologies in ascending order at the type section:

- **Castle Slate Member** - uniform, nodular, dark grey mudstones without sandstone;
- **The Narrow Cove Member, dominantly mud** - this member is described as a bedded sandstone and mudstone, present to a reported total thickness of c. 300m.

6.53 Bedrock at the site is buried beneath soils and Sand & Gravel subsoils. No bedrock outcrops were observed within the proposed extraction development site.

6.54 The GSI geological mapping shows a cluster of small bedrock outcrops c. 400m to the north of the proposed site, as well as series of bedrock outcrops along the Bandon River estuary to southwest side and some outcrop exposures c. 600m south of the site.

Karstification

6.55 Karst does not occur in these rock types; however, the GSI karst database was consulted and it confirmed that there are no known karst features in the vicinity of the proposed extraction development site.

Geological Profile

6.56 Based on the information from the review of published geological information, site inspections and the borehole survey the geological profile at the site comprises three principal units, see Table 6-3 below.

Table 6-3: Summary of site geological units

Unit No.	Geological Strata	Geological Interpretation
1	Ross Carberry Soil Association	Topsoil -Approx. 0.3m thickness
2	Glacial Till Deposits	Sand & Gravel Subsoils – from between 6m to over greater than 28m in thickness
3	Kinsale Formation	Limestone Mudstone bedrock

Geological Heritage

6.57 The proposed extraction site is not designated as geological heritage site or a site of geological importance.

6.58 The closest geological heritage site is Killumney Moraine, located approximately 12.6km north of the site.

Sensitive Receptors

6.59 In terms of the land, soils and geology baseline conditions considered here, the sensitive receptors identified from this baseline are:

- Agricultural land use;
- Agricultural soils; and
- Sand & Gravel subsoils.

Impact Assessment

Evaluation Methodology

6.60 The evaluation of impacts of the proposed extraction development is based on a methodology similar to that outlined in the IGI Guidelines (2013) and the EPA Guidelines (2022).

Evaluation of Impacts

6.61 This assessment focuses on the potential impact of the proposed extraction of sand and gravel material at the site.

6.62 The proposed extraction will result in the loss of agricultural land within the extraction area over the period of extraction. On cessation of the extraction activities, the site will be restored to agricultural land use, refer to EIAR Figure 2-4.

6.63 The status and importance of existing land, soil and geology attributes identified at the development site is assessed in Table 6-4 below.

Table 6-4: Status and Importance Land, Soil & Geology Attributes

Attribute	Status / Occurrence	Importance
Land	The land at the proposed extraction area is used for agriculture and is . The agricultural land is well drained.	Agricultural land has a value in terms of its ability to support agriculture and therefore it is considered to be of **high** importance at a local scale only.
Soils	The soils at the site are well draining and are suitable for agriculture. The Ross Carbery soil association has an extensive distribution across the county.	The soils are considered to be of **medium** importance at a local scale as they are suitable for agriculture with some improvement methods.
Subsoils (Sand & Gravel)	The Sand & Gravel subsoils are present in specific areas across the county and in the southern region of Ireland. The subsoils do not hold any particular status.	The Sand & Gravel at the site are considered to be of **high** importance at a local and regional scale for their contribution to the economy and employment.
Geology	The bedrock at the site does not hold any designated status.	The proposed development will not impact on the bedrock geology at the site.
Geological Heritage	None	None.

6.64 The magnitude of these impacts on the land, soils and geology attributes is assessed in Table 6-5, below.

Table 6-5: Magnitude of Potential Impacts on Land, Soil and Geology (with No Mitigation)

Attribute	Impact of Proposal	Magnitude of Potential Impact (with No Mitigation)
Land	Development of land for the purposes of extraction of Sand & Gravel with restoration to agricultural land use.	**Low** impact due to temporary loss of land use locally within the extraction area, and subsequent restoration to agricultural use.
Topsoil	Stripping of topsoil, topsoil storage and use in restoration works.	**Medium** impact due to temporary loss of topsoil locally within the extraction area and potential loss of soils if managed incorrectly. In addition, the soil type is relatively common throughout the county.
Subsoils (Sand & Gravel)	Extraction of Sand & Gravel subsoils	**High impact** with permanent extraction of Sand & Gravel resource for use as construction aggregates and materials.
Geology	**No impact**	**No impact**, no further consideration required here.
Geological Heritage	**No impact.**	**No impact**, no further consideration required here.

Indirect Impacts

6.65 There will be no indirect impacts on land, soils or geology as a result of the proposed development.

Unplanned Events

6.66 Unplanned events within the application site, such as accidents, have the potential to impact on the land, soils and geology adjoining the site.

6.67 Ground instability, particularly the long-term stability of the pit faces, has the potential to impact on adjoining lands. The proposed extraction scheme design and site operations adhere to the Health and Safety Authority Safe Quarry Guidelines (2020) in relation to the Safety Health and Welfare at Work SHWW (Quarries) Regulations 2008, as amended, and this will eliminate the potential for unplanned events such as instability of pit faces or instability in adjacent lands.

6.68 With the implementation of the SHWW Quarry Regulations 2008, as amended, it is considered extremely unlikely that instability of pit faces would result in an impact on the land, soils and geology at the proposed extraction development site.

Human Health

6.69 From a land, soils and geology perspective, any potential impacts on human health from the proposed extraction development would not be via the land use, soils and geology pathways but via other pathways such as air and water, which are addressed in the relevant chapters of this EIAR.

Cumulative Impacts

6.70 There is a potential cumulative impact in terms of the loss of land and soils with the adjacent existing adjacent Keohane Readymix Ltd. Dromkeen Pit at Innishannon, but as the soils will be retained on site for use in restoration of the land to agricultural and natural habitat use there will be no significant cumulative impacts arising to land or soils.

Interaction with Other Impacts

6.71 The interactions between Land, Soil and Geology with Biodiversity and Water at the site are discussed in Chapters 5 and 7 respectively.

'Do-nothing Scenario'

6.72 Under the 'do nothing scenario' the land at the proposed extraction site will continue to be purposed for agricultural requirements.

Mitigation Measures

6.73 Mitigation measures are outlined here for the development of the extraction area.

6.74 The site will be developed and restored on a phased basis, see Figure 2-4 in this EIAR, to reduce the exposed areas of soils at the site.

6.75 The site development stage in the extraction area (comprising topsoil stripping) is required before the extraction of Sand & Gravel material can take place at the site. The operational stage of the pit is the extraction of the Sand & Gravel material over the lifetime of the project.

Construction / Site Development Stage

Soils

6.76 Soils will be managed on site in line with best practice. The stripping, storage and reuse of the soils in restoration at the site will be undertaken on a phased basis.

6.77 Phase 1 will comprise removal of topsoil and subsoil from the eastern part of the extraction area and extraction of sand & gravel. The soil stripped from the Phase 1 area will be temporarily stored in the Phase 2 area pending use in the phased and final restoration works, see Figure 2-4.

6.78 Phase 2 will comprise use of the stripped soil temporarily stored in the Phase 2 area for progressive restoration of the Phase extraction area. Soil tripped from the Phase 2 area will be temporarily stored in the Phase 1 area pending use in the final restoration, see Figure 2-4.

6.79 The soils will be stripped and stored in accordance with best practice guidance a set out in The Institute of Quarrying guidelines[1].

[1] The Institute of Quarrying Good Practice Guide for Handling Soils in Mineral Workings, 2021.

6.80 The soil handling method can affect the quality of the restoration through severe soil deformation (compression and smearing); this is primarily caused through trafficking, the effects of which increase with soil moisture content. The soil stripping and storage operations will be undertaken in such a manner so as to minimise soil compaction.

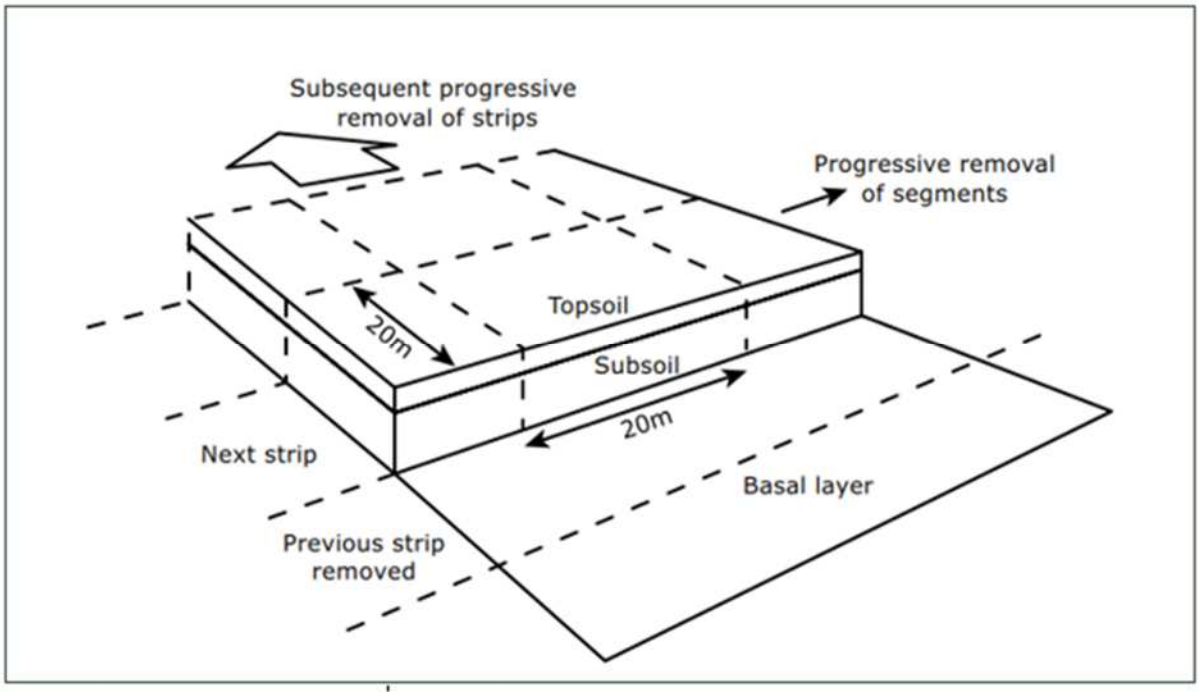
6.81 In order to limit the effects of erosion and deterioration on the soil, material will not be removed during either periods of prolonged dry weather or excessively wet weather; this is to avoid the higher potential for dust generation during extended periods of dry weather, and conversely the greater potential for soil erosion during extended periods of wet weather.

6.82 The stripped soils will be stored in such a manner that they can be reused in restoration works for the pit.

6.83 Good practice measures will be implemented at the site in order to preserve the structure and integrity of the soils and limit the effects of erosion on the stored soil during excavation and storage.

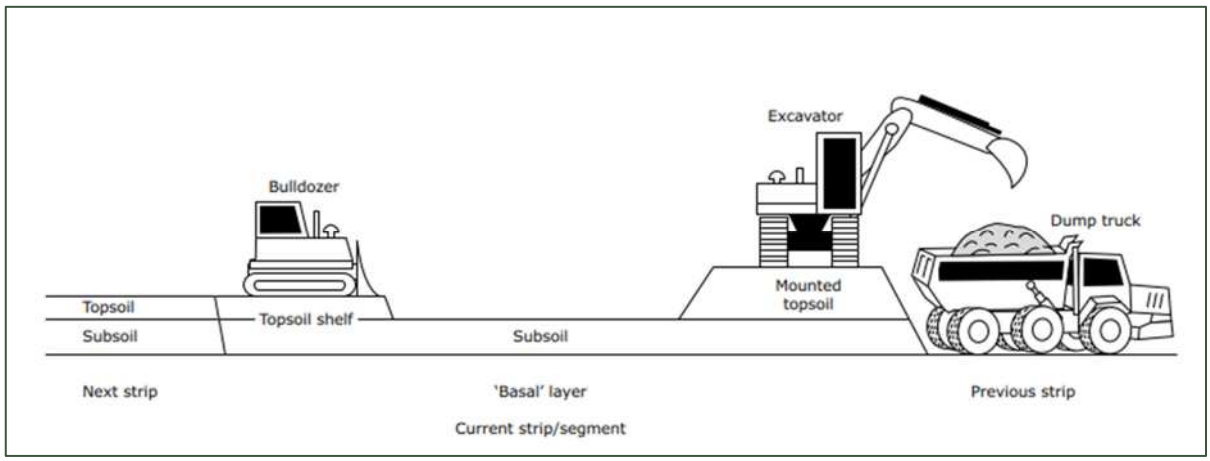
6.84 Soil stripping is to be undertaken by the excavator standing on the surface of the topsoil and digging the topsoil to its maximum depth and loading it into dump trucks. The dump trucks draw alongside the exposed soil profile, standing and travelling only on the basal layer, see **Diagram 6-1** and **Diagram 6-2** below.

Diagram 6-1: Soil stripping using modified layer by layer practice (The Institute of Quarrying, 2021)[2]



[2] Good Practice Guide for Handling Soils in Mineral Workings. The Institute of Quarrying (2021).

Diagram 6-2: Topsoil stripping using modified layer by layer practice (The Institute of Quarrying, 2021)



6.85 Topsoil storage will not exceed 3m in height in order to protect the structure of the soils for use in restoration.

6.86 Stripped soil will be re-vegetated where they are in place for a sufficient length of time to justify such a measure. The re-handling of soil material will be minimised as much as possible in order to preserve the integrity of the topsoil material. This is also an economically-prudent practice.

Subsoils

6.87 Sand & Gravel material will be extracted, processed and used for aggregates locally and regionally.

Geology

6.88 It is not proposed to extract bedrock as part of this development and, therefore, no mitigation measures are required. There will be no effect on the geology during construction.

Operational Stage

Land Stability

6.89 The operation of the pit will be in line with the Health and Safety Authority Safe Quarry Guidelines (2020), in relation to the Safety Health and Welfare at Work (Quarries) Regulations 2008 as amended. This will limit the potential for unplanned events such as instability of pit face or instability in adjacent lands. It is therefore considered that the residual impact of the proposed extraction at the site in terms of ground instability will be low to imperceptible.

Post-Operational Stage (Final Restoration)

Land

6.90 On cessation of extraction the land within the extraction area will be restored to agricultural use with the placement of previously striped soils at the site. The final restored pit slopes are designed to ensure long-term stability.

Topsoil

6.91 The development will be operated dry, 2 metres above the groundwater table to ensure that the restored soils will be free draining and suitable for agriculture. It is therefore considered that the dry working will ensure that the residual impact on soils during the restoration stage will be low to imperceptible.

Cumulative Impacts

6.92 The cumulative impacts on land and soil will be mitigated by the phased extraction and restoration of the site as well as through the ongoing restoration of the adjacent site at Inishannon.

6.93

Residual Impact Assessment

6.94 The residual impacts on land, soil and geology are those impacts which remain following the implementation of the mitigation measures outlined above.

Land

6.95 With the restoration of the proposed extraction development site back to agricultural land use, it is considered that the long-term impact of the proposed development on land and soils will be negligible and not significant.

6.96 The design of the extraction scheme (boundary set-back distance and final pit slopes) together with the operation of the quarry will be in line with the Health and Safety Authority Safe Quarry Guidelines in relation to the Safety Health and Welfare at Work (Quarries) Regulations 2008. This will eliminate the potential for unplanned events such as instability of quarry face or instability in adjacent lands. Therefore, it is considered that the residual impact of the proposed extraction development on land stability will be negligible and not significant.

Soil

6.97 The residual impact on the soil and topsoil will be low to negligible with the phased extraction and appropriate management of the soils for reuse in restoration. The residual impact on soil is considered Not Significant.

Subsoil (Sand & Gravel)

6.98 The residual impact on the extracted Sand & Gravel material will be permanent.

Monitoring

6.99 The restoration works will be managed and monitored during the two-year proposed final restoration period to ensure that the restored land use is successful and to confirm that the restored final pit faces are stable.

REFERENCES

Cork County Development Plan 2022 - 2028.

Creamer, R. & O'Sullivan, L., (2018) The Soils of Ireland

EPA Report No. 130 (2014), Irish Soil Information System Synthesis Report.

EPA (2008), Irish Soil Information System Final Technical Report 10.

Geological Survey of Ireland (2007), 1:100,000 Bedrock Geology of Ireland (Digital-Map).

Geological Survey of Ireland Bedrock Geology Sheet 16 (1:100,000), Geology of Cork and Cork, and accompanying geological memoir (1995).

Institute of Geologists of Ireland (2013) 'Guidelines for the preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements'.

Teagasc, 2004, Ireland Subsoil Parent Materials Map (digital version).

Teagasc, 2007, Ireland Soils Map (digital version).

The Institute of Quarrying (2021), Good Practice Guide for Handling Soils in Mineral Workings.

Transport Infrastructure Ireland (March 2013). Specification for Road Works Series 600 - Earthworks

Figures

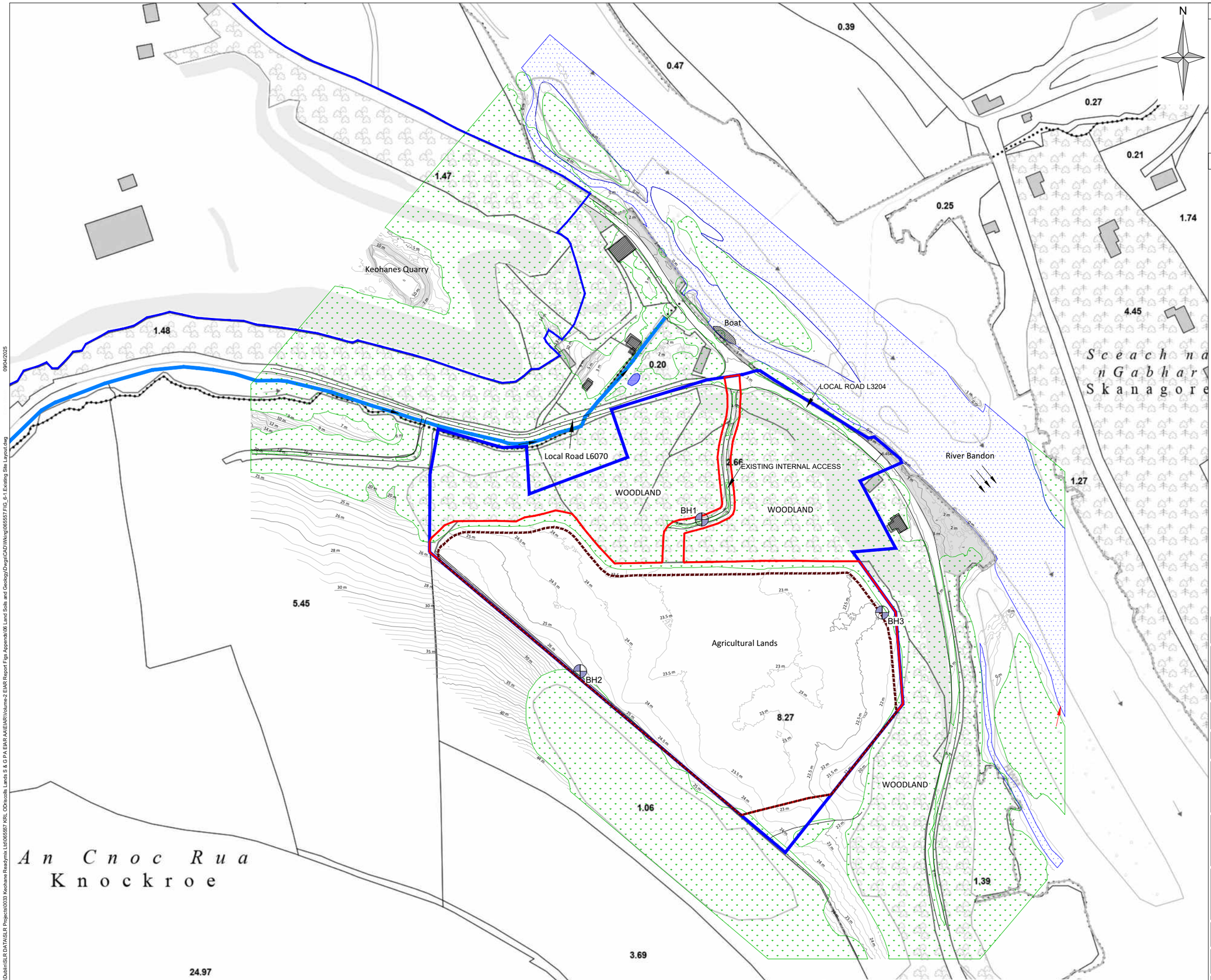
Figure 6-1: Site layout and Borehole Locations

Figure 6-2: Land Cover Map

Figure 6-3: Regional Soils Map

Figure 6-4: Regional Subsoils Map

Figure 6-5: Bedrock Geology Map



Notes:

1. EXTRACT FROM TAILTE EIREANN DIGITAL MAPPING 1:2,500 SCALE, MAP. NO. 6578

Legend:

- LAND INTEREST BOUNDARY
- PLANNING APPLICATION AREA (c.4.0 Hectares)
- EXTRACTION AREA (c.3.5 Hectares)
- BH3 — EXISTING BOREHOLE
- 40 m — CONTOURS

Rev	Amendments	Date	By	Chk	Auth

SLR

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Drawing Status & Suitability Code: **FINAL**

Client: KEOHANE READYMIX LTD.

Project: SAND & GRAVEL PIT
KNOCKROE, BANDON, CO. CORK

Drawing Title: EXISTING SITE LAYOUT

Scale	SLR Project No.
1:2,500 @ A3	065557.00001

Designed	Drawn	Checked	Authorised
EW	EW	TP	TP
Date: 04/25	Date: 04/25	Date: 04/25	Date: 04/25

Drawing Number: **FIGURE 6-1** Rev.: **1**

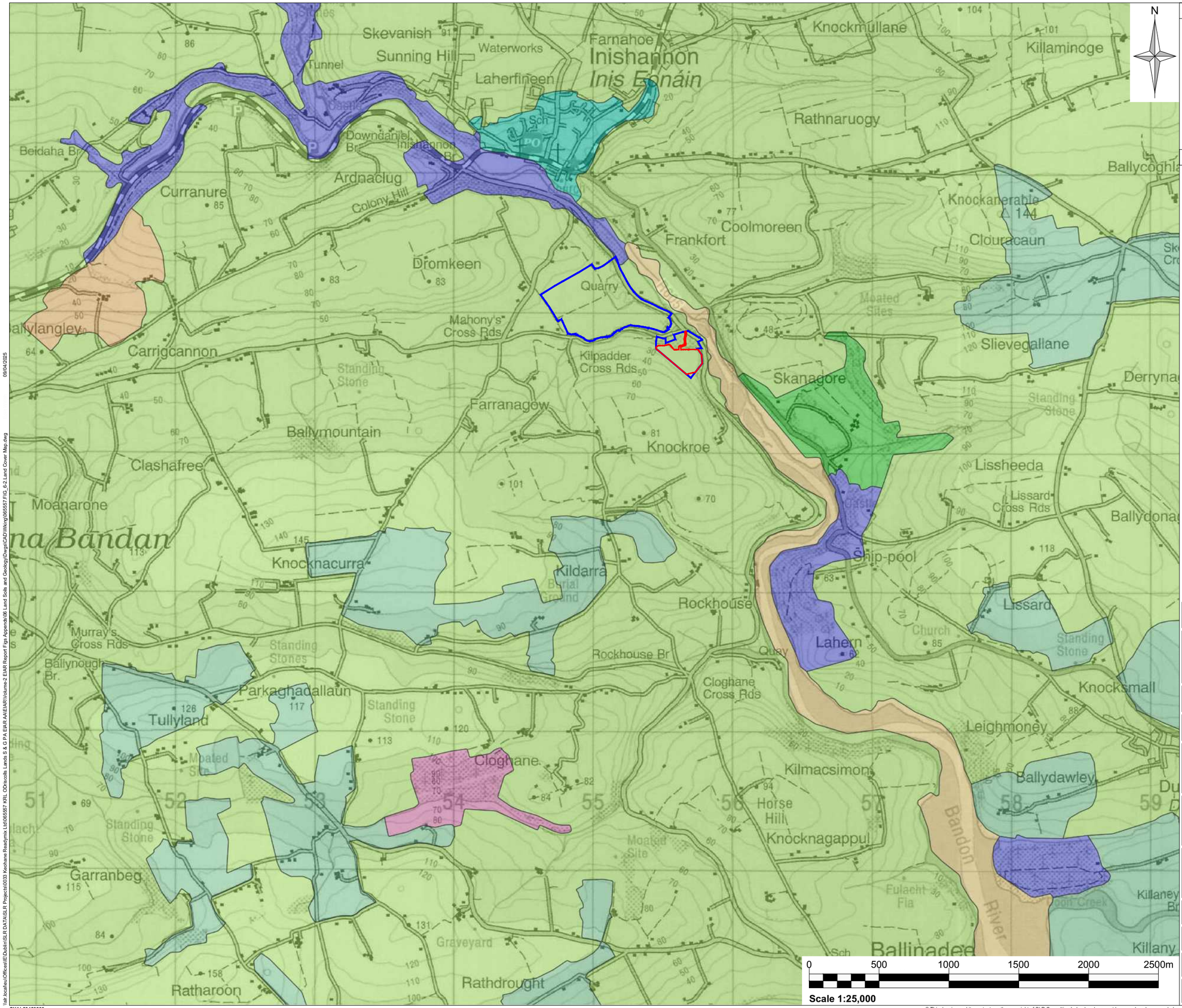
09/04/2025

\\slr.local\eu\Offices\IE\Dublin\SLR DATA\SLR Projects\0033 Keohane Readymix Ltd\065557 KRL ODriscolls Lands S & G PA EIAR-AA\EIAR\Volume-2 EIAR Report Figs Appends\06 Land Soils and Geology\Dwgs\CAD\Wking\065557.FIG_6-1 Existing Site Layout.dwg

CYAL50450233

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Notes:

1. Extract from Ordnance Survey Map **No. 86.**

Legend:

LAND INTEREST BOUNDARY

PLANNING APPLICATION AREA (c.4.0 Hectares)

Land Use

- Broad-leaved forest
- Complex cultivation patterns
- Discontinuous urban fabric
- Estuaries
- Land principally occupied by agriculture
- Mixed forest
- Non-irrigated arable land
- Pastures

Rev	Amendments	Date	By	Chk	Auth

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Client: KEOHANE READYMIX LTD.

Project: SAND & GRAVEL PIT
KNOCKROE, BANDON, CO. CORK

Drawing Title: LAND COVER MAP

Scale	SLR Project No.
1:25,000 @ A3	065557.00001

Designed	Drawn	Checked	Authorised
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Date	Date	Date	Date
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Drawing Number: **FIGURE 6-2** Rev. **1**

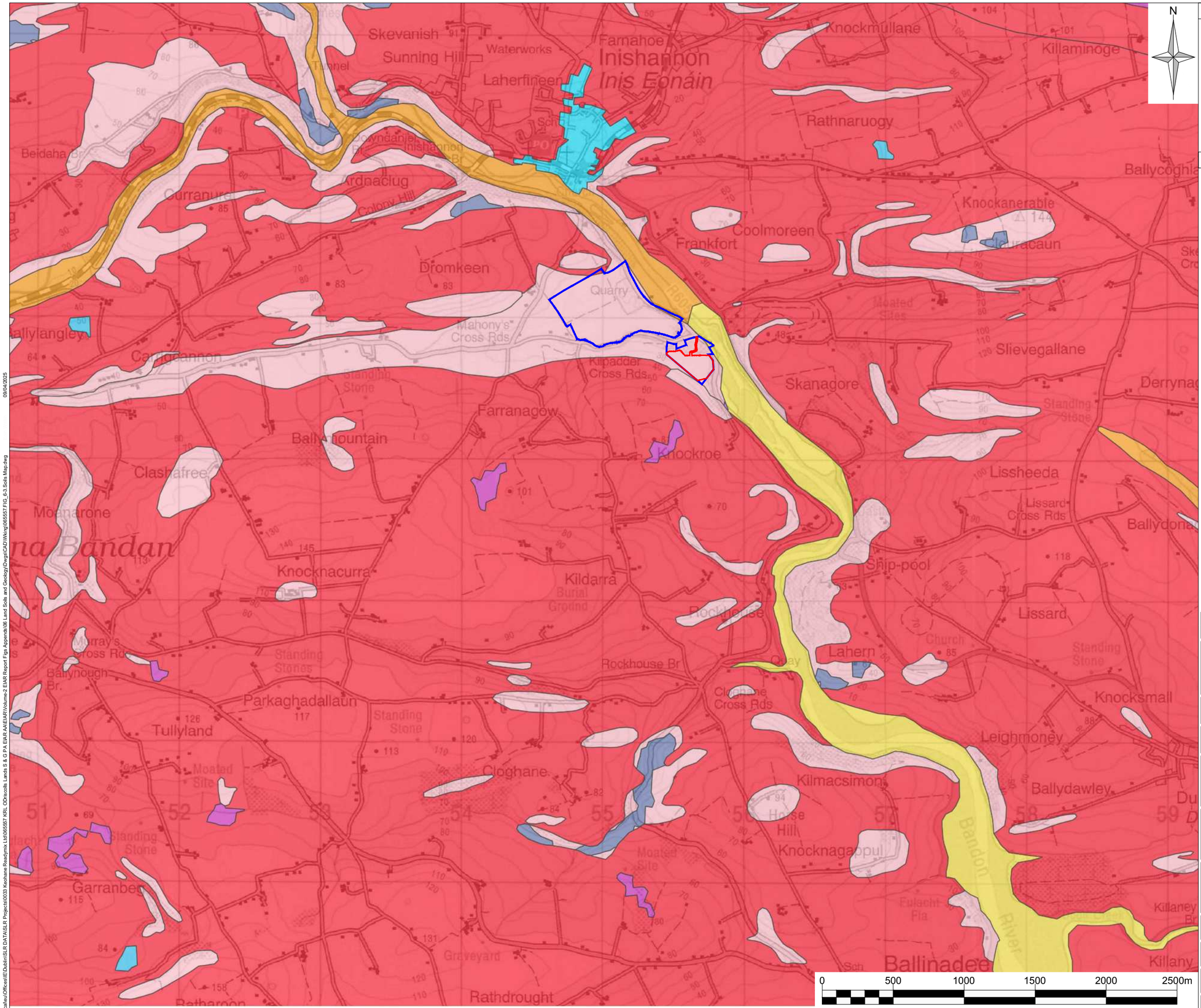
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\\slr.local\ie\Offices\IEDublin\SLR DATA\SLR Projects\0033 Keohane Readymix Ltd\065557 KRL ODriscolls Lands S & G PA EIAR AA\EIAR\Volume-2 EIAR Report Figs Appends\06 Land Soils and Geology\Dwgs\CAD\Wking\065557 FIG_6-2 Land Cover Map.dwg

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Notes:

1. Extract from Ordnance Survey Map **No. 86.**

Legend:

LAND INTEREST BOUNDARY

PLANNING APPLICATION AREA (c.4.0 Hectares)

Soils

- AlluvMIN - Alluvium Mineral
- AminDW - Deep well-drained derived from basic parent materials
- AminPD - Deep, poorly-drained derived from mainly acidic parent materials
- AminPDPT - Poorly-drained peaty topsoil derived from acidic parent materials
- AminSP - Shallow poorly-drained derived from acidic materals
- AminSRPT - Shallow reasonably-drained peaty soil derived from acidic materials
- AminSW - Shallow well-drained derived from acidic materials
- Artificial cover
- MarSed - Marine/estuarine sediments

Rev	Amendments	Date	By	Chk	Auth

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Drawing Status & Suitability Code: **FINAL**

Client: KEOHANE READYMIX LTD.

Project: SAND & GRAVEL PIT
KNOCKROE, BANDON, CO. CORK

Drawing Title: SOILS MAP

Scale	SLR Project No.
1:25,000 @ A3	065557.00001

Designed	Drawn	Checked	Authorised
EW	EW	TP	TP
Date: 04/25	Date: 04/25	Date: 04/25	Date: 04/25

Drawing Number: **FIGURE 6-3** Rev.: **1**

09/04/2025

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Notes:

1. Extract from Ordnance Survey Map **No. 86.**

Legend:

LAND INTEREST BOUNDARY

PLANNING APPLICATION AREA (c.4.0 Hectares)

Subsoils

- Bedrock at surface.
- Artificial surface.
- Till-type subsoil
- Alluvium
- Marine deposit
- Ssand and gravel

0 500 1000 1500 2000 2500m

Scale 1:25,000

Rev	Amendments	Date	By	Chk	Auth

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Project
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Drawing Title
SUBSOILS MAP

Scale	SLR Project No.
1:25,000 @ A3	065557.00001

Designed	Drawn	Checked	Authorised
EW	EW	TP	TP
Date	Date	Date	Date
04/25	04/25	04/25	04/25

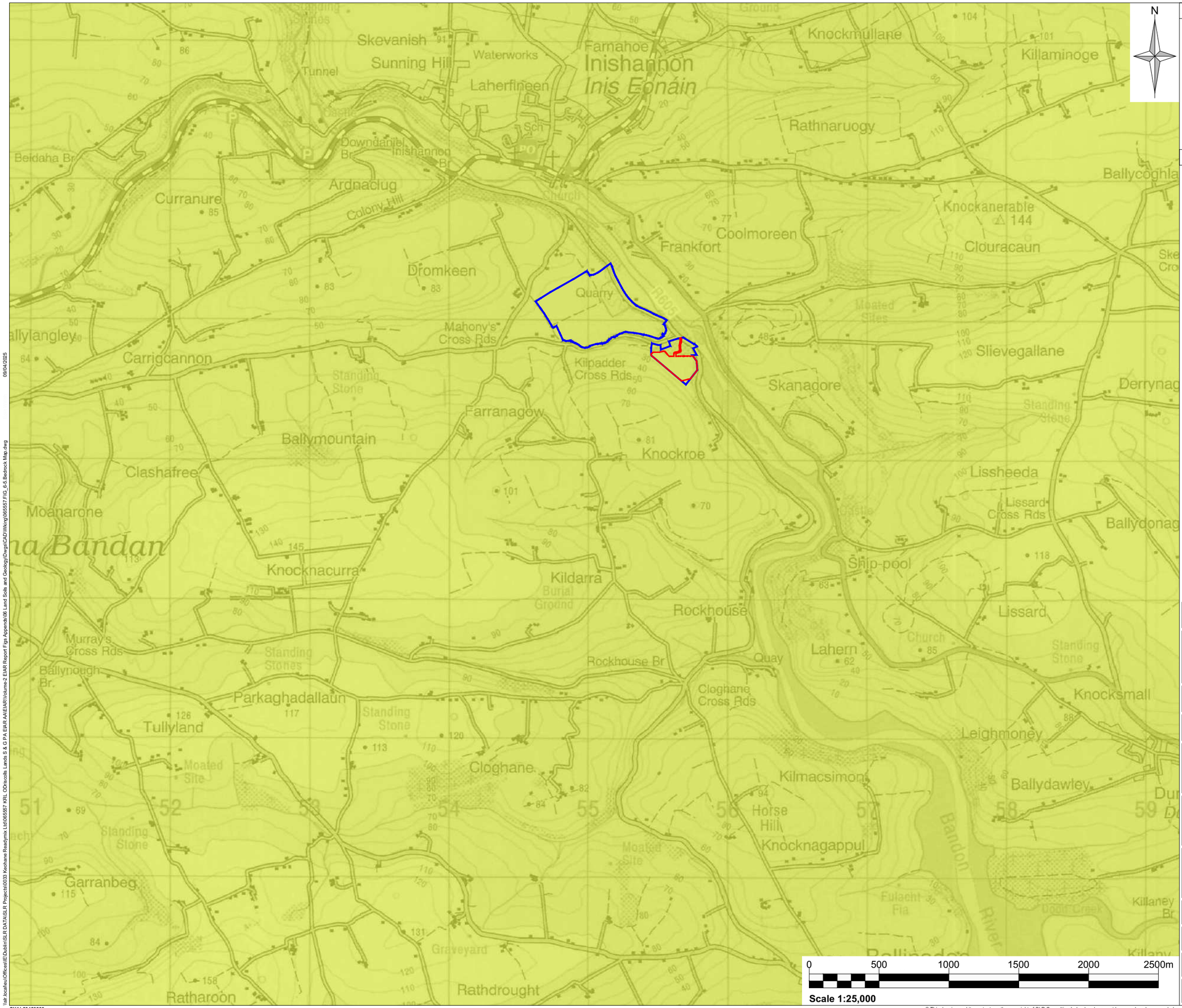
Drawing Number **FIGURE 6-4** Rev. **1**

\\dir.local\eu\Offices\IE\Dublin\SLR DATA\SLR Projects\0033 Keohane Readymix Ltd\065557 KRL ODriscolls Lands S & G PA EIAR AA\EIAR\Volume-2 EIAR Report Figs Appends\06 Land Soils and Geology\Dwgs\CAD\Working\065557 FIG_6-4 Subsoils Map.dwg 09/04/2025

CYAL50450233

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Notes:

1. Extract from Ordnance Survey Map **No. 86.**

Legend:

LAND INTEREST BOUNDARY

PLANNING APPLICATION AREA (c.4.0 Hectares)

Bedrock
Palaeozoic,
Carboniferous,
Mississippian

Rev	Amendments	Date	By	Chk	Auth

SLR

www.slrconsulting.com

Drawing Status & Suitability Code
FINAL

Client
KEOHANE READYMIX LTD.

Project
SAND & GRAVEL PIT
KNOCKROE, BANDON, CO. CORK

Drawing Title
BEDROCK MAP

Scale		SLR Project No.
1:25,000	@ A3	065557.00001

Designed	Drawn	Checked	Authorised
EW	EW	TP	TP
Date	Date	Date	Date
04/25	04/25	04/25	04/25

Drawing Number **FIGURE 6-5** Rev. **1**

09/04/2025

\\slr.local\eu\Offices\IE\Dublin\SLR DATA\SLR Projects\00033 Keohane Readymix Ltd\065557 KRL ODriscolls Lands S & G PA EIAR AA\EIAR\Volume-2 EIAR Report Figs Appends\06 Land Soils and Geology\Dwgs\CAD\Wking\065557.FIG_6-5 Bedrock Map.dwg

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Appendix 6-A Borehole Logs

BOREHOLE LOG

BOREHOLE No
BH 1

Client:
Keohane Readymix Ltd

Project No:	Date:	Ground Level:	Co-ordinates:
501.065557.00001	04/03/2025	7.50m	E555581 N555840

Project:
Knockroe, Bandon, Co. Cork

Sheet
1 of 2

SAMPLES & TESTS				Water	STRATA				
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	Instrument Backfill
							(12.50)	Dense medium coarse brown sub-rounded silty SAND AND GRAVEL with frequent cobbles and boulders	

Borehole Continued on Next Page

Boring Progress and Water Observations				
Date	Depth	Casing Dpt	Casing Dia	Water Dpt
04/03/2025	0.00	0.00	140mm	0
04/03/2025	13.50	13.00	154mm	8

Chiselling			Water Added	
From	To	Hours	From	To

General Remarks
Drillers Descriptions

All dimensions in metres	Contractor: Petersen Drilling Services	Method: Rotary open hole	Logged By:	Approved By:
Scale 1:66	Plant: Knebel HY79	Hole Size: 154mm	SP	PG

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH BS5930:2015+A2:2020

BOREHOLE LOG

BOREHOLE No
BH 1

Client:
Keohane Readymix Ltd

Project No:	Date:	Ground Level:	Co-ordinates:
501.065557.00001	04/03/2025	7.50m	E555581 N555840

Project:
Knockroe, Bandon, Co. Cork

Sheet
2 of 2

SAMPLES & TESTS				Water	STRATA				
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	Instrument Backfill
								Dense medium coarse brown sub-rounded silty SAND AND GRAVEL with frequent cobbles and boulders	
					-5.00		12.50		
							(0.80)	Dense brown very clayey SAND AND GRAVEL	
					-5.80		13.30		
					-6.00		13.50	Medium strong dark grey shaley LIMESTONE	
								Borehole Complete at 13.50m	

11 12 13 14 15 16 17 18 19

Boring Progress and Water Observations					Chiselling			Water Added		General Remarks
Date	Depth	Casing Dpt	Casing Dia	Water Dpt	From	To	Hours	From	To	Drillers Descriptions

All dimensions in metres	Contractor: Petersen Drilling Services	Method: Rotary open hole	Logged By:	Approved By:
Scale 1:66	Plant: Knebel HY79	Hole Size: 154mm	SP	PG

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH BS5930:2015+A2:2020

BOREHOLE LOG

BOREHOLE No **BH 2**

Client: **Keohane Readymix Ltd**

Project No:	Date:	Ground Level:	Co-ordinates:
501.065557.00001	05/03/2025	25.50m	E555496 N555734

Project: **Knockroe, Bandon, Co. Cork**

Sheet 1 of 3

SAMPLES & TESTS				Water	STRATA				
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	Instrument Backfill
					25.20		0.30	Firm brown TOPSOIL	
					24.80		0.70	Firm to stiff brown sandy silty CLAY	
							(6.10)	Dense coarse brown sub-rounded silty SAND AND GRAVEL. frequent cobbles and boulders	
					18.70		6.80	Weak dark grey shaley weathered LIMESTONE MUDSTONE	
								Borehole Continued on Next Page	

1 2 3 4 5 6 7 8 9

Boring Progress and Water Observations					Chiselling			Water Added		General Remarks
Date	Depth	Casing Dpt	Casing Dia	Water Dpt	From	To	Hours	From	To	Drillers Descriptions
05/03/2025	0.00	0.00	140mm	0						
05/03/2025	30.00	8.50	154mm	13						

All dimensions in metres	Contractor: Petersen Drilling Services	Method: Rotary open hole	Logged By:	Approved By:
Scale 1:66	Plant: Knebel HY79	Hole Size: 154mm	SP	PG

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH BS5930:2015+A2:2020

BOREHOLE LOG

BOREHOLE No
BH 2

Client:
Keohane Readymix Ltd

Project No:	Date:	Ground Level:	Co-ordinates:
501.065557.00001	05/03/2025	25.50m	E555496 N555734

Project:
Knockroe, Bandon, Co. Cork

Sheet
2 of 3

SAMPLES & TESTS				Water	STRATA				
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	Instrument Backfill
							(8.20)	Weak dark grey shaley weathered LIMESTONE MUDSTONE	
					10.50		15.00	Weak dark grey shaley LIMESTONE MUDSTONE	
								Borehole Continued on Next Page	

Boring Progress and Water Observations					Chiselling			Water Added		General Remarks
Date	Depth	Casing Dpt	Casing Dia	Water Dpt	From	To	Hours	From	To	Drillers Descriptions

All dimensions in metres	Contractor: Petersen Drilling Services	Method: Rotary open hole	Logged By:	Approved By:
Scale 1:66	Plant: Knebel HY79	Hole Size: 154mm	SP	PG

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH BS5930:2015+A2:2020

BOREHOLE LOG

BOREHOLE No **BH 2**

Client: **Keohane Readymix Ltd**

Project No:	Date:	Ground Level:	Co-ordinates:
501.065557.00001	05/03/2025	25.50m	E555496 N555734

Project: **Knockroe, Bandon, Co. Cork**

Sheet 3 of 3

SAMPLES & TESTS				Water	STRATA				
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	Instrument Backfill
								Weak dark grey shaley LIMESTONE MUDSTONE	
21									
22									
23									
24									
25							(15.00)		
26									
27									
28									
29									
					-4.50		30.00	Borehole Complete at 30.00m	

Boring Progress and Water Observations					Chiselling			Water Added		General Remarks
Date	Depth	Casing Dpt	Casing Dia	Water Dpt	From	To	Hours	From	To	Drillers Descriptions

All dimensions in metres	Contractor: Petersen Drilling Services	Method: Rotary open hole	Logged By:	Approved By:
Scale 1:66	Plant: Knebel HY79	Hole Size: 154mm	SP	PG

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH BS5930:2015+A2:2020

BOREHOLE LOG

BOREHOLE No
BH 3

Client:
Keohane Readymix Ltd

Project No:	Date:	Ground Level:	Co-ordinates:
501.065557.00001	05/03/2025	22.50m	E555707 N555775

Project:
Knockroe, Bandon, Co. Cork

Sheet
1 of 3

SAMPLES & TESTS				Water	STRATA				
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	Instrument / Backfill
					22.20		0.30	Firm brown TOPSOIL	
								Dense coarse brown sub-rounded slightly silty SAND AND GRAVEL with frequent cobbles and boulders	
								Borehole Continued on Next Page	

Boring Progress and Water Observations				
Date	Depth	Casing Dpt	Casing Dia	Water Dpt
05/03/2025	0.00	0.00	140mm	0
05/03/2025	28.00	28.00	154mm	21.5

Chiselling			Water Added	
From	To	Hours	From	To

General Remarks
Drillers Descriptions

All dimensions in metres	Contractor: Petersen Drilling Services	Method: Rotary open hole	Logged By:	Approved By:
Scale 1:66	Plant: Knebel HY79	Hole Size: 154mm	SP	PG

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH BS5930:2015+A2:2020

BOREHOLE LOG

BOREHOLE No
BH 3

Client:
Keohane Readymix Ltd

Project No:	Date:	Ground Level:	Co-ordinates:
501.065557.00001	05/03/2025	22.50m	E555707 N555775

Project:
Knockroe, Bandon, Co. Cork

Sheet
2 of 3

SAMPLES & TESTS				Water	STRATA				
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	Instrument Backfill
11								Dense coarse brown sub-rounded slightly silty SAND AND GRAVEL with frequent cobbles and boulders	
12									
13									
14									
15							(27.70)		
16									
17									
18									
19									
								Borehole Continued on Next Page	

Boring Progress and Water Observations					Chiselling			Water Added		General Remarks
Date	Depth	Casing Dpt	Casing Dia	Water Dpt	From	To	Hours	From	To	Drillers Descriptions

All dimensions in metres	Contractor: Petersen Drilling Services	Method: Rotary open hole	Logged By:	Approved By:
Scale 1:66	Plant: Knebel HY79	Hole Size: 154mm	SP	PG

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH BS5930:2015+A2:2020

BOREHOLE LOG

BOREHOLE No
BH 3

Client:
Keohane Readymix Ltd

Project No:	Date:	Ground Level:	Co-ordinates:
501.065557.00001	05/03/2025	22.50m	E555707 N555775

Project:
Knockroe, Bandon, Co. Cork

Sheet
3 of 3

SAMPLES & TESTS				Water	STRATA				Instrument Backfill
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
21								Dense coarse brown sub-rounded slightly silty SAND AND GRAVEL with frequent cobbles and boulders	
22									
23									
24									
25									
26									
27									
28					-5.50		28.00	Borehole Complete at 28.00m	
29									

Boring Progress and Water Observations					Chiselling			Water Added		General Remarks
Date	Depth	Casing Dpt	Casing Dia	Water Dpt	From	To	Hours	From	To	Drillers Descriptions

All dimensions in metres	Contractor: Petersen Drilling Services	Method: Rotary open hole	Logged By:	Approved By:
Scale 1:66	Plant: Knebel HY79	Hole Size: 154mm	SP	PG

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH BS5930:2015+A2:2020

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Appendix 7-A EU Directives / National Legislation and Regulations / Guidelines / Technical Standards
Appendix 7-B Borehole Logs
Appendix 7-C Rating of Existing Environment Significance / Sensitivity
Appendix 7-D Descriptions of Effects (EPA, 2022)
Appendix 6-E Classification of the Significance of Impacts

Introduction

Background

7.1 This chapter of the EIAR provides a description of the surface water and groundwater conditions in the application area of the site within the context of the regional setting, and assesses the potential impacts the proposed development will have on surface water and groundwater. Mitigation measures, if required, are proposed.

7.2 Available information on the surface water (hydrology) and groundwater (hydrogeology) of the Knockroe townland area in Inishannon, Co. Cork and its surrounds was collated and evaluated.

7.3 The proposed development comprises:

- Extraction of sand & gravel over an area of c.3.5 ha.
- Extraction by dry working to 2 metres above the groundwater level, at a maximum rate of 100,000 tonnes per year.
- Transport of the extracted sand & gravel to the adjacent Dromkeen Pit (Plan. Ref. 23/04780) for use in concrete production;
- Upgrading of the existing internal access road and use of the existing access onto the local road L3204.
- Provision of wheelwash and welfare unit (c.8.3 sq.m).
- Restoration of the lands to agricultural and natural habitat use;
- All within an application area of 4.0 hectares.

7.4 There will be no dewatering of groundwater or groundwater abstraction at the site. There will be no discharge of water off site to any surface water course as a result of the proposed development.

Proposed Development

7.5 The proposed development is described in detail in Chapter 2: Project Description of this EIAR and only those elements which relate to water and water management are presented here for the purpose of this chapter. The proposed development layout is shown on Figure 2-2 of this EIAR.

7.6 Extraction of sand & gravel will be by dry working only and the final pit floor level will be maintained at least 2m above the high groundwater level beneath the site. There is no dewatering, groundwater abstraction or discharge to surface water required as part of the proposed development.

7.7 The proposed development includes a wheel wash for vehicles exiting the site and the internal access road from the wheel wash to the public road will be surfaced to eliminate material being carried by site traffic onto the public road.

7.8 The extracted Sand & Gravel will be transported to the adjacent Dromkeen Pit for use in concrete production.

Existing Water Management

7.9 The site comprises a historical Sand & Gravel Pit and agricultural lands. Surface water run-off drains naturally through surface infiltration.

Site Water Requirements

7.10 There is no process water requirement for the site as the Sand & Gravel material will be transported to the adjacent Dromkeen Pit for use in concrete production. There will be a wheel wash at the site which will be topped up on an as needed basis by water from the existing KRL site at Dromkeen Pit, with the water requirement being very small (less than 1 cubic metre per day).

7.11 There will be a small self-contained welfare unit located at the site. It will include a recirculating chemical toilet and water storage. Bottled water will be supplied for drinking water. The welfare unit will be maintained under contract.

Storm Water Management

7.12 Extraction of sand & gravel will be carried out on a phased basis with ongoing restoration to limit the areas of bare ground at the site and the generation of storm water runoff across the site, refer to EIAR Figure 2-4. Any storm water at the site will percolate naturally through the Sand & Gravel material, to the groundwater, consistent with the current natural surface water drainage at the site.

7.13 Storm water runoff from the internal surfaced access road will infiltrate naturally to the ground consistent with the existing surface water drainage in the historical pit area. There will be no surface water runoff onto the public road.

Effluent Treatment System

7.14 With the self-contained welfare unit detailed above there is no requirement for effluent treatment system at the proposed development.

Fuel and Waste Oil Management

7.15 There will be no fuel or oil storage on the proposed development site. Machinery used at the site will be refuelled using the existing facilities at the adjacent Dromkeen Pit operated by KRL.

7.16 No vehicle maintenance or repairs will be undertaken at the site. All vehicle repairs will be undertaken in the existing covered maintenance shed at the existing adjacent Dromkeen Pit.

Dust Suppression

7.17 In dry weather the suppression of dust on internal access road and within the extraction area will be through the use of water bowsers with spray bars; these will be used on a short-term basis as and when required. Water for dust suppression will be sourced from the adjacent Dromkeen Pit.

Scope of Work

7.18 The scope of this chapter includes:

- An assessment of the existing water (hydrology and hydrogeology) environment within approximately 2 km the application area at the site;
- An assessment of the potential impact of a Sand & Gravel pit site development on surface water and groundwater; and
- Where necessary, recommendation(s) of mitigation measures to reduce or eliminate any potential impacts.

Project Team

7.19 This chapter of the EIAR was prepared by SLR Environmental Consulting Ireland. The project team consists of:

- Peter Glanville BA, MSc, PGeo, EurGeol, MCIWEM;
- Milo Cruise O'Brien BA, MSc, MIGI, MIAH; and
- Dominica Baird BSc, MSc, CGeol, EurGeol, MIAH.

Regulatory Background

Legislation

7.20 The key European Directives / European Union Legislation which apply to this Chapter of the EIAR, and the hydrology and hydrogeology assessment presented herein are:

- Environmental Impact Assessment Directive (2011/92/EU); and
- Directive of the European Parliament and of the Council amending Directive 2011/92/EU on assessment of effects of certain public and private projects on the environment (2014/52/EU).

7.21 Other European Directives to which this EIAR makes reference, or has had regard, are listed in **Appendix 7-A**.

7.22 Irish Government Acts, National Legislation and Regulations which apply to this Chapter of the EIAR, and the hydrology and hydrogeology assessment presented herein are also listed in **Appendix 7-A**.

7.23 Most notably, under Regulation 4 of the Groundwater Regulations 2010, a duty is placed on public authorities to promote compliance with the requirements of the regulations and to take all reasonable steps including, where necessary, the implementation of programmes of measures, to:

a) prevent or limit, as appropriate, the input of pollutants into groundwater and prevent the deterioration of the status of all bodies of groundwater;

b) protect, enhance and restore all bodies of groundwater and ensure a balance between abstraction and recharge of groundwater with the aim of achieving good groundwater quantitative status and good groundwater chemical status by 2015 or, at the latest, by 2027;

c) reverse any significant and sustained upward trend in the concentration of any pollutant resulting from the impact of human activity in order to progressively reduce pollution of groundwater;

d) achieve compliance with any standards and objectives established for a groundwater dependent protected area included in the register of protected areas established under Regulation 8 of the 2003 Regulations [S.I. No. 722 of 2003] by not later than 2015, unless otherwise specified in the Community legislation under which the individual protected areas have been established."

Planning Policy and Development Control

7.24 The Planning Policy and Development Control relating to water at the site in this EIAR is set out in the:

- Cork County Development Plan 2022-2028.

Guidelines and Technical Standards

7.25 The following key guidelines apply to this hydrology and hydrogeology assessment:

- Institute of Geologists of Ireland. Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements, April 2013;
- National Roads Authority, 2008. Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes; and
- The Planning System and Flood Risk Management Guidelines for Planning Authorities (2009): Office of Public Works and the Department of the Environment, Heritage and Local Government.

7.26 Additional guidelines and technical standards which apply to this Chapter of the EIAR, and the hydrology and hydrogeology assessment presented herein are listed in **Appendix 7-A**.

Receiving Environment

Study Area

7.27 For the purposes of this assessment, the study area comprises the proposed application site and the surrounding area up to 2km, reflecting the sensitivity of the surface water and groundwater; this is in line with the Institute of Geologists of Ireland's (IGI) guidelines (2013).

7.28 The IGI guidelines state that the minimum distance of 2 km should be reviewed in the context of the geological environment as well as the scale of development and increased to reflect the sensitivity of the subsurface. The IGI guidelines also state that maps should be sourced to allow for the review of the geological conditions that exist within a minimum of 2 km of the site boundary (from the outer limit of the planning and/or licence area) and presented at a scale of 1:25,000.

7.29 The baseline maps produced in this EIAR are at a scale of 1:25,000 and include an area up to c. 3.5 km from the application site.

7.30 The proposed development site's current land use is agricultural and historical sand & gravel pit..

Baseline Study Methodology

7.31 Desktop available information from published sources and available site information on the geology, hydrogeology and hydrological features of the Knockroe area and its surroundings were collated and evaluated.

7.32 The methodology involved in the assessment of the hydrology and hydrogeology at the site can be summarised as follows:

- A desk study, in which existing site data and relevant regional data sources for the area were examined;
- A site investigation with three boreholes to identify the geological strata and allow for groundwater monitoring; and
- The monitoring of site groundwater levels.

Sources of Information

7.33 The desk study involved the examination of several datasets to determine the geological and hydrogeological setting of the area, as detailed in Table 7 1.

Table 7-1: Regional Data Consultation

Data	Dataset
Soils	• EPA Maps • Irish Soils Information System - Teagasc
Subsoil Geology	• Teagasc/GSI/EPA Subsoil Mapping
Bedrock Geology	• Geological Survey of Ireland (GSI) Groundwater Data Viewer - Bedrock Geology
Surface Water	• Tailte Éireann Discovery Series mapping; • Environmental Protection Agency (EPA); • Water Framework Directive (WFD); • Office of Public Works (OPW) Catchment Flood Risk Assessment and Management (CFRAM); and • Current County Development Plan.
Groundwater	• GSI Groundwater Data Viewer - bedrock and gravel aquifers, vulnerability, water supplies, groundwater recharge; • GSI Groundwater body description documents; and • EPA water maps.
Climate	• Met Éireann
Protected Areas, Environmental Pressures	• EPA; • National Parks and Wildlife Service (NPWS).

Rainfall and Climate

7.34 The nearest rainfall gauging station is Cork Airport, located c. 15 km to the north-east of the site at Knockroe. The Long-Term Average (LTA) annual rainfall in the area at the Cork Airport weather station is c. 1,239.2 mm/yr for the period 1991-2020 (Met Eireann, 2024). The LTA monthly rainfall for the period 1991-2020 are shown in Table 7-2 below.

Table 7-2: LTA (1991-2020) Mean Monthly Rainfall Total (mm) for Cork Airport

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
131.3	97.2	91.5	86.5	80.8	83.3	87.2	94.6	92.0	131.2	127.0	136.6

Soils and Geology

Soils and Subsoils

7.35 The Irish Soil Information System project has developed a national association soil map for Ireland, the project is co-funded by Teagasc and the Environmental Protection Agency (EPA). The soils are discussed in detail in Chapter 6 of this EIAR.

7.36 The soils at the site are coarse loamy drift with siliceous stones known as the Ross Carberry Soil Association (ISIS Code 0900e), see **Figure 6-3**.

7.37 The EPA website also publishes subsoil maps created by the Spatial Analysis Unit and Teagasc in collaboration with the Geological Survey Ireland (GSI). The subsoils are also discussed in detail in Chapter 6 of this EIAR.

7.38 The subsoils at the proposed development are Sand & Gravel, deposited by glacial action, from the Devonian/Carboniferous period. The proposed development is immediately surrounded by marine deposited, gravelly, silts/clays along the Bandon estuary to the North and North-East, see **Figure 6-4.**

7.39 The GSI mapping indicates that the subsoil permeability at the proposed development site is classified at 'High' which reflects the Sand & gravel subsoils.

On Site Groundwater Monitoring Wells

A ground investigation comprising three groundwater monitoring boreholes was undertaken by SLR in March 2025; the borehole locations are shown on Figure 7-1. Summary details of the borehole are shown in Table 7-3 and the summary lithology is shown in

7.40 Table 7-4. The borehole logs are shown in Appendix 7-B.

Table 7-3: Summary details of groundwater monitoring boreholes

	BH1	BH2	BH3
Grid Reference (ITM)	E555581 / N555840	E555496 / N555734	E555707 / N555775
Approx. Ground Elevation (m AOD)	7.5	25.50	22.50
Borehole depth (m BGL)	13.5	30.00	27.00
Borehole base (m AOD)	- 6.0	- 4.50	-4.50
Proven Thickness of Sand & Gravel Material (m)	13.3	6.80	>28.00
Rock Head (m AOD)	- 5.8	18.70	*> -5.50 (No bedrock encountered)*

	BH1	BH2	BH3
Water strike on the 4th and 5th March 2025 (m BGL) / (mOD)	7.52 (0.54 mOD)	13.00 (12.50 mOD)	20.52 (2.47 mOD)

Table 7-4: Summary borehole lithology

BH		BH2		BH3	
0 to 13.3m	Silty SAND & GRAVEL with frequent cobbles and boulders. With Very clayey SAND & GRAVEL at the base	0 to 0.7m	Topsoil overlying sandy silty CLAY	0 to 0.3m	Topsoil
		0.7m to 6.8m	Slightly silty SAND & GRAVEL with frequent cobbles and boulders	0.3m to 28m	Slightly silty, SAND & GRAVEL, with frequent cobbles and boulders.
13.3m to 13.5m	LIMESTONE bedrock	6.8m to 30m	Shaley, weathered LIMESTONE MUDSTONE bedrock becoming less weathered with depth.		*No bedrock encountered in BH3*

7.41 The March 2025 ground investigation confirms that Sand & Gravel deposits are present at the site to a maximum thickness of at least 28m, borehole BH3, which is on the eastern boundary of the site. The thickness of the Sand & Gravel material thins along the western boundary of the site, with a thickness of 6m of Sand & Gravel material in borehole BH2 (consistent with the geological mapping, refer to Figure 6-4).

Local Bedrock Geology

7.42 Regionally, the site lies within the upper Devonian and lower Carboniferous Cork Group. Geological Survey of Ireland (GSI) 1:100,000 mapping shows the proposed extraction development site is underlain by a bedrock comprising the Kinsale Formation which is characterised by grey mudstones and mud dominant lithologies and includes the Castle Slate Member and the Narrow Cove Member, see Chapter 6 of this EIAR.

Karst

7.43 There GSI online map viewer does not have a record of karst features within 5km of the proposed Sand & Gravel extraction area at Knockroe.

Surface Water - Hydrology

Surface Water Bodies

7.44 Surface water bodies in the area are detailed on the EPA Water maps. The closest surface water bodies to the proposed development are the Upper Bandon estuary, located to the North-East, which flows in a south-easterly direction, and The

Knocknacurra Stream to the north of the proposed development, see Figure 7-1, which flows in an easterly direction into the Upper Bandon estuary. The local surface water bodies are shown in Figure 7-2.

7.45 The Knocknacurra Stream is located above the groundwater in the Sand & Gravel beneath the site and therefore cannot receive groundwater inflows from the site.

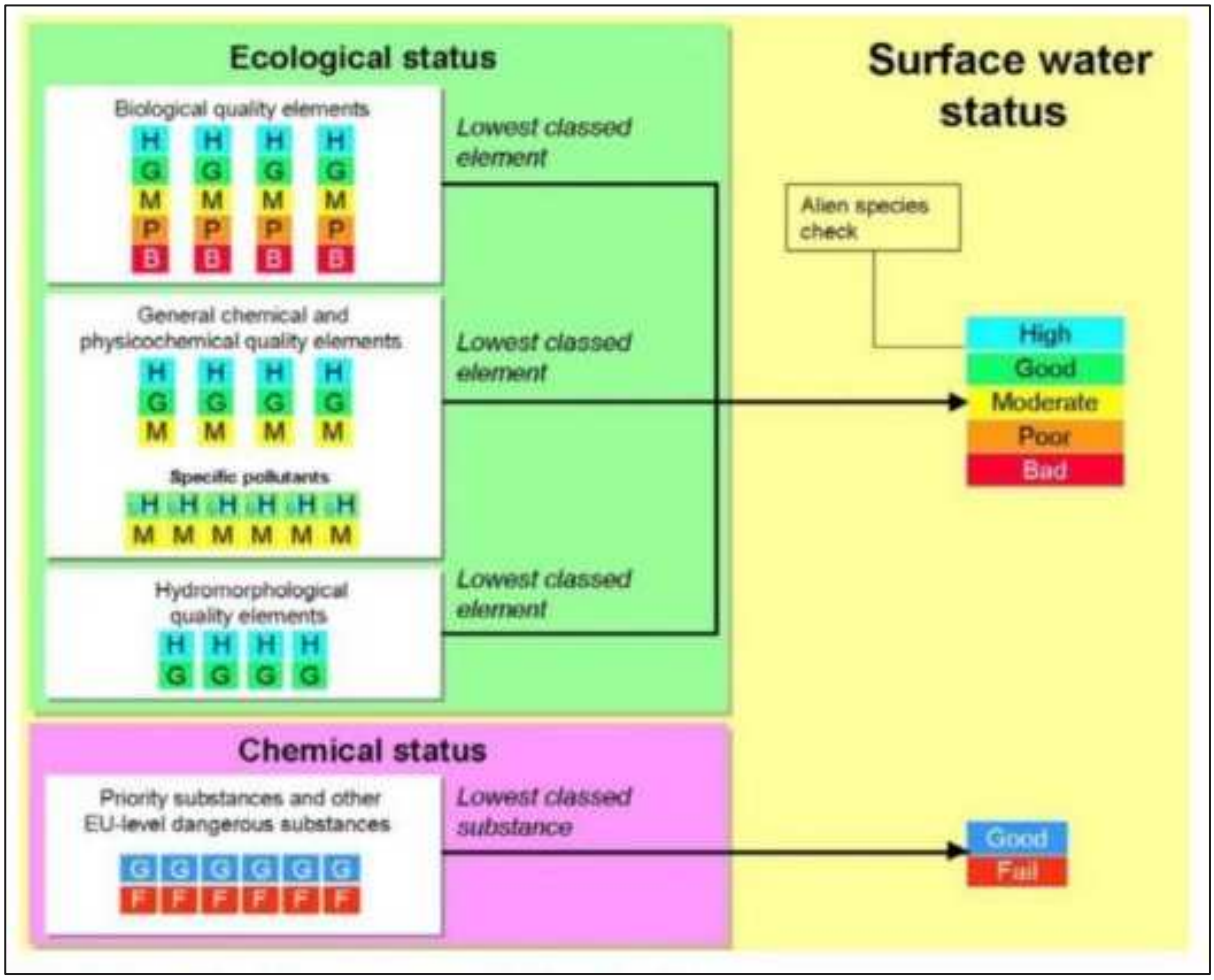
7.46 The Upper Bandon estuary, downstream of Innishannon, is tidal and classified as 'Transitional Waters' under the Water Framework Directive (WFD) waterbody classification scheme.

7.47 The proposed development lies within the Bandon-Ilen Catchment (ID 20), which has an area of c. 1,800 km^2 (EPA).

7.48 Under the WFD 2016-2021 River Water Quality, the transitional waters of the Upper Bandon Estuary near the proposed development are classified as being of 'Poor' status, while the Knocknacurra Stream is classified as being of 'Good' status.

7.49 Scheme for defining the Surface water status under WFD is shown in Diagram 7-1 below:

Diagram 7-1: Elements of the Water Framework Directive Status



Flooding and Flood Risk

7.50 The Office of Public Works (OPW) is the government agency with statutory responsibility for flooding in Ireland. The available OPW CFRAM coastal flood mapping indicates that under present day conditions the floor of the former pit at the

site entrance is liable to flood during the modelled low, medium and high probability flood events. However, the internal access track from the public road to the extraction area is not shown as liable to flooding as the track is elevated above the floor of the old pit. Under these modelled conditions the public road at the site entrance will be flooded.

7.51 Under more extreme climate scenarios (Mid-Range and High-end future scenarios), the flood extent is broadly similar same area has similar flooding potential and extent with the floor of the old pit flooding but not the internal access track to the extraction area. Under these modelled conditions the public road at the site entrance will be flooded.

7.52 In terms of emergency access and egress to the site during a flood event then it will be across fields and an existing farm access track to the northwest of the site which leads to the Dromkeen L6070 road.

Surface Water Quality

7.53 There will be no discharge of water from the site or abstraction of water, either surface water or groundwater, for the proposed extraction.

7.54 Under the WFD 2016-2021 River Water Quality, the transitional waters of the Upper Bandon Estuary near the proposed development are classified as being of 'Poor' status, while the Knocknacurra Stream is classified as being of 'Good' status.

Groundwater - Hydrogeology

Aquifer Characteristics

7.55 The EPA online map viewer shows the proposed development is underlain by a Locally Important (LI) bedrock aquifer, referring to the mudstone bedrock underlying the site. LI is bedrock, which is moderately productive only in local zones. Lg is described as highly permeable, more than 10 m thick or has a saturated thickness of at least 5 m, and normally extends over continuous area of up to 10 km^2 (i.e. 0.78 km^2). Groundwater flow paths are typically limited by the aquifer's extent, see **Figure 7-4**.

7.56 The groundwater vulnerability at the proposed development is classified as 'Moderate', see Figure 7-4,, meaning the groundwater has characteristics that make it moderately susceptible to contamination by human activities, see. Subsoil thickness is > 10m unsaturated thickness.

7.57 The effective rainfall (rainfall after evaporation) is 832.6 mm/yr and the groundwater recharge coefficient is 60%, based on the available GSI groundwater recharge data.

Groundwater Bodies

7.58 The proposed development is located within the Bandon Groundwater Body (GWB) (EU Code: IE_SW_G_086), see **Figure 7-5**.

7.59 The Bandon GWB is a drinking water protected area under the Water Framework Directive (WFD). Note that all GWBs in the Republic of Ireland are classified as drinking water protected areas under the WFD.

7.60 The information below is a summary of the GSI Groundwater Body Description: Summary of Initial Characterisation for the Bandon GWB.

7.61 In general, groundwater flows in the Bandon GWB are expected to occur in the top 15 m of the aquifer, which comprises a weathered, fractured, lithology. The bedrock has no intergranular permeability; therefore, groundwater flow occurs in the joint and fault system throughout the GWB.

7.62 Groundwater flow paths are expected to be relatively short at 30-300 m. Flow directions are expected to approximately follow local surface water catchments

7.63 Bedrock permeability is highest in the upper few metres and decreases with depth. In general, the mudstone and sandstone aquifer transmissivities will be low; in the range 2-20 m^2/day. Hydraulic conductivity is expected to be 0.05-0.5 m/day. Aquifer storativity will be low.

7.64 In mudstones limited fracturing and in-filling of fractures are to be expected. The degree of interconnection of fractures will generally be low, with fracturing confined to local zones.

7.65 Groundwater gradients are likely to be 0.01-0.04. Most groundwater flow is expected to be within the top 15 m of the aquifer, in a layer that comprises a weathered zone of a few metres and a connected fracture zone below this. Groundwater flow paths are expected to be relatively short; 30-300 m. Flow directions are expected to approximately follow local surface water catchments.

7.66 Diffuse recharge will occur via rainfall percolating through the subsoil or areas of outcropping rock. The proportion of effective rainfall that will recharge the aquifer is determined by the permeability of the soil and subsoil and by the slope.

7.67 The main discharges are to rivers and streams crossing the GWB and to generally small springs and seeps.

7.68 It is unlikely any major groundwater – surface water interactions occur due to the poor productivity of the aquifers in this GWB. Groundwater will discharge locally to rivers, streams, springs, and seeps crossing the aquifer however, it is likely to be relatively low.

7.69 The Bandon GWB is good status under the WFD 2016-2021 Groundwater Quality and has maintained this status since 2007. The Bandon GWB is classified as ‘Not at risk’ at failing to meet the WFD objectives by 2027.

Groundwater Quality

7.70 There has been no groundwater quality testing undertaken in the proposed development area.

Groundwater Levels

7.71 Groundwater levels were monitored when the groundwater boreholes were installed and then at the end of March 2025 also. The groundwater levels are shown in Table 7-5.

7.72 The recorded groundwater levels in BH1 and BH3 are in the Sand & Gravel material. The groundwater level in BH2 on the southern boundary is in the bedrock.

Table 7-5: Site Groundwater Levels

Borehole ID	Groundwater Level 04/03/2025 (mOD)	Groundwater Level 24/03/2025 (mOD)
BH1 (Sand & Gravel)	0.54m	- 0.16
BH2 (Bedrock)	12.5m (water Strike)	17.11
BH3 (Sand & Gravel)	2.47m	0.05

7.73 The existing groundwater levels at the site in the Sand & Gravel material are below the level of the Knocknacurra Stream, located to the north of the extraction area, see Figure 7-1. The stream does not receive groundwater flows from the Sand & Gravels at the site.

Groundwater Flow Direction

7.74 The local groundwater flow direction is towards the Upper Bandon estuary to the east of the site which forms the hydraulic boundary to the site. The groundwater in the Sand & Gravel material is unconfined.

Groundwater Supply Wells

7.75 Geological Survey Ireland (GSI) has an online database of wells and springs in Ireland; however, it should be noted this database is not extensive.

7.76 According to the GSI well database, there are a number of wells within a 5 km radius of the site. The wells are located in either sands and gravel aquifer to the north of the site (Brinny Gravels East and West GWBs) or the underlying locally important LI bedrock aquifer (Bandon GWB).

7.77 There is a public water supply spring is located c. 4.5 km south of the site (1405SEW177) which is the supply source for the Ballinadee Public Water Supply, managed by Cork County Council. The spring is classed as having low yield with an abstraction rate of 63.6 m^3/day.

7.78 There is a second recorded public water supply borehole located c. 3.4 km north of the site (1405SWW178) which is no longer in use. This is reported as an 'Old Handpump', managed by Cork County Council and is 22.8 m deep. The borehole is classed as having moderate yield of 65.3 m^3/day.

7.79 There is no group water scheme or public supply source protection area within the vicinity of the proposed Sand & Gravel extraction site, the closest is Ballinspittle / Garretstown Groundwater Source Protection Zone c. 9.5 km south of the site.

7.80 There are two groundwater supply wells at the adjacent existing KRL site at Inishannon. These wells are principally used for supplying the existing ancillary facilities and processing plant at the KRL site.

Protected Areas

7.81 A section of the Upper Bandon estuary immediately downstream of the site is designated as a proposed Natural Heritage Area (pNHA), Bandon Valley Below Inishannon, site code 001515. This site is important for its wetlands including the extensive areas of Common Reed and the more diverse areas of wetland vegetation.

7.82 Approximately 10km downstream on the Upper Bandon Estuary, the waters around Kinsale are protected for shellfish production (site code: IEPA2_0062), as listed in the Irish Shellfish Regulations (S.I. 200 / 1994), as amended.

7.83 There are no Natura 2000 (SAC or SPA) protected sites within 2 km of the proposed development site. The nearest Natura 2000 sites are located c. 9 km to the southwest of the site; the Courtmacsherry Estuary SAC (site code: 001230) and the Courtmacsherry Bay SPA. There is no hydrological or hydrogeological connectivity to these sites.

Water Framework Directive

7.84 The EU Water Framework Directive[1] (WFD) became EU law in December 2000 and provides for a single European framework to assess water quality (Ecological status) and allows for the comparison of results across Europe. The WFD covers rivers, lakes, estuaries or transitional waters, coastal waters as well as groundwaters.

7.85 Surface waters are classified into five quality classes (Ecological status) under the WFD; High, Good, Moderate, Poor and Bad Ecological status. Groundwater is classified into just two quality classes, Good and Poor Ecological status. High Ecological status is when the water is unpolluted, while at the opposite end of the classification Bad Ecological status is when the water is highly polluted.

7.86 The WFD requires baseline water quality in all waterbodies to be established for biological, chemical and hydromorphology quality. These three quality variables are combined to give the overall Ecological status classification of the waterbody; good or high ecological status and good chemical status for surface waters and good chemical and quantitative status for groundwaters.

7.87 The two principal objectives of the WFD are to:

- that all water bodies must reach at least 'Good' overall status by 2027, at the latest. For surface waters, good overall status is a combination of good ecological status (or potential) and good chemical status; and
- that the status of each water body, including all the quality elements which make up the overall status, must not deteriorate relative to the baseline reported in the relevant The River Basin Management Plans (RBMP).

7.88 The WFD identifies where actions are required to achieve Good Ecological status or maintain waterbodies which are already Good or High Ecological status. Waterbodies can be restored to Good and/or High Ecological status by using targeted actions and measures to reduce the impact of human activities on them.

7.89 For heavily modified or artificial water bodies, which are incapable of achieving Good Ecological status without impairing an existing specified water use, the environmental objective is to achieve good ecological potential.

7.90 The WFD requires that management plans are prepared on a river basin basis and specifies a structured method for developing these plans

[1] Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy.

River Basin Management Plan for Ireland: Third Cycle 2022-2027

7.91 The current Third Cycle Water Action Plan 2024: A River Basin Management Plan for Ireland for the period 2022 to 2027 sets out the measures and actions to protect and restore water quality. The plan states that while substantial progress has been made in the management of water services and how we work together to protect, restore and improve water quality with the improvement in some areas and aspects of water quality, many waterbodies are still subject to mounting environmental pressures and overall water quality is in decline, primarily due to nutrient pollution.

7.92 The RMBP states that, due to the overall decline in water quality, stronger measures are now required which will improve overall water quality; the sustainable management of water resources is important to address and adapt to the impacts of climate change, with many of the required measures having co-benefits for climate mitigation and biodiversity. Protecting and restoring water quality in Ireland will most of all need measures to address:

- the loss of agricultural nutrients to water;
- continue to improve wastewater treatment; and
- to re-establish natural free-flowing conditions in more rivers.

7.93 The plan states that Ireland's water resources and services face challenges on a number of fronts including a continued need for investment in infrastructure and an ever-increasing demand for water services due to urbanisation, population and economic growth. These challenges are set against a backdrop of widespread, rapid, and intensifying climate change.

WFD Third-Cycle

7.94 The waters of the Upper Bandon estuary are classified as being at risk of not meeting their objectives by the 2027 deadline and the Knocknacurra Stream is classified as not at risk of meeting their objectives by the 2027 deadline.

7.95 The Bandon GWB (IE_SW_G_086) is classified as being of 'Good' status under the WFD 2016-2021 for Groundwater Quality.

7.96 The Bandon GWB is classified as not at risk meeting its WFD objectives by 2027 under the Third-Cycle.

7.97 In summary, based on the evidence and assessment undertaken in the EIAR, it is considered that the proposed development will not be contrary to the objectives of the WFD to achieve Good Ecological Status in the Knocknacurra Stream and the Upper Bandon Estuary by 2027.

Water Environment Receptors

7.98 From the baseline study undertaken here, the following water environment sensitive receptors have been identified in the receiving environment:

- The transitional waters of the Upper Bandon Estuary adjacent to the site and downstream of Inishannon;
- Locally important bedrock aquifer; and
- Groundwater supply wells.

7.99 For each identified receptor, the significance and sensitivity of the receptor is assessed in **Table 7-6** below and a rating (High/Medium/Low/Negligible) applied,

based on the methodology outlined in existing guidance and reproduced in **Appendix 7-C**.

Table 7-6: Existing Environment - Significance and Sensitivity / Importance

No	Existing Environment	Significance	Sensitivity	Existing Environment Significance / Sensitivity Rating (H/M/L/N)
1	The Upper Bandon Estuary transitional waterbody adjacent to the site and downstream of Inishannon	Surface watercourse immediately east of the site. Upper Bandon Estuary has a poor status (WFD 2016-2021).	Assumed to be in hydraulic continuity with the site through groundwater – surface water interactions (recharge and discharge). Upper Bandon Estuary is at risk of not meeting its objectives by 2027 (WFD).	**Medium** – Attribute has a medium quality or value on a local scale
2	Locally important bedrock Aquifer / Bandon GWB	Locally important and good status (WFD 2016-2021).	Bandon GWB is expected to be in hydraulic continuity with surface water courses through groundwater – surface water interactions (recharge and discharge). The Bandon GWB not at risk of meeting its objectives by 2027 under the WFD.	**Medium** - Attribute has a medium quality or value on a local scale (locally important aquifer).
3	Groundwater supply wells	Private water supplies.	Local groundwater abstractions for drinking water supplies.	**Medium** - Attribute has a medium quality or value on a local scale.

Receiving Environment - Baseline Summary

7.100 Site levels over the existing agricultural lands reduce in a southerly direction from c. 26m AOD on the northern western boundary of the application site to c.21m AOD on the southeastern boundary.

7.101 The site is underlain by subsoils which are gravels derived from sandstones. The site is underlain by mudstone bedrock formations.

7.102 The closest surface water body to the site are the Knocknacurra Stream to the north and the Upper Bandon Estuary to the east. The Knocknacurra Stream flows east into the Bandon estuary. The stream is elevated above the groundwater in the gravels at the site.

7.103 The site is within the Water Framework Directive (WFD) Bandon-Ilen Catchment and Bandon Sub-Catchment.

7.104 Under the WFD classification, the Upper Bandon Estuary, to the east of the site, is a moderate status and the Knocknacurra Stream to the south of the site is a good status based on their physio-chemical and biological quality.

7.105 There is a minor potential for coastal flooding from the Bandon Estuary in the northeast part of the land holding but not within the planning application area. Should coastal flooding occur from the estuary then the local road at the site entrance may be susceptible to flooding.

7.106 The site is located within the central/eastwards part of Bandon Groundwater Body (GWB). Brandon GWB is classified as being good status under the WFD classification.

7.107 The groundwater vulnerability at the site is classed as Moderate as the unsaturated thickness of Sand & Gravel subsoils is >10m in thickness beneath the site,.

7.108 Groundwater levels recorded in March 2025 at the site in the Sand & Gravel material range from c. -0.05 to 2.47 mOD.

7.109 There are two groundwater supply wells at the adjacent existing KRL site at Inishannon. These wells are principally used for supplying the existing ancillary facilities and processing plant at the KRL site.

7.110 Local water supplies for farms and dwellings are from individual borehole supplies / mains. There is no group water scheme or public supply source protection area within the vicinity of the proposed development.

Impact Assessment

Evaluation Methodology

7.111 The potential direct and indirect impacts to surface water and groundwater associated with the proposed development at the site are discussed below.

7.112 The methodology applied here is a qualitative risk assessment methodology in which the nature of the potential impacts is described in terms of the character, magnitude, duration, probability and consequence of the impact.

7.113 The potential impact is then screened against the sensitivity of the receiving environment to establish the overall significance (without mitigation). Appropriate mitigation measures for the potential impacts identified are discussed, and the potential impacts reassessed assuming the mitigation measures in place.

Construction Stage Impacts (No Mitigation)

7.114 The potential direct and indirect impacts to surface waters and groundwater during the construction phase are discussed below.

7.115 In the context of the proposed development (dry working of the Sand & Gravel in the pit extraction area), the construction stage involves the stripping of topsoil and overburden in preparation for extraction of the underlying Sand & Gravel material.

Direct Impacts

7.116 Soil and overburden material will be excavated and stored on site ready for reuse in restoration and the groundwater beneath the application area will be naturally vulnerable to potential pollution incidents at the site.

7.117 Accidental fuel leakage/spillage is a potential impact during the Construction Stage and could also infiltrate into groundwater in the bedrock aquifer.

7.118 Any impact on the groundwater quality in the gravel and in the bedrock aquifer could, in turn, impact on water quality in the Bandon Estuary which is down gradient and forms the regional hydraulic boundary.

7.119 Any impact on the groundwater quality in the gravel and in the bedrock aquifer could, in turn, impact on groundwater quality in local domestic supply well down gradient of the extraction area.

7.120 There will be no groundwater abstraction or discharge from the site to any surface water during the Construction Stage.

Indirect Impacts

7.121 Indirect impacts would be a reduction in groundwater quality which would indirectly result in a reduction in surface water quality where the surface water and groundwater are in hydraulic continuity.

7.122 If there was an accidental spill at the site there would be an indirect impact on the water quality in the Upper Bandon estuary as it will be in hydraulic continuity with groundwater in the Gravel material and in the bedrock aquifer.

Operational Stage Impacts (No Mitigation)

7.123 The Operational Stage of the site will consist of the extraction of Sand & Gravel by dry working.

Direct Impacts

7.124 Extraction of Sand & Gravel by dry working will occur during this stage and so groundwater beneath the site will be vulnerable to potential pollution from site activities.

7.125 Accidental fuel leakage/spillage at the site is a potential impact during the Operational Stage and could also infiltrate into groundwater in the Sand & Gravel material and the bedrock aquifer.

7.126 Any impact on the groundwater quality in the gravel and in the bedrock aquifer could, in turn, impact on groundwater quality in local domestic supply well down gradient of the extraction area.

7.127 There will be no groundwater abstraction or discharge from the site to any surface water during the Operational Stage.

Indirect Impacts

7.128 Indirect impacts would be a reduction in groundwater quality which would indirectly result in a reduction in surface water quality where the surface water and groundwater are in hydraulic continuity.

7.129 If there was an accidental spill at the site, there would be an indirect impact on the water quality in the Upper Bandon estuary as it will be in hydraulic continuity with groundwater in the Sand & Gravel material and in the bedrock aquifer.

Table 7-7: Classification of Significance of Impacts (No Mitigation)

No.	Potential Impacts	Impact Rating (With No Mitigation)	Significance of Impact (With No Mitigation)
Construction Stage - Direct – Groundwater			
1	Reduction in groundwater quality in the Sand & Gravel material and in the bedrock aquifer accidental fuel leakage/ spillage	**Low**. Potential to affect groundwater quality in the groundwater through vertical migration. Impact is highly unlikely due to short term nature of works. Any accidental leakage / spillage from vehicles would be of very limited extent due to the small volume of fuel. There will be no fuel storage at the site.	**Slight**
2	Impact on groundwater quality in private water supplies	**Low**. Potential to affect groundwater quality (fuel / suspended solids) in private water supplies through lateral migration. Impact is unlikely due to short term nature of works; location of works above the groundwater table; and natural filtration through the unsaturated zone. Any accidental fuel leakage / spillage from vehicles would be of very limited extent due to the small volume of fuel in machinery. There will be no storage of fuel within the proposed development	**Slight**
Construction Stage - Indirect - Surface Water			
3	Impact on surface water quality in Upper Bandon Estuary via groundwater baseflow to the watercourse	**Low**. Potential to affect surface water quality (fuel / suspended solids) in Upper Bandon Estuary, through groundwater baseflow to the estuary. Impact is considered unlikely on the Upper Bandon Estuary due to the location of works above the groundwater table and natural filtration through the unsaturated zone. Any accidental fuel leakage / spillage from vehicles would be of very limited extent due to the small volume of fuel in machinery. There will be no storage of fuel within the proposed development.	**Slight**
Operational Stage - Direct – Groundwater			
4	Impact on groundwater quality in private water supplies	**Low**. Potential to affect groundwater quality (fuel / suspended solids) in private water supplies through lateral migration. Impact is unlikely due to short term nature of works; location of works above the groundwater table; and natural filtration through the unsaturated zone. Any accidental fuel leakage / spillage from vehicles would be of very limited extent due to the small volume of fuel in machinery. There will be no storage of fuel within the proposed extraction area.	**Slight**

No.	Potential Impacts	Impact Rating (With No Mitigation)	Significance of Impact (With No Mitigation)
Operational Stage - Indirect - Surface Water			
5	Impact on surface water quality in the Upper Bandon Estuary via groundwater baseflow to the watercourse	**Low:** Potential to affect surface water quality (fuel / suspended solids) in Upper Bandon Estuary, through groundwater baseflow to the estuary. Impact is considered unlikely on the Upper Bandon Estuary due to the location of works above the groundwater table and natural filtration through the unsaturated zone. Any accidental fuel leakage / spillage from vehicles would be of very limited extent due to the small volume of fuel in machinery. There will be no storage of fuel within the proposed development.	**Slight**

Post - Operational Stage Impacts (No Mitigation)

Direct Impacts

7.130 The site will be restored to agricultural and natural habitat land use as set out in Chapter 2 of this EIAR. Topsoil and subsoil stripped from the extraction areas will be used for this restoration work.

7.131 All machinery, the welfare unit and wheelwash will be decommissioned and removed from the site following permanent cessation of extraction operations as set out in Chapter 2 of this EIAR.

7.132 Following the restoration of the site, surface water runoff will percolate naturally to the ground. It is not considered that there are any direct post-operational stage impacts on surface water or groundwater.

Indirect Impacts

7.133 There are no indirect impacts anticipated.

Unplanned Events

7.134 It is considered highly unlikely that any unplanned events within the application site would result in a noticeable impact on the hydrology and hydrogeology. Accidents could result in the spillage of fuel, which has been considered in the assessment above.

'Do-nothing Scenario'

7.135 If the proposed Sand & Gravel pit development is not permitted, the lands will remain under agriculture.

Mitigation Measures

7.136 Mitigation measures required to reduce the significance of potential impacts associated with the extraction of Sand & Gravel to "**slight**" (or lower) to the water environment receptors are identified here in this Chapter.

7.137 Although the removal of Sand & Gravel material in the proposed extraction area does not pose a significant threat to groundwater or surface waters of the surrounding area, measures will be implemented to prevent any reduction in the quality of the local aquatic environment which could arise. These mitigation measures are in accordance with the 'Best Practice / Possible Mitigation Measures' set out in Section 3.4 of the DoEHLG (2004) Quarries and Ancillary Activities: Guidelines for Planning Authorities.

7.138 The following existing mitigation measures will be implemented at the site to prevent a reduction in surface water and groundwater quality:

- There will be no fuel storage within the proposed development.
- No chemicals or petroleum-based products and chemicals will be stored at the site;

- No maintenance or mechanical repairs to vehicles shall take place within the site. Vehicle repairs will be undertaken in the existing covered maintenance shed at the adjacent Dromkeen Pit operated by KRL.
- Emergency Response Spill Kits will be kept on site to prevent any accidental leaks of petroleum-based products from reaching groundwater or adjoining surface watercourses to the site. In addition to the dedicated spill kits, the pit staff also maintain a quantity of sawdust on site which can be used to soak up any petroleum-based products if they accidently leak on site; and
- There is a wheel wash facility for all HGV vehicles exiting the site and the internal road between the wheel wash and the public road will be surfaced to prevent trucks carrying material from the site onto the public road with their tyres.

7.139 There will be no groundwater abstraction or discharge of water off-site to surface waters.

Assessment of Impacts with Mitigation Measures in Place

7.140 With the above mitigation measures in place at the application site, all of the assessed impacts (without mitigation) set out in Table 7-7 will reduce to **Not Significant** / **Imperceptible**.

Residual Impact Assessment

7.141 Examination of the identified potential impacts on the receiving environment show that with the mitigation measures in place, there are no significant residual impacts with respect to groundwater and surface water during the construction / operational / post operational stages of the proposed development. Following mitigation, the significance of all potential impacts identified will be reduced to "**Not Significant**" or "**Imperceptible**".

Monitoring

7.142 There is an existing water monitoring programme in place at the site which includes groundwater level. This groundwater monitoring will be continued for the duration of the proposed development.

Groundwater

Groundwater Levels

7.143 Groundwater levels will be monitored on a continuous basis at the three monitoring boreholes at the site. The groundwater levels will be submitted to Cork Co. Council on an annual basis as part of the environmental monitoring programme at the site.

Groundwater Quality

7.144 The groundwater quality at the site will be monitored in boreholes BH1 and BH3 on an annual basis and the testing will include the following suite of parameters:.

- Electrical Conductivity;
- pH;
- Suspended solids;
- Total Hardness;
- Total Alkalinity;
- TOC;
- Nitrates;
- Ammonia;
- Chloride;
- Potassium;
- Chromium; and
- Mineral Oil and Diesel Range Organics.

7.145 The groundwater quality results will be submitted to Cork Co. Council on an annual basis as part of the environmental monitoring programme at the site.

Figures

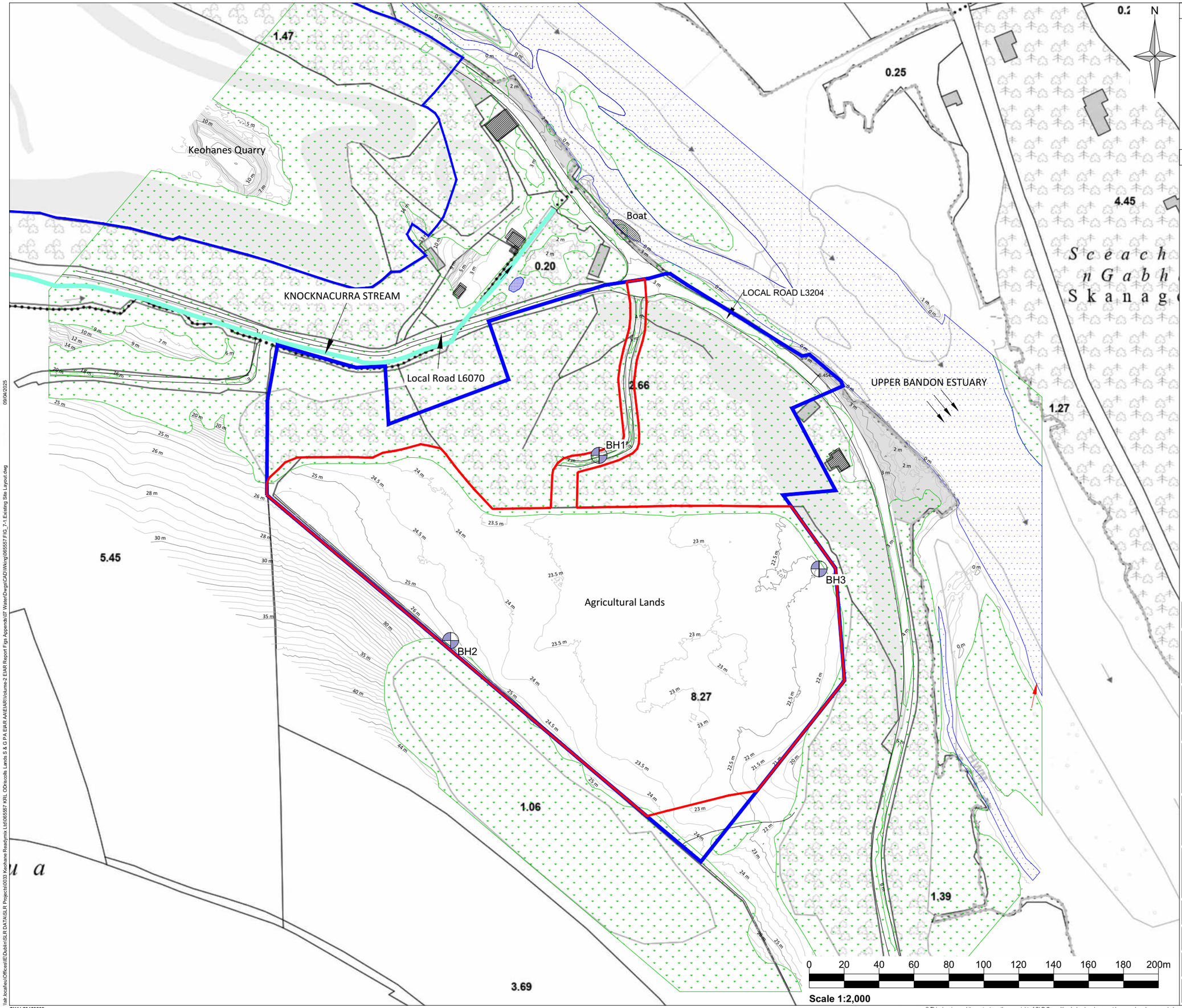
Figure 7-1: Existing Site Layout and Boreholes

Figure 7-2: Surface Water Bodies Map

Figure 7-3: Bedrock Aquifer Map

Figure 7-4: Groundwater Vulnerability Map

Figure 7-5: Groundwater Bodies Map



Notes:

1. EXTRACT FROM TAILTE EIREANN DIGITAL MAPPING 1:2,500 SCALE, MAP. NO. 6578

Legend:

- LAND INTEREST BOUNDARY
- PLANNING APPLICATION AREA (c.4.0 Hectares)
- EXISTING CONTOURS
- BH1 — BOREHOLE LOCATION (INSTALLED 2025)
- KNOCKNACURRA STREAM
- UPPER BANDON ESTUARY - WFD TRANSITIONAL WATER BODIES

Rev	Amendments	Date	By	Chk	Auth

SLR

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Drawing Status & Suitability Code: **FINAL**

Client: KEOHANE READYMIX LTD.

Project: SAND & GRAVEL PIT
KNOCKROE, BANDON, CO. CORK

Drawing Title: EXISTING SITE LAYOUT

Scale		SLR Project No.	
1:2,000	@ A3	065557.00001	
Designed	**Drawn**	**Checked**	**Authorised**
EW	EW	TP	TP
Date	**Date**	**Date**	**Date**
04/25	04/25	04/25	04/25

Drawing Number: **FIGURE 7-1** Rev. 1

\\slr.local\ie\Offices\IE\Dublin\SLR DATA\SLR Projects\00033 Keohane Readymix Ltd\065557 KRL ODs\cells Lands S & G PA EIAR AA\EIAR\Volume-2 EIAR Report Figs Appends\07 WaterDwgs\CAD\Wking\065557.FIG_7-1 Existing Site Layout.dwg 09/04/2025

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KNOCKNACURRA STREAM

N

Notes:

1. Extract from Ordnance Survey Map **No. 86.**

Legend:

PLANNING APPLICATION AREA (c.4.0 Hectares)

UPPER BANDON ESTUARY - WFD TRANSITIONAL WATER BODIES

WFD RIVER WATER BODIES

0 500 1000 1500 2000 2500m

Scale 1:25,000

Rev	Amendments	Date	By	Chk	Auth

SLR

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Drawing Status & Suitability Code: **FINAL**

Client: KEOHANE READYMIX LTD.

Project: SAND & GRAVEL PIT
KNOCKROE, BANDON, CO. CORK

Drawing Title: SURFACE WATER BODIES MAP

Scale		SLR Project No.
1:25,000	@ A3	065557.00001

Designed	Drawn	Checked	Authorised
EW	EW	TP	TP
Date	Date	Date	Date
04/25	04/25	04/25	04/25

Drawing Number: **FIGURE 7-2** Rev. **1**

\\slr.local\eu\Offices\IE\Dublin\SLR DATA\SLR Projects\0033 Keohane Readymix Ltd\065557 KRL ODriscolls Lands S & G PA EIAR AA\EIAR\Volume-2 EIAR Report Figs Appends\07 Water\Dwgs\CAD\Wking\065557 FIG_7-2 Surface Water Bodies Map.dwg 09/04/2025

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N

Notes:

1. Extract from Ordnance Survey Map **No. 86.**

Legend:

LAND INTEREST BOUNDARY

PLANNING APPLICATION AREA (c.4.0 Hectares)

Bedrock Aquifer
LI - Locally Important
Moderately Productive
Only In Local Zones

0 500 1000 1500 2000 2500m

Scale 1:25,000

Rev	Amendments	Date	By	Chk	Auth

SLR

www.slrconsulting.com

Drawing Status & Suitability Code
FINAL

Client
KEOHANE READYMIX LTD.

Project
SAND & GRAVEL PIT
KNOCKROE, BANDON, CO. CORK

Drawing Title
BEDROCK AQUIFER MAP

Scale	SLR Project No.
1:25,000 @ A3	065557.00001

Designed	Drawn	Checked	Authorised
EW	EW	TP	TP
Date	Date	Date	Date
04/25	04/25	04/25	04/25

Drawing Number
FIGURE 7-3

Rev.
1

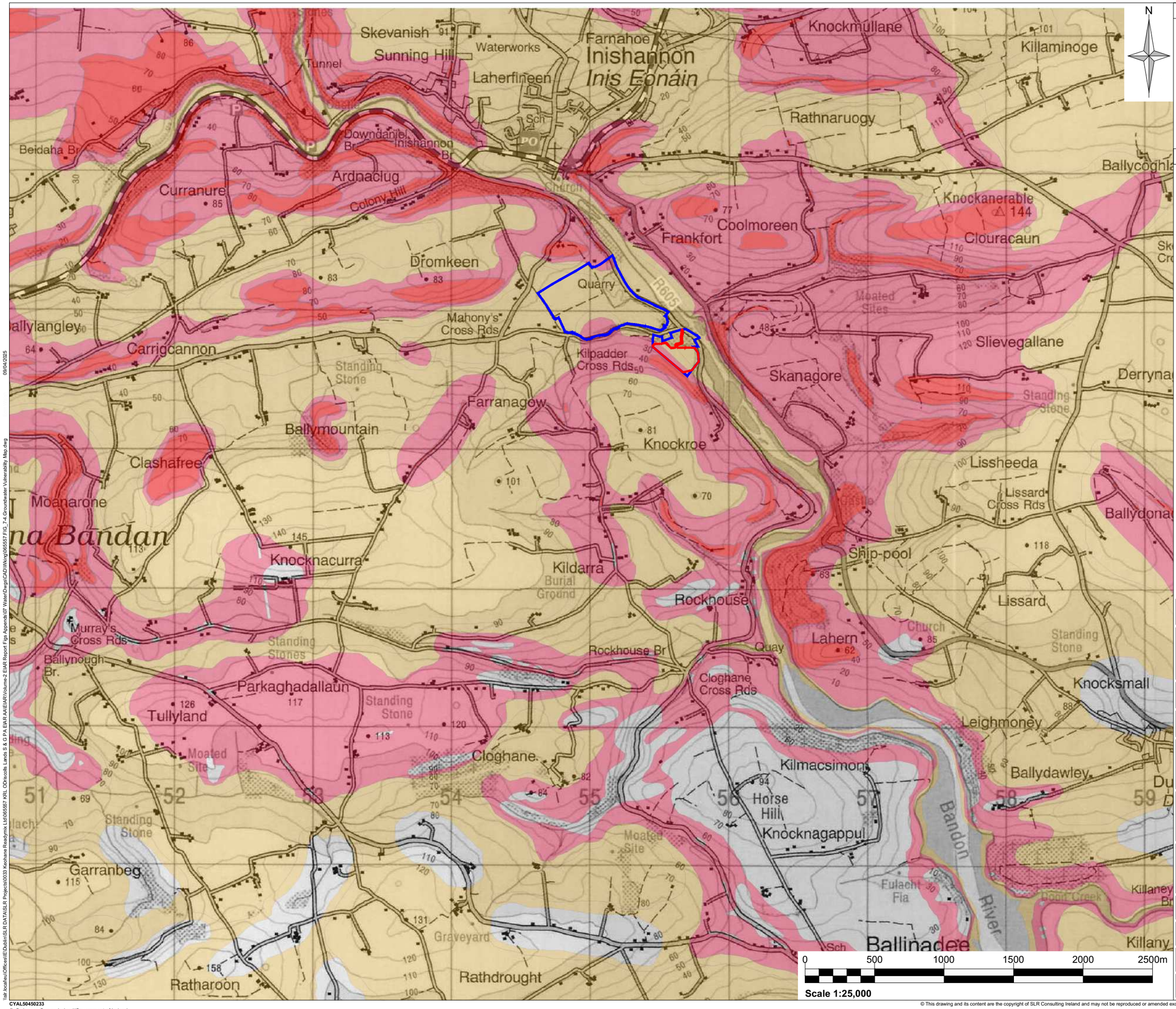
09/04/2025

\\dir.local\eu\Offices\IE\Dublin\SLR DATA\SLR Projects\00033 Keohane Readymix Ltd\065557 KRL ODriscolls Lands S & G PA EIAR AA\EIAR\Volume-2 EIAR Report Figs Appends\07 Water\Dwgs\CAD\Wking\065557 FIG_7-3 Bedrock Aquifer Map.dwg

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Notes:

1. Extract from Ordnance Survey Map **No. 86.**

Legend:

LAND INTEREST BOUNDARY

PLANNING APPLICATION AREA (c.4.0 Hectares)

Groundwater Vulnerability
- X - Rock At Or Near Surface/Karst
- E - Extreme
- H - High
- M - Moderate

Rev	Amendments	Date	By	Chk	Auth

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Drawing Status & Suitability Code: **FINAL**

Client: KEOHANE READYMIX LTD.

Project: SAND & GRAVEL PIT
KNOCKROE, BANDON, CO. CORK

Drawing Title: GROUNDWATER VULNERABILITY MAP

Scale		SLR Project No.	
1:25,000	@ A3	065557.00001	
Designed	**Drawn**	**Checked**	**Authorised**
EW	EW	TP	TP
Date	**Date**	**Date**	**Date**
04/25	04/25	04/25	04/25

Drawing Number: **FIGURE 7-4** Rev.: **1**

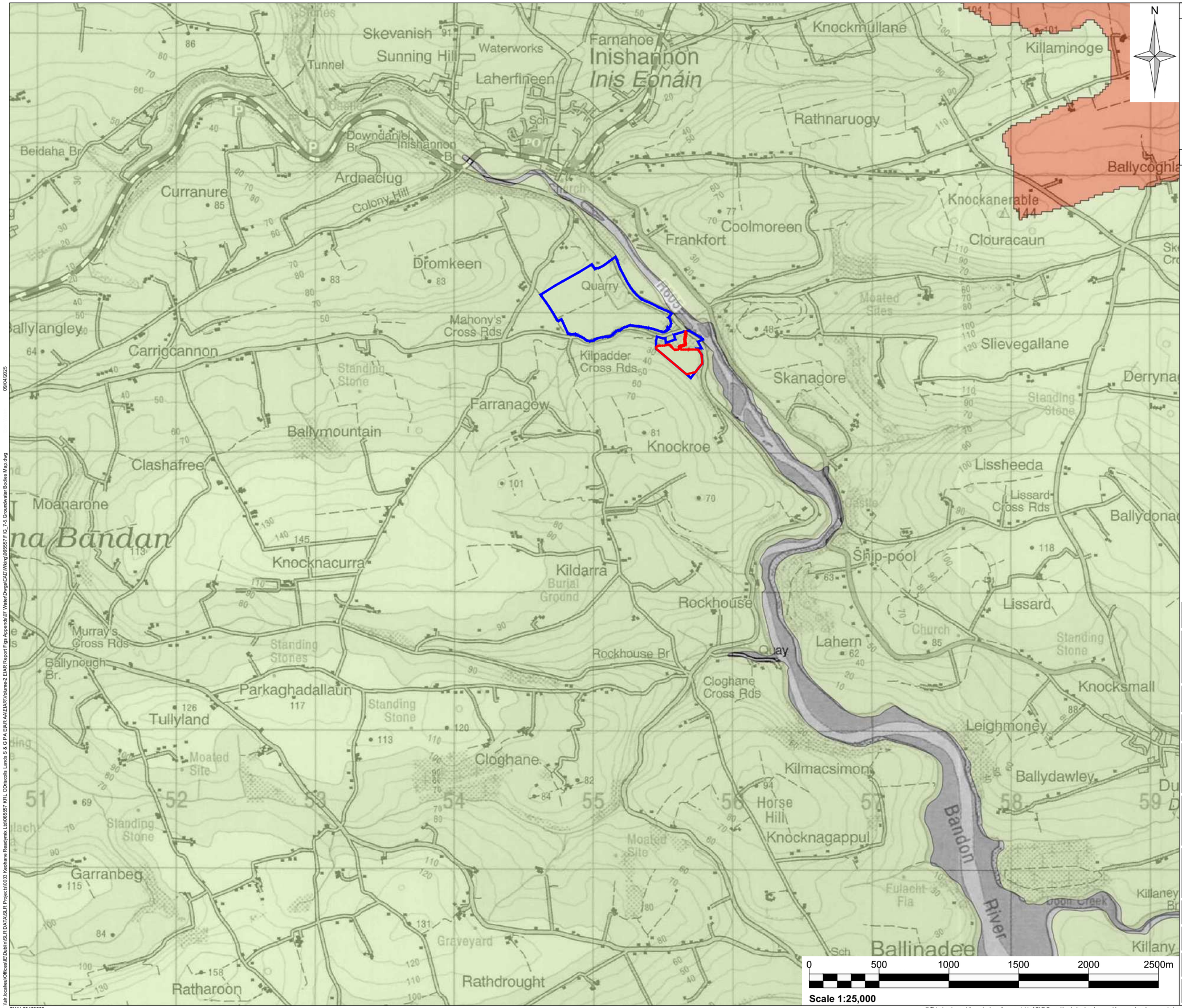
09/04/2025

\\slr.local\eu\Offices\IE\Dublin\SLR DATA\SLR Projects\065557 KRL ODriscolls Lands S & G PA EIAR AA\EIAR\Volume-2 EIAR Report Figs Appends\07 WaterDwgs\CAD\Working\065557 FIG_7-4 Groundwater Vulnerability Map.dwg

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Notes:

1. Extract from Ordnance Survey Map **No. 86.**

Legend:

LAND INTEREST BOUNDARY

PLANNING APPLICATION AREA (c.4.0 Hectares)

Groundwater Bodies

Bandon

Ballinhassig East

Rev	Amendments	Date	By	Chk	Auth

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Drawing Status & Suitability Code: **FINAL**

Client: KEOHANE READYMIX LTD.

Project: SAND & GRAVEL PIT
KNOCKROE, BANDON, CO. CORK

Drawing Title: GROUNDWATER BODIES MAP

Scale	SLR Project No.
1:25,000 @ A3	065557.00001

Designed	Drawn	Checked	Authorised
EW	EW	TP	TP
Date: 04/25	Date: 04/25	Date: 04/25	Date: 04/25

Drawing Number: **FIGURE 7-5** Rev.: **1**

09/04/2025

\\dir.local\eu\Offices\IE\Dublin\SLR DATA\SLR Projects\0033 Keohane Readymix Ltd\065557 KRL ODriscolls Lands S & G PA EIAR AA\EIAR\Volume-2 EIAR Report Figs Appends\07 Water\Dwgs\CAD\Wking\065557 FIG_7-5 Groundwater Bodies Map.dwg

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Appendix 7-A EU Directives / National Legislation and Regulations / Guidelines / Technical Standards

European Directives

- Environmental Impact Assessment. Directive (2011/92/EU) on the assessment of the effects of certain public and private projects on the environment;
- Environmental Impact Assessment Directive (2014/52/EU) on the assessment of the effects of certain public and private projects on the environment;
- Water Framework Directive (2000/60/EC);
- Groundwater Directive (2006/118/EC);
- Flooding Directive (2007/60/EC)
- Integrated Pollution and Prevention Control Directive (2008/1/EC); and
- The management of waste from extractive industries (2006/21/EC).

Irish Government Acts, National Legislation and Regulations

- S.I. No. 349 of 1989, European Communities (Environmental Impact Assessment) Regulations, and subsequent amendments (S.I. No. 84 of 1994, S.I. No. 352 of 1998, S.I. No. 93 of 1999, S.I. No. 450 of 2000 and S.I. No. 538 of 2001);
- The Planning and Development Acts, 2000 to 2009, The Planning and Development (Amendment) Act 2010, S.I. 600 of 2001 Planning and Development Regulations and subsequent amendments including, S.I. No. 364 of 2005 and S.I. 685 of 2006.
- National legislation on the protection of the water environment. Since 2000 water management in EU member states has primarily been directed by the Water Framework Directive (2000/60/EC) and the associate 'daughter' Groundwater Directive (2006/118/EC). Irish legislation implementing these, and other relevant directives currently includes:
- S.I. No. 9 of 2010 European Communities Environmental Objectives (Groundwater) Regulations 2010 and amendments (S.I. No. 389 of 2011 and S.I. No. 149 of 2012);
- European Union (Drinking Water) Regulations 2014 (S.I. No. 122 of 2014);
- S.I. No. 278 of 2007 European Communities (Drinking Water) (No. 2) Regulations;
- S.I. No. 272 of 2009 European Communities Environmental Objectives (Surface Waters) Regulations 2009 and amendment (S.I. No. 327 of 2012);
- S.I. No. 684 of 2007 Waste Water Discharge (Authorisation) Regulations, 2007, as amended (S.I. No. 231 of 2010);
- S.I. No. 122 of 2010 European Communities (Assessment and Management of Flood Risks) Regulations 2010;
- European Union (Planning and Development) (Environmental Impact Assessment) (No. 2) Regulations 2018 (S.I. No. 404 of 2018);
- Local Government (Water Pollution) Acts 1977 to 1998;
- European Communities (Quality of Salmonid Waters) Regulations, 1988 (S.I. No. 293 of 1988);

- European Communities (Quality of Shellfish Waters) Regulations, 2006 (S.I. No. 268 of 2006) and amendments (S.I No. 55 and 464 of 2009), and;
- Bathing Water Quality Regulations, 2008 (S.I. No. 79 of 2008) and amendments (S.I No. 351 of 2011 and S.I. No. 163 of 2016);

Guidelines

- DELG/EPA/GSI (1999). Groundwater Protection Schemes. Document prepared jointly by the Geological Survey of Ireland (GSI), the Environmental Protection Agency, and the Department of Environment, Heritage and Local Government.
- EPA (May 2022) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports.
- EPA (2010b). Methodology for Establishing Groundwater Threshold Values and the Assessment of Chemical and Quantitative Status of Groundwater, Including and Assessment of Pollution Trends and Trend Reversal.
- Fitzsimons, V., Daly, D. and Deakin, J. (2003). Draft GSI guidelines for assessment and mapping of groundwater vulnerability to contamination. Groundwater Chapter, Geological Survey of Ireland.
- GSI (2006). Criteria used in aquifer classification. Available from http://www.gsi.ie/Programmes/Groundwater/Aquifer+Classification.htm
- IGI (2007). Guidelines on Water Well Construction. Available from http://www.igi.ie/assets/files/Water%20Well%20Guidelines/Guidelines.pdf
- Kilroy, G., Dunne, F., Ryan, J., O'Connor, A., Daly, D., Craig, M., Coxon, C., Johnston, P. and Moe, H. (2008). A Framework for the Assessment of Groundwater – Dependent Terrestrial Ecosystems under the Water Framework Directive. Environmental Research Centre Report Series No. 12.
- Institute of Geologists of Ireland, 2007. Recommended collection, presentation and interpretation of geological and hydrogeological information for quarry developments.

Technical Standards

- British Standards (2015). Code of Practice for Ground Investigations BS5930:2015.
- CIRIA (2007). The SuDS Manual. (C697). CIRIA publication.
- SLR Standard operating Procedures (SoP) for surface water and groundwater:
  - 090330 Hydro SOP Number 1107 0 V 1 0 Drilling Supervision & Monitoring Well Construction;

Appendix 7-B Borehole Logs

BOREHOLE LOG

BOREHOLE No
BH 1

Client:
Keohane Readymix Ltd

Project No:	Date:	Ground Level:	Co-ordinates:
501.065557.00001	04/03/2025	7.50m	E555581 N555840

Project:
Knockroe, Bandon, Co. Cork

Sheet
1 of 2

SAMPLES & TESTS				Water	STRATA				
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	Instrument Backfill
							(12.50)	Dense medium coarse brown sub-rounded silty SAND AND GRAVEL with frequent cobbles and boulders	

Borehole Continued on Next Page

Boring Progress and Water Observations				
Date	Depth	Casing Dpt	Casing Dia	Water Dpt
04/03/2025	0.00	0.00	140mm	0
04/03/2025	13.50	13.00	154mm	8

Chiselling			Water Added	
From	To	Hours	From	To

General Remarks
Drillers Descriptions

All dimensions in metres	Contractor: Petersen Drilling Services	Method: Rotary open hole	Logged By:	Approved By:
Scale 1:66	Plant: Knebel HY79	Hole Size: 154mm	SP	PG

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH BS5930:2015+A2:2020

BOREHOLE LOG

BOREHOLE No
BH 1

Client:
Keohane Readymix Ltd

Project No:	Date:	Ground Level:	Co-ordinates:
501.065557.00001	04/03/2025	7.50m	E555581 N555840

Project:
Knockroe, Bandon, Co. Cork

Sheet
2 of 2

SAMPLES & TESTS				Water	STRATA				
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	Instrument Backfill
								Dense medium coarse brown sub-rounded silty SAND AND GRAVEL with frequent cobbles and boulders	
					-5.00		12.50		
							(0.80)	Dense brown very clayey SAND AND GRAVEL	
					-5.80		13.30		
					-6.00		13.50	Medium strong dark grey shaley LIMESTONE	
								Borehole Complete at 13.50m	

11 12 13 14 15 16 17 18 19

Boring Progress and Water Observations					Chiselling			Water Added		General Remarks
Date	Depth	Casing Dpt	Casing Dia	Water Dpt	From	To	Hours	From	To	Drillers Descriptions

All dimensions in metres	Contractor: Petersen Drilling Services	Method: Rotary open hole	Logged By:	Approved By:
Scale 1:66	Plant: Knebel HY79	Hole Size: 154mm	SP	PG

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH BS5930:2015+A2:2020

BOREHOLE LOG

BOREHOLE No **BH 2**

Client: **Keohane Readymix Ltd**

Project No:	Date:	Ground Level:	Co-ordinates:
501.065557.00001	05/03/2025	25.50m	E555496 N555734

Project: **Knockroe, Bandon, Co. Cork**

Sheet 1 of 3

SAMPLES & TESTS				Water	STRATA				
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	Instrument Backfill
					25.20		0.30	Firm brown TOPSOIL	
					24.80		0.70	Firm to stiff brown sandy silty CLAY	
							(6.10)	Dense coarse brown sub-rounded silty SAND AND GRAVEL. frequent cobbles and boulders	
					18.70		6.80	Weak dark grey shaley weathered LIMESTONE MUDSTONE	
								Borehole Continued on Next Page	

1 2 3 4 5 6 7 8 9

Boring Progress and Water Observations					Chiselling			Water Added		General Remarks
Date	Depth	Casing Dpt	Casing Dia	Water Dpt	From	To	Hours	From	To	Drillers Descriptions
05/03/2025	0.00	0.00	140mm	0						
05/03/2025	30.00	8.50	154mm	13						

All dimensions in metres	Contractor: Petersen Drilling Services	Method: Rotary open hole	Logged By:	Approved By:
Scale 1:66	Plant: Knebel HY79	Hole Size: 154mm	SP	PG

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH BS5930:2015+A2:2020

BOREHOLE LOG

BOREHOLE No
BH 2

Client:
Keohane Readymix Ltd

Project No:	Date:	Ground Level:	Co-ordinates:
501.065557.00001	05/03/2025	25.50m	E555496 N555734

Project:
Knockroe, Bandon, Co. Cork

Sheet
2 of 3

SAMPLES & TESTS				Water	STRATA				
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	Instrument Backfill
							(8.20)	Weak dark grey shaley weathered LIMESTONE MUDSTONE	
					10.50		15.00	Weak dark grey shaley LIMESTONE MUDSTONE	
								Borehole Continued on Next Page	

Boring Progress and Water Observations					Chiselling			Water Added		General Remarks
Date	Depth	Casing Dpt	Casing Dia	Water Dpt	From	To	Hours	From	To	Drillers Descriptions

All dimensions in metres	Contractor: Petersen Drilling Services	Method: Rotary open hole	Logged By:	Approved By:
Scale 1:66	Plant: Knebel HY79	Hole Size: 154mm	SP	PG

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH BS5930:2015+A2:2020

BOREHOLE LOG

BOREHOLE No **BH 2**

Client: **Keohane Readymix Ltd**

Project No:	Date:	Ground Level:	Co-ordinates:
501.065557.00001	05/03/2025	25.50m	E555496 N555734

Project: **Knockroe, Bandon, Co. Cork**

Sheet 3 of 3

SAMPLES & TESTS				Water	STRATA				
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	Instrument Backfill
								Weak dark grey shaley LIMESTONE MUDSTONE	
21									
22									
23									
24									
25							(15.00)		
26									
27									
28									
29									
					-4.50		30.00	Borehole Complete at 30.00m	

Boring Progress and Water Observations					Chiselling			Water Added		General Remarks
Date	Depth	Casing Dpt	Casing Dia	Water Dpt	From	To	Hours	From	To	Drillers Descriptions

All dimensions in metres	Contractor: Petersen Drilling Services	Method: Rotary open hole	Logged By:	Approved By:
Scale 1:66	Plant: Knebel HY79	Hole Size: 154mm	SP	PG

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH BS5930:2015+A2:2020

BOREHOLE LOG

BOREHOLE No
BH 3

Client:
Keohane Readymix Ltd

Project No:	Date:	Ground Level:	Co-ordinates:
501.065557.00001	05/03/2025	22.50m	E555707 N555775

Project:
Knockroe, Bandon, Co. Cork

Sheet
1 of 3

SAMPLES & TESTS				Water	STRATA				
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	Instrument / Backfill
					22.20		0.30	Firm brown TOPSOIL	
								Dense coarse brown sub-rounded slightly silty SAND AND GRAVEL with frequent cobbles and boulders	
								Borehole Continued on Next Page	

Boring Progress and Water Observations				
Date	Depth	Casing Dpt	Casing Dia	Water Dpt
05/03/2025	0.00	0.00	140mm	0
05/03/2025	28.00	28.00	154mm	21.5

Chiselling			Water Added	
From	To	Hours	From	To

General Remarks
Drillers Descriptions

All dimensions in metres	Contractor: Petersen Drilling Services	Method: Rotary open hole	Logged By:	Approved By:
Scale 1:66	Plant: Knebel HY79	Hole Size: 154mm	SP	PG

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH BS5930:2015+A2:2020

BOREHOLE LOG

BOREHOLE No
BH 3

Client:
Keohane Readymix Ltd

Project No:	Date:	Ground Level:	Co-ordinates:
501.065557.00001	05/03/2025	22.50m	E555707 N555775

Project:
Knockroe, Bandon, Co. Cork

Sheet
2 of 3

SAMPLES & TESTS				Water	STRATA				
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	Instrument Backfill
11								Dense coarse brown sub-rounded slightly silty SAND AND GRAVEL with frequent cobbles and boulders	
12									
13									
14									
15							(27.70)		
16									
17									
18									
19									
								Borehole Continued on Next Page	

Boring Progress and Water Observations					Chiselling			Water Added		General Remarks
Date	Depth	Casing Dpt	Casing Dia	Water Dpt	From	To	Hours	From	To	Drillers Descriptions

All dimensions in metres	Contractor: Petersen Drilling Services	Method: Rotary open hole	Logged By:	Approved By:
Scale 1:66	Plant: Knebel HY79	Hole Size: 154mm	SP	PG

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH BS5930:2015+A2:2020

BOREHOLE LOG

BOREHOLE No
BH 3

Client:
Keohane Readymix Ltd

Project No:	Date:	Ground Level:	Co-ordinates:
501.065557.00001	05/03/2025	22.50m	E555707 N555775

Project:
Knockroe, Bandon, Co. Cork

Sheet
3 of 3

SAMPLES & TESTS				Water	STRATA				Instrument Backfill
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
21								Dense coarse brown sub-rounded slightly silty SAND AND GRAVEL with frequent cobbles and boulders	
22									
23									
24									
25									
26									
27									
28					-5.50		28.00	Borehole Complete at 28.00m	
29									

Boring Progress and Water Observations					Chiselling			Water Added		General Remarks
Date	Depth	Casing Dpt	Casing Dia	Water Dpt	From	To	Hours	From	To	Drillers Descriptions

All dimensions in metres	Contractor: Petersen Drilling Services	Method: Rotary open hole	Logged By:	Approved By:
Scale 1:66	Plant: Knebel HY79	Hole Size: 154mm	SP	PG

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH BS5930:2015+A2:2020

Appendix 7-C Rating of Existing Environment Significance / Sensitivity

Importance	Criteria	Typical Example
High	Attribute has a high quality or value on an international scale	Groundwater/ Surface Water supports river, wetland or surface water body ecosystem protected by EU legislation e.g. SAC or SPA status
	Attribute has a high quality or value on a regional or national scale	Regionally Important Aquifer with multiple wellfields. Groundwater supports river, wetland or surface water body ecosystem protected by national legislation – e.g. NHA status. Regionally important potable water source supplying >2,500 homes Inner source protection area for regionally important water source. Drinking water supply from river. Amenity use of waterbody
	Attribute has a high quality or value on a local scale	Regionally Important Aquifer. Groundwater provides large proportion of baseflow to local rivers. Locally important potable water source supplying >1000 homes. Outer source protection area for regionally important water source. Inner source protection area for locally important water source.
Medium	Attribute has a medium quality or value on a local scale	Locally Important Aquifer Potable water source supplying >50 homes. Outer source protection area for locally important water source. No specific recreational use of waterbody
Low	Attribute has a low quality or value on a local scale	Poor Bedrock Aquifer. Potable water source supplying <50 homes. No water supply from surface water, no abstraction designation for watercourse No amenity value of waterbody
Negligible	Attribute has negligible quality or value on a local site scale	No groundwater supply from a bedrock aquifer in vicinity of site. Surface water not used for any specific purpose.

Appendix 7-D Descriptions of Effects (EPA, 2022)

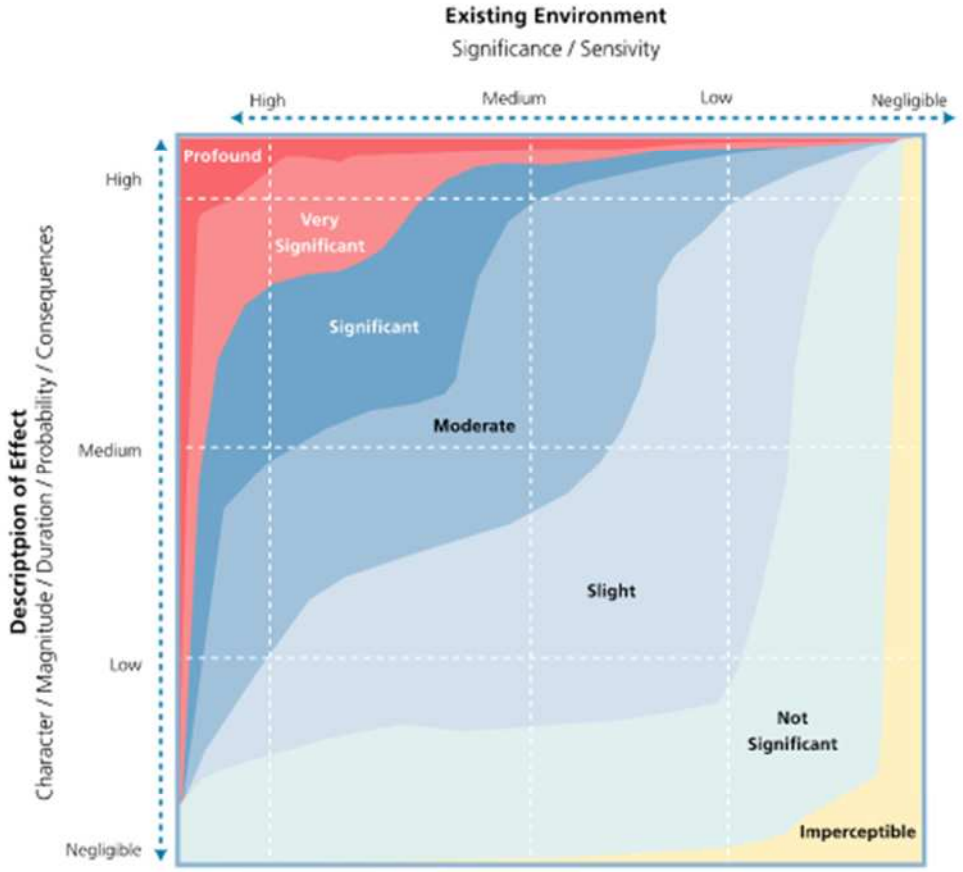
Impact Characteristic	Term	Description
Quality of Effects	Positive Effects	A change which improves the quality of the environment
	Neutral Effects	No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error
	Negative / Adverse Effects	A change which reduces the quality of the environment
Describing the Significance of Effects	Imperceptible	An effect capable of measurement but without significant consequences
	Not significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
	Slight Effects	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities
	Moderate Effects	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
	Significant Effects	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment
	Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.
	Profound Effects	An effect which obliterates sensitive characteristics
Describing the Extent and Context of Effects	Extent	Describe the size of the area, the number of sites, and the proportion of a population affected by an effect
	Context	Describe whether the extent, duration, or frequency will conform or contrast with established (baseline) conditions (is it the biggest, longest effect ever?)
Describing the Probability of Effects	Likely Effects	Describe the size of the area, the number of sites, and the proportion of a population affected by an effect.
	Unlikely Effects	Describe whether the extent, duration, or frequency will conform or contrast with established (baseline) conditions (is it the biggest, longest effect ever?
Describing the Duration and Frequency of Effects	Momentary Effects	Effects lasting from seconds to minutes
	Brief Effects	Effects lasting less than a day
	Temporary Effects	Effects lasting less than a year
	Short-term Effects	Effects lasting one to seven years
	Medium-term Effects	Effects lasting seven to fifteen years
	Long-term Effects	Effects lasting fifteen to sixty years
	Permanent Effects	Effects lasting over sixty years
	Reversible Effects	Effects that can be undone, for example through remediation or restoration
	Frequency of Effects	Describe how often the effect will occur. (once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annually.

Impact Characteristic	Term	Description
Describing the Types of Effects	Indirect / Secondary Effects	Likely, significant effects on the environment, which are not a direct result of the project, often produced away from the project site or because of a complex pathway.
	Cumulative Effects	The addition of many minor or significant effects, including effects of other projects, to create larger, more significant effects.
	Do-Nothing Effects	The environment as it would be in the future should the subject project not be carried out.
	Worst Case Effects	The effects arising from a project in the case where mitigation measures substantially fail.
	Indeterminable Effects	When the full consequences of a change in the environment cannot be described.
	Irreversible Effects	When the character, distinctiveness, diversity or reproductive capacity of an environment is permanently lost.
	Residual Effects	The degree of environmental change that will occur after the proposed mitigation measures have taken effect.
	Synergistic Effects	Where the resultant effect is of greater significance than the sum of its constituents, (e.g. combination of SOx and NOx to produce smog).

Appendix 6-E Classification of the Significance of Impacts

Determining Significance

Figure 3.4 shows how comparing the character of the predicted effect to the sensitivity of the receiving environment can determine the significance of the effect.



There are seven generalised degrees of effect significance that are commonly used in EIA. Imperceptible, Not Significant, Slight, Moderate, Significant, Very Significant and Profound. Generalised definitions of each of these are provided in Table 3.4. When more specific definitions exist within a specialised factor or topic, e.g. biodiversity, these should be used in preference to these generalised definitions. (ref. Advice Notes[68].)

(Source: Figure 3.4 Environmental Protection Agency (May, 2022), 'Guidelines on the Information to be contained in Environmental Impact Assessment Reports').

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APPENDICES

Appendix 8-A Dust Risk Screening Assessment Methodology

Introduction

Background

8.1 This Chapter of the Environmental Impact Assessment Report (EIAR), prepared by SLR Consulting Ireland, addresses the potential effects on air quality of the proposed development at Knockroe, Bandon, Co. Cork.

8.2 The proposed development will comprise:

- Extraction of sand & gravel over an area of c.3.5 Ha.
- Extraction by dry working to 2 metres above the groundwater level, at a maximum rate of 100,000 tonnes per year.
- Transport of the extracted sand & gravel to the adjacent Dromkeen Pit (Plan. Ref. 23/04780) for use in concrete production;
- Upgrading of the existing internal access road and use of the existing access onto the local road L3204.
- Provision of wheelwash and welfare unit (c.8.3 sq.m).
- Restoration of the lands to agricultural and natural habitat use;
- All within an application area of c.4.0 hectares.

8.3 Permission is sought for 15 years plus two years for final restoration (total duration of seventeen years). Further details of the proposed development are provided in Chapter 2 of this EIAR.

8.4 The proposed development will have the potential to generate fugitive dust emissions and particulates (PM10), which may result in impacts on local air quality. Combustion emissions (primary PM10, and oxides of nitrogen) from exhaust emissions associated with the sand and gravel extraction and the production and transportation of aggregates may also have the potential to impact on local air pollution.

8.5 Based on a maximum annual pit output of 100,000 tonnes per year from the proposed development , and the short transport distance (c. 0.5km) to the adjacent Dromkeen Pit, the road haulage fleet will comprise 1 no. heavy goods vehicle (HGV) – for aggregate haulage. The maximum number of HGV movements will be one to two HGV trips per hour based on a maximum annual total output of 100,000 tonnes per year, 50-week year, 5.day week ,8-hour day and 30 tonne (sand & gravel) HGV loads.

Scope of Work

8.6 The main focus of this assessment is the potential impact on local residential amenity of fugitive dust emissions and particulate matter generated by the proposed development. Dust emissions are likely to arise in the course of the following activities:

- soil stripping and earthworks (site preparation and restoration works);
- handling of excavated sand and gravel;
- trafficking by heavy goods vehicles (HGVs) over paved / unpaved surfaces;

8.7 With respect to the potential for air quality impacts, the key objective at the application site is to manage activities in order to ensure that air emissions are prevented where possible, and the effects of any residual releases are minimised.

8.8 This EIAR chapter describes and assesses the existing air quality baseline characteristics of the area at and around Knockroe based on EPA data. Air emissions arising from the proposed activities at the application site are considered and the air quality impacts assessed. Mitigation measures are identified where required, to eliminate and reduce these impacts insofar as practical.

8.9 The following sections of this Chapter describe the potential air quality impacts associated with the planned development activities. The following issues are addressed separately:

- relevant legislation, standards and guidance;
- baseline conditions pertaining to existing air quality levels around the existing site;
- methodology used to assess the potential impacts of planned activities on air quality at local properties;
- assessment of the impacts;
- description of mitigation measures that are incorporated into the construction, design and operation of the proposed development to eliminate or reduce the potential for increased air quality impacts (if required);
- summary of any residual impacts and reinstatement;
- summary of cumulative impacts;
- monitoring proposals.

Contributors / Author(s)

8.10 The air quality impact assessment presented in this Chapter was prepared by SLR Consulting Ireland. The lead consultant for the study was Tim Paul MSc CEng MIEI MRICS.

Limitations / Difficulties Encountered

8.11 This assessment is compiled on the basis of published regional and local data, and guidance documents. No difficulties were encountered in compiling the required information.

Regulatory Background

8.12 The following sections describe the main legislative policy requirements in respect of air quality associated with the proposed development.

Legislation

Air Quality Standards

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

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

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

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

- nitrogen oxides;
- sulphur dioxide;
- carbon monoxide;
- ozone;
- particulate matter (PM10, PM2.5 and black smoke);
- benzene and volatile organic compounds;
- heavy metals; and
- polycyclic aromatic hydrocarbons.

8.17 These pollutants are monitored at stations across the country and together they form the national ambient air quality network. A summary of relevant air quality limit values in relation to human health are presented in Table 8-1. Air quality limit values in relation to vegetation protection are presented separately in Table 8-2.

8.18 The air quality monitoring network is coordinated and managed by the EPA, as the National Reference Laboratory for air quality. The results of the monitoring are compared to limit values set out in EU and national legislation on ambient air quality. Map-based assessments of air quality are prepared and published by the EPA.

Table 8-1: Relevant Air Quality Limit Values for Protection of Human Health

Human health	Limit or target value			Information and alert thresholds (where applicable)		Long term objective
Pollutant	**Averaging period**	**Value**	**Maximum number of allowed occurrences**	**Period**	**Threshold value**	
Nitrogen Dioxide (NO_2)	Hour Year	200 µg/m^3 40 µg/m^3	18 0	1 hour alert	400 µg/m^3 Exceeded for 3 consecutive hours	
Sulphur Dioxide (SO_2)	Hour Day	350 µg/m^3 125 µg/m^3	24 3	1 hour alert	500 µg/m^3 Exceeded for 3 consecutive hours	
Particulate matter with aerodynamic diameter of less than 10µm (PM10)	Day Year	50 µg/m^3 40 µg/m^3	35 0			
Particulate matter with aerodynamic diameter of less than 2.5µm (PM2.5)	Year	25 µg/m^3 20 µg/m^3 (ECO)				0 8.5 to 18 µg/m^3

Table 8-2: Summary of Air Quality Limit Values : Protection of Vegetation

Vegetation	Critical level or target value		Long-term objective	
Pollutant	**Averaging period**	**Value**	**Value**	**Date**
Nitrogen dioxide (NOx)	Calendar year	30 µg/m^3		
Sulphur Dioxide (SO2)	Calendar year and winter (October to March)	20 µg/m^3		

Planning Policy and Development Control

National Spatial Strategy (NSS) / National Planning Framework – Project Ireland 2040

8.19 The National Planning Framework 2040 (published in February 2018) is a national planning framework for Ireland. The framework provides the policies for all regional and local plans. In the framework, the extractive industries are recognised as important for the supply of aggregates and construction materials to variety of sectors. It emphases that the planning process will play a key role in realising the potential of the extractive

industries and protecting reserves of aggregates and minerals. Aggregates and minerals will continue to be enabled where this is compatible with protection of the environments.

8.20 There are no specific policies in relation to air emissions in NPF for extractive or production of construction aggregates and materials. The general objective is to facilitate development and to protect the environment at the same time.

Guidelines Extractive Industry Emissions Limit Values

8.21 Section 261 of the Planning and Development Act 2000 (as amended), which regulated a significant proportion of established extractive development, came into effect in April 2004. The planning guidelines[1] for the extractive industries '*Quarries and Ancillary Activities – Guidelines for* Planning *Authorities*' were published by the Department of the Environment, Heritage and Local Government at around the same time.

8.22 Separately, in 2006, the EPA published complementary guidance aimed at pit / quarry operators, planning authorities and the general public *Environmental Management Guidelines for Environmental Management in the Extractive Industry (Non-Scheduled Minerals)*[2].

8.23 The Irish Concrete Federation (ICF), the trade body representing the interests of pit / quarry operators and producers of construction materials, has also published the ICF Environmental Code to provide guidance for its members on best practice in the environmental management of quarries. The document was last updated in 2005.

Specific Guidance Relating to Air Quality / Dust Nuisance

8.24 A range of monitoring techniques exist for dust deposition rates (i.e. Bergerhoff and Frisbee gauges). There is currently no Irish, European Union (EU) or World Health Organisation (WHO) statutory standards or limits appropriate for the assessment of deposited dust and its propensity to generate annoyance.

8.25 Industry standard criteria levels for the gravimetric assessment of dust deposition from extractive industry in Ireland are set out in the DoEHLG (2004) planning guidelines for the extractive industry, the ICF Guidelines (2005) and EPA (2006) Environmental Management Guidelines. Each of these Guidelines recommend the use of the Bergerhoff method for measuring dust deposition. In line with this approach, the guidelines recommend the TA Luft dust deposition limit value of 350mg/m^2/day (total dust deposition averaged over a 30-day period), measured at site boundaries

8.26 When the rate of accumulation of the coarser fraction of dust (referred to as deposited dust) is sufficiently rapid to cause fouling or discolouration, then it is generally considered to introduce a nuisance. The point at which an individual perceives dust deposition as a nuisance and causes a complaint is highly subjective.

8.27 The action of wind over dry ground will carry dust particles into the air. Although large emissions of dust occur naturally, man-made dust events are caused by a range of activities including agriculture, road traffic, construction works (including the handling and storage of soils and particulate matter) and by vehicles using paved and unpaved haul roads.

[1] Quarries and Ancillary Activities – Guidelines for Planning Authorities (DoEHLG, 2004)

[2] https://www.epa.ie/pubs/advice/general/EPA_management_extractive_industry.pdf

8.28 For operations involving the mechanical break up of solids, the most common concern regarding dust emissions is the potential nuisance effect from the larger fractions of dust.

Guidance on Assessment of Mineral Dust Impacts for Planning

8.29 Guidance on the assessment of the impacts of extractive operations on air quality has been prepared by the Institute of Air Quality Management (IAQM, 2016)[3]. This guidance uses a simple distance-based screening process to identify those operations where the dust impacts are unlikely to be significant and therefore require no further assessment. Where more detailed assessment is required, a basic assessment framework is presented which employs the Source-Pathway-Receptor approach to evaluate risk of impacts and effects.

Air Quality and Ecological Receptors

8.30 A majority of the research on the effects of particulate matter on vegetation has focussed on the chemical effects of alkaline dusts. A summary of a review of available research on behalf of the UK's Department for the Environment Transport and Regions (DETR) concluded that:

"*The issue of dust on ecological receptors is largely confined to the associated chemical effect of dust, and particularly the effect of acidic or alkaline dust influencing vegetation through soils*."

8.31 An Interim Advice Note (IAN) prepared as a supplement for Volume 11, Section 3, Part 1 of the UK DMRB (Design Manual for Roads and Bridges) and now incorporated into LA 105) suggests that only dust deposition levels above 1,000mg/m^2/day are likely to affect sensitive ecological receptors. This level of dust deposition is approximately five times greater than the level at which most dust deposition may start to cause a perceptible nuisance to humans. It states that most species appear to be unaffected until dust deposition rates are at levels considerably higher than this.

Assessment of Air Quality Impacts on Designated Nature Conservation Areas

8.32 Guidance on the assessment of the air quality impacts of development on designated nature conservation sites WAS prepared by the Institute of Air Quality Management (IAQM, 2019). This guidance is also useful to evaluate the effects of air pollution on habitats and species using air quality assessment.

8.33 The predicted scale of dust effects may be classified as either 'significant', or not 'significant'. Where effects are predicted to be 'significant', further mitigation is likely required before the proposals are to be acceptable under planning policy.

Air Quality and Health Effects

8.34 The main health effects of air pollution can include stroke, heart disease, lung cancer, and both chronic and acute respiratory diseases, including asthma. These conditions can lead to sickness and ill health as well as premature mortality.

[3] http://www.iaqm.co.uk/text/guidance/mineralsguidance_2016.pdf

8.35 Two recent EPA reports, A*ir Quality in Ireland 2015*[4] *and Ireland's Environment, An Assessment 2016*[5] detail the main air quality trends based on monitoring from the national ambient air quality network. There are monitored exceedances of the WHO guideline values for ozone, PM_{10} and $PM_{2.5}$ at a number of sites though there are no current exceedances of the lower (less protective) EU standards at the existing monitoring locations in Ireland. The reports also highlight the main challenges of reducing air pollution from key sources such as particulate matter emissions from solid fuel burning (e.g. peat, coal and wood) in the residential sector and NOx emissions from vehicles in the transport sector.

A summary of relevant Air Quality limit values in relation to human health was presented previously in Table 8-1.

Receiving Environment

Study Area

8.36 The proposed development is located approximately 6km east of Bandon and 2km south of Innishannon in Co. Cork, refer to EIAR Figure 1-1.

8.37 The lands are bounded by woodland / local roads to the north and east; and woodland / agricultural lands to the south and west. The Bandon River is located on the eastern side of the L3204 local road flowing in a southerly direction, refer to EIAR Figures 1-1 and 1-2.

8.38 The surrounding landuse is predominantly woodland and agricultural grazing land (refer to Figure 1-3). There is a history of sand & gravel extraction in the area the existing Dromkeen sand & gravel pit and concrete plant operated by Keohane Readymix Ltd. located c. 200metres to the north of the site.

8.39 There are a number of residential dwellings located along the roads to the north and east of the site, refer EIAR Figure 10-1.

Baseline Study Methodology

Dust Deposition

8.40 Dust monitoring has been undertaken by SLR Consulting at the adjacent Dromkeen Pit.

8.41 Monitoring was undertaken using the 'Bergerhoff method' referred to in the TA Luft Air Quality Standard. The 'Bergerhoff' dust deposition gauge used in the survey comprises a plastic collection bottle with protective basket, mounted on a post and set at 1500mm above ground level. The input of atmospheric borne particular material into the collection bottle takes place over a pre-determined measurement period (usually one month) by exposing it to the environment. The total dust collected in the bottle is expressed as deposition of total particulate matter ($mg/m^2/day$) arising from human activity in the area surrounding the application site.

[4] Environmental Protection Agency, 2016. Air Quality in Ireland 2015 - Key Indicators of Ambient Air Quality. Available at: www.epa.ie/pubs/reports/air/quality/Air%20Quality%20Report%202015.pdf

[5] Environmental Protection Agency, 2016. Ireland's Environment, An Assessment 2016. Available at: http://www.epa.ie/pubs/reports/indicators/SoE_Report_2016.pdf

PM_{10} Monitoring

8.42 The application site and surrounding area fall into Air Quality Zone D, categorised as rural Ireland by the EPA. The nearest PM10 air quality monitoring location within a similar Zone D area is located at Macroom, Co. Cork. As such, it is considered the most appropriate dataset available for assessment of air quality baseline concentrations within the study area.

Sources of Information

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

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

Field Survey / Monitoring / Inspection Works

8.45 Dust deposition surveys were undertaken at the adjacent Dromkeen Pit by SLR Consulting, at monitoring locations shown in Figure 8-1. A survey of the extent of existing residential housing around the application site was also undertaken.

8.46 The locations of the existing dust deposition monitoring D1 and D2 are shown on Figure 8-1.

Background Air Quality

8.47 As previously noted, the closest air quality monitoring location to the site in a similar Zone D area is located at Macroom, Co. Cork. Monitoring stations continuously monitor concentrations of particulate matter with an aerodynamic diameter of less than 10µm (PM10). Recent annual mean concentrations monitored at Macroom (published on the EPA website[6]) are presented in Table 8-3 below.

Table 8-3: Background PM10 Concentrations

Year	Annual Mean (µg/m^3)	Number of Days >50 µg/m^3
2022	16.1	7

8.48 Table 8-3 indicates that PM_{10} concentrations monitored at the Macroom monitoring site are below the annual mean Air Quality Standards (AQS) of 40µg/m^3 and comply with the requirement that a 24-hour mean of 50µg/m^3 should not be exceeded more than 35 times in a calendar year.

[6] Secure Archive for Environmental Research Data – http://erc.epa.ie/safer/

8.49 For rural areas, such as those surrounding the application site, the primary source of PM_{10} would be residential solid fuel emissions and local agricultural or rural based activities for deposited dust.

Dust Deposition Monitoring

8.50 The dust deposition monitoring results from the adjacent Dromkeen Pit recorded over the period 2023 are presented in Table 8-4 below.

Table 8-4: Dromkeen Pit - Dust Deposition Monitoring Results (2023)

MONITORING PERIOD	RESULT (mg/m²/day)	
	D1	D2
18/04/2023-19/05/2023	67	100
19/05/2023-19/06/2023	210	17
19/06/2023-21/07/2023	276	13
21/07/2023 –22/08/2023	50	85

8.51 The dust deposition monitoring results comply with the EPA (2006) / DoEHLG (2004) recommended dust deposition limit value of 350mg/m2/day (total dust deposition averaged over a 30-day period) for the sector, measured at site boundaries using the Bergerhoff Method.

Meteorology : Dispersion of Emissions

8.52 The most important climatological parameters governing the atmospheric dispersion of particles are as follows:

- wind direction determines the broad transport of the emission and the sector of the compass into which the emission is dispersed; and
- wind speed will affect ground level emissions by increasing the initial dilution of particles in the emission. It will also affect the potential for dust entrainment.

8.53 Rainfall is also an important climatological parameter in the generation of dust; sufficient amounts of rainfall can suppress dust at the source and eliminate the pathway to the receptor. According to Arup (1995)[7], rainfall greater than 0.2mm per day is sufficient to suppress dust emissions.

Local Wind Speed and Direction Data

8.54 The closest weather station with sufficient records of wind direction and wind speed considered representative of conditions experienced at the application site is Cork Airport Meteorological Station. A windrose for the average conditions recorded at Cork Airport over a ten-year period is presented in Figure 8-2. The predominant wind direction is from the south-western quadrant.

[7] Arup Environmental, Ove Arup and Partners (1995) The Environmental Effects of Dust from Surface Mineral Workings, HMSO, London (ISBM 11 75 3186 3)

Rainfall Data

8.55 Relevant rainfall data applicable to the overall site has been obtained from the Irish Meteorological Service website for the Cork Airport Metrological Station, located approximately 15km east of the application site. The annual average days with rainfall greater than 0.2mm is 204 days per year. Natural dust suppression (from rainfall) is therefore considered to be effective for 57% of the year.

Sensitive Receptors

Ecological Receptors

8.56 The application site is not subject to any statutory nature conservation designation.

8.57 There is pHNA Bandon Valley below Inishannon site is c. 40 metres from the eastern boundary of the application area at its nearest point, refer to Figure 8-1.

8.58 Based on the nature, size and scale of the planned development, it is considered that the maximum distance for which the project should be evaluated in terms of Natura 2000 (European) sites is up to a maximum radius of 2km unless there are any potential source-pathway-receptor links between the proposed development at Knockroe and any Natura 2000 sites beyond this distance. At a distance greater than 2km, and in the absence of any potential source-pathway-receptor link, it is generally considered that no Natura 2000 or designated sites would be affected by any direct loss of habitat or otherwise impacted upon.

Human Receptors

8.59 Sensitive locations are those where people may be exposed to dust from existing or planned activities. Locations with a high sensitivity to dust include hospitals and clinics, hi-tech industries, painting and furnishing and food processing. Locations classed as being moderately sensitive include schools, residential areas, and food retailers.

8.60 Receptors have been identified within a 500m distance of the application site boundary at Knockroe. The relevant receptors within c. 250 metres are listed in Table 8-5 below and their locations are shown in Figure 8-1.

8.61 There are 8 receptors identified within c. 250m of the application area of the application site, identified in Table 8-5 below.

Table 8-5: Receptors within c. 250m of the Extraction Area

Receptor Reference	Receptor	Sensitivity	Distance (m) / Direction from Site Boundary (approx.)
R1	Residential	Medium	145N
R2	Residential	Medium	180N
R3	Residential	Medium	250 NE
R4	Residential	Medium	290 NE
R5	Residential	Medium	285 NE
R6	Residential	Medium	280 NE
R7	Residential	Medium	285 NE

Receptor Reference	Receptor	Sensitivity	Distance (m) / Direction from Site Boundary (approx.)
pNHA	Ecological	High	40E

Impact Assessment Methodology

Evaluation Methodology

8.62 Fugitive dust emissions and particulate matter arising from the application site activities have the potential to affect existing sensitive receptors in the area due to a potential increase in airborne dust deposition.

8.63 Increased combustion emissions (primarily oxides of nitrogen) from vehicle exhaust emissions associated with the proposed extraction and concrete production activities also have the potential to contribute to local air pollution.

8.64 The significance of impacts due to emissions from the application site are dependent upon the magnitude of the emissions, the prevailing meteorological conditions for the location, and the proximity of sensitive locations to the emission sources.

8.65 This impact assessment is based upon a comparison of the baseline (both current and projected without the new development proposals) situation against the air quality impacts resulting from the 'with development' proposal scenario. The potential for 'in-combination' effects from other planned or proposed sources or air pollutants in the area has also been considered.

8.66 Each of the activities associated with extraction development have been assessed for potential air quality impacts including:

- emissions from preparatory works, including soil stripping (earthworks / trackout);
- emissions from sand and gravel extraction
- PM_{10} contribution from operational activities; and
- traffic exhaust emissions.

8.67 The methodology used in each assessment is presented in the sub-sections below which also provide an explanation of the significance criteria to describe the impacts of the proposed development on air quality.

8.68 For the purposes of environmental assessment of releases of dust from construction and mineral activities, the classifications of PM10 and 'deposited dust' are typically applied. The impacts associated with PM10 are related to potential health impacts while deposited dust is related to potential nuisance effects. The assessment of the potential impacts of each fraction has, therefore, been undertaken separately.

Significance Criteria

8.69 The following air quality specific significance criteria have been used to assess the significance of air quality impacts in preference to overall descriptors of significance.

8.70 To determine the significance of particulate matter effects associated with the development, an evaluation of the sensitivity of the surrounding area is required. Receptors can demonstrate different sensitivities to changes in environment and are classified as per Table 8-6 below (and IAQM Construction Dust Guidance).

Table 8-6: Methodology for Defining Sensitivity to Dust and PM10 Effects

Sensitivity of area	Human receptors	Ecological receptors(a)
Very High	Very densely populated area More than 100 dwellings within 20m Local annual mean PM10 concentrations exceed the Objective -Works continuing in one area of the site for more than 1-year	European Designated sites
High	Densely populated area.--10-100 dwellings within 20m of site. Local annual mean PM10 concentrations close to the Objective (36 – 40µg/m3)	Nationally Designated sites
Medium	Suburban or edge of town Less than 10 receptors within 20m Local annual mean PM10 concentrations below the Objective (30 – 36µg/m3)	Locally designated sites
Low	Rural area; industrial area No receptors within 20m Local annual mean PM10 concentrations well below the Objective (<30µg/m3 -Wooded area between site and receptors	No designations
Notes: (a)-Only applicable if ecological habitats are present which may be sensitive to dust effects.		

8.71 Table 8-7 below illustrates how the interaction of magnitude and sensitivity results in the significance of an environmental effect, with the application of mitigation measures as per the IAQM Construction Dust Guidance.

Table 8-7: Impact Significance Matrix – Dust Effects (With Mitigation)

Sensitivity of surrounding area	Risk of site giving rise to dust or pm10 effects		
	High	Medium	Low
Very High	Slight Adverse	Slight Adverse	Negligible
High	Slight Adverse	Negligible	Negligible
Medium	Negligible	Negligible	Negligible
Low	Negligible	Negligible	Negligible

Soil Stripping Stage Dust Impacts - Methodology

8.72 The Institute of Air Quality Management (IAQM) assessment of risk at construction stage is determined by considering the predicted change in conditions as a result of the proposed development. The risk category for potential effects arising from preparatory site works is earthworks;

8.73 Based on the scale and nature of the works including areas, soils and operations at the site, a dust emission class is defined for each of the activities. These dust emission classes are then used to determine the risk categories presented below. These risk

categories determine the potential risk of dust soiling effects assuming no mitigation measures are applied.

8.74 Table 8-8 illustrates how the interaction of distance to the nearest receptor and the dust emission class results in the determination of risk category from **earthworks activities**.

Table 8-8: Determination of Risk Category from Earthworks Activities

Distance to nearest receptor		Dust emission class		
Human	**Ecological**	**Large**	**Medium**	**Small**
<20	-	High Risk Site	High Risk Site	Medium Risk Site
20 – 50	-	High Risk Site	Medium Risk Site	Low Risk Site
50 – 100	<20	Medium Risk Site	Medium Risk Site	Low Risk Site
100 – 200	20 – 40	Medium Risk Site	Low Risk Site	Negligible
200 – 350	40 – 100	Low Risk Site	Low Risk Site	Negligible

8.75 Mitigation measures are recommended based on the evaluation of risk in accordance with the IAQM Dust and Air Emissions Mitigation Measures Guidance.

Operation Stage Dust Impacts - Methodology

8.76 A detailed dust assessment has been carried out as detailed below. This assessment incorporates both the existing and the proposed development.

8.77 A staged approach has been adopted to the assessment of operations stage impacts generated by sand & gravel extraction activities. This ensures that the approach taken for the assessment of risk is proportional to the risk of an unacceptable impact being caused. As such, where a simple review of the situation shows that risk of a health or nuisance impact is negligible, this will be sufficient. In cases where the risk cannot be regarded as insignificant, a more detailed assessment may be required, such as a quantitative screening assessment or an advanced dispersion modelling exercise, as appropriate.

8.78 Guidance on the assessment of the impacts of extractive operations on air quality has been prepared by the Institute of Air Quality Management (IAQM). This guidance uses a simple distance-based screening process to identify those operations where the dust impacts are unlikely to be significant and therefore require no further assessment. Where assessment that is more detailed is required, a basic assessment framework is presented which employs the Source-Pathway-Receptor approach to evaluate risk of impacts and effects.

8.79 The predicted scale of dust effects may be classified as either ‘significant’, or not ‘significant’. Where effects are predicted to be ‘significant’, further mitigation is likely required before the proposals are to be acceptable.

8.80 A semi-quantitative assessment of fugitive dust emissions from the proposed extraction activities has been undertaken. The assessment has been undertaken by constructing a conceptual model that takes into consideration the potential sources, surrounding receptors, and the pathway between source and receptor in order to assess the magnitude of risk of impact on local amenities.

8.81 The distance from the source to the sensitive receptor is crucial. The initial risk screening stage (Tier 1) focuses upon the potential for dust generation at the site and the distance between source and receptors. In Tier 1 of the assessment, a representative selection of dust sensitive receptors in each direction of the application site is identified within the 1km study area.

8.82 Further assessment is considered to be required for those receptors within c.250m of dust generating activities with both the existing and proposed development being considered, refer to Figure 8-1. Receptors within c.250m of dust generating processes progress onto a Tier 2 assessment. Other residential receptors beyond c. 250m are considered too far away to be impacted by potential dust from the application site and not considered any further in this assessment.

8.83 Tier 2 involves identifying source-pathway-receptor linkages and a semi-quantitative assessment of the likelihood and magnitude of any effects that could be associated with each pollutant linkage. This assessment takes account of:

- wind direction and speed data (to estimate frequency of exposure);
- proximity to source (to estimate magnitude of exposure);
- sensitivity of receptor; and
- occurrence of natural dust suppression (rainfall patterns).

8.84 This information is used to inform a semi-quantitative assessment of the likely magnitude of impact and is based upon professional experience of the assessor as the issue of dust nuisance on local receptors is a subjective issue, where public perception on what constitutes 'acceptable' levels varies from one person to the next. Assigning significance to nuisance impacts is qualitative and involves a judgement based on the likely magnitude, frequency, duration and reversibility (or recovery) of the impact. In this context, significant impact is taken to mean what is generally not publicly acceptable and desirable.

8.85 Note that the Tier 2 risk screening assessment do**es not take into account proposed mitigation measures** to be implemented at the proposed development. These will include provision of perimeter screening berms, dust suppression measures etc., identified in the section dealing with Mitigation Measures later in this Chapter.

8.86 Following the results of the risk assessment, mitigation measures are detailed, and the residual impact assessed. The detailed methodology used within the assessment is described in more detail in Appendix 8-A.

8.87 PM_{10} Contribution from Site-Based Activities : Methodology

8.88 In terms of whether the PM_{10} concentration in the local area is likely to exceed the AQS, the following information has been reviewed:

- existing PM10 concentrations; and
- expected additional contribution of PM_{10} from site operations.

8.89 In terms of estimating the potential magnitude of impact from site operations, a UK edition of the LAQM Technical Guidance (LAQM.TG(03)) stated that fugitive dust from stockpiles and pit operations can potentially contribute up to 5µg/m^3 towards annual mean background concentrations of the coarse fraction of particulates (2.5 – 10µm diameters) in the surrounding area.

8.90 To ensure a robust assessment of potential PM_{10} impacts, the approach is to apply the upper limit of 5µg/m^3 to represent potential future development contribution to annual

background / ambient PM_{10} concentrations to assess whether the Air Quality Standards objective is likely to be exceeded.

Traffic Emissions - Methodology

8.91 Atmospheric emissions related to site proposals are primarily associated with the exhaust emissions from heavy goods vehicles (HGVs). The decision as to whether an assessment of potential impact is required is based upon the criteria set out in the DMRB (Design Manual for Roads and Bridges).

8.92 The criterion for assessment of air quality contained within the latest guidance (LA 105) focuses on roads with relatively high changes in flows or high proportion of HGV traffic. Affected roads are defined as those that meet any of the following criteria:

- road alignment will change by 5m or more; or
- daily traffic flows will change by 1,000 Annual Average Daily Traffic (AADT) movements or more; or
- HGV flows will change by 200 AADT or more; or
- daily average speed will change by 10 km/hr or more; or
- peak hour speed will change by 20km/hr or more.

Assessment Of Impacts

Soil Stripping Stage Impacts – Assessment

8.93 An overview of the sources and processes associated with the preparatory site works and the construction / infrastructure installation activities, and their respective potential for dust deposition (both dust and smaller particles), is presented below in Table 8-9.

Table 8-9: Site Activities: Sources of Dust Emissions

Activity	Source	Emission potential	Comments
Soil Stripping / Restoration	Excavators / Dump Trucks	Medium - dry or fine materials during strong windy weather	Temporary, variable from day to day depending on prevailing meteorological conditions, level, and location of activity.
		Low – coarse or wet materials during conditions of low wind speed	Soils immediately used to construct screening berms, used in restoration works or placed in temporary stockpiles.

8.94 During the site preparatory works (comprising soil stripping, initial sand and gravel excavation, materials transfer, landscaping and restoration works) will be completely confined within the application site.

8.95 Considering this, together with the separation distance to receptors and the boundary screening provided by topography / existing vegetation, the dust risk category for these construction activities is assessed as 'low risk' to 'negligible'. A summary of the determined risk category for the various activities around the application site is presented in Table 8-10 below.

Table 8-10: Site Activities: Risk of Dust Emissions

Source	Risk of dust soiling effects	Ecological effects
Soil Stripping / Earthworks	Negligible - Low	Negligible - Low

Operational Stage Dust Impact – Assessment

8.96 When commenced and operational, the principal air quality impacts generated by the sand & gravel pit and operation activities will be dust and traffic related emissions. An overview of the sources and processes associated with the extraction activities, and their respective potential for dust deposition, is presented Table 8-11 below.

Table 8-11: Sources of Particulate Emissions

Activity	Source	Emission potential	Comments
Material loading to HGV	On-site vehicle, Dry loose material	High when dry material being handled during strong windy weather	Emissions due to prevailing meteorological conditions and amount of dry loose material. Emissions due to re-suspension of loose material on surfaces.

Activity	Source	Emission potential	Comments
Transfer off site / traffic off site	HGV / Road vehicles	Low - on paved road surfaces	Dependent on the amount of loose material on road surface available for re-suspension and track out.

Human Receptors

8.97 A total of 8 receptors were identified within the c.250m study area around the application site. Using the tiered assessment methodology all these receptors located within 250m have progressed onto a Tier 2 assessment as they are considered to have a greater risk of dust impact. Each receptor is assessed against the frequency of exposure and the distance from the source to the receptor (i.e. the pathway) in accordance with the methodology described in Appendix 8-A.

8.98 The frequency of exposure of each receptor is based upon the frequency of winds capable of carrying dust particles blowing in the direction, from the source to the receptor, on days when rainfall does not inhibit dust from becoming airborne. Representative data on the local wind climate is therefore required for this section of the assessment.

8.99 The wind-rose presented in Figure 8-2 (for Cork Airport Meteorological Station) indicates that the predominant wind direction is from the south-west. The potential for the generation of airborne dust will increase with wind speed, with winds greater than 3m/s capable of carrying airborne dust[8].

8.100 A wind rose showing the frequency of winds at wind speeds of greater than 2m/s is presented in Figure 8-2 with the individual frequencies for each 10-degree compass sector used within the assessment. In this assessment, wind speeds over 2m/s were used as this is how the data on percentage occurrence of wind frequency and wind speed is calculated and presented by Met Eireann. For this reason therefore, the impact assessment presented herein is conservative.

8.101 A summary of the risk assessment of dust impacts at the selected Tier 2 properties / locations arising from the proposed development activities (in the absence of any mitigation measures) is presented in Table 8-12 below. The risk assessment was carried out from the using the distance and direction from the overall site extraction boundary, the extraction will be carried out in a number of phases and the assessment represents the worst case scenario.

Table 8-12: Dust Risk Assessment Screening (Without Mitigation Measures)

Receptor reference	Distance from boundary (m)	Relevant wind direction [(a)]	Potential exposure duration [(b)]	Relative wind / distance rank [(c)]	Risk evaluation (without mitigation)
R1	145N	170-190	4.3	2/5	Acceptable
R2	180N	170-190	4.3	2/5	Acceptable
R3	250 NE	230-250	6.4	3/4	Acceptable
R4	290 NE	230-250	6.4	3/4	Acceptable
R5	285 NE	230-250	6.4	3/4	Acceptable

[8] Department of the Environment, Transport and the Regions, 1995. The Environmental Effects of Dust from Surface Mineral Workings – Volume 2. Technical Report. December 1995.

Receptor reference	Distance from boundary (m)	Relevant wind direction [a]	Potential exposure duration [b]	Relative wind / distance rank [c]	Risk evaluation (without mitigation)
R6	280 NE	230-250	6.4	3/4	Acceptable
R7	285 NE	230-250	6.4	3/4	Acceptable
pNHA	40E	260-280	4.7	2/8	Slight Adverse

Table Notes:

[A] – relevant wind direction based on upwind sector which would potentially convey from site towards the receptor.

[B] – Potential duration of exposure based on frequency of moderate to high wind speed (adjusted for dry days only) as described in the methodology in Appendix 8-A.

[C] – Ranking as per methodology in Appendix 8-A

Refer to Figure 8-1 for Receptor Locations

8.102 From Table 8-12 above, it is observed that the risk of impact from dust emissions associated with the proposed development at Knockroe(without any mitigation measures in place) is:

- Acceptable at R1, R2, R3, R4, R5, R6 and R7.
- Slight Adverse at the nearest point of the Bandon Valley below Innishannon pNHA located c. 40 metres from the site.

The risk of impact from dust emissions will therefore be Acceptable or less (Insignificant) for all receptors at a greater distance beyond 250 metres, and there is no requirement for further assessment of these receptors.

8.103 Using the screening assessment tool, the Air Quality Assessment (outlined in Appendix 8-A) considers that there is generally an Acceptable risk that dust may cause an impact at sensitive receptors within 250m of the source of the dust generated activities, without implementation of mitigation measures.

8.104 Note that this assessment **does not take into account** implementation of mitigation measures within the proposed development that will significantly reduce the risk level including provision of strengthened boundary vegetation / screen planting, dust suppression measures etc. (as outlined in the Mitigation Measures section below). The assessment is also considered to be conservative on the basis of the moderate wind speeds included in the risk evaluation and the overall site extraction boundary instead of phased approach.

Traffic Emissions - Assessment

8.105 The maximum number of HGV movements will be one to two HGV trips per hour based on a maximum annual output of 100,000 tonnes per year, 50 week year, 5 day week ,8 hour day and 30 tonne (sand & gravel) HGV loads. The development will also generate a very small volume of light vehicular traffic, principally by employees.

8.106 In view of the fact that none of the roads in the surrounding local road network meet any of the traffic / alignment criteria set out in LA 105, it is considered that the extent of any traffic related change arising from future development activity can be deemed ‘negligible’ in terms of its resultant impact on local air quality and that no further air quality assessment is necessary.

8.107 On this basis, the impact of combustion emissions (primarily oxides of nitrogen) from vehicle exhaust emissions associated with the transfer and/or transportation of materials

are screened out, and it is determined that there is no potential for emissions to contribute to local air pollution.

PM_{10} Contribution from Extraction / Production Activities - Assessment

8.108 In terms of PM_{10}, the maximum annual mean measured baseline background concentration is taken as 16.1 ug/m³ for 2022 at the Macroom monitoring station. Therefore, the potential contribution up of 5 µg/m^3 towards annual mean background concentrations of the coarse fraction (2.5 – 10 µm diameters) of particulates (in the immediate area of the site) is insignificant and well below the annual objective of 40 µg/m^3.

8.109 The potential impacts in relation to increase in ambient PM10 concentrations beyond the site boundary can be classified as 'negligible'.

Unplanned Events (Accidents)

8.110 Accidents, malfunctions and unplanned events refer to events or upset conditions that are not part of any activity or normal operation of the proposed development planned by the Applicant. Even with the best planning and the implementation of preventative measures, the potential exists for accidents, malfunctions or unplanned events to occur during the proposed extraction and concrete production activities.

8.111 Many accidents, malfunctions and unplanned events are, however, preventable and can be readily addressed or prevented by good planning, design, emergency response planning, and mitigation. In terms of air quality impact, the following unplanned events could have an effect on the local area:

- equipment malfunction;
- vehicle collision;
- dry and windy weather conditions with dust suppression equipment malfunction;
- accidental material spillages during transport.

8.112 In relation to air quality, the impacts of any unplanned events are considered to be negligible. If unplanned events were not mitigated, the effects of dust during dry and windy conditions could possibly lead to occasional increases in nuisance dust and 24-hour mean PM10 concentration immediately surrounding the site. However, these are not considered to be significant given the limited duration of such meteorological conditions and the likely limited scale of any incident.

Cumulative / Synergistic Impacts

8.113 In essence, cumulative impacts are those which result from incremental changes caused by other past, present or reasonably foreseeable actions together with those generated by the proposed development. Therefore, the potential impacts of the proposed development cannot be considered in isolation but must be considered in addition to impacts already arising from existing or planned development.

8.114 This air quality impact assessment herein indicates that the planned development activities will not contribute to a significant increase in local air pollution by way of excessive air / dust emissions. The only other significant sources of air emissions approved or planned within 2km of the application site is the adjacent Dromkeen Pit where there are a range of dust suppression and management measures in place and

dust deposition monitoring has demonstrated the operations complete with the dust deposition emission values for the sector as measured at the site boundary. Similar effective measures will be implemented at the proposed development and the cumulative impact of the proposed development is therefore classified as insignificant.

Interaction with Other Impacts

8.115 The potential impact on air quality by the project on sensitive receptors including sensitive ecological receptors and people living in the area has been fully assessed in this chapter. The overall impact of the project on these receptors is further considered in Chapter 4 Population and Human Health and Chapter 5 Biodiversity.

Mitigation Measures

8.116 A range of mitigation measures are recommended for implementation at the application site at Knockroe. Specific dust suppression and mitigation measures are listed in Table 8–13 below:

Table 8-13: Particulate Emission Mitigation Measures

Source / receptor	Emission potential	Recommended mitigation measures	Effectiveness
Excavators / HGV Loading	High – dry or fine material during strong windy weather	Minimise drop heights when handling materials. Dampen materials using water bowser	High
	Low – material of high moisture content during conditions of low wind speed	Minimise drop heights when handling material. Protect from wind where possible.	High
On-site Vehicles	High when travelling over un-surfaced and dry site roads.	Minimise length of on-site haul routes.	High
		Use of water bowser to dampen haul routes during dry weather periods.	High
		Restrict vehicle speeds to less than 20kph. Install signage and undertake staff training.	High
		Routing of traffic and away from any surrounding sensitive receptors.	High
Road Vehicles (transfer off-site)	Low / Moderate on paved road surfaces	Use of road sweeper to reduce the amount of material available for re-suspension, if required.	Moderate / High
		Travel over paved surfaces / access road.	High
		Direct all HGVs through wheelwash facility	High
		Limit mechanical disturbance of materials more likely to become airborne and/or time operations having regard to expected weather conditions	High
Slight Adverse Risk Receptor (pNHA)	High – during dry and strong windy weather	Internal access road and haul roads, with the potential to give rise to dust will be regularly watered as appropriate during dry and/or windy conditions by water bowser.	High

Source / receptor	Emission potential	Recommended mitigation measures	Effectiveness
		Phased work operations and restoration will reduce the impact of the dust emissions.	

Trackout Measures

8.117 When adverse conditions apply (dry, windy weather), water from a bowser will be sprayed on dry unpaved road / track surfaces in order to minimize dust rise. The surfaced section of the internal access road leading in and out of the development will also be sprayed as required.

8.118 All heavy goods vehicles leaving the application site will be routed through the proposed wheelwash facility in order to remove and / or dampen any particulate materials attaching to the undercarriage and to prevent transport of fine particulates off-site, onto the local public road network.

Residual Impact Assessment

8.119 With the range of mitigation measures to be implemented and design measures to be incorporated into the working scheme (phasing of extraction and restoration, refer to Chapter 2 and EIAR Figure 2-4), it is considered that the risk of dust related impacts at receptors generated by the proposed site activities will be further reduced.

8.120 After an assessment of potential adverse effects produced by the development it was concluded that there would be no significant adverse air quality effects for both human and ecological receptors which could cumulatively impact the site or the surrounding area. Overall, the effects of the proposed development on air quality have been considered to be insignificant to acceptable. A summary of the residual dust risk impact assessment at the closest sensitive receptors is provided in Table 8-14 below.

Table 8-14: Residual Dust Risk Assessment (With Mitigation Measures)

Receptor reference	Risk evaluation
R1	Insignificant
R2	Insignificant
R3	Insignificant
R4	Insignificant
R5	Insignificant
R6	Insignificant
R7	Insignificant
pNHA	Acceptable

8.121 Dust impacts on receptors located at distances greater than 250m from the site will be Insignificant or lower.

8.122 On the basis of the assessment presented above, it is concluded that the proposed development, with the range of mitigation measures to be implemented and design measures incorporated into the working scheme, will not have a dust deposition impact on any receptors in the vicinity of the site..

Monitoring

Dust Monitoring Methodology

8.123 Dust deposition monitoring will be undertaken at the application site for the duration of extraction activities at the proposed development (in accordance with EPA and DoEHLG guidelines) using the Bergerhoff Method .

Dust Monitoring Locations

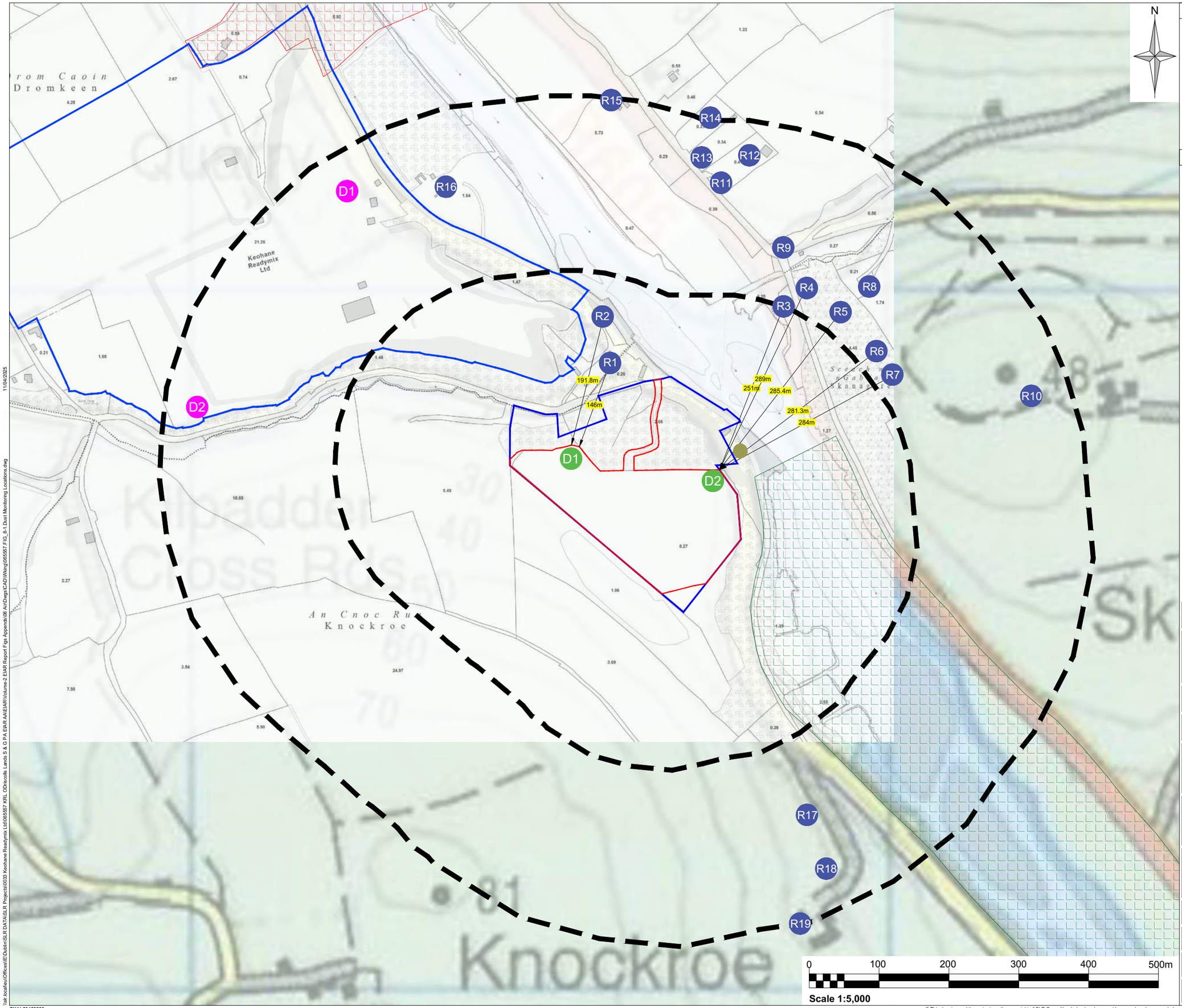
8.124 The proposed Knockroe dust deposition monitoring locations, D1 and D2 are shown on Figure 8-1. Location D1 is representative of the existing site boundary closest to the nearest receptors located to the north of the site. Location D2 is representative of the nearest receptors R3, R4, R5, R6, and R7 located to the north-east / east of the site.

Monitoring Results - Reporting

8.125 Dust monitoring locations shall be reviewed and revised where and as / when necessary. The results of the dust monitoring shall be submitted to Cork County Council on a regular basis for review and record purposes.

Figures

Figure 8-1: Dust Monitoring & Receptor Locations



Notes:

1. EXTRACT FROM TAILTE EIREANN DIGITAL MAPPING 1:2,500 SCALE, MAP. NO. 6578

Legend:

- LAND INTEREST BOUNDARY
- PLANNING APPLICATION AREA (c.4.0 Hectares)
- 250m/500m RADIUS FROM EXTRACTION AREA
- DUST MONITORING LOCATION
- DROMKEEN PIT DUST MONITORING LOCATION
- RESIDENTIAL PROPERTY / RECEPTOR LOCATION
- UNINHABITED PROPERTY
- 001740_BANDON VALLEY ABOVE INNISHANNON PNHA
- 001515_BANDON VALLEY BELOW INNISHANNON PNHA

Rev	Amendments	Date	By	Chk	Auth

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Drawing Status & Suitability Code: **FINAL**

Client: KEOHANE READYMIX LTD.

Project: SAND & GRAVEL PIT
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Drawing Title: DUST MONITORING LOCATIONS & RECEPTORS

Scale		SLR Project No.
1:5,000	@ A3	065557.00001

Designed	Drawn	Checked	Authorised
EW	EW	TP	TP
Date	Date	Date	Date
04/25	04/25	04/25	04/25

Drawing Number: **FIGURE 8-1**

Rev.: **1**

11/04/2025

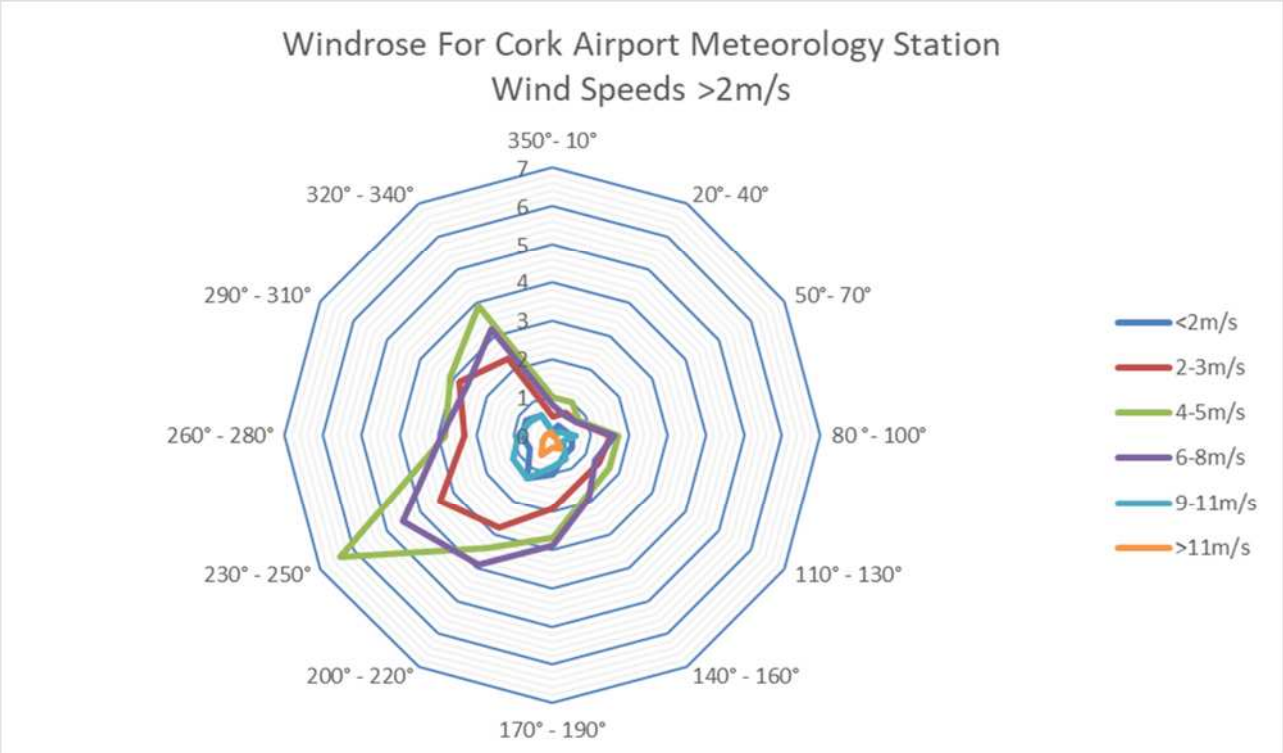
\\slr.local\eu\Offices\IE\Dublin\SLR DATA\SLR Projects\0033 Keohane Readymix Ltd\065567 KRL ODriscolls Lands S & G PA EIAR AA\EIAR\Volume-2 EIAR Report Figs Appends\08 Air\Dwgs\CAD\Wking\065567 FIG_8-1 Dust Monitoring Locations.dwg

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Figure 8-2: Windrose for Cork Airport Meteorological Station



Appendix 8-A Dust Risk Screening Assessment Methodology

The methodology applied in the assessment is a semi-quantitative risk assessment methodology, in which the probability of an impact occurring and the magnitude of the impact, if it were to occur, are considered. This methodology is the Tier 2 assessment of the dust assessment methodology. In the event that identified dust sensitive receptors are not screened out within Tier 1, this approach provides a mechanism for identifying the areas where mitigation measures are required, and for identifying mitigation measures appropriate to the risk presented by the development, (i.e. the assessment does not take account of proposed mitigation being put in place).

The magnitude of the potential risk at each receptor is classified depending on the frequency of exposure and the distance from the site to the receptor. Frequency of exposure is represented by the percentage of moderate to high winds (over 3m/s) from the direction of the site.

The screening assessment tool assesses the significance of the distance from site and the frequency of exposure of each receptor by assigning a ranked number. Receptors with a higher potential for dust impacts would therefore result in a higher value whilst receptors with lower potential would expect to carry a lower value. The value corresponding to an evaluation of risk is a product of the significance of the distance and frequency of exposure, each is assigned a value representing its significance. The multiplication of the two values assigned gives a total, which is then corresponded to a qualitative term of risk magnitude.

Frequency of Exposure Criterion

The potential for any site to emit dust is greatly influenced by weather. Increased wind speed increases the potential for the generation of airborne dust due to the suspension and entrainment of particles in airflow. A worst-case situation would be strong, warm, drying winds which increase the rate at which dust is lifted from an untreated surface and emitted into the air. Wind can also have the effect of spreading dust over a large area. Conversely, rainfall decreases dust emissions, due to both surface wetting and increasing the rate at which airborne dust is removed from air. An article on dust generation from quarry/pit operations[9] suggests that rainfall of greater than 0.2mm per day is considered sufficient to effectively suppress windblown dust emissions.

The frequency of exposure to dust emissions represents the percentage of time that wind speeds capable of carrying airborne dust (greater than 3m/s) are blowing from the site to the direction of the receptor. Frequencies are calculated based on meteorological data. For screening assessment wind speeds greater than 2m/s were considered as this is how data on percentage occurrence of wind frequency and wind speed is calculated and presented by Met Eireann. For this reason, the assessment is considered to be conservative.

For the screening assessment, a value of 1mm would be used for the criteria to classify days as ‘dry’ or ‘wet’; five times the recommended value, using annual average rainfall data. The average number of days when rainfall exceeds 1mm would be provided for each month and calculated over the year to provide an average.

The resulting frequency of moderate to high wind speeds with the potential of carrying airborne dust towards receptors would then be classified into the criteria in Table 8-A-1 with the respective rank value assigned.

[9] Leeds University. Good Quarry. http://www.goodquarry.com/article.aspx?id=55&navid=2

Table 8-A- 1:Frequency of Exposure – Risk Classification

Risk category	Criteria
1	Frequency of winds (>2 m/s) from the direction of the dust source on dry days are less than 3%
2	The frequency of winds (>2 m/s) from the direction of the dust source on dry days are between 3% and 6%
3	The frequency of winds (>2 m/s) from the direction of the dust source on dry days are between 6% and 9%
4	The frequency of winds (>2 m/s) from the direction of the dust source on dry days are between 9% and 12%
5	The frequency of winds (>2 m/s) from the direction of the dust source on dry days are between 12% and 15%
6	The frequency of winds (>2 m/s) from the direction of the dust source on dry days are greater than 15%

Distance to Source Criterion

In assessing dust impacts, the distance from the source to the sensitive location is crucial, as airborne and deposited dust tend to settle out close to the emission source. Smaller dust particles remain airborne for longer, dispersing widely and depositing more slowly over a wider area.

Guidance indicates that larger dust particles (greater than 30µm) will largely deposit within 100m of sources. Smaller particles (less than 10µm) are only deposited slowly. Concentrations decrease rapidly on moving away from the source, due to dispersion and dilution.

To allow for this effect of distance, buffer zones are often defined by mineral planning authorities around potentially dusty activities to ensure that sufficient protection is provided. They have not been established in any rigorous scientific way but usually range from 50m to 200m. The 1995 UK DoE Guidance on dust from surface mineral working's, however, recommends a stand-off distance of 100-200m from significant dust sources (excluding short-term sources), although it is recognised that these distances can be reduced if effective mitigation measures are identified and implemented. In terms of identifying sensitive locations therefore, and to represent an extreme worst-case scenario, consideration only needs to be given to sensitive receptors within c.250m of the site boundary. Receptors at a distance greater than c. 250m have therefore been screened out in Tier 1 of the assessment.

The criteria for classifying the distance from receptor to source and thus assigning a rank value has therefore been based on the various references to dust behaviour described above. The rank classifications are presented below in Table 8-A-2. Risk categories are maintained for receptors in excess of c. 250m for circumstances where although a receptor is beyond c. 250m from the dust source, its sensitivity for example is sufficient for it to be taken onto a Tier 2 assessment.

Table 8-A- 2: Distance to Source – Risk Classification

Risk category	Criteria
1	Receptor is more than 500m from the dust source
2	Receptor is between 400m and 500m from the dust source
3	Receptor is between 300m and 400m from the dust source

Risk category	Criteria
4	Receptor is between 200m and 300m from the dust source
5	Receptor is between 100m and 200m from the dust source
8	Receptor is less than 100m from the dust source

Sensitivity of Receptors

Sensitive locations are those where the public may be exposed to dust from the site. Locations with a high sensitivity to dust include hospitals and clinics, hi-tech industries, painting and furnishing and food processing. Locations classed as being moderately sensitive include schools, residential areas and food retailers. Table 8-A-3 below[10] shows examples of dust sensitive facilities.

Table 8-A-3: Examples of Dust Sensitive Facilities

High sensitivity	Medium sensitivity	Low sensitivity
Hospitals and clinics	Schools and residential areas	Farms
Retirement homes	Food retailers	Light and heavy industry
Hi-tech industries	Greenhouses and nurseries	Outdoor storage
Painting and furnishing	Horticultural land	
Food processing	Offices	

Evaluation of Risk

Once a rank value has been assigned to the frequency of exposure and distance to source, an overall risk can be evaluated by combining the two risk categories, along with consideration of the sensitivity of the receptor. For low sensitivity receptors the risk of dust impact is considered to be significantly lower than for medium and high sensitivity receptors. Therefore, a factor of 0.5 would be applied to the final risk evaluation ranking.

For each receptor, the relative magnitude of risk is given by identifying which of the score categories in Table 8-A-4 it falls into. This final evaluation represents the risk of dust impacts prior to control and mitigation measures being employed on site.

Table 8-A-4: Risk Evaluation Ranking (Without Mitigation)

Magnitude of risk	Score
Insignificant	7 or less
Acceptable	8 to 14
Slight Adverse	15 to 24
Moderate Adverse	25 or more

[10] Ireland M. (1992) "Dust: Does the EPA go far enough?", Quarry Management, pp23-24.

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Figure 9-1: Windrose for Cork Airport Meteorology Station

APPENDICES

Appendix 9-A Climate Change: Legislative Framework/Policy Context
Appendix 9-B Development Vulnerability Assessment Methodology
Appendix 9-C Development Vulnerability Assessment

Introduction

Background

9.1 This chapter of the Environmental Impact Assessment Report (EIAR), prepared by SLR Consulting Ireland, addresses potential effects of sand & gravel extraction at Knockroe, Bandon, Co. Cork.

9.2 The proposed development will comprise:

- Extraction of sand & gravel over an area of c.3.5 Ha.;
- Extraction by dry working to 2 metres above the groundwater level, at a maximum rate of 100,000 tonnes per year;
- Transport of the extracted sand & gravel to the adjacent Dromkeen Pit (Plan. Ref. 23/04780) for use in concrete production;
- Upgrading of the existing internal access road and use of the existing access onto the local road L3204;
- Provision of wheelwash and welfare unit (c.8.3 sq.m);
- Restoration of the lands to agricultural and natural habitat use;
- All within an application area of c.4.0 hectares.

9.3 Permission is sought for 15 years plus two years for final restoration (total duration of seventeen years).

9.4 Further details of the proposed development are provided in Chapter 2 of this EIAR.

Scope of Work

9.5 The following sections of this Chapter describe the potential climate change impacts associated with the proposed sand and gravel development. The following issues are addressed separately:

- climate change legislative framework / policy context;
- analysis of evolving environmental baseline trends;
- identifying climate change concerns in relation to proposed development;
- assessing effects (cumulative effects and uncertainty);
- identifying alternatives and mitigation measures;
- identifying monitoring and adaptive management.

Consultations / Consultees

9.6 No specific consultation has been carried out in relation to this topic.

Contributors / Author(s)

9.7 The climate impact assessment presented in this Chapter was prepared by Tim Paul, Chartered Engineer, SLR Consulting Ireland.

Limitations / Difficulties Encountered

9.8 There are currently no published guidelines and established methodology providing specifically for assessment of climate impacts from sand and graveling activities in Ireland. This Chapter of the EIAR has therefore been prepared based on general cross-sectoral guidance.

Legislative Framework / Policy Context

9.9 In recent years, there has been increasing public awareness about the implications of past, ongoing and continued future emissions of greenhouse gases on the earth's climate. The implications of such change will potentially have significant impact on local communities and national populations across the world. The ever-increasing awareness and acceptance of this reality has, in recent years, prompted significant public policy development around emissions and climate change.

9.10 An overview of the legislative framework and policy context which informs this assessment of potential climate impacts of the proposed development at Knockroe is presented in Appendix 9-A. This provides background detail in respect of the following:

- National Policy on Adaption to Climate Change
  - Sectoral Adaption Plans
  - Local Level Adaption
  - The Climate Change Action Plan 2023
- Regulation / Control of Greenhouse Gas Emissions
  - Paris Agreement (2015)
  - Kyoto Protocol (2008-2012)
  - EU 2021-2030 Targets for non-ETS sector emissions- Effort Sharing Regulations
  - Energy White Paper (2015)
- Future Management of Flood Risk
- EIA Directive 2014/52/EU
- Published Guidelines
  - Guidance on Integrating Climate Change and Biodiversity into EIA
  - Assessing Greenhouse Gas Emissions and Evaluating their Significance
  - Climate Change and Major Projects
  - Sector Planning Guidelines for Climate Change Adaption
  - Local Authority Strategy Development Guidelines.

Cork County Council Climate Adaption Strategy 2019- 2024

9.11 Under the National Adaptation Frameworks (NAF) the Environment Directorate of Cork County Council developed the Climate Adaptation Strategy for Cork County. The strategy establishes an extreme weather event baseline and predicts the challenges and risks that climate change will pose for the county in the future. It

also proposes a series of actions to adapt to those climatic changes which are already taking place.

9.12 Based on the risk register and the priority risks categorised by Cork County Council, seven high level goals were identified:

- Local Adaptation Governance and Business Operations: To support implementations of adaptation planning in all Council activities and operations. To build resilience within Cork County Council to support service delivery.
- Infrastructure and Built Environment: To increase resilience of roads and transport infrastructure and of Council owned assets housing stock.
- Landuse and Development: To integrate climate action considerations into landuse planning.
- Drainage and Flood Management: To adapt to the increased risk and impact of flooding. To liaise and work with other bodies responsible for management of water resources.
- Natural Environment, Built & Cultural Heritage: To develop approaches to protect the natural and key cultural assets in Cork County Council.
- Community, Health & Wellbeing: To build capacity & resilience within communities in regard to climate adaptation.
- Other Sectors & Agencies: To collaborate with other Sectors and Agencies in programs relating to climate action and adaptation planning.

Receiving Environment

Climate Environmental Baseline

Regional Context

9.13 Observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising sea level are unequivocal evidence of warming of the climate system globally. Global mean temperature has increased by 0.8°C compared with pre-industrial times for land and oceans, and by 1.0°C for land alone. Most of the observed increase in global average temperatures is very likely due to increases in anthropogenic greenhouse gas concentrations.

9.14 In future years, landmasses are expected to warm more than the oceans at northern middle and high latitudes. Despite possible reductions in average summer precipitation over much of Europe, precipitation amounts exceeding the 95th percentile are very likely in many areas; thus, episodes of severe flooding may become more frequent despite the general trend towards drier summer conditions. In an ensemble-based approach using outputs from 20 global climate models (GCMs), the Mediterranean, north-east and north-west Europe are identified as warming hot spots but with regional and seasonal variations in the pattern and amplitude of warming. Regional climate models (RCMs) also project rising temperatures for Europe until the end of the 21st century, with an accelerated increase in the second half of the century.

9.15 For precipitation, the larger-scale summer pattern shows a gradient from increases in Northern Scandinavia to decreases in the Mediterranean region. By contrast, increases in wintertime precipitation primarily north of 45°N are a consistent feature of RCM projections over Europe, with decreases over the Mediterranean. Overall,

then, there are consistent projections of change for northern and north-west Europe, including Ireland.

9.16 Ireland has a typical maritime climate, with relatively mild and moist winters and cool, cloudy summers. The prevailing winds are south-westerly in direction. The climate is influenced by warm maritime air associated with the Gulf Stream which has the effect of moderating the climate, and results in high average annual humidity across the country. The area of least precipitation is along the eastern seaboard of the country, in the rain shadow of the Leinster uplands.

9.17 Mean seasonal temperature will change across Ireland. Several studies have applied selected IPCC Special Reports on Emissions Scenarios (SRESs) to model climatic changes across Ireland at a regional scale. Despite the different methods and scenario combinations used, there is agreement in projected changes in temperature for Ireland. However, there are more disparities in the magnitude and sign (i.e. +/-) for the precipitation changes projected for the island.

9.18 **Table 9-1** summarises climate impact projections for Ireland, estimates of projections confidence are derived from published projection data from the Local Authority Adaptation Strategy Development Guidelines1.

Table 9-1: Climate Impacts Projections : 30-Year Overview[1]

Variable	Summary	Confidence	Projected Changes
Sea Levels Rise	Strong increase	High	Projections of sea level rise to 2100 suggest a global increase in the range of 0.09-0.88 m with a mean value of 0.48 m. For 2050, it is reasonable to assume a sea level rise in the region of 25 cm above present levels. It should be noted that due to a limited understanding of some important effects that contribute to rates of increase, these estimates of sea level rise may prove optimistic, and estimates of up to 4-6 m have been projected by some models.
Storm Surge	Strong increase	Medium	An increase in the number of intense cyclones and associated strong winds are expected over the north - east Atlantic. By the 2050s, storm surge heights in the range of 50-100 cm are expected to increase in frequency for all coastal areas with exception of the southern coast.
Coastal Erosion	Moderate increase	Low	Currently approximately 20% of Ireland's coastline is at risk of coastal erosion, particularly areas of the south and east coast and in isolated areas on the west coast. Rates of increase will be determined by local circumstances; however, it is expected that areas of the south-west are likely to experience the largest increase.
Cold Snaps / Frost	Moderate decrease (winter/night)	High	By mid-century, minimum temperatures during winter are projected to increase by ~20C in the southeast and ~2.90C in the north. This change will result in fewer frost days and milder night-time temperatures.
Heatwaves	Strong increase (summer)	High	Seven significant heatwaves (defined as 5+ days@>250C) have been recorded in Ireland over the past 30 years, resulting in approximately 300 excess

1

Variable	Summary	Confidence	Projected Changes
			deaths. By mid-century, a projected increase in summer maximum daily temperature of approximately 20C will likely intensify heatwaves, with maximum temperatures increasing and heatwave duration lengthening.
Dry Spells	Strong increase (summer)	Medium	There have been eight periods of insignificant rainfall in Ireland in the past 40 years. Of these, the events of 1976, 1995 and 2018 were the most severe, averaging 52, 40 and 54 days in duration respectively across Irish rainfall stations. An approximate 20% decrease in summer precipitation in many areas is strongly indicated under a high emissions scenario. This decrease is likely to result in progressively longer periods without significant rainfall, posing potentially severe challenges to water sensitive sectors and regions.
Extreme Rainfall	Strong increase (winter)	Low	Heavy precipitation days (in which more than 20mm of rain falls) are likely to increase in frequency in winter. By the 2050s an increase in the number of heavy precipitation days of around 20% above the level of 1981-2000 is projected under both low-medium and high emissions scenarios. This may have serious consequences for flood risk in sensitive catchments.
Flooding	Moderate increase (winter)	Low	An Irish Reference Network of hydrometric stations has been established to assess signals of climate charge in Irish hydrology. This network has detected an increasing trend in high river flows since 2000. Projections of future flows are beset by uncertainty at the catchment scale, but a broad signal of wetter winters and drier summers is evident across a number of independent studies.
Wind Speed	Minor increase (winter)	Medium	Observed wind speed over Ireland has not changed significantly in recent times, but it is anticipated that the distribution of wind will alter slightly in future, with winters marginally windier and summers marginally less so. Though the average wind speed is anticipated to change in only a minor way over the coming decades, the frequency of extreme windstorms is expected to increase due to alternations in the origin and track of tropical cyclones.

Local Context

9.19 The weather station at Cork Airport which is located approximately 15 km to the north-east of the application site is considered representative of conditions experienced at the application site.

Temperature

9.20 The moderating influence of the Atlantic Ocean is felt throughout Ireland. The annual mean temperature for different areas in Ireland varies between mountainous regions, lowlands, and the coast. Mean daily maximum temperatures are typically between 8.2 to 18.7°C and mean daily minimum temperatures are typically between 3.0 to 11.8°C.

9.21 The mean daily duration recording of sunshine for the area around Cork Airport is 3.9 hours. December is the dullest month, with 1.7 hours for Cork Airport of mean daily duration. May is the sunniest month, with 6.2 hours for Cork Airport and of mean daily duration, explained largely by its long days and finer weather.

Table 9-2: Cork Airport 1981 – 2010 (LTA), 2022, 2021, and 2020 Temperature Averages

	2022Celsius)												
	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Year**
Mean Daily Max	9.1	10.1	11	12.5	15.7	17	20	21.7	17.3	14.6	11.3	7.2	14.0
Mean Daily Min	3.8	3.9	3.6	5.5	8.5	9.7	12.3	12.4	10.3	9.2	6.3	2.2	7.3
Mean Temp	6.5	7.0	7.3	9.0	12.1	13.4	16.1	17.1	13.8	11.9	8.8	4.7	10.7
	2021												
Mean Daily Max	7.2	8.2	10.3	11.2	13.1	17.5	20.4	18.6	17.4	14.2	10.9	9.5	13.2
Mean Daily Min	2.2	3.4	4.4	4.1	5.9	10	12.9	12.1	11.7	8.4	5.6	5.9	7.2
Mean Temp	4.7	5.8	7.3	7.7	9.5	13.7	16.6	15.4	14.6	11.3	8.2	7.7	10.2
	2020												
Mean Daily Max	8.7	9	9.6	13.1	15.1	16.9	18.5	18.9	16.8	12.7	10.8	7.9	13.2
Mean Daily Min	3.6	3	2.7	6	7.8	10.2	11.2	12.2	10.1	6.6	5.8	3	6.85
Mean Temp	6.2	6.0	6.1	9.6	11.4	13.6	14.8	15.5	13.5	9.7	8.3	5.5	10.0
	Long Term Averages (1981 – 2010)												
Mean Daily Max	8.2	8.3	9.9	11.8	14.4	17	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 Temp	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

Wind

9.22 Results from the synoptic meteorological station at Cork Airport, located approx. 15 km north-east of the application site over the period 1990-2007, indicate that the main wind direction is from a west and south-westerly direction, with an annual incidence of 37.9% for winds between 200° and 280°; and 30% for winds between 290º and 0º refer Figure 9-1. The lowest frequency is for winds blowing from the east and northeast direction.

9.23 The mean yearly wind speed at Cork Airport over the period 1981 to 2010 is 10.5 knots, or 5.4 m/s, with maximum gusts of 65.9 knots or 33.9 m/s. The average number of gale days per year is 10.8; indicating that the area is “windy”, without experiencing the extreme gusts that occur on the west coast (**Table 9-3**).

Table 9-3: Cork Airport Wind 1981-2010

WIND (knots)	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec	Year
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	78.0	83.0	70.0	62.0	59.0	49.0	57.0	54.0	58.0	75.0	66.0	80.0	65.9

WIND (knots)	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec	Year
Max. mean 10-minute speed	52.0	54.0	43.0	40.0	40.0	33.0	40.0	38.0	39.0	48.0	46.0	56.0	44.1
Avg. 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

Rainfall / Precipitation

9.24 During the period 1981-2010, long-term monthly rates of precipitation were between 76.5 mm and 133.1 mm at the Cork Airport station, with winter months receiving the heaviest amounts. The mean of the Met Eireann records indicates that average annual rainfall around Cork Airport is approximately 1227.9 mm / year; refer to **Table 9-4**. The average rainfall data indicates that the greatest daily total (73.2 mm) falls in the month of July.

Table 9-4: Average Precipitation Cork Airport (mm) 1981-2010

	Rainfall (mm)												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
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 num. of days with ≥ 0.2mm	20	17	19	16	15	14	15	15	16	19	19	19	204

9.25 Rainfall is an important climatological parameter in the generation or control of dust; enough rainfall can suppress dust at the source and eliminate the pathway to the receptor. According to Arup Consulting Engineers (1995)[2], rainfall greater than 0.2 mm per day is sufficient to suppress dust emissions – refer to EIAR Chapter 8 (Air Quality). For the 30-year period (1981-2010) Cork Airport has recorded an average of 204 days per year (55%) where rainfall is equal to or above 0.2mm.

Impact Assessment

Methodology

9.26 In Ireland some sectors have independently begun the process of identifying key vulnerabilities for their activities. The report by the Irish Academy of Engineering, Ireland at Risk Critical Infrastructure – Adaptation for Climate Change (The Irish Academy of Engineering, 2009) and the report by the Heritage Council and Fáilte Ireland (the National Tourism Development Authority), Climate Change, Heritage and Tourism, Implications for Ireland's Coast and Inland Waterways (ed. Kelly and Stack, 2009) are examples of initiatives of this kind.

[2] Arup Environmental. Environment Effects of Surface Mineral Workings. UK DoE, October 1995

9.27 Other research work on adaptation in specific sectors has been carried out or commissioned by other Government Departments/bodies such as the OPW, CoFoRD (programme of competitive forest research for development research programme, etc. (e.g. CLIMADAPT).

9.28 A National Climate Change Vulnerability Scoping Study (Sweeney and Coll, 2012) was undertaken to identify first generation vulnerabilities for Ireland based on a sensitivity analysis across key sectors. The analysis identified a clustering of impacts and their importance in relation to an assessment of likely resilience by sector. The assessment methodology used was an impacts-first, science-first classical approach. The priority sectors identified are biodiversity and fisheries; water resources and the built coastal environment; forestry and agriculture.

9.29 As each sector develops its sectoral adaptation plan (under the Climate Action and Low Carbon Development Act 2015), detailed vulnerability and risk analysis will be required. Some preliminary work has been undertaken on costing the impacts of climate change in Ireland. This is now being supported by more detailed analysis of the current and future costs of flood risk management.

9.30 The implementation of adaptation is being supported by the development of a suite of guidelines, tools, and approaches. These include the Local Authority Adaptation Strategy Development Guideline; and the Irish climate information platform “Climate Ireland”, which includes data, information, tools, and approaches for local level adaptation decision making. Work is ongoing to develop sectoral decision-making tools and supports.

9.31 There are no specific tools developed for assessing climate change for extraction industry. The Climate Change and Major Project guidelines on how to make investments resilient to climate change provides a methodology for undertaking a vulnerability and risk assessment.

9.32 Climate change adaptation and mitigation re to be increasingly integrated in the preparation and approval of proposed development. Adaptation seeks to ensure adequate resilience of proposed development to the adverse impacts of climate change based on Vulnerability. Mitigation seeks to reduce the emissions of greenhouse gases.

Development Vulnerability

9.33 The aim of the vulnerability assessment is to identify the relevant climate hazards foreseen at the development location. Main steps include identifying and combining the sensitivity and exposure of the project which will describe the vulnerability, while the risk will be determined by likelihood and impact. Adaptation through project options, appraisal, and planning will depend on the assessed project vulnerability and risk.

9.34 Timescale for the project vulnerability and risk assessment shall correspond to the lifespan of the project. During the lifespan, there could be significant changes in frequency and intensity of weather events due to climate change, which should be considered. Detailed methodology charts for development vulnerability assessment are presented in Appendix 9-B.

Greenhouse Gases Emissions

9.35 All projects have the potential to emit greenhouse gas (GHG) emissions to atmosphere during the construction, operational and decommissioning phase of the development. Direct GHG emissions may be caused by operational activities and

project commissioning / decommissioning. Indirect GHG emissions may be due to increased demand for energy and indirect GHG generating activities. Indirect GHG activities linked to the development projects may include transport, space heating of buildings / offices or loss of habitats that provide carbon sequestration, (e.g., through land-use change).

9.36 The significance of a project's GHG emissions should be based on its net impact, which may be positive or negative. Where GHG emissions cannot be avoided, the significance of a project's emissions shall be reduced by mitigation or project design. Where GHG emissions remain significant but cannot be reduced further approaches to compensate project emissions should be considered.

9.37 Currently in Ireland, there is no set methodology to evaluate significance criteria or a defined threshold for GHG emissions for the mineral extraction industry. Due to the inconsistences between the different methods and their assumptions for assessment, there is no single agreed method by which to assess a project carbon budget. The method of assessment varies according to the type and scale of the development.

9.38 Due to a lack of guidelines and an established methodology, the assessment of significance of the GHG emissions is based on whether the development's GHG emissions cumulatively represent a considerable contribution to the global atmosphere and whether the development as continued or extended will replace existing development that would have a higher GHG profile.

9.39 Where the GHG emissions cannot be avoided, the mitigation should aim to reduce the development emissions at all stages.

Development Vulnerability Assessment

9.40 The aim of the vulnerability assessment is to identify the relevant climate hazards for the project at the foreseen location. A development vulnerability assessment for the proposed development is presented in **Appendix 9-C**.

9.41 Based on the development vulnerability assessment, measures to improve the resilience of the project to extreme rainfall, flash flood, storms, and winds are required.

Greenhouse Gas Emissions Assessment

9.42 For this assessment, GHG emissions have been calculated for the proposed development based on annual energy use at the proposed development at Knockroe in future years.

9.43 For the purposes of this climate assessment, it has been assumed that the projected traffic movements associated with the sand and gravel extraction activities will generate one to two HGV trips per hour based on a maximum annual total output of 100,000 tonnes per year, 50-week year, 5.day week ,8-hour day and 30 tonne (sand & gravel) HGV loads.

9.44 It has also been assumed that the average distance travelled for each delivery will be 0.5km each way to the adjacent Dromkeen Pit for processing (or 1km in total for each return trip).

9.45 It is estimated that up to c. 100 litres of diesel will be consumed each week (for 50 weeks per year) to power machinery on site.

9.46 Total annual GHG emissions associated with the proposed site activities are presented in **Table 9-5**.

Table 9-5: GHG Emissions Calculations

Type	Annual No	Distance (km)	Conversion factor (CO_2e)	Calculated CO_2e kg	Total annual CO_2e kg
Traffic (return trip)	3,334	1.0	0.71266 kg/km	2,376	-
Energy (Diesel on site machinery)	5,000 litres		2.60016 kg/litre[a]	13,001	-
Total					15,337
[a] Conversion factor for 2020 Primary Energy Conversion SEAI: diesel (kg/litre)					

9.47 Based on the calculated total of 15,337 CO_2eq kg (c. 15.337 tonnes of CO_2eq) and a comparison to Ireland's 2023 emissions value of 55.01 MTonnes of CO_{2e}, it is assessed that proposed operations would be a maximum of 0.000028% of Ireland's annual CO_{2e} emissions for the duration (i.e. insignificant)

9.48 Based on the scale and extent of proposed activities, GHG emissions generated by the proposed development are assessed as insignificant, not making a significant contribution to the global atmosphere.

Mitigation

9.49 Mitigation is designed to increase the resilience of the development, or wider environmental receptors, to climate change and focuses on increasing capacity to absorb climate related shocks.

Project Adaptation against Expected Climate Change Effects

9.50 In the context of climate change, measures to increase the adaptive capacity of the proposed development and disaster risk reduction strategies can be developed with a view to reducing vulnerability and increasing its resilience. Significant incidents related to the climate change that affect operation of the proposed development should be recorded for future analysis.

9.51 Based on a development vulnerability assessment (refer to **Appendix 9-C**), measures to improve the resilience of the project to extreme rainfall, flash flood, storms, and winds are and will be implemented. **Table 9-5** details specific mitigation measures for the proposed development relating to climate change adaptation.

Table 9-6: Mitigation Measures Related to Climate Change Adaptation

Main Concerns Related to:	Proposed Alternatives or Mitigation Measures
Extreme Rainfall, Flash Flood	
	Continuation of existing natural drainage. No discharge to surface waters arising from the development.
Storms and Winds	Implement procedures to facilitate operational shutdown where required during extreme weather conditions.
	Ensure the selection, design, operation, and maintenance of machinery meets required standards.
Risk Reduction Mechanism	Secure and maintain insurance for site assets and operations.

Proposed Reduction of GHG Emissions

9.52 The Applicant will implement a GHG monitoring programme at Knockroe. Based on the GHG monitoring results, the company will establish short, medium, and long-term objectives and targets for a GHG reduction programme and energy management plan.

9.53 **Table 9-6** details specific mitigation measures for the Knockroe site in respect of the GHG reduction programme.

Table 9-7: Mitigation Measures Related to GHG Reduction Programme

Main Concerns Related to:	Proposed Alternatives or Mitigation Measures
Direct GHG emissions	Use energy efficient machinery / energy, consider future use of electric machinery where practical.
GHG emissions related to transport	Unnecessary equipment / transport journeys should be avoided by management of transport and travel demands. Equipment should not be left in un-necessary idling mode.

Accidents, Malfunctions and Unplanned Events

9.54 Accidents, malfunctions, and unplanned events refer to events or upset conditions that are not part of any activity or normal operation of the proposed development planned by the Applicant. Even with the best planning and the implementation of preventative measures, the potential exists for accidents, malfunctions, or unplanned events to occur during the proposed extraction.

9.55 Many accidents, malfunctions and unplanned events are, however, preventable and can be readily addressed or prevented by good planning, design, emergency response planning, and mitigation. In terms of climate change impact, the following unplanned events could influence the local area:

- equipment malfunction;
- vehicle collision;
- accidental material spillages during transport;

9.56 In relation to climate change, the impacts of any unplanned events are deemed to be negligible.

Monitoring

Project Adaptation against Climate Change Effects

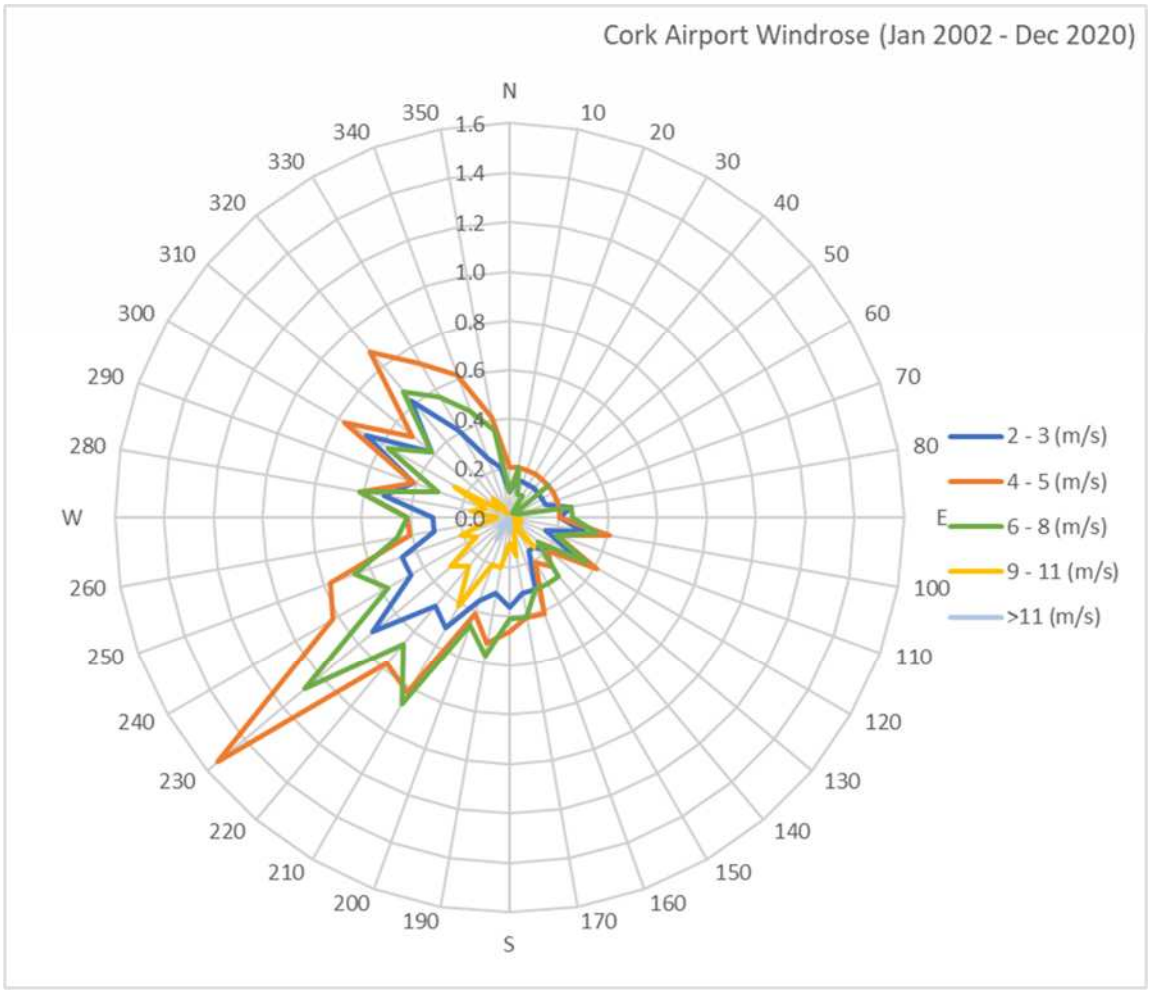
9.57 A framework shall be developed to assess project preparedness for adaptation against climate change. Provision shall be made for a periodic review of plans and the allocation of reporting responsibilities for a regime to measure and evaluate progress on adaptation. This will be documented in the Environmental Management System (EMS).

GHG Emissions

9.58 Monitor, report, and review progress in achieving GHG reductions at the development. This will be documented in the EMS.

Figures

Figure 9-1: Windrose for Cork Airport Meteorology Station



Appendix 9-A Climate Change: Legislative Framework/Policy Context

Introduction

In recent years, there has been increasing public awareness about the implications of past, ongoing and continued future emissions of greenhouse gases on the earth's climate. The implications of such change will potentially have significant impact on local communities and national populations across the world. The ever increasing awareness and acceptance of this reality has, in recent years, prompted significant public policy development around emissions and climate change.

An overview of the legislative framework and policy context which informs this assessment of the potential climate impacts of the proposed development at the proposed Knockroe sand and gravel extraction is presented herein below.

National Adaptation to Climate Change

The Irish National Policy Position establishes the fundamental national objective of achieving transition to a competitive, low carbon, climate-resilient and environmentally sustainable economy by 2050. It sets out the context for the objective; clarifies the level of GHG mitigation ambition envisaged; and establishes the process to pursue and achieve the overall objective. Specifically, the National Policy Position envisages that policy development will be guided by a long-term vision based on:

- an aggregate reduction in carbon dioxide (CO2) emissions of at least 80% (compared to 1990 levels) by 2050 across the electricity generation, built environment and transport sectors;
- in parallel, an approach to carbon neutrality in the agriculture and land-use sector, including forestry, which does not compromise capacity for sustainable food production.

The evolution of climate policy in Ireland will be an iterative process based on the adoption by Government of a series of national plans over the period to 2050. Greenhouse gas mitigation and adaptation to the impacts of climate change are to be addressed in parallel national plans – respectively through National Mitigation Plans and National Climate Change Adaptation Frameworks. The plans will be continually updated, as well as being reviewed on a structured basis at appropriate intervals, and at a minimum, every five years. This will include early identification and ongoing updating of possible transition pathways to 2050 to inform sectoral strategic choices.

The Climate Action and Low Carbon Development Act 2015[3] was enacted in December 2015. The Act identified and provided for the development and submission to Government of national mitigation and adaptation plans. It also established the institutional and governance framework within which these plans can be developed and implemented on a cyclical basis.

The Department of Communications, Climate Action and Environment (DCCAE) published a National Adaptation Framework (NAF) in January 2018[4]. The NAF sets out the national strategy to reduce the vulnerability of the country to the negative effects of climate change and to avail of positive impacts.

The NAF builds on the work already carried out under the National Climate Change Adaptation Network (NCCAF, 2012). Under the NAF a number of Government Departments will be required to prepare sectoral adaptation plans in relation to a priority area that they are

[3] https://www.dccae.gov.ie/en-ie/climate-action/legislation/Pages/Climate-Action-and-Low-Carbon-Development-Act-2015.aspx

[4] https://www.dccae.gov.ie/en-ie/climate-action/topics/adapting-to-climate-change/national-adaptation-framework/Pages/default.aspx

responsible for. Local authorities are required to prepare local adaptation strategies NAF also aims to improve the enabling environment for adaptation through ongoing engagement with civil society, the private sector and the research community.

The Climate Action and Low Carbon Development (Amendment) Act 2021 was signed into law by the President of Ireland on the 23rd of July 2021 enacting the pursuit of a higher level of climate action targets and ambition over the next decades including for the local government sector. The Act provides for approval of plans, by the government, towards achieving the National Climate Objective. The National Climate Objective refers to the transitioning of the country to a climate resilient, biodiversity rich, environmentally sustainable, and climate neutral economy by no later than 2050. The Act introduces the development of carbon budgets and sectoral emission ceilings covering successive five-year periods up to 2050. The Act states that carbon budgets for the purpose of achieving the National Climate Objective shall be proposed by the Climate Change Advisory Council and approved by government for a five-year period with new budgets introduced for each subsequent 5-year period thereafter. The first two carbon budget cycles will be aimed towards achieving a 51% reduction in greenhouse gas emissions by the end of 2030, using 2018 as the baseline year.

The Act also tasks the government with the development of a National Long-Term Climate Action Strategy, covering a minimum period of 30 years, and a National Adaptation Framework. The Long Term Climate Action Strategy will be updated every 5 years taking account of how the country is progressing towards the National Climate Objective. Additionally, the government is required to update the Climate Action Plan 2019: To Tackle Climate Breakdown on an annual basis.

Within 12 months of the enactment of the Act, local authorities will be requested by the Minister to prepare and make Local Authority Climate Action Plans. These Plans are to highlight the mitigation and adaptation measures that will be adopted during the next 5-year period. Local Authority Climate Action Plans are to be consistent with the most recently approved Climate Action Plan and National Adaptation Framework and have regard for the most recently approved Long-Term Climate Action Strategy, the most recently approved Sectoral Adaptation Plans, the National Planning Framework and any current Climate Change Policies. Local authorities are to cooperate with adjoining local authorities in the development of their Climate Action Plans. A further provision of the Bill provides that the Minister may issue guidelines in respect of the content and preparation of the local authority climate action plans and that local authorities shall comply with these guidelines.

The Climate Action and Low Carbon Development (Amendment) Act 2021 also included an amendment of Section 10(2) (n) of the Planning and Development Act 2000 whereby, to reduce anthropogenic greenhouse gas emissions as well as addressing adaptation requirements, County Development Plans will need to take account of Local Authority Climate Action Plans.

Sectoral Adaptation Plans

Under the National Adaptation Framework (NAF), Government Departments have to prepare Sectoral Adaptation Plans. Twelve sectors under 7 Government Departments will prepare plans. The deadline for submitting plans to Government is 30 September 2019. The sectors are :

- Seafood - Department of Agriculture, Food and the Marine;
- Agriculture - Department of Agriculture, Food and the Marine;
- Forestry - Department of Agriculture, Food and the Marine;
- Biodiversity - Department of Culture, Heritage and the Gaeltacht;

- Built and Archaeological Heritage - Department of Culture, Heritage and the Gaeltacht;
- Transport infrastructure - Department of Transport, Tourism and Sport;
- Electricity and Gas Networks - Department of Communications, Climate Action and Environment;
- Communications networks - Department of Communications, Climate Action and Environment;
- Flood Risk Management - Office of Public Works;
- Water Quality - Department of Housing, Planning and Local Government;
- Water Services Infrastructure - Department of Housing, Planning and Local Government;
- Health - Department of Health.

The aggregate and extractive industries were not specifically required under the National Adaptation Framework (NAF) to prepare sectoral adaptation plans in line with the requirements of the Climate Action and Low Carbon Development Act.

Under the non-statutory 2012 Framework, four Government Departments prepared draft sectoral plans covering 5 sectors. These plans are :

- Sectoral Adaptation Plan for Flood Risk Management (OPW, 2015);
- Adaptation Planning - Developing Resilience to Climate Change in the Irish Agriculture and Forest Sector (DAFM, 2017);
- Adaptation Planning - Developing Resilience to Climate Change in the Irish Transport Sector (DTTAS, 2017);
- Adaptation Plan for the Electricity and Gas Networks Sector (DCCAE, 2017).

Government Departments must develop statutory sectoral adaptation plans in accordance with the NAF and with a six-step adaptation planning process described in Sectoral Planning Guidelines for Climate Change Adaptation. This Department published the guidelines for the use of the sectors required to prepare statutory sectoral adaptation plans under the Framework. The guidelines aim to ensure that a coherent and consistent approach to adaptation planning will be adopted by the key sectors in Ireland. Completed plans could include actions that :

- Integrate adaptation into key sectoral plans and policies;
- identify and understand the key vulnerabilities, risks, and opportunities facing their sectors. This should include major cross cutting risks;
- ensure that plans related to emergencies assigned to a sectoral department as lead Government department under the Strategic Emergency Planning Guidelines are climate proofed;
- identify and collect information on the costs and benefits of adaptation within their sectors;
- build capacity within their sectors to cope with climate change;
- identify and address key research gaps within their sectors;
- improve co-ordination with the local government sector;
- develop appropriate monitoring and verification systems within their sectors.

Local Level Adaptation

The National Adaptation Framework identifies the critical role to be played by local authorities in addressing climate change adaptation. This will effectively build on their existing expertise and experience as first responders in emergency planning scenarios. Under the NAF each local authority will also be developing their own adaptation strategies in line with guidelines developed for the sector. Local authorities had been set a deadline for the completion of local adaptation strategies of 30 September 2019.

The NAF explores how local authorities might adopt a joint or regional approach to adaptation planning. In January 2018 the DCCAE entered into a five-year financial commitment of €10m to establish four Climate Action Regional Offices (CAROs). Building on a business case prepared by the local government sector itself, this commitment recognises the significant obligation which has been placed on local government to develop and implement its own climate action measures, as well as the need to build capacity within the sector to engage effectively with climate change – both in terms of mitigation and adaptation.

The Climate Action Regional Offices are being operated by a lead local authority in four different regions that have be grouped together based on a climate risk assessment with a focus on the predominant risk(s) in each geographical area. The establishment of these offices will enable a more coordinated engagement across the whole of government and will help build on the experience and expertise which exists across the sector.

The Climate Change Action Plan 2023 (CAP 2023)

Published in December 2022, CAP 2023 is the second annual update to Ireland's Climate Action Plan 2019, and in line with the requirements of the Climate Action and Low Carbon Development (Amendment) Act 2021. This plan sets a roadmap for taking decisive action to halve Irelands emissions by 2030 and reach net zero no later than 2050.

The Plan sets out indicative ranges of emissions reductions targets for each sector of the economy and actions to achieve these. In relation to local authorities, the Plan states:

The Climate Action Regional Offices will continue to play a central role in supporting and coordinating climate action by local authorities including developing capacity through training; supporting behavioural change initiatives; identifying and sourcing funding opportunities; and measuring and recording performance.

- Each local authority will prepare a Climate Action Plan at least once every five years, containing both mitigation and adaptation measures.
- Each local authority will develop a decarbonisation zone within its administrative area that will become the focus for a range of climate mitigation, adaptation and biodiversity measures.
- This process will include the identification of projects and their associated outcomes that will contribute to achieving our national climate target.

Table 9-A-1 summarises the adaptation actions to climate change in Ireland.

Table 9-A-1: Summary of Adaptation to Climate Change Actions in Ireland[5]

Item	Status	Programs
National Climate Adaptation Strategy	Legislation enacted.	Climate Action and Low Carbon Development Act 2015 National Adaptation Framework

[5] http://climate-adapt.eea.europa.eu/countries-regions/countries/ireland

Item	Status	Programs
	Statutory Framework adopted	Climate Action and Low Carbon Development (Amendment) Act 2021
Action Plans	Sectoral Adaptation Plans in development. Local authority plans in development.	Local Authority Adaptation Strategy Development Guidelines (2016) Sectoral Planning Guidelines for Climate Change Adaptation Local Authority Adaptation Support Tool The Climate Change Action Plan 2021
Impacts, Vulnerability and Adaptation Assessments	National Vulnerability Assessment	2012 National Climate Change Vulnerability Scoping Study Climate Change Impacts on Biodiversity in Ireland (2013) Climate change Impacts on Phenology in Ireland(2013) COCOADAPT (2013) 2013 HydroDetect Project Robust Adaptation to Climate Change in the Water Sector in Ireland (2013) Ensemble of Regional Climate Projections for Ireland(2015) Urb-ADAPT Sectoral Adaptation Plan for Flood Risk Management (OPW, 2015) Adaptation Planning - Developing Resilience to Climate Change in the Irish Agriculture and Forest Sector (DAFM, 2017) Adaptation Planning - Developing Resilience to Climate Change in the Irish Transport Sector (DTTAS, 2017) Adaptation Plan for the Electricity and Gas Networks Sector (DCCAE, 2017)
Research Programs	EPA Research Programme (Climate Pillar)	http://www.epa.ie
Climate services / Met Office	Established	http://www.met.ie
Web Portal	Established	http://www.climateireland.ie
Monitoring, Indicators, Methodologies	In development	
Training, Education	Ongoing / in development	http://www.climateireland.ie

Regulation / Control of Greenhouse Gas Emissions

Ireland is a party to both the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol, which together provide an international legal framework for addressing climate change.

In December 2015, an ambitious new legally binding, global agreement on climate change was agreed in Paris. The Paris Agreement aims to restrict global temperature rise to well below 2°C above pre-industrial levels, and to pursue efforts to limit the temperature increase to 1.5°C. It aims to increase global ability to adapt to the adverse impacts of climate change

and to foster climate resilience and low greenhouse gas emissions development, in a manner that does not threaten sustainable food production. It also seeks to achieve a balance between anthropogenic emissions by sources, and removals by sinks, of greenhouse gases in the second half of this century.

The first Irish National Mitigation Plan[6] represents an initial step to set us on a pathway to achieve the level of decarbonisation required. It is a whole-of-Government Plan, reflecting the central roles of the key Ministers responsible for the sectors covered by the Plan – Electricity Generation, the Built Environment, Transport and Agriculture, as well as drawing on the perspectives and responsibilities of a range of other Government Departments.

The measures that will be implemented through the plan will lay foundations for transitioning Ireland to a low carbon, climate resilient and environmentally sustainable economy by 2050. To support this ongoing work, the Plan also includes over 100 individual actions for various Ministers and public bodies to take forward.

- Emissions reduction measures and actions set out in this National Mitigation Plan are aligned with and build upon commitments made in the 2015 Energy White Paper. This paper will be guided by the following strategic objectives:
- policy will contribute to reductions in Ireland's greenhouse gas emissions and enhancement of sinks in a manner that achieves the optimum benefits at least cost;
- a stable and predictable policy and regulatory framework will be underpinned by rigorous analysis and appraisal, supported by strong research and analytical capacity;
- the Government will pursue investment, innovation and enterprise opportunities towards building a competitive, low carbon, climate-resilient and environmentally sustainable economy; and
- the citizen and communities will be at the centre of the transition.

COP 26

The Glasgow Climate Pact (The Pact), the final agreement document of COP26 that was negotiated by nearly 200 countries. For the first time in a UN climate agreement, there is an explicit reference to coal and fossil fuel subsidies and a promise to increase aid to developing countries, who are bearing the brunt of climate change. The main outcome of COP26 was the agreement of the Glasgow Climate Pact, which includes the following:

- Agreement that the current NDCs, are inadequate to limit temperature rises to 1.5C, and a roadmap for more frequent revisions of NDC's starting at COP27 next year in Egypt,
- Commitment to "phase down" coal-fired power generation. Unfortunately, this text was watered down from "phase-out", at the last minute. Nevertheless, agreement on this was important.
- Commitment to significantly increase funding for developing countries hardest hit by the
- effects of climate change.

[6] https://www.dccae.gov.ie/en-ie/climate-action/topics/national-mitigation-plan/Pages/default.aspx

Paris Agreement

The Paris Agreement which entered into force on 4 November 2016 aims to tackle 95% of global emissions through 188 Nationally Determined Contributions (NDCs) which will increase in ambition over time. Ireland's contribution to the Paris Agreement will be via the NDC tabled by the EU on behalf of its Member States. This is a binding target for an overall reduction of at least 40% in greenhouse gas emissions by 2030 (relative to 1990 levels). The target will be delivered by the EU by 2030 through reductions in the Emissions Trading Scheme (ETS) and non-ETS sectors of 43% and 30% respectively (relative to 2005).

Kyoto Protocol (2008 – 2012)

The EPA has overall responsibility for the national greenhouse gas inventory in Ireland's national system, which was established in 2007 under Article 5 of the Kyoto Protocol[7]. The EPA's OCLR[8] performs the role of inventory agency in Ireland and undertakes all aspects of inventory preparation and management as well as the reporting of Ireland's submissions annually in accordance with the requirements of Decision 280/2004/EC and the UNFCCC.

Ireland currently accounts for GHG emissions under the Kyoto Protocol. The Kyoto Protocol required Ireland to limit total national greenhouse gas emissions to 314.2 Mtonnes of CO_{2eq} over the five-year period 2008 – 2012 which is equivalent to 62.8 Mtonnes of CO_{2eq} per annum. The Kyoto Protocol limit is calculated as 13% above Ireland's 1990 baseline value which was established and fixed at 55.61Mtonnes of CO_{2eq} following an in-depth review of Ireland's 2006 greenhouse gas inventory submission to the UNFCCC[9].

EU 2021-2030 Targets for non-ETS sector emissions- Effort Sharing Regulations[10]

Under the EU Commission's Climate and Energy Package, sectors of the economy not covered by the EU ETS must reduce emissions by 30% by 2030 compared to 2005 as their contribution to the overall target.

The non-ETS sectors cover those sectors that are outside the EU Emissions Trading Scheme and includes agriculture, transport, built environment (residential, commercial/institutional), waste and non-energy intensive industry.

2015 Energy White Paper

The White Paper on Energy Policy, Ireland's Transition to a Low Carbon Energy Future 2015-2030, published in 2015, sets out a framework to guide energy policy in the period to 2030. The White Paper recognises that a radical transformation of our energy system is required to meet our national, EU and international climate objectives and sets a course for an energy sector where the State will provide the supports that enable consumers to become active energy citizens. It posits a policy approach where our energy system will change from one that is almost exclusively led by Government and utilities to one where individuals and communities are agents of change in the way Ireland generates, transmits, stores, conserves and uses energy. It sets out a vision, a framework and over 90 actions for Irish energy policy up to 2030 as we transition to a low carbon society and economy by 2050.

[7] http://unfccc.int/kyoto_protocol/items/2830.php

[8] http://www.epa.ie/mobile/about/org/oclr/

[9] http://unfccc.int/files/national_reports/annex_i_natcom/submitted_natcom/application/pdf/nc6_br1_ire.pdf

[10] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32018R0842

Future Management of Flood Risk

The Catchment Flood Risk Assessment and Management (CFRAM) Programme[11] (see www.cfram.ie) is the mechanism established to facilitate future adaptation to climate change. It provides for long-term flood risk management in Ireland and the embedment of flood risk assessment in the future development of capital projects. The future scenario flood maps produced under the CFRAM Programme will facilitate this approach, inform other industrial sectors, and provide a valuable resource for local adaptation planning and sustainable land use management and planning.

EIA Directive 2014/52/EU

Directive 2014/52/EU[12] of the European parliament and of the Council of 16 April 2014, amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment had to be transposed into national law by 16 May 2017, necessitating changes in laws, regulations, and administrative provisions across a number of legislative codes.

Key changes introduced in the 2014 Directive (in Annex IV - Information referred to in Article 5(1) – Information for the Environmental Impact Assessment Report) and the national transposing regulations (the European Union (Planning and Development)(Environmental Impact Assessment) Regulations, S.I. No. 296 of 2018) include a requirement for information on the impact of a project on climate (for example the nature and magnitude of greenhouse gas emissions) and the vulnerability of the project to climate change to be provided in the Environmental Impact Assessment Report.

Published Guidelines

Guidance on Integrating Climate Change and Biodiversity into EIA (EC, 2012)[13]

EU Guidelines provide recommendations on how to integrate climate change and biodiversity in Environmental Impact Assessment (EIA). The need for action on climate change and biodiversity loss is recognised across Europe and around the world. The guidelines include an explanation as to why climate change and biodiversity are so important in EIA, present the relevant EU-level policy background, provide advice on how to integrate climate change and biodiversity into selected stages of the EIA process. The annexes provide sources of further reading and links to other relevant information, data, and tools.

Assessing Greenhouse Gas Emissions and Evaluating their Significance (IEMA, 2017)[14]

IEMA Guidance provides information to assist practitioners with addressing greenhouse gas (GHG) emissions assessment and mitigation in statutory and non-statutory Environmental Impact Assessment (EIA). It complements IEMA's earlier guide on Climate Change Resilience and Adaptation and builds on the Climate Change Mitigation and EIA overarching principles. The requirement to consider this topic has resulted from the 2014 amendment to the EIA Directive.

[11] https://www.cfram.ie/

[12] http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32014L0052

[13] http://ec.europa.eu/environment/eia/pdf/EIA%20Guidance.pdf

[14] https://www.iema.net/policy/ghg-in-eia-2017.pdf

Climate Change and Major Projects (EC, 2016)[15]

This publication provides guidance for assessing vulnerability and risk from Climate Change for major projects funded by the European Regional Development Fund (ERDF) and the Cohesion Fund and listed in the concerned operational programmes.

Sectoral Planning Guidelines for Climate Change Adaptation[16]

The guidelines aim to ensure that a coherent and consistent approach to adaptation planning is adopted by the key sectors in Ireland. Sectors preparing sectoral adaptation plans under the NAF are required to prepare their plans in line with the process described in these guidelines while also being aware of the overall requirements regarding the development of sectoral adaptation plans.

Local Authority Adaptation Strategy Development Guidelines[17]

Guidance was produced to provide a consistent and coherent process for local authorities in helping them develop local adaptation strategies and contain information on the process of developing an adaptation strategy :

- provide background information on what adaptation entails and provides the rationale behind implementing a local scale adaptation strategy;
- outline the initial steps required in launching a strategy development process, describing key roles and who can fulfil them, and setting out important factors to consider in the early stages of strategy development;
- explains how to assess the role that weather extremes and periods of climate variability currently play within the local jurisdiction, and it describes why doing so is a fundamental element of working towards a more climate-resilient future;
- moves from the present to the identification of future climate risks, describing a staged risk assessment process and positioning the adaptation strategy within more detailed risk assessments undertaken during shorter term decision-making processes such as statutory plan-making;
- on the basis of the risk assessment process undertaken determination of adaptation goals and objectives and the types of adaptation actions that are available and outlines how each might be identified, assessed, prioritised and implemented is described;
- outlines the steps required to move from a phase of planning to one of implementation, and it explains the importance of monitoring and evaluation in ensuring that the strategy is achieving its anticipated adaptation objectives.

[15] https://ec.europa.eu/clima/sites/clima/files/docs/major_projects_en.pdf

[16] https://www.dccae.gov.ie/en-ie/climate-action/topics/adapting-to-climate-change/national-adaptation-framework/Pages/Sectoral.aspx

[17] https://www.dccae.gov.ie/en-ie/climate-action/topics/adapting-to-climate-change/national-adaptation-framework/Pages/Localadaptation.aspx

Appendix 9-B Development Vulnerability Assessment Methodology

The scale for assessing the likelihood of a climate hazard is presented in **Table 9-B-1**. The output of the likelihood analysis is an estimation of the likelihood for each of the essential climate variables and hazards.

Table 9-B-1: Scale of Likelihood of Climate Hazard

Term	Qualitative	Quantitative
Rare	Highly unlikely to occur	5%
Unlikely	Unlikely to occur	20%
Moderate	As likely to Occur	50%
Likely	Likely to Occur	80%
Almost certain	Very likely to occur	95%

The scale for assessing the potential impact of a climate hazard is presented in **Table 9-B-2**. The impact analysis provides an assessment of the potential impact of each of the essential climate variables and hazards.

Table 9-B-2: Example Table for Climate Hazard Impact Analysis

Risk areas	Insignificant	Minor	Moderate	Major	Catastrophic
Asset damage, engineering, operational					
Safety and Health					
Environment					
Social					
Financial					
Reputation					

The matrix for assessing the sensitivity of project to climate hazards is presented in **Table 9-B-3**. The sensitivity is summarised, along with the ranking of the relevant climate variables and hazards relating to the project.

Table 9-B-3: Example Table for Sensitivity of Project to Climate Hazards

	Extreme rainfall, flood , flash flood	Heath	Drought	Wildlife Fires	Storms and winds	Landslides	Cold Spells and snow	Freeze –thaw damage	Rising sea levels
On site assets									
Inputs – Water									
Inputs – Energy									
Outputs - product									
Transport links									

The matrix for assessing exposure of a project to climate hazards is presented in **Table 9-B-4**. The exposure analysis ranks climate variables and hazards as low, medium or high based on current and future climate.

Table 9-B-4: Example Table of Exposure of the Project to Climate Hazards

	Extreme rainfall, flood , flash flood	Heat	Drought	Wildlife Fires	Storms and winds	Landslides	Cold Spells and snow	Freeze –thaw damage	Rising sea levels
Current Climate									
Future Climate									

An example of the vulnerability of a project to climate hazards is presented in **Table 9-B-5**. The vulnerability combines the sensitivity and the exposure analysis.

Table 9-B-5: Example Table for Vulnerability Analysis of Project to Climate Hazards

Sensitivity	**Exposure (current & future climate)**		
	Low	**Medium**	**High**
Low			
Medium			
High			

Appendix 9-C Development Vulnerability Assessment

The likelihood analysis of the proposed development to climate hazards is presented in **Table 9-C-1**.

The proposed development has been assessed to be moderate affected by extreme rainfall, flash (pluvial) flood, storms and winds. The proposed development would be unlikely affected to cold spells, landslides and snow. The proposed development would not be affected by heat, drought, wildlife fires and freeze –thaw damage. The proposed development will not be affected by rising sea level.

Table 9-C-1: Analysis of Likelihood of Climate Hazards

	Extreme rainfall, flash flood	Flood	Heat	Drought	Wildlife Fires	Storms and winds	Landslides	Cold Spells and snow	Freeze –thaw damage	Rising sea levels
Rare			✓	✓	✓				✓	✓
Unlikely		✓					✓	✓		
Moderate	✓					✓				
Likely										
Almost certain										

Table 9-C-2 shows the climate hazard impact analysis of the proposed development. It was assessed that climate hazards will have major impacts on health and safety, the environment and financial areas, moderate impacts on asset damage and engineering, operational, social and reputation areas.

Table 9-C-2: Climate Hazard Impact Analysis

Risk areas	Insignificant	Minor	Moderate	Major	Catastrophic
Asset damage, engineering, operational			✓		
Safety and Health				✓	
Environment				✓	
Social			✓		
Financial				✓	
Reputation			✓		

Table 9-C-3 below assesses the sensitivity of the project to climate hazard. It was assessed that site assets, energy inputs and transport links are of high sensitivity to extreme rainfall, flood, flash floods, storms and winds; water inputs will be highly sensitive to droughts. On site assets will be medium sensitive to cold spells and snow and freeze – thaw damage. Transport links will be medium sensitive to cold spells and snow.

Table 9-C-3: Sensitivity of Project to Climate Hazards

	Extreme rainfall, flash flood	Flood	Heat	Drought	Wildlife Fires	Storms and winds	Landslides	Cold Spells and snow	Freeze –thaw damage	Rising sea levels
On site Assets	High	Low	Low	Low	Low	High	Low	Medium	Medium	Low
Inputs - Water	Low	Low	Low	High	Low	Low	Low	Low	Low	Low
Inputs - Energy	High	Low	Low	Low	Low	High	Low	Low	Low	Low
Transport Links	High	Low	Low	Low	Low	High	Low	Medium	Low	Low

In **Table 9-C-4**, the exposure of the planned development to climate hazards was assessed. In the current climate, the exposure of the development to extreme rainfall, flood, flash flood, storms and winds has been assessed to be medium. In the future, the development was assessed to have high exposure to rainfall, flash flood, storms, and winds.

Table 9-C 4: Exposure of the Development to Climate Hazards without Mitigation

	Extreme rainfall, flash flood	Flood	Heat	Drought	Wildlife Fires	Storms and winds	Landslides	Cold Spells and snow	Freeze –thaw damage	Rising sea levels
Current Climate	Medium	Low	Low	Low	Low	Medium	Low	Low	Low	Low
Future Climate	High	Low	Low	Low	Low	High	Low	Low	Low	Low

Table 9-C-5 shows the vulnerability analysis of the project to climate hazards; it combines the sensitivity and the exposure analysis. The project was assessed to be most sensitive to extreme rainfall, flash flood, storms, and winds.

Table 9-C-5: Vulnerability Analysis of Project to Climate Hazards

Sensitivity	**Exposure (current & future climate)**		
	Low	**Medium**	**High**
Low	Rising sea levels, Flood, Landslides, Freeze –thaw damage, Drought, Heat, Wildlife Fires, Cold spells & snow		
Medium		Current: Extreme Rainfall, Flash Flood, Storms and Winds	
High			Future: Extreme Rainfall, Flash Flood, Storms and Winds

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Introduction

Background

This Chapter of the Environmental Impact Assessment Report (EIAR), prepared by SLR Consulting Ireland, addresses the potential noise effects of the proposed development at Knockroe, Bandon, Co. Cork.

The proposed development will consist of:

- Extraction of sand & gravel over an area of c.3.5 Ha.
- Extraction by dry working to 2 metres above the groundwater level, at a maximum rate of 100,000 tonnes per year.
- Transport of the extracted sand & gravel to the adjacent Dromkeen Pit (Plan. Ref. 23/04780) for use in concrete production;
- Upgrading of the existing internal access road and use of the existing access onto the local road L3204.
- Provision of wheelwash and welfare unit (c.8.3 sq.m).
- Restoration of the lands to agricultural and natural habitat use;
- All within an application area of c.4.0 hectares.

Permission is sought for 15 years plus two years for final restoration (total duration of seventeen years). Further details of the proposed development are provided in Chapter 2 of this EIAR.

Based on a maximum annual pit output of 100,000 tonnes per year from the proposed development , and the short transport distance (c. 0.5km) to the adjacent Dromkeen Pit, the road haulage fleet will comprise 1 no. heavy goods vehicle (HGV) – for aggregate haulage. The maximum number of HGV movements will be one to two HGV trips per hour based on a maximum annual total output of 100,000 tonnes per year, 50-week year, 5.day week ,8-hour day and 30 tonne (sand & gravel) HGV loads.

The noise impact assessment presented herein describes and assesses the existing noise baseline characteristics of the local area. The anticipated effects of the sand and gravel extraction activities are then applied to these baseline conditions and the resulting noise impacts assessed. Mitigation measures are identified where necessary to eliminate or minimise adverse impacts, insofar as practical.

A vibration assessment has not been undertaken as previous experience from similar sand & gravel extraction operations has demonstrated that such developments do not produce ground-borne vibrations, at any properties in the vicinity.

In order to assist the understanding of acoustic terminology and the relative change in noise, a glossary of terms and phrases, which specifically relate to this Chapter of the EIAR, is provided in Appendix 10-A.

Scope of Work

The following sections of this EIAR Chapter describe the potential noise impacts associated with the proposed development. The following issues are addressed separately:

- regulatory control framework for noise;
- methodology used to assess potential impacts from activities at properties (dwellings and farms);
- baseline conditions pertaining to existing background / ambient noise levels around the site;
- noise impact evaluation criteria;
- prediction of the noise and vibrations levels and identification of potential impacts;
- assessment of severity of impacts, with reference to the evaluation criteria;
- description of mitigation measures that will be incorporated into the design and operation of the scheme to eliminate or minimise the potential for noise impact;
- a summary of any residual impacts; and
- monitoring proposals.

Contributors / Author(s)

The noise impact assessment presented in this Chapter was prepared by SLR Consulting Ireland. The lead consultant for the study was Tim Paul MSc CEng MIEI MRICS.

Limitations / Difficulties Encountered

This assessment is compiled on the basis of published guidance documents, and site-specific field surveys. No difficulties were encountered in compiling the required information.

Regulatory Control Framework

The following sections address the statutory planning / policy requirements and regulatory control of noise and vibration generated by development activity. Currently, there is no national or regional legislation which specifically addresses noise and vibration generated by mineral extraction and production of aggregates and construction materials. However, there are a number of guidance documents that are relevant in the context of both noise and vibration action planning.

Planning Policy and Development Control

The National Planning Framework (NPF) 2040 (published in February 2018) is a national planning framework for Ireland. The framework provides the policies for all regional and local plans. In the framework, the extractive industries are recognised as important for the supply of aggregates and construction materials to a variety of sectors.

National Planning Framework Objective 65 addresses noise related impact of development and identifies a requirement for Planning Authorities to :

> *"Promote the pro-active management of noise where it is likely to have significant adverse impacts on health and quality of life and support the aims of the Environmental Noise Regulations through national planning guidance and Noise Action Plans."*

There are no specific policies in relation to noise emissions in NPF for mineral extraction or production of construction aggregates and materials. The stated general development objective is to facilitate the development while at the same time protect the environment.

Quarries and Ancillary Activities

The EPA (2006) publication *Environmental Management Guidelines for Environmental Management in the Extractive Industry (Non-Scheduled Minerals)*[1].recommends the following in respect of noise:

> *In relation to sand and gravel pit developments and ancillary activities, it is recommended that noise from the activities on site shall not exceed the following noise ELVs at the nearest noise-sensitive receptor:*
>
> *Daytime : 08:00–20:00 h LAeq (1h) = 55 dBA*
>
> *Night-time : 20:00–08:00 h LAeq (1h) = 45 dBA*
>
> *Note: 95% of all noise levels shall comply with the specified limit value(s). No noise level shall exceed the limit value by more than 2 dBA.)*

The DoEHLG (2004) Guidelines for Planning Authorities (*Quarries and Ancillary Activities: Guidelines for Planning Authorities*[2]) recommends similar limit values.

Planning Practice Guidance 2014

The web-based Planning Practice Guidance (PPG) sets out the Government's planning policies for England and has a specific category for mineral developments.

With respect to noise, it requires those making mineral development proposals to carry out a noise impact assessment which should identify all sources of noise and, for each source, take into account the emission level, its characteristics, proposed operating location, on-time and its potential impact at the nearby noise-sensitive receptors.

The guidelines provide advice on noise from temporary activities at mineral extraction sites, the recommended derivation of free-field criteria for normal daytime operations, and the absolute criterion of 70dB LAeq,1hr for temporary operations.

Guidelines for Noise Impact Assessment (IEMA)

The *Guidelines for Noise Impact Assessment* produced by the Institute of Environmental Management and Assessment (IEMA) are generally recognised as established good practice standards for scope, content, and methodology of noise impact assessment.

These guidelines address the key principles of noise impact assessment and are applicable to all development proposals where noise effects are likely to occur. These guidelines state that for any assessment, the noise level threshold and significance should be determined by the assessor, based upon the specific evidence and likely subjective response to noise. An example impact scale offered by the IEMA guidelines is shown in Table 10-1.

[1] https://www.epa.ie/pubs/advice/general/EPA_management_extractive_industry.pdf

[2] https://www.epa.ie/pubs/advice/general/EPA_management_extractive_industry.pdf

Table 10-1: Example Impact Scale from the Change in Sound Levels (IEMA)

Long-Term Impact Classification	Short-Term Impact Classification	Sound Level Change dB L_{pAeqT} (+ive or -ive) T = either 16hr day or 8hr night
Negligible	Negligible	≥ 0 dB and < 1 dB
	Minor	≥ 1 dB and < 3 dB
Minor	Moderate	≥ 3.0 dB and < 5 dB
Moderate	Major	≥ 5.0 dB and < 10 dB
Major		≥ 10.0

The criteria above reflect the key benchmarks that relate to human perception of sound. A change of 3dB is generally considered to be the smallest change in environmental noise that is perceptible to the human ear under most normal conditions. A 10dB change in noise represents a doubling or halving of noise level. The difference between minimum perceptible change and doubling or halving of the noise level is split to provide greater definition to the assessment of changes in noise level

To determine the overall noise impact, the magnitude and sensitivity Noise Effects Descriptors are presented in Table 10-2.

Table 10-2: Noise Effects Descriptors (IEMA)

Very Substantial	Greater than 10 dB L_{Aeq} change in sound level perceived at a highly sensitive noise receptor
Substantial	Greater than 5 dB L_{Aeq} change in sound level at a noise-sensitive receptor, or a 5 to 9.9 dB L_{Aeq} change in sound level at a highly sensitive noise receptor
Moderate	A 3 to 4.9 dB L_{Aeq} change in a sound level at a sensitive or highly sensitive noise receptor, or a greater than 5 dB L_{Aeq} change in sound level at a receptor of some sensitivity
Slight	A 3 to 4.9 dB L_{Aeq} change in a sound level at a receptor of some sensitivity
None / Not Significant	Less than 2.9 dB L_{Aeq} change in sound level and/or all receptors of negligible sensitivity to noise or marginal to the zone of the influence of the proposed development

As recognised in the IEMA guidance, there are however many factors which affect people's perception and their responses to noise. Guidance on assessment of the magnitude of noise impact and the significance of the effects are presented in Table 10-3.

Table 10-3: Relationship between Noise Impact, Effect and Significance (IEMA)

Magnitude (Nature of Impact)	Description of Effect (on a Specific Sensitive Receptor)		Significance
Substantial	Beneficial	Receptor Perception = Marked Change Causes a material change in behaviour and/ or attitude, e.g. individuals begin to engage in activities previously avoided due to preceding environmental noise conditions. Quality of life enhanced due to change in character of the area.	**More Likely to be Significant** (Greater justification needed- based on impact magnitude and receptor sensitivities- to justify a non-significant effect) ↕ (Greater justification needed- based on impact magnitude and receptor sensitivities- to justify a significant effect) **Less Likely to be Significant**
Moderate		Receptor Perception = Noticeable Improvement Improved noise climate resulting in small change in behaviour and/or attitude, e.g. turning down volume of television; speaking more quietly; opening windows. Affects the character of the area such that there is a perceived change in the quality of life.	
Slight		Receptor Perception = Just Noticeable Improvement Noise impact can be heard but does not result in any change in behaviour or attitude. Can slightly affect character of the area but not such that there is a perceived change in quality of life.	
Negligible	N/A = no discernible effect on receptor		**Not Significant**
Slight	Adverse	Receptor Perception = Non-intrusive Noise impact can be heard, but does not cause change in behaviour or attitude, e.g. turning up volume of television, speaking more loudly; closing windows. Can slightly affect the character of the area but not such that there is a perceived change in the quality of life.	**Less Likely to be Significant** Greater justification needed- based on impact magnitude and receptor sensitivities- to justify a significant effect) ↕ Greater justification needed- based on impact magnitude and receptor sensitivities- to justify a non-significant effect) **More Likely to be Significant**
Moderate		Receptor Perception = Intrusive Noise impact can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; closing windows. Potential for non-waking sleep disturbance. Affects the character of area such that there is a perceived change in the quality of life.	
Substantial		Receptor perception = Disruptive Causes material change in behaviour and /or attitude, e.g. avoiding certain activities during periods of intrusion. Potential for sleep disturbance resulting in getting to sleep, premature awakening, and difficulty in getting back to sleep. Quality of life diminished due to change in character of area.	

Magnitude (Nature of Impact)	Description of Effect (on a Specific Sensitive Receptor)		Significance
Severe		Receptor Perception = Physically Harmful Significant Changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or psychological effects, e.g. regular sleep deprivation / awakening ; loss of appetite, significant , medically definable harm, e.g. auditory and non-auditory.	Significant

British Standard 5228: 2009+A1:2014

British Standard 5228-1:2009+A:2014 *Noise and Vibration Control on Construction and Open Sites, Part 1: Noise* (BS5228) sets out a methodology for predicting noise levels arising from a wide variety of construction and related activities. It can be used to predict noise levels arising from construction and operational stage activities at extraction sites, including associated earthmoving / restoration operations. BS5228 also sets out tables of sound power levels generated by a wide variety of mobile equipment.

Noise levels generated by site operations and experienced at local receptors will depend upon a number of variables, the most significant of which are:

- the amount of noise generated by plant and equipment being used at the development site, generally expressed as a sound power level;
- the periods of operation of the plant at the development site, known as the “on-time”;
- the distance between the noise source and the receptor, known as the “stand-off”;
- the attenuation due to ground absorption or barrier screening effects; and
- any reflections of noise due to the presence of hard vertical faces (i.e. walls).

AQTAG09 - Guidance on Effects of Industrial Noise on Wildlife

AQTAG09 (Air Quality Technical Advisory Group 09) guidance provides guidance to assist planning and/or licensing officials handling pollution prevention and control applications for industrial installations on relevant noise emissions and relates these to the requirements of the Habitats Regulations.

The Habitats Directive (92/43/EEC) specifies that, where specific noise from industry, measured at the habitat / nest site is below the levels in Table 10-4, it is considered unlikely that it will have an adverse impact on designated species. Where noise levels are exceeded, a more detailed noise assessment will be required.

Table 10-4: Specific Noise Levels at Habitat / Nest Site

Parameter	Noise Level, dB
$L_{Amax,F}$	80
$L_{Aeq,1hr}$	55

Noise and Human Health

Environmental noise exposure response relationships and thresholds for health endpoints for industry are not available at European or Irish level in legislation or guidelines.

WHO Environmental Noise Guidelines

World Health Organisation (WHO) Europe have produced the WHO Environmental Noise Guidelines 2018 for the European Region as a regional update to the WHO Community Noise Guidelines. The Guidelines include a review of evidence on the health effects of environmental noise to incorporate significant research carried out in recent years. The guidelines provide recommendation for protecting human health from exposure to environmental noise from various sources. The guidelines assess several environmental noise sources such as aircraft, rail, road, wind turbines and leisure noise.

EU Directive 2002/49/EC on the assessment and management of environmental noise introduced annual average indicators of noise exposure (L_{den} and L_{night}) as long-term exposure indicators, which differ from those used in the earlier WHO Guidelines for Community Noise (1999).

Receiving Environment

Study Area

The proposed development is located approximately 6km east of Bandon and 2km south of Innishannon in Co. Cork, refer to EIAR Figure 1-1.

The lands are bounded by woodland / local roads to the north and east; and woodland / agricultural lands to the south and west. The Bandon River is located on the eastern side of the L3204 local road flowing in a southerly direction, refer to EIAR Figures 1-1 and 1-2.

The surrounding landuse is predominantly woodland and agricultural grazing land (refer to Figure 1-3). There is a history of sand & gravel extraction in the area the existing Dromkeen sand & gravel pit and concrete plant operated by Keohane Readymix Ltd. located c. 200metres to the north of the site.

There are a number of residential dwellings located along the roads to the north and east of the site, refer EIAR Figure 10-1.

Baseline Study Methodology

An environmental noise survey was completed to establish the prevailing noise levels in the vicinity of the nearest noise sensitive receptors to the site.

The survey was conducted by SLR Consulting Personnel in accordance with the procedures outlined in ISO 1996-2:2017 *Acoustics — Description, measurement and assessment of environmental noise - Determination of sound pressure levels*.

All measurements were completed using a Class 1 Sound Level Meters (NTi Audio XL3 and Larson Davis 831 SLM). The sound level meters were calibrated before and after the survey. The calibration deviation was determined to fall within the acceptable range based on the meter specification (+/- 0.8 dB in this instance). The sound level meter was calibrated to traceable standard by a UKAS (United Kingdom Accreditation Service) accredited laboratory within 12 months preceding the measurement.

In addition to subjective observations on key sources contributing to the prevailing noise climate, the following noise level indices were recorded:

- $L_{Aeq,T}$ - The A-weighted equivalent continuous noise level over the measurement period and effectively represents an "average" value.
- $L_{Amax(F),T}$ - The maximum RMS A-weighted sound pressure level occurring within a specified time period. Measured using the "Fast" time weighting.
- $L_{Amin(F),T}$ - The minimum RMS A-weighted sound pressure level occurring within a specified time period. Measured using the "Fast" time weighting.
- $L_{A90,T}$ - The A-weighted noise level exceeded for 90% of the measurement period. This parameter is often used to describe the background noise.
- $L_{A10,T}$ - The A-weighted noise level exceeded for 10% of the measurement period. This parameter is often used to describe intermittent noise sources such as road traffic.

The weather conditions were generally conducive to environmental noise surveys with light to gentle northeasterly breeze (<4 m/s) present. External ambient air temperature of ~ 14°C was observed.

All measurements were completed under free-field conditions (i.e., at least 3.5 m from the nearest vertical reflecting surface, with the microphone approximately 1.5 m above ground level).

All noise levels are recorded in 'A-weighted' decibels, dB(A). A-weighting is the process by which noise levels are corrected to account for the non-linear frequency response of the human ear. All noise levels are quoted in dB(A) relative to a sound pressure of 20 Pa.

Sources of Information

A desk study was carried out to gather all relevant information relating to noise conditions around the application site. Further information was gathered through a site visit and technical assessments consistent with current standard methodologies and published best practice guidelines. This yielded the data required to allow an assessment of likely significant effects of the proposed development on sensitive receptors within its zone of influence.

Field Survey / Noise Monitoring

Measurements were completed at the four measurement positions between the hours of 11:58 and 16:30 hrs on Tuesday, 9th January 2024, noise levels were measured for a period of 1hour at each of the monitoring positions.

The four noise monitoring locations selected for the purposes of the baseline noise survey are shown on **Figure 10-1** and comprise the following:

- N01 is located at the front of Riverbank House, facing the L3204 Ballinspittle Road, the microphone was mounted free field and at a similar distance to the road as the façade of Riverbank House;
- N02 is located to the rear (sheltered) side of Riverbank House, facing toward the existing site, the microphone position would be considered near field due to proximity to the façade of the building and adjacent wall;

- N03 is located east of the proposed site and close to the nearest boundary f the pNHA along the L3204 Ballinspittle Road; and,
- N04 is located west of the site adjacent the L1031.

The noise monitoring results are summarised in Table 10-5 below.

Table 10-5: Summary of Noise Monitoring Results (2020 – 2023)

Loc.	Start	Sound Pressure Level (dB RE $2x10^{-5}$ Pa)				
		$L_{Aeq,T}$	L_{AFmax}	L_{AFmin}	L_{A10}	L_{A90}
N01	Tue 25 Mar, 13:00	62	82	33	56	42
	Tue 25 Mar, 13:15	62	83	35	58	43
	Tue 25 Mar, 13:30	62	83	39	59	46
N02	Tue 25 Mar, 12:47	45	31	62	48	35
	Tue 25 Mar, 13:02	45	31	63	48	35
	Tue 25 Mar, 13:17	45	31	62	49	36
N03	Tue 25 Mar, 14:00	56	75	28	50	35
	Tue 25 Mar, 14:15	59	78	30	55	38
	Tue 25 Mar, 14:30	61	81	34	56	42
N04	Tue 25 Mar, 15:15	53	69	37	58	41
	Tue 25 Mar, 15:30	52	65	36	57	41
	Tue 25 Mar, 15:45	54	67	34	59	42

The following observations are made in respect of the baseline noise monitoring undertaken around the application site:

- N01: Road traffic noise dominant intermittent source, some HGV but light vehicles, very limited traffic from site. Tractor ploughing field during 1st and 3rd measurement influencing background noise. Period of noise from resident working on wall omitted from measurement. Road traffic noise from R605 clearly audible. Birdsong audible intermittently. Bird scarer audible from site intermittently. No other site noise audible. Winds light NW, 2 ms, 14°C.
- N02: Road traffic noise dominant intermittent source, some HGV but mostly cars. Tractor ploughing field during 1st and 3rd measurement influencing background noise.
- N03: Road traffic noise dominant intermittent source, some HGV but mostly cars. Tractor ploughing field, influencing background noise levels. Road traffic noise from R605 clearly audible. Birdsong audible intermittently. Winds light NW, 2 ms, 14°C.
- N04: Road traffic from R605 dominant intermittent source, tractor ploughing field, influencing background noise levels. Winds light NW, 2 ms, 14°C.

No noise was observed from the operations of the adjacent Dromkeen Pit.

Table 10-6 below identifies the closest receptors affected by noise emissions from activities at the application site, and logarithmic averages of the noise monitoring results.

Table 10-6: Summary of Measured Noise Levels, Free Field dB (Average Values)

Location	Receptors effected	Period	L_{Aeq}
N1 / N2	R1, R2	Daytime	53.5
N4	R3, R4, R5, R6 and R7	Daytime	53

Location	Receptors effected	Period	L_{Aeq}
N3	pNHA	Daytime	58

Sensitive Receptors

Human Receptors

Sensitive locations are those where people may be exposed to noise from the planned activities. The closest receptors to the application site have been identified and assessed on the basis of their distance from the soil stripping activities and operational activities. The relevant receptors are listed in Table 10-7 and their locations are shown in Figure 10-1.

A list of the closest sensitive receptors in each direction surrounding the site and their distance from at its closest point are outlined in Table 10-7 below.

Table 10-7: Noise Sensitive Receptors

Receptor reference	Receptor	Sensitivity	Approx. Distance (m) from Extraction Area
R1	Residential	Medium	145
R2	Residential	Medium	190
R3	Residential	Medium	250
R4	Residential	Medium	280
R5	Residential	Medium	285
R6	Residential	Medium	280
R7	Residential	Medium	285
pNHA	Ecological	Medium	40

Ecological Receptors

The nearest ecological receptor is the Bandon Valley Below Innishannon pNHA, the nearest boundary of which is c. 40 metres form the extraction area, refer to Figure 10-1.

Noise Impact Assessment

Proposed Development

Operational noise rating ($L_{Ar, 1hr}$) predictions at each receptor location are based on the methodology set out in BS5228: Part 1 (2009)+ A1:2014 "*Code of Practice for Noise and Vibration Control on Construction and Open Sites*"

For the purposes of this impact assessment, the existing woodland, the existing topography (including the scheme design to retain the existing historical pit face) will provide significant natural screening to the closest receptors around the extraction area. A noise reduction of -10bB(A) has been adopted for full screening in assessing noise impacts for soil stripping and sand & gravel extraction.

For the purposes of the assessment, it is assumed that all potential operational noise sources are active and arise 100% continuously and simultaneously during assessment hours for the soil stripping / restoration stages and are active 40% during the assessment hours for the sand & gravel extraction (based on the low level of extraction of one to two loads per hour). On this basis, an On-time Adjustment (based on 40% on-time) has been included in the noise calculations for the sand & gravel extraction. The attenuation distance to the selected receptors is calculated from the extraction site boundary (as indicated in Figure 10-1) and from the noise source.

On the basis of the methodology outlined above, it is considered that the noise impact assessment presented herein is sufficiently robust and conservative and represents a worst-case scenario. Detailed noise assessment calculations are provided in Appendix 10-B.

The EPA (2006) Environmental Management Guidelines for Quarries and Ancillary Activities and the DoEHLG (2004) Guidelines for Planning Authorities both recommend a noise emission limit, applied to the nearest noise-sensitive receptors, of 55dB LAeq, 1hr during daytime working hours (defined as 07:00 to 18:00 hours).

A limit of 70dB LAeq, 1hr is permitted for periods of up to eight weeks in any working year at nearby noise sensitive receptors to facilitate ant necessary construction or temporary site works (e.g. screening berm construction).

As set out in Annex D of the updated Environmental Noise Standard, ISO 1996-2:2007(E), a prominent, discrete tonal component may be detected in one-third octave spectra if the level of a one-third octave band exceeds the level of the adjacent bands by some constant level difference (the appropriate level difference varies according to frequency and is greater at lower frequencies).

The noise characteristics of the plant which will be deployed in sand & gravel extraction at Knockroe and considered by this noise assessment are shown in Table 10-8 below.

Table 10-8: Noise Sources

Machinery	Octave band sound pressure levels @ 10m, Hz								L_{AEQ} @ 10m
	63	125	250	500	1k	2k	4k	8k	
Excavator / Loading Shovel (Soil Stripping, Restoration, S & G Extraction)	72	71	74	73	69	66	63	58	75
Dump truck / HGV (Soil Stripping , Restoration and S & G Extraction)	80	76	73	70	69	66	63	58	74

The machinery used at the proposed site will not generate impulsive or tonal noise, no penalty was therefore applied to the predicted operational LAr, 1hr noise level for presence of tonal or impulsive elements or for prediction of resultant noise level at each receptor.

Soil Stripping and Restoration

The following noise sources have been considered in the noise assessment for the initial site operations, during the preparatory works which will include activities such as soil stripping and restoration activities

- Excavator;
- Dump Truck.

For the purposes of the noise assessment, it is assumed that an excavator will be used continuously to carry out the soil stripping / earthworks, with one Dump Truck in attendance on-site at all times. Predicted noise levels calculated at nearest receptors are shown in Table 10-9 below, refer also calculations in Appendix 10-B.

Table 10-9: Soil Stripping and Restoration Predicted Noise Levels: Knockroe

Receptor	Period	Noise limit $L_{AEQ, 1HR}$ dB.(a)	Operational $L_{AEQ, 1HR}$ dB.(a)*	Difference
R1	Daytime	70.0	48	-22
R2	Daytime	70.0	46	-24
R3	Daytime	70.0	43	-27
R4	Daytime	70.0	42	-28
R5	Daytime	70.0	42	-28
R6	Daytime	70.0	42	-28
R7	Daytime	70.0	42	-28
pNHA	Daytime	70.0	56	-14

It can be seen from the results in Table 10-9 above that the noise criterion limits for the short-term preparatory (70dB(A)) are complied with at all sensitive locations assessed.

Sand and Gravel Extraction

The following noise sources have been considered in undertaking the noise assessment for the operations:

- Front End Loader
- HGV;

The resultant LAeq, 1hr noise level predicted for each receptor location is presented in Table 10-10 below, refer to Appendix 10-B for detailed calculations. Table 10-10 also shows the comparison between the predicted operational LAeq, 1hr noise level and a more onerous noise limit of 55dB(A) adopted at each receptor.

Table 10-10: Sand & Gravel Excavation – Predicted Noise Levels: Knockroe

Receptor	Period	Noise limit $L_{Aeq, 1hr}$ dB.(a)	Operational $L_{Aeq, 1hr}$ dB.(a)*	Difference
R1	Daytime	55.0	44	-11
R2	Daytime	55.0	42	-13
R3	Daytime	55.0	39	-16
R4	Daytime	55.0	38	-17
R5	Daytime	55.0	38	-17
R6	Daytime	55.0	38	-17
R7	Daytime	55.0	38	-17
pNHA	Daytime	55.0	52	-3

It can be seen from the results in Table 10-10 above that the noise levels generated solely by proposed development, even in a worst-case scenario, are below the prescribed noise limit at all nearby residential noise sensitive locations, and marginally above the noise limit by 1 dB(A) at the nearest boundary of the pNHA area.

Cumulative Noise Assessment

To identify the potential impact of the sand & gravel extraction activities, the predicted specific LAeq, 1hr dB(A) noise levels have been logarithmically added to existing ambient noise levels. The cumulative levels have been compared to the existing ambient noise levels at each of the noise sensitive locations for each time-period. The cumulative assessment is presented in Table 10-11 below.

Table 10-11: Cumulative Operational Noise Levels: Sand & Gravel Extraction

Receptor	Period	Existing noise level $L_{Aeq,T}$ dB.(a)	Operational $L_{ar, 1hr}$ dB.(a)*	Cumulative $L_{Aeq, T}$ dB.(a)*	Difference	Short term impact	Long term impact
R1	Daytime	53.5	44	54.5	1	Minor	Negligible
R2	Daytime	53.5	42	53.5	0	Negligible	Negligible
R3	Daytime	53	39	53	0	Negligible	Negligible
R4	Daytime	53	38	53	0	Negligible	Negligible
R5	Daytime	53	38	53	0	Negligible	Negligible
R6	Daytime	53	38	53	0	Negligible	Negligible
R7	Daytime	53	38	53	0	Negligible	Negligible
pNHA	Daytime	58	52	59	1	Minor	Negligible

With reference to the Guidelines for Noise Impact Assessment published by the Institute of Environmental Management and Assessment (IEMA), the cumulative short-term noise impact from the proposed development at all receptors is determined to Minor at R1 and Negligible at all other receptors in a worst-case scenario.

With reference to the Guidelines for Noise Impact Assessment published by the Institute of Environmental Management and Assessment (IEMA), the cumulative long-term noise impact from the proposed development at all receptors is determined to be Negligible in a worst-case scenario.

In view of the above findings, it is considered that further mitigation measures (beyond the natural screening / scheme design) to reduce the noise impacts are not required. Notwithstanding this, and in line with accepted best practice, a number of measures will be implemented at the proposed development to minimise the noise levels generated by site operations.

Ecological Receptors

The cumulative noise impacts at the nearest boundary of the pNHA area are assessed as Minor and Negligible over the short and long term, respectively (i.e. none / not significant). Accordingly, the pNHA Bandon Valley below Inishannon will not be impacted by the proposed development.

Unplanned Events

Accidents, malfunctions and unplanned events refers to events or upset conditions that are not part of any activity or normal operation of the proposed development as has been planned by Keohane. Even with the best planning and the implementation of preventative measures, the potential exists for accidents, malfunctions or unplanned events to occur during proposed development.

Many accidents, malfunctions and unplanned events are, however, preventable and can be readily addressed or prevented by good planning, design, emergency response planning, and mitigation.

In terms of noise impacts the following unplanned events could have an effect on the local area:

- equipment malfunction;
- vehicle collision.

In relation to noise impact of any unplanned events, these are considered to be negligible, as they have no potential to increase noise levels at sensitive receptors.

Cumulative Impacts

In essence, cumulative impacts are those which result from incremental changes caused by other past, present or reasonably foreseeable actions together with those generated by the proposed development. Therefore, the potential impacts of the proposed development cannot be considered in isolation but must be considered in addition to impacts already arising from existing or planned development.

This noise impact assessment indicates that the planned development activities will not contribute to a significant increase in noise levels within the surrounding environment.

The cumulative impact of the proposed development on local noise levels is therefore assessed as insignificant.

‘Do-nothing Scenario’

At present, the noise environment within the study area is dominated by road traffic noise generated by cars and occasional HGV traffic along the local road network. Some natural sounds such as birdsong, and agricultural activity sources (tractor ploughing, bird scarer etc.) are also audible.

Interaction with Other Impacts

The potential impact of the proposed development on sensitive receptors including local residents and sensitive ecological receptors is further considered in Chapter 4 'Population and Human Health' and Chapter 5 'Biodiversity'.

Noise Mitigation Measures

Where necessary, the three established strategies for impact mitigation are avoidance, reduction and remedy. Where it is not possible or practical to mitigate all impacts, then the residual impacts must be clearly described in accordance with the system for impact description set out in the EPA Guidelines. The adoption of Best Practicable Means is generally considered to be the most effective means of controlling noise emissions.

Notwithstanding the noise assessment which indicates the noise impacts on the nearest receptors will be Minor / Negligible in the short term and Negligible in the long term, the following best practice noise mitigation and management measures will be implemented. These measures will comprise:

Screening :-

- scheme design to maximise topographic and natural woodland screening;
- existing perimeter hedge planting will be retained and enhanced along the boundary of the site;

Machinery:-

- all machinery used at the development will have noise emission levels that comply with the limiting levels defined in EC Directive 86/662/EEC and any subsequent amendments;
- all machinery will be properly and regularly maintained and operated according to the manufacturers' recommendations, in such a manner as to avoid causing excessive noise;

Traffic :-

- care will be taken when loading HGV's to reduce or minimise potential noise disturbance to local residents;
- access / internal access road will be kept clean and maintained in a good state of repair, to avoid unwanted rattle and "body-slap" from heavy goods vehicles;
- vehicles waiting within the site will be prohibited from leaving their engines running and there will be no unnecessary revving of engines.

Experience and monitoring have demonstrated that by implementing these best practice noise management & mitigation measures, ambient noise levels from site activities and operations can be reduced by up to 5dB(A).

Residual Noise Impact Assessment

With implementation of the mitigation and management measures detailed above the residual noise impacts at all receptors will reduce to Negligible in the short-term and long-term.

Noise Monitoring

Noise monitoring will be undertaken at the application site for the duration of extraction activities at the proposed development (in accordance with EPA and DoEHLG guidelines).

Monitoring Locations

Noise monitoring will be carried out twice per year (every six months) at three monitoring locations N1, N3 and N4, refer to Figure 10-1.

Location N1 is representative of the nearest receptors R1 and R2 to the north of the existing site. Location N3 is representative of the pNHA nearest boundary; and Location N4 is representative of receptors to the east of the site.

Methodology

Continuous Noise Monitoring is carried out using a Larson Davis Model 831 Sound Level Meter or similar, which will be calibrated using a Larson Davis Acoustic Calibrator CAL 200. Noise monitoring is carried out in accordance with ISO 1996/1- 1982 Part 1: “Acoustics-Description and measurement of environmental noise“ and EPA Environmental Noise Survey Guidance Document.

During the noise survey, noise is measured for 1 hour at each noise monitoring location and 3 environmental noise parameters are measured. These are defined below:

- LAeq is the A-weighted equivalent continuous steady sound level during the sample period and effectively represents an “average” value.
- LA10 is the A-weighted sound level that is exceeded for 10% of the sample period; this parameter is typically used to quantify traffic noise.
- LA90 is the A-weighted sound level that is exceeded for 90% of the sample period; this parameter is typically used to quantify background noise.

A-weighting is the process by which noise levels are corrected to account for the non-linear frequency response of the human ear. All noise levels are quoted in dB(A) relative to a sound pressure of 20Pa.

Reporting

A report containing all noise monitoring results and their interpretation will be submitted to Cork County Council Planning / Environmental Section on a six-monthly basis where the results can be inspected by third parties. A copy of report will be maintained on site as part of the EMS documentation.

Figures

Figure 10-1: Noise Receptors and Noise Monitoring Locations

N

Notes:

1. EXTRACT FROM TAILTE EIREANN DIGITAL MAPPING 1:2,500 SCALE, MAP. NO. 6578

Legend:

- LAND INTEREST BOUNDARY
- PLANNING APPLICATION AREA (c.4.0 Hectares)
- 250m/500m RADIUS FROM EXTRACTION AREA
- N4 — PROPOSED NOISE MONITORING LOCATION
- R16 — RESIDENTIAL PROPERTY / RECEPTOR LOCATION
- UNINHABITED PROPERTY
- 001740_BANDON VALLEY ABOVE INNISHANNON PNHA
- 001515_BANDON VALLEY BELOW INNISHANNON PNHA

Rev	Amendments	Date	By	Chk	Auth

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Drawing Status & Suitability Code: **FINAL**

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Project: SAND & GRAVEL PIT
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Drawing Title: NOISE MONITORING LOCATIONS & RECEPTORS

Scale		SLR Project No.
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Designed	Drawn	Checked	Authorised
EW	EW	TP	TP
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Drawing Number: **FIGURE 10-1** Rev. **1**

0 100 200 300 400 500m

Scale 1:5,000

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Appendix 10-A Glossary Of Terminology

In order to assist the understanding of acoustic terminology and the relative change in noise, the following background information is provided.

The human ear can detect a very wide range of pressure fluctuations, which are perceived as sound. In order to express these fluctuations in a manageable way, a logarithmic scale called the decibel, or dB scale, is used. The decibel scale typically ranges from 0dB (the threshold of hearing) to over 120dB. An indication of the range of sound levels commonly found in the environment is given in the following table.

Table 10-A-1: Noise Levels Commonly Found in the Environment

Sound Level	Location
0dB(A)	Threshold of hearing
20 to 30dB(A)	Quiet bedroom at night
30 to 40dB(A)	Living room during the day
40 to 50dB(A)	Typical office
50 to 60dB(A)	Inside a car
60 to 70dB(A)	Typical high street
70 to 90dB(A)	Inside factory
100 to 110dB(A)	Burglar alarm at one metre away
110 to 130dB(A)	Jet aircraft on take off
140dB(A)	Threshold of Pain

Acoustic Terminology

dB (decibel) The scale on which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and a reference pressure (2x10-5 Pa).

dB(A) A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e. 'A' weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.

L_{Aeq} is defined as the notional steady sound level which, over a stated period of time, would contain the same amount of acoustical energy as the A-weighted fluctuating sound measured over that period.

L_{10} & L_{90} If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The L_n indices are used for this purpose, and the term refers to the level exceeded for n% of the time. Hence, L_{10} is the level exceeded for 10% of the time and as such can be regarded as the 'average maximum level'. Similarly, L_{90} is the 'average minimum level' and is often used to describe the background noise. It is common practice to use the L_{10} index to describe traffic noise.

L_{Amax} is the maximum A-weighted sound pressure level recorded over the period stated. L_{Amax} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.

Appendix 10-B Noise Assessment Calculations

Table 10-B-1: Soil Stripping and Restoration: Predicted Noise Calculations

Activity	Receptor	Activity LAeq (dB) at 10m Distance		Reflection	Screening	Activity Distance (m)	Noise Reduction Attenuated with Distance dB(A)	Noise level at receptor from Excavator (dB(A))	Noise level at receptor from Dump truck (dB(A))	Cumulative Noise Levels dB (A) at receptor
		Excavator	Dump Truck	dB(A)	dB(A)					
Soil Stripping, / Restoration	R1	75	74	3	-10	145	-23	45	44	48
	R2	75	74	3	-10	190	-25	43	42	46
	R3	75	74	3	-10	250	-28	40	39	43
	R4	75	74	3	-10	280	-29	39	38	42
	R5	75	74	3	-10	285	--29	39	38	42
	R6	75	74	3	-10	280	-29	39	38	42
	R7	75	74	3	-10	285	-29	39	38	42
	pNHA	75	74	-	-10	40	-12	53	52	56

Table 10-B-2: Sand & Gravel Extraction Activities: Predicted Noise Calculations

Activity	Receptor	Activity LAeq (dB) at 10m Distance		Reflection	Screening	Activity Distance (m)	Noise Reduction Attenuated with Distance dB(A)	On-time Adjustment (Plant working 40% of the time), dB(A)	Noise level at receptor from Loading Shovel (dB(A))	Noise level at receptor from HGV (dB(A))	Cumulative Noise Level at receptor dB (A)
		Loading Shovel	HGV	dB(A)	dB(A)						
Sand & Gravel Extraction	R1	75	74	3	-10	145	-23	-4	41	40	44
	R2	75	74	3	-10	190	-25	-4	39	38	42
	R3	75	74	3	-10	250	-28	-4	36	35	39
	R4	75	74	3	-10	280	-29	-4	35	34	38
	R5	75	74	3	-10	285	--29	-4	35	34	38
	R6	75	74	3	-10	280	-29	-4	35	34	38
	R7	75	74	3	-10	285	-29	-4	35	34	38
	pNHA	75	74	-	-10	40	-12	-4	49	48	52

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Introduction

Background

11.1 This chapter of the Environmental Impact Assessment Report (EIAR) relates to the potential effects of proposed development at Knockroe, Bandon, Co. Cork, on Material Assets. For further detail of the proposed development and the application site, refer to **Chapter 2** of this EIAR.

11.2 For the purposes of this EIAR, the 4.0 Ha. area within the red line boundary on EIAR **Figure 1-2** is referred to as 'the application area'.

11.3 The proposed development comprises extraction of sand & gravel only. The un-processed sand & gravel will be transported a short distance (c. 0.5km) to the existing Dromkeen Pit, operated by Keohane Readymix Ltd., for use in concrete production. The working hours will be 09.00 to 17.00 Mondays to Fridays only, and the low level of traffic generated will be one heavy goods vehicle (HGV) travelling back and forth from the site to the Dromkeen Pit (one to two trips per hour).

11.4 This chapter of the EIAR provides an overview of the material assets within the vicinity of the application area. It details those assets that may potentially be affected by the proposed development.

Scope of Work / EIA Scoping

11.5 According to the EPA (EPA (2003) Advice Notes on Current Practice:

"*Resources that are valued and that are intrinsic to specific places are called 'material assets'. They may be of either human or natural origin and the value may arise for either economic or cultural reasons*".

11.6 Under Schedule 6 of the Planning and Development Regulations (2001) as amended, material assets also refer to architectural and archaeological heritage and cultural heritage.

11.7 The EPA guidelines in relation to the preparation of EIAR[1] note the following in respect of material assets:

"*Material assets can now be taken to mean built services and infrastructure. Traffic is included because in effect traffic consumes roads infrastructure*."

11.8 The specific headings in the guidelines in relation to material assets refer to built services, roads and traffic and waste management.

11.9 **Chapter 14** of this EIAR addresses traffic impacts arising from the proposed development and **Chapter 12** addresses architectural heritage, archaeological heritage and cultural heritage issues, separately to this chapter.

11.10 This chapter comprises the consideration of existing resources pertinent to the proposed development and the application area that are not addressed elsewhere in the EIAR, and the likely development impacts on those resources. On this basis, this chapter addresses built services and waste management. Built services are

[1] Environmental Protection Agency (2022) Guidelines on the Information to be contained in Environmental Impact Assessment Reports.

understood to refer to electricity, telecommunications, gas, water supply infrastructure and sewerage.

Consultations / Consultees

11.11 Consultation was not undertaken in the preparation of this chapter of the EIAR.

Contributors / Author(s)

11.12 This chapter of the EIAR was prepared by Tim Paul, Director, SLR Consulting Ireland. Tim is a chartered mineral surveyor and chartered engineer with over 25 years' experience in providing strategic development advice, mineral reserve valuation, minerals planning & EIA; mine waste management; and transactional due diligence services for mining and minerals developments in Ireland and internationally.

Difficulties Encountered

11.13 No limitation or difficulties were encountered in the preparation of this chapter of the EIAR.

Regulatory Background

Guidelines

11.14 As outlined above, this chapter of the EIAR has been prepared in accordance with the Guidelines on the Information to be contained in Environmental Impact Assessment Reports by the EPA (2022).

Technical Standards

11.15 There are no technical standards relevant to this chapter of the EIAR.

Receiving Environment

Study Area

11.16 The study area relates to the land uses and utility infrastructure surrounding the application area.

Baseline Study Methodology

11.17 The baseline study comprises a desk-top review of online and published resources, information provided by the applicant and information contained in the other chapters of this EIAR. Ordnance Survey maps and aerial photography were also examined.

Sources of Information

11.18 Baseline information was obtained from the following sources:

- Myplan.ie (http://myplan.ie);

- Cork County Development Plan 2022 - 2028;
- Specialist environmental topic chapters of this EIAR;
- Ordnance Survey maps;
- Aerial photographs;
- www.openstreetmap.org.

Context

11.19 The development is located in the townland of Knockroe, approximately 2km south of Innishannon, Co. Cork, refer to EIAR Figure 1-1. The existing Dromkeen Pit and Concrete Plant operated by Keohane Readymix Ltd. is located to the north of the site.

11.20 The lands are bounded by woodland / local roads to the north and east; and woodland / agricultural lands to the south and west. The Bandon River is located on the eastern side of the L3204 local road flowing in a southerly direction, refer to Figures 1-1 and 1-2.

11.21 The surrounding landuse is predominantly woodland and agricultural grazing land (refer to Figure 1-3). There is a history of sand & gravel extraction in the area the existing sand & gravel pit and concrete plant operated by Keohane Readymix Ltd. located c. 200metres to the north of the site.

11.22 There are a number of residential dwellings located along the local county road to the north and east of the site.

Built Services / Infrastructure

11.23 There are no utilities serving the proposed development site. As the site will be used for sand & gravel extraction only using mechanical machinery during day-time hours there is no requirement for electricity supply at the site.

11.24 Staff will use a self-contained welfare unit (maintained under contract) located on site and will also avail of the existing office and welfare facilities at the adjacent Dromkeen site, as required.

Waste Management

General Waste Management

11.25 There will be no waste generated at the proposed development.

11.26 There will be no plant located on the site. All machinery will be re-fuelled and maintained at the adjacent Dromkeen Pit owned and operated by Keohane Readymix Ltd. At Dromkeen Pit waste oils are collected periodically by a licensed company; any batteries, rubber tyres and scrap metal arising on the site are stored within local designated storage areas prior to collection by a licensed collector.

Impact Assessment

Evaluation Methodology

11.27 The evaluation of effects on built services and waste comprises a qualitative assessment based on the quantitative and qualitative analysis of potential effects on the environment undertaken in other chapters of this EIAR. The assessment also takes into account a review of relevant literature and professional judgement in relation to impacts on built services and waste.

Built Services / Utilities

Construction and Operational Stage Impacts

11.28 There is no requirement for utilities during the construction stage or operational sates of the development. There will be no construction, or operational stage impacts in relation to built services / utilities.

11.29 Given that the proposed development does not require the provision of any built services it is considered that the proposed development would not have any significant, adverse, direct or indirect effects on built services / utilities.

Post-Operational Stage Impacts

11.30 The post-operational stage relates to the application area following the cessation of extraction operations and the completion of any restoration works. It is proposed to restore the lands to agricultural and natural habitat landuse.

11.31 No activities that would have the potential to affect any built services / utilities in the vicinity would be undertaken during this stage. It is not anticipated that there would be any significant direct or indirect effects on built services / utilities during the restoration works.

Waste

Construction and Operational Stage Impacts

11.32 There will be no waste arising within the proposed development during the construction or operational stages of the development. Accordingly, there will be no direct or indict effects arising from waste management during the construction or operational stages.

Post-Operational Stage Impacts

11.33 By the post-operational stage, the extraction area will be restored to agricultural and natural habitat use. There will be no waste arising within the proposed development during the post-operational stage of the development. Accordingly, there will be no direct or indict effects arising from waste management during the construction or operational stages.

Unplanned Events (i.e. Accidents)

11.34 According to the EPA guidelines, unplanned events, such as accidents, can include "*spill from traffic accidents, floods or land-slides affecting the site, fire, collapse or equipment failure on the site*". The 2014 EIA directive refers to "*major accidents, and/or natural disasters (such as flooding, sea level rise, or earthquakes)*". In addition, the EPA guidelines note that "Some types of factors are particularly vulnerable to unplanned events that have the potential to cause significant sudden environmental effects".

11.35 In this instance, the vulnerability of the proposed development to accidents, unplanned events or natural disasters is relatively limited owing to

- the nature of the materials being handled / extracted;
- the basic nature of the development works, extraction only; and
- the established nature of these activities with proven management systems in place.

11.36 Unplanned events in relation to the proposed development could conceivably relate to:

- instability arising from excavation, handling and placement of materials;
- spill from traffic accidents; and

11.37 The pit design incorporates industry standard slope angles to ensure both short-term and long-term stability. Adhering to the HSA (2020) Safe Quarry Guidelines to the Safety Health and Welfare at Work (Quarries) Regulations 2008 As amended should limit the potential for unplanned events in the form of instability in the pit faces.

11.38 The haul distance between the site and Dromkeen Pit is very short c. 0.5km. **Chapter 14** (Traffic) indicates that the proposed development would have negligible impact on traffic flows on the existing road network. It is considered that the risk of an accident resulting in a spillage would be no greater in relation to this development than it is for any other form of development that relies on the transportation of goods and materials by HGVs. The potential for significant impacts on material assets as a result of a road spillage is likely to be very low and any such effects would be temporary.

11.39 In light of these factors, it is considered that no material assets identified in this chapter are particularly vulnerable to unplanned or unforeseen events and that any unplanned events, were they to occur, would be unlikely to cause significant, sudden environmental effects in respect of existing built services / utilities and infrastructure or the management of wastes.

Cumulative / Synergistic Impacts

11.40 A search of the Cork Co. Council online planning search facility indicates that there are no other planned developments in the vicinity of the application area, which were granted planning permission in the last five years and have the potential to have any significant adverse cumulative impacts on material assets.

Transboundary Impacts

11.41 It is not anticipated that the impacts of the proposed development would have any significant transboundary effects on material assets.

Interaction with Other Impacts

11.42 It is not anticipated that the effects of the proposed development on material assets would interact significantly with other impacts.

Mitigation Measures

Construction and Operational Stage

11.43 No mitigation measures are required for the proposed development in relation to built services / utilities or waste management.

Post – Operational Stage

11.44 No mitigation measures are required for the proposed development in relation to built services / utilities or waste management.

11.45 .

Residual Impact Assessment

Construction Stage

11.46 No construction stage residual impacts on material assets will arise.

Operational Stage

11.47 No operational stage residual impacts on material assets will arise.

Post – Operational Stage

11.48 No operational stage residual impacts on material assets will arise.

Monitoring

11.49 There is no specific monitoring required or proposed in relation to material assets.

References

Environmental Protection Agency (2022) 'Guidelines on the Information to be contained in Environmental Impact Assessment Reports'.

Health & Safety Authority (HSA, 2020). 'Safe Quarry – Guidelines to the Safety, Health & Welfare at Work Regulations 2008 (S.I. No. 28 of 2008)'.

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INTRODUCTION

Background

12.1 This Chapter of the Environmental Impact Assessment Report (EIAR), commissioned by SLR Consulting Ireland on behalf of Keohane Readymix Ltd. addresses the impacts on the archaeological, architectural and cultural heritage of the application site and the surrounding area of a proposal for the development of a sand and gravel pit within an overall application area of c. 4.0 ha at Knockroe townland, Bandon, Co. Cork. The site location and study area are indicated in Figure 12-1.

12.2 The proposed development is described in detail in EIAR Chapter 2 – Project Description.

Scope of Work / Methodology

12.3 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, 2003 and 2022).

12.4 The criteria and definitions for describing effects set out below is drawn from the 2022 EPA Guidelines.

Quality of Effects	Positive A change which improves the quality of the environment.
	Neutral No effects or effects that are imperceptible, within normal bounds or variation or within the margin of forecasting error.
	Negative/adverse Effects A change which reduces the quality of the environment.
Significance of effects	Imperceptible An effect capable of measurement but without noticeable consequences.
	Not significant An effect which causes noticeable changes in the character of the environment but without noticeable consequences.
	Slight effects An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
	Moderate effects An effect that alters the character of the environment in a manner that is consistent with existing and emerging trends.
	Significant effects An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.

	Very Significant effects An effect which, by its character, magnitude, duration or intensity significantly alters the majority of a sensitive aspect of the environment.
	profound effects An effect which obliterates sensitive characteristics
Describing the extent and context of effects	Extent Describe the size of the area, the number of sites, and the proportion of population affected by an effect.
	Context Describe whether the extent, duration, or frequency will conform or contrast with established (baseline) conditions.
Describing the Probability of effects	Likely effects The effects can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented.
	Unlikely effects The effects can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.
Describing the duration and frequency of effects	Momentary effects Effects lasting from seconds to minutes.
	Brief effects Effects lasting less than a day.
	Temporary effects Effects lasting less than a year.
	Short-term effects Effects lasting one to seven years.
	Short-term effects Effects lasting seven to fifteen years.
	Long term-term effects Effects lasting fifteen to sixty years.
	Permanent effects Effects lasting over sixty years.
	Reversible effects Effects that can be undone, for example through remediation or restoration.
	Frequency of effects Describe how the effect will occur.
Describing the types of effects	Indirect effects Impacts on the environment which are not a direct result of the project.
	Cumulative effects The addition of minor or significant effects, including effects of other projects, to create a larger more significant effect.
	'Do-Nothing Effects' The environment as it would be in the future should the project not be carried out.
	'Worst case' effects The effects arising from a project in the case where mitigation measures substantially fail.

	Indeterminable effects When the full consequences of a change in the environment cannot be described.
	Irreversible effects When the character distinctiveness, diversity or reproductive capacity of an environment is permanently lost.
	Residual effects The degree of environmental change that will, occur after the proposed mitigation measures take effect.
	Synergistic effects Where the resultant effect is of greater significance than the sum of its constituents.

12.5 The study involved detailed investigation of the archaeological and historical background of the development site, the landholding and the surrounding area extending 1km from the development boundary (Fig. 12-1). This area was examined using information from the Record of Monuments and Places of County Cork, the Sites and Monuments Record, the Cork County Development Plan, the National Inventory of Architectural Heritage, lists of excavations and cartographic and documentary sources.

12.6 An impact assessment and mitigation strategy have been prepared. An impact assessment is undertaken to outline potential adverse impacts that the proposed development may have on the cultural resource, while a mitigation strategy is designed to avoid, reduce or offset such adverse impacts.

12.7 The application site is located in the townland of Knockroe, Co. Cork, on OS Six Inch sheet No.111, c.1.5km to the southeast of Innishannon, Co. Cork.

12.8 Extracts from the Record of Monuments and Places for County Cork are presented on a map of the local area around the site in Figure 12-1. RMP sites included on the Records of Monuments and Places statutory mapping are identified by black circles. The application area is shown in red.

Contributors / Author(s)

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

Limitations / Difficulties Encountered

12.10 No difficulties were encountered during the desktop study, field survey or in the preparation of this report.

REGULATORY BACKGROUND

12.11 The following paragraphs set out the regulatory background with regard to cultural impact assessments in Ireland in general and the site-specific planning background relevant to this cultural impact assessment, in particular.

Legislation

12.12 No specific Irish legislation exists governing cultural heritage assessments.

Planning Policy and Development Control

12.13 The County Cork Development Plan 2022-2028 (CDP) is the statutory plan detailing the development objectives/policies of the local authority. The plan includes objectives and policies, relevant to this assessment, i.e. regarding cultural heritage.

Built and Cultural Heritage

12.14 Volume 1, Chapter 16 of the Cork County Development Plan sets out the policies on built and cultural heritage within the county. The Plan recognises the importance of identifying, valuing and safeguarding our archaeological, architectural and cultural heritage for future generations through appropriate protection, management and enhancement measures or via the sensitive development of this resource.

12.15 The Council's objectives regarding archaeological heritage are to:

HE 16-2 Protection of Archaeological Sites and Monuments

Secure the preservation (i.e. preservation in situ or in exceptional cases preservation by record) of all archaeological monuments and their setting included in the Sites and Monuments Record (SMR) (see www.archaeology.ie) and the Record of Monuments and Places (RMP) and of sites, features and objects of archaeological and historical interest generally. In securing such preservation, the planning authority will have regard to the advice and recommendations of the Development Applications Unit of the Department of Housing, Local Government and Heritage as outlined in the Frameworks and Principles for the Protection of the Archaeological Heritage policy document or any changes to the policy within the lifetime of the Plan.

HE 16-3: Underwater Archaeology

Protect and preserve the archaeological value of underwater archaeological sites and associated underwater and terrestrial features. In assessing proposals for development, the development will take account of the potential underwater archaeology of rivers, lakes, wetlands, intertidal and sub-tidal environments through appropriate archaeological assessment by a suitably qualified archaeologist.

HE 16-4: Zones of Archaeological Potential in Historic Towns and Settlements

Proposed development works in Historic Towns and settlements, Zones of Archaeological Potential, Zones of Notification and the general historic environs in proximity to the zones, should

take cognisance of the impact potential of the works, and all appropriate archaeological assessments employed to identify and mitigate the potential impacts.

HE 16-5: Zones of Archaeological Potential

Protect the Zones of Archaeological Potential (ZAPs) located within historic towns, urban areas and around archaeological monuments generally. Any development within the ZAPs will need to take cognisance of the upstanding and potential for subsurface archaeology, through appropriate archaeological assessment.

HE 16-6: Industrial and Post Medieval Archaeology

Protect and preserve industrial and post-medieval archaeology and long-term management of heritage features such as mills, limekilns, forges, bridges, piers and harbours, water-related engineering works and buildings, penal chapels, dwellings, walls and boundaries, farm buildings, estate features, military and coastal installations. There is a general presumption for retention of these structures and features. Proposals for appropriate redevelopment including conversion should be subject to an appropriate assessment and record by a suitably qualified specialist/s.

HE 16-7: Battlefield, Ambush and Siege Sites and Defensive Archaeology

Protect and preserve the defensive archaeological record of County Cork including strategic battlefield, ambush and siege sites, and coastal fortifications and their associated landscape due to their historical and cultural value. Any development within or adjoining these areas shall undertake a historic assessment by a suitably qualified specialist to ensure development does not negatively impact on this historic landscape.

HE 16-8: Burial Places

Protect all historical burial places and their setting in County Cork and encourage their maintenance and care in accordance with appropriate conservation principles.

HE 16-9: Archaeology and Infrastructure Schemes

All large scale planning applications (i.e. development of lands on 0.5 ha or more in area or 1km or more in length) and Infrastructure schemes and proposed roadworks are subjected to an archaeological assessment as part of the planning application process which should comply with the Department of Arts, Heritage and the Gaeltacht's codes of practice. It is recommended that the assessment is carried out following pre planning consultation with the County Archaeologist, by an appropriately experienced archaeologist to guide the design and layout of the proposed scheme/development, safeguarding the archaeological heritage in line with Development Management Guidelines.

HE 16-10: Management of Monuments within Development Sites

Where archaeological sites are accommodated within a development it shall be appropriately conservation/ protection with provision for a suitable buffer zone and long-term management plan put in place all to be agreed in advance with the County Archaeologist.

HE 16-11: Archaeological Landscapes

To protect archaeological landscapes and their setting where the number and extent of archaeological monuments are significant and as a collective are considered an important archaeological landscape of heritage value.

HE 16-12: Raising Archaeological Awareness

As part of the Heritage Plan it is an objective to develop a management plan, if resources allow, for the archaeology of County Cork, which could include an evaluation of the Historic Character Assessment of Cork County helping to identify areas for tourism potential, and strategic research while also promoting best practice in archaeology and encouraging the interpretation, publication and dissemination of archaeological findings from the development application process.

HE 16-13: Undiscovered Archaeological Sites

To protect and preserve previously unrecorded archaeological sites within County Cork as part of any development proposals. The Council will require preservation in situ to protect archaeological monuments discovered. Preservation by record will only be considered in exceptional circumstances.

12.16 The Council's objectives regarding architectural heritage are to:

HE 16-14: Record of Protected Structures

a) The identification of structures for inclusion in the Record will be based on criteria set out in the Architectural Heritage Protection Guidelines for Planning Authorities (2011).

b) Extend the Record of Protected Structures in order to provide a comprehensive schedule for the protection of structures of special importance in the County during the lifetime of the Plan as resources allow.

c) Seek the protection of all structures within the County, which are of special architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest. In accordance with this objective,

a Record of Protected Structures has been established and is set out in Volume Two Heritage and Amenity, Chapter 1 Record of Protected Structures.

d) Ensure the protection of all structures (or parts of structures) contained in the Record of Protected Structures.

e) Protect the curtilage and attendant grounds of all structures included in the Record of Protected Structures.

f) Ensure that development proposals are appropriate in terms of architectural treatment, character, scale and form to the existing protected structure and not detrimental to the special character and integrity of the protected structure and its setting.

g) Ensure high quality architectural design of all new developments relating to or which may impact on structures (and their settings) included in the Record of Protected Structures.

h) Promote and ensure best conservation practice through the use of specialist conservation professionals and craft persons.

i) In the event of a planning application being granted for development within the curtilage of a protected structure, that the repair of a protected structure is prioritised in the first instance i.e. the proposed works to the protected structure should occur, where appropriate, in the first phase of the development to prevent endangerment, abandonment and dereliction of the structure.

HE 16-15: Protection of Structures on the NIAH

Protect where possible all structures which are included in the NIAH for County Cork, that are not currently included in the Record of Protected Structures, from adverse impacts as part of the development management functions of the County.

HE 16-16: Protection of Non- Structural Elements of Built Heritage

Protect non-structural elements of the built heritage. These can include designed gardens/garden features, masonry walls, railings, follies, gates, bridges, shopfronts and street furniture. The Council will promote awareness and best practice in relation to these elements.

HE 16-17: Areas of Special Planning Control

Establish areas of special planning control within Architectural Conservation Areas where appropriate. These areas will include a scheme setting out objectives for the conservation and enhancement of the special character of the area, and will be based on an Architectural Appraisal of each town.

HE 16-18: Architectural Conservation Areas

Conserve and enhance the special character of the Architectural Conservation Areas included in this Plan. The special character of an area includes its traditional building stock, material finishes, spaces, streetscape, shopfronts, landscape and setting. This will be achieved by;

(a) Protecting all buildings, structures, groups of structures, sites, landscapes and all other features considered to be intrinsic elements to the special character of the ACA from demolition and non-sympathetic alterations.

(b) Promoting appropriate and sensitive reuse and rehabilitation of buildings and sites within the ACA and securing appropriate infill development.

(c) Ensure new development within or adjacent to an ACA respects the established character of the area and contributes positively in terms of design, scale, setting and material finishes to the ACA.

(d) Protect structures from demolition and non sympathetic alterations.

(e) Promoting high quality architectural design within ACAs.

(f) Seek the repair and re-use of traditional shopfronts and where appropriate, encourage new shopfronts of a high quality architectural design.

(g) Ensure all new signage, lighting advertising and utilities to buildings within ACAs are designed, constructed and located in such a manner they do not detract from the character of the ACA.

(h) Protect and enhance the character and quality of the public realm within ACAs. All projects which involve works within the public realm of an ACA shall undertake a character assessment of the said area which will inform a sensitive and appropriate approach to any proposed project in terms of design and material specifications. All projects shall provide for the use of suitably qualified conservation architects/ designers.

(i) Protect and enhance the character of the ACA and the open spaces contained therein. This shall be achieved through the careful and considered strategic management of all signage, lighting, utilities, art works/pieces/paintings, facilities etc to protect the integrity and quality of the structures and spaces within each ACA.

(j) Ensure the protection and reuse of historic street finishes, furniture and features which contribute to the character of the ACA.

HE 16-19:Vernacular Heritage

a) Protect, maintain and enhance the established character, forms, features and setting of vernacular buildings, farmyards and settlements and the contribution they make to our architectural, archaeological, historical, social and cultural heritage and to local character and sense of place.

b) Cork County Council encourages best conservation practice in the renovation and maintenance of vernacular buildings including thatched structures through the use of specialist conservation professionals and craft persons. Development proposals shall be accompanied by appropriate documentation compiled by experienced conservation consultant.

c) There will generally be a presumption in favour of the retention of vernacular buildings and encouragement of the retention and re-use of vernacular buildings subject to normal planning considerations, while ensuring that the re-use is compatible with environmental and heritage protection.

HE 16-20: Historic Landscapes

a) Recognise the contribution and importance of historic landscapes and their contribution to the appearance of the countryside, their significance as archaeological, architectural, historical and ecological resources.

b) Protect the archaeological, architectural, historic and cultural element of the historic/heritage landscapes of the County of Cork.

c) All new development within historic landscapes should be assessed in accordance with and giving due regard to Cork County Councils 'Guidance Notes for the Appraisal of Historic Gardens,

Demesnes, Estates and their Settings' or any other relevant guidance notes or documents issued during the lifetime of the Plan.

HE 16-21: Design and Landscaping of New Buildings

a) Encourage new buildings that respect the character, pattern and tradition of existing places, materials and built forms and that fit appropriately into the landscape.

b) Promote sustainable approaches to housing development by encouraging new building projects to be energy efficient in their design and layout.

c) Foster an innovative approach to design that acknowledges the diversity of suitable design solutions in most cases, safeguards the potential for exceptional innovative design in appropriate locations and promotes the added economic, amenity and environmental value of good design.

d) Require the appropriate landscaping and screen planting of proposed developments by using predominantly indigenous/local species and groupings and protecting existing hedgerows and historic boundaries in rural areas. Protection of historical/commemorative trees will also be provided for.

HE 16-22: Village Design Statements

Facilitate the preparation and implementation of village design statements and other community led projects and plans to enhance village environments whilst ensuring that such initiatives are consistent with other Plan policies.

12.17 The Council's objectives regarding cultural heritage are to:

HE 16-23: Cultural Heritage

Protect and promote the cultural heritage of County Cork as an important economic asset and for its intrinsic value to identity of place and the well being of people within the County.

HE 16-24: Naming of New Developments

Promote and preserve local place names, local heritage and the Irish language by ensuring the use of local place names or geographical or cultural names which reflect the history and landscape of their setting in the naming of new residential and other developments. Such an approach will be a requirement of planning permissions for new developments.

HE 16-25: Gaeltacht Areas

Protect the linguistic and cultural heritage of the Gaeltacht areas of Cork by:

a) Encouraging development within the Gaeltacht and in the Gaeltacht Service Town of Macroom, which promotes, facilitates or complements the cultural heritage, including Irish language use;

b) Encouraging development within the Gaeltacht and the Gaeltacht Service Town of Macroom, which provides employment or social facilities, especially, but not exclusively, where these are of relevance to local young people;

c) Resisting development within the Gaeltacht, which would be likely to erode the cultural heritage (including the community use of Irish language), unless there are over-riding benefits for the long-term sustainability of the local community or for the proper planning and sustainable development of a wider area;

d) Ensuring that where the County Council erects signs within the Gaeltacht, these have Irish as their primary language, unless there are positive and over-riding reasons for doing otherwise;

e) Discouraging the exhibition of advertisements within the Gaeltacht which do not use Irish as their primary language;

f) Consider the requirement for the use of demanding linguistic impact analyses with planning applications for particular major developments. These would be cases where the potential impact of the development on the use of Irish as the community language is not immediately apparent and pivotal in the determination of the application.

g) Facilitate the preparation and implementation of local Gaeltacht Plans, Programmes and Initiatives, including Language Plans and Conservation Plans such as the Múscraí Heritage Plan, in the interests of the proper planning and sustainable development of Cork's Gaeltachts, provided that such plans are in keeping with Council policy.

h) Encourage the use of the Irish language, not just in Gaeltacht areas but throughout the County, particularly with regard to service provision, planning and development and Council initiatives/activities.

i) The use of the Irish language is promoted in the design of developments e.g. business advertising, recreational and community facilities are clearly identified and provided and shop-front signage should be in the Irish language;

j) The Plan encourages collaboration between Gaeltacht stakeholders, Gaeltacht communities and State agencies in the future planning and development projects to ensure the protection and promotion of the Irish language as the community language.

Guidelines

12.18 The report format and some of the descriptions of effects are based on the **Guidelines on the Information to be contained in Environmental Impact Assessment Reports**, published by the Environmental Protection Agency (EPA) in 2022.

Significant Risks

12.19 There are no known significant risks to human health or environmental effects, which may occur in relation to this cultural heritage assessment.

RECEIVING ENVIRONMENT

Study Area

12.20 The overall study area is shown in Figure 12-1.

Baseline Study Methodology

12.21 Research has been undertaken in two phases. The first phase comprised a paper survey of all available archaeological, historical and cartographic sources. The second phase involved the archaeological assessment of the proposed development area.

Paper Study

12.22 This is a document search. The following sources were examined and a list of sites and areas of archaeological potential compiled:

- Record of Monuments and Places County Cork
- The Sites and Monuments Record
- Available aerial photography
- Cartographic and written sources relating to the study area
- Cork Development Plan 2022-2028
- The National Inventory of Architectural Heritage

The Record of Monuments and Places

12.23 This was established under section 12 (1) of the 1994 National Monuments (Amendment) Act and provides that the Minister shall establish and maintain a record of monuments and places where the Minister believes there are monuments, such record to be comprised of a list of monuments and relevant places and a map or maps showing each monument and relevant place in respect of each county in the State. The associated files contain information of documentary sources and field inspections where these have taken place. Note that although the Historic and Archaeological Heritage and Miscellaneous Provisions Act 2023 was signed into law by the President on October 13, 2023, the act had not been commenced at the time this assessment was prepared. This assessment uses the National Monuments Acts 1930-2014, which were still in force at the time the assessment was completed. Several Recorded monuments were noted within the study area. All available information on these sites is provided in Appendix 12-1.

Cartographic Sources

12.24 This included seventeenth century mapping as well the 1st and 2nd editions of the Ordnance Survey six-inch maps and Documentary sources provide more general historical and archaeological background.

The County Development Plan

12.25 This notes structures listed for preservation.

Field Inspection

12.26 A field inspection was carried out on 1st of October 2024 to determine the location, extent and ascertain the significance of any archaeological sites and to identify any previously unrecorded or suspected sites and portable finds.

RECEIVING ENVIRONMENT, HISTORICAL AND ARCHAEOLOGICAL LANDSCAPE

The Landscape

12.27 The application site is located in the is located in the townland of Knockroe, Co. Cork, on OS Six Inch sheet No.111, c.1.5km to the southeast of Innishannon, Co. Cork. The application site is located in agricultural lands. The soil Ross Carbery coarse loamy drift with siliceous stones overlying compact drift with siliceous stones.

Historical and Archaeological Background

12.28 The following is a brief summation of the main types of sites and monuments that are known from the county along with the historical development of the study area. It is intended as a guide to the types of sites and monuments that might be encountered in the study area.

12.29 The site is situated in the townland of Knockroe, in the Barony of Carbery East, and the civil parish of Innishannon.

The Prehistoric Period

12.30 12.31 There is minimal evidence of prehistoric material in the study area. There are no known megalithic tombs or other Neolithic sites or monuments known from the study area or the surrounding area. The only indication of Bronze Age activity in the study area is the Fulacht Fiadh, or burnt mound, from Knockroe townland (CO111-006-) well to the south of the development. There are no Iron Age sites or finds known from the study area..

The Early Medieval Period

12.31 In the Early Medieval period (500 AD-1170 AD) the study area formed part of the cantred of Uí Meic Caille, later known as Ymakille, which formed part of the Kingdom of Cenél mBéicce (MacCotter 2008, 154). Classically settlement at this period is indicated by the presence of enclosed farmsteads known as ringforts, when enclosed with earthen banks, and cashels when enclosed by stone walls. There is one enclosure in the study area that may date to this period. The Cliff-edge fort at Dromkeen (CO111-008-) is situated to the extreme north of the application area.

The Later Medieval Period

12.32 Following the Anglo-Norman invasion of Ireland and the submission of Dermot MacCarthy, King of Desmond, to King Henry II in 1172, the city of Cork was by occupied Robert fitz Stephen and Milo de Cogan who used the city as a base to occupy the Kingdom of Desmond. After defeating Dermot MacCarthy he granted them 7 cantreds of Desmond. De Cogan got Kenalbek and Kenaleth (Kinalea), which at that time included the study area, and Obathan to the west of Cork city (Otway-Ruthven 1980, 62-3). The barony of Kinalea later passed from the de Cogans to the Barry Ogs of Rincorran by marriage. By the mid thirteenth century the Barry Ogs were in control of Innishannon as King Henry III

ordered a judgement concerning Philip de Barry's rights in Inshonan (Innishannon) to be reopened in 1256 (Sweetman 1876-86, II, No. 497). However, Anglo-Norman control of Kinalea was noted undisputed. Innishannon is mentioned twice in the thirteenth century in the Book of MacCarthy. In 1206. Domhnall Mór son of Diarmaid Cille Badhun, was noted as having killed Geoffrey de Cogan and to have won a battle at Inis Eóghanain. Again in 1262 it was noted that Inis Eóghanáin was burned by Fínghin Reanna Róin MacCarthy. In the papal taxation of 1291 Ecia Ymsogenan (Innishannon) was valued at 15 marks. In the ecclesiastical taxation of 1306 the parish of Insouna (Innishannon), also referred to as Innishanna, which was part of the Deanery of Kenalethe (Kinalea) was valued at 18 marks (Sweetman 1876-86, V). Innishannon, together with its ferry across the Bandon, was granted by King Henry V to Philip de Barry in 1412 (Lewis 1837)

12.33 The process of Anglo-Norman settlement or sub-infeudation was often associated with the construction of timber castles, known as Motte and Baileys. These earthwork fortifications were used to house and defend the Norman lords and their retinues while they set about the process of pacifying and organizing their new fiefs. However, there are no mottes in the study area or in this part of Cork.

12.34 Manorialism describes the organisation of the feudal rural economy and society characterised by the vesting of legal and economic power in a lord supported economically from his own direct landholding and from the obligatory contributions of a legally subject part of the peasant population under his jurisdiction. In Ireland the Lord's manor house was also sometimes enclosed by a rectangular moat and these sites 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. The closest examples are a pair of moated sites in Tullyland townland (CO111-021--- and Co111-021---) to the south-west. A defended manor house may not have been needed as nearby Innishannon town was walled..

12.35 The fifteenth century was characterised by the decline of Anglo-Norman power in Ireland which had been ebbing since the early fourteenth century. Part of the response to this was the construction of masonry tower houses which commenced in the early fifteenth century AD and lasted until the end of the sixteenth century. Many were built after King Henry VI introduced a building subsidy of £10 in 1429 to every man in the Pale who wished to build a castle within 10 years (Statute Rolls of the Parliament of Ireland, Reign of Henry VI, pp 33-5). Tower Houses were built by both the English and the Irish. There are no Tower Houses in the study area. The closest example is at Ship-pool (CO111-010-) in the southeast of the study area. This was built under Royal licence by Philip Roche in 1540s. In the early fifteenth century the western part of Innishannon parish was occupied by the MacCarthy Reagh sept of Carbery who captured the Barry Tower House at Skevanish (Nicholls 1993, 184; RMP 97:050). The Mac Carthy Reagh sept were descendants of Donnell Got who was a descendant of Donnel Mor MacCarthy King of Desmond. The McCarthys controlled the study area to the west of the Bandon River until the second half of the seventeenth century. The Annals of the Four Masters note a battle fought outside Inis-Eoghanain in 1560 between the McCarthys and the forces of the Earl of Desmond.

The Post-Medieval Period

12.36 The Book of Survey and Distribution (Manuscript National Library of Ireland) records that in 1640 Knockroe belonged to Daniell McCarthmore. However following the War of the

Three Kingdoms and the Act of Settlement the MacCarthys lost their lands in the study area and Knockroe had come into the hands of Edward Adams. Griffith's Valuation indicates that by 1854 Knockroe had come into the hands of William Kingston.

BUILDINGS

Protected Structures

12.37 The Cork County Development Plan 2022-2028 and the Record of Protected Structures was examined as part of the baseline study for this chapter of the EIAR. The review established that there are no protected structures located within the application area. There are two protected structures located within the study area. These are noted below. Both these structures are located on the eastern side of the River Bandon and will not be directly impacted by the development proposal. The banks of the river are wooded and neither structure has a any views of the application area..

No.	00891
Structure type	House
Townland	Coolmoreen
Designation	Record of Protected Structure
Data source	Cork County Development Plan 2022-2028
Perceived Significance:	Regional
Quality of effect	Neutral
Significance of effect	Not significant
Description	1 Storey Vernacular Dwelling
Illustration	-

No.	00711
Structure type	Castle
Townland	Ship-pool
Designation	Record of Protected Structure
Data source	Cork County Development Plan 2022-2028
Perceived Significance:	Regional
Quality of effect	Neutral
Significance of effect	Not significant
Description	Rectangular tower (10.4m E-W; 8m N-S) with circular turret attached at NE corner (diam. c. 4m). Photo of c. 1907 (Fuller 1907, facing 2) shows tower standing to full height, of apparently 5 storeys, with gable atop W wall. Upper part now fallen so that walls stand to roughly 2nd floor level.
Illustration	-

National Inventory of Architectural Heritage

12.38 The National Inventory of Architectural Heritage (NIAH) which is maintained by the Dept. of Housing, Local Government and Heritage was examined as part of the baseline study for this chapter of the EIAR on the 14th of August 2024. The review established that there are no NIAHs in the application area. There are five structures included in the NIAH situated outside the application area in the study area. The closest structure is a gate lodge in Skanagore townland (No. 20911106) that located c.700m southeast of the application are and has no views of it. This and the remaining structures in the study area include in the NIAH are considered to be too far distant from the proposed development to be impacted (see below).

No.	20911101
Structure type	House
Townland	Dromkeen
Designation	None
Data source	National Inventory of Architectural Heritage
Perceived Significance:	Regional
Quality of effect	Neutral
Significance of effect	Not significant
Description	Freestanding three-bay two-storey house, built c.1940, having paired canted bay windows with linking porch canopy to front (south-east) and single-bay two-storey return to rear (north-west). Hipped slate roofs having pitched slate roof to return with rendered chimneystacks and cast-iron rain water goods. Hipped lean-to slate roof to canopy. Rendered walls with plinth, having roughcast rendered wall and rendered sill band to first floor of front (south-east) elevation. Square-headed window openings with render sills throughout, having raised rendered surrounds to first floor of front elevation. One-over-one pane timber sliding sash windows in single and bipartite arrangements. Square-headed door opening with replacement timber panelled door and overlight to front elevation, flanked by fixed timber-framed sidelights. Square-headed door openings with rendered stepped approaches to rear and side (south-west) elevation, having timber battened doors. Located within own grounds with U-plan farmyard to north-west. Rusticated concrete block enclosing wall and piers with render block coping and double-leaf wrought-iron gates.
Illustration	-

No.	20849030
Structure type	Country House
Townland	Coolmoreen
Designation	None
Data source	National Inventory of Architectural Heritage
Perceived Significance:	Regional
Quality of effect	Neutral
Significance of effect	Not significant

Description	Detached L-plan two-storey with dormer attic former country house, built c.1720, comprising three-bay block with three-bay bow fronted block attached to north-west and two-storey canted bay window to south-east gable. Four-bay two-storey return to side (north-west). Five-bay single-storey extension to side (north-west) with circular-profile addition and recent glazed timber extension to north-west. Five-bay single-storey addition to side (south-east) with pedimented central bay. Two and three-storey extensions to rear (north-east). Now in use as hotel. Pitched slate roofs to main L-plan block and rear extensions, having rendered chimneystacks and eaves course with cast-iron rainwater goods. Pitched slate and flat bitumen roofs to dormer windows. Hipped slate roofs to canted bay, bow-fronted breakfront, central block of side (north-west) extension and north-easternmost extension to rear. Flat bitumen and lean-to artificial slate roofs to remaining additions and extensions having rendered parapet to front elevation of side (north-west) extension. Roughcast rendered walls throughout having rendered plinth, render coping to side (north-west) extension parapet. Diminishing window openings to front (south-west) elevation, square-headed window openings with stone sills and label mouldings to ground and first floors of front elevation having two-over-two and one-over-one pane timber sliding sash windows. Angled reveals to first floor window openings of two south-eastern most bays. Bipartite timber framed window with one-over-one pane timber sliding sash windows to single first floor window. Two-over-one pane timber sliding sash windows to front dormer windows. Ocular window openings to second floor of bow-fronted breakfront having uPVC casement windows. Square-headed window openings with stone sills and raised render reveals to side (north-west, south-east) elevations, having two-over-two pane timber sliding sash windows. Square-headed window openings to rear extensions having two-over-two pane timber sliding sash windows and uPVC casement windows. Diamond window opening to gable (south-east) of rear extension having uPVC casement window. Square-headed bowed bay window opening to side (south-west) elevation of rear elevation having bowed fixed multiple pane timber framed window having timber mullions and transoms having brick pilaster to side (south-west) surmounted by dentilated render cornice surmounted by render lion statue. Square-headed window openings with render sills to side return dormers having replacement uPVC casement windows. Square-headed door opening to front elevation within render doorcase, comprising pilasters, moulded architrave and cornice having timber panelled door and single-pane overlight, leading to glazed timber door. Square-headed door opening to bow-fronted breakfront within brick and render door surround, having projecting splayed reveals surmounted by dentilated cornice and lion statue, with tiled hood moulding above. Four round-headed door openings to side (north-west) extension and circular profile addition having double-leaf glazed timber French doors surmounted by sunburst fanlights. Square-headed door opening to glazed timber addition of side (north-west) extension having double-leaf glazed timber doors. Square-headed door opening to side (south-east) extension within pedimented doorcase comprising Doric columns surmounted by architrave frieze and cornice. Glazed timber door with single-pane stained-glass

	overlight. Square-headed door openings to rear extensions having timber battened and panelled timber doors. Located within own extensive grounds near the bank of the Bandon River with recent slipway and pier to bank.
Illustration	-

No.	20911106
Structure type	House
Townland	Skanagore
Designation	None
Data source	National Inventory of Architectural Heritage
Perceived Significance:	Regional
Quality of effect	Neutral
Significance of effect	Not significant
Description	Detached three-bay single-storey gate lodge, built c.1820, having later lean-to additions to rear (north-west) and side (north-east). Hipped replacement tile roof with gable to side (north-east), having red-brick chimneystack and uPVC rainwater goods. Corrugated-iron roofs to lean-to additions. Lined-and-ruled rendered walls with plinth to front (south-east) and side (south-west) elevations, having rendered walls to side (north-east) elevation and additions. Round-headed blind niches with raised render voussoirs and tooled limestone sill to side (south-west) elevation. Round-headed window openings with tooled limestone sills to front elevation, having three-pane timber casement windows surmounted by tripartite fanlights. Round-headed door opening with replacement timber battened door to front elevation. Square-headed window openings to side (south-east) elevation of addition to north-west. Square-headed door openings to rear (north-west) elevations of additions. Located within grounds of the Shippool estate, having rubble stone boundary walls including splayed rendered entrance with plinth, tooled limestone coping and square-profile piers with single and double-leaf cast-iron gates.
Illustration	-

No.	20911107
Structure type	House
Townland	Skanagore
Designation	None
Data source	National Inventory of Architectural Heritage
Perceived Significance:	Regional
Quality of effect	Neutral
Significance of effect	Not significant
Description	Detached U-plan five-bay single-storey over basement with dormer-attic former country house, built c.1925, with central bowed-bay window. Multiple-bay single-storey additional wings to side (south-east, north-west) elevations having projecting bays to front (south-west) with canted bay windows. Flat-roofed addition to north-west end of rear (north-east) elevation having lean-to additions to side (north-west) and rear (north-east) elevations. Hipped slate roofs with red-brick chimneystacks, rooflights and cast-iron rainwater goods. Felt-lined flat roofs to canted bays, central bowed bay, dormers and flat-roofed addition to rear having rough-cast rendered chimneystack with redbrick copping. Roughcast rendered walls throughout with tooled limestone plinth band to house, rendered plinth band to later additions. Square-headed openings having later timber casement windows throughout. Tooled stone sills to front and rear elevations of house, rendered sills bowed-bay, later additions and canted bays. Bowed bay comprising of rendered sill and six timber-framed casement windows. Round-headed door openings having concrete stepped approach, double-leaf timber glazed doors surmounted by fanlight to side (north-west and south-east) elevations of projecting end-bays, timber battened door with blocked overlight to rear elevation of basement. Square-headed door openings having rendered stepped approach, double-leaf timber glazed doors with overlight to front elevation, stone paved stepped approach and replacement timber panelled door surmounted by spoked overlight to side (south-east) elevation and concrete stepped approach with timber battened door having overlight to rear elevation of south-east wing. Timber panelled door to internal courtyard rear elevation. Timber battened doors to rear (north-east) elevations of lean-to additions. Timber battened utility door to basement rear elevation of north-west wing. Rendered parapet wall and coping with rendered and stone paved stairs to basement rear elevation. Stone paved patio with rubble stone parapet walls and central bowed stepped approach. Stables to south-east of house. L-plan farmyard to south-east of house, comprising of integral double-height carriage arch with three-bay two-storey former gate/carriage house to front (south-west) elevation with eleven-bay two-storey return to side (south-west), pitched slate roof to gate/carriage house, hipped slate roof to return and rubble-stone walls throughout. Two entrances with associated gate lodges, three-bay single-storey lodge to north-west and two-bay single-storey lodge to south-west.
Illustration	-

No.	20911108
Structure type	House
Townland	Ship-pool
Designation	None
Data source	National Inventory of Architectural Heritage
Perceived Significance:	Regional
Quality of effect	Neutral
Significance of effect	Not significant
Description	Detached two-bay single-storey gate lodge, built c.1820, having lean-to addition to side (south-west) with recessed porch to front (north-west) elevation and later lean-to addition to side (south-west). Currently vacant. Hipped artificial slate roof with rendered chimneystack and uPVC rainwater goods. Artificial slate roof to lean-to addition with corrugated-iron roof to later addition. Lined-and-ruled rendered walls throughout having rendered walls to side (south-west) and rear (north-east) elevations of lean-to addition. Corrugated-iron walls to later lean-to addition. Square-headed window openings with rendered sills and two-over-two pane timber sliding sash windows throughout. Replacement timber casement windows to rear elevation of lodge and side (south-east) elevation of lean-to addition. Blind square-headed door opening to front elevation of lodge. Square-headed door opening to interior of porch, having glazed timber door. Square-headed door opening to side (north-west) elevation of lean-to addition with timber battened door. Located at south-west entrance to Shippool House, having rubble stone boundary walls including splayed rendered walls with plinth, tooled limestone coping, and square-profile piers with single and double-leaf cast-iron gates.
Illustration	-

Field Survey

12.39 A field survey was carried out on the 1st of October 2024. This involved visiting and photographing all additional structures indicated on the 1942 Edition of the six-inch Ordnance Survey mapping within 100m of the proposed extension area. The locations of the structures are indicated on Fig. 12.1. There is one structure located in this area that is not of special architectural significance (see below).

No.	1
Structure type	Building
Townland	Knockroe

Designation	None
Data source	1942 edition 6 inch Ordnance Survey map
Perceived Significance:	No special architectural significance.
Type of effect:	Neutral
Significance of impact	Imperceptible
Description	Ruined two storey stone structure with the northeast wall and roof demolished and all fittings removed.
Illustration	Plate 12-1

No.	2
Structure type	?
Townland	Knockroe
Designation	None
Data source	1942 edition 6 inch Ordnance Survey map
Perceived Significance:	No special architectural significance.
Type of effect:	Neutral
Significance of impact	Imperceptible
Description	Ruined three-bay single-storey stone house with collapsed roof and mostly overgrown.
Illustration	Plate 12-1

ARCHAEOLOGY

Archaeological Assessment

Recorded Monuments

12.40 Note that in accordance with the Historic and Archaeological Heritage and Miscellaneous Provisions Bill 2023 the RMP will be replaced by the Register of Monuments, but the RMP was still legally in force when this assessment was prepared.

12.41 Examination of the Record of Monuments and Places for Co. Cork indicated that there are no Recorded Monuments located within the application site (see Fig. 12-1 and Appendix 12-A). These are described in the RMP as:

12.42 The closest Recorded Monument to the proposed development is a cliff-edge fort in Dromkeen townland CO111-008----. This monument is described in the RMP as:

CO111-008- Dromkeen Cliff-edge fort

At end of gravel spur overlooking W bank of Bandon River. Roughly oval area (30.7m E-W; 23m N-S) enclosed by deep fosse (D 3.7m) and counterscarp bank (H 0.6m) S->NE; by sheer cliff face NE->S. Interior split-level; W half 2.4m higher.

This monument is located c.65m to the north of application area in a wooded area. The monument will not be directly or indirectly impacted by the proposal and will have no views of the application area.

12.43 The remaining Recorded Monuments in the study area are situated further from the application area and are considered too far distant to be directly or indirectly impacted by the proposed development.

Sites and Monuments Record

12.44 Examination of the Sites and Monuments Record (SMR) which is maintained by the Dept. of Housing, Local Government and Heritage on 14th of August 2024 indicated that there are no SMRs included within the application area or the study area.

Cartographic Sources

12.45 The Ordnance Survey 1st and 3rd edition six-inch maps and the 1st edition 25-inch maps of the area were examined (Figs. 12-2 and 12-3). The analysis did not indicate any previously unrecorded archaeological sites in the application area or vicinity.

Aerial Photographs

12.46 Assessment of the Ordnance Survey 1995, 1996-2000, 2001-2005, 2006-12, 2011-13 and 2013-18 aerial imagery as well as Google Earth imagery from, 2012, 2013, 2015, 2018, 2020 and 2023, Bing imagery did not indicate any additional archaeological, architectural or cultural heritage sites in the application area or vicinity.

Place Name Evidence

12.47 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 above below are based on Logainm.ie. The placenames refer mainly to topographical, and ground cover features. There is a burial ground in Kildarra townland RMP CO111-004----. There is a ringfort in Rathnaruogy townland RMP CO097-056----.

12.48

Coolmoreen	Little great corner
Dromkeen	Beautiful ridge
Farranagow	land of the smith
Kildarra	Church of the oak
Knockroe	Red hill
Rathnaruogy	Red fort
Skananagor	Place of white thorns
Ship-pool	Originally *Poul na Long*

Archaeological investigations in the study area

12.49 The application site has been the subject of a geophysical survey and a test excavation that formed part of this assessment.

12.50 Examination of the excavations database at excavations.ie indicated that have been no archaeological excavations carried out within the application area. There has been one additional archaeological investigation carried out in the study area that uncovered nothing of archaeological significance (see below).

Dromkeen Licence No. 17E0179 No archaeology found

A programme of test trenching was carried out at the site of a proposed Waste Water Treatment Plant at Dromkeen, Innishannon, Co. Cork. Test trenching was recommended in an Archaeological Impact Assessment carried out in 2009 (Jones 2009).

Six test trenches were excavated across the footprint of the proposed Waste Water Treatment Plant in February 2018. A site investigation trench was also monitored on the northern side of the River Bandon, adjacent to a church and graveyard, both recorded

monuments. Nothing of archaeological significance was found during the course of the works.

Cork Co. Development Plan

12.51 No sites of archaeological importance, National Monuments, or protected structures listed in the Cork County Development Plan 2022-2028 are located within the proposed development area.

Field Assessment

12.52 A field assessment was carried out on the 1st of October 2024 to identify any previously unknown archaeological or cultural heritage sites within the application area. See plate 12-2 for the numbered fieldwork areas.

12.53 Area 1

This is a steep north-facing slope that is heavily overgrown and inaccessible (see Plate 12-4).

12.54 Area 2

This is a relatively flat irregular hexagonal-shaped field of pasture with sloping ground to the southwest and north. There was no visible surface indication of any archaeological or cultural heritage material (see Plates 12-4 – 12-5).

Geophysical Survey

12.55 A detailed Magnetometer Survey was conducted by AMS in September 2024 (NMS Licence No. 23R0461) on 3.9 Ha (See Fig. 12-4), refer to Appendix 12-A. There are 20 anomalies identified and numbered in the report (see Table below). Nothing of definitive archaeological significance was identified and these anomalies can best be described as of potential archaeological significance. The anomalies represent areas of magnetic enhancement (R1 and R6 which is an historic field boundary), and areas of burning or dumping (R2, R3, R8, R9, R10, and R11). R4, R7 and possibly R12 may relate to the demolition of a structure and track indicated on historic mapping. Rectilinear magnetic responses (R12, R13, R14, R17 and R18) may be related to pre-OS relict field divisions. Curvilinear anomalies (R5, R15, R16 and R19) may potentially represent ditches, possible enclosing elements.

4

Anomaly ID	Anomaly Type	Size	Description	Interpretation	Significance	Impact	Recommendation

R1	Area of Enhancement	18m in diameter	subcircular area of magnetic enhancement	This area of enhancement may represent a ditch or enclosing element, such as a possible ring-ditch or barrow. However, the weak signal suggests the possibility that this anomaly is representative of near surface geology.	Potential	High	Test
R2	Archaeology?	5m x 2m in size	highly magnetic irregularly shaped anomaly	This anomaly may represent an area of *in-situ* burning or a possible pit like feature. This anomaly may represent an archaeological, modern, or natural source.	Potential	High	Test
R3	Archaeology?	5m x 2m in size	highly magnetic irregularly shaped anomaly.	This anomaly may represent an area of *in-situ* burning or a possible pit like feature. This anomaly may represent an archaeological, modern, or natural source.	Potential	High	Test
R4	Area of Enhancement	21m x 16m	This area of magnetic enhancement contains a spread of highly magnetic responses	This area of magnetic enhancement may represent an area of *in-situ* burning or dumping. This AOE may be related to a structure and trackway in this area that is present on the six-inch OS map (1843), 25-inch OS map (1863–67) and six-inch Cassini OS map (1935–38). This anomaly may represent an archaeological, modern, or natural source.	Potential	High	Test
R5	Area of Enhancement	20m in length	curvilinear area of magnetic enhancement	This area of enhancement may represent a ditch, or a potential enclosing element. However, the weak signal suggests the possibility that this anomaly is near surface geology. This anomaly may represent an archaeological, modern, or natural source.	Potential	High	Test
R6	Area of Enhancement	174m x 8m	linear area of magnetic enhancement that contains numerous highly magnetic responses	This anomaly corresponds with a field boundary depicted on the first edition (1843) six-inch, 25-inch (1863–67) and six-inch Cassini (1935–38) OS mapping and may represent the ploughed out remains of the field boundary.	Low, historic field boundary	High	Don't test
R7	Area of Enhancement	8m x 7m	This area of magnetic enhancement contains a spread of highly magnetic responses	This area of magnetic enhancement may represent an area of *in-situ* burning or dumping. However, this AOE may be related to a structure and trackway in this area that is present on the six-inch OS map (1843), 25-inch OS map (1863–67) and six-inch Cassini OS map (1935–38). This anomaly may represent an	Potential	High	Test

				archaeological, modern, or natural source.			
R8	Archaeology?	8m x 2m	highly magnetic irregularly shaped anomaly	This anomaly may represent an area of *in-situ* burning or dumping. This area of enhancement may signify an occupationally enhanced soil or a natural feature. This anomaly may represent an archaeological, modern, or natural source.	Potential	High	Test
R9	Archaeology?	12m x 2m	Highly magnetic irregularly shaped anomaly	This anomaly may represent an area of *in-situ* burning or dumping. This area of enhancement may signify an occupationally enhanced soil or a natural feature. This anomaly may represent an archaeological, modern, or natural source.	Potential	High	Test
R10	Archaeology?	8m x 1m	highly magnetic irregularly shaped anomaly	This anomaly may represent an area of *in-situ* burning or dumping. This area of enhancement may signify an occupationally enhanced soil or a natural feature. This anomaly may represent an archaeological, modern, or natural source.	Potential	High	Test
R11	Archaeology?	7m x 1m	highly magnetic irregularly shaped anomaly	This anomaly may represent an area of *in-situ* burning or dumping. This area of enhancement may signify an occupationally enhanced soil or a natural feature. This anomaly may represent an archaeological, modern, or natural source.	Potential	High	Test
R12	Archaeology?	17m in length	positive rectilinear anomaly	This anomaly may represent an enclosing element or a pre-OS map field system. However, this anomaly may be related to a structure and trackway in this area that is present on six inch OS map (1843), 25-inch OS map (1863–67) and six-inch Cassini OS map (1935–38). This anomaly may represent either, an archaeological or natural source	Potential	High	Test
R13	Area of Enhancement	20m in length	rectilinear area of magnetic enhancement	This area of magnetic enhancement may represent an enclosing element or a pre-OS field system. However, the weak signal suggests the possibility that this anomaly is near surface geology. This anomaly may represent an archaeological, modern, or natural source.	Potential	High	Test

R14	Area of Enhancement	8m in length	rectilinear area of magnetic enhance ment	This area of magnetic enhancement may represent an enclosing element or a pre-OS field system. However, the weak signal suggests the possibility that this anomaly is near surface geology. This anomaly may represent an archaeological, modern, or natural source.	Potential	High	Test
R15	Archaeology?	18m in length	positive curvilinear anomaly	This anomaly may represent a ditch, a possible enclosing element, or near surface geology. This anomaly may represent either, an archaeological or natural source.	Potential	High	Test
R16	Area of Enhancement	18m in length	negative curvilinear area of magnetic enhancement	This anomaly may represent a ditch, a possible enclosing element, or near surface geology. This weakly magnetic anomaly may represent either, an archaeological or natural source.	Potential	High	Test
R17	Archaeology?	64m in length	positive linear anomaly	This anomaly may represent a ditch, a pre-OS map field system or may be the result of an occupational disturbance such as plough furrows or imported soils. This strongly magnetic anomaly may represent either, an archaeological or natural source.	Potential	High	Test
R18	Area of Enhancement	51m x 5m	linear area of magnetic enhancement that contains numerous highly magnetic responses	The response in this AOE may represent ploughed out archaeological features such as a possible ditch; however, this anomaly may be the result of an occupational disturbance or a possible modern source such as a pipe. This anomaly may represent an archaeological, modern, or natural source.	Potential	High	Test
R19	Archaeology?	14m in length	curvilinear anomaly	This anomaly may represent a ditch, a possible enclosing element, or near surface geology. This weakly magnetic anomaly may represent either an archaeological or natural source.	Potential	High	Test
R20	Archaeology?	34m x 6m	negative linear anom aly	This anomaly may represent a ditch, a pre-OS map field system or may be the result of an occupational disturbance such as plough furrows or imported soils. This strongly magnetic anomaly may represent either an archaeological or natural source.	Potential	High	Test

Test Excavation

12.56 In February2025 the application area was the subject of a test excavation carried out by Ewelina Rondelez for Rubicon Heritage (Licence No. 25E0042), refer to Appendix 12-B. The objectives of the excavation were to:

1. Test trench all 20 anomalies to define their interpretation and archaeological significance.

2. Test trench additional areas within the application area where no geophysical anomalies were detected to test the results of the survey.

21 trenches, totalling 695 linear metres were opened by machine and checked for archaeological features (See Fig. 12-5). Test trenches were excavated at locations chosen following consultation with the site .drawings and the results of the Archaeological Geophysical Survey (AMS 2024). The most significant archaeological feature was a Burnt Mound (C008) a deposit of charcoal-rich soil containing fire-affected/shattered stones (C008) was identified in trench 21. The spread of burnt mound material measured 7.7 metres in length, 5.7metres in width, and 0.15 metres in depth. Agricultural Features of no archaeological significance consisted of a Field boundary (C004) and linear features (C006, C009 and C015) together with the evidence of in situ burning in trenches 6, 10 and 16 and field clearance (C011) indicate ongoing agricultural land use. The possible pit (C012) may also be of the agricultural origin.

ASSESSMENT OF POTENTIAL IMPACTS

Direct Impacts

12.57 There will be an irreversible significant and permanent negative effect on a Burnt Mound (C008) a deposit of charcoal-rich soil containing fire-affected/shattered stones identified in Trench 21 through geophysical survey and test excavation. There will be no direct effects on any other known items of archaeology, buildings of special architectural heritage interest, or cultural heritage in the application area or the vicinity during the construction and operational phase of the proposal.

Indirect Impacts

12.58 There will be no indirect effects on any known items of archaeological, architectural or cultural heritage in the application area or the vicinity.

Interactions with Other Impacts

12.59 No interaction with other impacts has been identified.

Do Nothing Impacts

12.60 If the proposed development were not to proceed there would be no impact on archaeological, architectural or cultural heritage.

Worst Case Impact

12.61 No worst case scenario has been identified .

Unplanned Events

12.62 No unplanned events arising from the proposal capable of impacting known archaeological, architectural or cultural heritage within the application area has been identified by the assessment.

Cumulative Impacts

12.63 No screened projects in the vicinity of the application site which may lead to cumulative effects have been identified and no cumulative effects arise.

RECOMMENDATIONS / PROPOSED MITIGATION MEASURES

Direct Impacts

12.64 Due to the irreversible significant and permanent negative effect on a Burnt Mound (C008) a deposit of charcoal-rich soil containing fire-affected/shattered stones identified in Trench 21 this feature should be preserved in situ within a 10m buffer zone. Any archaeological material identified during test excavation should be preserved by record under licence from the National Monuments Service in advance of development.

Indirect Impacts

12.65 No indirect effects on any items of archaeological, architectural or cultural heritage warranting specific mitigation were identified during the course of the cultural heritage assessment.

BIBLIOGRAPHY

Cork County Council 2022. County Development Plan 2022-28.

DAHGI 1995. Recorded Monuments Protected under Section 12 of the National Monuments (Amendment) Act, 1994.

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).

EPA 2022. Guidelines on the Information to be contained in Environmental Impact Assessment Reports, published by the Environmental Protection Agency (EPA).

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

Nicholls, K.W. 1993. The development of lordship in County Cork 1300-1600, in P. Flanagan and C.G. Buttimer (eds) Cork History and Society. Dublin. 157-212.

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

PLATES



Plate 12-1 Structure 1 looking southwest



Plate 12-2 Structure 2 looking northwest

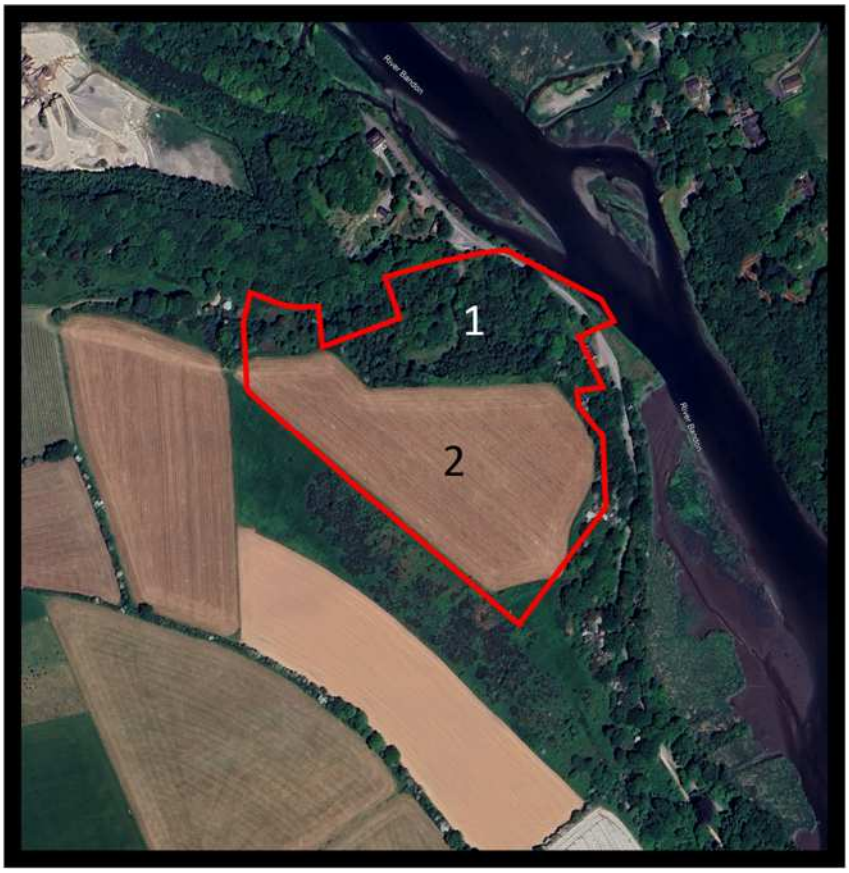


Plate 12-3 Google earth 2023 Orthophoto of the application area. The application area is indicated with the red line and the fieldwork areas are numbered.



Plate 12-4 Drone view of area 1 looking east.



Plate 12-5 Panoramic view of area 2 looking southeast.



Plate 12-5 Drone view of area 2 looking northwest.

FIGURES

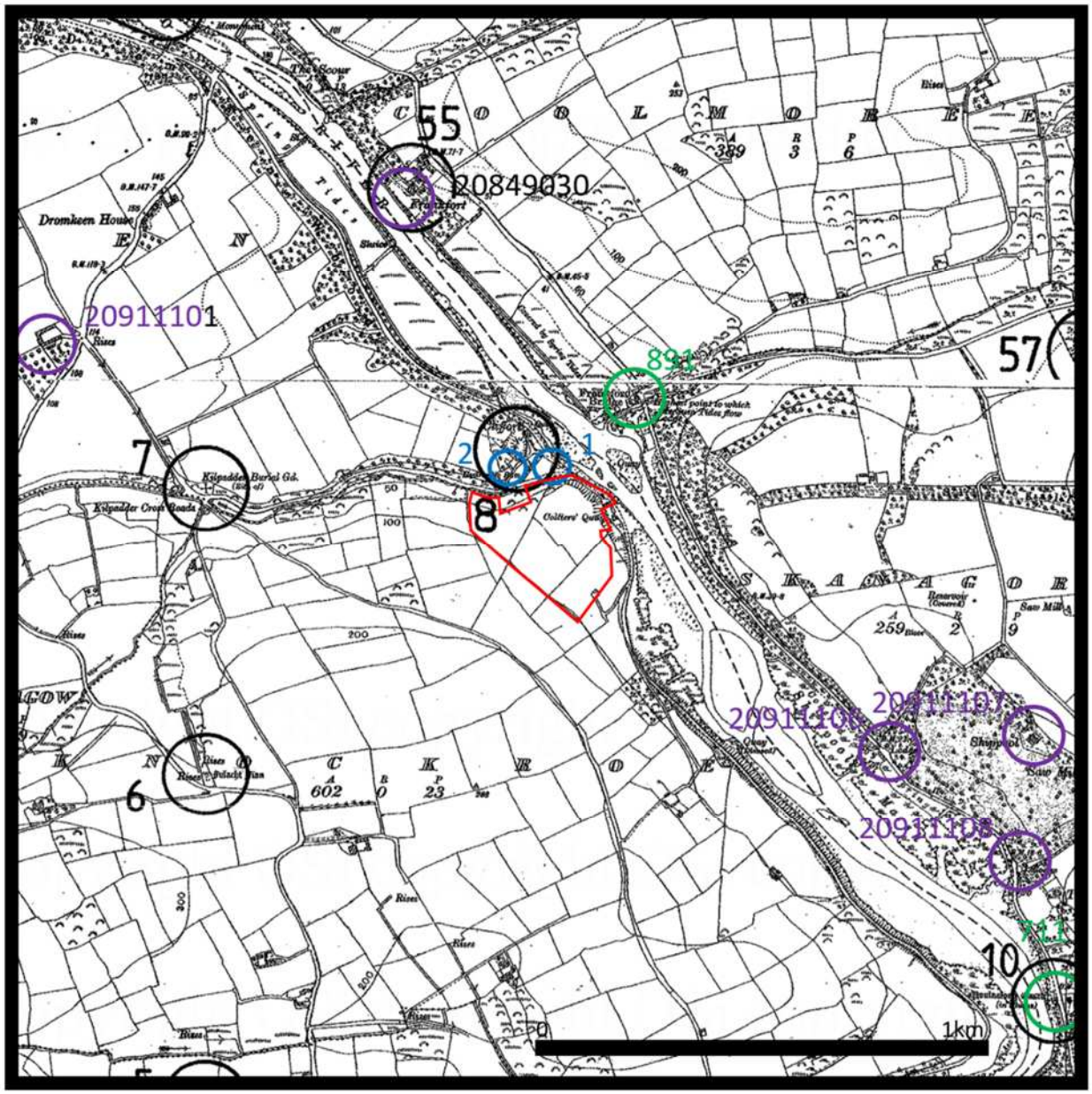


Figure 12-1 The study area. The red line is the application area, the dashed black line is the proposed extraction area. RMPs are indicated with black circles, and structures within 300m of the application area with brown circles.

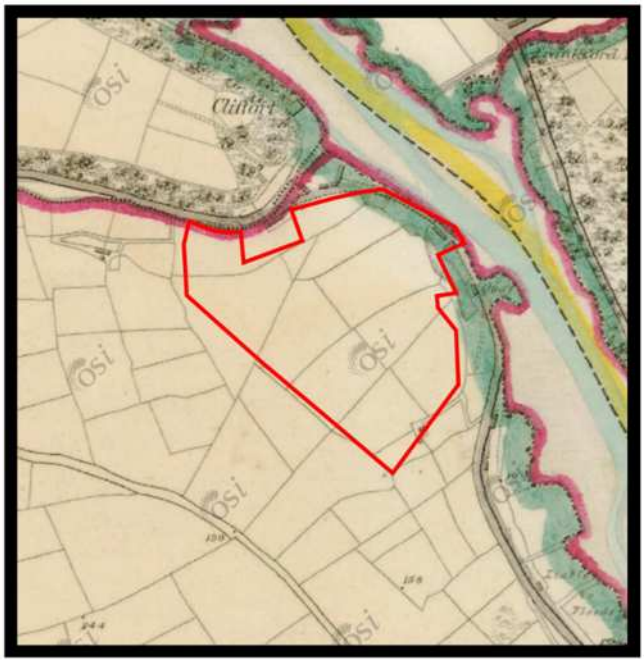


Figure 12-2 The OS 1st edition map indicating the application area (red line).

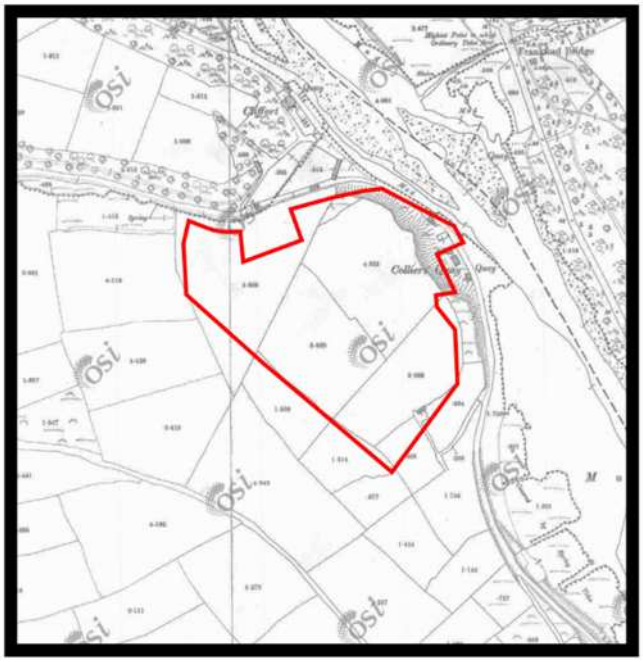
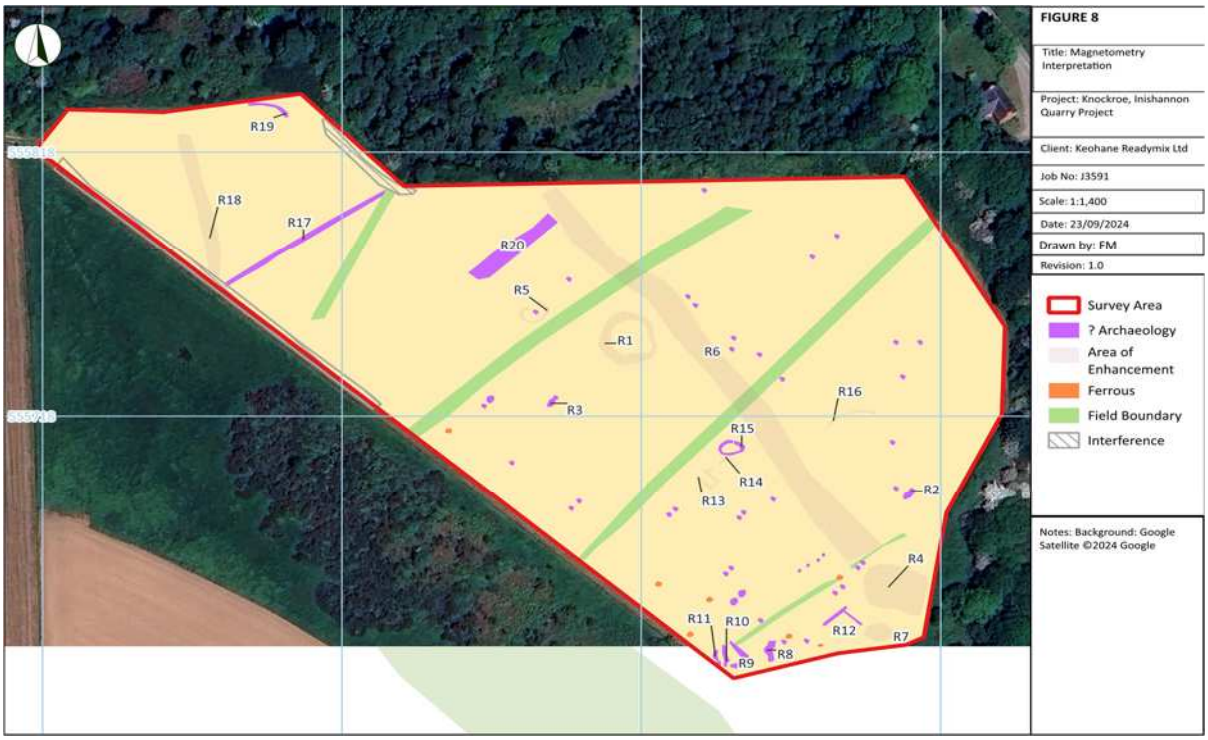


Figure 12-3 The OS 1st edition twenty-five map indicating the application area (red line).

Figure 12-4 Geophysical survey interpretation drawing.



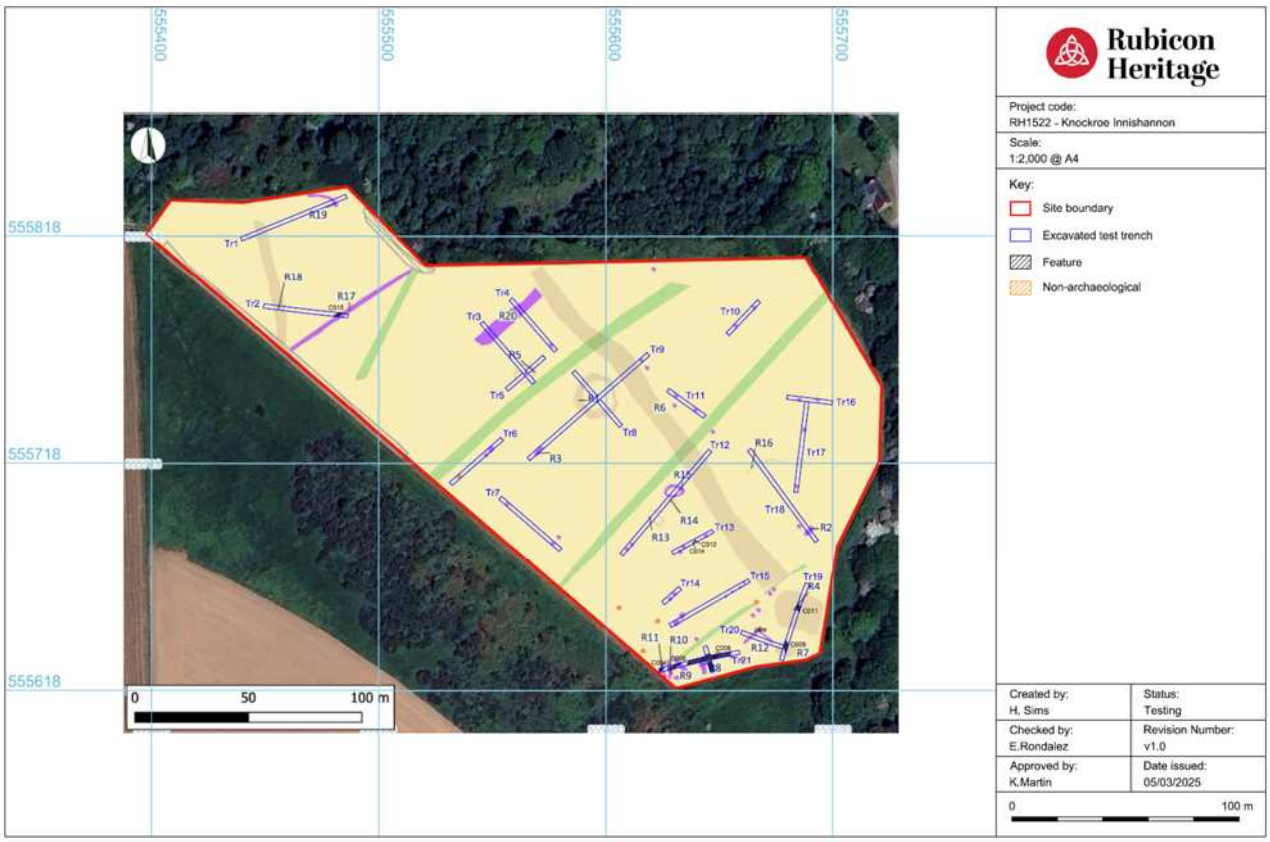


Figure 12-5 Excavated test trench array over geophysical survey interpretation.

APPENDICES

Appendix 12-A
Sites in the Record of Monuments and Places in the study area

CO097-055 Coolmoreen Country House

18-20th century structure. Much remodelled. Now the Innishannon Hotel.

CO111-006- Knockroe Fulacht fiadh

Grass-covered spread of burnt material in pasture. Levelled in 1982.

CO111-007- Dromkeen Burial ground

Not shown on 1st or 2nd eds of O.S. maps. In pasture. Area inaccessible due to heavy overgrowth.

CO111-008- Dromkeen Cliff-edge fort

At end of gravel spur overlooking W bank of Bandon River. Roughly oval area (30.7m E-W; 23m N-S) enclosed by deep fosse (D 3.7m) and counterscarp bank (H 0.6m) S->NE; by sheer cliff face NE->S. Interior split-level; W half 2.4m higher.

CO111-010- Ship-pool Castle - tower house

On steeply-sloping E bank of Bandon river; road skirts structure on E side from which ground falls steeply to river's edge, ground level on E side at same height as 1st floor on W side. All accessible opes blocked; access to interior not gained. Rectangular tower (10.4m E-W; 8m N-S) with circular turret attached at NE corner (diam. c. 4m). Photo of c. 1907 (Fuller 1907, facing 2) shows tower standing to full height, of apparently 5 storeys, with gable atop W wall. Upper part now fallen so that walls stand to roughly 2nd floor level. Ground floor door near S end W wall; surround in two plain orders with pointed arch, yett hole through N jamb; lobby inside door now blocked by tip of fallen rubble. At ground level on E side two blocked opes, probably doors but surrounds gone. Roughly at centre of N and S walls, at 1st floor level, single window lights with ogee heads. At same level on W wall broken ope, probably remains of 'handsome bay window' mentioned by Bennett (1869, 210); only N side of similar window ope survives directly above at 2nd floor level. Directly above door in W wall, at 1st floor level, single tapering corbel; all that now remains of bartizan at SW corner (see photo O'Neil 1940, facing 112). Opes at three levels on circular turret. Just above present ground level are three double-splayed lintelled opes (external opening: H c. 0.65m; Wth c. 0.9m; at narrowest point H c. 0.15m; Wth 0.15m; depth of splay externally c. 0.7m); gun ports for cannon of mid-16th century type, showing more Scottish than English influence (O'Neil ibid., 113). Blocked ope on N side of door in W wall apparently similar gun port (ibid.). Directly above gun ports on circular tower are seven rectangular loops (Wth 0.3m; H 0.9m), steeply angled downwards through wall

thickness 'for the discharge of muskets etc. downwards against attackers' (ibid.). Above these are two slit windows. Interior apparently filled with rubble of collapsed vault; this presumably collapsed after tower abandoned in 1787 (Bennett ibid.), when fireplace and 'cut limestone arches of bay windows' were stolen (ibid.). This fireplace survives intact, to some extent, at first floor level on N wall, 'with the crest and family arms of the Roches' on one of its jambs (ITA Survey: Inishannon). Built under Royal licence by Philip Roche in 1540s (Bennett ibid., 209;Hamilton 1860, 68 & 70); 1543 report states that 'building goeth well forward' (State Papers: King Henry the Eight: Part 3, 1538-1546). In 1642 taken by garrison of Bandon who 'killed 100 rebels at the castle of Poulnalong' (Smith 1750, vol. 2, 133). Thereafter residence of Herrick family; Smith (1750, vol. 1, 214) describes it as 'now a pleasant seat with good gardens and other improvements'. Abandoned by Herricks in 1787 (Bennett ibid.) for new residence; in ruins since then. Also known as Shippool Castle.

Appendix 12-B
Geophysical Survey Report

Report on a Geophysical Survey at Knockroe, Innishannon, Co. Cork

Archaeological
Management Solutions



By Finn Melia

With contributions from Jeff O'Neill

Detection Device Consent No.: 24R0461

For Keohane Readymix Ltd

October 2024

TITLE PAGE

AMS Job No.:	J3591
Project Name:	Knockroe, Innishannon, Co. Cork
Report Title:	Report on Geophysical Survey at Knockroe, Innishannon, Co. Cork
Client Name:	Keohane Readymix Ltd
Townland Name:	Knockroe
Grid Reference (ITM):	504844, 647739
Detection Device Consent No.:	24R0461
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Copyeditor:	Anne-Marie Hardy
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Executive Summary

This report describes the results of an archaeological geophysical survey, carried out by Archaeological Management Solutions (AMS), within Lands Made Available (LMA) at Knockroe, Innishannon, Co. Cork. The geophysical survey works were required as part of an archaeological assessment.

The Survey area consists of 3.9 hectares in total, located in the townland of Knockroe and the survey was confined within the LMA. Access to the lands for the purposes of the works was agreed between the Archaeological Consultant, Keohane Readymix Ltd and the landowners.

The magnetometry survey effectively characterised the extent of potential archaeological deposits. A total of 20 anomalies were identified, including small pit-like features, historic field boundaries, and ferrous anomalies. Key findings include two areas of magnetic enhancement (R1 and R6). Anomaly R1 may indicate the presence of a ditch or enclosing element, such as a possible ring-ditch or barrow. However, this may also represent near-surface geological formations. Anomaly R6 is a linear area of magnetic enhancement that corresponds with a field boundary depicted on the first-edition (1843) six-inch, 25-inch (1863–67) and six-inch Cassini (1935–38) Ordnance Survey (OS) mapping and may represent its ploughed out remains.

Alongside these areas of enhancement, there were eighteen additional magnetically contrasting anomalies. A number of these represent highly magnetic, irregularly shaped anomalies (R2, R3, R10, R11). These may suggest areas of burning, which could include a hearth, a burnt mound, a furnace, a kiln or any other combustion-related event, including modern agricultural activity. Two other areas (R4, R7) show magnetic enhancement that may be related to a structure and trackway depicted on historical mapping. Several rectilinear anomalies identified, such as R12, R13, R14, may represent enclosing elements or pre-OS map field systems, though these may also be geological in origin. Similarly, curvilinear anomalies R5, R15, R19 may be indicative of ditch features, or near-surface geology.

Please note that the National Monuments Service of the Department of Housing, Local Government and Heritage, the National Museum of Ireland and the local planning may issue recommendations/conditions.

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Abbreviations and Acronyms

Abbreviation/Acronym	Definition
AOE	Area of Enhancement
AMS	Archaeological Management Solutions
DIER	Database of Irish Excavation Reports
GIS	Geographic Information System
ITM	Irish Transverse Mercator
LMA	Lands Made Available
NIAH	National Inventory of Architectural Heritage
NMI	National Museum of Ireland
NMS	National Monuments Service
OS	Ordnance Survey
SMR	Sites and Monuments Record
WMS	Web Map Service

Coordinate Reference System

All grid coordinates in this report use the Irish Transverse Mercator (ITM) coordinate reference system unless otherwise stated.

1 Introduction

1.1 Project Background

This report describes the results of an archaeological geophysical survey within Lands Made Available (LMA) at Knockroe, Innishannon, Co. Cork, carried out by Archaeological Management Solutions (AMS), as part of an archaeological assessment on behalf of Keohane Readymix Ltd.

The Survey area consists of 3.9 hectares in total. Access to the lands for the purposes of the works was by agreement between the Archaeological Consultant, Keohane Readymix Ltd and the landowners.

1.2 Site Location

The survey area, located in the townland of Knockroe, is approximately c.1.1km southeast of Innishannon town, Co. Cork. (Figure 1). The maximum area to be investigated is approximately 3.9ha located within one greenfield site (GS-01). The local soils consist primarily of well-draining coarse loamy drift with siliceous stones (GSI 2024); however, the most easternly portion of the field is made up of soils consisting of tidal marsh (*ibid*.). The quaternary comprises gravels derived from Devonian and Carboniferous sandstones (*ibid*.). The bedrock consists of the Kinsale formation (GSI 2024; *ibid*.).

1.3 Historical Mapping

Historical mapping for the site indicates that the current field boundaries were very different on the earliest Ordnance Survey (OS) mapping, with numerous changes occurring in the time since (Figure 4). The survey area is currently a singular field containing no structures. On the first edition six-inch OS map (1843), this field was divided into nine separate fields. The southernmost portion of the survey area contained a structure and an access path with an east–west orientation. These divisions were reduced by the time of the 25-inch (1863–67) and six-inch Cassini (1935–38) OS maps, where the area was divided into six fields. The structure in the southern portion of the Survey Area was still present; however, the access path had changed to a north–south orientation. Additionally, there is a quarry represented to the northeast of the survey area on all the historical OS maps.

1.4 Recorded Archaeological Sites

There are no archaeological sites located within the survey area; however, there are four sites listed on the Sites and Monuments Record (SMR) within one kilometre of the survey area (CO111-008----, a cliff-edge fort, CO111-007----, a burial ground, CO111-006----, a *fulacht fiadh*, CO097-055----, a country house). The Closest of these sites is the cliff-edge fort (CO111-007----) at 159m from the survey area (Table 1, Figure 3).

Table 1. SMR sites locates within 1km of Knockroe Quarry Extension, Co. Cork Report, Geophysical Survey Area

Ref No.	Description	Townland	SMR ZoN Proximity
CO111-008----	Cliff-edge fort	Dromkeen	159m north of the survey area
CO111-007----	Burial ground	Dromkeen	616m northwest of the survey area
CO111-006----	*Fulacht fiadh*	Knockroe	836m southwest of the survey area
CO097-055----	Country house	Coolmoreen	765m north of the survey area

1.5 Previous Archaeological Investigations

According to the Database of Irish Excavation Reports (DIER), no previous investigations have occurred within the current site.

1.6 NMI Topographical Finds

There are no stray finds recorded in the National Museum of Ireland's (NMI) online Finds Database, as available on Heritage Maps, within the immediate area of the development, although this dataset is limited.

1.7 Built Heritage

There are no sites listed on the National Inventory of Architectural Heritage (NIAH) or the Record of Protected Structures (RPS) within the targeted survey area.

1.8 Purpose and Scope of the Assessment

The purpose of the geophysical survey was to identify any potential archaeological deposits that might be present in the 3.9ha targeted survey area using the following objectives:

- Identify any geophysical anomalies of possible archaeological origin within the specified survey areas.
- Accurately locate these anomalies and present the findings in map form.
- Describe the anomalies and discuss their likely provenance in a written report.
- Incorporate all of the above in a report to the Client.
- Preparation and submission of archives of the project data and report.

2 Methodology

2.1 Personnel

The survey comprised high-resolution magnetic gradiometry undertaken by Jeff O'Neill (Geophysical Supervisor) and Finn Melia (Geophysical Assistant). The methodology was approved by the Archaeological Licensing Section of the National Monuments Service (NMS) and Consent to use a Detection Device under Section 2 (2) of the National Monuments (Amendment) Act, 1987, was issued to Finn Melia by the Minister for Housing, Local Government and Heritage: Consent No.: 24R0461. The report has been written by Finn Melia.

2.2 Magnetometry Survey

The survey employed a detailed Magnetometer Survey, recording the vertical magnetic gradient; i.e., a fluxgate gradiometer. This technique measures variations in the magnetic properties of the soils. It is widely used in archaeological geophysical prospection due to its ability to detect and map a broad range of subsurface archaeological remains, including ditches and pits and burnt or fired features associated with metalworking and pottery production (Aspinall *et al*. 2008).

2.2.1 Data Capture

The survey recorded the vertical magnetic gradient, i.e., a fluxgate magnetometer. A Sensys MAGNETO MX PDA 5 Channel cart system was towed by a 2023 CFMOTO CFORCE 450 quad bike. Five Sensys FGM650 fluxgate gradiometer probes were mounted on a Sensys MAGNETO MX PDA 5 Channel cart system; each probe was spaced 0.5m apart. The magnetometer data were acquired gridlessly with Sensys MonMX Lite Software, connected to a Carlson BRX7 GNSS Smart Antenna RTK GPS, achieving a spatial resolution of 0.1m accuracy. Data were collected at ten times per second along the lines.

2.2.2 Data Processing

The magnetometry and GPS data were processed through Geoserver followed by DLMGPS 4.01-12 and finalised in Sensys MAGNETO 3.01-14. MAGNETO software was used for trace correction and equalisation.

2.2.3 Data Visualisation

The data were brought into QGIS as a GeoTIFF for display and interpretation as greyscale images.

2.3 Data Management, Processing, and Interpretation

This project used QGIS (Version 3.22.14) as a Geographical Information System (GIS) to manage the project. QGIS is an open-source GIS which can be used to create, edit, visualise, analyse and publish

geospatial information.[1] This project used the long-term release version of the software (3.22.14) as the basic platform to access, view and analyse the geophysical visualisations produced in Magneto. QGIS also allowed us to compare the visualisations with other relevant geospatial databases, record the analysis through digitising the morphology and magnitude of anomalies identified, and output a table catalogue of this analysis and corresponding maps.

For the purposes of this project, the following datasets were also accessed and/or downloaded:

- Tailte Éireann historical maps and orthographic photographs of the Survey Area, viewed online;[2]
- Sites and Monuments Record (SMR) point and polygon vectors as a Web Map Service (WMS);[3]
- National Inventory of Architectural Heritage (NIAH) point vector (downloaded from www.archaeology.ie);
- Rivers and lakes as a WMS (downloaded from https://gis.epa.ie/GetData);
- National soils database as a vector layer (downloaded from https://gis.epa.ie/GetData/Download);
- Townlands vector layer.[4]

The following vector layers were generated for the project:

- A polygon for the Survey area.
- Polygons for each identified geophysical anomaly.

The dimensions of individual anomalies were calculated in QGIS using the measure tools. All anomalies are defined by polygons.

2.4 Standards

The geophysical survey and report follow the recommendations outlined by relevant best practice guidance documents as a minimum standard (Bonsall *et al*. 2014; David *et al*. 2008; Gaffney *et al*. 2002; Schmidt *et al*. 2015). Geophysical data, shapefiles, figures and the text have been archived following the recommendations of the Archaeology Data Service (Schmidt & Ernenwein 2011). Raw geophysical data and GIS shapefiles are available in the archive.

[1] QGIS. Quantum GIS v3.22.14. https://www.qgis.org/en/site/

[2] Accessed from: https://maps.archaeology.ie/HistoricEnvironment/

[3] SMR data accessed from: https://data.gov.ie/dataset/national-monuments-service-archaeological-survey-of-ireland

[4] Vector layer downloaded from: www.townlands.ie; townland names confirmed against the OS townlands list from https://data.gov.ie/dataset/townland.

3 Findings

3.1 Magnetometry Results

The magnetometry data and magnetometry interpretation (Figure 7–10) should be cross-referenced with the descriptions (below) for a discussion of the anomalies. The magnetometry survey of the site successfully characterised the extent of potential archaeological deposits. The responses across the survey area were generally good revealing some possible archaeological features. Overall, this survey revealed highly magnetic responses across the entire survey area including numerous plough furrows, and a range of anomalies such as pit-like features, historic field boundaries and ferrous responses.

The most significant anomalies identified as part of this survey were two areas of magnetic enhancement. Anomaly R1 is a subcircular area of enhancement that may indicate the presence of a ditch or enclosing element, such as a possible ring-ditch or barrow. However, the weak signal of this anomaly suggests that it may represent near surface geological formations. Anomaly R6 is a linear area of magnetic enhancement that contains numerous highly magnetic responses. This corresponds with a field boundary depicted on the first-edition (1843) six-inch, 25-inch (1863–67) and six-inch Cassini (1935–38) OS mapping; it may represent the ploughed out remains of the field boundary.

In addition to these areas of magnetic enhancement, eighteen further anomalies were identified. Anomalies R2, R3, R10, and R11 represent strongly magnetic, irregular shaped anomalies that may represent areas of burning. This could include a hearth, a burnt mound, a furnace, a kiln or any other combustion-related event including modern agricultural activity. Anomalies R4 and R7 are areas of magnetic enhancement that contain spreads of highly magnetic responses that may be related to a structure and trackway depicted in this area that is present on the first-edition (1843) six-inch, 25-inch (1863–67) and six-inch Cassini (1935–38) OS mapping.

Additionally, a number of rectilinear areas of enhanced magnetic response were identified, such as R12, R13, and R14. These anomalies may represent potential enclosing elements or a pre-OS field system. However, the weak signal of R13 and R14 indicates the possibility that these represent near surface geological formations, while R12 may be related to a structure and trackway in this area that is present on the first-edition (1843) six-inch, 25-inch (1863–67) and six-inch Cassini (1935–38) OS mapping. Finally, there were also several curvilinear anomalies, such as R5, R15, and R19, that may represent ditches, possible enclosing elements, or near surface geology.

Table 2. Magnetometry survey Identified anomalies

Anomaly ID	Anomaly Type	Size	Description	Interpretation
R1	Area of Enhancement	18m in diameter	This is a subcircular area of magnetic enhancement	This area of enhancement may represent a ditch or enclosing element, such as a possible ring-ditch or barrow. However, the weak signal suggests the possibility that this anomaly is representative of near surface geology.
R2	Archaeology?	5m x 2m in size	This is a highly magnetic irregularly shaped anomaly	This anomaly may represent an area of *in-situ* burning or a possible pit like feature. This anomaly may represent an archaeological, modern, or natural source.
R3	Archaeology?	5m x 2m in size	This is a highly magnetic irregularly shaped anomaly.	This anomaly may represent an area of *in-situ* burning or a possible pit like feature. This anomaly may represent an archaeological, modern, or natural source.
R4	Area of Enhancement	21m x 16m	This area of magnetic enhancement contains a spread of highly magnetic responses	This area of magnetic enhancement may represent an area of *in-situ* burning or dumping. This AOE may be related to a structure and trackway in this area that is present on the six-inch OS map (1843), 25-inch OS map (1863–67) and six-inch Cassini OS map (1935–38). This anomaly may represent an archaeological, modern, or natural source.
R5	Area of Enhancement	20m in length	This is a curvilinear area of magnetic enhancement	This area of enhancement may represent a ditch, or a potential enclosing element. However, the weak signal suggests the possibility that this anomaly is near surface geology. This anomaly may represent an archaeological, modern, or natural source.
R6	Area of Enhancement	174m x 8m	This is a linear area of magnetic enhancement that contains numerous highly magnetic responses	This anomaly corresponds with a field boundary depicted on the first-edition (1843) six-inch, 25-inch (1863–67) and six-inch Cassini (1935–38) OS mapping and may represent the ploughed out remains of the field boundary.
R7	Area of Enhancement	8m x 7m	This area of magnetic enhancement contains a spread of highly magnetic responses	This area of magnetic enhancement may represent an area of *in-situ* burning or dumping. However, this AOE may be related to a structure and trackway in this area that is present on the six-inch OS map (1843), 25-inch OS map (1863–67) and six-inch Cassini OS map (1935–38). This anomaly may represent an archaeological, modern, or natural source.
R8	Archaeology?	8m x 2m	This is a highly magnetic irregularly shaped anomaly	This anomaly may represent an area of *in-situ* burning or dumping. This area of enhancement may signify an occupationally enhanced soil or a natural feature. This anomaly may represent an archaeological, modern, or natural source.

Anomaly ID	Anomaly Type	Size	Description	Interpretation
R9	Archaeology?	12m x 2m	This is a highly magnetic irregularly shaped anomaly	This anomaly may represent an area of *in-situ* burning or dumping. This area of enhancement may signify an occupationally enhanced soil or a natural feature. This anomaly may represent an archaeological, modern, or natural source.
R10	Archaeology?	8m x 1m	This is a highly magnetic irregularly shaped anomaly	This anomaly may represent an area of *in-situ* burning or dumping. This area of enhancement may signify an occupationally enhanced soil or a natural feature. This anomaly may represent an archaeological, modern, or natural source.
R11	Archaeology?	7m x 1m	This is a highly magnetic irregularly shaped anomaly	This anomaly may represent an area of *in-situ* burning or dumping. This area of enhancement may signify an occupationally enhanced soil or a natural feature. This anomaly may represent an archaeological, modern, or natural source.
R12	Archaeology?	17m in length	This is a positive rectilinear anomaly	This anomaly may represent an enclosing element or a pre-OS map field system. However, this anomaly may be related to a structure and trackway in this area that is present on six-inch OS map (1843), 25-inch OS map (1863–67) and six-inch Cassini OS map (1935–38). This anomaly may represent either, an archaeological or natural source
R13	Area of Enhancement	20m in length	This is a rectilinear area of magnetic enhancement	This area of magnetic enhancement may represent an enclosing element or a pre-OS field system. However, the weak signal suggests the possibility that this anomaly is near surface geology. This anomaly may represent an archaeological, modern, or natural source.
R14	Area of Enhancement	8m in length	This is a rectilinear area of magnetic enhancement	This area of magnetic enhancement may represent an enclosing element or a pre-OS field system. However, the weak signal suggests the possibility that this anomaly is near surface geology. This anomaly may represent an archaeological, modern, or natural source.
R15	Archaeology?	18m in length	This is a positive curvilinear anomaly	This anomaly may represent a ditch, a possible enclosing element, or near surface geology. This anomaly may represent either, an archaeological or natural source.
R16	Area of Enhancement	18m in length	This is a negative curvilinear area of magnetic enhancement	This anomaly may represent a ditch, a possible enclosing element, or near surface geology. This weakly magnetic anomaly may represent either, an archaeological or natural source.
R17	Archaeology?	64m in length	This is a positive linear anomaly	This anomaly may represent a ditch, a pre-OS map field system or may be the result of an occupational disturbance such as plough furrows or imported soils. This strongly magnetic anomaly may represent either, an archaeological or natural source.

Anomaly ID	Anomaly Type	Size	Description	Interpretation
R18	Area of Enhancement	51m x 5m	This is a linear area of magnetic enhancement that contains numerous highly magnetic responses	The response in this AOE may represent ploughed out archaeological features such as a possible ditch; however, this anomaly may be the result of an occupational disturbance or a possible modern source such as a pipe. This anomaly may represent an archaeological, modern, or natural source.
R19	Archaeology?	14m in length	This is a curvilinear anomaly	This anomaly may represent a ditch, a possible enclosing element, or near surface geology. This weakly magnetic anomaly may represent either an archaeological or natural source.
R20	Archaeology?	34m x 6m	This is a negative linear anomaly	This anomaly may represent a ditch, a pre-OS map field system or may be the result of an occupational disturbance such as plough furrows or imported soils. This strongly magnetic anomaly may represent either an archaeological or natural source.

4 Conclusions and Recommendations

The magnetometry survey effectively characterised the extent of potential archaeological deposits. A total of 20 anomalies were identified, including small pit-like features, historic field boundaries, and ferrous anomalies. Key findings include two areas of magnetic enhancement (R1 and R6). Anomaly R1 may indicate the presence of a ditch or enclosing element, such as a possible ring-ditch or barrow. However, this may also represent near surface geological formations. Anomaly R6 is a linear area of magnetic enhancement that corresponds with a field boundary depicted on the first-edition (1843) six-inch, 25-inch (1863–67) and six-inch Cassini (1935–38) OS mapping and may represent the ploughed out remains of the field boundary.

Alongside these areas of enhancement, there were eighteen additional magnetically contrasting anomalies. A number of these represent highly magnetic, irregularly shaped anomalies (R2, R3, R10, R11). These may suggest areas of burning, which could include a hearth, a burnt mound, a furnace, a kiln or any other combustion-related event, including modern agricultural activity. Two other areas (R4, R7) show magnetic enhancement that may be related to a structure and trackway depicted on historical mapping. Several rectilinear anomalies identified, such as R12, R13, R14, may represent enclosing elements or pre-OS map field systems, though these may be geological in origin. Similarly, curvilinear anomalies R5, R15, R19 may be indicative of ditch features, or near-surface geology.

Please note that the National Monuments Service of the Department of Housing, Local Government and Heritage, the National Museum of Ireland and the local planning may issue recommendations/conditions.

5 References

Aspinall, A., Gaffney, C., & Schmidt, A. 2008. *Magnetometry for Archaeologists*. Lanham, MD: Altamira Press.

Bonsall, J., Gaffney, C. & Armit, I. 2014. *Preparing for the future: A reappraisal of archaeo-geophysical surveying on National Road Schemes 2001-2010*. University of Bradford report for the National Roads Authority of Ireland.

David, A. Linford, N. & Linford, P. 2008. *Geophysical Survey in Archaeological Field Evaluation*. Second Edition, English Heritage.

Gaffney, C., Gater, J. & Ovenden, S. 2002. *The use of Geophysical Techniques in Archaeological Evaluations*, IFA Paper No. 6, Institute of Field Archaeologists.

Schmidt, A. & Ernenwein, E. 2011. *Guide to Good Practice: Geophysical Data in Archaeology*. 2nd Edition. Archaeology Data Service.

Schmidt, A.R., Linford, P., Linford, N., David, A., Gaffney, C.F., Sarris, A. & Fassbinder, J. 2015. *EAC Guidelines for the use of Geophysics in Archaeology: Questions to Ask and Points to Consider*. EAC Guidelines 2. Namur, Belgium: Europae Archaeologia Consilium (EAC), Association Internationale sans But Lucratif (AISBL).

Online Sources

Database of Irish Excavation Reports (DIER). https://excavations.ie/advanced-search/?exca_a=search&search=knockroe [Accessed: 23 October 2024].

GSI. 2024. GSI Datasets Public Viewer. Geological Survey Ireland. [Accessed: 08 October 2024]. Available from: http://spatial.dcenr.gov.ie/imf/imf.jsp?site=GSI_Simple.

Heritage Maps. https://heritagemaps.ie/WebApps/HeritageMaps/index.html this database only includes finds recorded in the National Museum of Ireland's (NMI) topographical files up to 2010 and is often found to be inaccurate and unreliable. [Accessed: 23 October 2024].

Figures

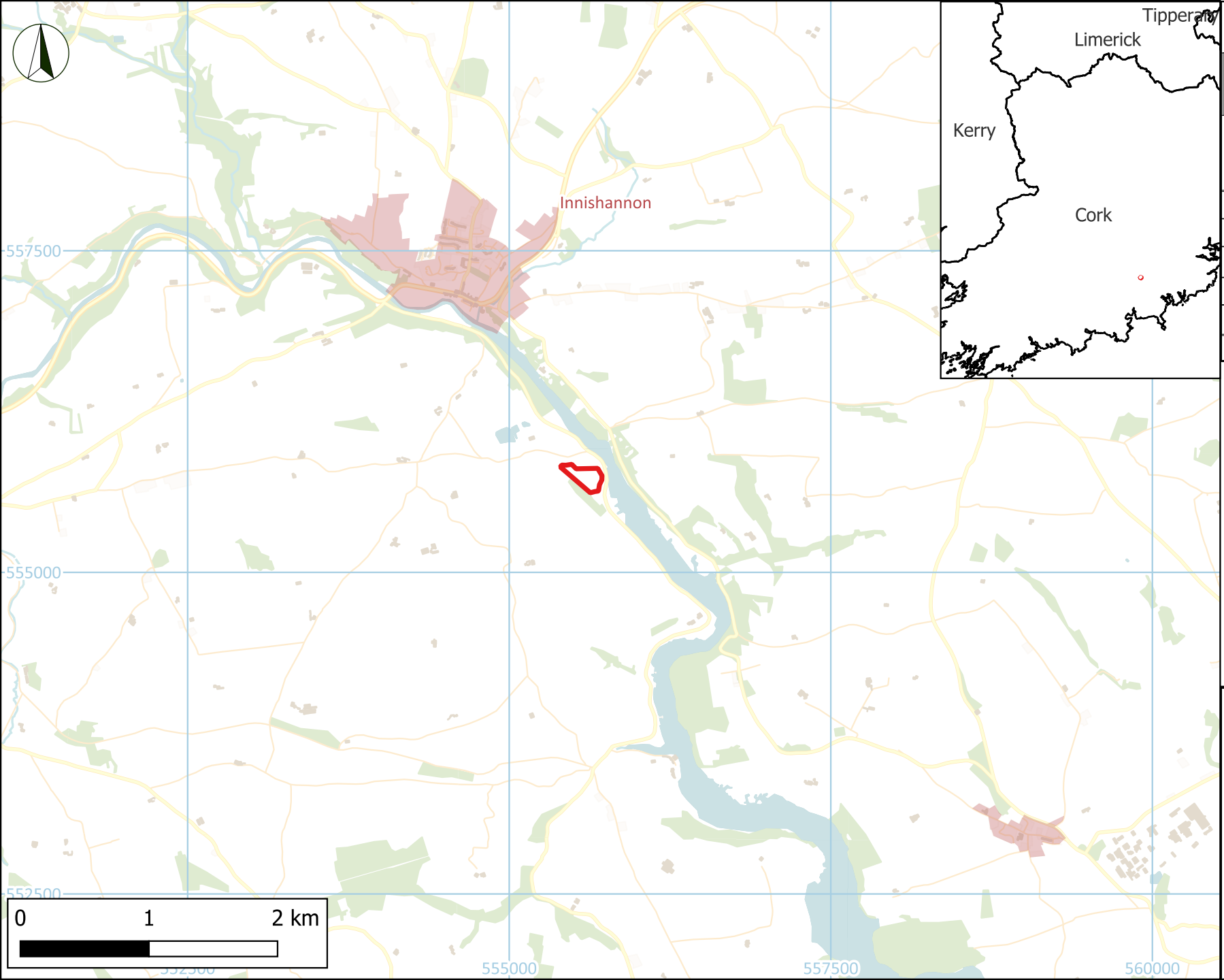


FIGURE 1

Title: Site Location Map

Project: Knockroe, Inishannon Quarry Project

Client: Keohane Readymix Ltd

Job No: J3591

Scale: 1:40,000

Date: 21/08/2024

Drawn by: FM

Revision: 1.0

Survey Area

Settlements

Notes: Background: MapTiler Planet © MapTiler

AMS

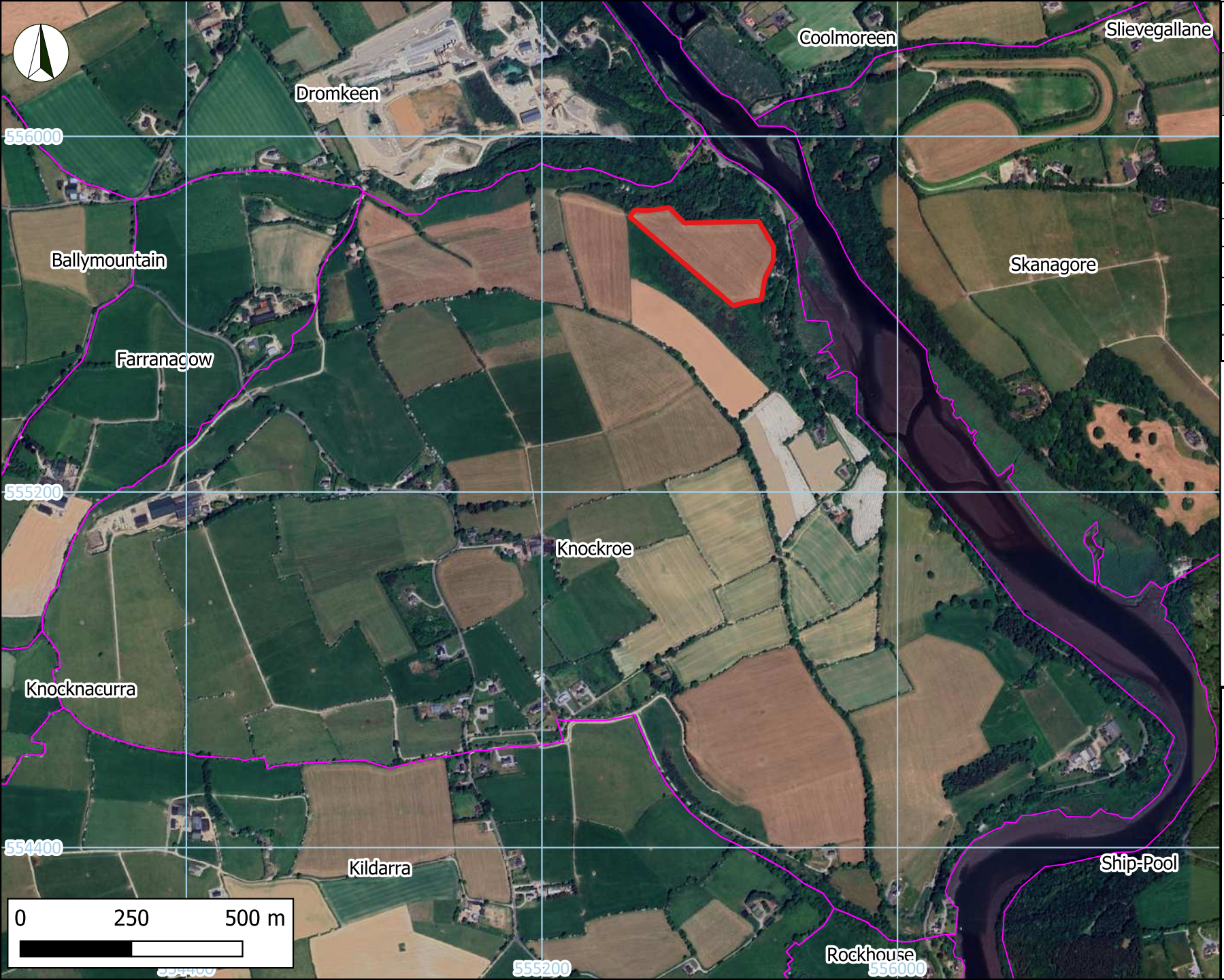


FIGURE 2

Title: Detailed Location Map

Project: Knockroe, Inishannon Quarry Project

Client: Keohane Readymix Ltd

Job No: J3591

Scale: 1:12,000

Date: 21/08/2024

Drawn by: FM

Revision: 1.0

Survey Area

Townlands

Notes: Background: Google Satellite ©2024 Google
Townlands data: © OSi

AMS

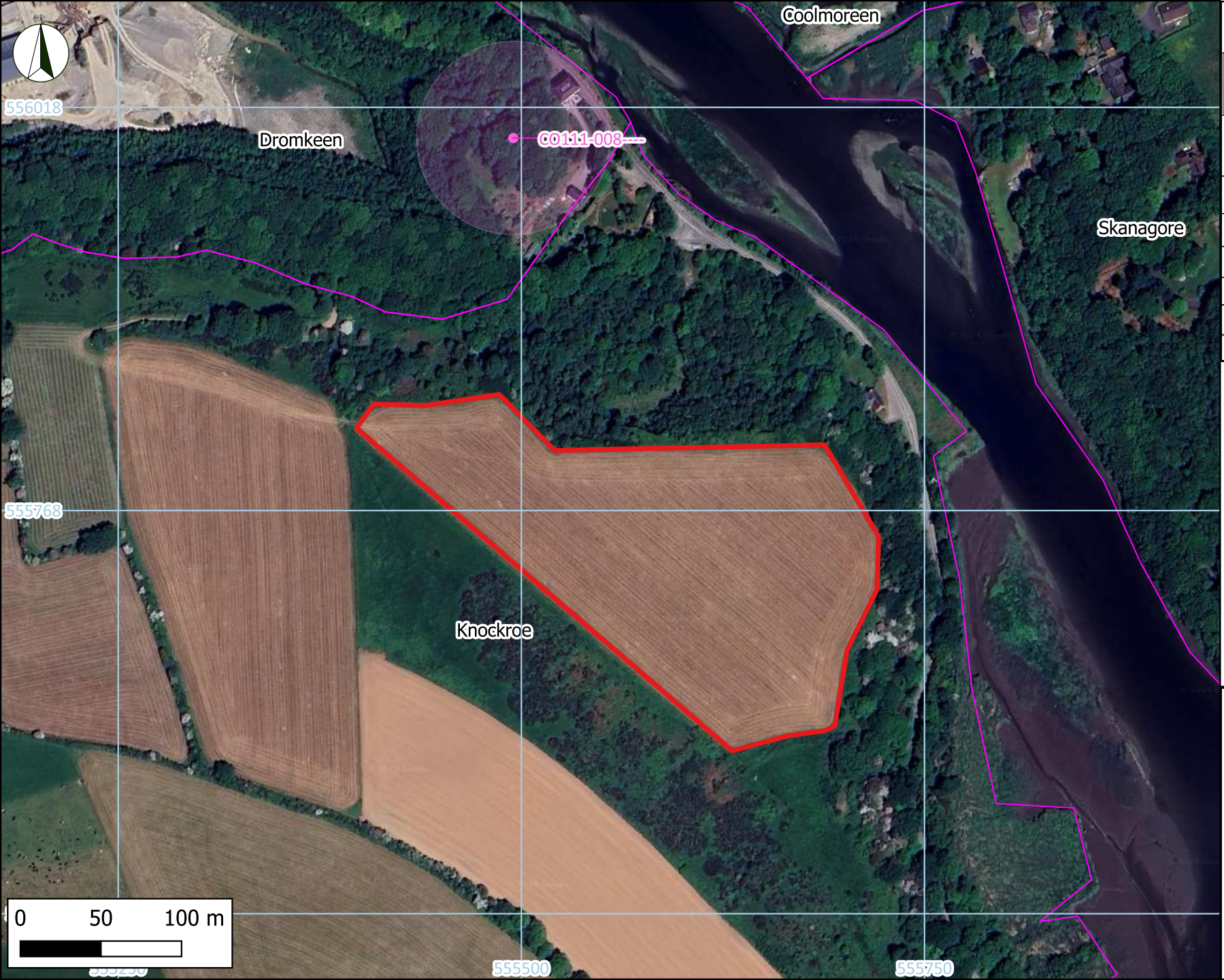


FIGURE 3

Title: Cultural Heritage Map

Project: Knockroe, Inishannon Quarry Project

Client: Keohane Readymix Ltd

Job No: J3591

Scale: 1:3,200

Date: 21/08/2024

Drawn by: FM

Revision: 1.0

- Survey Area
- Townlands
- SMR Site
- SMR ZoN

Notes: Background: Google Satellite ©2024 Google
Townlands data: © OSi
SMR Data: © Government of Ireland

AMS

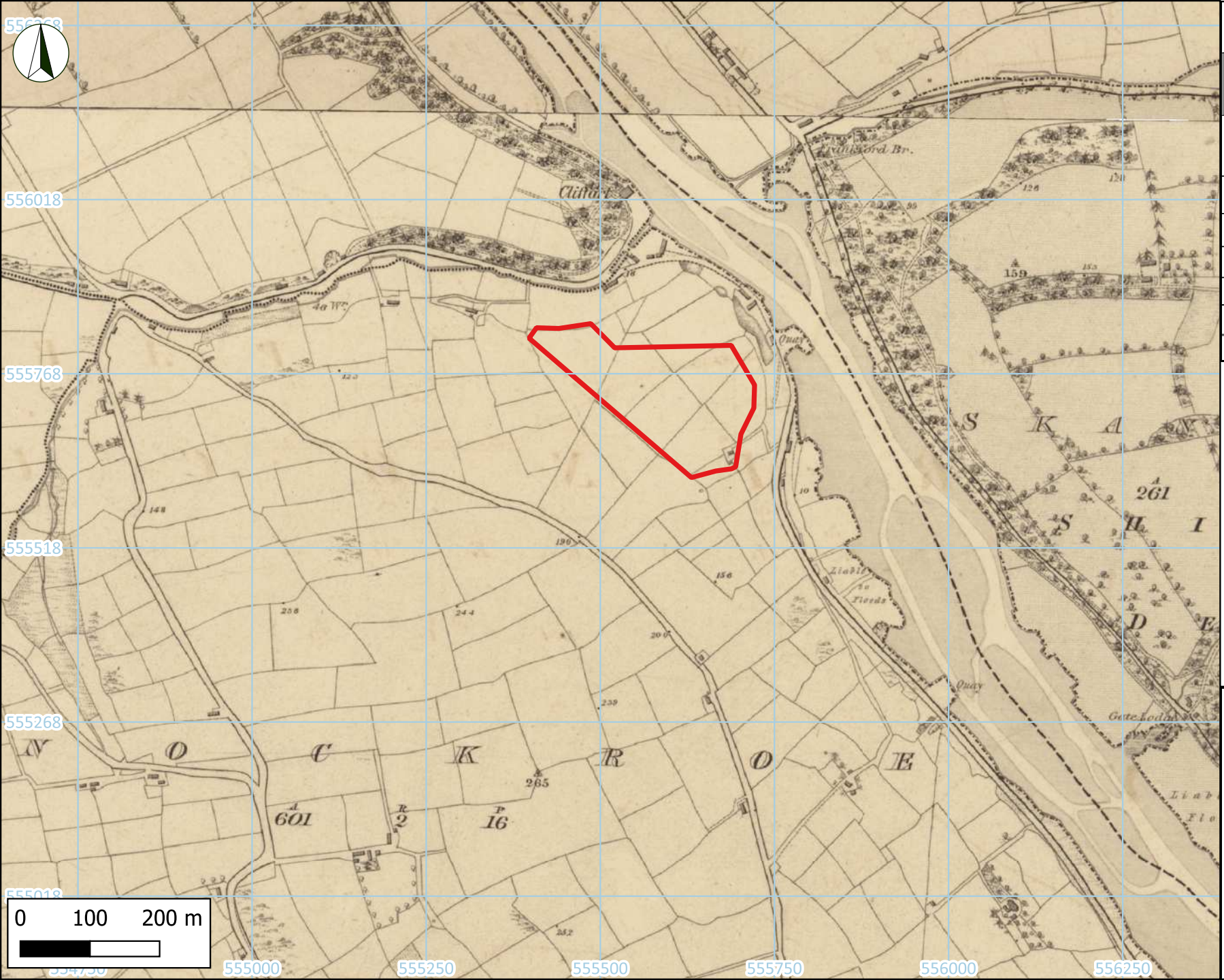


FIGURE 4

Title: Historic 6inch OS Map

Project: Knockroe, Inishannon Quarry Project

Client: Keohane Readymix Ltd

Job No: J3591

Scale: 1:7,400

Date: 08/10/2024

Drawn by: FM

Revision: 2.0

Notes: Background: 6inch OS Map 1843 Re-use: CC-BY NLS .

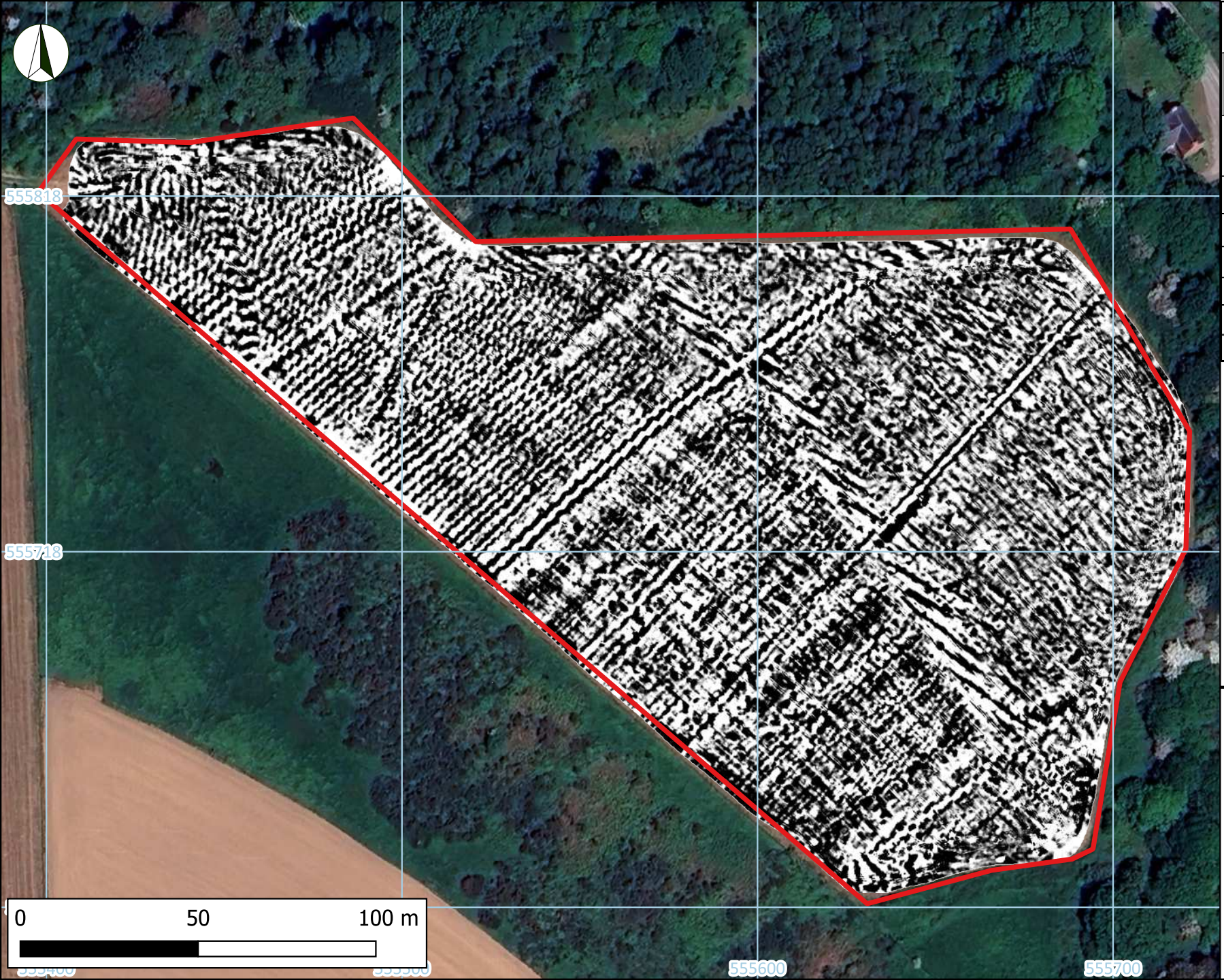


FIGURE 5

Title: Magnetometry Data 3nT

Project: Knockroe, Inishannon Quarry Project

Client: Keohane Readymix Ltd

Job No: J3591

Scale: 1:1,400

Date: 23/09/2024

Drawn by: FM

Revision: 1.0

Survey Area

Notes: Background: Google Satellite ©2024 Google
Dynamic range: ±3nT (white = low; black = high)

AMS

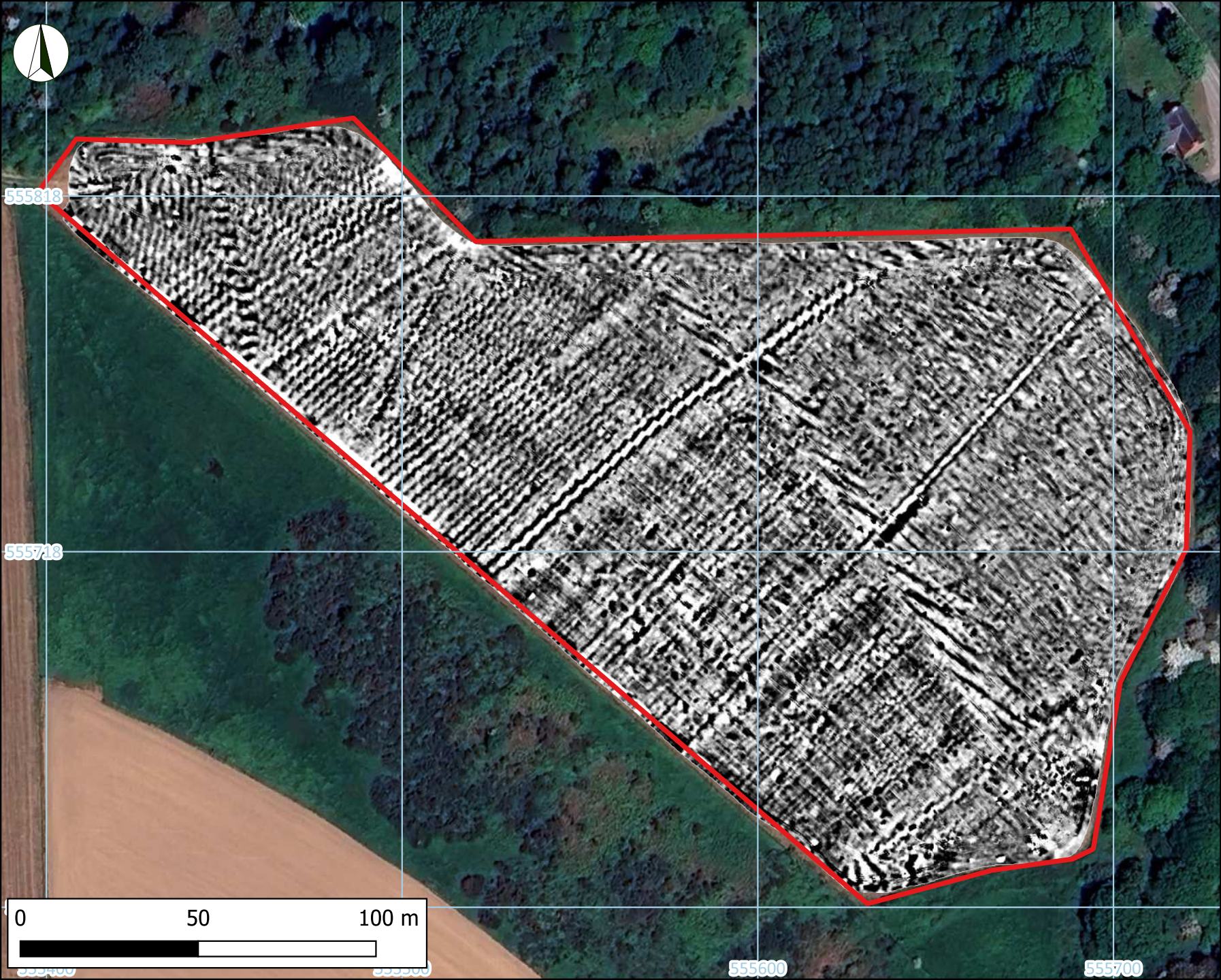


FIGURE 6

Title: Magnetometry Data 6nT

Project: Knockroe, Inishannon Quarry Project

Client: Keohane Readymix Ltd

Job No: J3591

Scale: 1:1,400

Date: 23/09/2024

Drawn by: FM

Revision: 1.0

Survey Area

Notes: Background: Google Satellite ©2024 Google
Dynamic range: ±6nT (white = low; black = high)

AMS



FIGURE 7

Title: Magnetometry Data 10nT

Project: Knockroe, Inishannon Quarry Project

Client: Keohane Readymix Ltd

Job No: J3591

Scale: 1:1,400

Date: 23/09/2024

Drawn by: FM

Revision: 1.0

Survey Area

Notes: Background: Google Satellite ©2024 Google
Dynamic range: ±10nT (white = low; black = high)

AMS

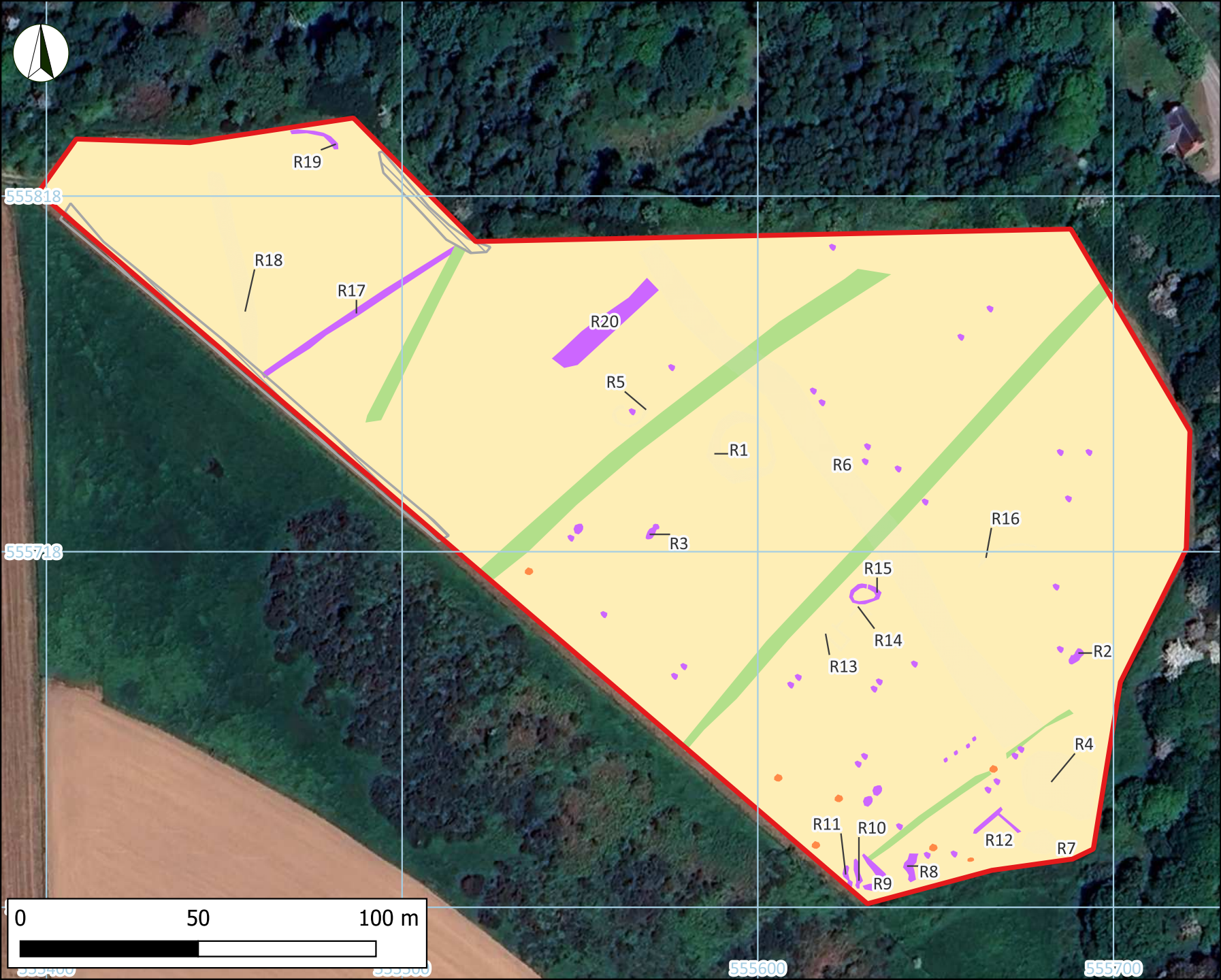


FIGURE 8

Title: Magnetometry Interpretation

Project: Knockroe, Inishannon Quarry Project

Client: Keohane Readymix Ltd

Job No: J3591

Scale: 1:1,400

Date: 23/09/2024

Drawn by: FM

Revision: 1.0

- Survey Area
- ? Archaeology
- Area of Enhancement
- Ferrous
- Field Boundary
- Interference

Notes: Background: Google Satellite ©2024 Google

AMS

Appendix 12-C
Archaeological Testing Report

Final Report on the Results of Archaeological Test Trenching at Knockroe, Innishannon, Co. Cork Part 1

Project Code: RH1522
Client: Keohane Readymix Ltd
Date: 7 March 2025
Excavation Licence: 25E0042
Licensee: Ewelina Rondelez
Report Author: Ewelina Rondelez
Archaeological Consultant: Rubicon Archaeology (Ireland) Ltd (formerly Rubicon Heritage Services Ltd)
ITM coordinates: 555608, 555756

Rubicon Heritage

VERSION CONTROL

Version	Date	Description	By	Approved By
0.1	25/02/2025	First draft of report	ER	
0.2	03/03/2025	Copy edit	KM	
0.2	07/03/2025	Copy edit	ROM	
1.0	07/03/2025	Final edit	ER	KM

NON-ARCHAEOLOGICAL INFORMATION [CONDITION 11]

Licence: 25E0042X
Site Owner: Keohane Readymix Ltd
Address: Ballygurteen
Clonakilty
Co. Cork

Planning Reg. No.: N/A **Excavation Type:** Test Trenching

Contractor/Developer: Keohane Readymix Ltd
Address: Ballygurteen
Clonakilty
Co. Cork

Background to investigation:

Keohane Readymix Ltd intend to open sand and gravel pit over an extraction area of c. 3.9 hectares at Knockroe, Innishannon, Co. Cork. A detailed Magnetometer Survey was conducted by AMS in September 2024 (NMS Licence No. 23R0461) at the proposed quarry extension. Twenty anomalies were identified.

An archaeological test trenching program was conducted at Knockroe, Innishannon, County Cork from February 10 to 11, 2025 under the licence no. 25E0042 . The test trenching excavation revealed a burnt mound spread (C008) in the southern corner of the site. The presence of burnt mound deposit indicates prehistoric activity, warranting preservation *in situ* or by record. Further analysis, such as radiocarbon dating and soil sampling, would provide a more precise chronology and interpretation of this feature. Furthermore, the identification of agricultural features (C004, C006, C009, and C015), along with furrows, indicates evidence of sustained land use and maintenance.

Please note that all recommendations are subject to the approval of An Bord Pleanála and the National Monuments Service, Department of Housing, Local Government, and Heritage.

Signed: Raudelez **Date:** 07/03/2025

DISCLAIMER

This report was produced by Rubicon Heritage Services Ltd under the criteria set out by its Integrated Management System, which is ISO certified in Quality (ISO 9001:2015), Environmental (ISO 14001:2015), Occupational Health and Safety (ISO 45001:2018) by external auditor – DQS GmbH. The report itself was not audited or certified.

Please note that the archaeological recommendations, mitigation proposals and methodology followed in this report are like those used on previous similar projects approved by the Archaeological Planning and Licencing Unit, National Monuments Service, Room G50, Custom House, Dublin 1. The National Monuments Acts 1930–2014, The Planning and Development Act 2000 (plus any amendments) and the most recent EPA guidelines were consulted. Guidelines and Plans issued from time–to–time by the statutory bodies have also been consulted. These are listed in the reference section of this report (DAHGI 1999a; 1999b; EPA 2003; 2017; IAI 2006; NMS 2006).

The archaeological test–trenching has been undertaken under licence, which required an approved method statement. Every effort has been taken in the preparation and submission of this report to provide as complete an assessment as possible within the terms of the brief, and all statements and opinions are offered in good faith. However, Rubicon cannot accept responsibility for errors of fact or opinion resulting from the data supplied by any third party, for any loss or other consequences arising from decisions made or actions taken on the basis of facts and opinions expressed in this report, (and any supplementary information), howsoever such facts and opinions may have been derived, or as the result of unknown and undiscovered sites or artefacts.

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Figure 2 Location of RMP sites with proposed development.
Figure 3 First edition 6-inch Ordnance Survey map with proposed development site.
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Figure 5 Cassini edition 6-inch Ordnance Survey map with proposed development site.
Figure 6 Excavated test trench array over geophysical survey interpretation.
Figure 7 Features identified in Trenches 13, 19, and 21.

PLATES

Plate 01 Field boundary C004, looking north-west.
Plate 02 Burnt mound spread C008, looking south-west.
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Plate 04 Furrow in Trench 21, looking south-west.
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Plate 10 C015 in Trench 2, looking south-west.
Plate 11 C011 in Trench 19, looking south-east.

ABBREVIATIONS AND TERMS USED

Barony, Parish, Townland	These terms refer to land divisions in Ireland. The barony is the largest land division in a county, which is formed from a number of parishes. These parishes are, in turn, made up of several townlands, which are the smallest land division in the county. The origins of these divisions are believed to be in the early medieval/Christian period (AD 500–1000) or may date earlier in the Iron Age (500 BC–AD 500).
DHLGH	Department of Housing, Local Government and Heritage
E	East
First Edition	This relates to the OS 6–inch maps for each county. The first edition map completed for the area dates to the early 1840s, and this is referred to in the text as the '6–inch map.
km	Kilometre
m	Metres, all dimensions are given in metres or part of a metre, unless otherwise stated
N	North
NIAH	National Inventory of Architectural Heritage, see www.buildingsofireland.ie
NMS	National Monuments Service. Regulatory body with the DHLGH with responsibility for archaeological heritage.
OS	Ordnance Survey
OSI	Ordnance Survey of Ireland
RMP	Record of Monuments and Places. An update of the older SMR, (sites and monuments record), on which all known archaeological sites are marked and listed in an accompanying list. The sites marked afford legal protection under the National Monuments Acts 1930–2004. The record is based on the 6–inch map series for the country and is recorded on a county basis. Each archaeological monument on the RMP has a unique code known as the RMP number prefixed by LI for Limerick.
RMP Number	This code is the number of the site on the RMP constraint map. It begins with the county code, for example LI for Limerick, the 6–inch sheet number, followed by the number of the archaeological monument on that sheet.
RPS	Record of Protected Structures
S	South
Second Edition	This relates to the OS 25–inch maps for each county. The second edition map completed for the area dates to the early 1900s and this is referred to in the text as the '25–inch map'.
Sheet	This relates to the 6–inch map for each county, which is divided into sheets
SMR	Sites and Monuments Record. The precursor of the RMP, the SMR now commonly relates to the archive paper files of known archaeological monuments maintained by the Archaeological Survey of Ireland (ASI). These files are arranged according to RMP number
W	West
T	Trench

EXECUTIVE SUMMARY

An archaeological test trenching programme was conducted at Knockroe, Innishannon, County Cork from February 10 to 11, 2025 (Figures 1–7). The site covered approximately 3.9 hectares and was situated in one large level agricultural field. The proposed development site is an extension to a nearby pre-existing quarry.

A detailed magnetometer survey was previously conducted by AMS in September 2024 (licence no. 23R0461) over an area of 3.9 hectares at the proposed quarry extension. Twenty anomalies were identified following this survey (Figure 6 and Table 1).

The test trench excavations revealed a burnt mound spread (C008) in the southern corner of the site (Figure 7, Plate 2 and 3). The presence of a burnt mound deposit indicates prehistoric activity, warranting preservation in situ or by record. Further analysis, such as radiocarbon dating and soil sampling, would provide a more precise chronology and interpretation of this feature. Furthermore, the identification of agricultural features (C004, C006, C009, and C015), along with furrows, indicates evidence of sustained land use and maintenance.

Please note all the recommendations in this report are subject to approval of the Local Authority and the National Monuments Service, Department of Housing, Local Government and Heritage.

1. INTRODUCTION

1.1 Site location and description

The proposed investigation area is situated in the townland of Knockroe, County Cork, approximately 1.5 km south-east of Innishannon. The total area available for investigation was approximately 3.9 hectares, encompassing one large, flat agricultural field (Figures 1–7). The site is located within the civil parish of Innishannon and the Barony of East Carbery (East Division), County Cork.

1.2 The proposed development

The proposed development site is an planned extension to a nearby pre-existing quarry. See Part 2 of this report for further details on the development and planning.

2. ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

2.1 General Background

The summary of the archaeological and historical background of the Knockroe townland aims to place it within a cultural and chronological context of the surrounding area, reflecting on the broader patterns of settlement, conflict, and economic change that have shaped the Munster region over millennia.

Prehistoric Period

The surrounding area reveals evidence of various human activities over thousands of years. Among the prehistoric features are *fulachtaí fia*. These sites, identified by fire-cracked stone and charcoal-enriched soil, often accompanied by water-filled troughs, suggest pyrolithic activity, with a ritualistic or cooking function which could date to between the Neolithic and Iron Age (Hawkes 2015). The closest *fulacht fia* (CO111-006----) is located c. 850 m to the south-west of the proposed development area.

The area around Knockroe townland is dotted with megalithic features such as standing stones, stone circles, and rows. An example is the Castlenalacht Stone Alignment (CO096-015----), located in the parish of Innishannon. This alignment consists of four tall, free-standing stones situated on a hilltop, forming the largest stone row among the more than 80 similar alignments in southwest Ireland. Dating to the Bronze Age (c. 3000–4000 years ago), this monument reflects such structures' ceremonial and perhaps territorial significance, marking important aspects of prehistoric cosmology and social organization.

The construction of hillforts in the Late Bronze Age further signifies the evolving social structure, which may have become more hierarchical with the emergence of influential local individuals and tribal formations. Clashanimud Hillfort, also within Innishannon parish, provides crucial insights into the martial aspects of that period. Excavations have revealed that the hillfort, established around 1100 BC, was short-lived, with evidence of its palisaded bank-and-ditch defences being deliberately destroyed by fire, likely during a conflict (O'Brien 2017, 39–124). This destruction suggests that the region was involved in broader patterns of social and political upheaval, characteristic of the Late Bronze Age across Europe, with parallels drawn to contemporaneous Mediterranean developments (O'Sullivan and Downey 2013, 23).

Early Medieval Period

Early Medieval remains (c. AD 400–1100) in the Knockroe area include several ringforts, also known as raths or lioses. These enclosed farmsteads, typically of circular or oval configuration, represented the principal settlements during this era, reflecting a society focused on agriculture, particularly cattle rearing and subsistence farming. Given its fertile lands and strategic positioning, the broader Bandon River valley, encompassing Knockroe, held significant importance during this period. Although specific ecclesiastical sites were not directly associated with Knockroe, the influence of Christianity was manifested through the establishment of nearby monastic sites. These ecclesiastical centres assumed a pivotal role in shaping the religious, cultural, and economic landscape of the region, thereby influencing the surrounding settlements.

Medieval Period

The Medieval period (circa AD 1100–1600) in the Knockroe region was heavily influenced by Anglo-Norman settlers who arrived there in the 12th century. The Normans built castles and fortifications to establish control over the area. Innishannon was granted a market and fair in 1256 and became an important Norman settlement by 1291, with higher taxes than the nearby town of Kinsale (Cole 1907, 54). The village was fortified with walls and included several castles, indicating its strategic significance along the Bandon River (Thomas 1992, Vol. 2, 243).

The presence of moated sites in the region further illustrates the defensive needs during this period and the Norman influence on settlement patterns. These sites, dating from the 13th to 14th centuries, served as fortified farmsteads, particularly along the frontier areas between Norman-controlled territories and Gaelic lands. Excavations at a moated site in Rigsdale (CO097-023----), near Innishannon, revealed a stone gatehouse and a coin of Edward I, dating the site to around 1280 AD (McCarthy 2002, 51–52; CCC 2020, 112).

In 1412, Henry V granted the village and the Bandon River ferry to Philip de Barry. The ferry, likely located at the current six-arched bridge, was a crucial crossing point and a source of income and control for the local lords. The medieval landscape of the Innishannon area saw conflicts such as the battle in 1560, where Carbery forces defeated the Geraldines on the riverbank near the bridge (Cole 1907, 54).

Post-medieval Period

During the post-medieval period, Innishannon and its surroundings experienced significant developments in land ownership and industry. In the early 17th century, the East India Company established an iron works and a shipbuilding yard at Dundaliel, Innishannon (CO097-049----). Initially, the company planned to build all its new ships in Dundaniel, but by 1615, this decision had been reversed (O'Sullivan 1988, 3). The construction was carried out by 300 English settlers, who also built a dock for ship construction, warehouses, sheds, forges, and a blast furnace to the west of Dundaniel Castle (CO097-050002----).

The Adderley family, who acquired land in the area during the reign of Charles II (1660–1685), played a significant role in the local economy and society. Thomas Adderley was instrumental in promoting the linen and cotton industries in the 18th century, transforming Innishannon into a centre for linen manufacturing. Only the foundations of Innishannon bleaching mill (CO097-054001----) survives today, but the spacious bleaching green is now used as the local G.A.A. pitch (CCC 2020, 145).

The village's history was also affected by natural events. Local tradition recalls that a tidal wave, caused by the 1755 Lisbon earthquake, reached Innishannon and caused significant damage—a rare but poignant reminder of the village's vulnerability to global events.

The more recent history of the Knockroe townland is highlighted by the famine burial pit (CO111-007----), located 800 m northwest of the site, which serves as a reflection of the broader events of the 19th century.

2.2 Review of Statutory Designations

2.2.1 National Monuments

There are no National Monuments or sites subject to a Protection Order that are relevant to the proposed development.

2.2.2 Record of Monuments and Places (RMPs)

Section 12 (1) of the National Monuments Act 1994 made provision for the establishment and maintenance of a Record of Monuments & Places (RMP). Under this Act, each site recorded in the Record of Monuments and Places is granted statutory protection. When the owner or occupier of a property, or any other person proposes to carry out, or to cause, or to permit the carrying out of any work at or in relation to a recorded archaeological monument they are required to give notice in writing to the Minister for Housing, Local Government and Heritage two months before commencing that work.

A cliff-edge fort (CO111-008----) lies approximately 200 m north of the proposed development area, in the townland of Dromkeen. A *fulacht fia* (CO111-006----) in the townland of Knockroe lies approximately 850 m to the south-west of the proposed development area.

2.2.3 Protected Structures

These are buildings that a planning authority considers to be of special interest from an architectural, historical, archaeological, artistic, cultural, scientific, social, and/or technical point of view. Protected Structures receive statutory protection from injury or demolition under Section 57 (1) of the Local Government (Planning and Development) Act 2000. Protected structure status does not exclude development or alteration but requires the developer to consult with the relevant planning authority to ensure that elements which make the structure significant are not lost during development.

There are no Protected Structures within the proposed development site.

2.2.4 NIAH

The National Inventory of Architectural Heritage (hereinafter the 'NIAH') is a state initiative under the administration of the Department of Arts, Heritage and the Gaeltacht and was established on a statutory basis under the provisions of the Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act 1999. Its purpose is to identify, record and evaluate the post-1700 architectural heritage of Ireland, uniformly and consistently, as an aid in the protection and conservation of the built heritage. NIAH surveys provide the basis for the recommendations of the Minister for Arts, Heritage and the Gaeltacht to the planning authorities for the inclusion of particular structures in their Record of Protected Structures (RPS).

There are no NIAH sites within the proposed development site.

2.3 Previous Archaeological Excavations

There have been no previous archaeological excavations within the townland of Knockroe. Archaeological investigations took place in Dromkeen townland as part of a proposed extension to the north of the pre-existing quarry in 2024, Excavation Licence 24E0695, which revealed agricultural linear features (Rondelez 2024).

2.4 Areas of Archaeological Potential identified in Geophysical Survey

A detailed Magnetometer Survey was conducted by AMS in September 2024 (NMS Licence No. 23R0461) on 3.9 Ha at the proposed quarry extension. Twenty anomalies were identified (Figure 6 and Table 1).

Table 1: Anomalies identified by Magnetometer Survey, conducted by AMS

Anomaly ID	Anomaly Type	Size	Description	Interpretation	Significance	Impact	Test
R1	Area of Enhancement	18m in diameter	subcircular area of magnetic enhancement	This area of enhancement may represent a ditch or enclosing element, such as a possible ring-ditch or barrow. However, the weak signal suggests the possibility that this anomaly is representative of near surface geology.	Potential	High	Test
R2	Archaeology ?	5m x 2m in size	highly magnetic irregularly shaped anomaly	This anomaly may represent an area of in-situ burning or a possible pit-like feature. This anomaly may represent an archaeological, modern, or natural source.	Potential	High	Test
R3	Archaeology ?	5m x 2m in size	highly magnetic irregularly shaped anomaly.	This anomaly may represent an area of in-situ burning or a possible pit-like feature. This anomaly may represent an archaeological, modern, or natural source.	Potential	High	Test
R4	Area of Enhancement	21m x 16m	This area of magnetic enhancement contains a spread of highly magnetic responses	This area of magnetic enhancement may represent an area of *in-situ* burning or dumping. This AOE may be related to a structure and trackway in this area that is present on the six-inch OS map (1843), 25- inch OS map (1863–67) and six-inch Cassini OS map (1935–38). This anomaly may represent an archaeological, modern, or natural source.	Potential	High	Test
R5	Area of Enhancement	20m in length	curvilinear area of magnetic enhancement	This area of enhancement may represent a ditch, or a potential enclosing element. However, the weak signal suggests the possibility that this anomaly is near surface geology. This anomaly may represent an archaeological, modern, or natural source.	Potential	High	Test

R6	Area of Enhancement t	174m x 8m	linear area of magnetic enhancement that contains numerous highly magnetic responses	This anomaly corresponds with a field boundary depicted on the first edition (1843) six-inch, 25-inch (1863–67) and six- inch Cassini (1935–38) OS mapping and may represent the ploughed out remains of the field boundary.	Low, historic field boundary	High	Test
R7	Area of Enhancement	8m x 7m	This area of magnetic enhancement contains a spread of highly magnetic responses	This area of magnetic enhancement may represent an area of *in-situ* burning or dumping. However, this AOE may be related to a structure and trackway in this area that is present on the six-inch OS map (1843), 25-inch OS map (1863–67) and six- inch Cassini OS map (1935–38). This anomaly may represent an archaeological, modern, or natural source.	Potential	High	Test
R8	Archaeology ?	8m x 2m	highly magnetic irregularly shaped anomaly	This anomaly may represent an area of *in- situ* burning or dumping. This area of enhancement may signify an occupationally enhanced soil or a natural feature. This anomaly may represent an archaeological, modern, or natural source.	Potential	High	Test
R9	Archaeology ?	12m x 2m	Highly magnetic irregularly shaped anomaly	This anomaly may represent an area of *in- situ* burning or dumping. This area of enhancement may signify an occupationally enhanced soil or a natural feature. This anomaly may represent an archaeological, modern, or natural source.	Potential	High	Test
R10	Archaeology ?	8m x 1m	highly magnetic irregularly shaped anomaly	This anomaly may represent an area of *in situ* burning or dumping. This area of enhancement may signify an occupationally enhanced soil or a natural feature. This anomaly may represent an archaeological, modern, or natural source.	Potential	High	Test
R11	Archaeology ?	7m x 1m	highly magnetic irregularly shaped anomaly	This anomaly may represent an area of *in situ* burning or dumping. This area of enhancement may signify an occupationally enhanced soil or a natural feature. This anomaly may represent an archaeological, modern, or natural source.	Potential	High	Test
R12	Archaeology ?	17m in length	positive rectilinear anomaly	This anomaly may represent an enclosing element or a pre-OS map field system. However, this anomaly may be related to a structure and trackway in this area that is present on six-inch OS map (1843), 25- inch OS map (1863–67) and six-inch Cassini OS map (1935–38). This anomaly may represent either an archaeological or natural source	Potential	High	Test

R13	Area of Enhancement	20m in length	rectilinear area of magnetic enhancement	This area of magnetic enhancement may represent an enclosing element or a pre-OS field system. However, the weak signal suggests the possibility that this anomaly is near surface geology. This anomaly may represent an archaeological, modern, or natural source.	Potential	High	Test
R14	Area of Enhancement	8m in length	rectilinear area of magnetic enhancement	This area of magnetic enhancement may represent an enclosing element or a pre-OS field system. However, the weak signal suggests the possibility that this anomaly is near surface geology. This anomaly may represent an archaeological, modern, or natural source.	Potential	High	Test
R15	Archaeology ?	18m in length	positive curvilinear anomaly	This anomaly may represent a ditch, a possible enclosing element, or near surface geology. This anomaly may represent either an archaeological or natural source.	Potential	High	Test
R16	Area of Enhancement	18m in length	negative curvilinear area of magnetic enhancement	This anomaly may represent a ditch, a possible enclosing element, or near surface geology. This weakly magnetic anomaly may represent either an archaeological or natural source.	Potential	High	Test
R17	Archaeology ?	64m in length	positive linear anomaly	This anomaly may represent a ditch, a pre- OS map field system or may be the result of an occupational disturbance such as plough furrows or imported soils. This strongly magnetic anomaly may represent either an archaeological or natural source.	Potential	High	Test
R18	Area of Enhancement	51m x 5m	linear area of magnetic enhancement that contains numerous highly magnetic responses	The response in this AOE may represent ploughed out archaeological features such as a possible ditch; however, this anomaly may be the result of an occupational disturbance or a possible modern source such as a pipe. This anomaly may represent an archaeological, modern, or natural source.	Potential	High	Test
R19	Archaeology ?	14m in length	curvilinear anomaly	This anomaly may represent a ditch, a possible enclosing element, or near surface geology. This weakly magnetic anomaly may represent either an archaeological or natural source.	Potential	High	Test
R20	Archaeology ?	34m x 6m	negative linear anomaly	This anomaly may represent a ditch, a pre-OS map field system or may be the result of an occupational disturbance such as plough furrows or imported soils. This strongly magnetic anomaly may represent either an archaeological or natural source.	Potential	High	Test

2.5 Cartographic Analysis

2.5.1 Firs Edition Ordnance Survey 6-inch series (1837–42)

The first edition Ordnance Survey map shows the area with several NE/SW and NW/SE field boundaries creating large open fields (Figure 3). A structure with an access road is visible in the southern part of the proposed development area. To the north, the cliff-edge fort is noted 'Cliffort'. A quay is marked on the river bank to the east of the proposed development site.

2.5.2 Ordnance Survey 25-inch series map (1888–1913)

This map shows that the field boundaries have been removed across the area to create four larger fields (Figure 4). The access road to the structure located in the south of the proposed development area was altered with the road approaching from the south rather than the east. The quay on the riverside to the east of the proposed development is marked as 'Colliers Quay'.

2.5.3 Cassini 6-inch series map (1888–1913)

This map shows that the field boundary associated with the structure was removed and size of the field around the structure was extended (Figure 5). The quay on the riverside to the east of the proposed development is marked as 'Colliers Quay'.

3. OBJECTIVES AND METHODOLOGY

3.1 Objectives

The archaeological testing programme aimed to identify the presence or absence of archaeological remains within the proposed development area and establish the nature, character, extent and significance of any archaeological features or deposits the development will potentially impact.

3.2 Methodology

When features of archaeological potential were uncovered the area was cleaned to establish the nature of the features. If features could not be confirmed as archaeological, limited exploratory work was undertaken to determine that they were archaeological in nature and not geological or the result of other non-archaeological activity (such as stone sockets, plough furrows, agricultural drainage, modern field clearance, etc).

If any artefacts were retrieved during the investigation, their treatment would comply with the National Museum of Ireland's *Standards for the care and treatment of archaeological objects from excavations* (2022) regarding care, numbering, and storage.

21 trenches, totalling 695 linear metres were opened and checked for archaeological features (Figures 6–7, Plates 1–11). Test trenches were excavated at locations chosen following consultation with the site drawings and the results of the Archaeological Geophysical Survey (AMS 2024).

3.3 Recording

All recording was in line with the standard operating procedures (SOP) and work instructions (WI) set out in Rubicon's Integrated Management System (IMS) (in compliance with ISO 9001:2015, ISO

14001:2015, and ISO 45001:2018) and was undertaken on pro forma record sheets (standard forms – SF). All contexts, small finds, and environmental samples were given unique numbers. Should waterlogged wood, bone, or metallurgical samples have been taken they would also have received unique numbers in line with recent NMI guidelines and been logged in one master *Sample Register (SF–105–PM)*. Rubicon's IMS is saved on our company SharePoint web–based platform for ease of on–site access.

Photographs, plans, and sectional drawings of individual trenches, features, and deposits (at an appropriate scale) were included as appropriate, as well as more general photographs of the work in progress and the sites in their landscape setting. Detailed site drawings were undertaken at appropriate archaeological recording scales (1:20 plan and 1:10 section). Photographic recording was also carried out and comprised digital photographs. All photographs are date stamped and collated in digital folders that are labelled appropriately.

All primary survey data was gathered using RTK (Real Time Kinematic) GPS survey instruments connected to Trimble's VRS Now network, giving consistent accuracy of <1 cm using satellites and terrestrial base–stations to triangulate 3D coordinates. All coordinates are provided in Irish Transverse Mercator (ITM). The location of any identified archaeological features, deposits and find spots were surveyed.

3.4 Samples retrieval strategy

A sampling strategy in accordance with Rubicon Heritage Services Ltd.'s standard environmental sampling practice was included in the method statement; however, since no archaeological remains were uncovered, it was not necessary to retrieve any samples.

3.5 Artefact retrieval strategy

An artefact retrieval strategy in accordance with Rubicon's Archaeological Recording Manual (WI–146–PM), the NMI's Standards for the care and treatment of archaeological objects from excavations (2022) and the IAI's (2006) Code of Conduct for the Treatment of Archaeological Objects was included in the method statement; however, no archaeological artefacts were retrieved.

4. RESULTS

The archaeological test trenching consisted of a total of 21 trenches, each varying in length and measuring 1.8 m in width, with depths ranging from 0.1 m to 0.5 m. A complete list of the archaeological test trenches excavated is available in Appendix 2.
The stratigraphy consisted primarily of three layers: topsoil (Mid-greyish-brown friable silty clay), subsoil (mid-brown soft silty clay), and natural deposits (light orangey brown sandy silt/mid orange-brown stony sandy silt). A complete list of the stratigraphic layers recorded is available in Appendix 1.

Field Boundary (C004)
A linear cut (C004), measuring 2.5 m in length, 1.3 m in width, and 0.2–3 m in depth, was identified as the remains of a former field boundary in trench 21 (Figure 7, Plate 1). It was filled with (C005) a mid-greyish-brown friable silty clay, suggesting natural silting or deliberate backfilling after the boundary went out of use.

Linear Features (C006, C009 and C015)

The C006 feature consists of a narrow linear cut, 2m long, 0.85m wide, and 0.27m deep, likely created through agricultural activity (Figure 7, Plate 8). The cut was filled with (C007) with a loose dark brown sandy silt, indicating gradual infilling. A linear cut (C009) in trench 19 was 2.5 m long, 1.6 m wide, and 0.35 m deep (Figure 7). It was filled (C010) with loose grey silt containing large, rounded stones, which may have been introduced through natural erosion or land clearance. Another linear feature was identified as a shallow cut (C015), measuring 1.8 m in length, 1.17 m in width, and 0.1 m in depth (Figure 7, Plate 10). It was filled (C016) with a loose light greyish-brown clayey silt, which likely accumulated gradually through soil movement or was deliberately deposited.

Burnt Mound Material (C008)

A deposit of charcoal-rich soil containing fire-affected/shattered stones (C008) was identified in trench 21 (Figure 7; Plates 2 and 3). The spread of burnt mound material measured 7.7 metres in length, 5.7 metres in width, and 0.15 metres in depth (Plate 2).

The extent of the mound was not indicated by the previous geophysical survey (Figure 6). The geophysical anomalies R8 and R9 in that place may correspond with agricultural linears cutting through the burnt mound material. The lack of visible elevation or raised ground in the landscape prior to excavation suggests that agricultural activity in the area may have obscured any surface indication of the burnt mound. A small sondage was excavated to determine the depth of this feature (Plate 3).

Deposits (C011 and C014)

A loose light brown clayey silt deposit (C011) in trench 19 was 2 m long, 2.4 m wide a 0.15 m deep, possibly representing a general accumulation of material over time (Figure 7 and Plate 11).

Charcoal-rich deposit (C014) in trench 14 was a mid-greyish-brown silty clay measuring 0.45 m long, 0.23 m wide and 0.05 m deep. A high concentration of charcoal in this fill may indicate past burning activity (Figure 7, Plate 9).

Possible Pit (C012)

A small, sub-circular cut (C012) in trench 14, 0.4m in diameter and 0.13m deep, may represent a shallow pit (Figure 7, Plate 6). It was filled (C013) with a mid-greyish-brown silty clay containing frequent charcoal inclusions, suggesting that it may have been used for burning or waste disposal.

Evidence of *in situ* burning

Areas of *in situ* burning were observed in trenches 6, 10 and 16 indicating localised high-temperature burning activity, interpreted most likely to be as a result of natural causes.

Field Clearance and Agricultural Activity

Evidence of previous field clearance activity was visible in trench 19. A concentration of larger stones (C011) corresponded with the previously identified geophysical anomaly R4. This may potentially relate to demolition remains of a 19th.century structure, present in the southern extent of the proposed development site and identified on the First Edition Ordnance Survey Map. No above ground remains of this structure exist today. Agricultural furrows (0.06–0.1 m deep and 0.4–0.60 m wide) were present across whole site.

5. DISCUSSION

The identified archaeological features indicate following findings:

Burnt Mound Spread (C008) in trench 21
A burnt spread (C008) of charcoal-rich soil with heat-shattered stones was identified in trench 21. Classic burnt mounds appear in the landscape as low grassy mounds of crescent or U-shaped plan (Waddell 2000, 174; Hawkes 2018), though excavation has shown that in many cases the mound can be ploughed out or indeed may never have been on such a scale as to remain identifiable above ground. The technology of burnt mounds is well known. Stones were heated in a nearby fire and placed in a water-filled trough – sometimes lined with timber, stones, clay or reed matting– the heat from the stones would then bring the water to boil. After repeated use the stones fractured and shattered, until eventually the pieces became too small to re-use and were discarded, creating a characteristic burnt mound or spread of heat-shattered stones. How the boiled water was subsequently utilised, however, is more difficult to ascertain. While burnt mounds often have no clear function, other than for the heating of water, they can be considered good indicators of nearby settlement sites, which are often located uphill in drier ground, but within easy walking distance. Burnt mounds have been identified in almost every part of the country and are the most common prehistoric monument in Ireland (Waddell 2000, 174; Hawkes 2018), with over 7000 examples known in County Cork by 1997 (Power 1997). In the wider locality, a *fulacht fia* (CO111-006----) in the townland of Knockroe lies approximately 850 m to the south-west of the proposed development area. Burnt mounds have been found to have a very broad date range with a small number of sites dating from the Late Neolithic and occasional examples producing dates from the Iron Age. However, burnt mounds that have been radiocarbon dated show a marked concentration of sites in the Middle Bronze Age, while there is a smaller but significant group indicating use in the Late Bronze Age (Brindley and Lanting 1990; Hawkes 2018).

Agricultural Features
Field boundary (C004) and linear features (C006, C009 and C015) together with the evidence of *in situ* burning in trenches 6, 10 and 16 and field clearance (C011) indicate ongoing agricultural land use. The possible pit (C012) may also be of the agricultural origin.

6. CONCLUSION

The test trenching excavation revealed a burnt mound spread (C008) in the southern corner of the site. The presence of a burnt mound deposit indicates prehistoric activity, warranting preservation *in situ* or by record. Further analysis, such as radiocarbon dating and environmental sampling, could provide a more precise chronology and interpretation of this feature. Furthermore, the identification of several agricultural features (C004, C006, C009, and C015), along with furrows, indicates evidence of sustained land use and maintenance.

7. RECCOMENDATIONS

The majority of the archaeologically tested area, except for the southern part of the site (Trench 21), contained no evidence of archaeological features and/or deposits. Therefore, the following mitigation strategy is recommended:

1. The burnt mound spread (C008), as described above, should be preserved *in situ*. If preservation *in situ* is not possible, a comprehensive programme of archaeological resolution

through archaeological excavation and preservation by record should be implemented before any works proceed within a 10 m radius of the recorded extent of the burnt mound spread.

2. An experienced licence eligible archaeologist should monitor any topsoil removal within the proposed development site. This should be completed under licence and in accordance with the provisions of the National Monuments Acts 1930-2014.
3. Should additional archaeological features or deposits be discovered during monitoring, the extent of such features/deposits should be determined and works at this location should cease. A strategy should be proposed to the Project Archaeologist and National Monuments Service to preserve the archaeological features/deposits *in situ*, where possible.
4. Where preservation *in situ* cannot be achieved, either in whole or in part, then a programme of full archaeological excavation should be proposed, to ensure the preservation by record of the portion of the site that will be directly impacted upon. This work should be carried out by a suitably qualified archaeologist under license and in accordance with the provisions of the National Monuments Acts 1930–2014.
5. The results of any archaeological monitoring, and/or excavation should be submitted in a report to the Project Archaeologist, Local Authority, the Heritage and Planning Division, Department of Housing, Local Government and Heritage and the National Museum of Ireland.

Please note all the recommendations in this report are subject to approval of the Local Authority and the National Monuments Service, Department of Housing, Local Government and Heritage. The wording of these recommendations is not intended to be used as a condition of planning.

8. ARCHIVE QUANTITIES

The site archive is comprised of the following materials:

Table 2: Site Archive

Item	Quantity
Photographs	46
Registers	2
Trench record sheets	8

The archive material is contained within one box.

Storage of the archive in a suitable format and location is required to provide for any future archaeological research. It is proposed that in addition to the paper archive a digital copy is prepared. The archive is currently stored in the offices of Rubicon Heritage Services Ltd, Unit 2, Europa Enterprise Park, Midleton, Co. Cork P25 TV25. It is proposed that following completion of post–excavation the archive will be deposited with the National Monuments Service, Department of the Arts, Heritage and the Gaeltacht and the National Museum of Ireland.

9. REFERENCES

Department of Arts, Heritage, Gaeltacht and the Islands (DAHGI) 1999 Frameworks and Principles for the Protection of the Archaeological Heritage, Stationery Office, Dublin

Department of the Environment, Heritage and Local Government 2004 Architectural Heritage Guidelines. Stationery Office, Dublin

Cork County Council (CCC) 2020 *Archaeological Heritage of County Cork*. Heritage Unit of CCC, Cork.

Cole, H 1907 'Innishannon and its neighbourhood'. *Journal of the Cork Historical and Archaeological Society*, Vol. 13, 53–64.

DoEHLG 2009 *Code of Practice between the Department of the Environment, Heritage and Local Government and the Irish Concrete Federation*. National Monuments Service, Dublin. Available online @ chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.archaeology.ie/sites/default/files/media/publications/cop-irish-concrete-federation-en.pdf

DAHGI 1995 Recorded Monuments Protected under Section 12 of the National Monuments (Amendment) Act, 1994.

DAHGI 1999a *Framework and Principles for the protection of the archaeological heritage*. Stationery Office Dublin.

DAHGI 1999b *Policy and Guidelines on Archaeological Excavation*. Stationery Office, Dublin.

Hawkes, A 2018 *The Archaeology of Prehistoric Burnt Mounds in Ireland*. Archaeopress, Oxford.

McCarthy, M 2002 'Rigsdale; Medieval moated site', in I. Bennett (ed.), *Excavations 2000: summary accounts of archaeological excavations in Ireland*, 51–52. Wordwell, Bray.

O'Brien, W 2017 'Clashanimud Hillfort, Co. Cork', in William O'Brien and James O'Driscoll (eds) *Hillforts, Warfare and Society in Bronze Age Ireland*, 39–124. Archaeopress, Oxford.

O'Sullivan, M and Downey, L 2013 'Hilltop forts and enclosures', *Archaeology Ireland*, Vol. 27, No.1, 23.

O'Sullivan, M and Downey, L 2023 'Flax-growing and linen-making in post-medieval Ireland', *Archaeology Ireland*, Vol. 37, No. 4, 33.

O'Sullivan, P 1988 'The English East India Company at Dunaliel', *Bandon Historical Journal,* Vol. 4, 3–7.

Power, D 1992 *Archaeological Inventory of Co. Cork. Vol. 1. West Cork*. Stationary Office, Dublin 7.

Rondelez, E 2024 Final Report on Archaeological Excavation at Dromkeen, Inishannon, Co. Cork (24E0695) (unpublished report).

Southern Star Team 2015 'Dromkeen locals unveil completed famine burial ground project'. The Southern Star, Friday, 7 August. Available online @ https://www.southernstar.ie/news/dromkeen-locals-unveil-completed-famine-burial-ground-project-4093961.

Thomas, A 1992 *The walled towns of Ireland, 2 vols*. Irish Academic Press, Dublin.

Online sources

Database of Irish Excavation Reports. www.excavations.ie

National Monuments Service, HEV. https://maps.archaeology.ie/HistoricEnvironment/

Taile Éireann. GeoHive https://www.arcgis.com/apps/webappviewer/index.html?id=3ae19cc156bf4706a929304bf8fcc4f6

Other Sources

National Inventory of Architectural Heritage (www.buildingsofireland.ie/).

Record of Monuments and Places (RMP), the Heritage Service, 7 Ely Place, Dublin 2.

Summary Accounts of Archaeological Excavations in Ireland (www.excavations.ie).

Topographical Files of the National Museum of Ireland, Kildare Street, Dublin 2 (www.archaeology.ie).

Placenames Database of Ireland (www.logainm.ie).

Cartographic References

First edition 6-inch Ordnance Survey map (1829–1846).

Third edition 25-inch Ordnance Survey (1:2500) map (1897–1913).

APPENDIX 1 CONTEXT REGISTER

Context No.	Type	Fill of	Filled by	Length (m)	Width (m)	Depth (m)	Description	Interpretation
1						0.1–0.3	Mid-greyish-brown friable silty clay	Topsoil
2						0.5–0.1	Mid-brown soft silty clay	Subsoil
3						n/a	Mid orangey brown silty clay	Natural
4	Cut		C005	2.5	1.3	0.23	Cut of linear	Cut of field boundary
5	Fill	C004		2.5	1.3	0.23	Friable mid-greyish-brown silty clay	Fill of field boundary
6	Cut		C007	2	0.85	0.27	Cut of linear	Cut of agricultural linear
7	Fill	C006		2	0.85	0.27	Loose dark brown sandy silt	Fill of linear C006
8	Deposit			7.7	5.7	0.15	Heat affected stones	Burnt mound material
9	Cut		C010	2.5	1.6	0.35	Cut of linear	Modern agricultural feature
10	Fill	C009		2.5	1.6	0.35	Loose grey silt with big, rounded stones	Fill of C009
11	Deposit			2	2.4	0.15	Loose light brown clayey silt	Deposit
12	Cut		C013	0.4	0.4	0.13	Cut of possible pit	Cut of possible pit
13	Fill	C012		0.4	0.4	0.13	Mid-greyish-brown silty clay with frequent charcoal inclusions	Fill of possible pit C012
14	Deposit			0.45	0.23	0.05	Charcoal rich loose Mid-greyish-brown silty clay	Possible deposit
15	Cut		C016	1.8	1.17	0.10	Cut of linear	Cut of agricultural linear
16	Fill	C015		1.8	1.17	0.10	Loose light greyish-brown clayey silt	Fill of linear C015

APPENDIX 2 TRENCH REGISTER

Trench No.	Length (m)	Width (m)	Depth (m)	Orientation	Description	Comments
1	50	1.8	0.1–0.25	NE–SW	Mid-greyish-brown friable silty clay Mid-brown soft silty clay Mid orangey brown silty clay	R19—not visible. Two ENE–WSE orientated furrows (0.4m wide and 0.15m deep).
2	40	1.8	0.1–0.25	E–W	Mid-greyish-brown friable silty clay Mid-brown soft silty clay Mid-orangey brown silty clay	R17—agricultural linear. R18 - multiple furrows running E-W at the NW end of the trench
3	35	1.8	0.1–0.35	NW–SE	Mid-greyish-brown friable silty clay Mid-brown soft silty clay Mid orangey brown silty clay	R20—natural patch of stone and gravel
4	30	1.8	0.1–0.35	NW–SE	Mid-greyish-brown friable silty clay Mid-brown soft silty clay Mid-orangey brown silty clay	R20—natural patch of stone and gravel
5	10	1.8	0.1–0.25	NE–SW	Mid-greyish-brown friable silty clay Mid-brown soft silty clay Mid-orangey brown silty clay	R5—natural patch of stone and gravel
6	30	1.8	0.1–0.35	NE–SW	Mid-greyish-brown friable silty clay Mid-brown soft silty clay Mid-orangey brown silty clay	
7	35	1.8	0.1–0.35	NW–SE	Mid-greyish-brown friable silty clay Mid-brown soft silty clay Mid orangey brown silty clay	
8	15	1.8	0.1–0.35	NW–SE	Mid-greyish-brown friable silty clay	R1—not visible

Trench No.	Length (m)	Width (m)	Depth (m)	Orientation	Description	Comments
					Mid-brown soft silty clay	
					Mid-orangey brown silty clay	
9	70	1.8	0.1–0.25	NE–SW	Mid-greyish-brown friable silty clay	R1, R3 and R9—natural patches of stone and gravel
					Mid-brown soft silty clay	
					Mid-orangey brown silty clay	
10	20	1.8	0.1–0.25	NE–SW	Mid-greyish-brown friable silty clay	
					Mid-brown soft silty clay	
					Mid-orangey brown silty clay	
11	30	1.8	0.1–0.25	NW–SE	Mid-greyish-brown friable silty clay	
					Mid-brown soft silty clay	
					Mid-orangey brown silty clay	
12	60	1.8	0.1–0.4	NE–SW	Mid-greyish-brown friable silty clay	R13, R14 and R15—natural patches of gravel
					Mid-brown soft silty clay	
					Mid-orangey brown silty clay	
13	20	1.8	0.2–0.4	NE–SW	Mid-greyish-brown friable silty clay	E–W orientated furrows
					Mid-brown soft silty clay	
					Mid-orangey brown silty clay	
14	10	1.8	0.1–0.3	NE–SW	Mid-greyish-brown friable silty clay	
					Mid-brown soft silty clay	
					Mid-orangey brown silty clay	
15	40	1.8	0.2–0.3	NE–SW	Mid-greyish-brown friable silty clay	
					Mid-brown soft silty clay	
					Mid-orangey brown silty clay	
16	20	1.8	0.1–0.25	E–W	Mid-greyish-brown friable silty clay	
					Mid-brown soft silty clay	

Trench No.	Length (m)	Width (m)	Depth (m)	Orientation	Description	Comments
					Mid-orangey brown silty clay	
17	40	1.8	0.1–0.35	N–S	Mid-greyish-brown friable silty clay	
					Mid-brown soft silty clay	
					Mid-orangey brown silty clay	
18	50	1.8	0.2–0.3	NW–SE	Mid-greyish-brown friable silty clay	R2 and R16—natural patches of gravel
					Mid-brown soft silty clay	
					Mid-orangey brown silty clay	
19	35	1.8	0.1–0.35	NE–SW	Mid-greyish-brown friable silty clay	R7—area of bigger stones concentration. Possibly filed clearance (C011). R4—disturbance possibly connected with the house structure
					Mid-brown soft silty clay	
					Mid-orangey brown silty clay	
20	20	1.8	0.1–0.2	NW–SE	Mid-greyish-brown friable silty clay	R12—a modern pipe
					Mid-brown soft silty clay	
					Mid-orangey brown silty clay	
21	35	1.8	0.15–0.35	E–W	Mid-greyish-brown friable silty clay	R8, R9, R10 and R11—possibly connected with C004, C006 and C008.
					Mid-brown soft silty clay	
					Mid-orangey brown silty clay	

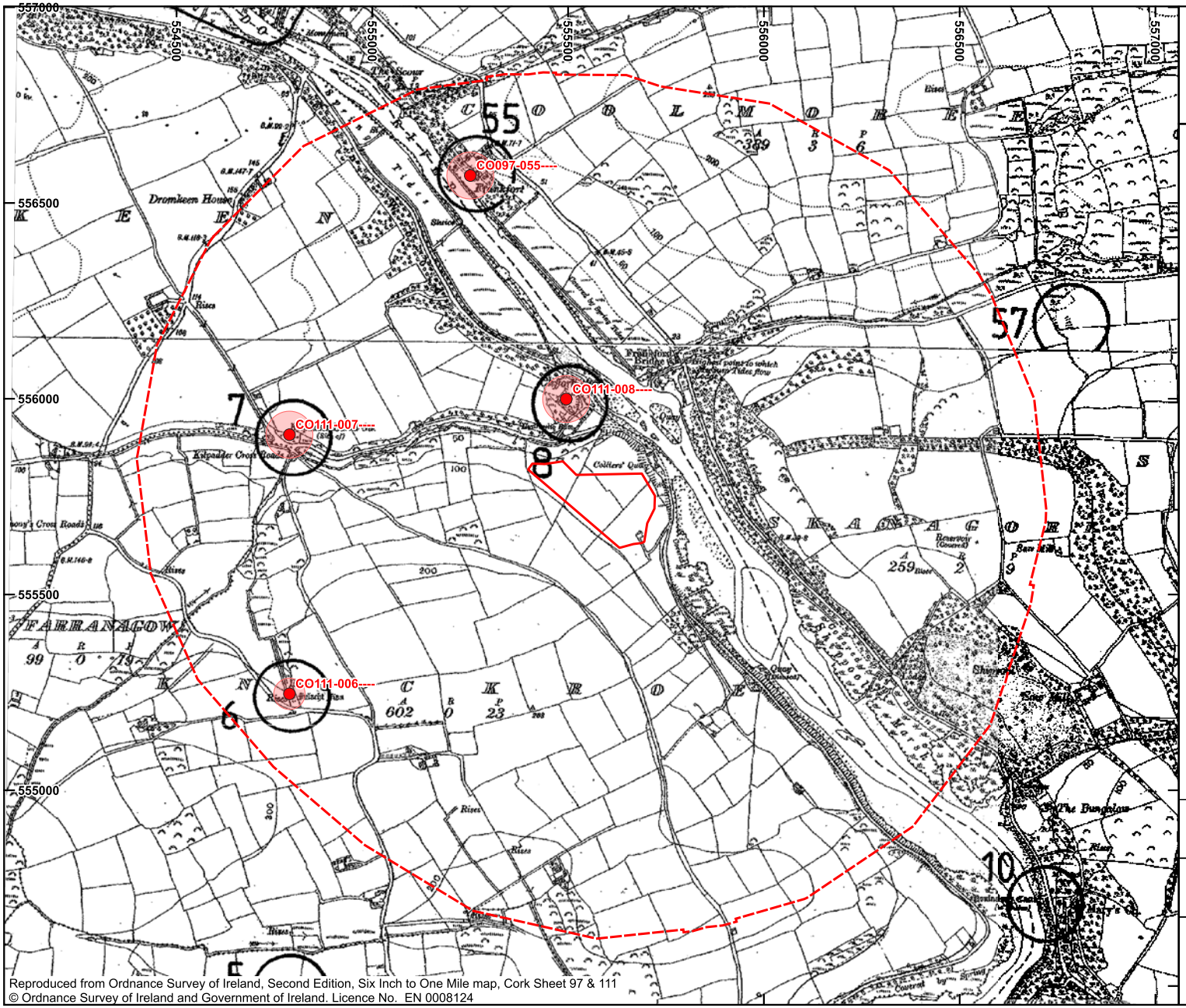
APPENDIX 3 PHOTO REGISTER

Photo No.	Camera No.	Direction Facing	Description
1	Olympus 102	NW	Linear C004 in T21
2	Olympus 102	NW	Linear C004 in T21
3	Olympus 102	NW	Linear C004 in T21
4	Olympus 102	SW	Linear C006 in T21
5	Olympus 102	E	Burnt mound spread C008 in T21
6	Olympus 102	W	Burnt mound spread C008 in T21
7	Olympus 102	S	Burnt mound spread C008 in T21
8	Olympus 102	E	T21
9	Olympus 102	N	Extension of T21
10	Olympus 102	WNW	Sondage in burnt mound material C008 in T21
11	Olympus 102	NNE	T19
12	Olympus 102	NNE	T15
13	Olympus 102	SES	Linear C009 in T19
14	Olympus 102	SW	Furrow in the extension of T21
15	Olympus 102	ESE	C011 in T19
16	Olympus 102	E	Modern pipe in T19
17	Olympus 102	WSW	Modern pipe in T19
18	Olympus 102	E	T20
19	Olympus 102	NE	T14
20	Olympus 102	NE	T13
21	Olympus 102	NNW	Field clearance in T13
22	Olympus 102	SES	C014 in T13
23	Olympus 102	SE	C012 in T13
24	Olympus 102	S	C006 in T21
25	Olympus 102	ENE	T12
26	Olympus 102	NW	R13 in T12
27	Olympus 102	NW	T11
28	Olympus 102	NE	T10
29	Olympus 102	WSW	T9
30	Olympus 102	E	T16
31	Olympus 102	SSW	T17
32	Olympus 102	NNW	T7
33	Olympus 102	S	*In situ* burning in T16
34	Olympus 102	SSE	*In situ* burning in T16
35	Olympus 102	NNW	*In situ* burning in T10
36	Olympus 102	SW	T6
37	Olympus 102	S	T6

Photo No.	Camera No.	Direction Facing	Description
38	Olympus 102	SE	T8
39	Olympus 102	NW	T4
40	Olympus 102	SW	T5
41	Olympus 102	NW	T3
42	Olympus 102	WSW	C015 in T2
43	Olympus 102	WNW	T2
44	Olympus 102	W	Agricultural feature in T1
45	Olympus 102	W	Agricultural feature in T1
46	Olympus 102	E	T1



Figure 1 - Knockroe, Innishannon, Co. Cork: Site location.



Rubicon Heritage

Legend

- Site Boundary
- Study Area (1km)
- RMP Site
- Zone of Notification

Project: RH1522 - Knockroe Innishannon	Date: 03/12/2024 Scale: 1:15,000 @A4
Status: Licence Application Revision: 1.0	Prepared by: H.Sims Approved by: I.Pawle

150 300 450 600 750 m

Figure 2 - Location of RMP sites with proposed development.

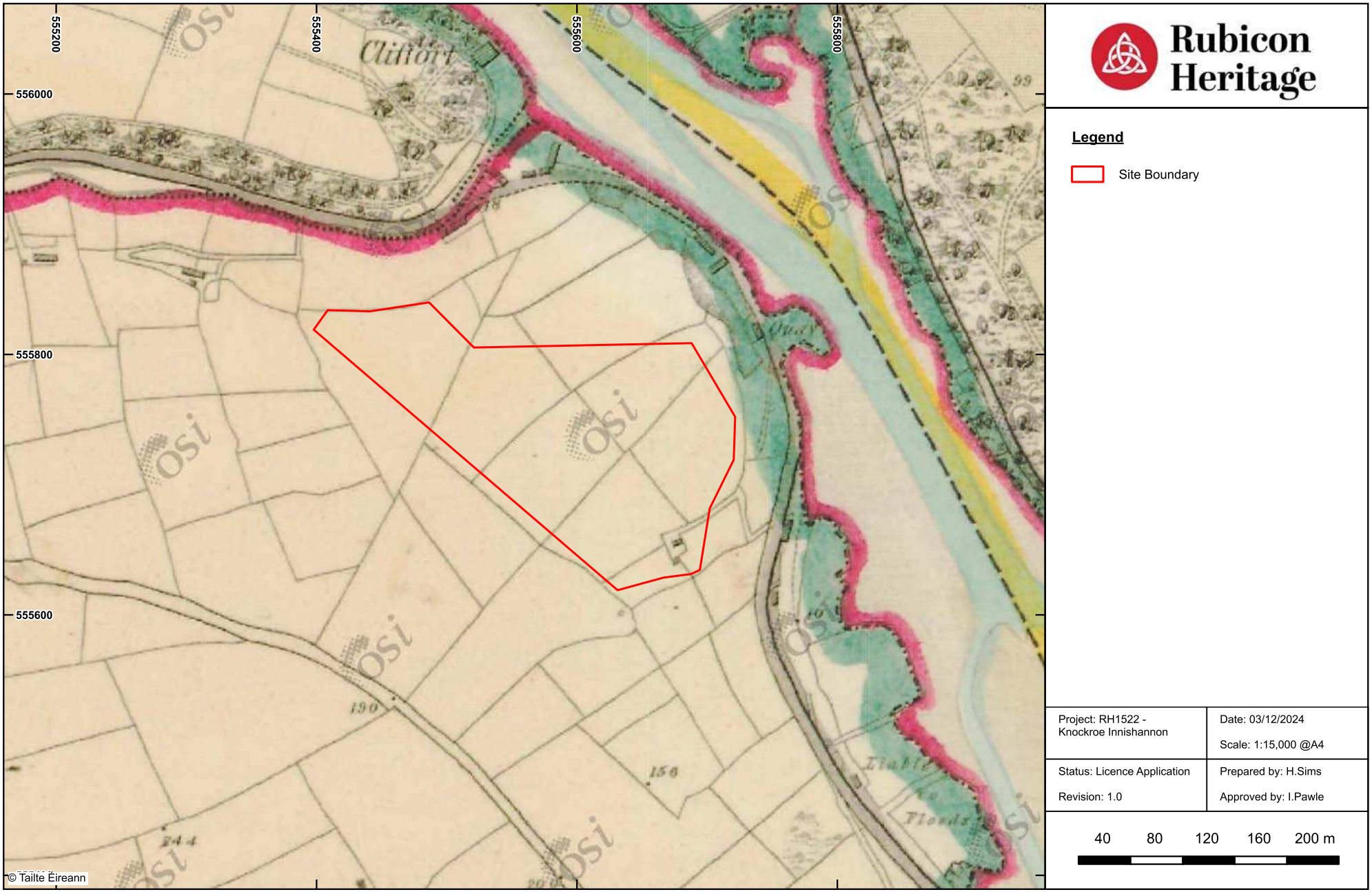


Figure 3 - First edition 6-inch Ordnance Survey map with proposed development site.

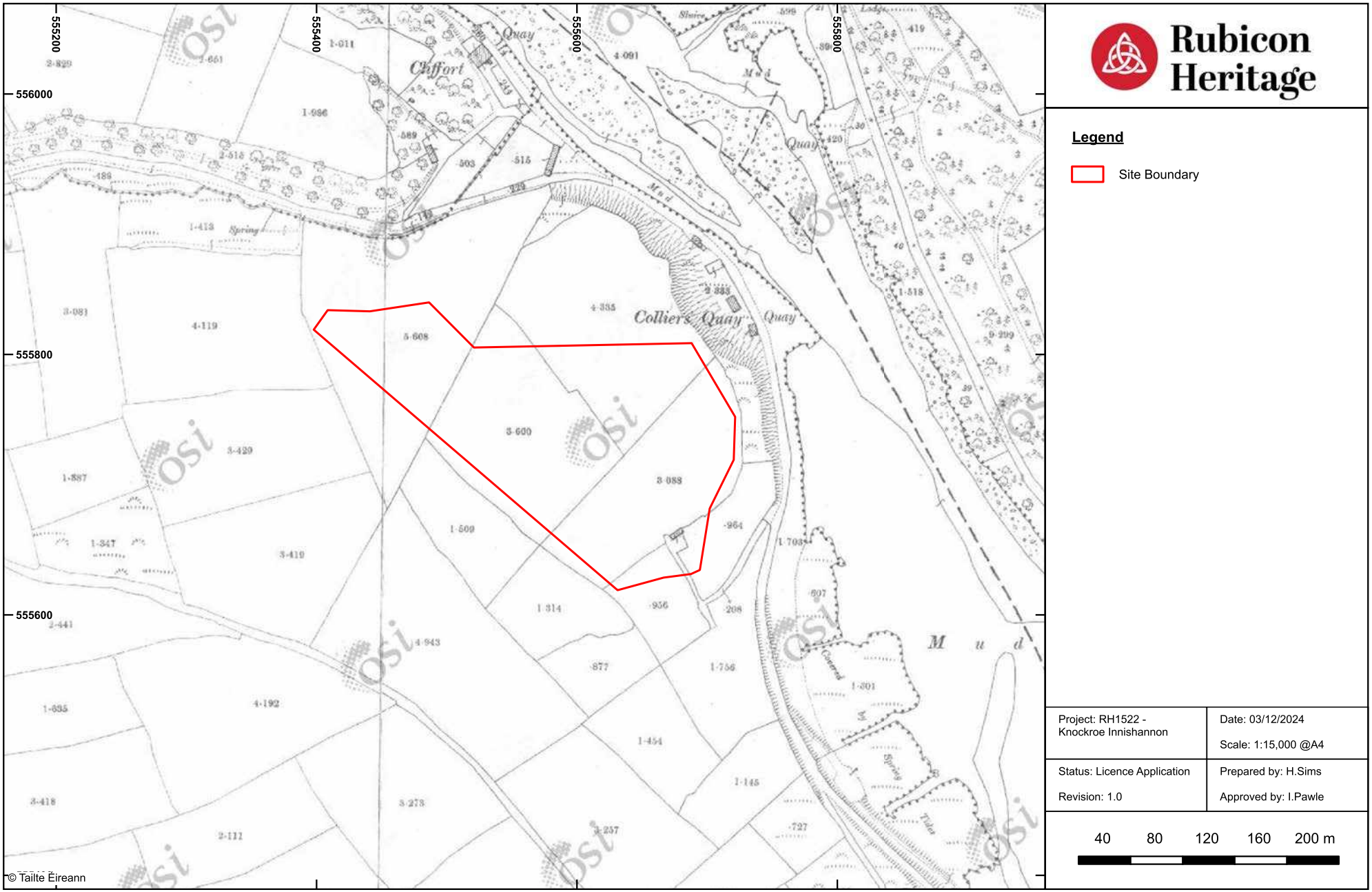


Figure 4 - First edition 25-inch Ordnance Survey map with proposed development site.

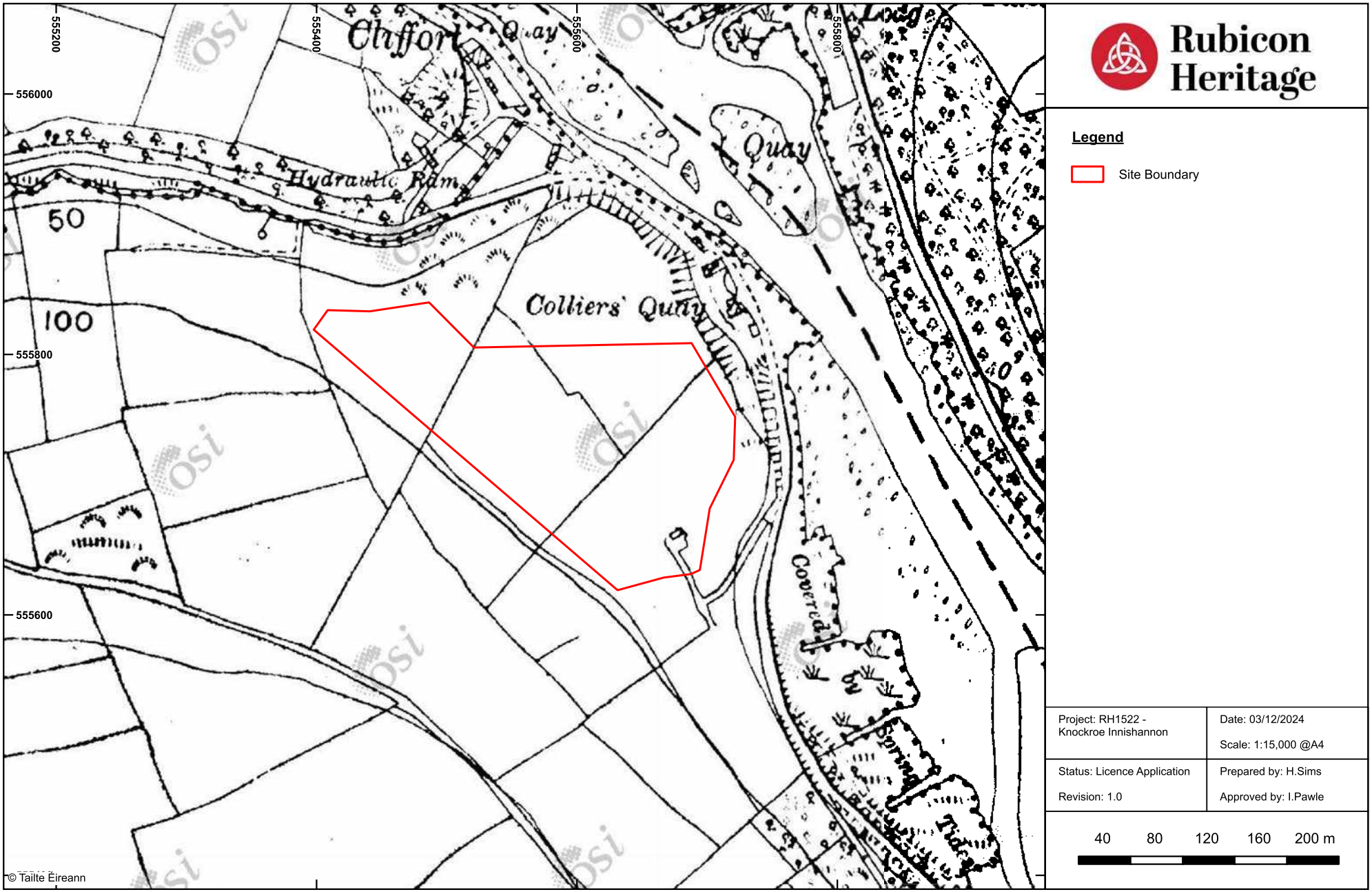
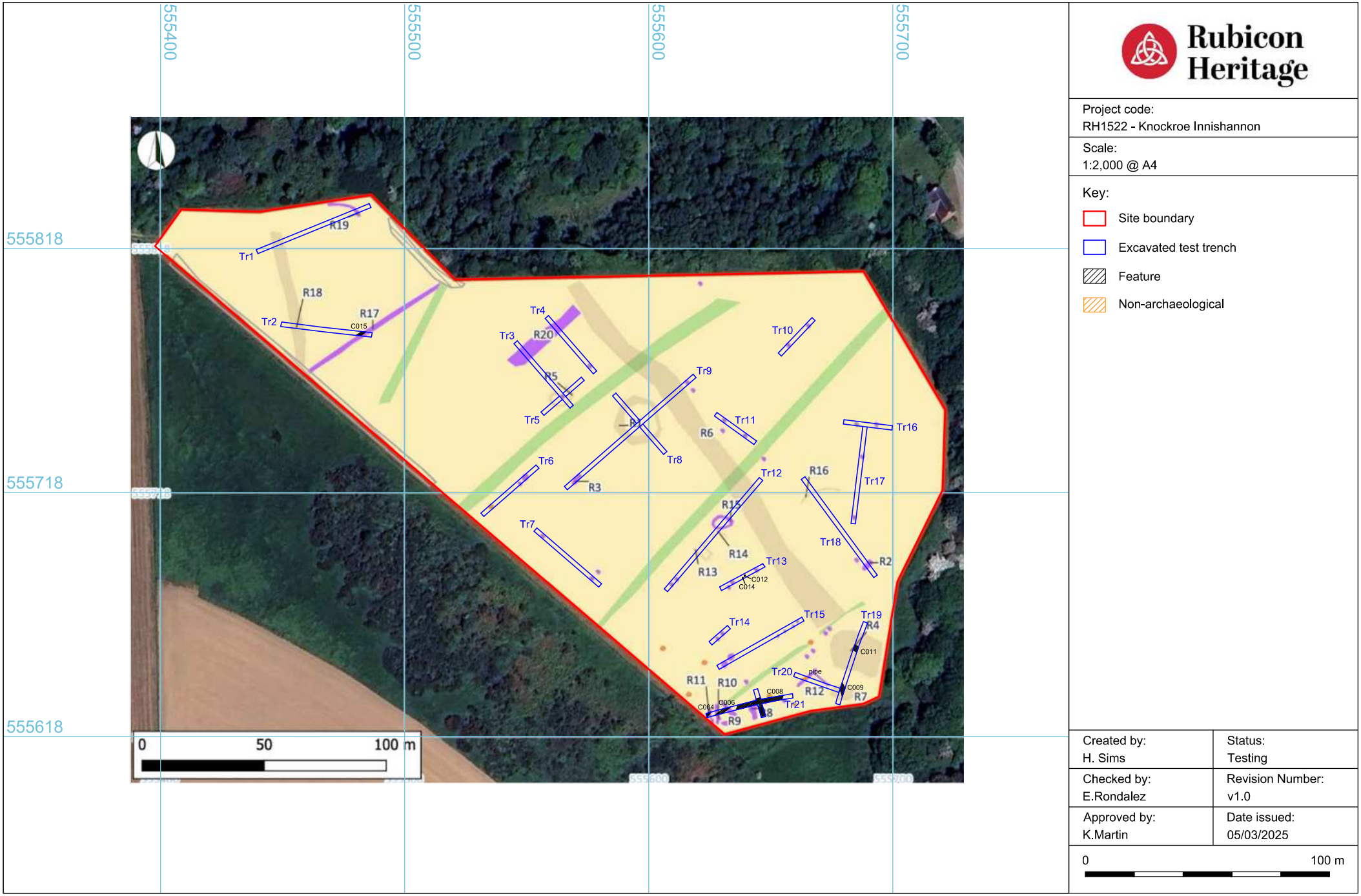


Figure 5 - Cassini edition 6-inch Ordnance Survey map with proposed development site.



Rubicon Heritage

Project code:
RH1522 - Knockroe Innishannon

Scale:
1:2,000 @ A4

Key:

- Site boundary
- Excavated test trench
- Feature
- Non-archaeological

Created by: H. Sims	Status: Testing
Checked by: E.Rondalez	Revision Number: v1.0
Approved by: K.Martin	Date issued: 05/03/2025

0 100 m

Figure 6 - Excavated test trench array over geophysical survey interpretation.

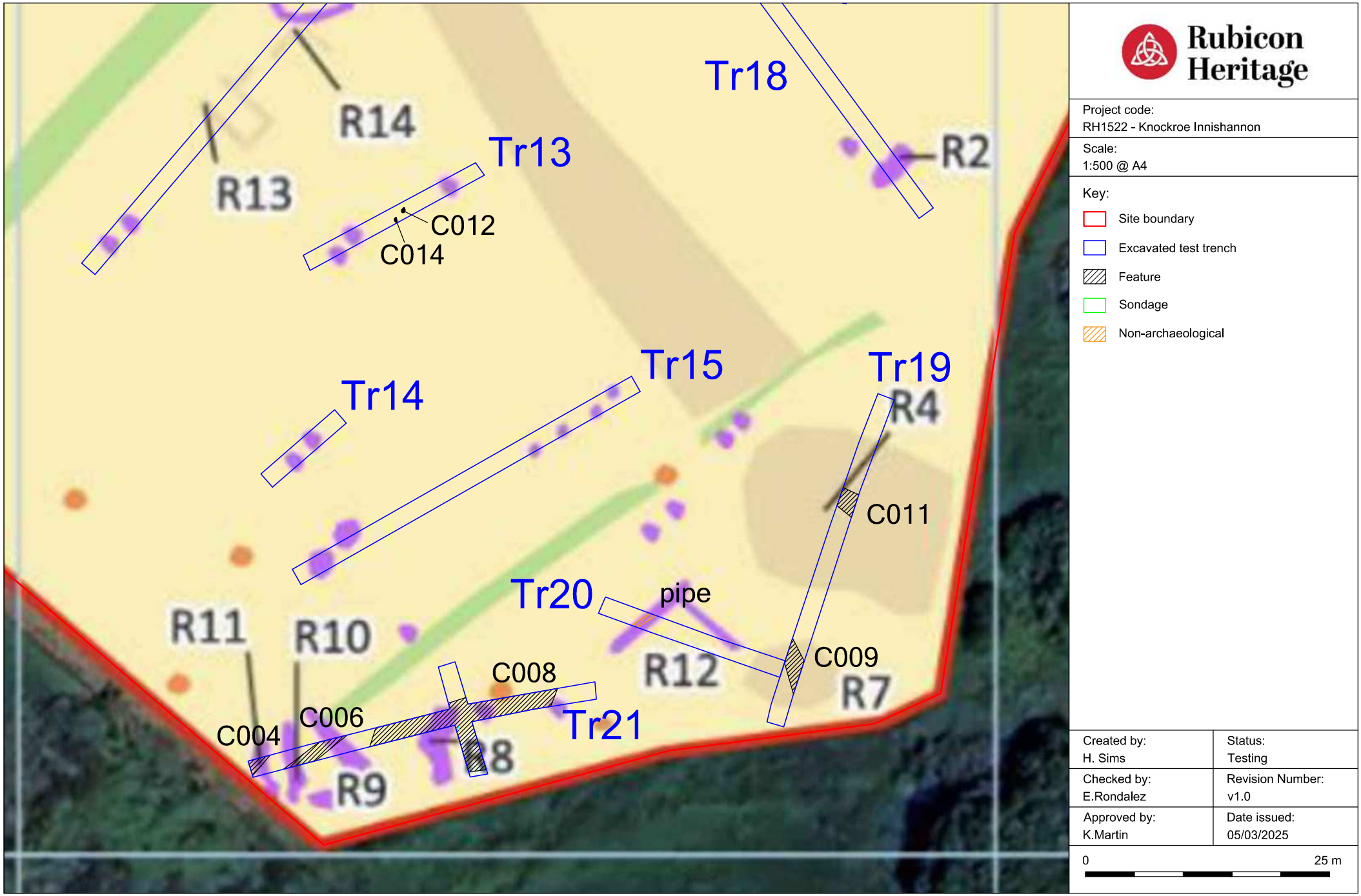


Figure 7 - Features identified in Trenches 13, 19, and 21.



Plate 1 - Field boundary C004, looking north-west.



Plate 2 - Burnt mound spread C008, looking south-west.



Plate 3 - Sondage in burnt mound spread C008, looking south.



Plate 4 - Furrow in Trench 21, looking south-west.



Plate 5 - Trench 14, looking north-east.



Plate 6 - C012 in Trench 13, looking south-east.



Plate 7 - C014 in Trench 13, looking south-east.



Plate 8 - C006 in Trench 21, looking south.



Plate 9 - Trench 4, looking south-east.



Plate 10 - C015 in Trench 2, looking south-west.



Plate 11 - C011 in Trench 19, looking south-east.

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INTRODUCTION

Background

13.1 This report assesses the landscape and visual effects arising from the proposed sand & gravel pit at Knockroe, Bandon, Co. Cork. The application area is located ca. 1.5 km south of the village of Inishannon and ca. 5.5 km east of the town of Bandon. The R605 – Regional Road passes within 200m to the east, separated from the site by the Bandon River. The N71 – National Road passes within 1.5 km to the north, within Inishannon.

13.2 The ca. 4.0 ha planning application area (i.e. the area within the red line boundary on Figure 13-1) is hereafter referred to as 'the application area' or 'the site'. It comprises upgrade of the existing internal access track and one agricultural field, within which the proposed extraction area will be located. The access track traverses a wooded area, which is located within a former sand & gravel pit. The woodland vegetation has naturally regenerated within the disused pit over the last 30+ years. The track follows the former access road into the pit, which has become partially overgrown with grass and scrub species, mainly willow and gorse. The former pit face, which is ca. 8 m in height runs along the southern boundary of the wooded area. The agricultural field / proposed extraction area, adjoins the top of the pit face to the south. It is proposed to cut a ramp into the former pit face to gain access to the sand and gravel deposit below the agricultural land.

13.3 It is proposed to extract sand & gravel from the site in two phases over a 15 year period, using the overburden present on site to lower the angle of the pit slopes on completion of the extraction works in any one area. Once all extraction works are completed an additional two years will be added for the final restoration of the site (total duration of the development is therefore seventeen years).

13.4 On commencement of the development, native hedge planting will be carried out along the south-western and northern boundary of the extraction area, to secure the top of the pit slopes, provide habitat linkage and compensate the loss of some scrub vegetation and trees along the access road. All existing boundary vegetation and the woodland areas within the wider land interest area, will be retained.

13.5 On completion of all extraction works, the pit floor will be restored to agricultural grazing land, while the pit slopes will be left for natural regeneration. Two pockets of native tree planting will be carried out on the narrow north-western section of the pit floor to support the natural recolonisation of the pit slopes. Further details on the proposed development are provided in Chapter 2 of this EIAR, Figure 2-2 Proposed Site Layout and Figure 2-5 Landscape & Restoration Plan.

13.6 This chapter should be read in conjunction with the following figures, which have been prepared to inform the EIAR chapter:

- **Figure 13-1:** Landscape Baseline and Viewpoint Locations
- **Figure 13-2:** Zone of Theoretical Visibility (ZTV) Map
- **Figure 13-3:** Viewpoints A & B
- **Figure 13-4:** Viewpoints D & E
- **Figure 13-5:** Viewpoints F & G

Scope of Work / EIA Scoping

13.7 The EPA guidelines in relation to the preparation of an EIAR (May 2022) suggest the following typical headings that may be included in respect of the prescribed environmental factor 'The Landscape':

- Landscape Appearance and Character;
- Landscape Context;
- Views & Prospects; and
- Historical Landscapes.

13.8 These headings are incorporated in the below assessment, as appropriate. However, in the absence of more detailed Irish guidance, the assessment contained within this chapter is based on the Third Edition of the Guidelines for Landscape and Visual Impact Assessment issued by the Landscape Institute and Institute of Environmental Management and Assessment (hereinafter referred to as 'GLVIA3'). These guidelines are widely accepted as best practice for Landscape and Visual Assessment (LVIA) in Ireland.

13.9 GLVIA3 emphasises that landscape and visual effects are related but independent issues; landscape effects are changes in the landscape, its character and quality; while visual effects relate to the appearance of these changes and the resulting effect on visual amenity.

13.10 The assessment of overall landscape and visual effects and their significance is defined in terms of the relationship between the sensitivity of the landscape/visual receptors and the magnitude of the change.

13.11 As GLVIA3 (paragraph 2.23) states, professional judgement is an important part of the LVIA process: whilst there may be some scope for objective measurement of landscape and visual changes, much of the assessment must rely on qualitative judgements. It is critical that these judgements are based upon a clear and transparent method so that the reasoning can be followed and examined by others.

13.12 GLVIA3 sets out a framework for making judgements about the level of effects that may result from change or development. It describes a step by step approach in which: judgements about the value and susceptibility of the receptor are combined into a judgement about sensitivity; judgements about the size/scale of the effect, its geographical extent and its duration and reversibility are combined into a judgement about the magnitude of the effect; and finally, the judgements about sensitivity of the receptor and the magnitude of the effect are combined to judge the level of the effect. If the assessment forms part of an EIA, a threshold may then be identified to show which effects are considered to be significant and which are not.

13.13 GLVIA3 is not prescriptive about exactly how the various judgments required in this framework should be made. This is a matter for individual practitioners to decide and explain. In this document it has been assessed that Major or Major/Moderate levels of effect are significant.

13.14 The full LVIA methodology is described in Appendix 13-A. Please note that much of the terminology used in assessing the landscape and visual effects is in accordance with the above-mentioned EPA Guidelines. However, the terminology used in this LVIA to describe the level of effects (= "significance of effects" in the EPA Guidelines) differs slightly from said EPA Guidelines, based on examples provided in GLVIA3.

Technical Standards

13.15 Photography and visual representations are based on the principles set out in the Landscape Institute – Technical Guidance Note 06/19 – Visual Representation of Development Proposals. There is no Irish standard/guidance, and in our experience, it is typically considered sufficient to provide two annotated viewpoint photographs (Type 1 photography in Technical Guidance Note 06/19) on one A3-sized sheet, using a range of horizontal angles of view (i.e. 75˚-105˚) to illustrate the full extent of the development within each photograph presented, as well as the context within which the site is located.

13.16 The Landscape Institute – Technical Guidance Note 02/21 – Assessing landscape value outside national designations was taken account of in the preparation of the assessment methodology, as provided in **Appendix 13-A** at the end of this chapter.

13.17 The Landscape Institute – Technical Guidance Note LITGN-2024-01 – Notes and Clarifications on aspects of Guidelines for Landscape and Visual Impact Assessment Third edition (GLVIA3) was also taken into account in the preparation of the assessment methodology provided.

Consultations / Consultees

13.18 Following a review of published development plans and the site survey, it was considered that there was no requirement for a separate formal consultation to be carried out regarding the landscape and visual effects of the proposed development.

Contributors / Author(s)

13.19 The LVIA including site work and completion of drawings was carried out by Anne Merkle, a Principal Landscape Architect with SLR Consulting Ireland. Anne graduated from the Nürtingen-Geislingen University (Germany) in Landscape Architecture (Dipl.-Ing. (FH)), in 2002. She has 20+ years' experience working for landscape consultancies in Ireland, specialising in Landscape and Visual Impact Assessments for a wide range of projects, including quarries, waste recovery facilities, wind farms, powerlines and mixed developments. In 2017, Anne completed an MSc in Biodiversity and Land Use Planning at NUI Galway. She is a full member of the Irish Landscape Institute (MILI) since 2005.

13.20 Anne further holds a Technician's Certificate in Arboriculture and is a Technician Member of the Arboricultural Association.

Sources of Information

13.21 The assessment is based upon a desk top assessment of relevant plans, guidance and landscape character assessments, as well as a thorough site assessment carried out in April 2024. The desktop study and field work were informed by:

- Cork County Development Plan 2022-2028;
- Draft Cork County Landscape Strategy (2007)
- digital and paper (Ordnance Survey Ireland) mapping at different scales; and
- information available on the internet (such as satellite images and information on recreational facilities and nature conservation sites)

Study Area

13.22 A study area of approximately 3km surrounding the application area was identified during the desktop study, based on the Zone of Theoretical Visibility Map (refer to **Figure 13-2**). While the ZTV indicates no visibility beyond 300 m to the south-west of the site and only limited visibility in all other directions, the 3km study area is maintained for the purposes of providing landscape context.

Field Survey

13.23 A detailed field survey was carried out on 12th March 2025, in sunny conditions with some clouds and with good visibility. Photographs were taken during the field surveys, using a Nikon D610 digital SLR full frame camera, with a fixed 50mm lens, mounted on a tripod with a panoramic head. The individual photos were taken in portrait format.

13.24 In accordance with GLVIA3, the field survey and viewpoint photography concentrated on publicly accessible areas, such as the road and public footpath networks, residential and outdoor recreational areas.

Limitations / Difficulties Encountered

13.25 No difficulties were encountered during the desktop study, field survey or in the preparation of this report.

Significant Risks

13.26 There are no known significant risks to human health or environmental effects, which may occur in relation to this landscape and visual impact assessment.

REGULATORY BACKGROUND

13.27 The following paragraphs set out the regulatory background with regard to LVIA in Ireland and the site-specific planning background relevant to the proposed development.

Legislation

13.28 In 2002, Ireland ratified the European Landscape Convention, which promotes the protection, management and planning of landscapes. The National Landscape Strategy for Ireland 2015-2025 was published "to ensure compliance with the European Landscape Convention and establish principles for protecting and enhancing the landscape while positively managing its change".

13.29 Article 1a of the European Landscape Convention defines landscape as "an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors". This definition has been included in the Planning and Development (Amendment) Act 2010, along with the requirement that objectives relating to landscape shall be included in development plans.

13.30 There is no Irish legislation specifically governing the preparation of landscape and visual impact assessments.

Planning Policy and Development Control

13.31 The Cork County Development Plan (CDP) 2022-2028 is the statutory plan detailing the development objectives/policies of the authority, covering the application area. Those objectives / policies, with relevance to this assessment, are listed below. The location/extent of relevant designations is shown on **Figure 13-1**, at the end of this chapter.

Mineral Extraction

13.32 Section 8.17 of the current Cork CDP, 'Mineral Extraction', states that the Council *"aims to protect and safeguard the operations of working quarries and proven aggregate resources from incompatible developments to ensure the continued viability of the extractive industry, whilst also ensuring that environmental, rural, scenic and residential amenities are protected."*

13.33 CDP **Objective EC 8-16:** 'Safeguarding Mineral resources' states the following:

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

Green Infrastructure and Development

13.34 CDP **Objective GI 14-3**: 'Green Infrastructure and Development' states the following:

"*a) Require new development and redevelopment proposals, where considered appropriate, to contribute to the protection, management and enhancement of the existing green and blue infrastructure of the local area in terms of the design, layout and landscaping of development proposals.*

b) Require all development to submit a green infrastructure statement outlining how the proposal contributes to green and blue infrastructure both within its environs as well as

within the wider settlement or rural area. Larger developments (multiple residential developments including Part 8 applications, retail, industrial, mineral extraction, etc) will be expected to prepare a Landscape/ Green (and Blue) Infrastructure Plan including a Landscape Design Rationale. This Plan should identify environmental assets and include proposals which protect, manage and develop green infrastructure resources in a sustainable manner. …"

Landscape Character Assessment of County Cork

13.35 Section 14.8 of the current Cork CDP summarises the content of the Draft Landscape Strategy, which was prepared for County Cork in 2007. This strategy identifies 16 landscape character types (LCT) and includes *"an evaluation of each landscape character type in terms of its Landscape Value, Sensitivity and Importance"*. Refer to the Landscape Baseline section below for more detail from the Draft Landscape Strategy relevant to the study area.

13.36 Those LCTs of particularly high value, sensitivity and importance were designated as High Value Landscapes (HVL), within which *"considerable care will be needed to successfully locate large scale developments without them becoming unduly obtrusive"*. The application area is located just within the boundary of one such areas designated as a HVL. The HVL expands from the site southwards towards Kinsale, on both sides of the Bandon River.

13.37 CDP **Objective GI 14-9**: 'Landscape' states the following:

"a) Protect the visual and scenic amenities of County Cork's built and natural environment.

b) Landscape issues will be an important factor in all land-use proposals, ensuring that a pro-active view of development is undertaken while protecting the environment and heritage generally in line with the principle of sustainability.

c) Ensure that new development meets high standards of siting and design.

d) Protect skylines and ridgelines from development.

e) Discourage proposals necessitating the removal of extensive amounts of trees, hedgerows and historic walls or other distinctive boundary treatments."

13.38 CDP **Objective GI 14-10**: 'Draft Landscape Strategy' states the following:

"Ensure that the management of development throughout the County will have regard for the value of the landscape, its character, distinctiveness and sensitivity as recognised in the Cork County Draft Landscape Strategy and its recommendations, in order to minimize the visual and environmental impact of development, particularly in areas designated as High Value Landscapes where higher development standards (layout, design, landscaping, materials used) will be required."

Landscape Views and Prospects

13.39 Section 14.9 of the current Cork CDP, 'Landscape Views and Prospects' includes objectives with regard to Views and Prospects and Scenic Routes.

13.40 CDP **Objective GI 14-12**: 'General Views and Prospects' states the following:

"Preserve the character of all important views and prospects, particularly sea views, river or lake views, views of unspoilt mountains, upland or coastal landscapes, views of historical or cultural significance (including buildings and townscapes) and views of natural beauty as recognized in the Draft Landscape Strategy."

13.41 The Bandon River passes immediately east of the application area, forming a distinct valley. Views from within this river valley are considered as part of the visual baseline descriptions and, where relevant, as part of the assessment of visual effects. There are no sea or lake views or views of unspoilt mountains within the study area and these types of views, as listed under Objective GI 14-12, will therefore not be considered further, as part of this LVIA.

13.42 CDP **Objective GI 14-13**: 'Scenic Routes' states the following:

"Protect the character of those views and prospects obtainable from scenic routes and in particular stretches of scenic routes that have very special views and prospects identified in this Plan. The scenic routes identified in this Plan are shown on the scenic amenity maps in the CDP Map Browser and are listed in Volume 2 Heritage and Amenity Chapter 5 Scenic Routes of this Plan"

13.43 CDP **Objective GI 14-14**: 'Development on Scenic Routes' states the following:

"a) Require those seeking to carry out development in the environs of a scenic route and/or an area with important views and prospects, to demonstrate that there will be no adverse obstruction or degradation of the views towards and from vulnerable landscape features. In such areas, the appropriateness of the design, site layout, and landscaping of the proposed development must be demonstrated along with mitigation measures to prevent significant alterations to the appearance or character of the area.

b) Encourage appropriate landscaping and screen planting of developments along scenic routes …."

13.44 Three Scenic Routes, listed in Volume 2 / Chapter 5 of the current Cork CDP are located within the study area. The scenic route numbers and their 'Description & General Views Being Protected' are as follows:

- **S63**: "R605 Regional Road & Local Road between Innishannon and Kinsale via Shippool. Views of woodland & the Bandon River Valley."
- **S64**: "N71 National Secondary Road between Bandon and Inishannon. Views of the Bandon River & woodland."
- **S65**: "Local Roads from Innishannon to Ballinadee to Barrel Cross Roads to Kilnacloona. Views of open countryside, hills, woodland & the Bandon River"

13.45 Views from these three scenic routes are considered as part of the visual baseline descriptions and, where relevant, as part of the assessment of visual effects.

RECEIVING ENVIRONMENT

Landscape Baseline

Existing Relevant Landscape Character Assessment

13.46 A Draft Landscape Strategy was prepared in 2007 for County Cork. This strategy identifies 76 landscape character areas (LCA), which were *"amalgamated into a set of 16 landscape character types based on similarities evident within the various areas. These landscape character types provide a more general categorization of the County's landscape"* (refer to section 14.8 of the Cork CDP 2022-2028).

13.47 The application area and the south-eastern fifth of the study area, i.e. the Bandon River valley, including the slopes to its west and east, are located within landscape character type (LCT) 3: Indented Estuarine Coast. To the immediate north and covering slightly more than the northern half of the study area is LCT 6a: Broad Fertile Lowland Valleys. Beyond ca. 300 m to the south-west of the application area and covering approximately the southwestern quarter of the study area lies LCT 7a: Rolling Patchwork Farmland.

13.48 The landscape description for **LCT 3: Indented Estuarine Coast**, in the 2007 Draft Landscape Strategy, includes the following:

"The indented estuarine coast landscape type stretches from Baltimore in the west to the mouth of Cork Harbour, in the east. This landscape comprises gently undulating topography incised by shallow river estuaries or 'drowned' valleys formed by glacial activity. …

In terms of landcover, fertile soils predominantly of brown podzolics allow the undulating landscape to be farmed relatively intensively. Fields of moderate size gently rise and fall with the topography, creating a patchwork further articulated by bounding broadleaf hedgerows of generally low height as well as post and wire fencing. …"

13.49 LCT 3 was evaluated as being of very high landscape value, i.e. *"Scenic landscapes with highest natural and cultural quality, areas with conservation interest and of national importance."* LCT 3 has further been evaluated as being of national landscape importance and as having very high landscape sensitivity, i.e. *"Very high sensitivity landscapes are extra vulnerable landscapes (for example, seascape area with national importance) likely to be fragile and susceptible to change."*

13.50 The landscape description for **LCT 6a: Broad Fertile Lowland Valleys**, in the 2007 Draft Landscape Strategy, includes the following:

"This landscape type stretches west and east from the environs of Cork City but also includes a smaller area east of Rathcormac. The valleys in these areas are created by the rivers flowing east to west and are surrounded by low well spaced ridges. These shallow and flat valleys wind as they follow the course of the river, rising to the north and south with gentle slopes where the valley is wide but with steeper faced slopes where the valley narrows. Further upstream to the west the broad flatness narrows and winds between low hills.

Landcover comprises highly fertile, regularly shaped fields typically of medium size and with mature broadleaf hedgerows. Agricultural use primarily involves intensive dairying as well as tillage, with farmsteads relatively well screened by the hedgerows. …"

13.51 LCT 6a was evaluated as being of high landscape value, i.e. *"Picturesque landscapes with scenic routes, natural and cultural heritage of county or national importance."* LCT 6a has further been evaluated as being of county landscape importance and as having high

landscape sensitivity, i.e. *"High sensitivity landscapes are vulnerable landscapes with the ability to accommodate limited development pressure. In this rank landscape quality is at a high level, landscape elements are highly sensitive to certain types of change. If pressure for development exceeds the landscape's limitations the character of the landscape may change."*

13.52 The landscape description for **LCT 7a: Rolling Patchwork Farmland**, in the 2007 Draft Landscape Strategy, includes the following:

13.53 *"This landscape mediates between the Indented Estuarine Coastline and the Broad Fertile Lowland Valleys, stretching approximately between Leap in the west and the outskirts of Ballinspittle in the east. ...*

The rolling landform is characterised by low and subtly defined rounded hills and interweaving shallow valleys. In terms of landcover, a mosaic of small to medium sized fields prevails, predominantly comprising brown podzolic soils. These fields are defined by mature but relatively low broadleaf hedgerows, many of which are tightly clipped, and some post and wire fencing. Occasional broadleaf clumps and copses or conifer shelterbelts punctuate the landscape and small swaths of coniferous plantation ascend the slopes to higher ground.. …"

13.54 LCT 7a was evaluated as being of medium landscape value, i.e. *"Landscapes with positive characters and with local or county importance."* LCT 7a has further been evaluated as being of county landscape importance and as having medium landscape sensitivity, i.e. *Medium sensitivity landscapes can accommodate development pressure, but with limitations in the scale and magnitude of the development. In this rank of sensitivity the landscape can accept some changes while others are more vulnerable to change. If pressure exceeds the landscapes limitation the character of the landscape may change."*

Landscape of the Site and its Context

13.55 GLVIA3 recommends that a landscape character assessment should be carried out as part of the baseline study (paragraph 5.4). This should consider:

- The elements that make up the landscape (e.g., physical, land cover and the influence of human activity);
- Aesthetic and perceptual aspects (e.g., scale, complexity, openness, tranquillity or wildness); and
- The overall character of the area.

Landscape Elements

13.56 The application area comprises the proposed access track, which traverses a wooded area and one agricultural field to the south. The wooded area (part of the applicant's land interest area) is located within a former sand & gravel pit. The woodland vegetation has naturally regenerated within the disused pit over the last 30+ years. The route of the proposed access track follows an existing track, which has become partially overgrown with grass and scrub species, mainly willow and gorse. The former pit face, which is ca. 15 m in height runs along the southern boundary of the wooded area.

13.57 The agricultural field, which is currently under pasture, adjoins the top of the pit face. It is therefore slightly elevated, compared with the ground levels within the wooded area / former pit. The field is near triangular in shape and gently sloping upwards to the south-west. Its northern boundary is marked by a mix of scrub and woodland vegetation,

associated with the adjoining former pit. The eastern boundary is also marked by woodland vegetation, which forms part of the wooded slopes on the western banks of the Bandon River Valley. The field is adjoined by another agricultural field to the southwest, the boundary of which is not marked by vegetation or fencing, but by a change in topography, as the adjoining field is much more steeply sloping. Due to this steep slope large parts of this field are covered in scrub vegetation, mostly gorse.

13.58 The levels along the proposed access road range from 3 m above Ordnance Datum (AOD) at the site entrance to 8 m AOD at the southern end of the existing track on the former pit floor. Levels withing the agricultural field, which forms part of the application area range from 22 m AOD at its eastern end to 26 m AOD along the south-western boundary.

13.59 Immediately south-west of the application area, the ground begins to rise steeply towards a broad local ridge. Several such local ridges surround the site in all directions, forming an undulating topography and enclosing the application area visually. The nearest such ridges are within 500 m to the south-west (up to 81m AOD), 1.7 km to the north-west (up to 83m AOD), 1 km to the north (up to 77m AOD), 2.4km to the north-east (up to 144m AOD) and beyond 2 km to the east (120-144 m AOD). The three latter ridges are located to the east of the Bandon River, which is located east of the site and forms a distinct valley, at levels below 10m AOD. The river meanders through the study area in an approximately north-west to south-east direction and passing within 60m of the eastern boundary of the application area at its closest point.

13.60 The topography of the wider landscape continues to be broadly undulating. These undulations are created by many small streams and their associated valleys, most of which have an approximately east-west orientation and merge with the Bandon River valley. The majority of the wider landscape has the characteristics of LCT 6a: Broad Fertile Lowland Valleys and LCT 7a: Rolling Patchwork Farmland, as described in the Cork Draft Landscape Strategy (see above). The only slight difference in character is at the lower end of the Bandon River, i.e. to the south-east of the application area, where the river widens, as it becomes tidal. This is in line with the description of LCT 3: Indented Estuarine Coast. It should be noted that the river is visually enclosed due to an abundance of treelines / woodland vegetation along its shores and on the valley slopes. The land adjoining the valley slopes at the lower end of the river is therefore visually separated from the Bandon River valley. The landuse patterns and topography of this land are very similar to LCT 6a and LCT 7a.

13.61 The majority of fields within the agricultural landscape of the study area are under pasture, with some tillage present as well. Fields typically have straight boundaries, unless adjoined by a watercourse. Smaller fields often have a regular rectangular shape, while larger fields are more irregularly shaped, with few boundaries at right angles to each other. Most fields are bound by hedgerows, some of which are dense and tightly cut, while others are lined with mature trees. In some locations hedgerows appear to have been replaced by post and wire fencing.

13.62 The river valleys within the study area are generally well wooded, in particular where they have steep sides, as is the case for the Bandon River to the east of the site, as well as the valley associated with a small stream immediately to the north of the site. Other than that tree cover, which is largely deciduous, is restricted to boundary hedgerows and shelterbelts surrounding farmsteads throughout the area.

13.63 The N71 - National Road is the main transport corridor within the study area, traversing its northern half in a north-east / south-west direction. At its closest point, in Inishannon, it is located approximately 1.5 km north of the site. Another main route is the R605 - Regional Road, which follows the eastern bank of the Bandon River out of Inishannon, and passes

within 200m of the application area. A dense network of local roads follows the river valleys and crosses over the ridgelines within the study area. This network is, however, disrupted by the Bandon River, with only one bridge within the study area at Inishannon.

13.64 Inishannon is the largest settlement within the study area. To the north of the Bandon River, ribbon development and one-off housing is abundant along the roads leaving the village. To the south of the river properties are less frequent, however one-off housing is still common.

13.65 Human activity has strongly influenced the land use within the study area, mainly in the form of agriculture. This is emphasised by the many straight hedgerows marking field boundaries. On a smaller scale, human influences are visible in the form of roads, farm and residential buildings and wooden electricity poles, as well as an existing sand and gravel pit to the north of the application area, across the aforementioned wooded valley (note: this is operated by the applicant). On the whole, while this is an attractive rural landscape, with occasional views of distant ridgelines / mountains or along the River Bandon valley, there are few locations from where no man-made structures are visible (i.e. mostly roads, buildings or wooden poles).

Aesthetic and Perceptual Aspects

13.66 The agricultural field which forms part of the site is open. However, there is a high level of enclosure from the woodland vegetation to the north and east and sloping topography to the south-west. The scale of much of the landscape throughout the study area is small to medium, due to the enclosure from (tree-lined) hedgerows and wooded areas, as well as the undulating topography. The scale increases considerably in elevated locations, where longer distance views, through gaps in or over low hedgerows, become available.

13.67 The mix of pasture fields, bound by hedgerows, wooded river valleys and shelterbelts throughout the study area results in colours and textures that are generally simple and repetitive, but with no regular pattern. The colour palette is dominated by multiple shades of green, interspersed with some browns and greys, where fields are under tillage are present and at the existing sand and gravel pit north of the site.

13.68 While the study area has an overall natural appearance, there is little sense of wildness or remoteness, due to the many signs of human activity, such as improved grassland, electricity poles, roads and residential properties. The local roads are not frequently used, in particular in the southern half of the study area, which is less densely populated (as noted during the field survey on a weekday afternoon). However, movement and noise from cars, repeatedly interrupt periods of tranquillity.

Overall Character

13.69 The agricultural land within the study area, including the main part of the site, display characteristics which align with all three nearby LCTs, as these have many similarities, i.e. gently undulating farmland, with small to medium sized fields, bound by mature deciduous hedgerows, some of which are kept at a low height.

13.70 The wooded river valleys within the study area, in particular that of the River Bandon, display a distinctly different character to the agricultural land. This character partially aligns with the descriptions of the Indented Estuarine Coast LCT (LCT 3).

13.71 Since the Cork Draft Landscape Strategy does not define distinct Landscape Character Areas (LCA), the following LCAs are described for assessment in this report:

- Gently Undulating Farmland LCA – comprising all ‘worked’ land within 3km of the application area, including grassland areas, tillage land, the associated farmsteads

and one-off housing, as well as the existing sand and gravel pit to the north of the site.

- Wooded River Valley LCA – comprising the Bandon River and its tributaries, as well as any adjoining wooded valley slopes, within 3km of the application area.
- Inishannon LCA – comprising the semi-urban village of Inishannon.

Protected Nature Conservation Sites

13.72 The National Parks and Wildlife Service (NPWS) website was reviewed for protected nature conservation sites in proximity to the application area, as these provide an indication of the natural heritage value placed on the local landscape.

13.73 Two proposed Natural Heritage Areas (pNHA) are located within the study area, as detailed below (refer to **Figure 13-1** for the location and extent of these sites). The nearest other nature conservation site is located over 7 km to the west:

- Bandon Valley Below Inishannon pNHA (Site Code: 001515) – Ca. 60 m to the east of the site.
- Bandon Valley Above Inishannon pNHA (Site Code: 001740) – Ca. 600 m to the north-west of the site.

Visual Baseline

Zone of Theoretical Visibility (ZTV)

13.74 The visibility of the application area was initially assessed by a desktop study of OSI Discovery Maps (1:50,000) and available aerial photography. This was followed by 3D computer modelling and calculation of the zone of theoretical visibility (ZTV), using LSS (McCarthy Taylor) software, in accordance with the methodology provided in **Appendix 13-B** at the end of this chapter.

13.75 The ZTV, which illustrates the subtended vertical angle of visibility, was calculated for the existing agricultural field within which the proposed extraction area will be located. It should be noted that the ZTV mapping is based on a bare terrain; that is, the computer model does not include built structures or vegetation. As a result, the extent of visibility, which is illustrated, is regarded as a worst-case scenario, and would be greatly reduced if buildings and vegetation, such as the woodland vegetation to the immediate north and east of the site and many existing hedgerows in the wider landscape, were included in the model.

13.76 In SLR's experience, views from within areas with a visibility of a subtended vertical angle of up to 0.4 degrees tend to be screened by hedgerows and other vegetation (if present) and/or built structures in an urban environment. These areas are coloured in shades of grey on the ZTV mapping, in order to differentiate them from the areas with a higher probability of visibility, which are marked in shades of yellow, orange and red.

13.77 The resulting ZTV is depicted on **Figure 13-2**. It indicates that a higher probability of visibility of the application area is experienced from a number of locations within 2 km to the north and east of the application area (i.e. the areas of theoretical visibility in yellow, orange and red). This includes sections of scenic routes S63 and S65, east and west of the Bandon River, in the vicinity of the application area.

13.78 The ZTV further depicts that some areas within 3 km to the north-west and 3 km to the south-east of the site experience a low probability of visibility, as indicated by the shades

of grey. As mentioned above, views from within these areas are likely to be largely screened by existing intervening vegetation, as is present throughout the agricultural landscape within the study area, in the form of hedgerows and along the wooded river valleys, as well as built structures within Inishannon village.

13.79 Also, it should be noted that the majority of the theoretical visibility areas, including most of the areas with a higher probability of visibility, cover agricultural land, which is not publicly accessible. While parts of the site may be visible from this land, only few and infrequent visual receptors are present in those areas (e.g. the owners of the land) and these are therefore not assessed in detail.

13.80 The ZTV further illustrates that the undulating topography throughout the application area, fully screens views of the application area from many areas, including all land beyond 300 m to the south and west of the site and much of the land beyond 1 km to the north and 2 km to the east. This includes views from scenic route S64, along the N71, west of Inishannon, which will therefore not be considered further, as part of this assessment.

Outdoor Recreational Facilities within the Study Area

13.81 The study area was searched for existing outdoor recreational facilities, as these provide an indication of potential visual receptors within the area, in addition to local residents and road users. Except for the Dromkeen Forest Walk, south-west of Inishannon, no other formal walking routes or other outdoor recreational facilities were identified. This forest walk is located entirely within a wooded area and separated from the site by an intervening ridgeline. Users of this facility would therefore not be affected by the proposed development.

Actual Visibility

13.82 It was found that views of the application area are greatly restricted by roadside and intervening vegetation, as well as the undulating topography within the study area. The application area is only visible in views from a small number of locations within 1.5km to the south-west, 1km to the west and between 1.5-2km to the east. In most cases, views are only intermittently available along roads, through gaps in the roadside hedgerows (e.g. at field gates) or where said vegetation is kept low.

13.83 Some residential properties with potential views of the proposed development were identified. However, the total number of properties with visibility is greatly reduced by mature vegetation surrounding most property boundaries, as well as intervening vegetation and topography.

13.84 The actual visibility of the application area was assessed during the field survey, concentrating on publicly accessible locations, including any outdoor recreational facilities identified, as appropriate. This survey confirmed that existing roadside and intervening vegetation blocks views towards the site from many of the locations, which are indicated as having theoretical visibility on the ZTV mapping, in particular the areas indicated as having a low potential for visibility.

13.85 But also views from some of the areas indicated as having a higher potential for visibility are restricted by vegetation, including views from the L3204 along the western bank of the Bandon River (i.e. Scenic Route 65) and the R605 along its eastern bank (i.e. Scenic Route S63). Views of the main part of the application area, i.e. the proposed extraction area, from these two roads are fully screened by the woodland vegetation to the north and east of the site, as well as vegetation along the banks of the river. The only part of the application area visible is the site entrance, from a short stretch of the L3204 in the immediate vicinity of the entrance.

13.86 It was established that the actual visibility of (parts of) the application area is restricted to:

- views of the site entrance, from the local roads L3204 (i.e. Scenic Route 65) and L6070, in the immediate vicinity of the entrance;
- partial and intermittent views of the proposed extraction area, from a ca. 500 m section of the local road in the townland of Slievegallane, within 1.2-1.6 km east of the site, including adjoining residential properties; and
- partial and intermittent views of the proposed extraction area, from a ca. 300 m section of the local road in the townland of Coolmoreen, within 1.7-2.0 km north-east of the site, including adjoining residential properties.

13.87 Viewpoint photography was taken during the field survey from several locations throughout the study area. Six of these were selected to represent the range of available views, including views that illustrate how the application area is screened by intervening vegetation.

13.88 The location of the six viewpoints is illustrated on **Figures 13-1 & 13-2**. For each of the viewpoints, annotated panoramic images showing the existing view are provided (refer to **Viewpoints A-F** on **Figures 13-3 to 13-5**). The panoramas are made up from 6 individual photographic frames, which were merged together using Adobe Photoshop software. It should be noted that photography is a tool to assist in the visualisation process and cannot be expected to replicate the actual view that would be attained on the ground.

13.89 **Viewpoint A** represents views from local roads L3204 (i.e. Scenic Route 65) and L6070 in the immediate vicinity of the proposed site entrance. The existing locked gate at the site entrance and a small section of the access track into the site, are visible in views from locations along these roads, up to ca. 80 m distance from the junction between the two. An existing chain-link fence to the east and west of the gate is barely noticeable, due to the dense scrub and woodland vegetation visible beyond. This vegetation has naturally colonised the site beyond the fence, which was formerly a sand and gravel pit. The majority of the access track and the main section of the application area, i.e. the proposed extraction area, are fully screened by the existing dense vegetation. Views east from the L3204 (to the left of the view provided) are of the Bandon River. Please note that while a section of the L3204 is visible from a residential property (Riverbank House) just north of the junction with the L607, the site entrance and the proposed extraction area are screened by intervening vegetation in views from the property.

13.90 **Viewpoint B** represents views from the R605 (i.e. Scenic Route 63) on the eastern bank of the Bandon River, within 1 km to the north and south-east of the site. Views of the river and its western bank are typically screened by roadside and intervening vegetation. In some locations, where there are gaps in the vegetation, small sections of the river, but not the road (L3204) along the western bank, can be glimpsed, more so during the winter months, when trees are not in leaf. Similarly, the ridge above the application area can be glimpsed in some of these views, but the proposed extraction area is fully screened by the woodland vegetation along its boundaries, as well as intervening vegetation. There are some residential properties in the vicinity of this section of the R605. Some on the west side of the road and therefore potentially with more open views of the river, some in a slightly elevated position to the east of the road. Glimpsed views of the site entrance might be possible from some of these properties, however, the proposed extraction area remains screened by intervening vegetation.

13.91 **Viewpoint C** represents intermittent views from a ca. 500 m long section of the local road, within 1.2-1.6 km to the east of the site. Ca. 6 residential properties nearby experience similar views, where not screened by dense vegetation along the properties' boundaries. Long-distance views over an undulating agricultural landscape are available from this

section of road. The agricultural field within which the proposed extraction area will be located is partially visible at a low elevation, as a narrow band in the midground of views. Woodland vegetation to the front of the site provides partial screening (more so during the summer months, when trees are in leaf). The existing sand and gravel pit to the north of the application area is partially visible, also at a low elevation, at a short distance from the site, separated by a wooded area.

13.92 **Viewpoint D** represents intermittent views from a ca. 300 m long section of the local road, within 1.7-2.0 km to the north-east of the site. Ca. 8 residential properties nearby experience similar views, where not screened by dense vegetation along the properties' boundaries. Similar to Viewpoint C, long-distance views over an undulating agricultural landscape are available from this section of road. The agricultural field within which the proposed extraction area will be located is partially visible at a low elevation, as a very narrow band in the midground of views. Woodland vegetation to the front of the site provides partial screening (more so during the summer months, when trees are in leaf). The existing sand and gravel pit to the north of the application area is fully screen by intervening vegetation in views from this road.

13.93 **Viewpoints E & F** illustrate how intervening vegetation screens the application area in other locations indicated as having potential visibility by the ZTV mapping (refer to **Figure 13-2**), i.e. views from elevated locations to the north and north-west of the site.

Sensitive Receptors

Landscape Receptors

13.94 The landscape receptors potentially affected by the proposed development and therefore considered as part of the assessment of landscape effects, are:

- Individual elements:
  - One pasture field.
- Overall Character:
  - Gently Undulating Farmland LCA
  - Wooded River Valley LCA.

13.95 The trees and scrub vegetation to be removed to facilitate the widening of the access road does not form a distinctive landscape element, as they are contained within a much larger wooded area, the vast majority of which will be retained. This vegetation is therefore not considered as a sensitive landscape receptor. Also, the Inishannon LCA is unlikely to be affected by the proposed development, due to the physical and visual separation from it and is therefore also not considered as a sensitive landscape receptor.

13.96 No distinctive or highly sensitive aesthetic / perceptual aspects were identified in the immediate vicinity of the application area, such as remoteness, wildness or tranquillity. While there is an increased sense of tranquillity in the southern half of the study area, this is unlikely to be affected by the proposed development, considering the visual separation and distance to the most remote parts of the study area. Also, while the proposed development will result in a localised contrast to the existing colours/textures, they will be similar to that of the nearby existing sand and gravel pit, which is an established element of the local landscape. Further to that, the effects are unlikely to be significant, when considering the visual enclosure of the site and limited timeframe of the development. For the above reasons no aesthetic and perceptual aspects were identified as sensitive landscape receptors to be brought forward to the assessment of landscape effects

Visual Receptors

13.97 The visual receptors, potentially affected by the proposed development and therefore considered as part of the assessment of visual effects, are:

- Residents:
  - One residential property along the L3204, just north of the site entrance (represented by **Viewpoint A** on **Figure 13-3**);
  - Up to six residential properties within 1.2-1.6 km to the east of the site (represented by **Viewpoint C** on **Figure 13-4**);
  - Up to eight residential properties within 1.7-2.0 km to the north-east of the site (represented by **Viewpoint D** on **Figure 13-4**); and
- Vehicle users:
  - Within ca. 80 m of the junction of the L3204 and the L6070 in the vicinity of the site entrance (represented by **Viewpoints A** on **Figure 13-3**);
  - Intermittently along ca. 500m of the local road within 1.2-1.6 km to the east of the site (represented by **Viewpoint C** on **Figure 13-4**); and
  - Intermittently along ca. 300m of the local road within 1.7-2.0 km to the north-east of the site (represented by **Viewpoint D** on **Figure 13-4**).

IMPACT ASSESSMENT

13.98 This section sets out the effects that the proposed development would have on both landscape and visual receptors (as identified in the previous section), during the operational stage of the sand and gravel pit, including the restoration activities, as well as during the post-operational stage, when all extraction / restoration works are completed. It is based on the detailed project description and layout drawings contained in Chapter 2 of this EIAR.

Aspects of the Development which Have the Potential to Cause Landscape and Visual Effects

Operational Stage

13.99 The operational stage of the proposed development, for the purpose of this assessment, is considered to include the extraction and final restoration works, i.e. a 17 year period. The following elements of the proposed development, during the operational stage, are those which are most likely to result in landscape & visual effects:

- Reduction / removal of existing hedgerow vegetation to the south of the site entrance to facilitate better site lines in this direction.
- Removal of 10-20 trees and some scrub vegetation along the internal access track, to facilitate its widening and surfacing of part of the track, as well as the access ramp through the existing former pit slope into the proposed extraction area.
- Stripping of soil and overburden from the proposed extraction area and temporary storage of the stripped material within the site, before being used in the restoration activities.
- Planting and establishment of a native hedge along the northern and part of the eastern and south-western boundary of the extraction (ca. 660m in total) on commencement of the development.
- Changes to the landform, due to the proposed extraction works, resulting in a bowl shaped pit area, with associated benched pit slopes.
- HGVs traveling along the short section of the L3204 from the site entrance to the entrance of the existing sand and gravel pit to the north of the site (maximum 2 trips per hour).
- The restoration of the site to a combination of agricultural grazing land and natural habitat. This entails the restoration of the pit floor to agricultural land, while the pit slopes would be left for natural regeneration. Two pockets of native tree planting would be carried out to support the natural colonisation of the pit slopes. All existing scrub / woodland vegetation along the site boundaries would be retained.

13.100 It should be noted that lighting within the application area will be restricted to mobile lighting on the machinery used for the loading of material within the proposed sand and gravel extraction area and some fixed downlights associated with the proposed portakabin along the access road. All lighting would only be in use for wintertime operations, when darkness has fallen, within the proposed site operating hours, i.e. 09.00 hours to 17.00 hours Monday to Friday only. There would therefore be a period where such lighting would be required for up to 2 hours in the morning and up to 2h in the evening, during the height of winter. Night-time light pollution caused by the proposed development would therefore be of brief duration during winter months, which is not considered significant.

Post-Operational Stage

13.101 The post-operational stage of the proposed development, for the purpose of this assessment, is considered to be the period when all extraction and restoration works are completed. The following element of the proposed development, at the post-operational stage, is most likely to result in landscape & visual effects:

- The landform of the extraction area will remain changed. The pit slopes, which will be similar to the adjoining steeply sloping topography, will take a number of years to become fully colonised with locally occurring grass and scrub species.

Operational Stage Landscape Effects

Landscape Sensitivity

13.102 In accordance with GLVIA3, the sensitivity of landscape receptors is determined by combining their value with their susceptibility to the type of development proposed.

13.103 In determining the value of landscapes, GLVIA3 recommends that the starting point should be to consider landscape-related designations. In this context it is important to note that the Bandon River valley, downstream starting from and including the application area, and some of the adjoining undulating agricultural are covered by a high value landscape designation, as set out in the Cork County Development Plan. This area is therefore afforded local authority value, for the purpose of the sensitivity assessment.

13.104 It should be noted that the undulating agricultural landscape adjoining the lower Bandon River valley, i.e. those parts covered by the high value landscapes designation, is very similar to that covering the remainder of the study area, which is not covered by this designation. Also considering that there is visual separation between the agricultural land and the river valley, due to topography and woodland on the valley slopes it could be argued that the high value designation should only apply to the river valley and not the adjoining agricultural land. However, in order not to underestimate the value of the landscape within the study area and since it is difficult to differentiate between higher and lower value sections of the agricultural land, it was decided to afford local authority value to all of the agricultural land within the study area.

13.105 The individual pasture field landscape receptor is afforded a lower value, i.e. at a community level, due to its lack of natural or cultural heritage value, distinctiveness or strong perceptual values.

13.106 The susceptibility of each of the sensitive landscape receptors is assessed in **Table 13-1**. This is combined with the previously assessed value and a judgement of the overall sensitivity provided.

Table 13-1: Sensitivity of Landscape Receptors

Landscape Receptors	Value	Susceptibility	Overall Sensitivity
Individual Elements			
One pasture field	**COMMUNITY**	**HIGH** The susceptibility of the affected pasture field is high, as it would be removed.	**MEDIUM**

Landscape Receptors	Value	Susceptibility	Overall Sensitivity
Overall Character			
Gently Undulating Farmland LCA	**LOCAL AUTHORITY**	**MEDIUM** The gently undulating farmland LCA shares characteristics of LCT 3, LCT 6a and LCT 7a, as set out in the Draft Landscape Strategy of County Cork. Although very similar, the three LCTs have been afforded different abilities to accommodate development pressure, i.e. from susceptible to change, to limited ability, to able to accommodate change. Considering the type of development proposed, i.e. sand and gravel extraction within an enclosed agricultural fiel, it is considered that this landscape receptor can accommodate the development without transformational change.	**MEDIUM**
Wooded River Valley LCA	**LOCAL AUTHORITY**	**MEDIUM** The wooded river valley LCA displays the characteristics of LCT 3 as set out in the Draft Landscape Strategy of County Cork. This LCT is described as *"likely to be fragile and susceptible to change"*. The majority of the development is located within the neighbouring LCA and will be screened by existing vegetation. Considering the type of development proposed within this LCA, i.e. limited vegetation removal and track surfacing, it is considered that this landscape receptor can accommodate the development without transformational change.	**MEDIUM**

Magnitude of Landscape Change

13.107 **Table 13-2** describes the size & scale, geographical extent and duration/reversibility of the landscape effects for each landscape receptor, all of which contribute to the assessment of the magnitude of these effects.

Table 13-2: Magnitude of Landscape Change

Visual Receptors	Factors	Magnitude of Change
Individual Elements		
One pasture field	Size & Scale: **SMALL** Geographical Extent: **SMALL** Duration / Reversibility: **LONG-TERM – REVERSIBLE** **Notes:** The proposed development would result in the loss of one agricultural field, which is not a distinctive element in the surrounding vast agricultural landscape and considering the visual	**SLIGHT**

Visual Receptors	Factors	Magnitude of Change
	enclosure from topography and vegetation. The composition / balance of the landscape will not be changed. The loss would only influence the landscape at a local level, i.e. the site and area immediately surrounding it. Part of the extraction area will be restored to agricultural land within a long-term period, with the remainder of the site restored to a natural habitat (which will be of a greater biodiversity value than the current land use and would be an extension to the adjoining woodland area).	
Overall Character		
Gently Undulating Farmland LCA	Size & Scale: **SMALL** Geographical Extent: **SMALL** Duration / Reversibility: **LONG-TERM – REVERSIBLE** **Notes:** The proposed development would not result in the introduction of completely new elements into the farmland landscape, considering the nearby existing sand and gravel pit. Due to the small size of the development and visual enclosure, the overall composition / balance of the landscape would not be changed. The changes would only influence the landscape at a local level, i.e. the site and area immediately surrounding it. Part of the extraction area will be restored to agricultural land within a long-term period, with the remainder of the site restored to a natural habitat (which will be of a greater biodiversity value than the current land use and would be an extension to the adjoining woodland area).	**SLIGHT**
Wooded River Valley LCA	Size & Scale: **NEGLIGIBLE** Geographical Extent: **SMALL** Duration / Reversibility: **MEDIUM-TERM – REVERSIBLE** **Notes:** The proposed vegetation removal south of the site entrance and along the access track will be a small element, resulting in a negligible change to the local character. The changes would only influence the landscape at a local level, i.e. the site and area immediately surrounding it. The vegetation south of the access road and along the access track will continue to be managed to maintain site lines and access, for the duration of the extraction activities, i.e. a medium-term period.	**SLIGHT - NEGLIGIBLE**

Assessment of Landscape Effects and Significance

13.108 An assessment of the landscape effects during the operational phase, based on the sensitivity of each of the landscape receptors combined with the magnitude of change experienced by each of them, is provided in **Table 13-3** below. The assessment also includes a judgment of the nature of the effect (i.e. negative/positive/neutral).

Table 13-3: Assessment of Landscape Effects

Landscape Receptor	Sensitivity	Magnitude	Landscape Effects	Nature of Effect
Individual Elements				
One pasture field	MEDIUM	SLIGHT	**MODERATE/MINOR**	Negative
Overall Character				
Gently Undulating Farmland LCA	MEDIUM	SLIGHT	**MODERATE/MINOR**	Negative
Wooded River Valley LCA	MEDIUM	SLIGHT / NEGLIGIBLE	**MINOR**	Negative

13.109 **None of these landscape effects are assessed to be significant.**

Post – Operational Stage Landscape Effects

13.110 At the post-operational stage, much of the site would have been restored to agricultural land, with all existing vegetation having been retained and the pit slopes left for natural regeneration. Over time, the pit slopes would become colonised with locally occurring grass and scrub species, similar to what has taken place in the neighbouring disused sand and gravel pit, ensuring that the site will increasingly merge with the neighbouring woodland, thereby reducing the landscape effects, despite the remaining level changes. As a result, the effects on all landscape receptors would reduce to **MINOR/NEGLIGIBLE** and would become neutral.

Operational Stage Visual Effects

Visual Receptor Sensitivity

13.111 The value placed on each of the types of visual receptors identified above is described in **Table 13-4** below. Also, the susceptibility to change of each of the receptor types (as per the LVIA Methodology in **Appendix 13-A**) is described and a judgement of the overall sensitivity made.

Table 13-4: Sensitivity of Visual Receptors

Visual Receptors	Value	Susceptibility	Overall Sensitivity
Residents			
Residential receptor just north of the site entrance, represented by **Viewpoint A**	**MEDIUM** (Views of the Bandon River and woodland along local road L3204 adjoining property designated as part of Scenic Route S65)	**HIGH** (Susceptible to changes in views, particularly from gardens and living rooms)	**HIGH**

Visual Receptors	Value	Susceptibility	Overall Sensitivity
All other residential receptors identified, represented by **Viewpoints C & D**	**LOW** (No designated or locally promoted views)	**HIGH** (Susceptible to changes in views, particularly from gardens and living rooms)	**MEDIUM**
Vehicle Users			
Section of the L3204 in the vicinity of the site entrance, represented by **Viewpoint A**	**MEDIUM** (Views of the Bandon River and woodland along local road L3204 designated as part of Scenic Route S65)	**MEDIUM** (While this scenic route is not locally promoted travellers along this road are likely to have some focus on views along the river)	**MEDIUM**
All other sections of road identified, represented by **Viewpoints C & D**	**LOW** (No designated or locally promoted views)	**LOW** (Unlikely to be focused on views)	**LOW**

Magnitude of Visual Change

13.112 **Table 13-5** describes the size & scale, geographical extent and duration/reversibility of the visual effects for each visual receptor, all of which contribute to the assessment of the magnitude of these effects.

Table 13-5: Magnitude of Visual Change

Visual Receptors	Factors	Magnitude of Change
Residents and Vehicle Users		
One property just north of and sections of local road within ca. 80m of the junction at the site entrance (**Viewpoint A**)	Size & Scale: **NEGLIGIBLE** Geographical Extent: **NEGLIGIBLE** Duration / Reversibility: **MEDIUM-TERM – REVERSIBLE** **Notes:** The reduction / removal of hedge vegetation to the south of the site entrance and limited removal of trees / scrub vegetation along the internal track will result in a barely perceptible change to the existing views, considering the backdrop of dense woodland vegetation which will be retained. Also, hedgerows along roads are regularly cut back, so this would not be a new feature within the local area. A very low number of maximum 2 HGVs/h associated with the proposed development, would travel from the site along the L3204 to the existing pit to the north and back. This would also result in a negligible change to views. Views of the HGVs would be experienced by the residents of one property only. Views of the changes at the site entrance would be experienced from very limited sections of the local roads in close proximity to the site entrance, by a small number of road users, as these roads are not frequently used.	**NEGLIGIBLE**

Visual Receptors	Factors	Magnitude of Change
	The maintaining of the hedgerow south of the site entrance and HGVs travelling along the road would be carried out / present for the duration of the extraction works, i.e. 15 years / a medium term period. Following this period any visibility of HGVs and the cutting back of vegetation (except for general road safety purposes) would cease.	
Up to six properties and ca. 500 m section of local road, 1.2-1.6 km east of site (**Viewpoint C**)	Size & Scale: **SMALL** Geographical Extent: **SMALL** Duration / Reversibility: **LONG-TERM – REVERSIBLE** **Notes:** Parts of the soil stripping and extraction works, as well as the temporary storage of overburden within the site will be visible in a narrow strip in the midground of views, taking up a small portion of the available panoramic views. The existing sand and gravel pit to the north is also visible as a small feature in the mid ground of views, but is visually separated by a wooded area. Overall, the changes to the views will be perceptible, but only partially alter the composition of views. The views would be experienced by the residents of a limited number of properties and from a short section of a remote local road. The changes within the site would be visible for the duration of the operational stage, with the site being restored to a mix of agricultural land and natural habitat at the end of the operational period.	**SLIGHT**
Up to eight properties and ca. 300 m section of local road, 1.7-2.0 km north-east of site (**Viewpoint D**)	Size & Scale: **SMAL** Geographical Extent: **SMALL** Duration / Reversibility: **LONG-TERM – REVERSIBLE** **Notes:** Parts of the soil stripping and extraction works, as well as the temporary storage of overburden within the site will be visible in a narrow strip in the midground of views, taking up a small portion of the available panoramic views. The existing sand and gravel pit to the north is not visible in these views. Overall, the changes to the views will be perceptible, but only partially alter the composition of views. The views would be experienced by the residents of a limited number of properties and from a short section of a local road, which is mainly used by local residents. The changes within the site would be visible for the duration of the operational stage, with the site being restored to a mix of agricultural land and natural habitat at the end of the operational period.	**SLIGHT**

Assessment of Visual Effects and Significance

13.113 An assessment of the visual effects during the operational phase, based on the sensitivity of each of the visual receptors combined with the magnitude of change experienced by each of them, are provided in **Table 13-6** below. The assessment also includes a judgment of the nature of the effect (i.e. negative/positive/neutral).

Table 13-6: Assessment of Visual Effects

Visual Receptor	Sensitivity	Magnitude	Visual Effects	Nature of Effect
Residents				
One property just north of the site entrance (**Viewpoint A**)	HIGH	NEGLIGIBLE	**MODERATE / MINOR**	Negative
Up to six properties 1.2-1.6 km east of site (**Viewpoint C**)	MEDIUM	SLIGHT	**MODERATE / MINOR**	Negative
Up to eight properties 1.7-2.0 km north-east of site (**Viewpoint D**)	MEDIUM	SLIGHT	**MODERATE / MINOR**	Negative
Vehicle Users				
Sections of local road within ca. 80m of the junction at the site entrance (**Viewpoint A**)	MEDIUM	NEGLIGIBLE	**MINOR**	Negative
Ca. 500 m section of local road, 1.2-1.6 km east of site (**Viewpoint C**)	LOW	SLIGHT	**MINOR**	Negative
Ca. 300 m section of local road, 1.7-2.0 km north-east of site (**Viewpoint D**)	LOW	SLIGHT	**MINOR**	Negative

13.114 **None of these visual effects are assessed to be significant.**

Post-Operational Stage Visual Effects

13.115 At the post-operational stage, part of the site would have been restored to agricultural land, with the pit slopes left for natural regeneration. Over time the pit slopes would become colonised by scrub and woodland vegetation, similar to what has taken place in the neighbouring disused pit and the two areas will merge visually. Views from locations in the vicinity of the site entrance will revert back to a similar state to what is currently present. As a result, the effects on all visual receptors would reduce to **MINOR-NEGLIGIBLE** and would become neutral.

Direct/Indirect Effects

13.116 All landscape and visual effects described above are direct effects. The proposed development is not considered to have indirect effects in landscape and visual terms, i.e. the proposed development is unlikely to cause consequential changes to the surrounding landscape character areas or to existing views of the landscape surrounding the application area.

Compliance with relevant Planning Policies

Mineral Extraction

13.117 The above impact assessment demonstrates that the landscape and visual effects, due to the proposed development would range from moderate/minor to minor for the landscape

and visual receptors that were identified. This is due to the fact that the proposed development would be contained within one agricultural field, largely screened by intervening vegetation and topography and therefore (partially) visible from few locations only.

13.118 It is therefore considered that the rural, scenic and residential amenities of the local area are protected, as proposed in section 8.17 of the current Cork CDP.

Green Infrastructure and Development

13.119 A Landscape and Restoration Plan was prepared for the proposed development and can be found in Chapter 2 of this EIAR (refer to Figure 2-5). This contains information on the existing vegetation/habitats to be retained on the site and the proposed of the site to a combination of agricultural grassland and natural habitat. If further contains information on proposed native hedge and tree planting surrounding the proposed extraction area and on the pit floor. This would compensate the reduction / removal of some sections of hedgerows south of the site entrance and the removal of a limited number of trees and scrub vegetation along the internal access track, as well as increase the biodiversity levels on site and provide additional habitat linkage.

13.120 It is considered that the Landscape and Restoration Plan meets the requirements of and therefore would be in compliance with Objective GI 14-3 contained in the current Cork CDP.

Landscape Character Assessment of County Cork

13.121 The above landscape and visual impact assessment had regard to the Cork County Draft Landscape Strategy and has concluded that the landscape and visual effects, due to the proposed development on the whole would be moderate/minor or less. No skylines or ridgelines would be affected by the proposed development. While some hedgerows would be reduced/removed to facilitate sightlines and a limited number of trees and scrub vegetation would be removed along the internal access track, the majority of the existing hedgerow / scrub / woodland vegetation within the land interest area of the applicant would be retained. Also, the loss would be compensated by the planting of a new native hedge around the proposed extraction area and of two pockets of native tree planting on the pit floor, as part of the restoration works.

13.122 In light of the above, it is considered that the proposed development is in compliance with Objective GI 14-9 and Objective GI 14-10 contained in the current Cork CDP.

Landscape Views and Prospects

13.123 As illustrated by **Viewpoint A** on **Figure 13-3**, there will be no views of the proposed extraction works from the L3204 along the western banks of the Bandon River, which is designated as Scenic Route S65. The only elements visible from this road (in the vicinity of the site entrance only) will be the reduction/removal of some hedgerow vegetation to the south of the site entrance and the removal of some internal trees / scrub vegetation, Both will be difficult to discern, considering the amount of woodland vegetation to be retained, which forms the back drop to these works. Also, the HGVs entering and exiting the site will be visible, however this will be at a very low frequency of max. 2 trips/h and therefore a small addition the existing traffic along this road. The character of the views along the river valley / from S65 will therefore be preserved.

13.124 **Viewpoint B** on **Figure 13-3** illustrates that views from the R605 along the eastern banks of the Bandon River (designated as Scenic Route S63), towards the application area are

screened by roadside and intervening vegetation. Neither the vegetation reduction / removal near the site entrance, nor the proposed extraction works will therefore be seen from this road. The HGVs associated with the development, if glimpsed through gaps in the vegetation, will be experienced like any other traffic on the road on the other shore of the river. Therefore, the character of the views along the river valley / from S63 will be preserved.

13.125 It is considered that the proposed development is in compliance with Objective GI 14-12, Objective GI 14-13 and Objective GI 14-14 contained in the current Cork CDP.

Unplanned Events (i.e. Accidents)

13.126 It is highly unlikely that any unplanned events within the application area would result in significant landscape or visual impact.

Cumulative / Synergistic Impacts

13.127 Considering the visual separation from the existing sand and gravel pit to the north of the proposed development site and the visual enclosure of the proposed extraction area, the cumulative landscape and visual effects of both developments are not considered significant. No other existing / permitted developments, or developments currently in the planning process were identified, that would have the potential for significant cumulative landscape or visual impacts

Transboundary Impacts

13.128 The proposed application area is not located in the vicinity of a national boundary. Therefore, transboundary landscape or visual impacts would not arise.

Interaction with Other Impacts

13.129 There are no anticipated interactions with other environmental effects.

‘Do-nothing Scenario’

13.130 If no extraction works within the proposed extraction area were to take place, the agricultural field would continue to be used for such purposes for the foreseeable future and the woodland vegetation within the disused pit to the north would continue to naturally develop, resulting in no landscape or visual effects.

MITIGATION MEASURES

Operational Stage

13.131 The substantial screening provided by topography and the existing woodland vegetation along the northern and eastern site boundaries, as well as the undulating topography and existing woodland / hedgerow vegetation in the wider landscape, are the main mitigating factors minimising the landscape and visual impacts associated with the proposed development.

13.132 This combined with the landscape and restoration proposals, including hedge and tree planting along the edge of the extraction area and on the pit floor, as well as the restoration of the extraction area to a combination of agricultural grassland and natural habitat will help the integration of the site into the local landscape and further reduce its visibility. No additional landscape or visual mitigation measures are therefore considered necessary during the operational stage. Please refer to **Figure 2-4**, the Landscape and Restoration Plan, provided in Chapter 2 of this EIAR, for the landscape/restoration proposals.

Post-Operational Stage

13.133 During the post-operational stage, the existing woodland vegetation to the north and east of the extraction area, which will be retained, will continue to provide substantial screening. Also, the pit slopes would become colonised by locally occurring grass, scrub and woodland species, merging the site with the neighbouring wooded area. Additional landscape or visual mitigation measures at the post-operational stage are therefore not considered necessary.

RESIDUAL IMPACT ASSESSMENT

Operational Stage

13.134 As no additional mitigation measures are required during the operational stage, the residual levels of landscape and visual effects would be as per the assessment above. In summary, the assessment has found that the proposed development would have moderate/minor or minor effects on the sensitive landscape receptors identified, during the operational stage (i.e. levels of impact not considered to be significant).

13.135 The visual effects on views would range from none for the vast majority of locations within the study area, to moderate/minor for a small number of residential receptors and minor for a small number vehicle users in the vicinity of the site entrance within 1.2-2km to the north-east and east of the application area (i.e. impacts not considered to be significant).

Post-Operational Stage

13.136 As no additional mitigation measures are required during the post-operational stage, the residual landscape and visual effects would be as per the assessment above. In summary, on completion of all restoration works the predicted landscape and visual effects would reduce to minor/negligible.

MONITORING

13.137 There are no monitoring requirements, arising from this landscape and visual assessment.

REFERNCES

Environmental Protection Agency (May 2022) Guidelines on the Information to be contained in Environmental Impact Assessment Reports, EPA Ireland

The Landscape Institute with the Institute of Environmental Management and Assessment (2013) Guidelines for Landscape and Visual Impact Assessment, Third Edition, Routledge

The Landscape Institute (2019) Technical Guidance Note 06/19: Visual Representation of Development Proposals, Landscape Institute

The Landscape Institute (2021) Technical Guidance Note 02/21: Assessing landscape value outside national designations, Landscape Institute

The Landscape Institute (2024) Technical Guidance Note LITGN-2024-01 Published August 2024: Notes and Clarifications on Aspects of Guidelines for Landscape and Visual Impact Assessment Third Edition (GLVLIA3)

FIGURES

Figure 13-1
Landscape Baseline and Viewpoint Locations

Figure 13-2
Zone of Theoretical Visibility (ZTV) Map

Figure 13-3
Viewpoints A & B

Figure 13-4
Viewpoints C& D

Figure 13-5
Viewpoints E & F

N71
R605
S64
S63
S65
INISHANNON
Inis Eonáin
LCT 6a
LCT 3
LCT 7a
1 km
2 km
3 km
4 km
A
B
C
D
E
F
0 500 1000 1500 2000 2500m
Scale 1:25,000

N

Notes:

1. Extract from Ordnance Survey Map No.86

Legend:

- Applicants Land Interest Area
- Planning application area
- Viewpoint locations
- Approximate distance from application area

Landscape Designations:

- Scenic routes (Cork County Development Plan 2022)
- Landscape Character Types (LCT) (Cork draft landscape strategy 2007)
- High value landscape (Cork draft landscape strategy 2007)

Outdoor Recreational Facilities:

- Dromkeen Forest walk

Protected Sites:

- Proposed Natural Heritage Area (PNHA) (www.npws.ie)

Rev	Amendments	Date	By	Chk	Auth

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www.slrconsulting.com

Client: Keohane Readymix Ltd.

Project: Sand & Gravel Pit
Knockroe, Bandon, Co. Cork

Figure Title: Landscape Baseline & Viewpoint Locations

Scale		SLR Project No.	
1:25,000	@ A3	501.0033.065557	
Designed	Drawn	Checked	Authorised
SH	SH	AM	AM
Date	Date	Date	Date
04/25	04/25	04/25	04/25

Figure Number: **Figure 13-1** Rev. **0**

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08/04/2025

N

Notes:

1. Extract from Ordnance Survey Map No.86

Legend:

- Applicants Land Interest Area
- Planning Application Area
- Viewpoint Locations (A)
- Approximate distance from Application Area (2 km)
- Areas / sections of road with similar (intermittent) visibility of the proposed development to that of the sample viewpoint(s) contained within the areas

Vertical subtended angles visible (of the application area)

- Subtended vertical angle greater than **25.6** degrees
- Subtended vertical angle **12.8** to **25.6** degrees
- Subtended vertical angle **6.4** to **12.8** degrees
- Subtended vertical angle **3.2** to **6.4** degrees
- Subtended vertical angle **1.6** to **3.2** degrees
- Subtended vertical angle **0.8** to **1.6** degrees
- Subtended vertical angle **0.4** to **0.8** degrees
- Subtended vertical angle **0.2** to **0.4** degrees
- Subtended vertical angle **0.1** to **0.2** degrees
- Subtended vertical angle less than **0.1** degrees
- No theoretical visibility

Note: Vegetation cover and built structures were not taken into account, as part of the calculation of this ZTV, which therefore represents the worst-case-scenario. In SLR's experience, views from areas in grey (i.e. less than 0.4 degrees) tend to be screened by hedgerows and other intervening vegetation, if locally present.
Please refer to Appendix 13-B of the EIAR for the ZTV methodology.

Rev	Amendments	Date	By	Chk	Auth

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Project
Sand & Gravel Pit
Knockroe, Bandon, Co. Cork

Figure Title
Zones of Theoretical Visibility (ZTV)

Scale	SLR Project No.
1:25,000 @ A3	501.0033.065557

Designed	Drawn	Checked	Authorised
SH	SH	AM	AM
Date 04/25	Date 04/25	Date 04/25	Date 04/25

Figure Number **Figure 13-2** Rev. **0**

0 500 1000 1500 2000 2500m

Scale 1:25,000

CYAL50450233

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VIEWPOINT A: Local Road L3204 in the townland of Knockroe, at the junction with the local road (L6070) leading to Mahony's Cross Roads (opposite the entrance to the application area) - Scenic Route S65

Grid Coordinates (ITM): **555606:555962** Approximate Elevation: **5m AOD** Distance from planning application boundary: **30m** Direction of View: **South** Date/time of photograph: **12/03/2025 @ 15:50**

Description: The entrance to the application area is visible from short stretches of the two local roads, in the vicinity of the site entrance. Intervening topography and vegetation screen views towards the entrance from all other locations along these roads. The proposed extraction area is screened in views from all locations along these roads (including residential properties) by intervening topography and vegetation. This will not change, even though some trees / vegetation will need to be removed to facilitate the widening of the internal access track. The curving internal access track, combined with the majority of the vegetation being retained, will ensure that all extraction activities are fully screened. Note: the existing gate at the entrance will be retained.



VIEWPOINT B: R605 - Regional Road in the townland of Coolmoreen, at the junction with a local road, ca. 2km south-east of Inishannon - Scenic Route S63

Grid Coordinates (ITM): **555782:556122** Approximate Elevation: **10m AOD** Distance from planning application boundary: **260m** Direction of View: **South-west** Date/time of photograph: **12/03/2025 @ 17:10**

Description: The site entrance to the application area is almost fully screened in views from the R605 and adjoining residential properties by intervening vegetation. During the winter month sections of the road on the western side of the Bandon River, including the site entrance, can be intermittently glimpsed through the vegetation in the vicinity of this viewpoint. However, this diminishes further during the summer months, when all trees are in leaf. The propose extraction area is fully screened and will remain fully screened by topography and vegetation for the duration of the proposed development in all views from the R605 and adjoining properties.

Notes:

1. Extract from Ordnance Survey Map No.86

Legend:

- Applicants Land Interest Area (c. 108.3 hectares)
- Planning Application Area (c. 6.3 hectares)
- Viewpoint Locations
- Approximate distance from Application Area

Viewpoint Location Map (scale 1:50,000)



Rev	Amendments	Date	By	Chk	Auth

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Project: Sand & Gravel Pit
Knockroe, Bandon, Co. Cork

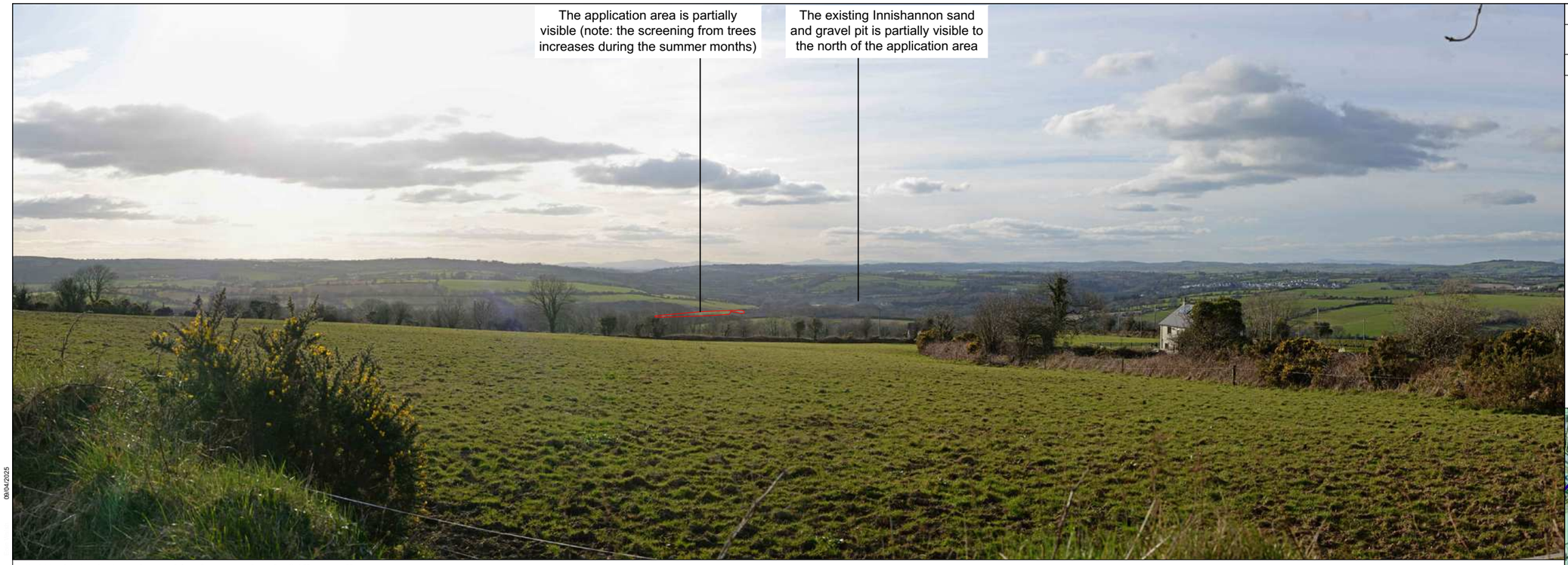
Figure Title: Viewpoints A & B

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Date: 04/25	Date: 04/25	Date: 04/25	Date: 04/25

Figure Number: **Figure 13-3** Rev.: **0**

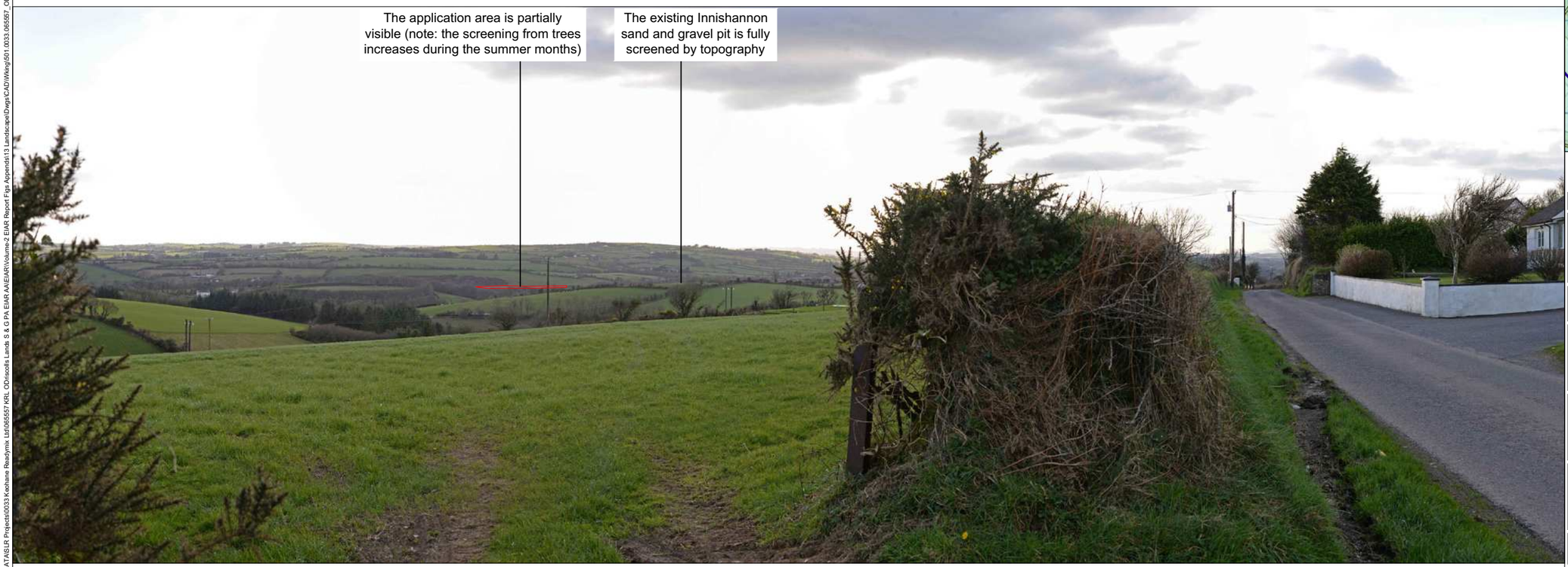
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VIEWPOINT C: Local Road in the townland of Slievegallane

Grid Coordinates (ITM): **557349:555786** Approximate Elevation: **110m AOD** Distance from planning application boundary: **1,600m** Direction of View: **West** Date/time of photograph: **12/03/2025 @ 16:50**

Description: The proposed extraction area is partially visible as a narrow band in views from some locations along a ca. 500m long section of this remote local road, as well as ca. 6 residential properties in this area. The extent of visibility varies depending on the exact viewing position, and associated presence of intervening vegetation, as well as whether deciduous trees are in leaf or not. At no point is the extraction area fully openly visible or taking up a greater portion of these panoramic views (owing to the distance). The site entrance and access track are screened in all views.



VIEWPOINT D: Local Road in the townland of Coolmoreen, ca. 2km east of Inishannon

Grid Coordinates (ITM): **557100:557062** Approximate Elevation: **100m AOD** Distance from planning application boundary: **1,900m** Direction of View: **South-west** Date/time of photograph: **12/03/2025 @ 16:30**

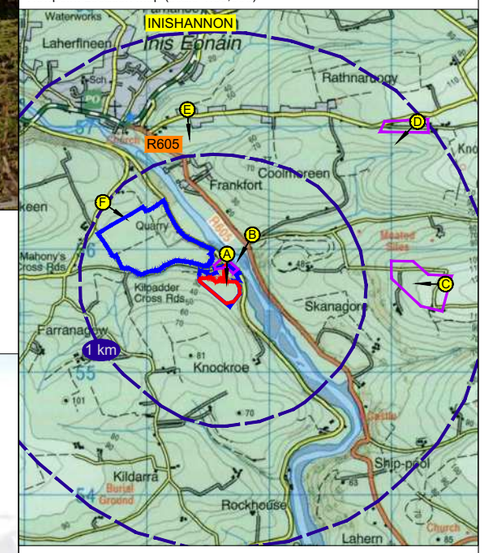
Description: The proposed extraction area is partially visible as a very narrow band in views from some locations along a ca. 300m long section of this local road, as well as ca. 8 residential properties in this area. The extent of visibility varies depending on the exact viewing position, and associated presence of intervening vegetation (note the roadside hedgerow in the right half of the view), as well as whether deciduous trees are in leaf or not. At no point is the extraction area fully openly visible or taking up a greater portion of these panoramic views (owing to the distance). The site entrance and access track are screened in all views.

Notes:

1. Extract from Ordnance Survey Map No.86

Legend:

Viewpoint Location Map (scale 1:50,000)



Rev	Amendments	Date	By	Chk	Auth

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Project: Sand & Gravel Pit
Knockroe, Bandon, Co. Cork

Figure Title: Viewpoints C & D

Scale	SLR Project No.
NTS @ A3	501.0033.065557

Designed	Drawn	Checked	Authorised
CN	CN	AM	AM
Date 04/25	Date 04/25	Date 04/25	Date 04/25

Figure Number: **Figure 13-4** Rev.: **0**

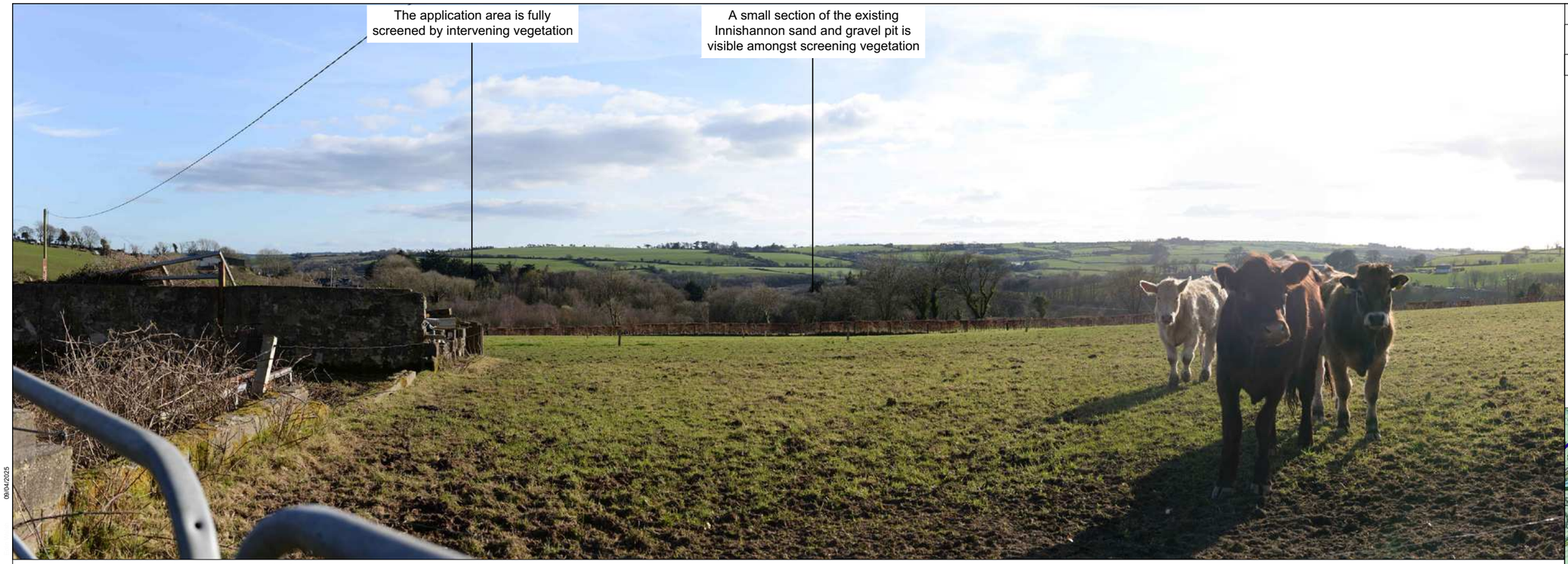
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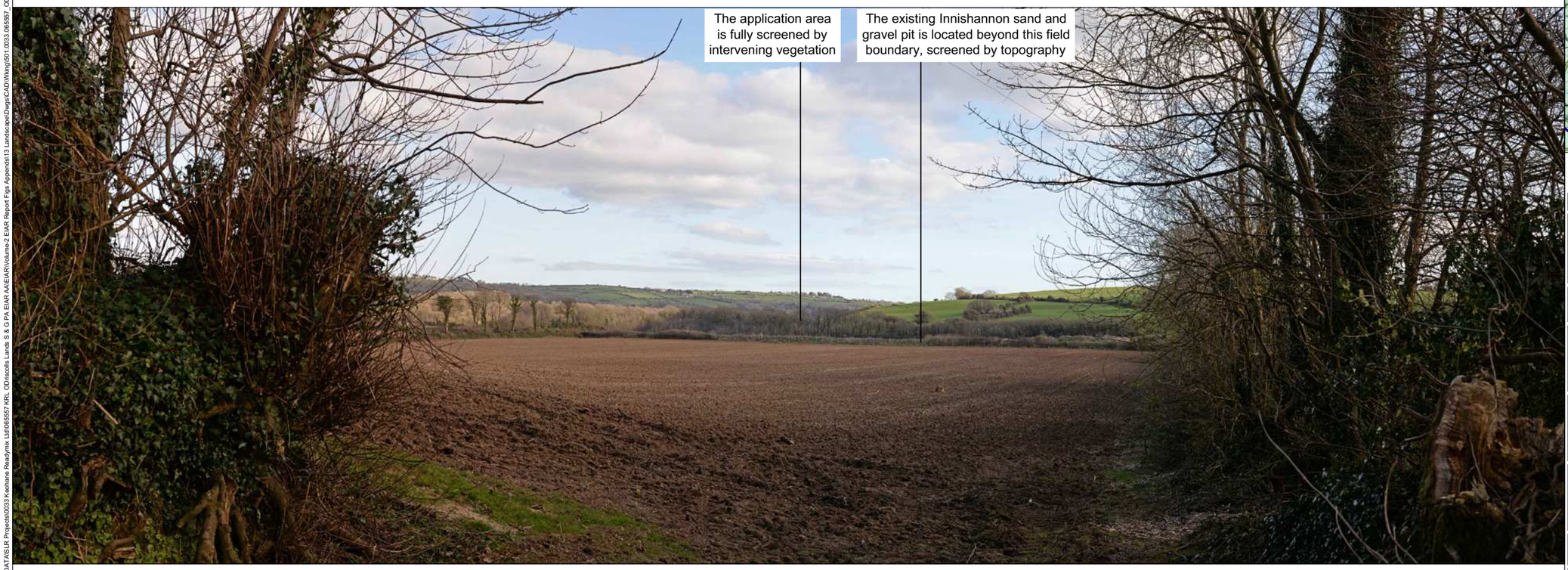
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VIEWPOINT E: Local Road in the townland of Rathnaruogy, ca. 500m east of Inishannon

Grid Coordinates (ITM): **555306:557155** Approximate Elevation: **45m AOD** Distance from planning application boundary: **1,250m** Direction of View: **South** Date/time of photograph: **12/03/2025 @ 16:20**

Description: The Zone of theoretical visibility mapping (refer to Figure 13-2) indicates some potential visibility from this section of road. However, intervening vegetation fully screens the the application area in views from this area, including from residential properties. This is the case for views from within Inishannon in general.



VIEWPOINT F: Local Road in the townland of Dromkeen, ca. 1km east of Mahony's Cross Roads

Grid Coordinates (ITM): **554622:556408** Approximate Elevation: **40m AOD** Distance from planning application boundary: **970m** Direction of View: **South-east** Date/time of photograph: **12/03/2025 @ 16:00**

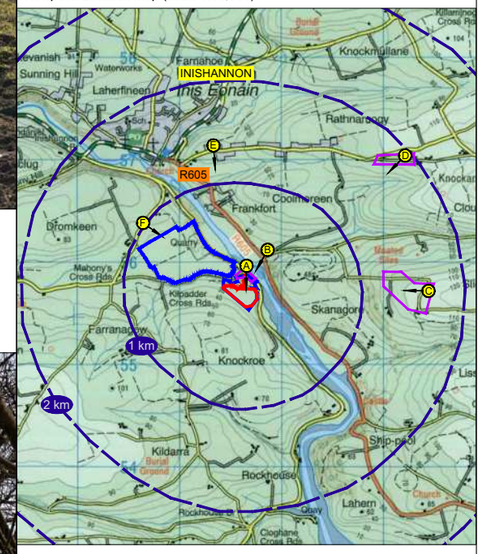
Description: The Zone of theoretical visibility mapping (refer to Figure 13-2) indicates a low potential for visibility from this section of road. However, intervening vegetation fully screens the the application area in views from this area, including from residential properties.

Notes:

1. Extract from Ordnance Survey Map No.86

Legend:

Viewpoint Location Map (scale 1:60,000)



Rev	Amendments	Date	By	Chk	Auth

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Project: Sand & Gravel Pit
Knockroe, Bandon, Co. Cork

Figure Title: Viewpoints E & F

Scale	SLR Project No.
NTS @ A3	501.0033.065557

Designed	Drawn	Checked	Authorised
CN	CN	AM	AM
Date: 04/25	Date: 04/25	Date: 04/25	Date: 04/25

Figure Number: **Figure 13-5** Rev.: **0**

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APPENDICES

Appendix 13-A Criteria and Definitions used in Assessing Landscape and Visual Effects

Introduction

Landscape and Visual Impact Assessment (LVIA) is a tool used to identify the effects of development on *"landscape as an environmental resource in its own right and on people's views and visual amenity"* (GLVIA3, paragraph 1.1). GLVIA3[1] (paragraph 2.22) states that these two elements, although inter-related, should be assessed separately. GLVIA3 is the main source of guidance on LVIA.

Landscape is a definable set of characteristics resulting from the interaction of natural, physical and human factors: it is a resource in its own right. Its assessment is distinct from visual assessment, which considers effects on the views and visual amenity of different groups of people at particular locations. Clear separation of these two topics is recommended in GLVIA3.

"*Notes and Clarifications on aspects of GLVIA3*" (Landscape Institute Technical Guidance Note 2024/01, published August 2024) makes it clear at section 2.0 that Townscape and Seascape assessments should follow the same process as LVIA, and therefore also follow the guidance in GLVIA3.

As GLVIA3 (paragraph 2.23) states, professional judgement is an important part of the LVIA process: whilst there is scope for objective measurement of landscape and visual changes, much of the assessment must rely on qualitative judgements. It is critical that these judgements are based upon a clear and transparent method so that the reasoning can be followed and examined by others.

Impacts can be defined as the action being taken, whereas effects are the changes result from that action. This method of assessment assesses landscape and visual effects.

Landscape and visual effects can be positive, negative or neutral in nature. Positive effects are those which enhance and/or reinforce the characteristics which are valued. Negative effects are those which remove and/or undermine the characteristics which are valued. Neutral effects are changes which are consistent with the characteristics of the landscape or view. LI TGN 2024/01 notes at section 3(7) that the assessment of the level of effect and the nature of effect should be independent of each other.

Landscape and visual effects can result directly from the development itself (direct effects), or may be indirect changes (which are not a direct result of the development but occur as a result of a more complex pathway, such as changes to drainage patterns or perceptual changes further from the proposed development).

[1] Landscape Institute and Institute of Environmental Management and Assessment 'Guidelines for Landscape and Visual Impact Assessment' (Third Edition, April 2013)

Landscape and visual effects can also be cumulative, which are the additional changes caused by a proposed development in conjunction with other developments, particularly those which are recently consented or which have been applied for.

In LVIAs which form part of an EIA, it is necessary for identify significant and non-significant effects. In non-EIA LVIAs, also known as appraisals, the same principles and process as LVIA may be applied but, in so doing, it is not required to establish whether the effects arising are or are not significant given that the exercise is not being undertaken for EIA purposes (see GLVIA3 statement of clarification 1/13 10-06-13, Landscape Institute).

Landscape Effects

Landscape, as defined in the European Landscape Convention, is defined as "*an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors"*, (Council of Europe, 2000). Landscape does not apply only to special or designated places, nor is it limited to countryside.

GLVIA3 (paragraph 5.34) recommends that the effect of the development on landscape receptors is assessed. Landscape receptors are the components of the landscape that are likely to be affected by the proposed development, and can include individual elements (such as hedges or buildings), aesthetic and perceptual characteristics (for example sense of naturalness, tranquillity or openness), or, at a larger scale, the character of a defined character area or landscape type. Designated areas (such as National Parks or Areas of Outstanding Natural Beauty (AONBs)) are also landscape receptors.

This assessment is being undertaken because the proposed development has the potential to remove or add elements to the landscape, to alter aesthetic or perceptual aspects, and to add or remove characteristics and thus potentially change overall character.

Judging landscape effects requires a methodical assessment of the sensitivity of the landscape receptors to the proposed development and the magnitude of effect which would be experienced by each receptor.

Landscape Sensitivity

Sensitivity of landscape receptors is assessed by combining an assessment of the susceptibility of landscape receptors to the type of change which is proposed with the value attached to the landscape. (GLVIA3, paragraph 5.39).

Value Attached to Landscape Receptors

Landscape receptors may be valued at community, local, national or international level. Existing landscape designations provide the starting point for this assessment, as set out in **Table 13A-1** below.

The table sets out the interpretation of landscape designations in terms of the value attached to different landscape receptors. As GLVIA3 (paragraph 5.24) notes, at the local scale of an LVIA study area it may be found that the landscape value of a specific area may be different to that suggested by the formal designation.

Table 13A-1: Interpretation of Landscape Designations

Designation	Description	Value
World Heritage Sites, candidate World Heritage Site	Unique sites, features or areas identified as being of international importance according to UNESCO criteria. Consideration should be given to their settings especially where these contribute to the attributes of outstanding universal value for which such an area of landscape is valued.	International
National Parks	Areas of landscape identified as being of national importance for their natural beauty (and in the case of National Parks the opportunities they offer for outdoor recreation). Consideration should be given to their settings[2] especially where these contribute to the special qualities for which the landscape is valued.	National
Local Landscape Designations (such as Areas of Outstanding Natural Beauty or Areas of High Amenity) included in local planning documents.	Areas of landscape identified as having importance at the local authority level.	Local Authority
Undesignated landscapes of community value	Landscapes which do not have any formal designation but which are assessed as having value to local communities, perhaps on the basis of demonstrable physical attributes which elevate it above ordinary countryside.	Local Authority / Community
Landscapes of low value	Landscapes in poor condition or fundamentally altered by presence of intrusive man-made structures. Landscapes with no demonstrable physical attributes which elevate it above ordinary countryside.	Low

Where landscapes are not designated and where no other local authority guidance on value is available, an assessment is made by reference to criteria in the **Table 13A-2** below. This is based on Table 1 of Landscape Institute Technical Guidance Note 2/21. These factors are not fixed and should be reviewed on a case-by-case basis. When assessing landscape value of a site it is important to consider not only the site itself but also its context.

Landscapes may be judged to be of local authority or community value on the basis of one or more of these factors. There may also be occasional circumstances where an undesignated landscape may be judged to be of national value, for example where it has a clear connection with a nationally designated landscape, or is otherwise considered to be of equivalent value to a national designation. Similarly, on occasions there may be areas within designated landscapes that do not meet the designation criteria, or demonstrate the key characteristics/special qualities in a way that is consistent with the rest of the designated area.

[2] LI TGN 2024/01 states at section 5(13) that the setting of protected landscapes is "*generally created in policy and is not a designation (or a receptor) in its own right (unlike the settings of heritage assets). The extent of the setting of a designated landscape for LVIA purposes is not geographically defined and will vary with the nature of the development proposed. In LVIA, the question would remain whether the changes in the setting (i.e the landscape nearby but outside the designated area) would affect the designated landscape in terms of effects on its special qualities and, if so, to what degree*".

An overall assessment is made for each landscape receptor, based on an overview of the above criteria, to determine its value - whether for example it is comparable to a local authority landscape designation or similar, or whether it is of value to local people and communities. For example, an intact landscape in good condition, where scenic quality, tranquillity, and/or conservation interests make a particular contribution to the landscape, or where there are important cultural or historical associations, might be of equivalent value to a local landscape designation. Conversely, a degraded landscape in poor condition, with no particular scenic qualities or natural or cultural heritage interest is likely to be considered of limited landscape value.

Table 13A-2: Factors Considered in Assessing the Value of Non-Designated Landscapes

Factor	Criteria
Natural Heritage	Landscape with clear evidence of ecological, geological, geomorphological or physiographic interest. Presence of wildlife and habitats that contribute to the sense of place. Landscape which contains valued natural capital assets that contribute to ecosystem services.
Cultural Heritage	Landscape with clear evidence of archaeological, historical or cultural interest. Landscape which contributes to the significance of heritage assets. Landscape which offers a dimension of time depth.
Landscape Condition	Landscape which is in a good physical state both with regard to individual elements and overall landscape structure. Absence of detracting/incongruous features.
Associations	Landscape which is connected with notable people, events and the arts.
Distinctiveness	Landscape that has a strong sense of identity or place. Presence of distinctive features that are characteristic of a place, or presence of rare/unusual features that confer a strong sense of place. Includes landscape that makes an important contribution to the character or identity of a settlement.
Recreational	Landscape offering recreational opportunities where experience of landscape is important. Includes open access areas, common land and rights of way where appreciation of the landscape is an important element of the experience. Landscape that forms part of a view that that is important to the enjoyment of a recreational activity.
Perceptual (Scenic)	Landscape that appeals to the senses, primarily the visual sense. Distinctive features, or distinctive combinations of features. Strong aesthetic qualities. Visual diversity or contrasts. Memorable/distinctive views or landmarks, or landscape that contributes to these.
Perceptual (Wildness and Tranquillity)	Landscape with a strong perceptual value notably remoteness, wildness, tranquillity and/or dark skies.
Functional	Landscape which performs a clearly identifiable and valuable function, particularly in the healthy functioning of the landscape. Natural hydrological systems, important parts of the green infrastructure network, pollinator rich habitats. Landscapes that have strong physical or functional links with an adjacent national landscape designation or are important to the appreciation of the designated landscape and its special qualities.

Susceptibility of Landscape Receptors to Change

As set out in GLVIA3, susceptibility refers to the ability of the landscape receptor to *"accommodate the proposed development without undue adverse consequences for the baseline situation and/or the achievement of landscape planning policies and strategies"*. Judgement of susceptibility is particular to the specific characteristics of the proposed development and the ability of a particular landscape or feature to accommodate the type of change proposed, and makes reference to the criteria set out in **Table 13A-3** below. Aspects of the character of the landscape that may be affected by a particular type of development include landform, skylines, land cover, enclosure, human influences including settlement pattern and aesthetic and perceptual aspects such as the scale of the landscape, its form, line, texture, pattern and grain, complexity, and its sense of movement, remoteness, wildness or tranquillity.

For example, an urban landscape which contains a number of industrial buildings may have a low susceptibility to buildings of a similar scale and character. Conversely a rural landscape containing only remote farmsteads is likely to have a high susceptibility to large scale built development.

Table 13A-3: Landscape Receptor Susceptibility to Change

Susceptibility	Criteria
High	The landscape receptor is highly susceptible to the proposed development because the key characteristics of the landscape have no or very limited ability to accommodate it without transformational adverse effects, taking account of the existing character and quality of the landscape.
Medium	The landscape receptor is moderately susceptible to the proposed development because the relevant characteristics of the landscape have some ability to accommodate it without transformational adverse effects, taking account of the existing character and quality of the landscape.
Low	The landscape receptor has low susceptibility to the proposed development because the relevant characteristics of the landscape are generally able to accommodate it without transformational adverse effects, taking account of the existing character and quality of the landscape.

Defining Sensitivity

As has been noted above, the sensitivity of landscape receptors is defined in terms of the relationship between value and susceptibility to change as indicated in Figure 13A-1 below. This summarises the general nature of the relationship but it is not formulaic and only indicates general categories of sensitivity. Professional judgement is applied on a case by case basis in determining sensitivity of individual receptors with the diagram only serving as a guide.

Table 13A-4 below summarises the nature of the relationship but it is not formulaic and only indicates general categories of sensitivity. Judgements are made about each landscape receptor, with the table serving as a guide.

Where, taking into account the component judgements about the value and susceptibility of the landscape receptor, sensitivity is judged to lie between levels, an intermediate assessment of high/medium or medium/low is adopted. In a few limited cases a category of less than low (very low) may be used where the landscape is of low value and susceptibility is particularly low.

Figure 13A-1: Example Levels of Sensitivity defined by Value and Susceptibility of Landscape Receptors

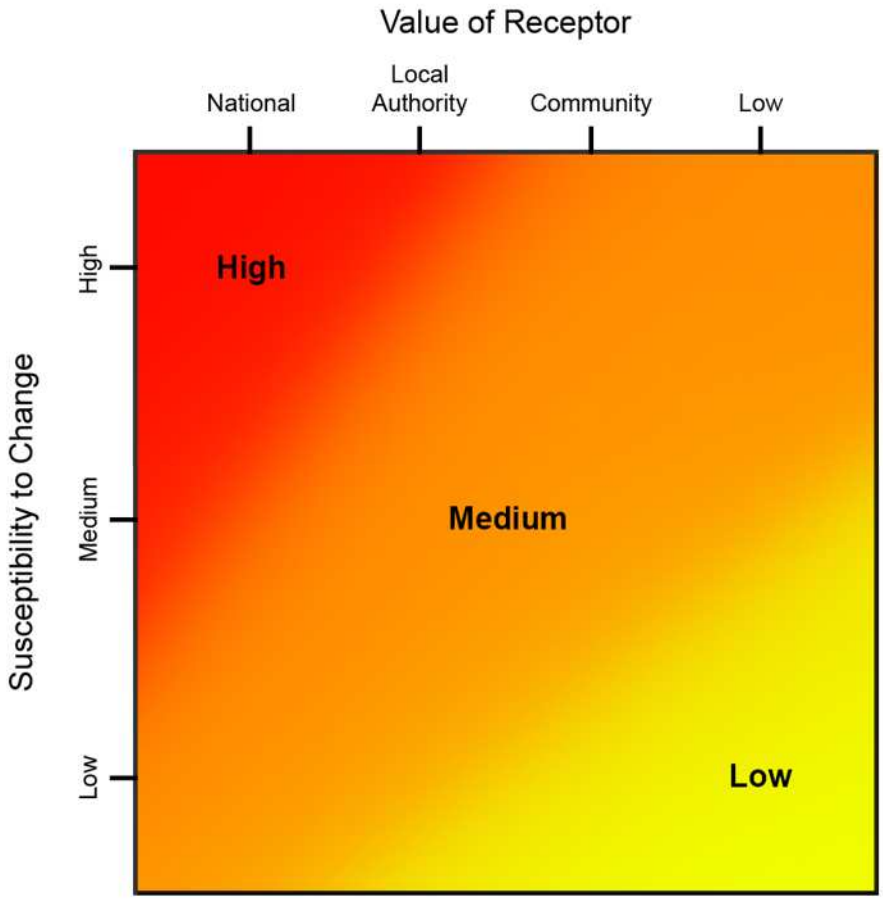


Table 13A-4: Example Levels of Sensitivity defined by Value and Susceptibility of Landscape Receptors

Susceptibility	Criteria
High	The landscape receptor is of international or national value and is considered to have high susceptibility to the effects of the proposed development. OR The landscape receptor is of national value and is considered to have medium susceptibility to the effects of the proposed development.
Medium	The landscape receptor is of international or national value and is considered to have low susceptibility to the effects of the proposed development. OR The landscape receptor is of local authority value and is considered to have high susceptibility to the effects of the proposed development. OR The landscape receptor is of local authority value and is considered to have medium susceptibility to the effects of the proposed development. OR The landscape receptor is of community value and is considered to have high susceptibility to the effects of the proposed development.
Low	The landscape receptor is of local authority value and is considered to have low susceptibility to the effects of the proposed development. OR The landscape receptor is of community value and is considered to have medium susceptibility to the effects of the proposed development. OR The landscape receptor is of community value and is considered to have low susceptibility to the effects of the proposed development.

Magnitude of Landscape Change

The magnitude of landscape change is established by assessing the size or scale of change, the geographical extent of the area influenced and the duration and potential reversibility of the change. LI TGN 2024/01 states at section 3(3) that "*it is likely that size/scale of effect will be the most important factor, with geographical extent and duration/reversibility considered as 'modifiers*".

Size and Scale of Change

The size and/or scale of change in the landscape takes into consideration the following factors:

- the extent/proportion of landscape elements lost or added; and/or
- the degree to which aesthetic/perceptual aspects are altered; and
- whether this is likely to change the key characteristics of the landscape.

The criteria used to assess the size and scale of landscape change are based upon the amount of change that will occur as a result of the proposed development, as described in **Table 13A-5** below.

Table 13A-5: Magnitude of Landscape Change: Size/Scale of Change

Category	Description
Large level of landscape change	There would be a large level of change in landscape character, and especially to the key characteristics if, for example, the proposed development: • becomes a dominant feature in the landscape, changing the balance of landscape characteristics; and/or • would dominate important visual connections with other landscape types, where this is a key characteristic of the area.
Medium level of landscape change	There would be a medium level of change in landscape character, and especially to the key characteristics if, for example: • the proposed development would be more prominent but would not change the overall balance or composition of the landscape; and/or • key visual connections to other landscape types may be interrupted intermittently by the proposed development, but these connections would not be dominated by them.
Small level of landscape change	There would be a small level of change in landscape character, and especially to the key characteristics if, for example: • there would be no introduction of new elements into the landscape and the proposed development would not significantly change the composition/balance of the landscape.
Negligible level of landscape change/ No change	There would be a negligible or no level of change in landscape character, and especially to the key characteristics if, for example, the proposed development would be a small element and/or would be a considerable distance from the receptor.

Geographical Extent of Change

The geographical extent of landscape change is assessed by determining the area over which the changes will influence the landscape, as set out in **Table 13A-6**. For example, this could be at the site level, in the immediate setting of the site, or over some or all of the landscape character types or areas affected.

Table 13A-6: Magnitude of Landscape Change: Geographical Extent

Category	Description
Large extent of landscape change	Affects a wider area, far from the site itself, or affects a large proportion of the landscape receptor.
Medium extent of landscape change	Landscape change extends beyond the site boundaries or affects a medium proportion of the landscape receptor.
Small extent of landscape change	Change affecting a localised area, often focused on the site itself, or affects a small proportion of the landscape receptor.
Negligible extent of landscape change	The change will affect only a negligible extent of the landscape receptor under consideration.

Duration and Reversibility of Change

The duration of the landscape change is categorised in **Table 13A-7** below, which considers whether the change will be permanent and irreversible or temporary and reversible. The levels of duration are based on the EPA Guidelines on the information to be contained in Environmental Impact Assessment Reports (2022).

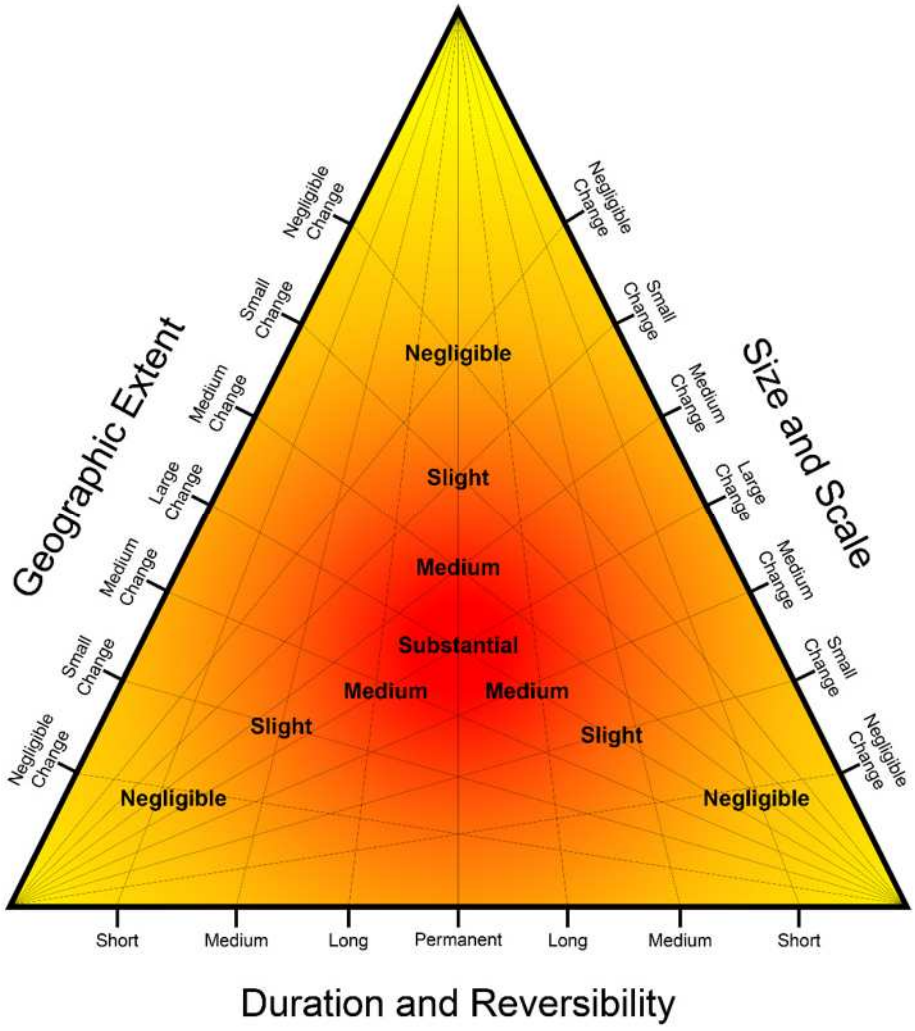
Table 13A-7: Magnitude of Landscape Change: Duration and Reversibility

Category	Description
Permanent/ Irreversible	Effects that will last for over 60 years and is deemed irreversible.
Long-term reversible	Effects that will last between 15 and 60 years and are theoretically reversible.
Medium-term reversible	Effects that will last between 7 and 15 years and are wholly or partially reversible.
Temporary/ Short-term reversible	Effects that will last from 0 to 7 years and is reversible likely to include construction effects.

Deciding on Overall Magnitude of Landscape Change

The relationships between the three factors that contribute to assessment of the magnitude of landscape effects are illustrated graphically, as a guide, in **Figure 13A-2** below. Various combinations are possible and the overall magnitude of each effect is determined using professional judgement rather than by formulaic application of the relationships in the diagram.

Figure 13A-2: Determining the Magnitude of Landscape Change

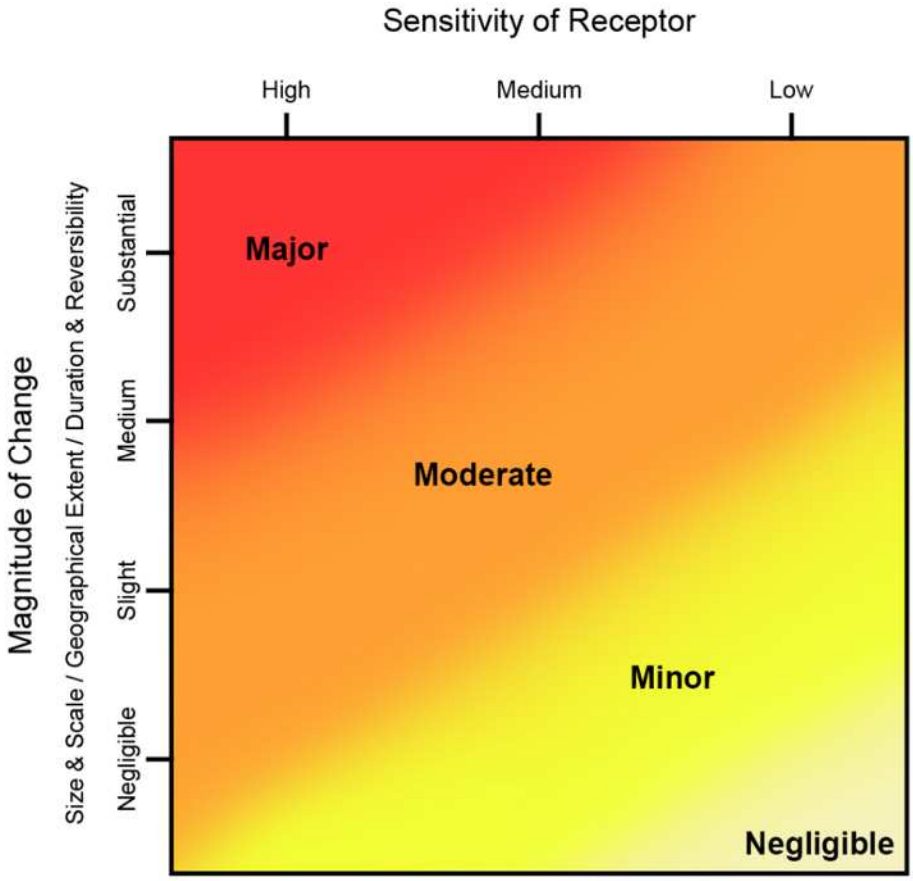


Assessment of Landscape Effects

The assessment of overall landscape effects is defined in terms of the relationship between the sensitivity of the landscape receptors and the magnitude of the change. The diagram below (**Figure 13A-3**) summarises the nature of the relationship but it is not formulaic. Judgements are made about each landscape effect using this diagram as a guide.

Major and Major/Moderate effects are regarded as important planning considerations in landscape and visual appraisals (or significant effects in landscape and visual impact assessments). Moderate effects are not generally considered to be important planning considerations/significant effects, although the assessor may conclude that some moderate effects could constitute significant effects in certain circumstances: for example, there may be a concentration of several moderate effects in one location, or a moderate effect may occur for a particularly sensitive receptor or be of a particularly high magnitude.

Figure 13A-3: Assessment of Landscape Effects



Visual Effects

Visual effects are the effects of change and development on the views available to people and their visual amenity. Visual receptors are the people whose views may be affected by the proposed development. They generally include users of walking trails or other recreational facilities or attractions; travellers who may pass through the study area because they are visiting, living or working there; residents living in the study area, either as individuals or, more often, as a community; and people at their place of work:

- Communities within settlements (i.e. towns and villages);
- Residents of individual properties and clusters of properties;
- People using nationally designated or regionally promoted footpaths and cycle routes;
- Visitors at publicly accessible sites including, for example, gardens and designed landscapes, historic sites, and other visitor attractions or outdoor recreational facilities where the landscape or seascape is an important part of the experience;
- Users of outdoor sport and recreation facilities;
- Visitors staying at caravan parks or camp sites;
- Road users on recognised scenic or promoted tourist routes;
- Users of other roads;
- Rail passengers;
- People at their place of work.

LI TGN 2024/01 states at section 6(1) that visual assessment should focus on the way that communities experience views from public locations. It notes that *"views from houses and individual properties are a matter of private amenity, noting that it is an established planning principle that there is no right to a view"*

Judging visual effects requires a methodical assessment of the sensitivity of the visual receptors to the proposed development and the magnitude of effect which would be experienced by each receptor.

Viewpoints are chosen, in discussion with the competent authority and other stakeholders and interested parties, for a variety of reasons but most commonly because they represent views experienced by relevant groups of people.

Visual Sensitivity

Sensitivity of visual receptors is assessed by combining an assessment of the susceptibility of visual receptors to the type of change which is proposed with the value attached to the views. (GLVIA3, paragraph 6.30).

Value Attached to Views

Different levels of value are attached to the views experienced by particular groups of people at particular viewpoints. Assessment of value takes account of a number of factors, including:

- Recognition of the view through some form of planning designation or by its association with particular heritage assets; and

- The popularity of the viewpoint, in part denoted by its appearance in guidebooks, literature or art, or on tourist maps, by information from stakeholders and by the evidence of use including facilities provided for its enjoyment (seating, signage, parking places, etc.); and
- Other evidence of the value attached to views by people including consultation with local planning authorities, some of whom have carried out assessments of valued views, and professional assessment of the quality of views.

The assessment of the value of views is summarised in **Table 13A-8** below. These criteria are provided for guidance only.

Table 13A-8: Examples of Factors Considered in assessing the Value Attached to Views

Value	Description
High	Views from nationally (and in some cases internationally) known viewpoints, which: • have some form of planning designation; or • are associated with internationally or nationally designated landscapes or important heritage assets; or • are promoted in sources such as maps and tourist literature; or • are linked with important and popular visitor attractions where the view forms a recognised part of the visitor experience; or • have important cultural associations. Also, may include views judged by assessors to be of high value.
Medium	Views from viewpoints of some importance at regional or local levels, which: • have some form of local planning designation associated with locally designated landscapes or areas of equivalent landscape quality; or • are promoted in local sources; or • are linked with locally important and popular visitor attractions where the view forms a recognised part of the visitor experience; or • have important local cultural associations. Also, may include views judged by the assessors to be of medium value.
Low	Views from viewpoints which, although they may have value to local people: • have no formal planning status; or • are not associated with designated or otherwise high-quality landscapes; or • are not linked with popular visitor attractions; or • have no known cultural associations. Also, may include views judged by the assessors to be of low value.

Susceptibility of Visual Receptors to Change

The susceptibility of different types of people to changes in views is mainly a function of:

- The occupation or activity of the viewer at a given viewpoint; and
- The extent to which the viewer's attention or interest be focussed on a particular view and the visual amenity experienced at a given view.

As LI TGN 2024/01 states at section 6(2), "*visual susceptibility is not influenced by the development type, which would be assessed as part of the magnitude of effect*".

The susceptibility of different groups of viewers is assessed with reference to the guidance in **Table 13A-9** below. However, as noted in GLVIA3 *"this division is not black and white and, in reality, there will be a gradation in susceptibility to change"*. Therefore, the susceptibility of each group of people affected is considered for each project and assessments are included in the relevant text in the report.

Table 13A-9: Visual Receptor Susceptibility to Change

Susceptibility	Description
High	Residents; People engaged in outdoor recreation where their attention is likely to be focused on the landscape and on particular views; Visitors to heritage assets or other attractions where views of the surroundings are an important part of the experience; Communities where views contribute to the landscape setting enjoyed by the residents.
Medium	Travellers on scenic routes where the attention of drivers and passengers is likely to be focused on the landscape and on particular views. People engaged in outdoor sport or recreation, which may involve appreciation of views e.g. users of golf courses.
Low	People engaged in outdoor sport or recreation, which does not involve appreciation of views; People at their place of work whose attention is focused on their work; where the setting is not important to quality of working life; Travellers, where the view is incidental to the journey.

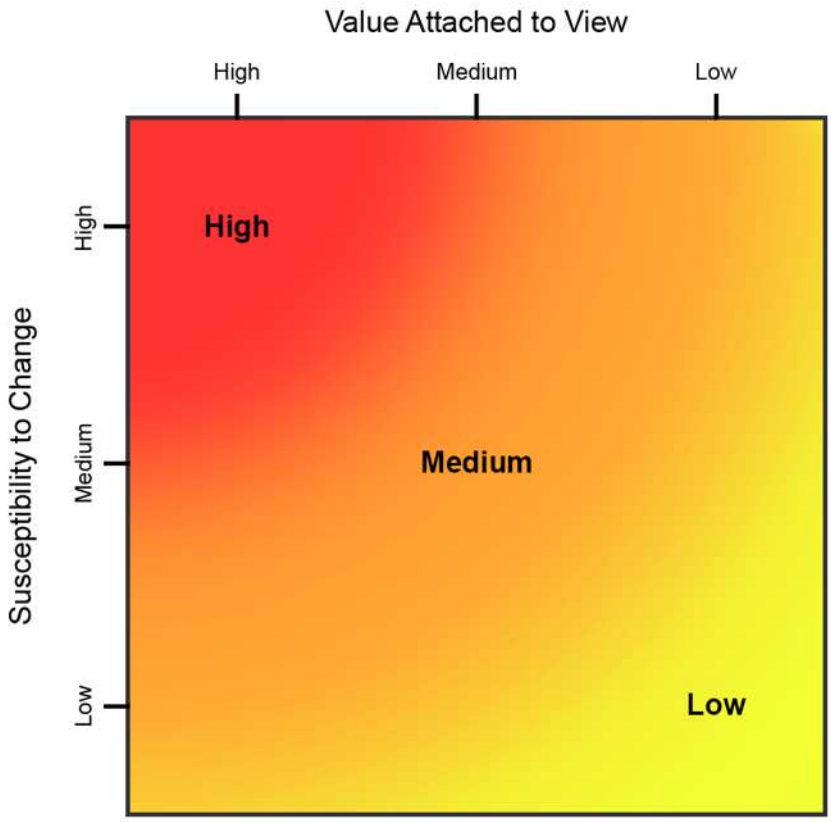
Defining Sensitivity

The sensitivity of visual receptors is defined in terms of the relationship between the value of views and the susceptibility of the different receptors to the proposed change. **Figure 13A-4** below summarises the nature of the relationship; it is not formulaic and only indicates general categories of sensitivity. Judgements are made on merit about each visual receptor, with the table below only serving as a guide. **Table 13A-10** sets down the main categories that may occur but again it is not comprehensive and other combinations may occur.

Table 13A-10: Example Levels of Sensitivity defined by Value and Susceptibility of Visual Receptors

Sensitivity	Criteria
High	The visual receptor group is highly susceptible to changes in views and visual amenity and relevant views are of high value. OR The visual receptor group has a medium level of susceptibility to changes in views and visual amenity and relevant views are of high value. OR The visual receptor group is highly susceptible to changes in views and visual amenity and relevant views are of value at the medium level.
Medium	The visual receptor group is highly susceptible to changes in views and visual amenity and relevant views are of value at the low level. OR The visual receptor group has a medium level of susceptibility to changes in views and visual amenity and relevant views are of value at the medium level. OR The visual receptor group has a low level of susceptibility to changes in views and visual amenity and relevant views are of value at the high level.
Low	The visual receptor group has a medium level of susceptibility to changes in views and visual amenity and relevant views are of value at the low level. OR The visual receptor group has a low level of susceptibility to changes in views and visual amenity and relevant views are of value at the medium level. OR The visual receptor group has a low level of susceptibility to changes in views and visual amenity and relevant views are of value at the low level.

Figure 13A-4: Levels of Sensitivity Defined by Value and Susceptibility of Visual Receptor Groups



Magnitude of Visual Change

The magnitude of visual change is established by assessing the size or scale of change, the geographical extent of the area influenced and the duration and potential reversibility of the change.

Size and Scale of Change

The criteria used to assess the size/scale of visual change are as follows:

- the scale of the change in the view with respect to the loss or addition of features in the view, changes in its composition, including the proportion of the view occupied by the proposed development and distance of view;
- the degree of contrast or integration of any new features or changes in the landscape with the existing or remaining landscape elements and characteristics in terms of factors such as form, scale and mass, line, height, colour and texture; and
- the nature of the view of the proposed development, for example whether views will be full, partial or glimpses or sequential views while passing through the landscape.

The above criteria are summarised in the **Table 13A-11** below:

Table 13A-11: Magnitude of Visual Change: Size/Scale of Change

Sensitivity	Criteria
Large visual change	The proposed development will cause a complete or large change in the view, resulting from the loss of important features in or the addition of important new ones, to the extent that this will substantially alter the composition of the view and the visual amenity it offers.
Medium visual change	The proposed development will cause a clearly noticeable change in the view, resulting from the loss of features or the addition of new ones, to the extent that this will alter to a moderate degree the composition of the view and the visual amenity it offers. Views may be partial/intermittent.
Small visual change	The proposed development will cause a perceptible change in the view, resulting from the loss of features or the addition of new ones, to the extent that this will partially alter the composition of the view and the visual amenity it offers. Views may be partial only.
Negligible visual change	The proposed development will cause a barely perceptible change in the view, resulting from the loss of features or the addition of new ones, to the extent that this will barely alter the composition of the view and the visual amenity it offers. Views may be glimpsed only.
No change	The proposed development will cause no change to the view.

Geographical Extent of Change

The geographical extent of the visual change identified at representative viewpoints is assessed by reference to a combination of the Zone of Theoretical Visibility (ZTV), where this has been prepared, and field work, and consideration of the criteria in **Table 13A-12** below. Representative viewpoints are used as 'sample' points to assess the typical change experienced by different groups of visual receptors at different distances and directions from the proposed development. The geographical extent of the visual change is judged for each group of receptors: for example, people using a particular route or public amenity, drawing on the viewpoint assessments, plus information about the distribution of that particular group of people in the Study Area.

LI TGN 2024/01 states at section 6(8) that geographic extent should primarily refer to the extent of the viewing area that is affected (for example the length of a footpath or the proportion of a community).

Thus, low levels of change identified at representative viewpoints may be extensive or limited in terms of the geographical area they are apparent from: for example, a view of the proposed development from elevated Access Land may be widely visible from much or all of the accessible area, or may be confined to a small proportion of the area. Similarly, a view from a public footpath may be visible from a single isolated viewpoint, or over a prolonged stretch of the route. Community views may be experienced from a small number of dwellings, or affect numerous residential properties.

Table 13A-12: Magnitude of Visual Change: Geographical Extent of Change

Category	Description
Large extent of visual change	The proposed development is seen by the group of receptors in many locations across the Study Area or from the majority of a linear route and/or by large numbers of viewers; or the effect on the specific view(s) is extensive.
Medium extent of visual change	The proposed development is seen by the group of receptors from a medium number of locations across the Study Area or from a medium part of a linear route and/or by a medium number of viewers; or the effect on the specific view is moderately extensive.
Small extent of visual change	The proposed development is seen by the group of receptors at a small number of locations across the Study Area or from only limited sections of a linear route and/or by a small number of viewers; or the effect on a specific view is small.
Negligible extent of visual change	The proposed development is either not visible in the Study Area or is seen by the receptor group at only one or two locations or from a very limited section of a linear route and/or by a very small number of viewers; or the effect on the specific view is barely discernible.

Duration and Reversibility

The duration of the visual change at viewpoints is categorised in **Table 13A-13** below, which considers whether views will be permanent and irreversible or temporary and reversible. The levels of duration are based on the EPA Guidelines on the information to be contained in EIA Reports (2022).

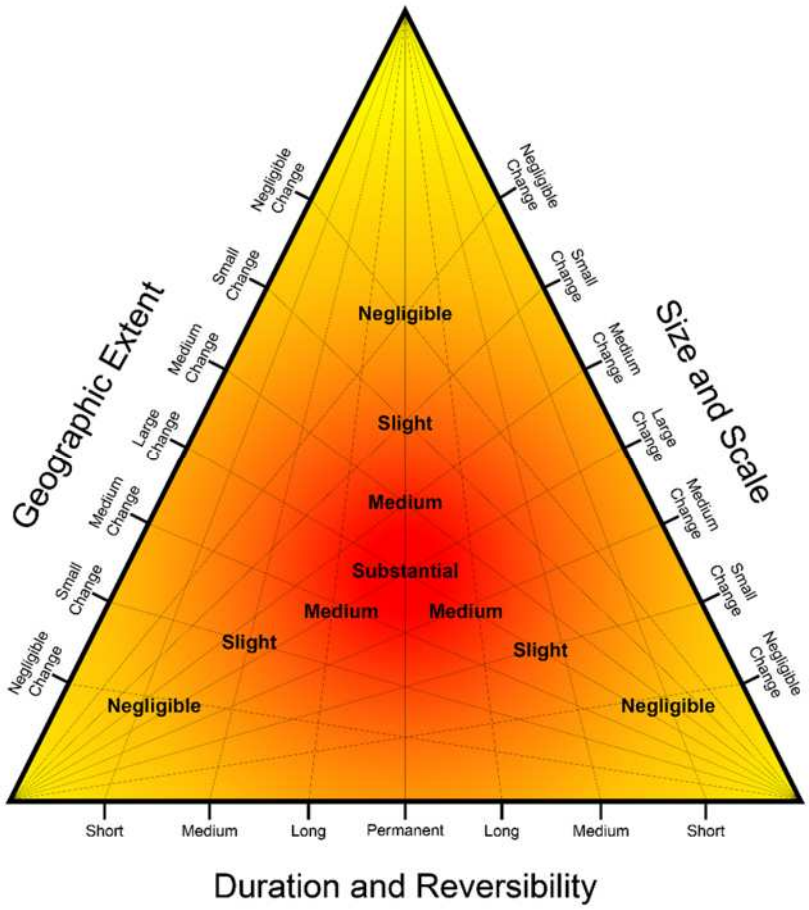
Table 13A-13: Magnitude of Visual Change: Duration and Reversibility

Category	Description
Permanent/ Irreversible	Effects that will last for over 60 years and is deemed irreversible.
Long-term reversible	Effects that will last between 15 and 60 years and are theoretically reversible.
Medium-term reversible	Effects that will last between 7 and 15 years and are wholly or partially reversible.
Temporary / Short-term reversible	Effects that will last from 0 to 7 years and is reversible - likely to include construction effects.

Deciding on Overall Magnitude of Visual Change

The relationships between the three factors that contribute to assessment of the magnitude of visual effects are illustrated graphically, as a guide, in **Figure 13A-5** below. Various combinations are possible and the overall magnitude of each effect is made using professional judgement rather than by formulaic application of the relationships in the diagram.

Figure 13A-5: Determining the Magnitude of Visual Change

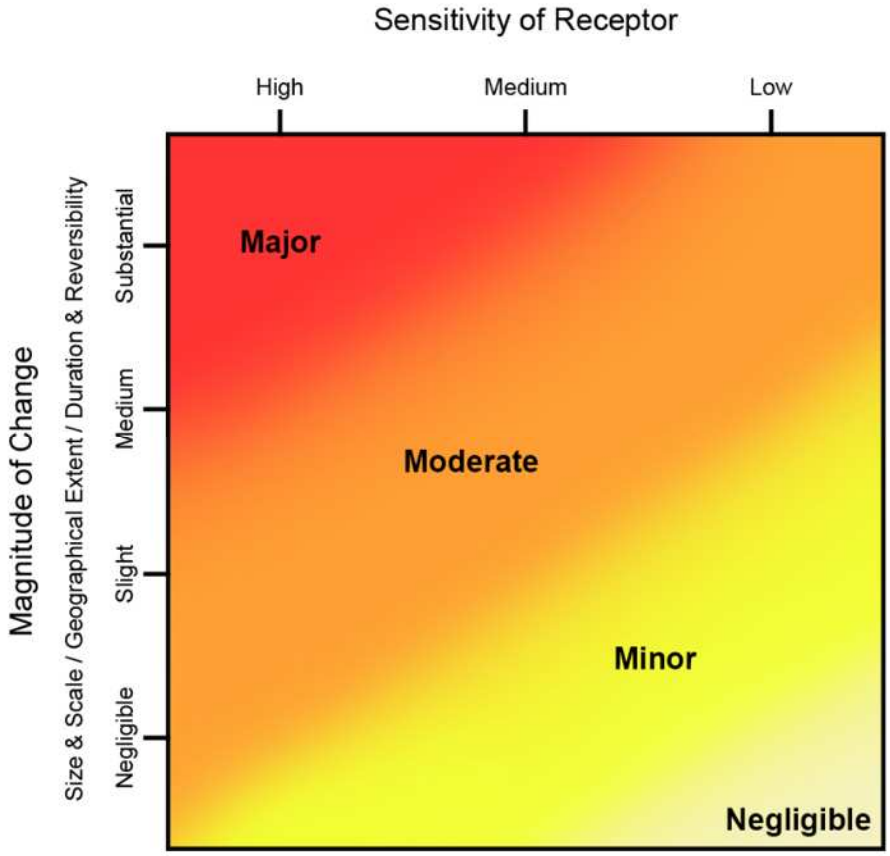


Assessment of Visual Effects and Significance

The assessment of visual effects is defined in terms of the relationship between the sensitivity of the visual receptors (value and susceptibility) and the magnitude of the change. The diagram below (**Figure 13A-6**) summarises the nature of the relationship but it is not formulaic and only indicates broad levels of effect. Judgements are made about each visual effect using this diagram as a guide.

Major and Major/Moderate effects are regarded as important planning considerations in landscape and visual appraisals (or significant effects in landscape and visual impact assessments). Moderate effects are not generally considered to be important planning considerations/significant effects, although the assessor may conclude that some moderate effects could constitute significant effects in certain circumstances: for example, there may be a concentration of several moderate effects in one location, or a moderate effect may occur for a particularly sensitive receptor or be of a particularly high magnitude.

Figure 13A-6: Assessment of Visual Effects and Overall Significance

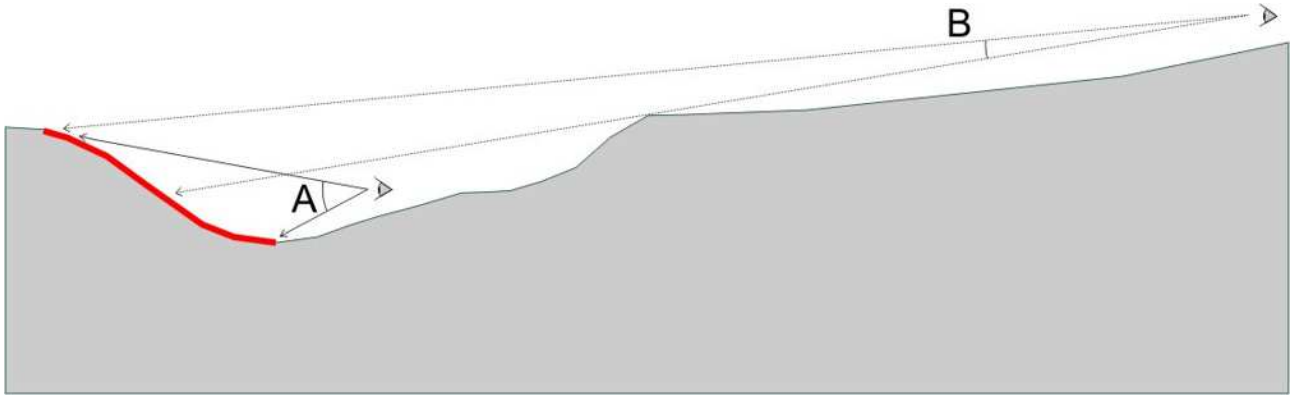


Appendix 13-B – Zone of Theoretical Visibility (ZTV) Methodology

A Zone of Theoretical Visibility (ZTV) Study was conducted for the existing agricultural field, within which the proposed extraction area will be located, to help identify areas sensitive to visual impacts. This study used the measurement of the vertical subtended angle for its methodology. This method is explained below and illustrated by Figure A, below.

When a Target Area (red) is observed from a Viewpoint (A or B) its apparent height can be measured in the form of degrees, to give a Subtended Vertical Angle.

Figure A:



The use of the Subtended Vertical Angle in formulating a ZTV has the benefit of automatically reducing values to reflect the distance from the Target Area, and partial screening by intervening landforms. Generally, the further the viewpoint is from the Target Area the smaller the Subtended Vertical Angle, reflecting the effect of distance on visual impacts.

Thus, in the example section above Viewpoint A experiences a higher subtended angle due to proximity to the red target area. Viewpoint B has a lower subtended angle due to greater distance from the target area and partial screening by intervening landform.

If the Subtended Vertical Angle is measured from a series of grid points for a particular Target Area, the resultant data can then be used to generate contours. Each contour level representing a certain vertical angle, and thus potential level of visibility.

The subtended vertical angle method of calculating ZTVs using LSS digital terrain modelling software has been proven by field investigation on numerous sites to be an accurate method of predicting areas of potential visibility for on-site investigation.

However, the computer generated ZTV study is undertaken using a mostly bare earth landform to give the worst case scenario. In reality any built structures (settlements, walls etc) or areas of vegetation (woodlands, scrub and hedgerows) will reduce the actual visibility of the target area. Some of the existing vegetation along the site boundaries was included in the calculation of the ZTV for the proposed development, reducing the projected theoretical visibility somewhat. However, vegetation in the wider landscape was not included and therefore, it is necessary to carry out fieldwork to validate the results of the ZTV.

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Introduction

14.1 PMCE Ltd were commissioned by SLR Consulting Ireland to undertake an assessment of the traffic impacts associated with the proposed Sand and Gravel Extraction in Knockroe, Bandon, Co. Cork

14.2 In preparing this report reference has been made to the following documents:

- Transport Infrastructure Ireland (TII) Publications document PE PDV-02045, "Traffic and Transport Assessment Guidelines" (May 2014) published by TII;
- TII Publications document PE-PAG-02017, "Project Appraisal Guidelines for National Roads Unit 5.3 – Travel Demand Projections" (October 2021) published by TII;
- TII Publications document PE-PAG-02039, "Project Appraisal Guidelines for National Roads Unit 16.1 - Expansion Factors for Short Period Traffic Counts" (October 2016) published by TII;
- Traffic Count Survey Data, collected by Traffinomics;
- TII Publications document DN-GEO-03031, "Rural Road Link Design" (June 2017 & May 2023) published by TII;
- TII Publications document DN-GEO-03060, "Geometric Design of Junctions (priority junctions, direct accesses, roundabouts, grade-separated and compact grade-separated junctions)" (June 2017 & May 2023) published by TII;
- Cork County Council Development Plan 2022-2028

Scope of Work

14.3 The objective of this report is to examine the traffic implications associated with the proposed extraction of sand and gravel in Knockroe, Co. Cork, in terms of its integration with the existing traffic in the area. The report determines and quantifies the extent of additional trips generated by the development and the impact on the operational performance of these trips on the local road network

Baseline Study Methodology

The methodology adopted for this appraisal and report involved, in brief:

14.4 **Site Visit**: A site visit was undertaken on 17th March 2025, the weather was dry, and the ground surface was dry.

14.5 **Trip Generation and Trip Assignment:** This is used to derive trip rates and forecast trips for the proposed development, and to assign generated traffic flows onto the existing road network.

14.6 **Link Capacity Assessment**: To estimate an AADT value for each of the main roads on the surrounding road network and assess their capacity with and without the proposed development.

14.7 **Junction Capacity Assessment**: The traffic count data was used to develop models for one junction on the existing road network and its capacity was assessed using the 'Junctions 9' computer programme.

14.8 **Future Year Assessments**: The estimated future year volumes on the study area network, as a result of the increase in background traffic and any development related traffic, was used to assess the future operational performance of all junctions and surrounding road network for 2026 (assumed year of opening) and at two future assessment years, the opening year +5 (2031) and the opening year +15 (2041).

Site Location

14.9 **Figure 14-1** shows the proposed Sand and Gravel Pit location at Knockroe, Bandon, Co. Cork and the surrounding road network.

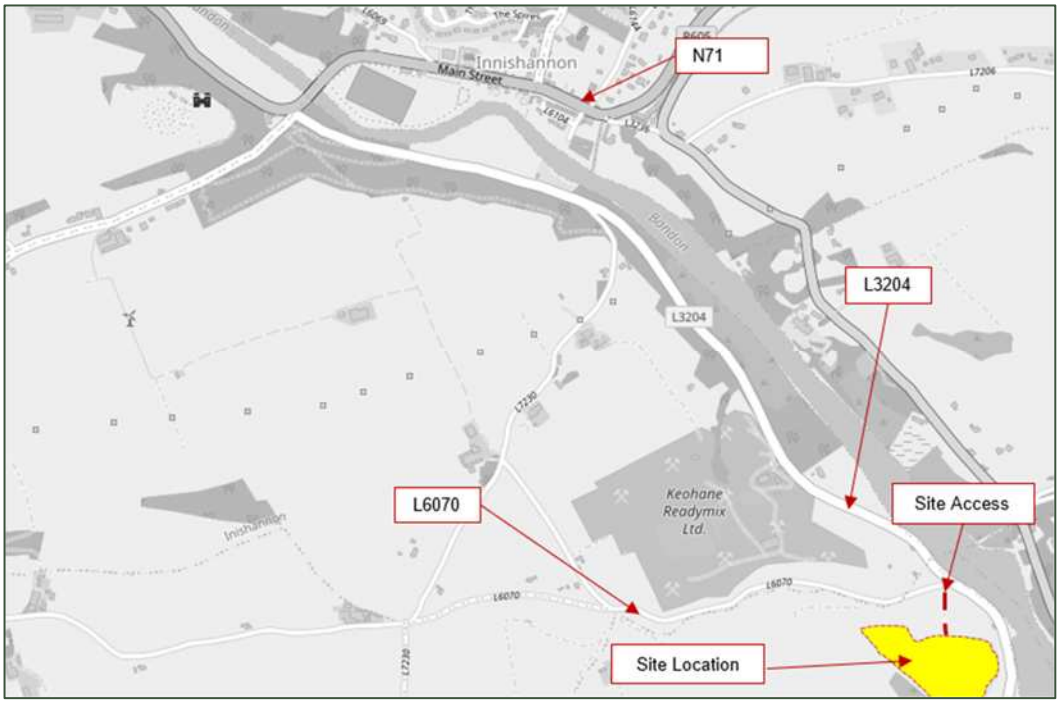


Figure 14-1: Location Plan

Site Description

14.10 The planning application concerns a new sand and gravel extraction area, located in Knockroe, Bandon, Co. Cork, approximately 1.5 km south of Innishannon and 6 km east of Bandon town.

14.11 The proposed development involves the extraction of sand and gravel, which will be processed at the existing Keohane Readymix Ltd Dromkeen Pit located to the north of the site.

14.12 The surrounding land can be characterised as rural, with predominant land uses focused on agricultural activities in the vicinity of the development.

14.13 The proposed site includes an existing access that is located at the junction between the L3204 and the L6070.

Existing Road Network

L3204 Local Road

14.14 The L3204 is a local road located between Innishannon and Ballinspittle, County Cork



14.15 The L3204 is 15 km long, running in a north-south direction. The L3204 has a width of approximately 6 metres, with no footpaths or verges and a posted speed limit of 60kph.

L6070 Local Road

14.16 The L6070 is a narrow local road adjacent to the site access. The L6070 is approximately 4km long, running in an east-west direction.



14.17 The L6070 has an approximate width 3-4m, with no footpaths or verges.

N71 National Road

14.18 The N71 National Road, between Killarney and Cork City, is the closest main road to the site (approximately 2km to the north of the site).



14.19 Development traffic would access the N71 via the L3204, which extends south of its priority controlled junction with the N71.

Traffic Volumes

14.20 Classified 12-hour Junction Turning Counts (JTCs) were carried out on Tuesday 4th March 2025, by Traffinomics Ltd., at a total of 2 no. junctions.

14.21 The counts were carried out between 7:00am and 7:00pm, with this time period encompassing the peak hours on the adjacent national and local roads network. Surveyed vehicles were broken down into five categories as follows:

Cars;

LGV's (Light Goods Vehicles);

OGV1 (Two and three axle goods vehicles);

OGV2 (Four and five axle goods vehicles);

Buses.

14.22 The detailed results of the traffic survey are summarised in **Appendix 14-B**. The morning and evening peak hours have been established as:

- **3-Arm Junction of the N71 and L3204 (referred to as the 'N71 Junction' in this report) –** 07:00 to 08:00 (AM Peak) and 16:45 to 17:45 (PM Peak)
- **3-Arm T-Junction of the L3204 and L6070-Site Access (referred to as the 'Site Access' in this report)**– 08:15 to 09:15 (AM Peak) and 17:15 to 18:15 (PM Peak).

14.23 The count data for each site has been converted to Annual Average Daily Traffic (AADT) values using the methodology described in "Expansion Factors for Short Period Traffic

Counts" (Unit 16.1 NRA Project Appraisal Guidelines, October 2016). Appendices A to C of the above document were used in the expansion of traffic counts to AADT's.

14.24 A combined factor of 0.827 was arrived at by combining the individual hourly factors for the count duration. This factor was then used to determine the 24-hour traffic flow. This was then converted to a Weekly Average Daily Traffic (WADT) using an index of 0.96 for the Tuesday traffic count. Finally, this was converted to AADT using an index of 1.12 for the month of March. These factors were used to calculate the AADT for each of the traffic survey sites.

14.25 The resulting AADT figures at each junction are provided in **Appendix 14-C**.

Proposed Development

Trip Generation & Distribution

14.26 The site is estimated to extract up to a maximum of 100,000 tonnes of material from the site annually. The extracted sand & gravel will be transported a short distance by road to the adjacent Dromkeen Pit and Concrete Plant (Dromkeen site) operated by Keohane Readymix Ltd., for processing.

14.27 The duration of the development will depend on market demand, and planning permission is being sought for 15 years extraction and 2 years final restoration, i.e. a planning permission duration of 17 years. Following extraction, the lands will be restored to agricultural use.

14.28 A wheelwash will be provided on site, and the section of internal road from the wheelwash to the site entrance will be surfaced to mitigate the transport of any mud / dirt onto the public road.

14.29 In determining the daily traffic volumes associated with the development an average of 14 loads per day from the site has been calculated based on the following assumptions:

The facility will operate for 50 weeks per year.

Material will be transported from the site in 30 tonne loads.

The facility will operate for 5 days per week (Monday to Friday) inclusive.

The facility opening times will be 9am to 5pm on weekdays.

Staff Trips

14.30 The site will employ 1 staff member, and it is not anticipated that this number will increase. Staff movements will generate 1 trip inbound in the morning and 1 trip outbound in the evening peak. Staff car movements have been distributed in accordance with the existing light vehicle distribution at the site access.

Miscellaneous Trips

14.31 A total of 3 trips have been assumed to occur daily to cater for possible miscellaneous trips associated with the site. These miscellaneous trips allow for operations meetings, site inspections, maintenance operations for facility and machinery, etc. It is not considered that these trips would coincide with either peak hour.

Trip Distribution & Composition

14.32 **Appendix 14-A** contains extracts from the TRICS database giving the forecast arrivals / departures distribution at similar sites.

14.33 The distribution of the development traffic on the adjacent road network is based on an assessment of the existing traffic flows at the site access derived from the traffic count data.

14.34 **Table 14-1** details the trip distribution that has been applied to the development traffic as part of the junction capacity analysis.

Table 14-1: Summary of Predicted Daily Trips in Opening Years and Beyond

Development	Type of Traffic	Daily Trips	
		Arrivals	Departures
Sand and Gravel Pit	Transportation of Material (HGV's) – maximum output	14	14
	Staff (LVs)	1	1
	Miscellaneous (LVs)	3	3
Total		18	18

Trip Assignment

14.35 The assignment of the forecast development traffic onto the adjacent road network is based on the existing traffic flow distribution at each junction as derived from the traffic counts and projected routes. This is illustrated in Figure 14-2 and Figure 14-3.

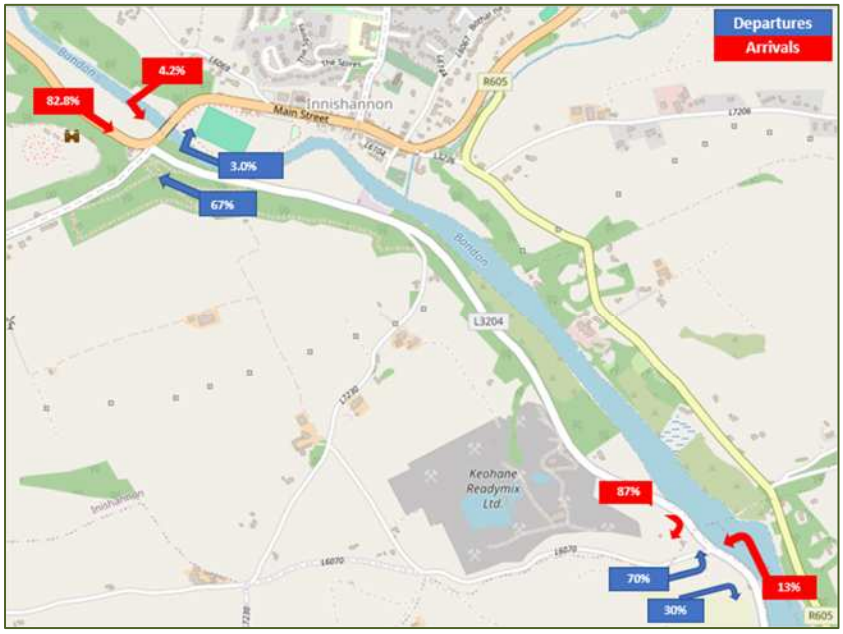


Figure 14-2: Assignment of Development Traffic throughout the Adjacent Road Network (LVs)



Figure 14-3: Assignment of Development Traffic throughout the Adjacent Road Network (HV's)

Scope of Assessment

14.36 Section 2.1 of the "Traffic and Transport Assessment Guidelines" published by Transport Infrastructure Ireland recommends that in an urban or congested setting that a traffic assessment should cover all roads and junctions where the developing traffic exceeds 5% of the existing or background traffic, or 10% of background traffic when located in rural areas.

14.37 **Figure 14-4** outlines the distributed development traffic as a percentage of the background traffic on the adjacent road network.

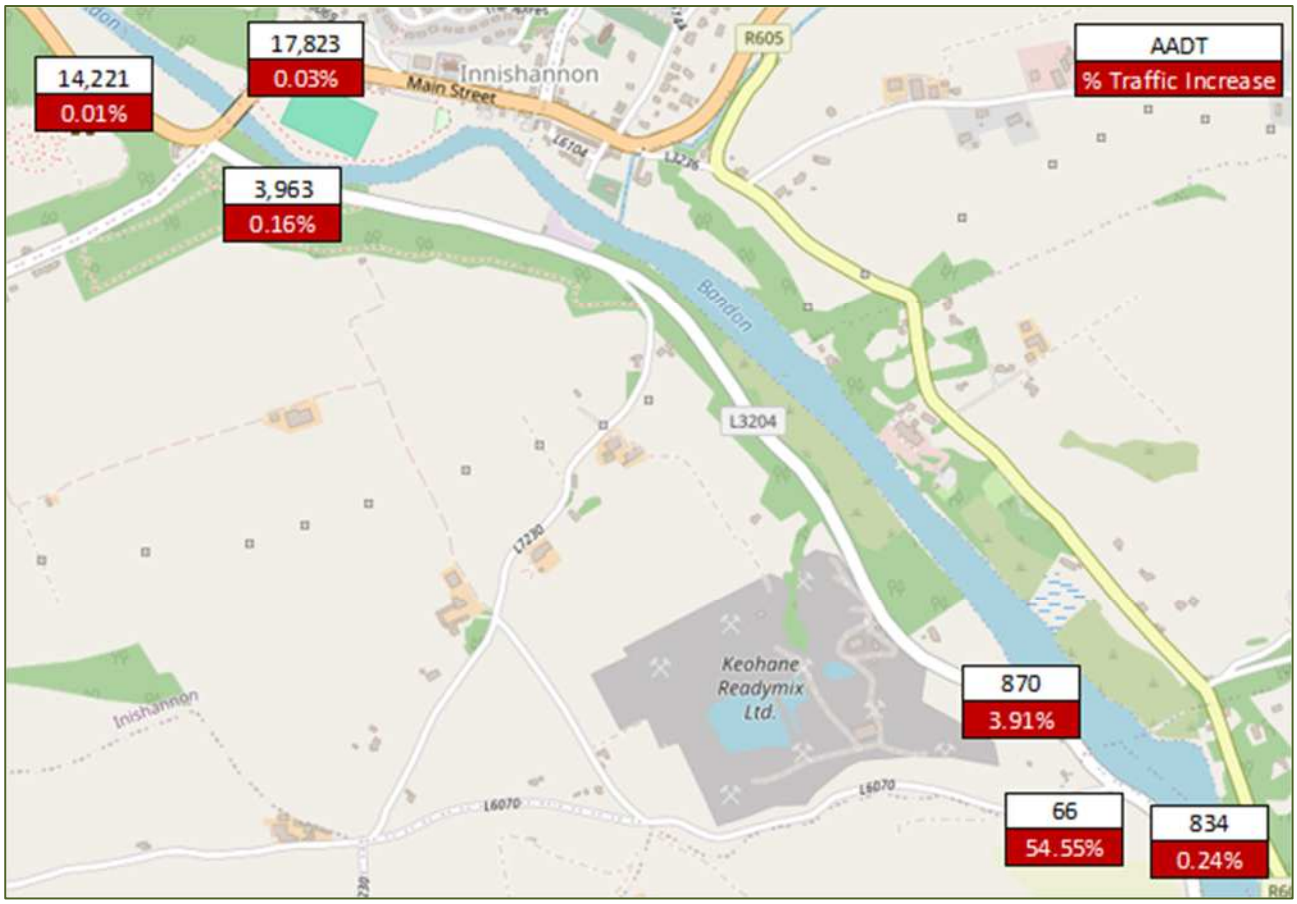


Figure 14-4: AADT and Development Traffic as a Percentage of Existing Traffic

14.38 Therefore, this Traffic and Transport Assessment shall undertake a capacity assessment only at the site access junction with the L3204.

Road Impacts

Assessment Years

14.39 The “Traffic and Transport Assessment Guidelines” published by Transport Infrastructure Ireland recommend the assessment of traffic in the Opening Year, for the Opening Year +5 years and the Opening Year +15 years.

14.40 The assessment years for the Traffic and Transport assessment are therefore 2026 for the Opening Year, 2031 and 2041 for the Future Assessment Years.

Traffic Growth

14.41 The "Project Appraisal Guidelines - Unit 5.3 – Travel Demand Projections (PE-PAG-02017)" published by TII in October 2021 has been used to determine future year traffic flows on the network from the 2025 traffic count data.

14.42 **Table 14-2** contains a summary of the traffic growth factors published in the "Project Appraisal Guidelines". For this assessment, a central growth scenario has been adopted (a ‘central’ growth scenario was assumed given the site location and scale).

Table 14-2: Future Year Traffic Growth Figures (County Cork – Excluding Metropolitan Area)

Year	Low Growth		Central Growth		High Growth	
	LV	**HV**	**LV**	**HV**	**LV**	**HV**
2016-2030	1.0173	1.0361	**1.0189**	**1.0377**	1.0223	1.0411
2030-2040	1.0067	1.0141	**1.0087**	**1.0160**	1.0124	1.0197

Link Capacity Assessment

L3204 Regional Road

14.43 The TII Publications document reference DN-GEO-03031 provides guidance on recommended rural road layouts in its Table 6/1. It advises that the capacity of a Type 3 Single Carriageway Road with 6.0m cross-section is 5,000 AADT for a Level of Service D. The L3204 adjacent to the quarry is considered to be most similar to the Type 3 Single Carriageway cross-section in this document with a capacity of 5,000 AADT for Level of Service D.

14.44 The combined background and Site Traffic volumes, outlined in **Table 14-3** in each of the assessment years is less than the LOS D capacity of 5,000 AADT for a Type 3 Single Carriageway. It is considered that the L3204 will operate within capacity for each of the assessment years. **Table 14-3** indicates that the traffic associated with the proposed development represents between 3.1% and 3.9% of the total traffic on the L3204 during the assessment years 2026 to 2041.

Table 14-3: Combined AADT for each Assessment Year (L3204)

	Assessment Year			
	Base Year	**2026**	**2031**	**2041**
Background Traffic (worst-case scenario)	870	887	960	1,051
Additional Development Traffic	-	36	36	36
Combined Traffic (Background + Additional Dev. Traffic)	870	923	996	1,087
Additional Traffic as % of Combined Traffic	-	3.9%	3.6%	3.1%

Junction Capacity Analysis

14.45 The capacity of the surveyed junctions was assessed using the Transport Research Laboratory's (TRL) **Junctions 9** computer programme.

14.46 Junction performance is measured as a ratio between the flow and capacity (RFC). The capacity analysis has been carried out for a period of 12-hours for each of the assessment years (2026, 2031, and 2041).

14.47 A rural junction with an RFC below 0.85 is considered to be operating within capacity, and an RFC of 0.85 indicates a junction operating at capacity.

14.48 The capacity of a stream or arm of a junction refers to the maximum flow of vehicles entering the junction, within a given time period and is based on the formula given in LR942 (Kimber, 1980). The formulae describing the theoretical capacity of a junction were derived empirically and have a ±15% confidence interval. Consequently, the standard approach to junction capacity analysis, for priority-controlled junctions, uses an RFC of 0.85 to describe

the theoretical maximum capacity, however in reality there may be additional capacity above this level. Where the flow on an arm, in a given time period, exceeds the theoretical capacity this will result in increased time to traverse the junction, leading to delays and queues forming. In normal operation queues forming at a junction will dissipate over time as the volume of vehicles arriving at the junction fall below the available capacity.

14.49 The capacity of a junction can also be measured by its Level of Service (LOS). The LOS is denoted by a letter ranging from A – F. The following list describes the traffic conditions on a road network for each Level of Service:

- **LOS A:** Free-flow traffic with individual users virtually unaffected by the presence of others in the traffic stream (free-flow);
- **LOS B:** Stable traffic flow with a high degree of freedom to select speed and operating conditions but with some influence from other users (reasonably free flow);
- **LOS C:** Restricted flow that remains stable but with significant interactions with others in the traffic stream. The general level of comfort and convenience declines noticeably at this level (stable flow);
- **LOS D:** High-density flow in which speed and freedom to manoeuvre are severely restricted and comfort and convenience have declined even though flow remains stable (approaching unstable flow).
- **LOS E:** Unstable flow at, or near, capacity levels with poor levels of comfort and convenience (unstable flow); and
- **LOS F:** Forced traffic flow in which the amount of traffic approaching a point exceeds the amount that can be served. This is characterised by stop-and-go waves, poor travel times and low comfort and convenience (forced or breakdown flow).

14.50 It is therefore considered that a junction operating at a LOS E is close to, or at, capacity and a junction operating at LOS F is considered to be above capacity.

14.51 The detailed junction capacity analysis outputs for the analysed junction, for each of the assessment years, are contained within **Appendix 14-D** to this report.

Site 1: L3204/L6070 Site Access

14.52 A summary of the junction capacity analysis results for the junction of the L3204 and the L6070 Local Road is shown in **Table 14-4**. The results indicate that the junction will continue to operate within capacity for each of the assessment years 2026, 2031, and 2041.

Table 14-4: Summary of Traffic Analysis at L3204/L6070 Site Access

	12 Hours (07:00 – 19:00)			
	Queue (Veh)	**Delay (s)**	**RFC**	**LOS**
Stream	2026			
L6070-L3204 N	0.0	7.68	0.02	A
L6070-LL3204 S	0.0	15.81	0.02	C
L3204 N-L3204 S/L6070	0.0	11.16	0.03	B
Stream	2031			
L6070-L3204 N	0.0	7.79	0.02	A
L6070-LL3204 S	0.0	15.87	0.02	C
L3204 N-L3204 S/L6070	0.0	11.07	0.03	B
Stream	2041			
L6070-L3204 N	0.0	7.93	0.03	A
L6070-LL3204 S	0.0	15.95	0.02	C
L3204 N-L3204 S/L6070	0.0	11.07	0.04	B
Stream	2026+Adj+Dev			
L6070-L3204 N	0.0	7.02	0.02	A
L6070-LL3204 S	0.0	16.04	0.02	C
L3204 N-L3204 S/L6070	0.0	11.13	0.03	B
Stream	2031+Adj+Dev			
L6070-L3204 N	0.0	7.23	0.02	A
L6070-LL3204 S	0.0	16.03	0.02	C
L3204 N-L3204 S/L6070	0.0	11.05	0.03	B
Stream	2041+Adj+Dev			
L6070-L3204 N	0.0	7.46	0.03	A
L6070-LL3204 S	0.0	16.06	0.02	C
L3204 N-L3204 S/L6070	0.0	10.96	0.04	B

Road Safety

Site Access

14.53 The development will be accessed by an existing entrance at the junction between the L3204 and the L6070 T-junction.

14.54 The L6070 Local Road is a narrow (3-4m) road that carries a low volume of local traffic (less than 8 vehicles per hour). While the existing entrance is located at the junction between the L3204/L6070, the low volume of traffic on the L6070 junction, would mitigate any safety concerns in relation to conflicting movements. The narrow road cross-



section would also prevent any high vehicle speeds on this road, further supporting safe movement of vehicles at the junction.

Sightlines

14.55 The posted speed limit on the L3204 is 60kph, which has sightline requirements of 90m in both directions. Following analysis, visibility to the north (left out of the L3204/L6070 Junction) exceeds this requirement. However, visibility to the south (looking right out of the L3204/L6070 junction) is restricted by the L3204's horizontal alignment, and vegetation in the verge, limiting visibility to 60m.

14.56 Improvements can be achieved at this existing junction through removal of the hedgerow, which is within the applicant's land. Hedges and trees near the existing site entrance will be trimmed/removed, and maintained regularly, thereby offering improvements over the existing visibility at the existing junction.

Parking

14.57 The parking provision is sufficient for the number of staff working on site and also for any miscellaneous trips that may occur.

Conclusions

14.58 The Traffic and Transport Assessment makes the following conclusions:

- Link capacity analysis was carried out on L3204, and it was determined that all roads will continue to operate within capacity for each of the assessment years: 2026, 2031, and 2041.
- The results of the junction capacity analysis indicates that the junction assessed will operate within capacity for each of the assessment years: 2026, 2031, and 2041.
- Visibility to the north (left out of the L3204/L6070 Junction) exceeds the 90m sightline requirement. However, visibility to the south (looking right out of the L3204/L6070 junction) is restricted by the L3204's horizontal alignment, and vegetation in the verge, limiting visibility to 60m.

  Improvements can be achieved at this existing junction through removal of the hedgerow, which is within the applicant's land. Hedges and trees near the existing site entrance will be trimmed/removed, and maintained regularly, thereby offering improvements over the existing visibility at the existing junction.
- There is sufficient parking provision within the site to accommodate parking for all staff, and site operation.

Proposed Mitigation Measures and / or Factors

Mitigation and Management

14.59 Following the link, and junction, capacity assessments, the trips associated with the operation of the proposed development, were found to have an imperceptible impact on the link capacity of the L3204 Local Road, and the junction capacity of site access junction.

14.60 Visibility to the north (left out of the L3204/L6070 Junction) exceeds the 90m sightline requirement. However, visibility to the south (looking right out of the L3204/L6070 junction)

is restricted by the L3204's horizontal alignment, and vegetation in the verge, limiting visibility to 60m.// Improvements can be achieved at this existing junction through removal of the hedgerow, which is within the applicant's land. Hedges and trees near the existing site entrance will be trimmed/removed, and maintained regularly, thereby offering improvements over the existing visibility at the existing junction.

14.61 A wheelwash will be provided on site, and the section of internal road from the wheelwash to the site entrance will be surfaced to mitigate the transport of any mud / dirt onto the public road.

14.62 Signage informing road users of site entrance ahead will be provided 100 metres north and south of the L3204/L6070 Junction.

14.63 The impact of the proposed development, in relation to road safety and the existing road infrastructure, was also determined to be imperceptible.

Cumulative and In-Combination Effects

14.64 A search for planned future developments which may have an impact on future traffic flows in the vicinity of the development was undertaken for approved developments, not yet built or operational, of relevance to the consideration of cumulative impacts in respect of traffic and transportation and none were identified.

Interactions with Other Environmental Attributes

14.65 The vehicular traffic flows that shall be generated by the development may result in corresponding changes to noise levels and air quality in the vicinity of the surrounding road network. The nature, extent and consequences of these changes are examined in Chapters 8 and 10 of this EIAR respectively.

Indirect effects

14.66 The indirect effects of the development, in relation to traffic, on the surrounding road environment are deemed to be imperceptible.

Residual effects

14.67 The residual effects of the development, in relation to traffic, on the surrounding road environment are deemed to be imperceptible.

Monitoring

14.68 Monitoring of the traffic impacts to the surrounding road and junction network's performance is not considered to be required, as the Opening Year +5 and Opening Year +15 analysis has determined that the local road network will continue to operate within capacity, with an imperceptible impact from the proposed development.

Difficulties Encountered

14.69 There were no particular difficulties encountered during the compilation of this chapter.

References

Environmental Protection Agency (2022) 'Guidelines on the Information to be contained in Environmental Impact Assessment Reports'.

Appendices

Appendix 14-A: TRICS Outputs

Appendix 14-B: Traffic Survey Data

Appendix 14-C: Estimated AADT's

Appendix 14-D: Junctions 9 Outputs

Appendix 14-A – TRICS Output

PMCE Ltd Lower Commons Road Dublin 22 Licence No: 261601

Filtering Summary

Land Use	02/H	EMPLOYMENT/QUARRY
Selected Trip Rate Calculation Parameter Range	10.00-40.00 hect AREA	
Actual Trip Rate Calculation Parameter Range	10.00-40.00 hect AREA	
Date Range	Minimum: 01/01/86	Maximum: 09/11/10
Parking Spaces Range	All Surveys Included	
Days of the week selected	Tuesday	2
	Wednesday	2
	Friday	1
Main Location Types selected	Edge of Town	1
	Free Standing (PPS6 Out of Town)	4
Inclusion of Servicing Vehicles Counts	Servicing vehicles Included	X - Selected
	Servicing vehicles Excluded	6 - Selected
Population within 500m	All Surveys Included	
Population <1 Mile ranges selected	1,000 or Less	1
	1,001 to 5,000	2
	5,001 to 10,000	2
Population <5 Mile ranges selected	25,001 to 50,000	1
	50,001 to 75,000	2
	75,001 to 100,000	1
	125,001 to 250,000	1
Car Ownership <5 Mile ranges selected	0.6 to 1.0	4
	1.1 to 1.5	1
PTAL Rating	No PTAL Present	5
Filter by Site Operations Breakdown	All Surveys Included	

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 02 - EMPLOYMENT
Category : H - QUARRY
TOTAL VEHICLES

Selected regions and areas:

03	SOUTH WEST		
	DC	DORSET	1 days
05	EAST MIDLANDS		
	NN	NORTH NORTHAMPTONSHIRE	1 days
08	NORTH WEST		
	GM	GREATER MANCHESTER	1 days
09	NORTH		
	DH	DURHAM	1 days
	HP	HARTLEPOOL	1 days

This section displays the number of survey days per TRICS® sub-region in the selected set

Primary Filtering selection:

This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculation.

Parameter:	Site area
Actual Range:	10.00 to 40.00 (units: hect)
Range Selected by User:	10.00 to 40.00 (units: hect)

Parking Spaces Range: All Surveys Included

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/86 to 09/11/10

This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.

Selected survey days:

Tuesday	2 days
Wednesday	2 days
Friday	1 days

This data displays the number of selected surveys by day of the week.

Selected survey types:

Manual count	5 days
Directional ATC Count	0 days

This data displays the number of manual classified surveys and the number of unclassified ATC surveys, the total adding up to the overall number of surveys in the selected set. Manual surveys are undertaken using staff, whilst ATC surveys are undertaking using machines.

Selected Locations:

Edge of Town	1
Free Standing (PPS6 Out of Town)	4

This data displays the number of surveys per main location category within the selected set. The main location categories consist of Free Standing, Edge of Town, Suburban Area, Neighbourhood Centre, Edge of Town Centre, Town Centre and Not Known.

Selected Location Sub Categories:

Out of Town	4
No Sub Category	1

This data displays the number of surveys per location sub-category within the selected set. The location sub-categories consist of Commercial Zone, Industrial Zone, Development Zone, Residential Zone, Retail Zone, Built-Up Zone, Village, Out of Town, High Street and No Sub Category.

Inclusion of Servicing Vehicles Counts:

Servicing vehicles Included	X days - Selected
Servicing vehicles Excluded	6 days - Selected

Secondary Filtering selection:

Use Class:

B2	5 days

This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order (England) 2020 has been used for this purpose, which can be found within the Library module of TRICS®.

Filter by Site Operations Breakdown:
All Surveys Included

Population within 500m Range:
All Surveys Included

Secondary Filtering selection (Cont.):

Population within 1 mile:

1,000 or Less	1 days
1,001 to 5,000	2 days
5,001 to 10,000	2 days

This data displays the number of selected surveys within stated 1-mile radii of population.

Population within 5 miles:

25,001 to 50,000	1 days
50,001 to 75,000	2 days
75,001 to 100,000	1 days
125,001 to 250,000	1 days

This data displays the number of selected surveys within stated 5-mile radii of population.

Car ownership within 5 miles:

0.6 to 1.0	4 days
1.1 to 1.5	1 days

This data displays the number of selected surveys within stated ranges of average cars owned per residential dwelling, within a radius of 5-miles of selected survey sites.

Travel Plan:

Not Known	2 days
No	3 days

This data displays the number of surveys within the selected set that were undertaken at sites with Travel Plans in place, and the number of surveys that were undertaken at sites without Travel Plans.

PTAL Rating:

No PTAL Present	5 days

This data displays the number of selected surveys with PTAL Ratings.

LIST OF SITES relevant to selection parameters

1 DC-02-H-02 STONE QUARRY DORSET
SOUTHWELL STREET
NEAR PORTLAND
SOUTHWELL
Free Standing (PPS6 Out of Town)
Out of Town
Total Site area: 40.00 hect
Survey date: WEDNESDAY *03/09/97* *Survey Type: MANUAL*

2 DH-02-H-01 LIMESTONE QUARRY DURHAM
STONYBECK LANE
NEAR DURHAM
BISHOP MIDDLEHAM
Free Standing (PPS6 Out of Town)
Out of Town
Total Site area: 10.00 hect
Survey date: TUESDAY *02/12/08* *Survey Type: MANUAL*

3 GM-02-H-01 STONE QUARRY GREATER MANCHESTER
GEORGE'S LANE
HORWICH

Edge of Town
No Sub Category
Total Site area: 17.00 hect
Survey date: FRIDAY *09/08/91* *Survey Type: MANUAL*

4 HP-02-H-01 QUARRY HARTLEPOOL
HART VILLAGE
HARTLEPOOL

Free Standing (PPS6 Out of Town)
Out of Town
Total Site area: 22.80 hect
Survey date: TUESDAY *09/11/10* *Survey Type: MANUAL*

5 NN-02-H-01 GRAVEL QUARRY NORTH NORTHAMPTONSHIRE
WOLLASTON ROAD
BOZEAT
WELLINGBOROUGH
Free Standing (PPS6 Out of Town)
Out of Town
Total Site area: 14.50 hect
Survey date: WEDNESDAY *26/11/08* *Survey Type: MANUAL*

This section provides a list of all survey sites and days in the selected set. For each individual survey site, it displays a unique site reference code and site address, the selected trip rate calculation parameter and its value, the day of the week and date of each survey, and whether the survey was a manual classified count or an ATC count.

TRIP RATE for Land Use 02 - EMPLOYMENT/H - QUARRY
TOTAL VEHICLES
Calculation factor: 1 hect
BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. AREA	Trip Rate	No. Days	Ave. AREA	Trip Rate	No. Days	Ave. AREA	Trip Rate
00:00 - 00:30									
00:30 - 01:00									
01:00 - 01:30									
01:30 - 02:00									
02:00 - 02:30									
02:30 - 03:00									
03:00 - 03:30									
03:30 - 04:00									
04:00 - 04:30									
04:30 - 05:00									
05:00 - 05:30									
05:30 - 06:00									
06:00 - 06:30									
06:30 - 07:00									
07:00 - 07:30	5	20.86	0.393	5	20.86	0.153	5	20.86	0.546
07:30 - 08:00	5	20.86	0.249	5	20.86	0.211	5	20.86	0.460
08:00 - 08:30	5	20.86	0.230	5	20.86	0.163	5	20.86	0.393
08:30 - 09:00	5	20.86	0.201	5	20.86	0.221	5	20.86	0.422
09:00 - 09:30	5	20.86	0.259	5	20.86	0.240	5	20.86	0.499
09:30 - 10:00	5	20.86	0.268	5	20.86	0.192	5	20.86	0.460
10:00 - 10:30	5	20.86	0.153	5	20.86	0.173	5	20.86	0.326
10:30 - 11:00	5	20.86	0.182	5	20.86	0.182	5	20.86	0.364
11:00 - 11:30	5	20.86	0.173	5	20.86	0.163	5	20.86	0.336
11:30 - 12:00	5	20.86	0.173	5	20.86	0.153	5	20.86	0.326
12:00 - 12:30	5	20.86	0.105	5	20.86	0.153	5	20.86	0.258
12:30 - 13:00	5	20.86	0.153	5	20.86	0.163	5	20.86	0.316
13:00 - 13:30	5	20.86	0.192	5	20.86	0.201	5	20.86	0.393
13:30 - 14:00	5	20.86	0.230	5	20.86	0.240	5	20.86	0.470
14:00 - 14:30	5	20.86	0.249	5	20.86	0.211	5	20.86	0.460
14:30 - 15:00	5	20.86	0.221	5	20.86	0.259	5	20.86	0.480
15:00 - 15:30	5	20.86	0.192	5	20.86	0.182	5	20.86	0.374
15:30 - 16:00	5	20.86	0.182	5	20.86	0.125	5	20.86	0.307
16:00 - 16:30	4	22.45	0.156	4	22.45	0.134	4	22.45	0.290
16:30 - 17:00	4	22.45	0.134	4	22.45	0.156	4	22.45	0.290
17:00 - 17:30	4	22.45	0.067	4	22.45	0.111	4	22.45	0.178
17:30 - 18:00	4	22.45	0.033	4	22.45	0.234	4	22.45	0.267
18:00 - 18:30	4	22.45	0.011	4	22.45	0.089	4	22.45	0.100
18:30 - 19:00	4	22.45	0.011	4	22.45	0.011	4	22.45	0.022
19:00 - 19:30									
19:30 - 20:00									
20:00 - 20:30									
20:30 - 21:00									
21:00 - 21:30									
21:30 - 22:00									
22:00 - 22:30									
22:30 - 23:00									
23:00 - 23:30									
23:30 - 24:00									
Total Rates:			4.217			4.120			8.337

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

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Parameter summary

Trip rate parameter range selected:	10.00 to 40.00 (units: hect)
Survey date date range:	01/01/86 - 09/11/10
Number of weekdays (Monday-Friday):	5
Number of Saturdays:	0
Number of Sundays:	0
Surveys automatically removed from selection:	1
Surveys manually removed from selection:	0

This section displays a quick summary of some of the data filtering selections made by the TRICS® user. The trip rate calculation parameter range of all selected surveys is displayed first, followed by the range of minimum and maximum survey dates selected by the user. Then, the total number of selected weekdays and weekend days in the selected set of surveys are show. Finally, the number of survey days that have been manually removed from the selected set outside of the standard filtering procedure are displayed.

Appendix 14-B: – Traffic Survey Data

TRAFFINOMICS LIMITED

INNISHANNON TRAFFIC COUNTS **MARCH 2025**

MANUAL CLASSIFIED JUNCTION TURNING COUNTS **TRA/25/030**

SITE: 01 DATE: 4th March 2025

LOCATION: L3204/L6070 Dromkeen DAY: Tuesday

	MOVEMENT 1							MOVEMENT 2							MOVEMENT 3						
TIME	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**
07:00	3	2	0	0	0	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15	4	4	0	0	0	8	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30	1	3	0	0	0	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45	3	1	0	0	0	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	11	10	0	0	0	21	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00	2	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15	3	0	0	0	0	3	3	0	0	0	0	0	0	0	1	0	0	0	0	1	1
08:30	6	2	0	0	0	8	8	0	0	0	0	0	0	0	1	0	0	1	0	2	3
08:45	3	4	1	0	0	8	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	14	6	1	0	0	21	22	0	0	0	0	0	0	0	2	0	0	1	0	3	4
09:00	4	1	0	0	0	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:15	2	1	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:30	3	1	0	0	0	4	4	0	0	0	0	0	0	0	0	1	0	0	0	1	1
09:45	5	0	0	1	0	6	7	0	1	0	0	0	1	1	1	0	0	0	0	1	1
H/TOT	14	3	0	1	0	18	19	0	1	0	0	0	1	1	1	1	0	0	0	2	2
10:00	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	1	1
10:15	3	3	0	2	0	8	11	0	1	0	0	0	1	1	0	0	0	0	0	0	0
10:30	3	1	0	0	0	4	4	0	0	0	0	0	0	0	1	0	0	0	0	1	1
10:45	3	0	0	0	0	3	3	0	2	1	0	0	3	4	0	0	0	0	0	0	0
H/TOT	10	4	0	2	0	16	19	0	3	1	0	0	4	5	2	0	0	0	0	2	2
11:00	2	0	1	0	0	3	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15	1	0	0	0	0	1	1	0	1	0	0	0	1	1	1	0	0	0	0	1	1
11:30	4	1	0	0	0	5	5	0	0	0	0	0	0	0	1	0	0	0	0	1	1
11:45	2	0	1	1	0	4	6	0	0	0	0	0	0	0	1	0	0	0	0	1	1
H/TOT	9	1	2	1	0	13	15	0	1	0	0	0	1	1	3	0	0	0	0	3	3
12:00	4	1	0	0	0	5	5	0	0	1	0	0	1	2	0	0	0	0	0	0	0
12:15	4	2	0	0	0	6	6	1	0	0	0	0	1	1	0	0	0	0	0	0	0
12:30	5	1	0	0	0	6	6	0	0	0	0	0	0	0	1	1	0	0	0	2	2
12:45	3	0	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	16	4	0	0	0	20	20	1	0	1	0	0	2	3	1	1	0	0	0	2	2

TRAFFINOMICS LIMITED

INNISHANNON TRAFFIC COUNTS **MARCH 2025**

MANUAL CLASSIFIED JUNCTION TURNING COUNTS **TRA/25/030**

SITE: 01 DATE: 4th March 2025

LOCATION: L3204/L6070 Dromkeen DAY: Tuesday

	MOVEMENT 1							MOVEMENT 2							MOVEMENT 3						
TIME	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**
13:00	0	0	0	0	0	0	0	0	1	1	0	0	2	3	0	0	0	0	0	0	0
13:15	4	2	0	0	0	6	6	0	0	0	0	0	0	0	1	0	0	0	0	1	1
13:30	3	1	2	0	0	6	7	0	1	0	0	0	1	1	0	0	0	0	0	0	0
13:45	7	2	0	0	0	9	9	1	1	0	0	0	2	2	1	0	0	0	0	1	1
H/TOT	14	5	2	0	0	21	22	1	3	1	0	0	5	6	2	0	0	0	0	2	2
14:00	7	0	1	1	0	9	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:15	7	1	0	1	0	9	10	0	0	0	0	0	0	0	1	0	0	0	0	1	1
14:30	8	1	0	0	0	9	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:45	10	1	1	1	0	13	15	1	0	0	0	0	1	1	0	0	0	0	0	0	0
H/TOT	32	3	2	3	0	40	45	1	0	0	0	0	1	1	1	0	0	0	0	1	1
15:00	6	2	0	1	0	9	10	0	1	0	0	0	1	1	0	0	0	0	0	0	0
15:15	3	1	0	0	0	4	4	0	0	0	0	0	0	0	0	1	0	0	0	1	1
15:30	4	0	0	0	0	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:45	11	2	0	2	0	15	18	1	0	0	0	0	1	1	0	0	0	0	0	0	0
H/TOT	24	5	0	3	0	32	36	1	1	0	0	0	2	2	0	1	0	0	0	1	1
16:00	7	0	0	1	0	8	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15	10	2	0	0	0	12	12	0	0	1	0	0	1	2	0	0	0	0	0	0	0
16:30	8	1	0	0	0	9	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45	8	1	1	0	0	10	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	33	4	1	1	0	39	41	0	0	1	0	0	1	2	0	0	0	0	0	0	0
17:00	7	5	0	1	0	13	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15	9	0	0	0	0	9	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	8	6	1	2	0	17	20	1	0	0	0	0	1	1	0	0	0	0	0	0	0
17:45	5	0	0	0	0	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	29	11	1	3	0	44	48	1	0	0	0	0	1	1	0	0	0	0	0	0	0
18:00	8	1	0	0	0	9	9	0	1	0	0	0	1	1	0	0	0	0	0	0	0
18:15	7	3	1	0	0	11	12	1	0	0	0	0	1	1	1	1	0	0	0	2	2
18:30	5	1	1	0	0	7	8	0	0	0	0	0	0	0	1	0	0	0	0	1	1
18:45	5	0	0	0	0	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	25	5	2	0	0	32	33	1	1	0	0	0	2	2	2	1	0	0	0	3	3
P/TOT	231	61	11	14	0	317	341	6	10	4	0	0	20	22	14	4	0	1	0	19	20

TRAFFINOMICS LIMITED

INNISHANNON TRAFFIC COUNTS **MARCH 2025**

MANUAL CLASSIFIED JUNCTION TURNING COUNTS **TRA/25/030**

SITE: 01 DATE: 4th March 2025

LOCATION: L3204/L6070 Dromkeen DAY: Tuesday

	MOVEMENT 4							MOVEMENT 5							MOVEMENT 6						
TIME	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**
07:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	4	0	1	0	15	16
07:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	4	1	0	0	25	26
07:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	0	0	0	0	15	15
07:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	2	0	0	0	18	18
H/TOT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	61	10	1	1	0	73	75
08:00	1	0	0	0	0	1	1	0	0	0	0	0	0	0	8	1	0	1	0	10	11
08:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	1	0	11	12
08:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	1	0	0	0	6	6
08:45	0	0	0	0	0	0	0	1	0	0	0	0	1	1	8	0	0	0	0	8	8
H/TOT	1	0	0	0	0	1	1	1	0	0	0	0	1	1	31	2	0	2	0	35	38
09:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	1	0	0	0	13	13
09:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	1	1	0	0	8	9
09:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	2	2
09:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	4	4
H/TOT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23	3	1	0	0	27	28
10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2	2
10:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	4	4
10:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	3	3
10:45	1	0	0	0	0	1	1	0	0	0	0	0	0	0	2	0	0	0	0	2	2
H/TOT	1	0	0	0	0	1	1	0	0	0	0	0	0	0	11	0	0	0	0	11	11
11:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	1	0	0	0	5	5
11:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	2	3
11:30	0	0	0	0	0	0	0	1	0	0	0	0	1	1	6	0	0	0	0	6	6
11:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	2	0	0	0	6	6
H/TOT	0	0	0	0	0	0	0	1	0	0	0	0	1	1	15	3	1	0	0	19	20
12:00	0	0	1	0	0	1	2	0	0	0	0	0	0	0	2	1	2	0	0	5	6
12:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	0	0	0	4	4
12:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1
12:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	4	4
H/TOT	0	0	1	0	0	1	2	0	0	0	0	0	0	0	10	2	2	0	0	14	15

TRAFFINOMICS LIMITED

INNISHANNON TRAFFIC COUNTS **MARCH 2025**

MANUAL CLASSIFIED JUNCTION TURNING COUNTS **TRA/25/030**

SITE: 01 DATE: 4th March 2025

LOCATION: L3204/L6070 Dromkeen DAY: Tuesday

	MOVEMENT 4							MOVEMENT 5							MOVEMENT 6						
TIME	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**
13:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	1	0	0	4	5
13:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	2	2
13:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	4	4
13:45	0	0	1	0	0	1	2	0	0	0	0	0	0	0	4	1	1	0	0	6	7
H/TOT	0	0	1	0	0	1	2	0	0	0	0	0	0	0	11	3	2	0	0	16	17
14:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	2	2	0	0	7	8
14:15	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	1	1
14:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	10	10
14:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	0	0	0	6	6
H/TOT	1	0	0	0	0	1	1	0	0	0	0	0	0	0	17	5	2	0	0	24	25
15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	2	1	0	0	8	9
15:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	7	7
15:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	1	0	0	0	6	6
15:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	2	0	0	0	8	8
H/TOT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23	5	1	0	0	29	30
16:00	0	0	0	0	0	0	0	1	0	0	0	0	1	1	6	1	0	0	0	7	7
16:15	1	0	0	0	0	1	1	0	0	0	0	0	0	0	5	1	1	0	0	7	8
16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	3	3
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	3	3
H/TOT	1	0	0	0	0	1	1	1	0	0	0	0	1	1	15	4	1	0	0	20	21
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	3	0	0	0	10	10
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	7	7
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	1	0	0	0	5	5
17:45	1	0	0	0	0	1	1	0	0	0	0	0	0	0	3	0	0	0	0	3	3
H/TOT	1	0	0	0	0	1	1	0	0	0	0	0	0	0	21	4	0	0	0	25	25
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	2	2
18:15	1	0	0	0	0	1	1	0	0	0	0	0	0	0	5	1	0	0	0	6	6
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	2	0	0	0	6	6
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	1	0	0	0	6	6
H/TOT	1	0	0	0	0	1	1	0	0	0	0	0	0	0	15	5	0	0	0	20	20
P/TOT	6	0	2	0	0	8	9	3	0	0	0	0	3	3	253	46	11	3	0	313	322

INNISHANNON TRAFFIC COUNTS **MARCH 2025**

MANUAL CLASSIFIED JUNCTION TURNING COUNTS **TRA/25/030**

SITE: 02 DATE: 4th March 2025

LOCATION: N71/L3204 DAY: Tuesday

	MOVEMENT 1							MOVEMENT 2							MOVEMENT 3						
TIME	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**
07:00	148	28	5	2	0	183	188	2	0	0	1	0	3	4	0	1	0	1	0	2	3
07:15	125	23	1	3	0	152	156	0	0	0	1	0	1	2	0	0	0	2	0	2	5
07:30	101	28	4	6	5	144	159	0	0	0	1	0	1	2	0	1	0	0	0	1	1
07:45	85	18	3	6	1	113	123	2	0	0	1	0	3	4	0	0	0	1	0	1	2
H/TOT	459	97	13	17	6	592	627	4	0	0	4	0	8	13	0	2	0	4	0	6	11
08:00	72	8	5	4	3	92	103	1	0	0	1	0	2	3	1	1	0	1	0	3	4
08:15	89	17	3	4	2	115	124	0	2	0	0	0	2	2	0	0	0	2	0	2	5
08:30	114	19	4	10	0	147	162	1	0	0	1	0	2	3	1	0	0	0	0	1	1
08:45	83	13	2	6	2	106	117	1	0	1	0	0	2	3	0	0	0	1	0	1	2
H/TOT	358	57	14	24	7	460	505	3	2	1	2	0	8	11	2	1	0	4	0	7	12
09:00	92	21	4	8	2	127	141	1	0	0	0	0	1	1	1	0	0	1	0	2	3
09:15	131	24	2	2	2	161	167	0	0	2	1	0	3	5	0	1	0	0	0	1	1
09:30	85	18	6	7	4	120	136	2	0	0	0	0	2	2	0	0	0	0	0	0	0
09:45	100	19	3	8	0	130	142	1	0	0	1	0	2	3	1	0	0	0	0	1	1
H/TOT	408	82	15	25	8	538	586	4	0	2	2	0	8	12	2	1	0	1	0	4	5
10:00	67	17	4	5	2	95	106	1	0	0	0	0	1	1	1	0	0	1	0	2	3
10:15	81	17	6	5	5	114	129	0	0	0	2	0	2	5	1	0	0	0	0	1	1
10:30	72	16	3	11	2	104	122	2	0	0	0	0	2	2	0	0	0	1	0	1	2
10:45	93	8	5	14	1	121	143	0	0	0	2	0	2	5	1	1	0	0	0	2	2
H/TOT	313	58	18	35	10	434	499	3	0	0	4	0	7	12	3	1	0	2	0	6	9
11:00	72	12	4	6	0	94	104	0	1	0	1	0	2	3	1	1	0	0	0	2	2
11:15	61	21	5	8	2	97	112	0	0	0	0	0	0	0	1	1	0	1	0	3	4
11:30	74	14	2	15	2	107	130	1	0	0	0	0	1	1	2	0	0	0	0	2	2
11:45	79	11	0	11	0	101	115	0	0	0	0	0	0	0	2	0	0	0	0	2	2
H/TOT	286	58	11	40	4	399	461	1	1	0	1	0	3	4	6	2	0	1	0	9	10
12:00	66	15	5	2	1	89	95	1	0	0	0	0	1	1	2	0	1	0	0	3	4
12:15	78	11	6	6	0	101	112	0	1	0	0	0	1	1	0	1	0	0	0	1	1
12:30	84	17	2	7	2	112	124	3	1	0	1	0	5	6	0	0	1	0	0	1	2
12:45	72	10	5	14	0	101	122	1	0	0	0	0	1	1	1	0	0	1	0	2	3
H/TOT	300	53	18	29	3	403	453	5	2	0	1	0	8	9	3	1	2	1	0	7	9

INNISHANNON TRAFFIC COUNTS **MARCH 2025**

MANUAL CLASSIFIED JUNCTION TURNING COUNTS **TRA/25/030**

SITE: 02 DATE: 4th March 2025

LOCATION: N71/L3204 DAY: Tuesday

	MOVEMENT 1							MOVEMENT 2							MOVEMENT 3						
TIME	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**
13:00	70	25	4	4	0	103	110	0	0	0	1	0	1	2	0	0	0	1	0	1	2
13:15	65	15	6	5	1	92	103	2	0	0	0	0	2	2	0	0	0	1	0	1	2
13:30	92	16	3	11	1	123	140	1	0	0	0	0	1	1	1	1	1	0	0	3	4
13:45	69	11	4	8	1	93	106	3	0	0	0	0	3	3	1	0	0	0	0	1	1
H/TOT	296	67	17	28	3	411	459	6	0	0	1	0	7	8	2	1	1	2	0	6	9
14:00	54	14	5	3	4	80	90	1	0	0	0	0	1	1	0	0	0	0	0	0	0
14:15	50	8	4	5	3	70	82	0	0	1	0	0	1	2	0	0	0	0	0	0	0
14:30	94	18	7	9	1	129	145	1	0	0	1	0	2	3	0	0	1	0	0	1	2
14:45	43	23	3	2	2	73	79	1	0	1	0	0	2	3	2	1	0	0	0	3	3
H/TOT	241	63	19	19	10	352	396	3	0	2	1	0	6	8	2	1	1	0	0	4	5
15:00	65	18	4	6	1	94	105	0	0	0	1	0	1	2	0	0	1	0	0	1	2
15:15	94	15	9	8	2	128	145	0	0	0	1	0	1	2	1	1	0	0	0	2	2
15:30	71	16	5	3	0	95	101	3	0	1	1	0	5	7	0	0	0	0	0	0	0
15:45	68	20	3	2	2	95	101	0	1	0	0	0	1	1	1	0	0	0	0	1	1
H/TOT	298	69	21	19	5	412	452	3	1	1	3	0	8	12	2	1	1	0	0	4	5
16:00	107	28	6	6	2	149	162	0	0	0	1	0	1	2	1	0	0	1	0	2	3
16:15	49	7	2	4	4	66	76	0	0	0	1	0	1	2	0	0	0	0	0	0	0
16:30	110	29	4	5	0	148	157	1	1	0	0	0	2	2	0	0	0	1	0	1	2
16:45	44	18	1	5	2	70	79	0	0	0	0	0	0	0	0	1	0	0	0	1	1
H/TOT	310	82	13	20	8	433	474	1	1	0	2	0	4	7	1	1	0	2	0	4	7
17:00	99	18	2	4	0	123	129	1	0	0	0	0	1	1	0	1	0	0	0	1	1
17:15	109	12	1	4	0	126	132	2	0	0	0	0	2	2	1	0	0	0	0	1	1
17:30	130	17	2	5	0	154	162	0	1	0	0	0	1	1	0	0	0	0	0	0	0
17:45	116	10	3	3	3	135	143	0	0	0	0	0	0	0	1	0	0	0	0	1	1
H/TOT	454	57	8	16	3	538	566	3	1	0	0	0	4	4	2	1	0	0	0	3	3
18:00	97	12	1	5	0	115	122	1	1	0	0	0	2	2	1	1	0	0	0	2	2
18:15	96	15	1	3	0	115	119	1	0	0	0	0	1	1	1	0	0	2	0	3	6
18:30	84	19	0	7	1	111	121	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:45	52	9	2	4	1	68	75	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	329	55	4	19	2	409	438	2	1	0	0	0	3	3	2	1	0	2	0	5	8
P/TOT	4052	798	171	291	69	5381	5914	38	9	6	21	0	74	104	27	14	5	19	0	65	92

INNISHANNON TRAFFIC COUNTS **MARCH 2025**

MANUAL CLASSIFIED JUNCTION TURNING COUNTS **TRA/25/030**

SITE: 02 DATE: 4th March 2025

LOCATION: N71/L3204 DAY: Tuesday

	MOVEMENT 4							MOVEMENT 5							MOVEMENT 6						
TIME	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**
07:00	28	8	1	4	0	41	47	6	3	0	1	0	10	11	40	10	4	5	1	60	70
07:15	60	11	0	2	1	74	78	6	5	0	0	0	11	11	28	28	5	4	0	65	73
07:30	61	11	0	3	0	75	79	10	6	0	1	0	17	18	52	25	5	5	0	87	96
07:45	52	6	0	3	1	62	67	17	7	0	2	0	26	29	49	24	3	8	1	85	98
H/TOT	201	36	1	12	2	252	270	39	21	0	4	0	64	69	169	87	17	22	2	297	336
08:00	51	3	0	1	2	57	60	15	3	0	1	0	19	20	75	17	3	6	3	104	116
08:15	44	3	0	4	1	52	58	22	2	1	4	0	29	35	90	25	3	10	3	131	149
08:30	64	4	1	0	0	69	70	28	12	0	4	0	44	49	82	21	3	8	0	114	126
08:45	35	4	1	4	0	44	50	35	6	2	2	1	46	51	91	22	4	7	1	125	137
H/TOT	194	14	2	9	3	222	238	100	23	3	11	1	138	155	338	85	13	31	7	474	528
09:00	43	7	1	2	1	54	58	30	3	0	3	0	36	40	84	22	4	8	3	121	136
09:15	24	4	2	3	1	34	40	13	3	1	0	0	17	18	62	14	3	4	1	84	92
09:30	14	4	0	2	0	20	23	13	7	0	4	0	24	29	67	19	5	13	0	104	123
09:45	8	3	2	3	0	16	21	9	4	0	0	0	13	13	50	16	7	4	0	77	86
H/TOT	89	18	5	10	2	124	142	65	17	1	7	0	90	100	263	71	19	29	4	386	437
10:00	21	5	0	0	2	28	30	10	3	1	1	0	15	17	62	27	5	8	2	104	119
10:15	19	4	1	0	1	25	27	10	6	0	6	0	22	30	56	13	1	5	2	77	86
10:30	17	7	0	2	0	26	29	23	2	3	2	0	30	34	77	15	8	13	0	113	134
10:45	9	1	2	2	0	14	18	8	5	1	4	0	18	24	44	20	1	3	0	68	72
H/TOT	66	17	3	4	3	93	103	51	16	5	13	0	85	104	239	75	15	29	4	362	411
11:00	6	1	1	5	0	13	20	10	6	3	1	0	20	23	58	10	2	5	2	77	87
11:15	10	2	2	4	0	18	24	10	6	1	2	0	19	22	62	24	4	10	0	100	115
11:30	19	3	2	3	0	27	32	12	3	1	4	0	20	26	51	11	2	4	1	69	76
11:45	11	1	0	6	0	18	26	11	1	2	3	0	17	22	63	22	4	7	2	98	111
H/TOT	46	7	5	18	0	76	102	43	16	7	10	0	76	93	234	67	12	26	5	344	389
12:00	17	5	2	3	0	27	32	23	5	1	6	0	35	43	70	16	8	10	1	105	123
12:15	12	1	2	3	0	18	23	26	3	1	3	0	33	37	74	17	5	9	1	106	121
12:30	15	6	1	3	0	25	29	15	6	1	4	0	26	32	60	14	4	2	0	80	85
12:45	13	6	2	5	0	26	34	13	6	2	1	0	22	24	64	12	4	5	1	86	96
H/TOT	57	18	7	14	0	96	118	77	20	5	14	0	116	137	268	59	21	26	3	377	424

INNISHANNON TRAFFIC COUNTS **MARCH 2025**

MANUAL CLASSIFIED JUNCTION TURNING COUNTS **TRA/25/030**

SITE: 02 DATE: 4th March 2025

LOCATION: N71/L3204 DAY: Tuesday

	MOVEMENT 4							MOVEMENT 5							MOVEMENT 6						
TIME	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**
13:00	14	3	2	1	0	20	22	16	3	2	3	0	24	29	81	12	3	7	0	103	114
13:15	17	0	0	4	0	21	26	23	3	1	2	0	29	32	72	22	2	5	1	102	111
13:30	27	5	2	1	0	35	37	14	3	3	3	0	23	28	55	31	3	8	0	97	109
13:45	9	2	3	1	0	15	18	29	2	0	3	0	34	38	69	11	2	4	4	90	100
H/TOT	67	10	7	7	0	91	104	82	11	6	11	0	110	127	277	76	10	24	5	392	433
14:00	15	3	2	3	1	24	30	26	2	2	7	0	37	47	92	22	2	7	2	125	137
14:15	11	4	1	3	1	20	25	18	1	0	2	0	21	24	42	17	0	4	4	67	76
14:30	15	2	2	5	0	24	32	20	6	0	5	0	31	38	91	10	4	7	1	113	125
14:45	12	4	0	5	0	21	28	26	2	2	5	0	35	43	84	13	3	5	1	106	115
H/TOT	53	13	5	16	2	89	114	90	11	4	19	0	124	151	309	62	9	23	8	411	453
15:00	15	2	1	4	0	22	28	21	5	0	5	1	32	40	79	17	1	4	0	101	107
15:15	16	3	0	4	0	23	28	21	6	0	1	0	28	29	89	13	2	8	5	117	133
15:30	16	2	1	4	1	24	31	23	4	1	5	0	33	40	88	20	2	4	1	115	122
15:45	25	6	0	6	0	37	45	34	6	0	6	0	46	54	109	18	5	5	0	137	146
H/TOT	72	13	2	18	1	106	131	99	21	1	17	1	139	163	365	68	10	21	6	470	508
16:00	22	5	0	5	0	32	39	41	6	1	2	0	50	53	134	31	0	3	2	170	176
16:15	19	6	0	4	0	29	34	31	9	1	5	1	47	55	113	20	2	4	2	141	149
16:30	23	3	1	6	0	33	41	38	4	1	3	1	47	52	121	37	0	3	1	162	167
16:45	16	3	2	0	0	21	22	34	5	1	7	0	47	57	119	34	3	2	4	162	170
H/TOT	80	17	3	15	0	115	136	144	24	4	17	2	191	217	487	122	5	12	9	635	662
17:00	19	4	1	2	0	26	29	36	9	0	0	0	45	45	113	24	3	2	2	144	150
17:15	22	7	0	3	0	32	36	37	8	0	3	0	48	52	126	25	2	1	1	155	158
17:30	19	7	3	1	0	30	33	30	4	1	4	0	39	45	157	29	1	1	1	189	192
17:45	6	2	0	1	0	9	10	34	6	0	3	0	43	47	127	18	2	4	1	152	159
H/TOT	66	20	4	7	0	97	108	137	27	1	10	0	175	189	523	96	8	8	5	640	659
18:00	26	5	0	0	0	31	31	33	9	1	1	0	44	46	134	19	4	4	0	161	168
18:15	16	6	2	0	0	24	25	24	7	1	0	0	32	33	124	30	2	3	3	162	170
18:30	14	6	1	0	0	21	22	25	2	1	3	0	31	35	137	16	3	0	0	156	158
18:45	14	2	0	0	0	16	16	39	2	0	0	0	41	41	133	10	5	1	2	151	157
H/TOT	70	19	3	0	0	92	94	121	20	3	4	0	148	155	528	75	14	8	5	630	652
P/TOT	1061	202	47	130	13	1453	1659	1048	227	40	137	4	1456	1658	4000	943	153	259	63	5418	5894

TRAFFINOMICS LIMITED

INNISHANNON TRAFFIC COUNTS **MARCH 2025**

MANUAL CLASSIFIED JUNCTION TURNING COUNTS **TRA/25/030**

SITE: 01 DATE: 4th March 2025

LOCATION: L3204/L6070 Dromkeen DAY: Tuesday

	MOVEMENT 1							MOVEMENT 2							MOVEMENT 3						
TIME	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**
07:00	3	2	0	0	0	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15	4	4	0	0	0	8	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30	1	3	0	0	0	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45	3	1	0	0	0	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	11	10	0	0	0	21	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00	2	0	0	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15	3	0	0	0	0	3	3	0	0	0	0	0	0	0	1	0	0	0	0	1	1
08:30	6	2	0	0	0	8	8	0	0	0	0	0	0	0	1	0	0	1	0	2	3
08:45	3	4	1	0	0	8	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	14	6	1	0	0	21	22	0	0	0	0	0	0	0	2	0	0	1	0	3	4
09:00	4	1	0	0	0	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:15	2	1	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
09:30	3	1	0	0	0	4	4	0	0	0	0	0	0	0	0	1	0	0	0	1	1
09:45	5	0	0	1	0	6	7	0	1	0	0	0	1	1	1	0	0	0	0	1	1
H/TOT	14	3	0	1	0	18	19	0	1	0	0	0	1	1	1	1	0	0	0	2	2
10:00	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	1	1
10:15	3	3	0	2	0	8	11	0	1	0	0	0	1	1	0	0	0	0	0	0	0
10:30	3	1	0	0	0	4	4	0	0	0	0	0	0	0	1	0	0	0	0	1	1
10:45	3	0	0	0	0	3	3	0	2	1	0	0	3	4	0	0	0	0	0	0	0
H/TOT	10	4	0	2	0	16	19	0	3	1	0	0	4	5	2	0	0	0	0	2	2
11:00	2	0	1	0	0	3	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15	1	0	0	0	0	1	1	0	1	0	0	0	1	1	1	0	0	0	0	1	1
11:30	4	1	0	0	0	5	5	0	0	0	0	0	0	0	1	0	0	0	0	1	1
11:45	2	0	1	1	0	4	6	0	0	0	0	0	0	0	1	0	0	0	0	1	1
H/TOT	9	1	2	1	0	13	15	0	1	0	0	0	1	1	3	0	0	0	0	3	3
12:00	4	1	0	0	0	5	5	0	0	1	0	0	1	2	0	0	0	0	0	0	0
12:15	4	2	0	0	0	6	6	1	0	0	0	0	1	1	0	0	0	0	0	0	0
12:30	5	1	0	0	0	6	6	0	0	0	0	0	0	0	1	1	0	0	0	2	2
12:45	3	0	0	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	16	4	0	0	0	20	20	1	0	1	0	0	2	3	1	1	0	0	0	2	2

TRAFFINOMICS LIMITED

INNISHANNON TRAFFIC COUNTS **MARCH 2025**

MANUAL CLASSIFIED JUNCTION TURNING COUNTS **TRA/25/030**

SITE: 01 DATE: 4th March 2025

LOCATION: L3204/L6070 Dromkeen DAY: Tuesday

	MOVEMENT 1							MOVEMENT 2							MOVEMENT 3						
TIME	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**
13:00	0	0	0	0	0	0	0	0	1	1	0	0	2	3	0	0	0	0	0	0	0
13:15	4	2	0	0	0	6	6	0	0	0	0	0	0	0	1	0	0	0	0	1	1
13:30	3	1	2	0	0	6	7	0	1	0	0	0	1	1	0	0	0	0	0	0	0
13:45	7	2	0	0	0	9	9	1	1	0	0	0	2	2	1	0	0	0	0	1	1
H/TOT	14	5	2	0	0	21	22	1	3	1	0	0	5	6	2	0	0	0	0	2	2
14:00	7	0	1	1	0	9	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:15	7	1	0	1	0	9	10	0	0	0	0	0	0	0	1	0	0	0	0	1	1
14:30	8	1	0	0	0	9	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14:45	10	1	1	1	0	13	15	1	0	0	0	0	1	1	0	0	0	0	0	0	0
H/TOT	32	3	2	3	0	40	45	1	0	0	0	0	1	1	1	0	0	0	0	1	1
15:00	6	2	0	1	0	9	10	0	1	0	0	0	1	1	0	0	0	0	0	0	0
15:15	3	1	0	0	0	4	4	0	0	0	0	0	0	0	0	1	0	0	0	1	1
15:30	4	0	0	0	0	4	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:45	11	2	0	2	0	15	18	1	0	0	0	0	1	1	0	0	0	0	0	0	0
H/TOT	24	5	0	3	0	32	36	1	1	0	0	0	2	2	0	1	0	0	0	1	1
16:00	7	0	0	1	0	8	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15	10	2	0	0	0	12	12	0	0	1	0	0	1	2	0	0	0	0	0	0	0
16:30	8	1	0	0	0	9	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45	8	1	1	0	0	10	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	33	4	1	1	0	39	41	0	0	1	0	0	1	2	0	0	0	0	0	0	0
17:00	7	5	0	1	0	13	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15	9	0	0	0	0	9	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	8	6	1	2	0	17	20	1	0	0	0	0	1	1	0	0	0	0	0	0	0
17:45	5	0	0	0	0	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	29	11	1	3	0	44	48	1	0	0	0	0	1	1	0	0	0	0	0	0	0
18:00	8	1	0	0	0	9	9	0	1	0	0	0	1	1	0	0	0	0	0	0	0
18:15	7	3	1	0	0	11	12	1	0	0	0	0	1	1	1	1	0	0	0	2	2
18:30	5	1	1	0	0	7	8	0	0	0	0	0	0	0	1	0	0	0	0	1	1
18:45	5	0	0	0	0	5	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	25	5	2	0	0	32	33	1	1	0	0	0	2	2	2	1	0	0	0	3	3
P/TOT	231	61	11	14	0	317	341	6	10	4	0	0	20	22	14	4	0	1	0	19	20

TRAFFINOMICS LIMITED

INNISHANNON TRAFFIC COUNTS **MARCH 2025**

MANUAL CLASSIFIED JUNCTION TURNING COUNTS **TRA/25/030**

SITE: 01 DATE: 4th March 2025

LOCATION: L3204/L6070 Dromkeen DAY: Tuesday

	MOVEMENT 4							MOVEMENT 5							MOVEMENT 6						
TIME	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**
07:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	4	0	1	0	15	16
07:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	4	1	0	0	25	26
07:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	0	0	0	0	15	15
07:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	2	0	0	0	18	18
H/TOT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	61	10	1	1	0	73	75
08:00	1	0	0	0	0	1	1	0	0	0	0	0	0	0	8	1	0	1	0	10	11
08:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	1	0	11	12
08:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	1	0	0	0	6	6
08:45	0	0	0	0	0	0	0	1	0	0	0	0	1	1	8	0	0	0	0	8	8
H/TOT	1	0	0	0	0	1	1	1	0	0	0	0	1	1	31	2	0	2	0	35	38
09:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	1	0	0	0	13	13
09:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	1	1	0	0	8	9
09:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	2	2
09:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	4	4
H/TOT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23	3	1	0	0	27	28
10:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	2	2
10:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	4	4
10:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	3	3
10:45	1	0	0	0	0	1	1	0	0	0	0	0	0	0	2	0	0	0	0	2	2
H/TOT	1	0	0	0	0	1	1	0	0	0	0	0	0	0	11	0	0	0	0	11	11
11:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	1	0	0	0	5	5
11:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	2	3
11:30	0	0	0	0	0	0	0	1	0	0	0	0	1	1	6	0	0	0	0	6	6
11:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	2	0	0	0	6	6
H/TOT	0	0	0	0	0	0	0	1	0	0	0	0	1	1	15	3	1	0	0	19	20
12:00	0	0	1	0	0	1	2	0	0	0	0	0	0	0	2	1	2	0	0	5	6
12:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	0	0	0	4	4
12:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1	1
12:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	4	4
H/TOT	0	0	1	0	0	1	2	0	0	0	0	0	0	0	10	2	2	0	0	14	15

TRAFFINOMICS LIMITED

INNISHANNON TRAFFIC COUNTS **MARCH 2025**

MANUAL CLASSIFIED JUNCTION TURNING COUNTS **TRA/25/030**

SITE: 01 DATE: 4th March 2025

LOCATION: L3204/L6070 Dromkeen DAY: Tuesday

	MOVEMENT 4							MOVEMENT 5							MOVEMENT 6						
TIME	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**
13:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	1	0	0	4	5
13:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	2	2
13:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	4	4
13:45	0	0	1	0	0	1	2	0	0	0	0	0	0	0	4	1	1	0	0	6	7
H/TOT	0	0	1	0	0	1	2	0	0	0	0	0	0	0	11	3	2	0	0	16	17
14:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	2	2	0	0	7	8
14:15	1	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	1	1
14:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0	0	10	10
14:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	0	0	0	6	6
H/TOT	1	0	0	0	0	1	1	0	0	0	0	0	0	0	17	5	2	0	0	24	25
15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	2	1	0	0	8	9
15:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	7	7
15:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	1	0	0	0	6	6
15:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	2	0	0	0	8	8
H/TOT	0	0	0	0	0	0	0	0	0	0	0	0	0	0	23	5	1	0	0	29	30
16:00	0	0	0	0	0	0	0	1	0	0	0	0	1	1	6	1	0	0	0	7	7
16:15	1	0	0	0	0	1	1	0	0	0	0	0	0	0	5	1	1	0	0	7	8
16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	3	3
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	3	3
H/TOT	1	0	0	0	0	1	1	1	0	0	0	0	1	1	15	4	1	0	0	20	21
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	3	0	0	0	10	10
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	7	7
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	1	0	0	0	5	5
17:45	1	0	0	0	0	1	1	0	0	0	0	0	0	0	3	0	0	0	0	3	3
H/TOT	1	0	0	0	0	1	1	0	0	0	0	0	0	0	21	4	0	0	0	25	25
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	2	2
18:15	1	0	0	0	0	1	1	0	0	0	0	0	0	0	5	1	0	0	0	6	6
18:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	2	0	0	0	6	6
18:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	1	0	0	0	6	6
H/TOT	1	0	0	0	0	1	1	0	0	0	0	0	0	0	15	5	0	0	0	20	20
P/TOT	6	0	2	0	0	8	9	3	0	0	0	0	3	3	253	46	11	3	0	313	322

INNISHANNON TRAFFIC COUNTS **MARCH 2025**

MANUAL CLASSIFIED JUNCTION TURNING COUNTS **TRA/25/030**

SITE: 02 DATE: 4th March 2025

LOCATION: N71/L3204 DAY: Tuesday

	MOVEMENT 1							MOVEMENT 2							MOVEMENT 3						
TIME	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**
07:00	148	28	5	2	0	183	188	2	0	0	1	0	3	4	0	1	0	1	0	2	3
07:15	125	23	1	3	0	152	156	0	0	0	1	0	1	2	0	0	0	2	0	2	5
07:30	101	28	4	6	5	144	159	0	0	0	1	0	1	2	0	1	0	0	0	1	1
07:45	85	18	3	6	1	113	123	2	0	0	1	0	3	4	0	0	0	1	0	1	2
H/TOT	459	97	13	17	6	592	627	4	0	0	4	0	8	13	0	2	0	4	0	6	11
08:00	72	8	5	4	3	92	103	1	0	0	1	0	2	3	1	1	0	1	0	3	4
08:15	89	17	3	4	2	115	124	0	2	0	0	0	2	2	0	0	0	2	0	2	5
08:30	114	19	4	10	0	147	162	1	0	0	1	0	2	3	1	0	0	0	0	1	1
08:45	83	13	2	6	2	106	117	1	0	1	0	0	2	3	0	0	0	1	0	1	2
H/TOT	358	57	14	24	7	460	505	3	2	1	2	0	8	11	2	1	0	4	0	7	12
09:00	92	21	4	8	2	127	141	1	0	0	0	0	1	1	1	0	0	1	0	2	3
09:15	131	24	2	2	2	161	167	0	0	2	1	0	3	5	0	1	0	0	0	1	1
09:30	85	18	6	7	4	120	136	2	0	0	0	0	2	2	0	0	0	0	0	0	0
09:45	100	19	3	8	0	130	142	1	0	0	1	0	2	3	1	0	0	0	0	1	1
H/TOT	408	82	15	25	8	538	586	4	0	2	2	0	8	12	2	1	0	1	0	4	5
10:00	67	17	4	5	2	95	106	1	0	0	0	0	1	1	1	0	0	1	0	2	3
10:15	81	17	6	5	5	114	129	0	0	0	2	0	2	5	1	0	0	0	0	1	1
10:30	72	16	3	11	2	104	122	2	0	0	0	0	2	2	0	0	0	1	0	1	2
10:45	93	8	5	14	1	121	143	0	0	0	2	0	2	5	1	1	0	0	0	2	2
H/TOT	313	58	18	35	10	434	499	3	0	0	4	0	7	12	3	1	0	2	0	6	9
11:00	72	12	4	6	0	94	104	0	1	0	1	0	2	3	1	1	0	0	0	2	2
11:15	61	21	5	8	2	97	112	0	0	0	0	0	0	0	1	1	0	1	0	3	4
11:30	74	14	2	15	2	107	130	1	0	0	0	0	1	1	2	0	0	0	0	2	2
11:45	79	11	0	11	0	101	115	0	0	0	0	0	0	0	2	0	0	0	0	2	2
H/TOT	286	58	11	40	4	399	461	1	1	0	1	0	3	4	6	2	0	1	0	9	10
12:00	66	15	5	2	1	89	95	1	0	0	0	0	1	1	2	0	1	0	0	3	4
12:15	78	11	6	6	0	101	112	0	1	0	0	0	1	1	0	1	0	0	0	1	1
12:30	84	17	2	7	2	112	124	3	1	0	1	0	5	6	0	0	1	0	0	1	2
12:45	72	10	5	14	0	101	122	1	0	0	0	0	1	1	1	0	0	1	0	2	3
H/TOT	300	53	18	29	3	403	453	5	2	0	1	0	8	9	3	1	2	1	0	7	9

INNISHANNON TRAFFIC COUNTS **MARCH 2025**

MANUAL CLASSIFIED JUNCTION TURNING COUNTS **TRA/25/030**

SITE: 02 DATE: 4th March 2025

LOCATION: N71/L3204 DAY: Tuesday

	MOVEMENT 1							MOVEMENT 2							MOVEMENT 3						
TIME	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**
13:00	70	25	4	4	0	103	110	0	0	0	1	0	1	2	0	0	0	1	0	1	2
13:15	65	15	6	5	1	92	103	2	0	0	0	0	2	2	0	0	0	1	0	1	2
13:30	92	16	3	11	1	123	140	1	0	0	0	0	1	1	1	1	1	0	0	3	4
13:45	69	11	4	8	1	93	106	3	0	0	0	0	3	3	1	0	0	0	0	1	1
H/TOT	296	67	17	28	3	411	459	6	0	0	1	0	7	8	2	1	1	2	0	6	9
14:00	54	14	5	3	4	80	90	1	0	0	0	0	1	1	0	0	0	0	0	0	0
14:15	50	8	4	5	3	70	82	0	0	1	0	0	1	2	0	0	0	0	0	0	0
14:30	94	18	7	9	1	129	145	1	0	0	1	0	2	3	0	0	1	0	0	1	2
14:45	43	23	3	2	2	73	79	1	0	1	0	0	2	3	2	1	0	0	0	3	3
H/TOT	241	63	19	19	10	352	396	3	0	2	1	0	6	8	2	1	1	0	0	4	5
15:00	65	18	4	6	1	94	105	0	0	0	1	0	1	2	0	0	1	0	0	1	2
15:15	94	15	9	8	2	128	145	0	0	0	1	0	1	2	1	1	0	0	0	2	2
15:30	71	16	5	3	0	95	101	3	0	1	1	0	5	7	0	0	0	0	0	0	0
15:45	68	20	3	2	2	95	101	0	1	0	0	0	1	1	1	0	0	0	0	1	1
H/TOT	298	69	21	19	5	412	452	3	1	1	3	0	8	12	2	1	1	0	0	4	5
16:00	107	28	6	6	2	149	162	0	0	0	1	0	1	2	1	0	0	1	0	2	3
16:15	49	7	2	4	4	66	76	0	0	0	1	0	1	2	0	0	0	0	0	0	0
16:30	110	29	4	5	0	148	157	1	1	0	0	0	2	2	0	0	0	1	0	1	2
16:45	44	18	1	5	2	70	79	0	0	0	0	0	0	0	0	1	0	0	0	1	1
H/TOT	310	82	13	20	8	433	474	1	1	0	2	0	4	7	1	1	0	2	0	4	7
17:00	99	18	2	4	0	123	129	1	0	0	0	0	1	1	0	1	0	0	0	1	1
17:15	109	12	1	4	0	126	132	2	0	0	0	0	2	2	1	0	0	0	0	1	1
17:30	130	17	2	5	0	154	162	0	1	0	0	0	1	1	0	0	0	0	0	0	0
17:45	116	10	3	3	3	135	143	0	0	0	0	0	0	0	1	0	0	0	0	1	1
H/TOT	454	57	8	16	3	538	566	3	1	0	0	0	4	4	2	1	0	0	0	3	3
18:00	97	12	1	5	0	115	122	1	1	0	0	0	2	2	1	1	0	0	0	2	2
18:15	96	15	1	3	0	115	119	1	0	0	0	0	1	1	1	0	0	2	0	3	6
18:30	84	19	0	7	1	111	121	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18:45	52	9	2	4	1	68	75	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H/TOT	329	55	4	19	2	409	438	2	1	0	0	0	3	3	2	1	0	2	0	5	8
P/TOT	4052	798	171	291	69	5381	5914	38	9	6	21	0	74	104	27	14	5	19	0	65	92

INNISHANNON TRAFFIC COUNTS **MARCH 2025**

MANUAL CLASSIFIED JUNCTION TURNING COUNTS **TRA/25/030**

SITE: 02 DATE: 4th March 2025

LOCATION: N71/L3204 DAY: Tuesday

	MOVEMENT 4							MOVEMENT 5							MOVEMENT 6						
TIME	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**
07:00	28	8	1	4	0	41	47	6	3	0	1	0	10	11	40	10	4	5	1	60	70
07:15	60	11	0	2	1	74	78	6	5	0	0	0	11	11	28	28	5	4	0	65	73
07:30	61	11	0	3	0	75	79	10	6	0	1	0	17	18	52	25	5	5	0	87	96
07:45	52	6	0	3	1	62	67	17	7	0	2	0	26	29	49	24	3	8	1	85	98
H/TOT	201	36	1	12	2	252	270	39	21	0	4	0	64	69	169	87	17	22	2	297	336
08:00	51	3	0	1	2	57	60	15	3	0	1	0	19	20	75	17	3	6	3	104	116
08:15	44	3	0	4	1	52	58	22	2	1	4	0	29	35	90	25	3	10	3	131	149
08:30	64	4	1	0	0	69	70	28	12	0	4	0	44	49	82	21	3	8	0	114	126
08:45	35	4	1	4	0	44	50	35	6	2	2	1	46	51	91	22	4	7	1	125	137
H/TOT	194	14	2	9	3	222	238	100	23	3	11	1	138	155	338	85	13	31	7	474	528
09:00	43	7	1	2	1	54	58	30	3	0	3	0	36	40	84	22	4	8	3	121	136
09:15	24	4	2	3	1	34	40	13	3	1	0	0	17	18	62	14	3	4	1	84	92
09:30	14	4	0	2	0	20	23	13	7	0	4	0	24	29	67	19	5	13	0	104	123
09:45	8	3	2	3	0	16	21	9	4	0	0	0	13	13	50	16	7	4	0	77	86
H/TOT	89	18	5	10	2	124	142	65	17	1	7	0	90	100	263	71	19	29	4	386	437
10:00	21	5	0	0	2	28	30	10	3	1	1	0	15	17	62	27	5	8	2	104	119
10:15	19	4	1	0	1	25	27	10	6	0	6	0	22	30	56	13	1	5	2	77	86
10:30	17	7	0	2	0	26	29	23	2	3	2	0	30	34	77	15	8	13	0	113	134
10:45	9	1	2	2	0	14	18	8	5	1	4	0	18	24	44	20	1	3	0	68	72
H/TOT	66	17	3	4	3	93	103	51	16	5	13	0	85	104	239	75	15	29	4	362	411
11:00	6	1	1	5	0	13	20	10	6	3	1	0	20	23	58	10	2	5	2	77	87
11:15	10	2	2	4	0	18	24	10	6	1	2	0	19	22	62	24	4	10	0	100	115
11:30	19	3	2	3	0	27	32	12	3	1	4	0	20	26	51	11	2	4	1	69	76
11:45	11	1	0	6	0	18	26	11	1	2	3	0	17	22	63	22	4	7	2	98	111
H/TOT	46	7	5	18	0	76	102	43	16	7	10	0	76	93	234	67	12	26	5	344	389
12:00	17	5	2	3	0	27	32	23	5	1	6	0	35	43	70	16	8	10	1	105	123
12:15	12	1	2	3	0	18	23	26	3	1	3	0	33	37	74	17	5	9	1	106	121
12:30	15	6	1	3	0	25	29	15	6	1	4	0	26	32	60	14	4	2	0	80	85
12:45	13	6	2	5	0	26	34	13	6	2	1	0	22	24	64	12	4	5	1	86	96
H/TOT	57	18	7	14	0	96	118	77	20	5	14	0	116	137	268	59	21	26	3	377	424

INNISHANNON TRAFFIC COUNTS **MARCH 2025**

MANUAL CLASSIFIED JUNCTION TURNING COUNTS **TRA/25/030**

SITE: 02 DATE: 4th March 2025

LOCATION: N71/L3204 DAY: Tuesday

	MOVEMENT 4							MOVEMENT 5							MOVEMENT 6						
TIME	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**	**CAR**	**LGV**	**OGV1**	**OGV2**	**BUS**	**TOT**	**PCU**
13:00	14	3	2	1	0	20	22	16	3	2	3	0	24	29	81	12	3	7	0	103	114
13:15	17	0	0	4	0	21	26	23	3	1	2	0	29	32	72	22	2	5	1	102	111
13:30	27	5	2	1	0	35	37	14	3	3	3	0	23	28	55	31	3	8	0	97	109
13:45	9	2	3	1	0	15	18	29	2	0	3	0	34	38	69	11	2	4	4	90	100
H/TOT	67	10	7	7	0	91	104	82	11	6	11	0	110	127	277	76	10	24	5	392	433
14:00	15	3	2	3	1	24	30	26	2	2	7	0	37	47	92	22	2	7	2	125	137
14:15	11	4	1	3	1	20	25	18	1	0	2	0	21	24	42	17	0	4	4	67	76
14:30	15	2	2	5	0	24	32	20	6	0	5	0	31	38	91	10	4	7	1	113	125
14:45	12	4	0	5	0	21	28	26	2	2	5	0	35	43	84	13	3	5	1	106	115
H/TOT	53	13	5	16	2	89	114	90	11	4	19	0	124	151	309	62	9	23	8	411	453
15:00	15	2	1	4	0	22	28	21	5	0	5	1	32	40	79	17	1	4	0	101	107
15:15	16	3	0	4	0	23	28	21	6	0	1	0	28	29	89	13	2	8	5	117	133
15:30	16	2	1	4	1	24	31	23	4	1	5	0	33	40	88	20	2	4	1	115	122
15:45	25	6	0	6	0	37	45	34	6	0	6	0	46	54	109	18	5	5	0	137	146
H/TOT	72	13	2	18	1	106	131	99	21	1	17	1	139	163	365	68	10	21	6	470	508
16:00	22	5	0	5	0	32	39	41	6	1	2	0	50	53	134	31	0	3	2	170	176
16:15	19	6	0	4	0	29	34	31	9	1	5	1	47	55	113	20	2	4	2	141	149
16:30	23	3	1	6	0	33	41	38	4	1	3	1	47	52	121	37	0	3	1	162	167
16:45	16	3	2	0	0	21	22	34	5	1	7	0	47	57	119	34	3	2	4	162	170
H/TOT	80	17	3	15	0	115	136	144	24	4	17	2	191	217	487	122	5	12	9	635	662
17:00	19	4	1	2	0	26	29	36	9	0	0	0	45	45	113	24	3	2	2	144	150
17:15	22	7	0	3	0	32	36	37	8	0	3	0	48	52	126	25	2	1	1	155	158
17:30	19	7	3	1	0	30	33	30	4	1	4	0	39	45	157	29	1	1	1	189	192
17:45	6	2	0	1	0	9	10	34	6	0	3	0	43	47	127	18	2	4	1	152	159
H/TOT	66	20	4	7	0	97	108	137	27	1	10	0	175	189	523	96	8	8	5	640	659
18:00	26	5	0	0	0	31	31	33	9	1	1	0	44	46	134	19	4	4	0	161	168
18:15	16	6	2	0	0	24	25	24	7	1	0	0	32	33	124	30	2	3	3	162	170
18:30	14	6	1	0	0	21	22	25	2	1	3	0	31	35	137	16	3	0	0	156	158
18:45	14	2	0	0	0	16	16	39	2	0	0	0	41	41	133	10	5	1	2	151	157
H/TOT	70	19	3	0	0	92	94	121	20	3	4	0	148	155	528	75	14	8	5	630	652
P/TOT	1061	202	47	130	13	1453	1659	1048	227	40	137	4	1456	1658	4000	943	153	259	63	5418	5894

Appendix 14-C: – Estimated AADTs

Table 1: Estimated AADTs at Site 1 - (L3204/L6070 – Site Access Junction)

Hour Ending	L3204 South	L6070	L3204 North
08:00	94	0	94
09:00	58	5	59
10:00	45	3	48
11:00	28	7	33
12:00	33	5	36
13:00	35	5	38
14:00	38	8	44
15:00	65	3	66
16:00	61	3	64
17:00	61	3	60
18:00	70	2	70
19:00	53	6	57
Period Total	**641**	**50**	**669**
Period Total HGVs	**41**	**7**	**44**
% HGVs	**6.40%**	**14.00%**	**6.58%**
Total AADT	**834**	**66**	**870**

Table 2: Estimated AADTs at Site 2 – (N71/L3204)

Hour Ending	N71 East	L3204	N71 West
08:00	1205	330	903
09:00	1294	375	949
10:00	1138	226	936
11:00	974	191	809
12:00	895	164	755
13:00	992	227	795
14:00	1004	214	816
15:00	976	223	773
16:00	1127	257	894
17:00	1374	314	1076
18:00	1450	279	1185
19:00	1279	248	1047
Period Total	**13,708**	**3,048**	**10,938**
Period Total HGVs	**1,377**	**422**	**1,057**
% HGVs	**10.05%**	**13.85%**	**9.66%**
Total AADT	**17,823**	**3,963**	**14,221**

Appendix 14-D – Junctions 9 Outputs

Junctions 9

PICADY 9 - Priority Intersection Module

Version: 9.5.0.6896
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The users of this computer program for the solution of an engineering problem are in no way relieved of their responsibility for the correctness of the solution

Filename: Site 1 - Site Access.j9
Path: P:\Traffic Files\P25-027\Modelling\Site 1 -Site Access
Report generation date: 19/03/2025 11:26:32

«2026,
- »Junction Network
- »Arms
- »Traffic Demand
- »Origin-Destination Data
- »Vehicle Mix
- »Results

Summary of junction performance

	Queue (Veh)	Delay (s)	RFC	LOS
	2026			
Stream B-C	0.0	7.68	0.02	A
Stream B-A	0.0	15.81	0.02	C
Stream C-AB	0.0	11.16	0.03	B
	2031			
Stream B-C	0.0	7.79	0.02	A
Stream B-A	0.0	15.87	0.02	C
Stream C-AB	0.0	11.07	0.03	B
	2041			
Stream B-C	0.0	7.93	0.03	A
Stream B-A	0.0	15.95	0.02	C
Stream C-AB	0.0	10.96	0.04	B
	2026+Adj+Dev			
Stream B-C	0.0	7.02	0.02	A
Stream B-A	0.0	16.04	0.02	C
Stream C-AB	0.0	11.13	0.03	B
	2031+Adj+Dev			
Stream B-C	0.0	7.23	0.02	A
Stream B-A	0.0	16.03	0.02	C
Stream C-AB	0.0	11.05	0.03	B
	2041+Adj+Dev			
Stream B-C	0.0	7.46	0.03	A
Stream B-A	0.0	16.08	0.02	C
Stream C-AB	0.0	10.96	0.04	B

Values shown are the highest values encountered over all time segments. Delay is the maximum value of average delay per arriving vehicle.

File summary

File Description

Title	
Location	
Site number	
Date	11/03/2025
Version	
Status	(new file)
Identifier	
Client	
Jobnumber	
Enumerator	PMCE\sugenom
Description	

Units

Distance units	Speed units	Traffic units input	Traffic units results	Flow units	Average delay units	Total delay units	Rate of delay units
m	kph	Veh	Veh	perTimeSegment	s	-Min	perMin

Analysis Options

Vehicle length (m)	Calculate Queue Percentiles	Calculate detailed queueing delay	Calculate residual capacity	RFC Threshold	Average Delay threshold (s)	Queue threshold (PCU)
5.75				0.85	36.00	20.00

Analysis Set Details

ID	Include in report	Network flow scaling factor (%)	Network capacity scaling factor (%)
A1	✓	100.000	100.000

Demand Set Details

ID	Scenario name	Traffic profile type	Start time (HH:mm)	Finish time (HH:mm)	Time period length (min)	Time segment length (min)	Run automatically
D1	2026	DIRECT	07:00	19:00	720	15	✓

2026,

Data Errors and Warnings

No errors or warnings

Junction Network

Junctions

Junction	Name	Junction type	Major road direction	Use circulating lanes	Junction Delay (s)	Junction LOS
1	L3204/L6070 Site Access	T-Junction	Two-way		0.82	A

Junction Network Options

Driving side	Lighting
Left	Normal/unknown

Arms

Arms

Arm	Name	Description	Arm type
A	L3204 S		Major
B	Site Access - L6070		Minor
C	L3204 N		Major

Major Arm Geometry

Arm	Width of carriageway (m)	Has kerbed central reserve	Has right turn bay	Visibility for right turn (m)	Blocks?	Blocking queue (PCU)
C - L3204 N	6.00			0.0	✓	0.00

Geometries for Arm C are measured opposite Arm B. Geometries for Arm A (if relevant) are measured opposite Arm D.

Minor Arm Geometry

Arm	Minor arm type	Width at give-way (m)	Width at 5m (m)	Width at 10m (m)	Width at 15m (m)	Width at 20m (m)	Estimate flare length	Flare length (PCU)	Visibility to left (m)	Visibility to right (m)
B - Site Access - L6070	One lane plus flare	8.00	5.00	2.20	2.20	2.20	✓	1.00	0	0

Slope / Intercept / Capacity

Priority Intersection Slopes and Intercepts

Junction	Stream	Intercept (Veh/TS)	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
1	B-A	114.918	0.084	0.212	0.133	0.302
1	B-C	159.888	0.098	0.248	-	-
1	C-B	143.491	0.222	0.222	-	-

The slopes and intercepts shown above do NOT include any corrections or adjustments.

Streams may be combined, in which case capacity will be adjusted.

Values are shown for the first time segment only; they may differ for subsequent time segments.

Traffic Demand

Vehicle mix varies over time	Vehicle mix varies over turn	Vehicle mix varies over entry	Vehicle mix source	PCU Factor for a HV (PCU)	O-D data varies over time
✓	✓	✓	HV Percentages	2.00	✓

Demand overview (Traffic)

Arm	Linked arm	Profile type	Use O-D data	Scaling Factor (%)
A - L3204 S		DIRECT	✓	100.000
B - Site Access - L6070		DIRECT	✓	100.000
C - L3204 N		DIRECT	✓	100.000

Origin-Destination Data

07:00 - 07:15

Demand (Veh/TS)

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0.00	0.00	15.30
	B - Site Access - L6070	0.00	0.00	0.00
	C - L3204 N	5.09	0.00	0.00

07:15 - 07:30

Demand (Veh/TS)

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0.00	0.00	25.49
	B - Site Access - L6070	0.00	0.00	0.00
	C - L3204 N	8.15	0.00	0.00

07:30 - 07:45

Demand (Veh/TS)

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0.00	0.00	15.28
	B - Site Access - L6070	0.00	0.00	0.00
	C - L3204 N	4.08	0.00	0.00

07:45 - 08:00

Demand (Veh/TS)

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0.00	0.00	18.34
	B - Site Access - L6070	0.00	0.00	0.00
	C - L3204 N	4.08	0.00	0.00

08:00 - 08:15

Demand (Veh/TS)

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0.00	0.00	10.21
	B - Site Access - L6070	1.02	0.00	0.00
	C - L3204 N	2.04	0.00	0.00

08:15 - 08:30

Demand (Veh/TS)

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0.00	0.00	11.23
	B - Site Access - L6070	0.00	0.00	1.02
	C - L3204 N	3.06	0.00	0.00

08:30 - 08:45

Demand (Veh/TS)

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0.00	0.00	6.11
	B - Site Access - L6070	0.00	0.00	2.06
	C - L3204 N	8.15	0.00	0.00

08:45 - 09:00

Demand (Veh/TS)

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0.00	1.02	8.15
	B - Site Access - L6070	0.00	0.00	0.00
	C - L3204 N	8.17	0.00	0.00

09:00 - 09:15

Demand (Veh/TS)

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0.00	0.00	13.25
	B - Site Access - L6070	0.00	0.00	0.00
	C - L3204 N	5.09	0.00	0.00

09:15 - 09:30

Demand (Veh/TS)

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0.00	0.00	8.17
	B - Site Access - L6070	0.00	0.00	0.00
	C - L3204 N	3.06	0.00	0.00

09:30 - 09:45

Demand (Veh/TS)

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0.00	0.00	2.04
	B - Site Access - L6070	0.00	0.00	1.02
	C - L3204 N	4.08	0.00	0.00

09:45 - 10:00

Demand (Veh/TS)

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0.00	0.00	4.08
	B - Site Access - L6070	0.00	0.00	1.02
	C - L3204 N	6.13	1.02	0.00

10:00 - 10:15

Demand (Veh/TS)

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0.00	0.00	2.04
	B - Site Access - L6070	0.00	0.00	1.02
	C - L3204 N	1.02	0.00	0.00

10:15 - 10:30

Demand (Veh/TS)

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0.00	0.00	4.08
	B - Site Access - L6070	0.00	0.00	0.00
	C - L3204 N	8.19	1.02	0.00

10:30 - 10:45

Demand (Veh/TS)

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0.00	0.00	3.06
	B - Site Access - L6070	0.00	0.00	1.02
	C - L3204 N	4.08	0.00	0.00

10:45 - 11:00

Demand (Veh/TS)

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0.00	0.00	2.04
	B - Site Access - L6070	1.02	0.00	0.00
	C - L3204 N	3.06	3.08	0.00

11:00 - 11:15

Demand (Veh/TS)

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0.00	0.00	5.09
	B - Site Access - L6070	0.00	0.00	0.00
	C - L3204 N	3.08	0.00	0.00

11:15 - 11:30

Demand (Veh/TS)

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0.00	0.00	2.06
	B - Site Access - L6070	0.00	0.00	1.02
	C - L3204 N	1.02	1.02	0.00

11:30 - 11:45

Demand (Veh/TS)

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0.00	1.02	6.11
	B - Site Access - L6070	0.00	0.00	1.02
	C - L3204 N	5.09	0.00	0.00

11:45 - 12:00

Demand (Veh/TS)

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0.00	0.00	6.11
	B - Site Access - L6070	0.00	0.00	1.02
	C - L3204 N	4.11	0.00	0.00

12:00 - 12:15

Demand (Veh/TS)

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0.00	0.00	5.13
	B - Site Access - L6070	1.04	0.00	0.00
	C - L3204 N	5.09	1.04	0.00

12:15 - 12:30

Demand (Veh/TS)

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0.00	0.00	4.08
	B - Site Access - L6070	0.00	0.00	0.00
	C - L3204 N	6.11	1.02	0.00

12:30 - 12:45

Demand (Veh/TS)

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0.00	0.00	1.02
	B - Site Access - L6070	0.00	0.00	2.04
	C - L3204 N	6.11	0.00	0.00

12:45 - 13:00

Demand (Veh/TS)

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0.00	0.00	4.08
	B - Site Access - L6070	0.00	0.00	0.00
	C - L3204 N	3.06	0.00	0.00

13:00 - 13:15

Demand (Veh/TS)

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0.00	0.00	4.09
	B - Site Access - L6070	0.00	0.00	0.00
	C - L3204 N	0.00	2.06	0.00

13:15 - 13:30

Demand (Veh/TS)

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0.00	0.00	2.04
	B - Site Access - L6070	0.00	0.00	1.02
	C - L3204 N	6.11	0.00	0.00

13:30 - 13:45

Demand (Veh/TS)

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0.00	0.00	4.08
	B - Site Access - L6070	0.00	0.00	0.00
	C - L3204 N	6.15	1.02	0.00

13:45 - 14:00

Demand (Veh/TS)

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0.00	0.00	6.13
	B - Site Access - L6070	1.04	0.00	1.02
	C - L3204 N	9.17	2.04	0.00

14:00 - 14:15

Demand (Veh/TS)

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0.00	0.00	7.17
	B - Site Access - L6070	0.00	0.00	0.00
	C - L3204 N	9.21	0.00	0.00

14:15 - 14:30

Demand (Veh/TS)

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0.00	0.00	1.02
	B - Site Access - L6070	1.02	0.00	1.02
	C - L3204 N	9.19	0.00	0.00

14:30 - 14:45

Demand (Veh/TS)

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0.00	0.00	10.19
	B - Site Access - L6070	0.00	0.00	0.00
	C - L3204 N	9.17	0.00	0.00

14:45 - 15:00

Demand (Veh/TS)

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0.00	0.00	6.11
	B - Site Access - L6070	0.00	0.00	0.00
	C - L3204 N	13.28	1.02	0.00

15:00 - 15:15

Demand (Veh/TS)

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0.00	0.00	8.17
	B - Site Access - L6070	0.00	0.00	0.00
	C - L3204 N	9.19	1.02	0.00

15:15 - 15:30

Demand (Veh/TS)

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0.00	0.00	7.13
	B - Site Access - L6070	0.00	0.00	1.02
	C - L3204 N	4.08	0.00	0.00

15:30 - 15:45

Demand (Veh/TS)

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0.00	0.00	6.11
	B - Site Access - L6070	0.00	0.00	0.00
	C - L3204 N	4.08	0.00	0.00

15:45 - 16:00

Demand (Veh/TS)

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0.00	0.00	8.15
	B - Site Access - L6070	0.00	0.00	0.00
	C - L3204 N	15.32	1.02	0.00

16:00 - 16:15

Demand (Veh/TS)

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0.00	1.02	7.13
	B - Site Access - L6070	0.00	0.00	0.00
	C - L3204 N	8.17	0.00	0.00

16:15 - 16:30

Demand (Veh/TS)

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0.00	0.00	7.15
	B - Site Access - L6070	1.02	0.00	0.00
	C - L3204 N	12.23	1.04	0.00

16:30 - 16:45

Demand (Veh/TS)

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0.00	0.00	3.06
	B - Site Access - L6070	0.00	0.00	0.00
	C - L3204 N	9.17	0.00	0.00

16:45 - 17:00

Demand (Veh/TS)

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0.00	0.00	3.06
	B - Site Access - L6070	0.00	0.00	0.00
	C - L3204 N	10.21	0.00	0.00

17:00 - 17:15

Demand (Veh/TS)

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0.00	0.00	10.19
	B - Site Access - L6070	0.00	0.00	0.00
	C - L3204 N	13.26	0.00	0.00

17:15 - 17:30

Demand (Veh/TS)

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0.00	0.00	7.13
	B - Site Access - L6070	0.00	0.00	0.00
	C - L3204 N	9.17	0.00	0.00

17:30 - 17:45

Demand (Veh/TS)

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0.00	0.00	5.09
	B - Site Access - L6070	0.00	0.00	0.00
	C - L3204 N	17.38	1.02	0.00

17:45 - 18:00

Demand (Veh/TS)

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0.00	0.00	3.06
	B - Site Access - L6070	1.02	0.00	0.00
	C - L3204 N	5.09	0.00	0.00

18:00 - 18:15

Demand (Veh/TS)

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0.00	0.00	2.04
	B - Site Access - L6070	0.00	0.00	0.00
	C - L3204 N	9.17	1.02	0.00

18:15 - 18:30

Demand (Veh/TS)

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0.00	0.00	6.11
	B - Site Access - L6070	1.02	0.00	2.04
	C - L3204 N	11.23	1.02	0.00

18:30 - 18:45

Demand (Veh/TS)

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0.00	0.00	6.11
	B - Site Access - L6070	0.00	0.00	1.02
	C - L3204 N	7.15	0.00	0.00

18:45 - 19:00

Demand (Veh/TS)

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0.00	0.00	6.11
	B - Site Access - L6070	0.00	0.00	0.00
	C - L3204 N	5.09	0.00	0.00

Vehicle Mix

07:00 - 07:15

Heavy Vehicle Percentages

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0	0	7
	B - Site Access - L6070	0	0	0
	C - L3204 N	0	0	0

07:15 - 07:30

Heavy Vehicle Percentages

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0	0	4
	B - Site Access - L6070	0	0	0
	C - L3204 N	0	0	0

07:30 - 07:45

Heavy Vehicle Percentages

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0	0	0
	B - Site Access - L6070	0	0	0
	C - L3204 N	0	0	0

07:45 - 08:00

Heavy Vehicle Percentages

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0	0	0
	B - Site Access - L6070	0	0	0
	C - L3204 N	0	0	0

08:00 - 08:15

Heavy Vehicle Percentages

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0	0	10
	B - Site Access - L6070	0	0	0
	C - L3204 N	0	0	0

08:15 - 08:30

Heavy Vehicle Percentages

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0	0	9
	B - Site Access - L6070	0	0	0
	C - L3204 N	0	0	0

08:30 - 08:45

Heavy Vehicle Percentages

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0	0	0
	B - Site Access - L6070	0	0	50
	C - L3204 N	0	0	0

08:45 - 09:00

Heavy Vehicle Percentages

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0	0	0
	B - Site Access - L6070	0	0	0
	C - L3204 N	13	0	0

09:00 - 09:15

Heavy Vehicle Percentages

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0	0	0
	B - Site Access - L6070	0	0	0
	C - L3204 N	0	0	0

09:15 - 09:30

Heavy Vehicle Percentages

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0	0	13
	B - Site Access - L6070	0	0	0
	C - L3204 N	0	0	0

09:30 - 09:45

Heavy Vehicle Percentages

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0	0	0
	B - Site Access - L6070	0	0	0
	C - L3204 N	0	0	0

09:45 - 10:00

Heavy Vehicle Percentages

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0	0	0
	B - Site Access - L6070	0	0	0
	C - L3204 N	17	0	0

10:00 - 10:15

Heavy Vehicle Percentages

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0	0	0
	B - Site Access - L6070	0	0	0
	C - L3204 N	0	0	0

10:15 - 10:30

Heavy Vehicle Percentages

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0	0	0
	B - Site Access - L6070	0	0	0
	C - L3204 N	25	0	0

10:30 - 10:45

Heavy Vehicle Percentages

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0	0	0
	B - Site Access - L6070	0	0	0
	C - L3204 N	0	0	0

10:45 - 11:00

Heavy Vehicle Percentages

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0	0	0
	B - Site Access - L6070	0	0	0
	C - L3204 N	0	34	0

11:00 - 11:15

Heavy Vehicle Percentages

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0	0	0
	B - Site Access - L6070	0	0	0
	C - L3204 N	34	0	0

11:15 - 11:30

Heavy Vehicle Percentages

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0	0	50
	B - Site Access - L6070	0	0	0
	C - L3204 N	0	0	0

11:30 - 11:45

Heavy Vehicle Percentages

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0	0	0
	B - Site Access - L6070	0	0	0
	C - L3204 N	0	0	0

11:45 - 12:00

Heavy Vehicle Percentages

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0	0	0
	B - Site Access - L6070	0	0	0
	C - L3204 N	50	0	0

12:00 - 12:15

Heavy Vehicle Percentages

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0	0	40
	B - Site Access - L6070	100	0	0
	C - L3204 N	0	100	0

12:15 - 12:30

Heavy Vehicle Percentages

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0	0	0
	B - Site Access - L6070	0	0	0
	C - L3204 N	0	0	0

12:30 - 12:45

Heavy Vehicle Percentages

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0	0	0
	B - Site Access - L6070	0	0	0
	C - L3204 N	0	0	0

12:45 - 13:00

Heavy Vehicle Percentages

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0	0	0
	B - Site Access - L6070	0	0	0
	C - L3204 N	0	0	0

13:00 - 13:15

Heavy Vehicle Percentages

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0	0	25
	B - Site Access - L6070	0	0	0
	C - L3204 N	0	50	0

13:15 - 13:30

Heavy Vehicle Percentages

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0	0	0
	B - Site Access - L6070	0	0	0
	C - L3204 N	0	0	0

13:30 - 13:45

Heavy Vehicle Percentages

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0	0	0
	B - Site Access - L6070	0	0	0
	C - L3204 N	34	0	0

13:45 - 14:00

Heavy Vehicle Percentages

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0	0	17
	B - Site Access - L6070	100	0	0
	C - L3204 N	0	0	0

14:00 - 14:15

Heavy Vehicle Percentages

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0	0	29
	B - Site Access - L6070	0	0	0
	C - L3204 N	23	0	0

14:15 - 14:30

Heavy Vehicle Percentages

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0	0	0
	B - Site Access - L6070	0	0	0
	C - L3204 N	11	0	0

14:30 - 14:45

Heavy Vehicle Percentages

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0	0	0
	B - Site Access - L6070	0	0	0
	C - L3204 N	0	0	0

14:45 - 15:00

Heavy Vehicle Percentages

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0	0	0
	B - Site Access - L6070	0	0	0
	C - L3204 N	16	0	0

15:00 - 15:15

Heavy Vehicle Percentages

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0	0	13
	B - Site Access - L6070	0	0	0
	C - L3204 N	11	0	0

15:15 - 15:30

Heavy Vehicle Percentages

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0	0	0
	B - Site Access - L6070	0	0	0
	C - L3204 N	0	0	0

15:30 - 15:45

Heavy Vehicle Percentages

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0	0	0
	B - Site Access - L6070	0	0	0
	C - L3204 N	0	0	0

15:45 - 16:00

Heavy Vehicle Percentages

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0	0	0
	B - Site Access - L6070	0	0	0
	C - L3204 N	14	0	0

16:00 - 16:15

Heavy Vehicle Percentages

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0	0	0
	B - Site Access - L6070	0	0	0
	C - L3204 N	13	0	0

16:15 - 16:30

Heavy Vehicle Percentages

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0	0	15
	B - Site Access - L6070	0	0	0
	C - L3204 N	0	100	0

16:30 - 16:45

Heavy Vehicle Percentages

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0	0	0
	B - Site Access - L6070	0	0	0
	C - L3204 N	0	0	0

16:45 - 17:00

Heavy Vehicle Percentages

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0	0	0
	B - Site Access - L6070	0	0	0
	C - L3204 N	10	0	0

17:00 - 17:15

Heavy Vehicle Percentages

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0	0	0
	B - Site Access - L6070	0	0	0
	C - L3204 N	8	0	0

17:15 - 17:30

Heavy Vehicle Percentages

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0	0	0
	B - Site Access - L6070	0	0	0
	C - L3204 N	0	0	0

17:30 - 17:45

Heavy Vehicle Percentages

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0	0	0
	B - Site Access - L6070	0	0	0
	C - L3204 N	18	0	0

17:45 - 18:00

Heavy Vehicle Percentages

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0	0	0
	B - Site Access - L6070	0	0	0
	C - L3204 N	0	0	0

18:00 - 18:15

Heavy Vehicle Percentages

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0	0	0
	B - Site Access - L6070	0	0	0
	C - L3204 N	0	0	0

18:15 - 18:30

Heavy Vehicle Percentages

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0	0	0
	B - Site Access - L6070	0	0	0
	C - L3204 N	9	0	0

18:30 - 18:45

Heavy Vehicle Percentages

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0	0	0
	B - Site Access - L6070	0	0	0
	C - L3204 N	15	0	0

18:45 - 19:00

Heavy Vehicle Percentages

		To		
		A - L3204 S	B - Site Access - L6070	C - L3204 N
From	A - L3204 S	0	0	0
	B - Site Access - L6070	0	0	0
	C - L3204 N	0	0	0

Results

Results Summary for whole modelled period

Stream	Max RFC	Max Delay (s)	Max Queue (Veh)	Max LOS	Average Demand (Veh/TS)	Total Junction Arrivals (Veh)
B-C	0.02	7.68	0.0	A	0.40	19.38
B-A	0.02	15.81	0.0	C	0.17	8.19
C-AB	0.03	11.16	0.0	B	0.45	21.70
C-A					6.71	322.21
A-B					0.06	3.06
A-C					6.65	319.18

Main Results for each time segment

07:00 - 07:15

Stream	Total Demand (Veh/TS)	Junction Arrivals (Veh)	Capacity (Veh/TS)	RFC	Throughput (Veh/TS)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0.00	0.00	155.84	0.000	0.00	0.0	0.0	0.000	A
B-A	0.00	0.00	110.78	0.000	0.00	0.0	0.0	0.000	A
C-AB	0.00	0.00	139.86	0.000	0.00	0.0	0.0	0.000	A
C-A	5.09	5.09			5.09				
A-B	0.00	0.00			0.00				
A-C	15.30	15.30			15.30				

07:15 - 07:30

Stream	Total Demand (Veh/TS)	Junction Arrivals (Veh)	Capacity (Veh/TS)	RFC	Throughput (Veh/TS)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0.00	0.00	153.31	0.000	0.00	0.0	0.0	0.000	A
B-A	0.00	0.00	108.22	0.000	0.00	0.0	0.0	0.000	A
C-AB	0.00	0.00	137.59	0.000	0.00	0.0	0.0	0.000	A
C-A	8.15	8.15			8.15				
A-B	0.00	0.00			0.00				
A-C	25.49	25.49			25.49				

07:30 - 07:45

Stream	Total Demand (Veh/TS)	Junction Arrivals (Veh)	Capacity (Veh/TS)	RFC	Throughput (Veh/TS)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0.00	0.00	156.10	0.000	0.00	0.0	0.0	0.000	A
B-A	0.00	0.00	111.14	0.000	0.00	0.0	0.0	0.000	A
C-AB	0.00	0.00	140.09	0.000	0.00	0.0	0.0	0.000	A
C-A	4.08	4.08			4.08				
A-B	0.00	0.00			0.00				
A-C	15.28	15.28			15.28				

07:45 - 08:00

Stream	Total Demand (Veh/TS)	Junction Arrivals (Veh)	Capacity (Veh/TS)	RFC	Throughput (Veh/TS)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0.00	0.00	155.34	0.000	0.00	0.0	0.0	0.000	A
B-A	0.00	0.00	110.49	0.000	0.00	0.0	0.0	0.000	A
C-AB	0.00	0.00	139.41	0.000	0.00	0.0	0.0	0.000	A
C-A	4.08	4.08			4.08				
A-B	0.00	0.00			0.00				
A-C	18.34	18.34			18.34				

08:00 - 08:15

Stream	Total Demand (Veh/TS)	Junction Arrivals (Veh)	Capacity (Veh/TS)	RFC	Throughput (Veh/TS)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0.00	0.00	129.97	0.000	0.00	0.0	0.0	0.000	A
B-A	1.02	1.02	120.45	0.008	1.01	0.0	0.0	7.535	A
C-AB	0.00	0.00	140.99	0.000	0.00	0.0	0.0	0.000	A
C-A	2.04	2.04			2.04				
A-B	0.00	0.00			0.00				
A-C	10.21	10.21			10.21				

08:15 - 08:30

Stream	Total Demand (Veh/TS)	Junction Arrivals (Veh)	Capacity (Veh/TS)	RFC	Throughput (Veh/TS)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	1.02	1.02	157.79	0.006	1.01	0.0	0.0	5.740	A
B-A	0.00	0.00	99.11	0.000	0.01	0.0	0.0	0.000	A
C-AB	0.00	0.00	140.76	0.000	0.00	0.0	0.0	0.000	A
C-A	3.06	3.06			3.06				
A-B	0.00	0.00			0.00				
A-C	11.23	11.23			11.23				

08:30 - 08:45

Stream	Total Demand (Veh/TS)	Junction Arrivals (Veh)	Capacity (Veh/TS)	RFC	Throughput (Veh/TS)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	2.06	2.06	106.09	0.019	2.05	0.0	0.0	7.680	A
B-A	0.00	0.00	99.42	0.000	0.00	0.0	0.0	0.000	A
C-AB	0.00	0.00	142.13	0.000	0.00	0.0	0.0	0.000	A
C-A	8.15	8.15			8.15				
A-B	0.00	0.00			0.00				
A-C	6.11	6.11			6.11				

08:45 - 09:00

Stream	Total Demand (Veh/TS)	Junction Arrivals (Veh)	Capacity (Veh/TS)	RFC	Throughput (Veh/TS)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0.00	0.00	105.58	0.000	0.02	0.0	0.0	0.000	A
B-A	0.00	0.00	98.84	0.000	0.00	0.0	0.0	0.000	A
C-AB	0.00	0.00	137.10	0.000	0.00	0.0	0.0	0.000	A
C-A	8.17	8.17			8.17				
A-B	1.02	1.02			1.02				
A-C	8.15	8.15			8.15				

09:00 - 09:15

Stream	Total Demand (Veh/TS)	Junction Arrivals (Veh)	Capacity (Veh/TS)	RFC	Throughput (Veh/TS)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0.00	0.00	139.06	0.000	0.00	0.0	0.0	0.000	A
B-A	0.00	0.00	111.44	0.000	0.00	0.0	0.0	0.000	A
C-AB	0.00	0.00	138.35	0.000	0.00	0.0	0.0	0.000	A
C-A	5.09	5.09			5.09				
A-B	0.00	0.00			0.00				
A-C	13.25	13.25			13.25				

09:15 - 09:30

Stream	Total Demand (Veh/TS)	Junction Arrivals (Veh)	Capacity (Veh/TS)	RFC	Throughput (Veh/TS)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0.00	0.00	148.26	0.000	0.00	0.0	0.0	0.000	A
B-A	0.00	0.00	112.56	0.000	0.00	0.0	0.0	0.000	A
C-AB	0.00	0.00	140.33	0.000	0.00	0.0	0.0	0.000	A
C-A	3.06	3.06			3.06				
A-B	0.00	0.00			0.00				
A-C	8.17	8.17			8.17				

09:30 - 09:45

Stream	Total Demand (Veh/TS)	Junction Arrivals (Veh)	Capacity (Veh/TS)	RFC	Throughput (Veh/TS)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	1.02	1.02	160.47	0.006	1.01	0.0	0.0	7.564	A
B-A	0.00	0.00	100.66	0.000	0.00	0.0	0.0	0.000	A
C-AB	0.00	0.00	142.47	0.000	0.00	0.0	0.0	0.000	A
C-A	4.08	4.08			4.08				
A-B	0.00	0.00			0.00				
A-C	2.04	2.04			2.04				

09:45 - 10:00

Stream	Total Demand (Veh/TS)	Junction Arrivals (Veh)	Capacity (Veh/TS)	RFC	Throughput (Veh/TS)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	1.02	1.02	159.96	0.006	1.02	0.0	0.0	5.664	A
B-A	0.00	0.00	99.65	0.000	0.00	0.0	0.0	0.000	A
C-AB	1.06	1.06	146.44	0.007	1.06	0.0	0.0	6.189	A
C-A	6.09	6.09			6.09				
A-B	0.00	0.00			0.00				
A-C	4.08	4.08			4.08				

10:00 - 10:15

Stream	Total Demand (Veh/TS)	Junction Arrivals (Veh)	Capacity (Veh/TS)	RFC	Throughput (Veh/TS)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	1.02	1.02	160.47	0.006	1.02	0.0	0.0	5.643	A
B-A	0.00	0.00	101.02	0.000	0.00	0.0	0.0	0.000	A
C-AB	0.00	0.00	142.03	0.000	0.01	0.0	0.0	0.000	A
C-A	1.02	1.02			1.02				
A-B	0.00	0.00			0.00				
A-C	2.04	2.04			2.04				

10:15 - 10:30

Stream	Total Demand (Veh/TS)	Junction Arrivals (Veh)	Capacity (Veh/TS)	RFC	Throughput (Veh/TS)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0.00	0.00	159.96	0.000	0.01	0.0	0.0	0.000	A
B-A	0.00	0.00	99.28	0.000	0.00	0.0	0.0	0.000	A
C-AB	1.08	1.08	147.52	0.007	1.07	0.0	0.0	6.123	A
C-A	8.13	8.13			8.13				
A-B	0.00	0.00			0.00				
A-C	4.08	4.08			4.08				

10:30 - 10:45

Stream	Total Demand (Veh/TS)	Junction Arrivals (Veh)	Capacity (Veh/TS)	RFC	Throughput (Veh/TS)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	1.02	1.02	160.22	0.006	1.01	0.0	0.0	5.652	A
B-A	0.00	0.00	100.47	0.000	0.00	0.0	0.0	0.000	A
C-AB	0.00	0.00	140.81	0.000	0.01	0.0	0.0	0.000	A
C-A	4.08	4.08			4.08				
A-B	0.00	0.00			0.00				
A-C	3.06	3.06			3.06				

10:45 - 11:00

Stream	Total Demand (Veh/TS)	Junction Arrivals (Veh)	Capacity (Veh/TS)	RFC	Throughput (Veh/TS)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0.00	0.00	132.10	0.000	0.01	0.0	0.0	0.000	A
B-A	1.02	1.02	120.98	0.008	1.01	0.0	0.0	7.501	A
C-AB	3.16	3.16	109.28	0.029	3.14	0.0	0.0	7.953	A
C-A	2.97	2.97			2.97				
A-B	0.00	0.00			0.00				
A-C	2.04	2.04			2.04				

11:00 - 11:15

Stream	Total Demand (Veh/TS)	Junction Arrivals (Veh)	Capacity (Veh/TS)	RFC	Throughput (Veh/TS)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0.00	0.00	131.51	0.000	0.00	0.0	0.0	0.000	A
B-A	0.00	0.00	121.53	0.000	0.01	0.0	0.0	0.000	A
C-AB	0.00	0.00	109.30	0.000	0.03	0.0	0.0	8.236	A
C-A	3.07	3.07			3.07				
A-B	0.00	0.00			0.00				
A-C	5.09	5.09			5.09				

11:15 - 11:30

Stream	Total Demand (Veh/TS)	Junction Arrivals (Veh)	Capacity (Veh/TS)	RFC	Throughput (Veh/TS)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	1.02	1.02	160.21	0.006	1.01	0.0	0.0	5.653	A
B-A	0.00	0.00	100.55	0.000	0.00	0.0	0.0	0.000	A
C-AB	1.03	1.03	143.50	0.007	1.02	0.0	0.0	6.317	A
C-A	1.01	1.01			1.01				
A-B	0.00	0.00			0.00				
A-C	2.06	2.06			2.06				

11:30 - 11:45

Stream	Total Demand (Veh/TS)	Junction Arrivals (Veh)	Capacity (Veh/TS)	RFC	Throughput (Veh/TS)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	1.02	1.02	159.36	0.006	1.02	0.0	0.0	5.683	A
B-A	0.00	0.00	99.70	0.000	0.00	0.0	0.0	0.000	A
C-AB	0.00	0.00	141.90	0.000	0.01	0.0	0.0	0.000	A
C-A	5.09	5.09			5.09				
A-B	1.02	1.02			1.02				
A-C	6.11	6.11			6.11				

11:45 - 12:00

Stream	Total Demand (Veh/TS)	Junction Arrivals (Veh)	Capacity (Veh/TS)	RFC	Throughput (Veh/TS)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	1.02	1.02	159.46	0.006	1.02	0.0	0.0	5.682	A
B-A	0.00	0.00	99.65	0.000	0.00	0.0	0.0	0.000	A
C-AB	0.00	0.00	126.21	0.000	0.00	0.0	0.0	0.000	A
C-A	4.11	4.11			4.11				
A-B	0.00	0.00			0.00				
A-C	6.11	6.11			6.11				

12:00 - 12:15

Stream	Total Demand (Veh/TS)	Junction Arrivals (Veh)	Capacity (Veh/TS)	RFC	Throughput (Veh/TS)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0.00	0.00	130.63	0.000	0.01	0.0	0.0	0.000	A
B-A	1.04	1.04	60.11	0.017	1.02	0.0	0.0	11.409	B
C-AB	1.11	1.11	75.24	0.015	1.10	0.0	0.0	9.297	A
C-A	5.02	5.02			5.02				
A-B	0.00	0.00			0.00				
A-C	5.13	5.13			5.13				

12:15 - 12:30

Stream	Total Demand (Veh/TS)	Junction Arrivals (Veh)	Capacity (Veh/TS)	RFC	Throughput (Veh/TS)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0.00	0.00	131.71	0.000	0.00	0.0	0.0	0.000	A
B-A	0.00	0.00	60.58	0.000	0.01	0.0	0.0	0.000	A
C-AB	1.06	1.06	145.22	0.007	1.06	0.0	0.0	9.154	A
C-A	6.07	6.07			6.07				
A-B	0.00	0.00			0.00				
A-C	4.08	4.08			4.08				

12:30 - 12:45

Stream	Total Demand (Veh/TS)	Junction Arrivals (Veh)	Capacity (Veh/TS)	RFC	Throughput (Veh/TS)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	2.04	2.04	160.73	0.013	2.03	0.0	0.0	5.670	A
B-A	0.00	0.00	80.49	0.000	0.00	0.0	0.0	0.000	A
C-AB	0.00	0.00	143.26	0.000	0.01	0.0	0.0	0.000	A
C-A	6.11	6.11			6.11				
A-B	0.00	0.00			0.00				
A-C	1.02	1.02			1.02				

12:45 - 13:00

Stream	Total Demand (Veh/TS)	Junction Arrivals (Veh)	Capacity (Veh/TS)	RFC	Throughput (Veh/TS)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0.00	0.00	159.96	0.000	0.01	0.0	0.0	0.000	A
B-A	0.00	0.00	89.25	0.000	0.00	0.0	0.0	0.000	A
C-AB	0.00	0.00	142.58	0.000	0.00	0.0	0.0	0.000	A
C-A	3.06	3.06			3.06				
A-B	0.00	0.00			0.00				
A-C	4.08	4.08			4.08				

13:00 - 13:15

Stream	Total Demand (Veh/TS)	Junction Arrivals (Veh)	Capacity (Veh/TS)	RFC	Throughput (Veh/TS)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0.00	0.00	158.62	0.000	0.00	0.0	0.0	0.000	A
B-A	0.00	0.00	106.26	0.000	0.00	0.0	0.0	0.000	A
C-AB	2.06	2.06	94.61	0.022	2.04	0.0	0.0	8.588	A
C-A	0.00	0.00			0.00				
A-B	0.00	0.00			0.00				
A-C	4.09	4.09			4.09				

13:15 - 13:30

Stream	Total Demand (Veh/TS)	Junction Arrivals (Veh)	Capacity (Veh/TS)	RFC	Throughput (Veh/TS)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	1.02	1.02	160.47	0.006	1.01	0.0	0.0	5.643	A
B-A	0.00	0.00	97.37	0.000	0.00	0.0	0.0	0.000	A
C-AB	0.00	0.00	99.87	0.000	0.02	0.0	0.0	9.200	A
C-A	6.11	6.11			6.11				
A-B	0.00	0.00			0.00				
A-C	2.04	2.04			2.04				

13:30 - 13:45

Stream	Total Demand (Veh/TS)	Junction Arrivals (Veh)	Capacity (Veh/TS)	RFC	Throughput (Veh/TS)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0.00	0.00	159.96	0.000	0.01	0.0	0.0	0.000	A
B-A	0.00	0.00	97.99	0.000	0.00	0.0	0.0	0.000	A
C-AB	1.06	1.06	146.13	0.007	1.06	0.0	0.0	6.203	A
C-A	6.11	6.11			6.11				
A-B	0.00	0.00			0.00				
A-C	4.08	4.08			4.08				

13:45 - 14:00

Stream	Total Demand (Veh/TS)	Junction Arrivals (Veh)	Capacity (Veh/TS)	RFC	Throughput (Veh/TS)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	1.02	1.02	143.15	0.007	1.01	0.0	0.0	6.331	A
B-A	1.04	1.04	57.93	0.018	1.02	0.0	0.0	15.809	C
C-AB	2.17	2.17	148.17	0.015	2.16	0.0	0.0	6.192	A
C-A	9.04	9.04			9.04				
A-B	0.00	0.00			0.00				
A-C	6.13	6.13			6.13				

14:00 - 14:15

Stream	Total Demand (Veh/TS)	Junction Arrivals (Veh)	Capacity (Veh/TS)	RFC	Throughput (Veh/TS)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0.00	0.00	137.03	0.000	0.01	0.0	0.0	0.000	A
B-A	0.00	0.00	58.82	0.000	0.02	0.0	0.0	0.000	A
C-AB	0.00	0.00	147.23	0.000	0.02	0.0	0.0	6.034	A
C-A	9.21	9.21			9.21				
A-B	0.00	0.00			0.00				
A-C	7.17	7.17			7.17				

14:15 - 14:30

Stream	Total Demand (Veh/TS)	Junction Arrivals (Veh)	Capacity (Veh/TS)	RFC	Throughput (Veh/TS)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	1.02	1.02	159.28	0.006	1.01	0.0	0.0	5.686	A
B-A	1.02	1.02	113.34	0.009	1.01	0.0	0.0	12.108	B
C-AB	0.00	0.00	116.91	0.000	0.00	0.0	0.0	0.000	A
C-A	9.19	9.19			9.19				
A-B	0.00	0.00			0.00				
A-C	1.02	1.02			1.02				

14:30 - 14:45

Stream	Total Demand (Veh/TS)	Junction Arrivals (Veh)	Capacity (Veh/TS)	RFC	Throughput (Veh/TS)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0.00	0.00	142.84	0.000	0.01	0.0	0.0	0.000	A
B-A	0.00	0.00	115.93	0.000	0.01	0.0	0.0	0.000	A
C-AB	0.00	0.00	135.49	0.000	0.00	0.0	0.0	0.000	A
C-A	9.17	9.17			9.17				
A-B	0.00	0.00			0.00				
A-C	10.19	10.19			10.19				

14:45 - 15:00

Stream	Total Demand (Veh/TS)	Junction Arrivals (Veh)	Capacity (Veh/TS)	RFC	Throughput (Veh/TS)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0.00	0.00	158.37	0.000	0.00	0.0	0.0	0.000	A
B-A	0.00	0.00	111.27	0.000	0.00	0.0	0.0	0.000	A
C-AB	1.12	1.12	150.56	0.007	1.11	0.0	0.0	6.022	A
C-A	13.18	13.18			13.18				
A-B	0.00	0.00			0.00				
A-C	6.11	6.11			6.11				

15:00 - 15:15

Stream	Total Demand (Veh/TS)	Junction Arrivals (Veh)	Capacity (Veh/TS)	RFC	Throughput (Veh/TS)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0.00	0.00	157.61	0.000	0.00	0.0	0.0	0.000	A
B-A	0.00	0.00	111.30	0.000	0.00	0.0	0.0	0.000	A
C-AB	1.09	1.09	147.40	0.007	1.09	0.0	0.0	6.170	A
C-A	9.12	9.12			9.12				
A-B	0.00	0.00			0.00				
A-C	8.17	8.17			8.17				

15:15 - 15:30

Stream	Total Demand (Veh/TS)	Junction Arrivals (Veh)	Capacity (Veh/TS)	RFC	Throughput (Veh/TS)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	1.02	1.02	159.20	0.006	1.01	0.0	0.0	5.689	A
B-A	0.00	0.00	99.71	0.000	0.00	0.0	0.0	0.000	A
C-AB	0.00	0.00	140.90	0.000	0.01	0.0	0.0	0.000	A
C-A	4.08	4.08			4.08				
A-B	0.00	0.00			0.00				
A-C	7.13	7.13			7.13				

15:30 - 15:45

Stream	Total Demand (Veh/TS)	Junction Arrivals (Veh)	Capacity (Veh/TS)	RFC	Throughput (Veh/TS)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0.00	0.00	159.46	0.000	0.01	0.0	0.0	0.000	A
B-A	0.00	0.00	99.90	0.000	0.00	0.0	0.0	0.000	A
C-AB	0.00	0.00	140.15	0.000	0.00	0.0	0.0	0.000	A
C-A	4.08	4.08			4.08				
A-B	0.00	0.00			0.00				
A-C	6.11	6.11			6.11				

15:45 - 16:00

Stream	Total Demand (Veh/TS)	Junction Arrivals (Veh)	Capacity (Veh/TS)	RFC	Throughput (Veh/TS)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0.00	0.00	157.87	0.000	0.00	0.0	0.0	0.000	A
B-A	0.00	0.00	110.57	0.000	0.00	0.0	0.0	0.000	A
C-AB	1.13	1.13	151.52	0.007	1.13	0.0	0.0	5.964	A
C-A	15.21	15.21			15.21				
A-B	0.00	0.00			0.00				
A-C	8.15	8.15			8.15				

16:00 - 16:15

Stream	Total Demand (Veh/TS)	Junction Arrivals (Veh)	Capacity (Veh/TS)	RFC	Throughput (Veh/TS)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0.00	0.00	158.02	0.000	0.00	0.0	0.0	0.000	A
B-A	0.00	0.00	112.10	0.000	0.00	0.0	0.0	0.000	A
C-AB	0.00	0.00	139.75	0.000	0.01	0.0	0.0	0.000	A
C-A	8.17	8.17			8.17				
A-B	1.02	1.02			1.02				
A-C	7.13	7.13			7.13				

16:15 - 16:30

Stream	Total Demand (Veh/TS)	Junction Arrivals (Veh)	Capacity (Veh/TS)	RFC	Throughput (Veh/TS)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0.00	0.00	130.60	0.000	0.00	0.0	0.0	0.000	A
B-A	1.02	1.02	119.01	0.009	1.01	0.0	0.0	7.626	A
C-AB	1.22	1.22	81.14	0.015	1.21	0.0	0.0	8.781	A
C-A	12.04	12.04			12.04				
A-B	0.00	0.00			0.00				
A-C	7.15	7.15			7.15				

16:30 - 16:45

Stream	Total Demand (Veh/TS)	Junction Arrivals (Veh)	Capacity (Veh/TS)	RFC	Throughput (Veh/TS)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0.00	0.00	131.93	0.000	0.00	0.0	0.0	0.000	A
B-A	0.00	0.00	121.28	0.000	0.01	0.0	0.0	0.000	A
C-AB	0.00	0.00	84.45	0.000	0.01	0.0	0.0	11.161	B
C-A	9.17	9.17			9.17				
A-B	0.00	0.00			0.00				
A-C	3.06	3.06			3.06				

16:45 - 17:00

Stream	Total Demand (Veh/TS)	Junction Arrivals (Veh)	Capacity (Veh/TS)	RFC	Throughput (Veh/TS)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0.00	0.00	159.13	0.000	0.00	0.0	0.0	0.000	A
B-A	0.00	0.00	112.77	0.000	0.00	0.0	0.0	0.000	A
C-AB	0.00	0.00	142.81	0.000	0.00	0.0	0.0	0.000	A
C-A	10.21	10.21			10.21				
A-B	0.00	0.00			0.00				
A-C	3.06	3.06			3.06				

17:00 - 17:15

Stream	Total Demand (Veh/TS)	Junction Arrivals (Veh)	Capacity (Veh/TS)	RFC	Throughput (Veh/TS)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0.00	0.00	157.36	0.000	0.00	0.0	0.0	0.000	A
B-A	0.00	0.00	110.86	0.000	0.00	0.0	0.0	0.000	A
C-AB	0.00	0.00	129.00	0.000	0.00	0.0	0.0	0.000	A
C-A	13.26	13.26			13.26				
A-B	0.00	0.00			0.00				
A-C	10.19	10.19			10.19				

17:15 - 17:30

Stream	Total Demand (Veh/TS)	Junction Arrivals (Veh)	Capacity (Veh/TS)	RFC	Throughput (Veh/TS)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0.00	0.00	158.12	0.000	0.00	0.0	0.0	0.000	A
B-A	0.00	0.00	112.19	0.000	0.00	0.0	0.0	0.000	A
C-AB	0.00	0.00	135.49	0.000	0.00	0.0	0.0	0.000	A
C-A	9.17	9.17			9.17				
A-B	0.00	0.00			0.00				
A-C	7.13	7.13			7.13				

17:30 - 17:45

Stream	Total Demand (Veh/TS)	Junction Arrivals (Veh)	Capacity (Veh/TS)	RFC	Throughput (Veh/TS)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0.00	0.00	158.63	0.000	0.00	0.0	0.0	0.000	A
B-A	0.00	0.00	110.80	0.000	0.00	0.0	0.0	0.000	A
C-AB	1.15	1.15	153.25	0.008	1.14	0.0	0.0	5.916	A
C-A	17.25	17.25			17.25				
A-B	0.00	0.00			0.00				
A-C	5.09	5.09			5.09				

17:45 - 18:00

Stream	Total Demand (Veh/TS)	Junction Arrivals (Veh)	Capacity (Veh/TS)	RFC	Throughput (Veh/TS)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0.00	0.00	131.66	0.000	0.00	0.0	0.0	0.000	A
B-A	1.02	1.02	121.87	0.008	1.01	0.0	0.0	7.446	A
C-AB	0.00	0.00	139.94	0.000	0.01	0.0	0.0	0.000	A
C-A	5.09	5.09			5.09				
A-B	0.00	0.00			0.00				
A-C	3.06	3.06			3.06				

18:00 - 18:15

Stream	Total Demand (Veh/TS)	Junction Arrivals (Veh)	Capacity (Veh/TS)	RFC	Throughput (Veh/TS)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0.00	0.00	132.14	0.000	0.00	0.0	0.0	0.000	A
B-A	0.00	0.00	121.19	0.000	0.01	0.0	0.0	0.000	A
C-AB	1.09	1.09	149.29	0.007	1.08	0.0	0.0	6.135	A
C-A	9.10	9.10			9.10				
A-B	0.00	0.00			0.00				
A-C	2.04	2.04			2.04				

18:15 - 18:30

Stream	Total Demand (Veh/TS)	Junction Arrivals (Veh)	Capacity (Veh/TS)	RFC	Throughput (Veh/TS)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	2.04	2.04	153.94	0.013	2.02	0.0	0.0	5.924	A
B-A	1.02	1.02	108.35	0.009	1.01	0.0	0.0	8.385	A
C-AB	1.10	1.10	149.48	0.007	1.10	0.0	0.0	6.046	A
C-A	11.14	11.14			11.14				
A-B	0.00	0.00			0.00				
A-C	6.11	6.11			6.11				

18:30 - 18:45

Stream	Total Demand (Veh/TS)	Junction Arrivals (Veh)	Capacity (Veh/TS)	RFC	Throughput (Veh/TS)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	1.02	1.02	159.31	0.006	1.03	0.0	0.0	5.687	A
B-A	0.00	0.00	99.68	0.000	0.01	0.0	0.0	0.000	A
C-AB	0.00	0.00	141.15	0.000	0.01	0.0	0.0	0.000	A
C-A	7.15	7.15			7.15				
A-B	0.00	0.00			0.00				
A-C	6.11	6.11			6.11				

18:45 - 19:00

Stream	Total Demand (Veh/TS)	Junction Arrivals (Veh)	Capacity (Veh/TS)	RFC	Throughput (Veh/TS)	Start queue (Veh)	End queue (Veh)	Delay (s)	Unsignalised level of service
B-C	0.00	0.00	159.46	0.000	0.01	0.0	0.0	0.000	A
B-A	0.00	0.00	99.78	0.000	0.00	0.0	0.0	0.000	A
C-AB	0.00	0.00	138.03	0.000	0.00	0.0	0.0	0.000	A
C-A	5.09	5.09			5.09				
A-B	0.00	0.00			0.00				
A-C	6.11	6.11			6.11				

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Introduction

15.1 This chapter of the Environmental Impact Assessment Report (EIAR), prepared by SLR Consulting Ireland, provides supporting information to accompany a Planning Application to Cork Co. Council by Keohane Readymix Ltd. for sand & gravel extraction at Knockroe, Bandon, co. Cork. It addresses the potential interaction of environmental impacts arising from the proposed development.

15.2 For the purposes of this EIAR, the area of 4.0 Ha. within the red line boundary on EIAR Figure 1-2 is referred to as 'the application area'. A description of the development is provided in EIAR Chapter 2.

15.3 All of the predictable significant impacts of the proposed development and proposed measures in place to mitigate them have been outlined in this EIAR.

15.4 However, for any development with the potential for significant environmental impact there is also the potential for interaction amongst these impacts. The result of these interactions may either exacerbate the magnitude of the impact or ameliorate it. The interaction of impacts on the surrounding environment needs to be addressed as part of the Environmental Impact Assessment process.

15.5 This Environmental Impact Assessment Report was prepared by SLR Consulting on behalf of Keohane Readymix Ltd. as an integrated document, rather than a collection of separate reports. The impacts that arise as a result of the interaction between several aspects of the development have, therefore been addressed in the main body of each EIAR chapter.

The Interaction of the Foregoing

15.6 The interaction between the various environmental topics has been covered within each of the EIAR chapters, 4 through to 14, where relevant.

15.7 A matrix method has been used[1], in which the environmental components addressed in the previous sections of this EIAR have been placed on both axes of a matrix; these interactions are summarised in Table 15-1 below.

15.8 The purpose of the effects matrix is to identify potential interactions. Actual interactions and their significance are dealt with in the relevant chapter of the EIAR. An overview of the key interactions is provided below in this chapter.

[1] As per EPA Guidelines (2022)

Table 15-1: Potential Impact Interaction and Key Interrelationships Matrix

	Population & Human Health	Bio-diversity	Land, Soils & Geology	Water	Climate	Air Quality	Noise	Material Assets	Cultural Heritage	Landscape and Visual	Traffic
Population & Human Health						■	■			■	■
Bio-diversity						■	■				
Land, Soils & Geology				■							
Water			■		■						
Climate				■							
Air Quality	■	■									■
Noise	■	■									
Material Assets											
Cultural Heritage											
Landscape and Visual	■										
Traffic	■					■					

Overview Of Key Interactions

Population and Human Health

15.9 In relation to the key interactions of human receptors with air quality, noise, landscape and traffic, these are addressed in Chapter 8 (Air Quality), Chapter 10 (Noise), Chapter 13 (Landscape) and Chapter 14 (Traffic), as outlined above.

Biodiversity

15.10 In relation to biodiversity there is potential for interaction with air quality and noise, and these interactions are addressed in Chapter 8 (Air Quality) and Chapter 10 (Noise).

15.11 Following review of the existing dust deposition, noise results and detailed assessments it is concluded that the proposed development will have an acceptable (i.e. not significant) dust impact and negligible noise impact on the nearest ecological receptors. Due to the

large separation distance between the site and the nearest designated European (Natura 2000) sites any potential dust and noise impact on same will be negligible.

Land, Soils and Geology

15.12 The interaction between Land, Soils & Geology and Water is addressed in Chapter 7 (Water), see below.

Water

15.13 In relation to water there is potential for interaction with land, soils & geology and climate, and these are addressed in Chapter 6 (Land, Soil & Geology) and Chapter 7 (Water) of the EIAR.

15.14 Mitigation and management measures will be in place to prevent spills and manage the water environment (i.e. no fuel storage on site; no machinery maintenance or repairs on site, no groundwater abstraction and no discharge off-site to surface waters etc.) . Implementation of these measures will ensure that there will be no significant effects owing to the interaction of land, soils and geology and the water environment.

Climate

15.15 The interaction of climate (weather conditions) with the water environment is addressed in Chapter 7 (Water), in terms of surface water, groundwater and water management at the site.

Air Quality

15.16 In relation to air quality (in particular dust deposition) there is potential for interaction with human and ecological receptors, and this is addressed in Chapter 8 (Air Quality).

15.17 Following a detailed dust assessment it is concluded that the proposed development (with the range of management / mitigation measures implemented) will have an acceptable (i.e. significant) dust impact on the nearest ecological receptors and an insignificant dust impact on the nearest human receptors. Due to the large separation distance between the site and the nearest designated European (Natura 2000) sites any potential dust impact on same will be negligible.

Noise

15.18 In relation to noise there is potential for interaction with human and ecological receptors, and this is addressed in Chapter 10 (Noise).

15.19 Following a detailed noise assessment it is concluded that the proposed development (with the range of management / mitigation measures implemented) will have a negligible noise impact on human or ecological receptors. Due to the large separation distance between the site and the nearest designated European (Natura 2000) sites any potential noise impact on same will be negligible.

Material Assets

15.20 Due to the nature and location of the proposed development there is no potential for any significant interaction between material assets (waste management and built services) and the other environmental topics.

Cultural Heritage

15.21 There is no potential for any significant interaction between Cultural Heritage and other environmental topics.

Landscape & Visual

15.22 The proposed development has the potential to impact on population (human) amenity through changes to the landscape and views / prospects. The detailed landscape & visual assessment provided in Chapter 13 (Landscape) concludes that the proposed development would have moderate/minor or minor effects on the sensitive landscape receptors identified, during the operational stage (i.e. levels of impact not considered to be significant). The character of the views along the river valley / from designated scenic routes will be preserved.

15.23 On completion of all restoration works the predicted landscape and visual effects would reduce to minor/negligible (i.e. effects not regarded as significant).

Traffic

15.24 Potential interactions associated with traffic movements from the proposed development with the general population in the form of other road users are addressed in Chapter 14 (Traffic). The detailed traffic assessment concludes that the traffic generated by the operation of proposed development would have an imperceptible impact on the link capacity of the L3204 Local Road, and the junction capacity of site access junction. The impact of the proposed development, in relation to road safety and the existing road infrastructure, was also determined to be imperceptible.

15.25 Chapter 8 (Air Quality) provides details of the management / mitigation measures that are in place at the development to prevent / minimise generation of traffic-related dust on the internal access road and at the site entrance.

REFERENCES

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