

# ROADSTONE LIMITED

## Eastern Satellite Quarry and New Concrete Plant Ballykennedy, Kilgreany and Canty Townlands, Dungarvan, Co. Waterford

### ENVIRONMENTAL IMPACT ASSESSMENT REPORT



July 2021

VOLUME 1



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Ref. 501.00180.00264





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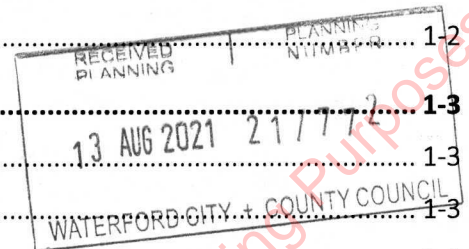
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## INTRODUCTION

- 1.1 This Environmental Impact Assessment Report (EIAR) provides supporting information to accompany a Planning Application to Waterford City and County Council by Roadstone Limited in respect of a proposed new satellite quarry to be developed immediately to the east of Cappagh Quarry and the construction and operation of a new concrete batching plant on a hardstanding area on the quarry floor at the northern end of the existing quarry.
- 1.2 The proposed development, within an overall application site area of 18.2 hectares (45.0 acres) provides for the following:
- development of a satellite quarry immediately to the east of Cappagh Quarry (previously permitted under Planning Permission 06/1599 and An Bord Pleanála PL 24.225443) and the local access passageway which delineates its eastern boundary. The satellite quarry will extend to 13.6 hectares (33.6 acres), of which approximately 9.7 hectares (24.0 acres) will be extracted;
  - construction of a 40m long sub-surface reinforced concrete tunnel underpass (with internal cross-section measuring 6m wide by 5.5m high) under the existing local access passageway (previously permitted under Planning Permission 920/97) to connect the existing quarry to the proposed satellite quarry at quarry floor level;
  - stripping of overburden soils at the satellite quarry for use in construction of environmental bunds and ongoing site restoration works and subsequent excavation of a single quarry bench in limestone bedrock using mechanical excavation and blasting techniques. The proposed quarry faces will vary in height from approximately 8m to 20m and the quarry floor will not extend below 10mOD or into the underlying groundwater body (consistent with Condition 2 of the existing quarry planning permission);
  - processing (crushing and screening) of excavated rock to produce aggregates;
  - demolition of an existing derelict house in the north-western corner of the proposed satellite quarry, removal of existing internal hedgerows, construction of new perimeter fence and installation of access gates leading from the local access passageway to a perimeter track running above and around the satellite quarry;
  - temporary diversion of a section of the existing local access passageway to facilitate construction and installation of the proposed tunnel underpass and re-instatement of the access passageway above it thereafter;
  - provision of a temporary access gate and ramp at the existing quarry to facilitate the temporary haulage of materials to and from the satellite quarry and across the existing passageway until the proposed tunnel underpass is in place;
  - demolition of concrete supports for former crushing plant;
  - construction and operation of a new concrete batching facility (which comprises 4 No. cement silos, batching / mixing unit, aggregate storage bins, an aggregate loading hopper and connecting conveyor systems), all on a concrete paved area on the existing quarry floor, in front of the northern quarry face;
  - provision of a batching control office and admixture storage shed;
  - construction of a closed loop concrete recycling facility, comprising a concrete truck wash out area, settlement lagoons and 70,000 litre water storage / recycling tank immediately behind (north of) the concrete batching plant;
  - construction of an aggregate storage hardstanding area (covering approximately 1 hectare)



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immediately to the east of the proposed concrete batching plant;

- continued use of established site infrastructure in service of the proposed satellite quarry and new concrete batching plant;
- removal and replanting of the existing boundary hedge, re-alignment of the boundary wall and demolition / removal of an existing structure to the east of the existing quarry access junction in order to provide enhanced sightlines for traffic egressing the quarry;
- implementation of a progressive restoration scheme (in phases) in tandem with extraction activities across the satellite quarry area.

- 1.3 The overall satellite quarry area of 13.6 hectares comprises the proposed extraction area (of approximately 9.7 hectares), the perimeter access track, the 2m high perimeter vegetated safety / screening berm and other associated landscaping / screening areas.
- 1.4 The total volume of limestone bedrock to be extracted at the proposed satellite quarry is 1,400,000m<sup>3</sup>, equivalent to approximately 3,360,000 tonnes assuming an in-situ rock density of 2.4tonnes/m<sup>3</sup>.
- 1.5 The overall application site, extending across part of the existing quarry footprint plus the satellite quarry area, covers a total area of 18.2 hectares. The location of the application site is indicated on an extract from the 1:50,000 scale Ordnance Survey Discovery series map of the area reproduced in Figure 1-1.

## THE APPLICANT

- 1.6 The Applicant, Roadstone Limited is an operating company within CRH plc and is Ireland's leading supplier of aggregates, concrete products and bituminous road surfacing materials to the construction and development industries. The company currently employs several hundred people at 65 locations throughout the country.
- 1.7 Roadstone Limited originally developed from aggregate supply companies founded by the Roche Brothers in the 1930s. After steady growth through the 1930s and 1940s, it was floated on the Irish Stock Exchange in 1949. After further significant growth through the 1960s, Roadstone merged with Cement Ltd. in 1970 to become Cement Roadstone Holdings (CRH) plc. Today, CRH plc is one of the leading suppliers of construction materials in the world, operating from over 3,100 locations and employing over 79,000 people worldwide.
- 1.8 Operations at all Roadstone's quarry and concrete production facilities adhere to the environmental guidelines of the Irish Concrete Federation (ICF) and current best practice for the quarrying industry, as set out in the publication *Guidelines on Environmental Management in the Extractive Industries* published by the Environmental Protection Agency (EPA, 2006).
- 1.9 Roadstone is committed to achieving and maintaining industry leading environmental standards. To this end, the company has established, and actively implements, an in-house Environmental Management System (EMS) at all its locations. The EMS for existing extractive operations at Cappagh Quarry is accredited to ISO 14001 standard and is subject to regular audit. At each of its operational sites, Roadstone strives to develop and maintain good working relationships with local communities and businesses and with the Local Authority.

## Applicant's Land Interest

- 1.10 The Applicant's freehold land ownership at Cappagh Quarry extends to 58.9 hectares (145.5 acres) and is shown edged blue in Figure 1-2. The application site is located entirely within the Applicant's ownership and extends to an area of 18.2 hectares (45.0 acres). The extent of the application site



is shown edged red in Figure 1-2. Planning site notices have been erected at existing and former accesses to the Roadstone landholding, at the locations indicated in Figure 1-2.

## THE SITE

### Site Location and Setting

- 1.11 The application site and Cappagh Quarry are located approximately 8km west of Dungarvan, 8km south-east of Cappoquin and 13km east of Lismore in west County Waterford. The quarry and application site straddle the three townlands of Ballykennedy, Kilgreany and Canty, located approximately 1.5km to the south of N72 National Secondary Route which links Dungarvan to both Cappoquin and Lismore.
- 1.12 The quarry is located on the limestone floor of a wide valley which runs broadly west to east, between two parallel sandstone ridges which rise to elevations in excess of 200mOD. Ground levels start to rise from the valley floor up to the Drum Hills approximately 3km to the south and to the foothills of the Comeragh Mountains approximately 3km to the north.
- 1.13 There are few streams or watercourses in the immediate vicinity of the quarry. The River Finisk flows from north to south approximately 2km to the west, while the River Brickey flows west to east approximately 0.5km to the south. The River Brickey system has been modified as part of an arterial drainage scheme implemented and maintained by the Office of Public Works to improve surface water drainage of lands within its immediate catchment.

### Site Description

- 1.14 The topography of the area immediately surrounding the existing quarry and the proposed satellite quarry to the east is locally flat to gently undulating. Ground levels are locally elevated above 30mOD at the northern end of the proposed satellite quarry, and from there, slope away gently in all directions. The ground levels around the southern end of the proposed satellite quarry are approximately 20mOD to 21mOD.
- 1.15 Quarry floor level across the pre-existing quarry lies above 10mOD and is restricted by its existing planning permission from extending deeper. Existing quarry faces range in height from approximately 20m at the north-eastern corner to approximately 8m in the south-western corner.
- 1.16 The proposed satellite quarry currently comprises a number of agricultural fields, set as grassland. There is an old derelict property located at the northern end of the satellite quarry area which fronts onto the L2018 Local Road. This is to be demolished to facilitate the proposed quarry development.
- 1.17 The existing local access passageway which runs above and behind the eastern face of the pre-existing quarry provides a link between the Whitechurch Road (L2018 Local Road) and the Canty Road for local landowners and residents. A recent aerial photograph (taken in February 2021) is reproduced in Figure 1-3 and shows the layout of the quarry and key elements of the associated site infrastructure.

### Site Access

- 1.18 The existing quarry and application site are located immediately south of the L2018 Local Road linking the R672 Regional Road at Ballynamuck West (on the north-western outskirts of Dungarvan) to the N72 National Secondary Road at Ballynahemery, immediately east of Finisk Bridge. For much of its length, the L2018 Local Road also forms part of the Sean Kelly Cycle Trail which links a number of towns across West Waterford.

- 1.19 Access to, and egress from, Cappagh Quarry, the proposed satellite quarry and the new concrete batching plant will be provided via the existing quarry access junction, located on the southern side of the L2018 Local Road (and previously permitted under WCC Planning Ref. No. RB06/1599 and An Bord Pleanála Reference No. PL 24.225443).
- 1.20 The existing quarry entrance lies within the 80km/h national speed limit. Visibility splays of 4.5m x 90m exist in both directions at this junction, in accordance with the requirements of the then Waterford County Development Plan (2005) which was current when the most recent planning permission for extraction activities was granted. These sightlines require improvement to meet current Development Plan requirements. To achieve this, it is proposed to amend the position of the existing boundary wall and hedge to the east of the access, and to demolish / remove an existing structure.
- 1.21 Traffic exiting the quarry and heading for the N72 initially travels westwards along the L2018 Local Road to Whitechurch Crossroads, immediately west of the existing quarry access. Thereafter, it turns right onto the L2019 Local Road and continues in a northerly direction for 1.5km, up to its junction with the N72.
- 1.22 Alternatively, traffic exiting the quarry can continue straight through Whitechurch Crossroads and along the L2018 for 1.8km, running westwards at first before then turning northwards toward its junction with the N72 at Ballynahemery.
- 1.23 Traffic travelling to the R671 Regional Road and to the N25 National Primary Road and Youghal, Co. Cork, turns left onto the L2019 Local Road at Whitechurch Cross-Roads and continues in a south-westerly direction for 2.5km thereafter, up to its junction with the R671 at Knocknascagh Crossroads.
- 1.24 The proposed development will not, in and of itself, generate any increase in established quarry output over and above established former levels. It is expected that future quarry output (from all combined existing and future activities) will generate a maximum of 100 daily HGV return trips to and from the quarry (i.e.. 100 inward HGV movements inward plus 100 outward HGV movements).

## Surrounding Land-Use

- 1.25 The existing quarry at Cappagh has been in operation since 1952 and was acquired by John A. Wood (now a part of Roadstone) in 1969. Although extraction of permitted reserves under the existing planning permission is effectively complete, some processing of the limestone bedrock still continues at the quarry. The limestone at and around the quarry is of relatively high grade and purity and is valued as a source of high-quality aggregate for the construction industry.
- 1.26 The lands surrounding the quarry and application site are characterised as rural and predominantly agricultural in nature. Local fields comprise a mix of grassland and tillage and there is relatively little, if any forestry in the area. There are many farm-based enterprises of varying size and scale throughout the area, together with many farm homesteads and dispersed residential housing, much of which is located along the local road network.
- 1.27 There are two national schools in the local area around the quarry. Whitechurch National school is located approximately 2km south-west of the quarry, along the L2019 Local Road, close to the Knocknascagh Crossroads and the junction with the R671 Regional Road. Carriglea National School is located in Ballyduff townland approximately 4km east of the quarry, along the L2018 Local Road
- 1.28 There are a number of rural based enterprises in the surrounding area. Cappagh Fishing Lakes in Ballinamintra Upper, approximately 1.5km north of the quarry, on the northern side of the N72 provides facilities for leisure anglers at a number of privately owned lakes. Carriglea Convent is a facility which provides residential, respite and day services to people with an intellectually disability or autism and is currently located approximately 2.8km east of the quarry.



- 1.29 Woodhouse windfarm is a 20 MW windfarm located 3km south-west of the quarry. It is operated by the ESB and comprises a total of 8 No. 2.5MW turbines. MMG Ireland is a metal fabricator and galvanising business located in Ballinameela, approximately 1.6km west of the quarry. Keereen Quarries is another rural quarry located approximately 3.5km south-west of Cappagh Quarry, on the western side of the R671 Regional Road.
- 1.30 Community facilities in the area include St. James Church, located approximately 1.3km south-west of the quarry along the L2019 Local Road. Further along the road, Ballinameela Community Centre and Ballinameela GAA club are both located adjacent to Whitechurch National School, 2km south-west of the quarry. West Waterford Golf club is located approximately 3.5km south-east of the quarry in Coolcormuck townland.
- 1.31 Two high voltage electricity transmission lines run broadly NE to SW a short distance beyond the south-eastern corner of the Roadstone property boundary. A 220kV line runs approximately 100m south of the proposed satellite quarry at its closest point while a 100kV line runs approximately 1.3km to the south-east.
- 1.32 The closest designated nature site to Cappagh Quarry is located along the banks of the River Finisk which flows approximately 1.2km west of the quarry at its closest point and forms part of the wider Blackwater River (Cork/Waterford) SAC (Site Code: 002170).
- 1.33 The closest protected structure to the quarry is the Whitechurch Church of Ireland parish church located at the crossroads immediately beyond the north-western corner of the application site and the Roadstone landholding (Ref. No. 668 in the Waterford County Development 2011 – 2017).
- 1.34 The closest Recorded Monument is a rath / ringfort in Canty townland (RMP Ref. No. WA30-021), located approximately 0.5 km to the south-east of the proposed satellite quarry. Kilgreany Cave Dwelling (WA030-18) and Ballynamindra Middle Cave Dwelling (WA030-15), both located over 200m south-west of the application site, were placed on the Register of Historic Monuments in 1996.
- 1.35 Existing land use and established land designations within approximately 1km of Cappagh Quarry and the application site are shown on Figure 1-4.

## ENVIRONMENTAL IMPACT ASSESSMENT REPORT (EIAR)

- 1.36 An Environmental Impact Assessment Report (EIAR) is *“a statement of the effects, if any, which proposed development, if carried out, would have on the environment”*. It is a systematic evaluation of the positive and negative impacts of a planned project or development on both the natural and human environment. The principal objectives of an Environmental Impact Assessment Report are:
- to identify and/or predict the likely significant impacts of the project / development;
  - to identify what mitigation measures should be incorporated into the project / development to eliminate or minimise the likely impacts;
  - to interpret and communicate the assessment of the impact of the project / development, in both technical and non-technical terms;
  - to assist a Planning Authority in its decision-making process in respect of a planning application for the project / development.

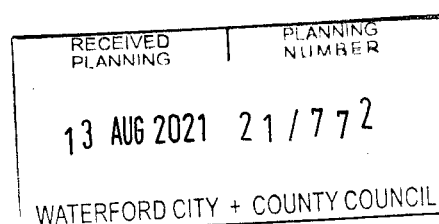
### EIA Screening

- 1.37 Part 1 and Part 2 of Schedule 5 of the Planning and Development Regulations 2001 (as amended) identify the nature and scale of development that requires mandatory Environmental Impact Assessment (EIA) and submission of an Environmental Impact Assessment Report (EIAR) in support of a planning application.

- 1.38 Paragraph 2(b) of Part 2 of Schedule 5 states that the following form of development requires an EIA  
*Extraction of stone, gravel, sand or clay where the area of extraction would be greater than 5 hectares.*
- 1.39 Paragraph 13(a) of Part 2 of Schedule 5 states that the following development also requires an EIA  
*Any change or extension of development (already authorised, executed or in the process of being executed (not being a change or extension referred to in Part 1)) which would*  
 (i) *Result in the development being of a class listed in Part 1 or paragraphs 1 to 12 of Part 2 of this Schedule or*  
 (ii) *Result in an increase in size greater than*  
 - *25 per cent or*  
 - *An amount equal to 50% of the appropriate threshold,*  
*whichever is the greater.*
- 1.40 The planned 13.6 hectare satellite quarry exceeds the 5-hectare threshold for EIA set by Paragraph 2(b) of Schedule 5 of the Regulations. As it is also linked to the existing quarry by way of a tunnel underpass, it arguably also exceeds the threshold for extension set by both Paragraph 13(a) Clause (i) and (ii). In such circumstances therefore, there is a clear requirement for EIA and preparation and submission of an EIA Report (EIAR) under Part 2 of Schedule 5 of the Planning and Development Regulations 2001 (as amended).

## EIA Scoping / Consultations

- 1.41 In the course of preparing this Environmental Impact Assessment Report a pre-planning consultation meeting was held outdoors at the application site between the local area planner for Waterford City and County Council and representatives of SLR Consulting Ireland and Roadstone Limited on 19<sup>th</sup> May 2021 (Meeting Ref. No. PQ202191).
- 1.42 At the meeting, details of the proposed development were outlined in the course of a site walkover and issues of interest or concern to the Planning Authority were identified and discussed. Amongst the issues raised by the area planner during the pre-planning consultation were the requirement to
- have regard to the continued utility of the existing passageway and any undertakings made previously in respect of its continued availability to the local community;
  - address compliance with conditions attaching to the existing planning permission;
  - establish the need for the proposed development;
  - provide clarity on aggregate processing activities / concrete production operations;
  - assess / address impacts on local residents most likely to be impacted by the development;
  - provide clarity on all ongoing and future restoration activities at the existing quarry.
- 1.43 Arising from feedback provided at the pre-planning consultation, Roadstone decided to amend its previous development proposal (from 2018) which had provided for a re-alignment of the existing local access passageway to facilitate eastward extension of the existing quarry and instead opted to develop a satellite quarry immediately east of the existing passageway and to install a tunnel underpass to link it to the established quarry on the other side. Where appropriate, other issues identified above have been addressed in the Planning Statement and/or other Chapters of this EIAR.





- 1.44 As part of a formal pre-planning consultation process, a number of relevant prescribed bodies and consultees were contacted by SLR Consulting Ireland by both email and post on 3 March 2021 (and in the days immediately thereafter). Each was provided with a summary report and drawings in respect of proposed quarry development and new concrete batching plant and invited to provide feedback and/or details of any issues likely to be concern to them which should be addressed in the EIAR accompanying the planning application for the project.
- 1.45 The prescribed bodies / consultees who were formally contacted are listed in Table 1-1 below:

Table 1-1  
Pre-Planning Consultees

Prescribed Bodies / Organisation	
Minister for Housing, Local Government and Heritage	Minister of Culture, Heritage and the Gaeltacht (Development Applications Unit, DAU)
Health Service Executive (EHO, Wicklow)	Geological Survey of Ireland
Inland Fisheries Ireland	Environmental Protection Agency
Transport Infrastructure Ireland	Heritage Council

- 1.46 Responses to the consultation exercise were provided by the Department of Housing (National Monuments Service), Transport Infrastructure Ireland, the Geological Survey of Ireland and the local HSE Environmental Health Officer. Copies of these submissions are provided in Appendix 1-A and any issues or concerns raised therein are addressed in the relevant specialist topic Chapter of this EIAR.
- 1.47 Other consultations and informal discussions were held with officials in State bodies and agencies by individual EIA contributors when undertaking environmental impact assessment in their specialist discipline. Relevant details / outcomes of those consultations are detailed in the specialist environmental chapters of this EIAR, together with details of relevant data or information provided.

## Difficulties Encountered with EIAR Compilation

- 1.48 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.

## Format of the Environmental Impact Assessment Report (EIAR)

- 1.49 To facilitate clarity, this EIAR has been prepared in accordance with the Environmental Protection Agency (EPA) Guidelines (Draft – May 2017). The EIAR is sub divided into sixteen parts. As an overview, they comprise of:

### Chapter 1: Introduction / Screening / Scoping

- 1.50 An introduction to the development and a brief explanation of the aims and format of the EIAR. It also identifies the various professional consultants who have contributed to this EIAR and the screening / scoping process carried out.

### Chapter 2: Project Description

- 1.51 Chapter 2 provides:

- details of the physical characteristics of the proposed development project and the land-use requirements during construction and operation, as well as other works that are integral to the project;
- the main characteristics of the operational phase of the project e.g. nature and quantity of materials and natural resources;
- an estimate, by type and quantity, of the expected residues and emissions produced during the construction, operational and restoration phases of the proposed development.

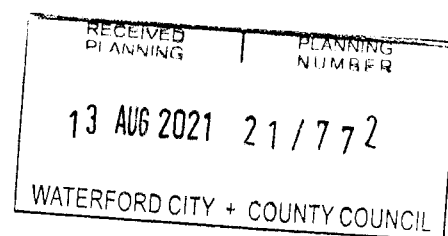
### Chapter 3: Reasonable Alternatives

- 1.52 Chapter 3 provides a description of the reasonable alternatives studied by the Applicant, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.

### Chapters 4 – 15 : Specialist Environmental Topics

- 1.53 The EIA specialist topic chapters provide detailed information on all aspects of prescribed environmental receptors, grouped under the following chapter headings:

- Chapter 4: Population and Human Health
- Chapter 5: Biodiversity
- Chapter 6: Land, Soils and Geology
- Chapter 7: Water
- Chapter 8: Air Quality
- Chapter 9: Climate
- Chapter 10: Noise and Vibration
- Chapter 11: Material Assets
- Chapter 12: Cultural Heritage
- Chapter 13: Landscape
- Chapter 14: Traffic and Transportation
- Chapter 15: Interactions
- Chapter 16 Summary of Environmental Measures



- 1.54 The EIA Chapter for each specialist topic follows the same general format, as follows:

- An **Introduction** describing the purpose of the Chapter;
- A description of the **Methodology** adopted in undertaking the assessment;
- A description of the **Existing (Baseline) Environment** relevant to the environmental topic under assessment;
- An Impact Assessment resulting from the proposed development activities at the application site which identifies and describes the likely significant impacts on the relevant environmental receptor;
- Recommendation of **Mitigation Measures** to avoid, reduce, and where possible remedy any significant negative impacts identified;
- An assessment of the **Residual / Likely Significant Effects** which will remain assuming that the recommended mitigation measures are successfully implemented in full; and
- An assessment of **Cumulative Effects** arising from any known planned future development in the vicinity of the application site.



- 1.55 The associated references, plates, figures and appendices are provided at the end of each chapter (for Chapters 1 through 16).
- 1.56 A “Non-Technical Summary of the Environmental Impact Assessment Report”, presenting the key details and findings of each of the above listed EIAR Chapters is provided as a separate, stand-alone document.

## EIA CONTRIBUTORS

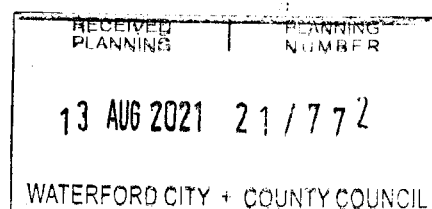
- 1.57 Roadstone Limited appointed SLR Consulting Ireland to prepare this Environmental Impact Assessment Report (EIAR) in support of its Planning Application for the proposed satellite quarry extension to Cappagh Quarry and the construction / operation of the new concrete batching plant.
- 1.58 SLR Consulting is a leading independent global environmental and advisory services consultancy. SLR provides a full range of planning, EIA and environmental advisory services across 30 in-house specialist technical disciplines and operates a network of offices in Ireland, UK, Asia-Pacific, Africa and North America. SLR Consulting Ireland (formerly John Barnett and Associates) has been carrying out Environmental Impact Assessments relating to extractive and waste development in Ireland since the EIA Directive was first transposed into national legislation in 1990.
- 1.59 The EIA specialists who contributed to the EIAR are identified in Table 1-2 below:

Table 1-2  
List of Contributors

Topic	Contributor	Company
Introduction	Derek Luby BE(Civil) MSc DIC MIEI	SLR Consulting Ireland
Description of Development	Derek Luby BE(Civil) MSc DIC MIEI	SLR Consulting Ireland
Alternatives	Derek Luby BE(Civil) MSc DIC MIEI	SLR Consulting Ireland
Population and Human Health	Ciarán O’Sullivan BA(GPEP) MRUP MIPI	SLR Consulting Ireland
Biodiversity	Owen Twomey BSc MSc MIEEM Elaine Dromey BSc MSc MIEEM Michael Bailey BSc MSc MIEEM	SLR Consulting Ireland
Land, Soils and Geology	Paul Gordon EurGeol BSc MSc PGeo	SLR Consulting Ireland
Water	Peter Glanville BA PhD. PGeo EurGeol Dominica Baird EurGeol BSc. MSc. MIAH, CGeol	SLR Consulting Ireland
Air Quality	Aldona Binchy MSc.(Eng), PIEMA, MIAH	SLR Consulting Ireland

Topic	Contributor	Company
Climate	Aldona Binchy MSc. (Eng), PIEMA, MIAH	SLR Consulting Ireland
Noise and Vibration	Aldona Binchy MSc. (Eng), PIEMA, MIAH	SLR Consulting Ireland
Material Assets	Ciarán O'Sullivan BA(GPEP) MRUP MIPI	SLR Consulting Ireland
Cultural Heritage	Dr. Charles Mount MA	Consultant
Landscape	Anne Merkle Dipl. Ing (FH) MILI	SLR Consulting Ireland
Roads and Traffic	David O'Brien BA BAI CEng MIEI PGDip(PM) RSACert Aly Gleeson BSc. BE MEng MBA FIEI RSA Cert Peter Monaghan BE CEng FIEI FConsEI CIHT RSACert	PMCE Consulting Engineers
Interactions / Summary of Environmental Measures	Derek Luby BE(Civil) MSc DIC MIEI	SLR Consulting Ireland
Co-ordination of EIAR	Derek Luby BE(Civil) MSc DIC MIEI	SLR Consulting Ireland

- 1.60 Each contributor has been fully briefed about the proposed development and the background to it. They have also visited the site and have familiarised themselves with the surrounding local environment. Each expert is fully qualified and competent in their respective field and is considered to have the necessary experience, expertise and knowledge for the preparation of their respective specialist EIA Chapter.





## FIGURES

Figure 1-1  
Site Location Map

Figure 1-2  
Site Location / Site Notice Plan

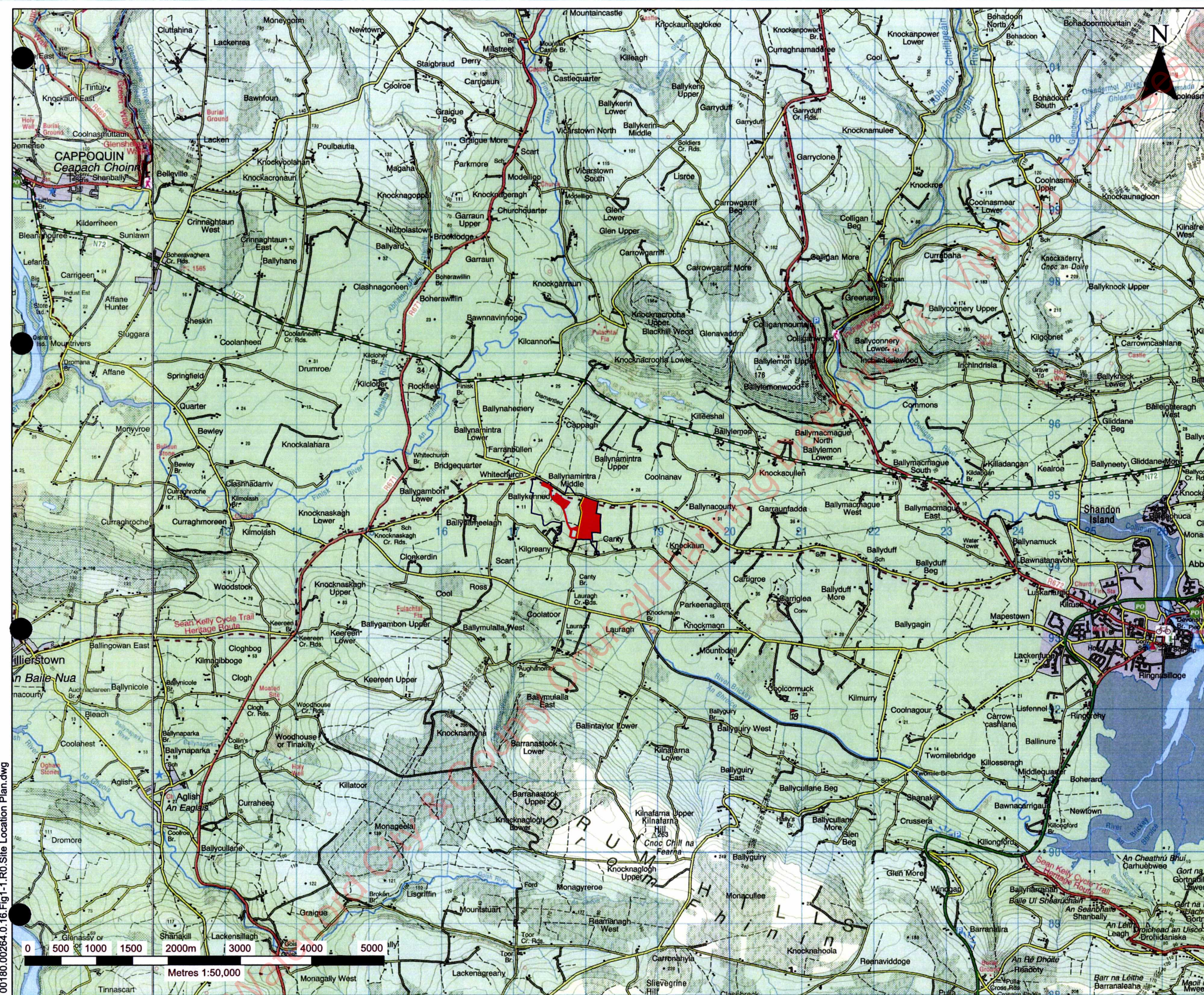
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Existing Site Layout – Aerial Photograph

Figure 1-4  
Surrounding Land Use

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**NOTES**  
1. EXTRACT FROM ORDNANCE SURVEY IRELAND DISCOVERY SERIES SHEET NO. 82  
2. ORDNANCE SURVEY IRELAND LICENCE NO. CYAL50167032 (C) ORDNANCE SURVEY & GOVERNMENT OF IRELAND

**LEGEND**  

ROADSTONE LAND INTEREST (C. 58.9 HA)

PLANNING APPLICATION AREA (C. 18.2 HA)

EXISTING PASSAGEWAY

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ROADSTONE LTD.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

EASTERN SATELLITE QUARRY AND  
NEW CONCRETE PLANT  
CAPPAGH QUARRY, COUNTY WATERFORD

SITE LOCATION PLAN

FIGURE 1-1

Scale

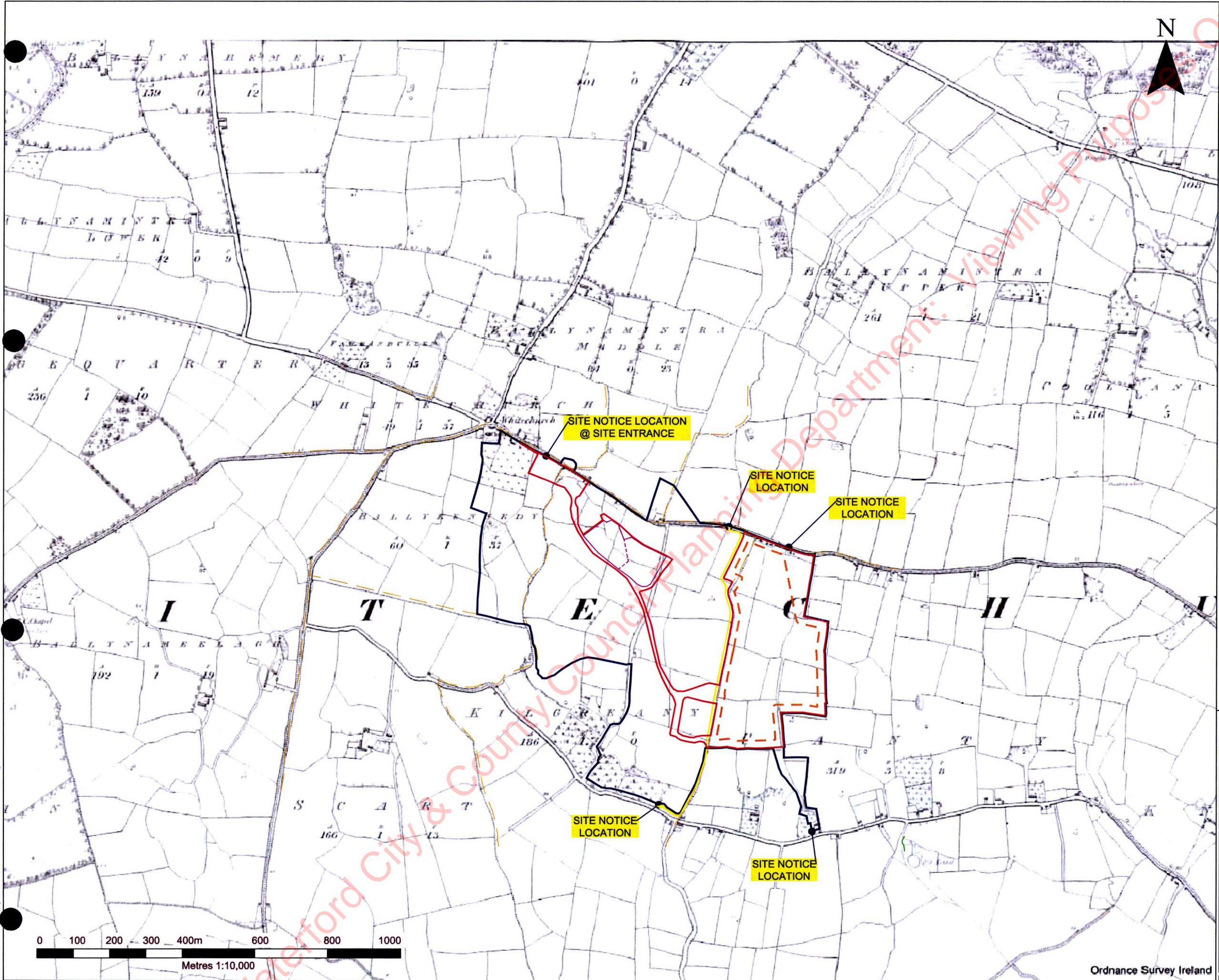
1: 50,000 @ A3

Date

JULY 2021



00180.00264.0.16.Fig1-2.R0.Site Location Plan.dwg



**NOTES**

1. MAPPING EXTRACT FROM 6 INCH MAP SHEET WD030 FROM ORDNANCE SURVEY IRELAND

2. ORDNANCE SURVEY IRELAND LICENCE NO. CYAL50167032 (C) ORDNANCE SURVEY & GOVERNMENT OF IRELAND

LEGEND	
	ROADSTONE LAND INTEREST (C. 58.9 HA)
	PLANNING APPLICATION AREA (C. 18.2 HA)
	PROPOSED EXTRACTION AREA (C. 9.7 HA)
	PROPOSED CONCRETE PLANT & AGGREGATE STORAGE AREA (C. 1.9 HA)
	EXISTING PASSAGEWAY

RECEIVED PLANNING | PLANNING NUMBER  
13 AUG 2021 21/772  
WATERFORD CITY + COUNTY COUNCIL

SLR CONSULTING IRELAND  
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ROADSTONE LTD.  
ENVIRONMENTAL IMPACT ASSESSMENT REPORT  
EASTERN SATELLITE QUARRY AND  
NEW CONCRETE PLANT  
CAPPAGH QUARRY, COUNTY WATERFORD  
SITE LOCATION / SITE NOTICE PLAN

FIGURE 1-2

Scale  
1: 10,000 @ A3

Date  
JULY 2021



00180.00264.0.16-1-3.R0.Existing Site Layout Aerial Photo.dwg



**NOTES**

1. VECTOR SURVEY EXTRACT FROM ORDNANCE SURVEY IRELAND

2. ORDNANCE SURVEY IRELAND LICENCE NO. CYAL50167032  
(C) ORDNANCE SURVEY IRELAND/GOVERNMENT OF IRELAND

3. SURVEY COMPLETED ON 2ND FEBRUARY 2018 BY ASM IRELAND AND UPDATED IN DEC 2020

**LEGEND**

	ROADSTONE LAND INTEREST (C. 58.9 HA)
	PLANNING APPLICATION AREA (C. 18.2 HA)
	PROPOSED EXTRACTION AREA (C. 9.7 HA)
	PROPOSED CONCRETE PLANT & AGGREGATE STORAGE AREA (C. 1.9 HA)
	EXISTING PASSAGEWAY
	EXISTING GROUND CONTOUR (mOD)
	BUILDINGS
	TRACKS
	DENSE VEGETATION & FORESTRY
	OVERHEAD TRANSMISSION LINES
	TRAFFIC FLOW DIRECTION

RECEIVED PLANNING 13 AUG 2021 21/772  
WATERFORD CITY + COUNTY COUNCIL

**Roadstone**

**SLR**

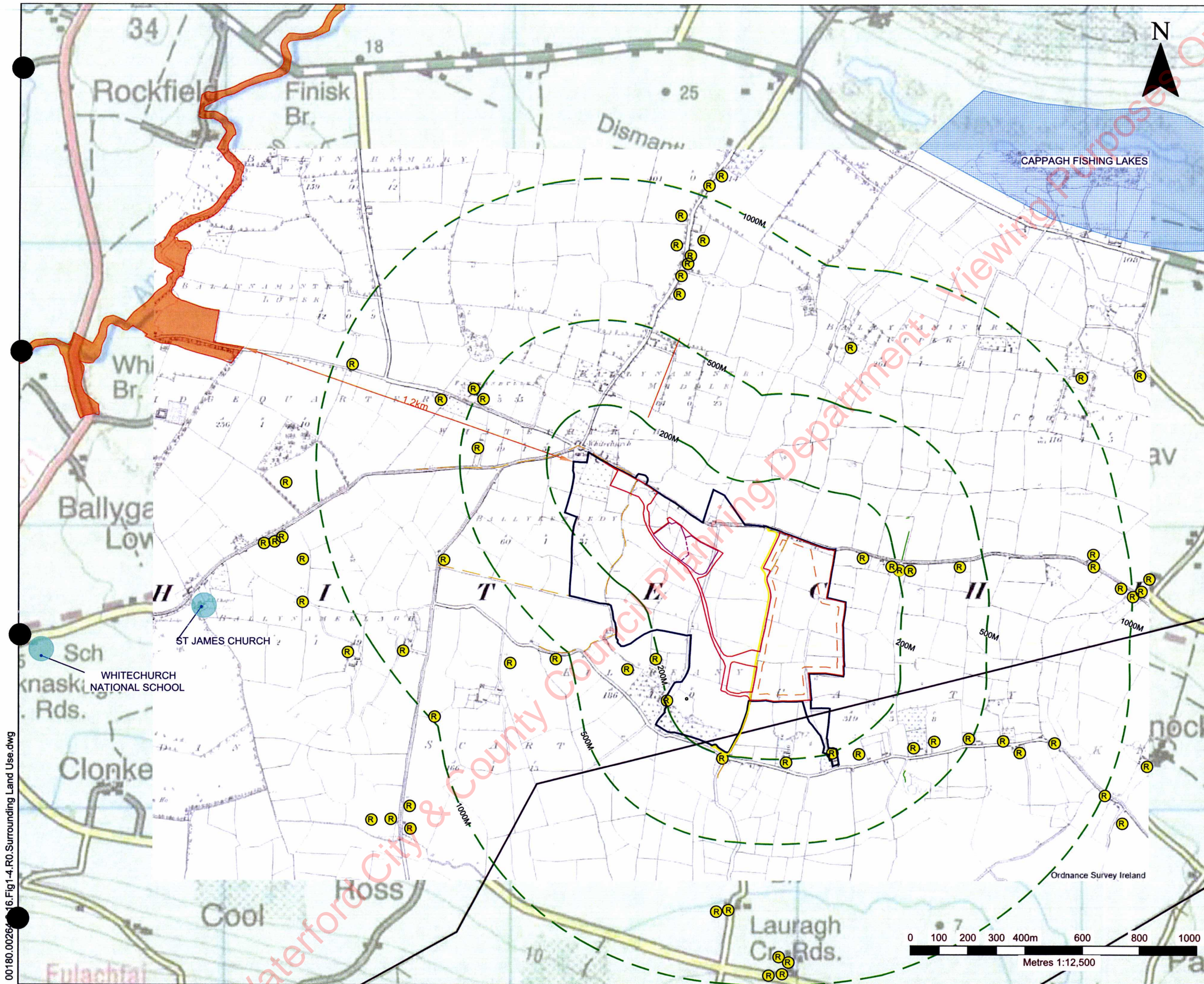
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ENVIRONMENTAL IMPACT ASSESSMENT REPORT  
EASTERN SATELLITE QUARRY AND  
NEW CONCRETE PLANT  
CAPPAGH QUARRY, COUNTY WATERFORD  
EXISTING SITE LAYOUT - AERIAL PHOTO

**FIGURE 1-3**

Scale 1: 4,000 @ A3  
Date JULY 2021





**NOTES**

1. MAPPING EXTRACT FROM 6 INCH MAP SHEET WD030 FROM ORDNANCE SURVEY IRELAND AND DISCOVERY SHEET NO. 82

2. ORDNANCE SURVEY IRELAND LICENCE NO. CYAL50167032 (C) ORDNANCE SURVEY IRELAND/GOVERNMENT OF IRELAND

**LEGEND**

- ROADSTONE LAND INTEREST (C. 58.9 HA)
- PLANNING APPLICATION AREA (C. 18.2 HA)
- PROPOSED EXTRACTION AREA (C. 9.7 HA)
- PROPOSED CONCRETE PLANT & AGGREGATE STORAGE AREA (C. 1.9 HA)
- EXISTING PASSAGEWAY
- OVERHEAD TRANSMISSION LINES
- RESIDENCE LOCATIONS
- 1KM OFFSET FROM PLANNING APPLICATION AREA
- BLACKWATER RIVER SPECIAL AREAS OF CONSERVATION (SITE CODE 002170)

RECEIVED PLANNING | PLANNING NUMBER

13 AUG 2021 21/772

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**Roadstone**

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**SLR**

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EASTERN SATELLITE QUARRY AND  
NEW CONCRETE PLANT  
CAPPAGH QUARRY, COUNTY WATERFORD

**SURROUNDING LAND USE**

**FIGURE 1-4**

Scale 1: 12,500 @ A3

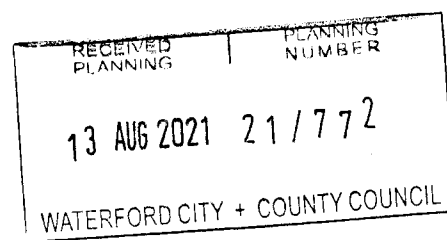
Date JULY 2021

00180.00264-16.Fig1-4.R0.Surrounding Land Use.dwg



## APPENDIX 1-A

### Formal Pre-Planning Consultation : Consultee Responses





An Roinn Turasóireachta, Cultúir,  
Ealaíon, Gaeltachta, Spóirt agus Meán  
Department of Tourism, Culture,  
Arts, Gaeltacht, Sport and Media

Your Ref: Cappagh Quarry

Our Ref: G Pre00069/2021 (Please quote in all related correspondence)

9<sup>th</sup> April 2021

SLR Consulting Ireland  
7 Dundrum Business Park  
Windy Arbour  
Dublin 14

Via email: [dluby@slrconsulting.com](mailto:dluby@slrconsulting.com)

**Re: planning permission for an eastern extension to its existing quarry in the townlands of Ballykennedy, Kilgreany and Canty, approximately 8km west of Dungarvan (known locally as Cappagh Quarry).**

A chara

I refer to your pre-planning correspondence received on 3<sup>rd</sup> March in connection with the above proposed development.

Outlined below are heritage-related observations/recommendations co-ordinated by the Development Applications Unit under the stated headings.

### **Archaeology**

The pre-planning consultation briefing report makes reference to the archaeological heritage and notes that *"the cultural heritage and archaeological component of the environmental impact assessment of the proposed quarry extension and new concrete plant comprised paper/literature reviews, site visits and fieldwork studies over an extended period between 2016 and 2021."* However, very little detail is provided in the briefing document relating to the nature of the archaeological assessment completed to date, the potential archaeological impact identified and suggested mitigation measures to ensure the protection of the archaeological heritage.

The proposed quarry extension site covers a site area measuring 20.8 hectares and is located in the vicinity of Kilgreany cave, which has been placed on the Register of Historic Monuments (WA 030:018 *cave dwelling*). Kilgreany cave is thus subject to statutory protection under section 5 of the National Monuments (Amendment) Act 1987. This

**Aonad na nIarratas ar Fhorbairt**

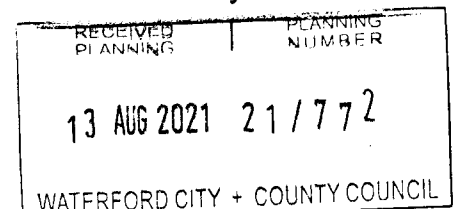
*Development Applications Unit*

**Óifigí an Rialtais**

*Government Offices*

**Bóthar an Bhaile Nua, Loch Garman, Contae Loch Garman, Y35 AP90**

Newtown Road, Wexford, County Wexford, Y35 AP90





limestone cave was investigated in 1928 by Tratman and Movius in 1934. The bones of domestic animals as well as elk, reindeer and bear were recovered with the remains of two humans. Originally thought to have been Palaeolithic, the human remains have been dated to  $4820 \pm 6$  BP (Molleson 1985-6). Artefacts recovered from the upper levels are Early Christian in date. There is potential for related and similar archaeological sites to survive within the footprint of the proposed quarry extension.

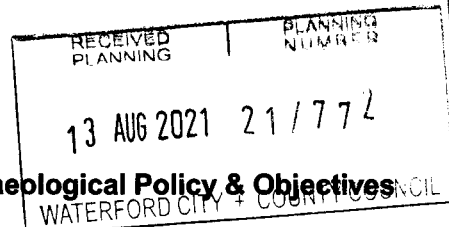
The proposed development site/extraction area is also located in the vicinity of monuments WA030:013 *cave dwelling* and WA030:015 *cave dwelling* which are located north-west of the proposed extraction area.

A geophysical survey was carried out by Target Geophysics in association with an earlier proposed development at the quarry (07R0016 Nicholls). However, the survey carried out to date was limited to an area located within the southern extent of the existing quarry. A geophysical survey will be required within the area of the proposed quarry extension to determine the presence/absence of any possible archaeological features/anomalies within this area and to develop an informed archaeological strategy to ensure the protection of the archaeological heritage.

It is recommended that a specialist in archaeological geophysical survey be engaged by the developer to carry out a geophysical survey within the area of the proposed quarry extension. On completion of the survey, targeted archaeological testing of any identified anomalies of possible archaeological significance should be carried out (licensed under the National Monuments Acts 1930-1994). A detailed and comprehensive archaeological impact assessment report based on documentary research, fieldwork, geophysical survey, archaeological testing and an examination of all available plans/engineering drawings should be prepared and submitted as part of the EIAR submitted with any future planning application.

The suggested archaeological mitigation measures outlined in the briefing document are not considered adequate and a more detailed and comprehensive assessment of any potential impact on the archaeological heritage of the area will have to be completed to develop an informed archaeological mitigation strategy, preferably in advance of any planning decision.





### **Current Waterford County Development Plan - Archaeological Policy & Objectives**

The developer should be aware of the archaeological policy and objectives contained in the current Waterford County Development Plan which include the following:

Policy AH 14 – It is the policy of the Council to protect, conserve and preserve the integrity of archaeological monuments and their settings and archaeological objects within the County, and those buildings and sites which have been identified on the RMP.

Policy AH 15 – It will be an objective of the planning authority to secure the preservation (i.e. preservation in-situ or, as a minimum, preservation by record) of all archaeological monuments included in the Record of Monuments and Places as established under Section 12 of the National Monuments (Amendment) Act 1994, and of site features and objects of archaeological interest generally.

In securing such preservation the planning authority will have regard to the advice and recommendations of the National Monuments Service, both in respect of whether or not to grant planning permission and in respect of the conditions to which permission, if granted, should be granted.

Objective AH 3 – It is an objective of the Plan to ensure that development in the vicinity of a site of archaeological interest shall not be detrimental to the character of the archaeological site or its setting by reason of its location, scale, bulk or detailing. When considering development in the vicinity of all archaeological sites including town defences, the planning authority will require the preparation of an archaeological assessment detailing the potential impact of any development on upstanding structures, buried structures and deposits. The report will also include a visual impact assessment to ensure adequate consideration of any potential visual impact the proposed development may have on upstanding remains.

The above observations and recommendations are based on the documentation submitted to this Department on a pre-planning basis and are made without prejudice to any observations the Minister may make in the context of any consultation arising on foot of any development application referred to the Minister, by the planning authority, in his role as statutory consultee under the Planning and Development Act 2000, as amended.



You are requested to send further communications to the Development Applications Unit (DAU) at [manager.dau@chg.gov.ie](mailto:manager.dau@chg.gov.ie), or to the following address:

The Manager  
Development Applications Unit (DAU)  
Government Offices  
Newtown Road  
Wexford  
Y35 AP90

Is mise, le meas

**Diarmuid Buttimer**  
**Development Applications Unit**



H S E South,  
Waterford Community Services,  
Cork Road,  
Waterford  
Phone: 051 842952  
E-Mail: Siobhan.murphy6@hse.ie

**Date:** 31 March 2021

**Name:** Mr. Derek Luby, SLR Consulting Ireland, 7 Dundrum Business Park,  
Windy Arbour, Dublin D14 N2Y7

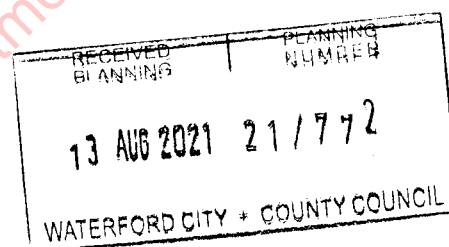
**Consultant's reference:** 501-00180.00264

**Re:** EIA Scoping Report

**Proposed development:** Proposed Eastern Quarry Extension and New Concrete Batching  
Plant, Cappagh Quarry, Co. Waterford.

**Applicant:** Roadstone Ltd

**EHIS Reference:** 1631



Dear Mr. Luby,

Please find enclosed the HSE Consultation Report in relation to the above proposal.

The following HSE departments were made aware of the consultation request for the proposed development on 3<sup>rd</sup> March 2021

- Emergency Planning – David O'Sullivan
- Estates – Helen Maher
- Assistant National Director for Health Protection – Kevin Kelleher/ Laura Murphy
- CHO – Kate Killeen White

If you have any queries regarding this report the initial point of contact is Ms. Siobhan Murphy, Principal Environmental Health Officer who will refer your query to the appropriate person.

Yours sincerely

---

Siobhan Murphy  
Principal Environmental Health Officer





H S E South  
Waterford Community Services,  
Cork Road,  
Waterford  
Phone: 051 842952  
E-Mail: Siobhan.murphy6@hse.ie

**HSE EIAR Scoping Consultation Report**  
**Environmental Health Service Submission Report**

**Date:** 31<sup>st</sup> March 2021

**Report to:** Mr Derek Luby, SLR Consulting Ireland, 7 Dundrum Business Park,  
Windy Arbour, Dublin D14 N2Y7

**Consultant's reference:** 501-00180.00264

**Our reference:** EHIS 1631

**Type of Consultation:** EIA Scoping

**Applicant:** Roadstone Ltd.

**Proposed development:** Proposed Eastern Quarry Extension and New Concrete Batching Plant,  
Cappagh Quarry, Co. Waterford.

**General**

This scoping consultation is for the extension of an existing Roadstone limestone quarry at Cappagh Quarry, Co. Waterford. The extension will be 15.6 hectares within a total landholding of 57.7 hectares. The proposed extraction area is approximately 11.9 hectares. Proposed works include:

1. an eastwards extension of the existing quarry development of which approximately 11.9 hectares (29.4 acres) will be extracted
2. continued excavation of a single quarry bench in limestone bedrock, varying in height from approximately 8m to 20m from the quarry floor to current ground level, not extending below
3. 10mOD or into the underlying groundwater body (consistent with Condition 2 of the existing planning permission)
4. demolition of an existing derelict house in the north-western corner of the proposed eastern extension area, and removal of existing hedgerows along the existing quarry boundary

5. eastward re-alignment of a section of the existing local access passageway used by members of the local community and agricultural vehicles to follow the eastern boundary of the proposed quarry extension
6. demolition of concrete supports of former rock processing / crushing plant
7. construction and operation of a new concrete batching facility (which comprises 4 No. cement
8. silos, batching / mixing unit, aggregate storage bins, an aggregate loading hopper and connecting conveyor systems), all on a concrete paved area on the existing quarry floor, in front of the northern quarry face
9. provision of a batching control office and admixture storage shed;
10. construction of a closed loop concrete recycling facility, comprising a concrete truck wash out area, settlement lagoons and 70,000 litre water storage / recycling tank immediately behind (north of) the concrete batching plant
11. construction of an aggregate storage hardstanding area (covering approximately 1 hectare) immediately to the east of the proposed concrete batching plant
12. continued use of established structures and site infrastructure in service of the proposed quarry extension and new batching plant
13. removal and replanting of the existing boundary hedge, re-alignment of the boundary wall and demolition / removal of existing structures to the east of the existing quarry access junction in order to provide enhanced sightlines for traffic egressing the quarry.
14. The following documents should be considered when preparing the Environmental Impact Assessment Report:
  15. Guidelines on the information to be contained in EIS (2002), 187kb
  16. Advice Notes on Current Practice in the preparation of EIS (2003), 435kb
  17. Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment

[https://www.housing.gov.ie/sites/default/files/publications/files/guidelines for planning authorities and an bord pleanala on carrying out eia - august 2018.pdf](https://www.housing.gov.ie/sites/default/files/publications/files/guidelines%20for%20planning%20authorities%20and%20an%20bord%20pleanala%20on%20carrying%20out%20eia%20-%20august%202018.pdf)

EU publication: Environmental Impact Assessment of Projects Guidance on the preparation of the Environmental Impact Assessment Report, EU, 2017

[http://ec.europa.eu/environment/eia/pdf/EIA\\_guidance\\_EIA\\_report\\_final.pdf](http://ec.europa.eu/environment/eia/pdf/EIA_guidance_EIA_report_final.pdf)

Adoption of the Directive (2014/52/EU) in April 2014 initiated a review of the above guidelines. The draft new guidelines can be seen at:

<http://www.epa.ie/pubs/consultation/reviewofdraftguidelinesadvisenotes>

Generally the Environmental Impact Assessment should examine all likely significant impacts and provide the existing baseline conditions and the following information for each:

PLANNING	PLANNING NUMBER
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WATERFORD CITY + COUNTY COUNCIL	

- a) Description of the receiving environment
- b) The nature and scale of the impact;
- c) An assessment of the significance of the impact;
- d) Proposed mitigation measures;
- e) Residual impacts.

Directive 2014/52/EU has an increased requirement to assess likely significant impacts on Population and Human Health. In the experience of the Environmental Health Service (EHS) impacts on human health are generally inadequately assessed in EIA in Ireland. It is recommended that the wider determinants of health and wellbeing are considered in a proportionate manner when considering the EIA. Guidance on wider determinants of health can be found at [www.publichealth.ie](http://www.publichealth.ie)

It should be noted that any positive likely significant impacts should be identified and assessed, not just the likely significant negative impacts from the proposed development.

Potential health impacts arising from the proposed quarry extension should be considered under the EIAR chapters on Water, Land, Soils and Geology, Air Quality and Climate and Acoustics.

The HSE will consider the final EIAR accompanying the planning application and will in particular make comments to the Planning Authority on the methodology used for assessing the likely significant impacts and the evaluation criteria used in assessing the significance of the impacts.

The EIAR should identify the nearest sensitive receptors and consider the impact of the existing and proposed development on them. Sensitive receptors include but are not limited to

- Occupied houses
- Farms
- Schools
- Childcare facilities
- Medical facilities and nursing homes
- Sports and community facilities and
- Food premises.

The Environmental Health Service (EHS) considers the following should be assessed in the Environmental Impact Assessment (EIA)

- Any potentially significant emissions to surface water
- Any potentially significant emissions to ground water, in particular to the underlying regionally important karstified aquifer referred to in Chapter 3.1 'Population and Human Health' of the Pre-Planning Consultation Briefing Report dated February 2021

- Potential impacts on groundwater resulting from blasting activities, if undertaken, should Also be considered.
- Any potentially significant emissions to air, including noise, vibration and dust

Other areas for consideration in the EIA include

- Public consultation, in addition to consultation with statutory and non-statutory agencies. This is particularly relevant as a section of an existing local access passageway running above and behind the existing quarry face is to be re-aligned. This passageway provides a link for local landowners and residents between the Whitechurch Road and the Cauty Road. In addition to consultation on the overall quarry extension development, the opinions of local residents and landowners should be sought specifically on this aspect of the proposed development.
- Details of site restoration which should be provided in a Site Decommissioning and Restoration Plan. A timescale for the proposed quarry restoration should be included.
- Potential for future health gain from the restoration of the proposed development.
- Cumulative impacts of developments in the locality including any impacts from the existing quarry and any additional quarries and other developments in the area
- Maintenance of access roads
- It is noted in the Briefing Report submitted with the pre-planning consultation request that *'the proposed development will generate a maximum of 200 daily HGV return movements (100 HGVs inward and 100HGVs outward) from all existing and planned future onsite extraction'* and that *'it will also generate up to 20 return trips for cars and light vans (equivalent to 20 movements inward and 20 movements outward)*. Clarification should be provided in the EIAR regarding the haul routes taken by this traffic and if any sensitive receptors, in particular, Whitechurch National School, is located along such routes.

In considering the measures to be employed by the developer to minimise the potential impacts of the proposed development to human health, reference was made by the EHS to the EPA's 'Environmental Management Guidelines on the Environmental Management in the Extractive Industry (Non-Scheduled Minerals) 2006'

It is noted in the Pre-Planning Consultation Briefing Report dated February 2021 that mitigation measures will be considered in the EIAR. The Environmental Health Service notes that Planning Permission was granted for the continuation of quarrying activities at the existing Cappagh quarry by An Bord Pleanála (PL24.2254430) on 4 July 2008. Conditions attached to permission included, but were not limited to

- (1) *During the operational phase of the proposed development, the noise level from within the premises, measured at noise sensitive locations in the vicinity, shall not exceed -*
  - (a) *an  $L_{AeqT}$  value of 55 dB(A) during the period 0800 to 2000 hours from Monday to Friday (inclusive), and during the period 0800 to 1400 hours on Saturdays.*
  - (b) *an  $L_{AeqT}$  value of 45 dB(A) at any other time.*



*(2) All sound measurements shall be carried out in accordance with ISO Recommendations R 1996, "Assessment of Noise with Respect to Community Response" as amended by ISO Recommendations R 1996/1, 2 and 3, "Description and Measurement of Environmental Noise", as appropriate*

- Vibration levels from blasting shall not exceed a peak particle velocity of 12 millimetres per second, measured in any three mutually orthogonal directions at any sensitive location. The peak particle velocity relates to low frequency vibration of less than 40 hertz where blasting occurs no more than once in seven continuous days. Where blasting operations are more frequent, the peak particle velocity limit is reduced to eight millimetres per second. Blasting shall not give rise to air overpressure values at sensitive locations which are in excess of 125 d(B) (Linear) maximum peak with a 95% confidence limit. No individual air overpressure value shall exceed the limit value by more than 5dB (Linear).*
- Dust levels from the site shall not exceed 350 milligrams per square metre per day averaged over 30 days when measured at the boundary of the site. The developer shall submit to the planning authority for agreement details of ongoing dust monitoring programmes within three months from the date of this order. The details to be submitted shall include monitoring locations, commencement date and the frequency of monitoring results. Details of all dust suppression measures shall likewise be agreed with the planning authority within three months from the date of this order*
- On an annual basis, for the lifetime of the facility (within two months from each year end), the developer shall submit to the planning authority five copies of an environmental audit. Independent environmental auditors approved by the planning authority shall carry out this audit. This audit shall be carried out at the expense of the developer and made available to the public for inspection at all reasonable hours at a location to be agreed with the planning authority.*

*This report shall contain.... 'a full record of all monitoring results over the previous year for noise, dust and water quality'*

**As the existing quarry has been in operation under planning conditions since 2008, the Environmental Health Service expects that the EIAR will contain a comprehensive set of results of monitoring for noise, dust and water quality taken during the intervening years. Information should be provided in the EIAR on the outcome of mitigation measures employed in the existing quarry.**

**The results of any monitoring undertaken in 2020 will be viewed in the context of the limited operation of the quarry during Covid 19 restrictions.**

It is recommended that an Environmental Management System (EMS) is put in place, with training of all site staff. There should be on-going review of the effectiveness of the EMS. The EMS should be devised in accordance with international standards such as ISO 14001 2015 and EU EMAS (1993).

When assessing the above potential impacts, the existing environment, the assessment methodology and evaluation criteria should be clearly reported in the EIAR. Existing baseline

assessments (noise, dust, ground and surface water quality) should be included. Any mitigation proposed should be identified and the predicted residual impact clearly stated. Assessment should be carried out for both the operation phase and the remedial phase of the proposed development.

#### Emissions to surface water

The Pre-Planning Consultation Report states that 'there is no off-site discharge of water from the quarry/application site to any nearby streams or rivers'. Settlement lagoons should be of sufficient size to cope with flooding and periods of heavy rain and should be adequately sealed with an impermeable material to prevent leaching to groundwater.

Hard standing areas used for refuelling vehicles should drain to Class 1 Hydrocarbon Interceptors prior to discharge.

Details of the fuels and chemicals used and stored on site and the method proposed for the bunding of fuel and chemical storage tanks should be outlined in the EIAR. Provision should be made for the inspection and monitoring of bunding structures.

In order to minimise the wastage of water, surface water should be used for activities such as wheel washing and dust suppression.

#### Emissions to Groundwater

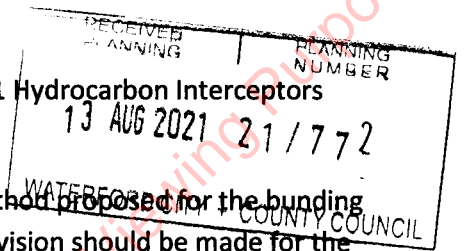
It is recommended that detailed information is gathered on the location of private wells (which are used as a drinking water supply) serving properties within a 2km radius of the quarry. The EIA should include proposals for sampling private wells (if planning permission is granted) prior to works commencing to the quarry extension; at least biannually during the operation of the quarry and twice within the first year following cessation of operations at the site.

Reference should be made in the EIA to the Geological Survey of Ireland's (GSI) Groundwater Protection Scheme for Co. Waterford to determine if there are vulnerable groundwater sources or aquifers in the vicinity of the proposed development.

The Pre-Planning Report states that '*groundwater quality results suggest that the groundwater flowing beneath the site is being impacted by activities remote from it, principally by agriculture which is the predominant land use in the surrounding area*' (Chapter 3.4 Water). Details of all potential impacts of the proposed quarry extension on groundwater quality, **including any potential increase in ammonia levels which may be attributable to blasting**, must be included in the EIAR. Mitigation measures aimed at the protection of groundwater and public health should be described. As indicated, water monitoring results associated with the existing quarry should also be included in the EIAR.

#### Emissions to air, including noise, vibration and dust

The EHS recommends that the developer notes the limit values specified in the Air Quality Standards Regulations 2011 (S.I. No. 180 of 2011) which apply to ambient air quality in the vicinity of developments such as quarries.



The EIA should establish baseline air quality at the nearest sensitive receptors by means of background air quality monitoring. Air quality monitoring should be undertaken prior to the commencement of operations in the quarry extension and throughout the operation of the site using the Bergerhoff Method as specified in the German TA Luft Air Quality Standards (TA Luft 1986).

Total dust deposition should not exceed  $350\text{mg/m}^2$  /day when averaged over a thirty day period. This is a maximum limit and the EMS should be such that dust depositions seldom reach this level.

The Environmental Management System should include dust minimisation and suppressions measures to be employed to minimise the impact of dust emissions from the quarry.

Methods can include, but are not limited to

- Wheel washing of every vehicle leaving the site
- Covering every load on vehicles leaving the site
- Protect and replace vegetation on site
- Where possible, use enclosed conveyors rather than trucks within the site
- Cover stockpiles to prevent windblown dust
- Spray and wash access and haul roads frequently to suppress dust
- Provide screening berms of adequate height
- Undertake regular plant and vehicle maintenance
- Undertake regular monitoring and inspection of access and haul roads to identify and attend to accidental spillages and structural defects to roads (i.e. potholes). Proposals for an agreement between the local roads authority and the applicant for the on-going maintenance of haul roads during the operation of the proposed development should be outlined.
- considering meteorological conditions (wind speed and wind direction) when siting stockpiles

As it is proposed to undertake blasting on site, the EHS recommends that a Vibration Monitoring Report is included in the EIA which includes blasting methods to be employed during the operation of the proposed quarry extension. Details of the advanced notification system, as included in Condition 06 (2) of the existing planning permission, advising occupants in the locality of the date and time of proposed blasting, should be included in the EIA. Blasting should not occur during hours of darkness or at weekends.

Details of blast and vibration monitoring results for the existing quarry should be included in the EIAR.

Consideration should be given to adopting noise reduction measures recommended in the EPA's 'Environmental Management Guidelines on the Environmental Management in the Extractive Industry (Non-Scheduled Minerals) 2006' in particular those relating to adequate screening of the site, maintenance of plant and machinery, reducing truck movements within the site and efficient

methods of blasting. Details of the proposed noise mitigation measures to be employed should be included in the EIA.

The EHS recommends that reference is made by the developer to the EPA's 'Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities NG4' (January 2016). The existing background noise level should be considered when assessing the impact of noise from the proposed development on local receptors and when setting ELVs.

Details of the location and frequency of noise monitoring for the proposed extension should be included in the EIA to be submitted as part of the Planning Application.

### **Public consultation**

The EHS emphasises the need for early and meaningful public consultation in the development process. Accurate information should be obtained regarding the location of sensitive receptors referred to above. There should be on-going engagement with these receptors during the EIA process and the EAIR should detail proposals for keeping sensitive receptors informed and any measures to be employed during the operational phase for dealing with enquiries and/or complaints from members of the public.

The future use of the restored site should be included in the public consultation process.

A copy of the complaints procedure and a log of complaints received in respect of the existing quarry during the past five years should be included in the EAIR.

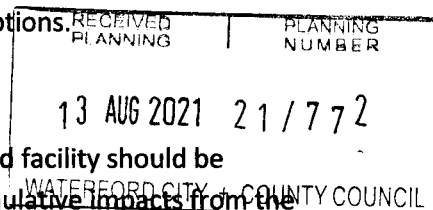
Site operation times should be considered as part of the consultation process with local residents.

### **Potential for future health gain from the restoration of the proposed development**

A Decommissioning and Site Restoration Plan for the proposed extraction facility should be put in place. The potential to provide a facility on site which will provide an opportunity for health gain for the wider community should be considered, for example, walkways, cycle paths, woodland paths, pitch and putt course or an amenity park including a number of these options.

### **Cumulative impacts of developments in the locality**

All extraction and quarrying facilities within a 5km radius of the proposed facility should be identified and assessed when considering the potentially significant cumulative impacts from the proposed development. The EIA should include cumulative traffic, noise, dust and hydrological impacts.



Eugene McDonagh  
Environmental Health Officer  
Waterford

Environmental Health Officer  
Environment Operational Unit  
Ennistymon Health Centre  
Ennistymon  
Co. Clare





Derek Luby  
SLR Consulting Ireland  
7 Dundrum Business Park,  
Windy Arbour,  
Dublin D14 N2Y7

11 March 2021

**Re: Cappagh Quarry, Co. Waterford: Pre-planning Consultation**  
**Your Ref:**  
**Our Ref:21/64**

Dear Mr. Luby,

Geological Survey Ireland is the national earth science agency and is a division of the Department of the Environment, Climate and Communications. We provide independent geological information and advice and gather various data for that purpose. Please see our [website](#) for data availability. We recommend using these various data sets, when conducting the EIAR, SEA, planning and scoping processes. Use of our data or maps should be attributed correctly to 'Geological Survey Ireland'.

With reference to your letter dated 02 March 2021, concerning the Cappagh Quarry, Co. Waterford: Pre-planning Consultation, Geological Survey Ireland would like to make the following comments.

#### **Geoheritage**

Geological Survey Ireland is in partnership with the National Parks and Wildlife Service (NPWS, Department of Housing, Local Government and Heritage), to identify and select important geological and geomorphological sites throughout the country for designation as geological NHAs (Natural Heritage Areas). This is addressed by the Geoheritage Programme of Geological Survey Ireland, under 16 different geological themes, in which the minimum number of scientifically significant sites that best represent the theme are rigorously selected by a panel of theme experts.

County Geological Sites (CGSs), as adopted under the National Heritage Plan, include additional sites that may also be of national importance, but which were not selected as the very best examples for NHA designation. All geological heritage sites identified by Geological Survey Ireland are categorised as CGS pending any further NHA designation by NPWS. CGSs are now routinely included in County Development Plans and in the GIS of planning departments, to ensure the recognition and appropriate protection of geological heritage within the planning system. CGSs can be viewed online under the Geological Heritage tab on the online [Map Viewer](#).

The audits for Co. Waterford were completed in 2011 and were revised in 2012. The full report details can be found [here](#). **Our records show that there are CGSs within and in the vicinity of the proposed quarry extension.**

**Cappagh Quarry**, Co. Waterford (217588, 94836), under IGH themes: IGH 1 Karst and IGH 8 Lower Carboniferous. Link to site report: [WD013](#). The quarry is excavated in Carboniferous Limestone of the Waulsortian Formation. There are karstic features in the quarry walls which may be of Holocene (post-glacial) age or they may have begun forming during the Quaternary Period. The quarry is one of the best places to see Waulsortian rocks in County Waterford. Additional features of interest here are the extensive expressions of karstified limestone. There are solution pipes, sand filled dolines (enclosed depressions), epikarst and expanded joints with brown deposits of the mineral calcite on them. As an active quarry, the CGS status has no impact or restriction on the normal permitted operation of the quarry.

**Kilgreany Cave**, Co. Waterford (217638, 94379), under IGH theme: IGH 1 Karst. Link to site report: [WD040](#). The cave is formed within Carboniferous limestone rock. It probably began forming in an interglacial period during the Quaternary (i.e. during the last 1.6 million years) and may have continued forming during the early part of the Holocene (post-glacial) period.



The Cappagh Quarry site report written at the time of the audit, 2011, stated that as an active quarry, the CGS status has no impact or restriction on the normal permitted operation of the quarry. It was also stated that there may be opportunities for active engagement with the operators to preserve some interesting quarry faces, such as the heavily karstified eastern side, depending on planned end-use or restoration plans.

With the proposed quarry extension plan, there will be impacts on the integrity of current CGS. However, we note that this has been addressed within the scoping report and while the current eastern face of the quarry (the face with the most relevant geological and karst features) will be removed a new face will be exposed. Ideally, the site should not be damaged or integrity impacted or reduced in any manner due to the proposed development. However, in cases such as this where the integrity cannot be preserved we would ask that careful consideration be given in design to accommodating preservation of final quarry faces and access to the site during extraction to record the exposures to strengthen our knowledge and datasets. Please contact Clare Glanville ([Clare.Glanville@gsi.ie](mailto:Clare.Glanville@gsi.ie)) for further information and possible mitigation measures if applicable.

We are pleased to see in the restoration phase that the quarry floor will be returned to grassland at a level of 10mOD resulting in some quarry faces remaining intact. Geological Survey Ireland requests that the operator (Roadstone Ltd) might assist our geological heritage goals with the following (and ideally this would be written into the restoration / closure plan):

1. Allowing access to quarry faces by appropriate scientists (upon request and with due regards to Health and Safety requirements) during quarrying to check for interesting new stratigraphies / relationships as they might become exposed and to establish if the quarry site is worthy of recognition post extraction and through aftercare/restoration planning.
2. If deemed appropriate in (1) above, leaving a representative section of the quarry face at the end of the quarry life or inclusion of information panels to promote the geology to the public or develop tourism or educational resources if appropriate depending on the future use of the site. Natural exposures are few, or deeply weathered, this measure would permit on-going improvement of geological knowledge of the subsurface.

The Geoheritage Programme tries to promote a partnership between geological heritage and active quarrying, with such measures as those outlined in the 'Geological Heritage Guidelines for the Extractive Industry', which can be downloaded [here](#). This document, written in association with Irish Concrete Federation, acts as a comprehensive guide in the sustainable extraction of natural resources while preserving the geological heritage of Ireland.

### **Groundwater**

Groundwater is important as a source of drinking water, and it supports river flows, lake levels and ecosystems. It contains natural substances dissolved from the soils and rocks that it flows through, and can also be contaminated by human actions on the land surface. As a clean, but vulnerable, resource, groundwater needs to be understood, managed and protected.

We are pleased to see extensive use and reference to Geological Survey Ireland's datasets within the water section of the pre-planning consultation briefing report. While the information below appears to have, in the main, been considered within the report it is provided here for reference purposes if required.

Proposed developments need to consider any potential impact on specific groundwater abstractions and on groundwater resources in general. We recommend using the groundwater maps on our [Map viewer](#), which should include: wells; drinking water source protection areas; the national map suite - aquifer, groundwater vulnerability, groundwater recharge and subsoil permeability maps. For areas underlain by limestone, please refer to the karst specific data layers (karst features, tracer test database; turlough water levels ([gwlevel.ie](http://gwlevel.ie))).



Background information is also provided in the Groundwater Body Descriptions. Please read all disclaimers carefully when using Geological Survey Ireland data.

Groundwater flooding maps (historic & predictive) are available through our [web viewers](#). The historic flood maps provide information of historic flooding, both surface water and groundwater. The predictive groundwater flood map provides information on the probability of future karst groundwater flooding (where available). For information on the development and limitations of these flood maps, please check the user guidance notes on our website.

### **Geological Mapping**

Geological Survey Ireland maintains online datasets of bedrock and subsoils geological mapping that are reliable and accessible. We would encourage you to use these data which can be found [here](#), in your future assessments.

### **Geotechnical Database Resources**

Geological Survey Ireland continues to populate and develop our national geotechnical database and viewer with site investigation data submitted voluntarily by industry. The current database holding is over 7500 reports with 134,000 boreholes; 31,000 of which are digitised which can be accessed through downloads from our [Geotechnical Map Viewer](#). We would encourage the use of this database as part of any baseline geological assessment of the proposed development as it can provide invaluable baseline data for the region or vicinity of proposed development areas. This information may be beneficial and cost saving for any site specific investigations that may be designed as part of the project.

### **Geohazards**

Geohazards can cause widespread damage to landscapes, wildlife, human property and human life. In Ireland, landslides, flooding and coastal erosion are the most prevalent of these hazards. We recommend that geohazards be taken into consideration, especially when developing areas where these risks are prevalent, and we encourage the use of our data when doing so. We note and commend the inclusion of potential impacts to the adjacent CGS (Kilgreany Cave) from vibration and land movement, and the consideration of slope stability in general. We note that flooding is identified and discussed as a potential issue under climate change in the pre-planning consultation briefing report. We provide the following information for reference purposes.

Geological Survey Ireland has information available on landslides in Ireland via the National Landslide Database and Landslide Susceptibility Map both of which are available for viewing on our dedicated [Map Viewer](#). Associated guidance documentation relating to the National Landslide Susceptibility Map is also available.

Geological Survey Ireland also engaged in a national project on Groundwater Flooding. The data from this project may be useful in relation to Flood Risk Assessment (FRA) and management plans, and is described in more detail under 'Groundwater' above.

### **Guidelines**

The following guidelines may also be of assistance:

- Institute of Geologists of Ireland, 2013. Guidelines for the Preparation of the Soils, Geology and Hydrogeology Chapters of Geology in Environmental Impact Statements.
- Department of Environment, Heritage and Local Government, 2004. Quarries and Ancillary Activities, Guidelines for Planning Authorities.
- Environmental Protection Agency, 2006. Environmental Management in the Extractive Industry: Non-Scheduled Minerals.
- Geological Survey of Ireland - Irish Concrete Federation, 2008. Geological Heritage Guidelines for the Extractive Industry.





An Roinn Comhshaoil,  
Aeráide agus Cumarsáide  
Department of the Environment,  
Climate and Communications



**Geological Survey**  
Suirbhéireacht Gheolaíochta  
Ireland | Éireann

#### **Other Comments**

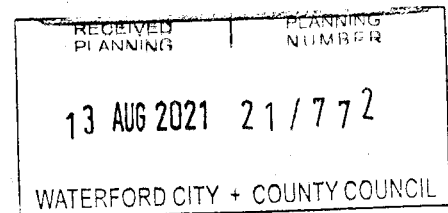
Should development go ahead, all other factors considered, Geological Survey Ireland would much appreciate a copy of reports detailing any site investigations carried out. As discussed under Geoheritage above, we would ask that significant quarry faces remaining upon cessation of extractive works be designed to remain visible as rock exposure rather than covered with soil and vegetated, in accordance with safety guidelines and engineering constraints. This measure would permit on-going improvement of geological knowledge of the subsurface and could enhance the knowledge around this geoheritage site. Alternatively, we ask that a digital photographic record of significant new excavations could be provided. Potential visits from Geological Survey Ireland to personally document exposures could also be arranged.

The data would be added to Geological Survey Ireland's national database of site investigation boreholes, implemented to provide a better service to the civil engineering sector. Data can be sent to Beatriz Mozo, Geological Mapping Unit, at [Beatriz.Mozo@gsi.ie](mailto:Beatriz.Mozo@gsi.ie), 01-678 2795.

I hope that these comments are of assistance, and if we can be of any further help, please do not hesitate to contact me ([Trish.Smullen@gsi.ie](mailto:Trish.Smullen@gsi.ie)), or my colleague Clare Glanville ([Clare.Glanville@gsi.ie](mailto:Clare.Glanville@gsi.ie)).

Yours sincerely,

Clare Glanville  
Senior Geologist  
Geological Survey Ireland



**From:** INFO  
**To:** Derek Luby  
**Subject:** RE: Cappagh Quarry, Co. Waterford : Pre-planning Consultation  
**Date:** 12 March 2021 11:05:40  
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**Dear Mr. Luby,**

Thank you for your email of 3 March 2021 regarding the above.

Transport Infrastructure Ireland (TII) wishes to advise that it is not in a position to engage directly with planning applicants in respect to proposed developments. TII will endeavour to consider and respond to planning applications referred to it given its status and duties as a statutory consultee under the Planning Acts. The approach to be adopted by TII in making such submissions or comments will seek to uphold official policy and guidelines as outlined in the Spatial Planning and National Roads Guidelines for Planning Authorities (DoECLG, 2012). Regard should also be had to other relevant guidance available at [www.TII.ie](http://www.TII.ie).

The issuing of this correspondence is provided as best practice guidance only and does not prejudice TII's statutory right to make any observations, requests for further information, objections or appeals following the examination of any valid planning application referred.

With respect to EIAR scoping issues, the recommendations indicated below provide only general guidance for the preparation of an EIAR, which may affect the national road network.

The developer/scheme promoter should have regard, inter alia, to the following:

- Consultations should be had with the relevant Local Authority/National Roads Design Office with regard to locations of existing and future national road schemes in the vicinity of the subject development site.
- TII would be specifically concerned as to potential significant impacts the development would have on the existing national road network (and junctions with national roads) in the proximity of the proposed development, N25 and N72.
- The developer should assess visual impacts from existing national roads.
- The developer should have regard to any Environmental Impact Statement and all conditions and/or modifications imposed by An Bord Pleanála regarding road schemes in the areas concerned. The developer should in particular have regard to any potential cumulative impacts.
- The developer, in preparing EIAR, should have regard to TII Publications (formerly DMRB and the Manual of Contract Documents for Road Works).
- The developer, in preparing EIAR, should have regard to TII's Environmental Assessment and Construction Guidelines, including the Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes (National Roads Authority, 2006).
- The EIAR should consider the Environmental Noise Regulations 2006 (SI 140 of 2006) and, in particular, how the development will affect future action plans by the relevant competent authority. The developer may need to consider the incorporation of noise barriers to reduce noise impacts (see Guidelines for the Treatment of Noise and Vibration in National Road Schemes (1st Rev., National Roads Authority, 2004)).
- It would be important that, where appropriate, subject to meeting the appropriate thresholds and criteria and having regard to best practice, a Traffic and Transport Assessment (TTA) be carried out in accordance with relevant guidelines, noting traffic volumes attending the site and traffic routes to/from the site with reference to impacts on the national road network and junctions of lower category roads with national roads. TII's Traffic and Transport Assessment Guidelines (2014) should be referred to in relation to proposed development with potential impacts on the national road network. The scheme promoter is also advised to have regard to Section 2.2 of the NRA/TII TTA Guidelines which addresses requirements for sub-threshold TTA.
- The designers are asked to consult TII Publications to determine whether a Road Safety Audit is required.
- In the interests of maintaining the safety and standard of the national road network, the EIAR should identify the methods/techniques proposed for any works traversing/in proximity to the national road network.
- In relation to haul route identification, the applicant/developer should clearly identify haul routes proposed

and fully assess the network to be traversed where abnormal loads are concerned. Separate structure approvals/permits and other licences may be required in connection with the proposed haul route and all structures on the haul route should be checked by the applicant/developer to confirm their capacity to accommodate any abnormal load proposed.

Notwithstanding any of the above, the developer should be aware that this list is non-exhaustive, thus site and development specific issues should be addressed in accordance with best practice.

I trust that the above comments are of assistance in your EIAR preparation.

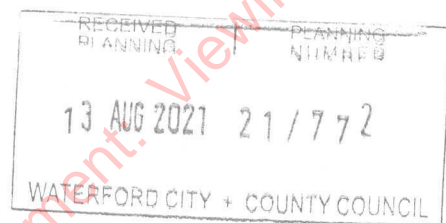
Yours sincerely,

**Alban Mills**  
**Senior Regulatory & Administration Executive**  
**Ref No. TII21-112694**

TII\_Logo\_150814



**From:** Derek Luby <[dluby@slrconsulting.com](mailto:dluby@slrconsulting.com)>  
**Sent:** Wednesday 3 March 2021 10:40  
**To:** INFO <[Information@tii.ie](mailto:Information@tii.ie)>  
**Subject:** Cappagh Quarry, Co. Waterford : Pre-planning Consultation



**CAUTION: This email originated from outside of TII. Do not click links or open attachments unless you recognise the sender and are sure that the content is safe.**

Dear Sir / Madam

We are writing on behalf of our Client, Roadstone Limited, to advise that it intends to apply to Waterford City and County Council for planning permission for an eastern extension to its existing quarry in the townlands of Ballykennedy, Kilgreany and Canty, approximately 8km west of Dungarvan (known locally as Cappagh Quarry). The planning application will be accompanied by an Environmental Impact Assessment Report (EIAR) and a Natura Impact Statement (NIS) Screening Report. It is currently envisaged that the planning application will be submitted to Waterford City and County Council in early Q2 of 2021.

Prior to completing the EIA Report and submitting the planning application, we would like to undertake some pre-planning consultations with TII to establish what, if any views, concerns and/or suggestions you may have in respect of the development.

To that end, we have provided information in respect of the proposed development in the accompanying briefing document which you are invited to read and review. We would greatly appreciate if you could provide your feedback in respect of the proposed development as part of this pre-application consultation exercise. All comments and feedback received will be reviewed, and where appropriate, will be addressed in finalising the development proposal and the accompanying Environment Impact Assessment Report.

Submissions or feedback should be forwarded before 31 March 2021 via post to SLR's Dublin office, at the address provided below, or via email to [dluby@slrconsulting.com](mailto:dluby@slrconsulting.com)

Regards

SLR's response to Coronavirus COVID-19 - In response to the ongoing global pandemic, we are actively following the advice provided by our national and state governments. As a flexible, full-service organisation we are open for business and will continue to operate and deliver advice and services to our clients wherever possible and in line with government guidance.





RECEIVED PLANNING	PLANNING NUMBER
13 AUG 2021	21/772
WATERFORD CITY + COUNTY COUNCIL	

Waterford City & County Council Planning Department: Viewing Purposes Only!



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## APPENDICES

- Appendix 2-A Passageway Agreement with Local Residents
- Appendix 2-B Quarry Output 2007-2020
- Appendix 2-C Passageway Traffic Survey (October 2017)

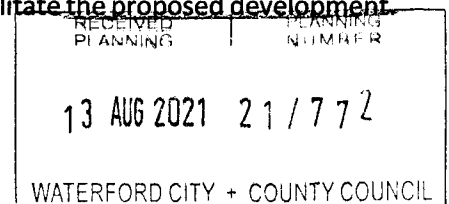
## EXISTING QUARRY DEVELOPMENT

- 2.1 The application site comprises an existing active quarry in the townlands of Ballykennedy and Kilgreany, approximately 8km west of the town of Dungarvan Co. Waterford and a proposed eastern satellite quarry in the adjoining townland of Canty, to be linked to it by a tunnel underpass. The existing quarry and application site is generally accessed via the existing N72 National Secondary Road and a local road which runs south from a junction in Cappagh townland (the L2019 Local Road).
- 2.2 The existing quarry at Cappagh has been in operation since 1952 and was acquired by John A. Wood (now a part of Roadstone) in 1969. Ongoing activities at Cappagh Quarry are permitted under Planning Ref. PD 06/1599 and An Bord Pleanála Ref. No. PL 24.225443. The existing permission was obtained on foot of a direction issued by Waterford County Council to apply for planning permission on foot of the quarry registration process undertaken in accordance with Section 261 of the Planning and Development Acts. The permission provided for continuation of extraction and processing activities as well as for associated landscaping and quarry restoration works.
- 2.3 The limestone that occurs at and around Cappagh Quarry is of relatively high grade and purity and is valued as a source of high-quality aggregate for the construction industry. At the present time, extraction of bedrock above the groundwater table is effectively complete and extractable reserves are almost depleted. There is some intermittent ongoing activity at the quarry as stockpiles are processed to produce construction aggregates and/or ground limestone (for soil conditioning).
- 2.4 In recent years, Roadstone has commenced restoration works across sections of the quarry floor, placing soil / topsoil across it before seeding it so to establish natural, native grassland cover.
- 2.5 There is an existing track / passageway running above and behind the existing eastern quarry face which provides a link for local landowners and residents between the Whitechurch Road (L2018 Local Road) and the Canty Road (which runs broadly parallel, 800m to the south). This track and the accesses thereto are permitted under Planning Ref. Nos. 510/97 and 920/97.
- 2.6 The proposed satellite quarry lies immediately east of the existing quarry and the local access passageway which delineates its eastern boundary and comprises a total of 7 existing agricultural fields set as grassland, with existing field boundaries defined by lines of hedgerows.
- 2.7 There is a derelict property located at the northern end of the proposed satellite quarry, fronting onto the L2018 Local Road. This property is to be demolished to facilitate the proposed development.

## EXISTING QUARRY INFRASTRUCTURE

### Site Layout

- 2.8 The existing site layout at Cappagh Quarry is shown in Figure 2-1. The site entrance is located in the north-western corner of the Roadstone landholding, approximately 200m south-east of Whitechurch Crossroads. Most of the pre-existing site infrastructure which services the quarry is located around the site entrance and it is intended that this will continue in service for the extended life of the quarry, should planning permission for the proposed satellite quarry and new concrete batching plant be granted. A haul road runs east from the established infrastructure area to the partially restored quarry floor and the proposed satellite quarry.



## Site Access

- 2.9 Existing vehicular access to the quarry is via a short section of internal paved road which runs from a junction along the L2018 into the quarry holding and past the site office. Thereafter the road connects to a network of unpaved haul roads which run across the quarry site.
- 2.10 There is an existing traffic management system in place around the infrastructure area, shown in Figure 2-1, which seeks to minimise crossing traffic movements and potential traffic conflicts around the infrastructure area. Internally, within the quarry, direction signs, warning notices and speed restriction signs are in place along haul roads leading to and from the access / infrastructure area.

## Site Security

- 2.11 All access to the quarry is controlled by a security gate at the site entrance. This gate is closed outside of working hours. The site boundaries are secured by a section of stone wall around the site entrance and by a combination of fencing and planted earth mounds or boundary hedgerows around the remainder of the quarry perimeter. The existing quarry also has a monitored CCTV system installed, with cameras monitoring the entrance gates.
- 2.12 The permitted operational hours for the quarry are 07.00 hours to 20.00 hours Monday to Friday and 07.00 and 14.00 hours on Saturday, with no operations on Sundays or Public Holidays. These operating hours are consistent with the operational hours set by Condition 3 of the current quarry planning permission (Planning Ref. No. PD06/1599 and PL24.225443).

## Site Roads, Parking and Hardstanding Areas

- 2.13 Provision is made for employee and visitor car parking in the vicinity of the existing site entrance and around a number of existing site offices, as indicated in Figure 2-1.
- 2.14 As previously noted, a short section of the access road around the site entrance and site offices is paved, while the remainder of the internal haul road network is unpaved. There are several paved and unpaved (hardstanding) areas around the quarry which are used for HGV / lorry parking and for occasional storage of site plant, equipment and/or materials. Rain falling across all of these areas generally percolates downwards into the underlying soil / bedrock. There is little surface water run-off and overground flow – any that does arise, infiltrates to ground and/or exposed bedrock within a relatively short distance.

## Wheelwash

- 2.15 In order to prevent transport of soil and dirt onto the public road network, all HGVs and lorries exiting the quarry must pass through the existing wheelwash facility at the start of the paved section of the internal road leading out of the quarry, towards the L2018 Local Road.

## Weighbridge

- 2.16 In order to track and record the amount of material leaving the quarry, all HGV traffic is directed across an existing weighbridge located alongside the existing quarry site office.

## Offices and Ancillary Facilities

- 2.17 The existing site office, canteen and staff welfare facilities located at the site infrastructure area in the north-western corner of Cappagh Quarry will continue in service for the duration extraction activities at the proposed satellite quarry. The weighbridge office and all administration and management functions for the quarry are based within the site offices located close to the site entrance.



- 2.18 Staff changing, washing and cooking facilities are provided at a separate canteen facility, located immediately east of the site office. The location of the existing site office and canteen is shown in Figure 2-1.

### Utilities and Services

- 2.19 Electric power, lighting and heating to existing site offices and staff welfare facilities at the quarry are all currently provided via a connection to the electricity distribution network.
- 2.20 Site staff at the quarry avail of the existing toilet, hand-washing and welfare facilities provided at the main site offices and staff canteen. Water is supplied to these facilities from an existing groundwater production well on-site. Potable water is not sourced from this well. Bottled drinking water is delivered to the site on a regular basis, as required.
- 2.21 Wastewater from the existing facilities is currently fed via a sewerage pipe to an existing septic tank. Treated effluent is discharged to ground via a percolation area.
- 2.22 Two high voltage electricity transmission lines run a short distance beyond the south-eastern corner of the Roadstone property boundary. A220kV line runs approximately 100m south of the proposed satellite quarry at its closest point, while a 100kV line runs approximately 1.3km to the south-east. Lower voltage, overhead electricity distribution lines criss-cross the surrounding rural landscape.

### Fuel Storage

- 2.23 Fuel for the existing quarry operations is stored in existing fuel storage tanks located to the south of the site office, at the location shown in Figure 2-1. These tanks are bunded to provide a storage volume equivalent to 110% of the tank storage volume and constructed on a sealed concrete surface.
- 2.24 Most mobile plant and all HGV's and lorries at the quarry are (and will continue to be) re-fuelled at the existing paved concrete slab located in front (south) of the bunded fuel tanks. Mobile crushing and screening plant and mechanical excavators on the quarry floor are (and will continue to be) refuelled from mobile, double skin fuel bowsers.
- 2.25 Surface water run-off from the paved slab in front of the fuel storage tanks is captured by sub-surface drainage pipes and passed through an existing grit trap and hydrocarbon interceptor before being discharged to ground via a soakaway / infiltration area. The interceptor is cleaned out and maintained on an ongoing basis.

### Maintenance Shed / Workshop

- 2.26 There is an existing maintenance shed / workshop for routine servicing, maintenance and/or repair of plant, machinery, HGVs and lorries located in the north-western corner of the quarry, south of the site office, at the location shown in Figure 2-1.
- 2.27 Oils and lubricants, including waste materials, are stored under cover, on spill pallets. Internal bunding is also used to contain any potential leaks or spills of potentially hazardous oils or waste liquid. Drums or tanks holding waste oil or lubricant are emptied at intervals by a licensed waste contractor and disposed off-site at a suitably licensed waste facility.
- 2.28 Oil and lubricant changes and servicing of wheeled plant are generally undertaken at the existing maintenance shed. Some maintenance works are also undertaken on occasion over the paved concrete slab in front of the bunded fuel tanks. More extensive or non-routine repair or maintenance of plant takes place at off-site locations.

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## Equipment Storage

- 2.29 Mobile plant and equipment are (and will continue to be) stored on hardstand areas within the existing quarry / application site. As access to the site can be restricted outside of working hours, it is not considered necessary to provide a dedicated, secure compound for plant and equipment within the quarry.
- 2.30 Storage for small items of plant and equipment, replacement parts, minor quantities of hydraulic oil and/or lubricants, minor quantities of liquid (oil) waste, the oil spill kit, safety clothing and equipment is provided in the existing maintenance shed.

## Lighting

- 2.31 There is no fixed or permanent external lighting across the application site, other than at the existing site offices and roads around the site entrance.
- 2.32 Mobile lighting towers are provided elsewhere around the quarry as and when required to permit safe operation of plant and machinery during early morning and late evening periods over winter months.

## Existing Surface Water Management

- 2.33 All rain which falls across the quarry recharges directly to ground and the underlying groundwater table, which currently lies below the quarry floor level. Groundwater recharge is largely diffuse across the quarry and there is no point recharge. There is no off-site discharge of water from the quarry / application site to any nearby streams or rivers.
- 2.34 Where there is delayed recharge to ground, surface water run-off may collect in shallow ponds on occasion across the quarry floor. Such ponds generally disappear within a short time period as the water within them slowly infiltrates to ground.

## OVERVIEW OF PROPOSED DEVELOPMENT

- 2.35 The proposed development comprises an satellite quarry immediately east of Cappagh Quarry, to be connected to it by a sub-surface tunnel running beneath the existing local access passageway which separates them. The development also provides for the construction and operation of a new concrete batching plant on a paved concrete slab on the quarry floor at the northern end of the existing quarry.
- 2.36 There is no requirement for any significant new / additional site infrastructure to service the planned development. All pre-existing quarry infrastructure, including but not limited to site offices, staff welfare facilities, maintenance workshop, bunded fuel storage facility, weighbridge, wheelwash, car parking area and utilities will continue in service for the duration of activity at the proposed satellite quarry and/or the operational life of the new concrete batching plant.

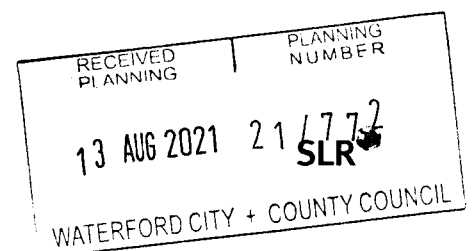
## Eastern Satellite Quarry

- 2.37 The proposed development comprises an eastern satellite quarry which will be developed in 5 separate phases (designated Phases 3A to 3E), in tandem with the final progressive phased restoration of the existing quarry. The planned extent and sequencing of the proposed satellite quarry development and associated phasing of quarry restoration works is shown in Figure 2-2 and Figure 2-3. The final overall restoration plan for the satellite quarry (following completion of extraction activities at the satellite quarry) is provided in Figure 2-4.

- 2.38 The total area of the proposed eastern satellite quarry is 13.6 hectares, of which 9.7 hectares will be extracted. The remaining site area will comprise the perimeter access track, the 2m high perimeter vegetated safety / screening berm and other associated landscaping / screening areas. Cross-sections through the proposed satellite quarry area are provided in Figure 2-5.
- 2.39 The existing uninhabited, derelict house in north-western corner of the satellite quarry area will be demolished and existing hedgerows along the internal field boundaries will be removed in order to facilitate the satellite quarry development.
- 2.40 The satellite quarry itself will comprise excavation of a single quarry bench in limestone bedrock, varying in height from approximately 8m to 20m, from existing ground level to current quarry floor level. The quarry floor in the satellite quarry will not extend below 10mOD or into the underlying groundwater body, consistent with Condition 2 of the existing planning permission (Planning Ref. 06/1599 and An Bord Pleanála Ref. PL 24.225443)

### Sub-Surface Connecting Tunnel Underpass

- 2.41 It is proposed to connect the existing quarry to the proposed eastern satellite quarry by way of a reinforced concrete tunnel underpass (of rectangular cross-section). The tunnel link is to be located toward the southern end of the satellite quarry where existing ground levels are lowest, at approximately 21mOD to 22mOD, and where consequently, the depth and extent of any temporary excavations required to install the tunnel link will be minimised. A copy of an agreement made with local residents in 1997 which included provision for the future installation of an underpass beneath the passageway is reproduced in Appendix 2-A.
- 2.42 The tunnel underpass will extend from the satellite quarry, at a present-day location close to the north-western corner of the most southerly field, and run beneath the local access passageway (previously permitted under Planning Permission 920/97), to emerge from the eastern quarry face in the pre-existing quarry, at a point close to the main internal haul road which runs through the middle of it and links back to the existing site infrastructure area (refer to Figure 2-2 and 2-3).
- 2.43 The connecting tunnel underpass between the two quarries will be 40m long and will be accessed at quarry floor level on both sides, falling from approximately 11mOD at the entrance from the existing quarry to 10mOD at the exit into the proposed satellite quarry. The tunnel will have an internal cross-section measuring 6m wide by 5.5m high. Plan details for the proposed tunnel, together with elevations and cross-sections are provided in Figure 2-6.
- 2.44 The construction and installation of the connecting tunnel will require a section of the existing local access passageway to be temporarily diverted to facilitate the required rock excavation to quarry floor level. The proposed diversion route will follow the line of existing / former hedgerows along the two southernmost fields of the satellite quarry, as indicated in Figure 2-7.
- 2.45 The diverted roadway will be 3m wide and will typically comprise approximately 300mm of crushed aggregate roadbase / hardstanding over glacial till subgrade and/or near-surface bedrock. Although dependent on the timing of the tunnel installation works, it is likely that the diverted roadway may tie into the long-term perimeter access / jeep track to be constructed around the southern and south-eastern boundary of the satellite quarry.
- 2.46 The base of the temporary rock excavation will need to be oversize of the proposed tunnel dimensions to facilitate the construction works and it is likely that excavation side slopes will be developed in rock at an overall slope angle of approximately 45°. A cross-section through the temporary excavation required to facilitate the tunnel installation is provided in Figure 2-7.





## Concrete Batching Plant

- 2.47 The proposed new concrete batching facility will be located on the quarry floor in the north-western corner of the existing quarry, immediately east of the established site infrastructure area. In order to provide some increased protection to the underlying groundwater table, ground levels around the batching plant will be raised to create a level paved / hardstanding platform area at 12mOD.
- 2.48 The proposed concrete batching facility will comprise 4 No. cement silos, each just over 21m high, a batching / mixing unit, aggregate storage bins, an aggregate loading hopper and connecting conveyor systems, all on a concrete paved area in front of the northern quarry face.
- 2.49 Various sized aggregates produced on site (by processing blasted rock from the adjoining satellite quarry) will be stored in the 4 No. aggregate storage bins. Cement will be delivered to site in bulk tankers from Irish Cement plants at either Platin or Mungret and stored in the 4 No. sealed cement silos. The concrete mixing unit (batching tower) will be provided with noise reducing cladding to eliminate / reduce both fugitive dust and noise. Readymix concrete lorries are required to reverse into a partially enclosed loading bay beneath the concrete mixing plant, so that batched concrete from the plant can be discharged via a chute into the lorry mixer drums.
- 2.50 As part of the development, a batching control office (portacabin) and an admixture storage shed will also be provided beside the batching plant. A 70,000 litre water storage tank will also be provided to the rear of the plant.
- 2.51 Provision is also made for construction of a closed loop concrete recycling facility, comprising a concrete truck wash out area, settlement lagoons, submerged pumps and a pipeline connection to transfer recycled water to the 70,000-litre water storage tank immediately behind (north of) the concrete batching plant. The concrete base of the settlement lagoons will not extend below 10mOD in order to avoid impacting the underlying groundwater table.
- 2.52 The location and layout of the proposed concrete batching plant within the overall quarry context is shown in Figure 2-2. The detailed plan layout and elevations of the plant are shown in Figure 2-8 and Figure 2-9 respectively, while details of the proposed closed loop concrete recycling and settlement lagoon system are shown on Figure 2-10. Details of the proposed batching office, admixture storage shed and water tank are provided in Figures 2-11 and 2-12.
- 2.53 All of the above elements will be constructed over a 300mm thick concrete slab extending across an area of approximately 0.9ha. Surface water run-off from the paved slab will be shed northwards and will either infiltrate into the underlying bedrock immediately north of, and beyond the slab, or will be captured locally around the concrete recycling facility and the settlement lagoons at the truck wash out area and will ultimately be recycled in concrete production.
- 2.54 Processed aggregates (from the adjoining satellite quarry) and imported sand from other local quarries will be stockpiled on a dedicated hardstand area to be established immediate east of, and adjacent to, the concrete batching plant, at the location indicated in Figure 2-8. This stockpile area will have a plan area of approximately 1 hectare. There will be little, if any surface water run-off across this area and any rainfall is likely to infiltrate diffusely to the underlying groundwater table.
- 2.55 Some low-level spot lighting will be provided around the batching plant to facilitate production operations during winter months and minimise any potential light pollution. Lighting will principally be fixed around the vehicle loading bay and other operational areas where safety assessments identify a requirement for it.
- 2.56 Appropriate low-level signage will be provided within the quarry along the internal road network to direct HGV traffic to and from the batching plant and/or aggregate stockpile area.

## SITE PREPARATION WORKS

- 2.57 At the outset of the proposed development and prior to commencement of initial blasting and preparatory extraction works at the satellite quarry, tunnel installation and/or ready mix concrete production activities, it will be necessary to undertake some preparatory site work (construction phase works), as detailed below.

### Satellite Quarry Area

- 2.58 Prior to the commencement of initial blasting and rock extraction activities / operations at the satellite quarry, it will be necessary to complete preparatory works as set out below.

- 2.59 The initial stage of the preparatory works for the satellite quarry will entail

- demolition of the 'Old House' in the north-western corner of the satellite quarry under the supervision of a bat expert;
- strengthening of the existing hedgerow boundary around the entire perimeter of the satellite quarry by planting of native stockproof hedging where feasible and appropriate to do so;
- construction of a 2.4m high chain link fence around the entire perimeter of the satellite quarry, offset 2m from the centreline of existing boundary hedgerows;
- installation of gates (2.4m high) on the western side of the satellite quarry, to facilitate ground level access from the local access passageway at both the northern and southern end, as shown in Figure 2-2;
- installation of temporary gates (2.4m high) and a ramp in the south-eastern corner of the existing quarry, to facilitate temporary haulage of materials to and from the satellite quarry and across the access passageway until such time as the proposed tunnel underpass is built and in use, refer to Figure 2-2;
- construction of a 3m wide jeep / access track immediately inside the fenceline along the northern, eastern and southern perimeter of the satellite quarry. The jeep / access track will be grassed (with no hardcore surface or sub-base);
- stripping of topsoil and overburden subsoil cover in advance of the initial phase of rock extraction at the southern end the satellite quarry (identified as Phase 3A extraction in Figure 2-2), from the area immediately in front of and around the proposed tunnel portal;
- construction of a 2m high perimeter screening / safety berm around the entire quarry perimeter (inside of the jeep / access track) using topsoil and overburden subsoil stripped across the initial (Phase 3A) extraction area and its subsequent planting with semi-natural woodland species and a spruce hedge;
- overground transfer of any excess topsoil and subsoil excavated across the initial Phase 3A excavation area at the satellite quarry to the existing quarry for re-use in ongoing restoration works. Excess soils will be transferred by way of haulage trucks running at ground level, between the quarry access gates referenced above, across the existing access passageway and down the temporary ramp to the existing quarry. Excess rock, crushed rock and aggregate will also be transferred across to the existing quarry until such time as the tunnel underpass is built and in use;
- planting of a triangular area at the north-eastern corner of the proposed satellite quarry, extending to approximately 0.61 hectares with semi-natural woodland species.

- 2.60 Where feasible and appropriate, existing boundary hedgerows will be strengthened by planting further native species-rich hedgerows. This planting will comprise native species of local provenance, including wild privet *Ligustrum vulgare*, dogwood *Cornus sanguineus*, guelder rose *Viburnum opulus*,



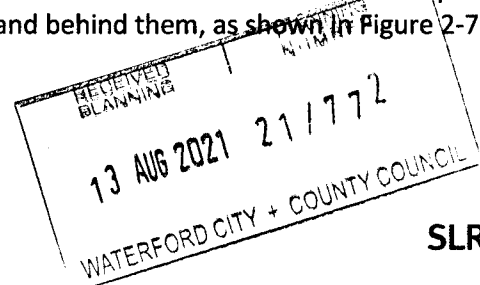
hazel *Corylus avellana*, hawthorn *Crataegus monogyna* and blackthorn *Prunus spinosa*. The triangular area in the north-eastern corner of the quarry will be planted with similar species.

- 2.61 The perimeter access / jeep track is required to enable site staff (or sub-contractors) undertake checks and any necessary maintenance work on the perimeter berm or security fence, as may be required by health and safety legislation.
- 2.62 It is envisaged that the access / jeep track will be grassed except for a short period during the proposed tunnel installation and construction works, when the existing local access passageway will be temporarily diverted and will likely run across the southern section of the track. The construction of the diverted passageway will comprise 300mm of compacted aggregate roadbase / hardstanding over the underlying subgrade.
- 2.63 On completion of the tunnel installation works and re-instatement of the existing passageway, the roadbase / hardstanding materials will be removed and the grass track over the southern section of the diverted route will be re-instated. The excavated roadbase materials will be screened, stockpiled and supplied as aggregate for appropriate re-use within the existing quarry or for off-site construction projects.
- 2.64 The proposed perimeter berm will be 2m high with 1 in 1.5 slopes on either side, 8 m wide at the base and 2 m wide on the crest (refer to the cross-section shown in Figure 2-5). The sides and top of the berm will be planted with a variety of age classes ranging from feathered whips up to 10-12 cm girth trees in order to strike a balance between immediate screening effect, establishment potential and the density of screening. Hedging will be planted along the crest.
- 2.65 The proposed screening berms to be located around the perimeter of the eastern satellite quarry will be left intact for the life of the quarry (and likely in perpetuity to continue to provide biodiversity enhancement to the application site and the local environment). The growth and establishment of vegetation along this perimeter will also help to mitigate against noise and potential dust emissions from future quarry operations and reduce the visual impact of the development from the passageway, public road network and surrounding lands.
- 2.66 The new perimeter security fence will continue to be checked monthly and after any incident. Records of checking, maintenance and repairs of the fence will be maintained on-site.

#### *Tunnel Installation Works and Temporary Passageway Diversion*

- 2.67 In order to construct the proposed tunnel underpass linking the existing quarry to the proposed satellite quarry, it will be necessary to open up an initial excavation in overburden soils and underlying rock at the southern end of the satellite quarry and to create a sunken area extending down to proposed quarry floor level in front of and around the portal for the tunnel underpass.
- 2.68 The initial (Phase 3A) quarry excavation will straddle the two southernmost fields of the satellite quarry area and will have a plan footprint area of approximately 1 hectare (inclusive of side slopes and rock benches). Excavations will be undertaken using conventional mechanical excavation techniques (in overburden soil and weathered rock) and by blasting (in competent rock). Much of the excavated topsoil and overburden soils will be used to construct the perimeter screening berm around the satellite quarry.
- 2.69 Excess topsoil and overburden soils will be either temporarily stockpiled within the satellite quarry, beyond the excavation footprint or, more likely, will be transferred by haulage trucks at ground level, across the existing passageway, for use in ongoing restoration works at the existing quarry. As previously noted, the haul route will run between the proposed new access gates at the southern end of both the existing quarry and proposed satellite quarry (refer to Figure 2-2).

- 2.70 During the initial (Phase 3A) construction stage excavations, the excavated weathered rock and competent rock will be stockpiled at ground level within the satellite quarry, north of and beyond the initial excavation footprint. The stockpiled rock will subsequently be crushed and screened on site (at existing ground level) to produce aggregate. Noise generated by these activities will be partially screened by material stockpiles and by rising ground levels over the intervening distance between the works area and residential receptors to the north and south.
- 2.71 Some of the crushed rock will be stockpiled at the satellite quarry pending subsequent use in backfilling of the temporary tunnel excavation and re-instatement of the perimeter berm on the eastern side of the existing quarry. Excess crushed rock / aggregate will be transferred by haulage trucks across the passageway (and new southern access gates) to the existing quarry. These aggregates will then be dispatched off-site or will be stockpiled pending subsequent use in the production of readymix concrete.
- 2.72 A number of mitigation measures will be implemented to enhance traffic safety and reduce risks associated with passageway crossing movements to an acceptably low level. These measures include
- cutting back vegetation around the proposed access gates and crossing point to enhance traffic visibility, particularly if works progress over spring and/or summer months; and
  - provision of traffic signage along the passageway and the temporary haulage route between the two quarries to warn of crossing traffic ahead.
- 2.73 Once the initial excavation has been extended down to quarry floor level and opened up sufficiently in front of the tunnel portal location, it will be necessary to temporarily close a section of the existing passageway and to divert any occasional traffic travelling over it around the Phase 3A excavation to facilitate opening of the cut and cover excavation across the passageway (and the subsequent installation of precast concrete sections of the tunnel underpass linking the two quarries at quarry floor level). As a precautionary measure, a temporary safety berm up to 2m high will be placed across the passageway at either end of the closed section to prevent any traffic movement across it.
- 2.74 It is envisaged that the diverted section of passageway will closely track the existing field boundaries / hedgerows around the two southernmost fields of the satellite quarry in which the initial (Phase 3A) quarry excavations will be developed, refer to Figure 2-7. The diverted track will be 3m wide, unpaved and will comprise approximately 300mm of crushed aggregate roadbase / hardstanding overlying glacial till subsoil and/or near-surface bedrock. A chainlink fence will be erected on either side of the diverted track to restrict access to the initial excavation / works area.
- 2.75 The proposed temporary tunnel excavation will be developed in soil and rock at an overall slope angle of approximately 45° and will extend approximately 0.5m below the proposed tunnel floor levels of 10mOD to 11mOD. This temporary excavation will be oversized to facilitate the tunnel construction works and will extend from the eastern face of the existing quarry into the initial (Phase 3A) quarry excavation developed on the other side of the local access passageway. The location and approximate size / dimensions of the tunnel excavation are shown in Figure 2-7.
- 2.76 The connecting tunnel linking the two quarries will most likely comprise several precast concrete box sections produced off-site by a specialist precast concrete manufacturer and transferred to site by flat, low-body trailers. The precast concrete sections will be brought through the existing quarry to the existing eastern quarry face and then lifted and lowered into position within the prepared excavation by a mobile crane. Concrete wingwalls will be constructed either side of the tunnel portals end to support graded (sloped) backfill materials above and behind them, as shown in Figure 2-7.





- 2.77 After the tunnel sections have been connected and sealed, the tunnel excavation will be backfilled with stockpiled, pre-crushed aggregate up to existing ground level and the local access passageway reinstated to run north-south across it. Chainlink fencing, perimeter screening berms and planting will then be established over the backfilled excavation, on either side of the reinstated passageway, as indicated on the site layout plans in Figures 2-3 and 2-3 and cross-sections provided in Figure 2-5.
- 2.78 Thereafter, the temporary safety berms at either end of the closed section of passageway will be removed, traffic movements will be reinstated along the passageway, all temporary works or infrastructure required to facilitate the tunnel installation works and passageway diversion will be removed and any remaining sections of boundary fence, perimeter track and/or screening berm around the satellite quarry completed and secured.

#### *Concrete Batching Plant*

- 2.79 The construction and installation of the proposed concrete batching plant will entail the following works in front of the northern quarry face, at the location shown in Figures 2-2 and 2-3;
- demolition of concrete supports for the former fixed crushing plant;
  - raising of ground level and construction of a level development platform / hardstanding area (using site won materials) around the proposed development footprint for the concrete batching plant and the adjoining aggregate storage area;
  - construction of the concrete foundations and concrete slab on which the batching plant will be erected and supported;
  - importation of the various structural elements of the plant, much of which is pre-constructed / pre-assembled off-site, on specialist low loader / machinery transport vehicles;
  - construction and commissioning of the concrete batching plant, including cement silos, mixer plant, aggregate storage bins, intake hopper and conveyor systems;
  - construction / installation of the batching office (portacabin), admixture storage shed and water storage tank;
  - construction of the concrete recycling facility / settlement lagoons using in-situ concrete construction techniques and commissioning of water recycling infrastructure.

#### **Additional Preparatory Works**

- 2.80 In addition to the above, it will also be necessary, prior to commencement of site activities, to undertake works around the existing quarry access junction, principally the removal and replanting of sections of the existing boundary hedge, re-alignment of the boundary wall and demolition / removal of a structure to the east of the existing access junction. These works are required to provide enhanced sightlines for traffic egressing the quarry (in line with current design standards).
- 2.81 An indication of the scrub areas, hedgerows and associated trees to be removed, to facilitate the proposed development are provided on planning drawing D14 (Trees to be Removed). These trees are deemed to be exempted from the requirement for a felling licence should planning permission be granted (as per provisions of the Forestry Act 2014).
- 2.82 Any environmental control and monitoring infrastructure necessitated by the proposed development, to assess the nature, extent, magnitude and/or duration of any potential impacts on sensitive or selected environmental receptors, will also be established and commissioned at the outset of the development, prior to the commencement of operations.
- 2.83 It is likely that some or all of the preparatory works outlined above will be subject to prior agreement and oversight of the Local Authority, in accordance with standard conditions attaching to any planning consent which may ultimately be issued in respect of the proposed development.

## QUARRY OPERATIONS AND ACTIVITIES

### Quarry Design

- 2.84 The proposed satellite quarry to be developed immediately east of Cappagh Quarry has been designed having regard to the 'Guidelines to the Safety, Health and Welfare at Work (Quarries) Regulations 2008' published by the Health and Safety Authority (HSA) and to the following criteria
- a 3D topographical survey provided by the Applicant to Irish National Grid;
  - a 2.4m high perimeter fence around the entire perimeter of the proposed satellite quarry;
  - a 2m high perimeter screening berm with 1 in 1.5 slopes on either side and 2m wide crest;
  - a 3m wide (grassed) access track along both the outside and inside edge of the perimeter screening berm;
  - a 1 in 1.5 excavation slope from the edge of inside access track surface to the base of the in-situ overburden;
  - a 3m stand-off to rock-head (i.e. between the base of the overburden slope and the top of the rock excavation);
  - a 70° slope from top of rock-head to bottom of quarry face (depending on ground conditions);
- 2.85 The full extent of the proposed satellite quarry, developed in line with the criteria set out above, is shown in Figures 2-2 and 2-3. Cross sections through the satellite quarry, when developed to its full extent, are shown in Figure 2-5, together with a cross-section showing the future development layout across the existing local access passageway.
- 2.86 The proposed satellite quarry will provide for extraction across approximately 9.7 hectares down to a projected final floor level of 10mOD and will generate 1,400,000m<sup>3</sup> of high-quality limestone bedrock. Assuming an in-situ rock density of 2.4tonnes/m<sup>3</sup>, the corresponding extractable resource will be approximately 3,360,000 tonnes.

### Extraction and Blasting

- 2.87 As with the previous quarry operation, mechanical excavation and blasting techniques will continue to be used at the satellite quarry to break-up and fragment the in-situ limestone rock prior to processing (crushing / screening etc.). A programme of mitigation measures will continue to be implemented to ensure that the excavation / blasting operations do not result in any significant impact on the residential amenity of the local area (refer to Chapter 10 of this EIAR – Noise and Vibration).
- 2.88 The practices used for blasting operations at Cappagh Quarry will continue to be in line with best industry practice. All blasting at the quarry will comply with Part 5 of the Guidelines to the Safety, Health and Welfare at Work (Quarries) Regulations 2008. Roadstone employs a dedicated blasting team who ensure that market leading technologies and procedures are used to control blasting operations. Each working area across the satellite quarry footprint will be worked in a manner that minimises the risk of any potential flyrock incidents.
- 2.89 Roadstone is proposing to limit blasting activities at the satellite quarry area to between 11.00 hours and 15.00 hours Monday to Friday to ensure that it does not clash with traditional milking times and avoids a potential source of stress for dairy herds during milking. Waterford City and County Council (the Planning Authority) and all residential property owners and dairy farmers within 500m of the satellite quarry area will be notified at least one working day before any blasting is undertaken.

- 2.90 Prior to the firing of any blast, Roadstone will also continue to give warning of an imminent blast by sounding an alarm for a minimum period of one minute. The alarm shall be of sufficient power to be heard within 500 m of the satellite quarry. An 'all clear' signal will be given by means of a siren once blasting has been completed.
- 2.91 Roadstone will continue to monitor ground borne vibration and air overpressure emissions at the nearest sensitive locations (e.g. between the nearest residential property and the location of the blast, as identified in Figure 2.14), against the limit values set out in the reference industry guidance documents (specifically *Quarries and Ancillary Activities : Guidelines for Local Authorities* (DoEHLG, 2004) and *Guidelines on Environmental Management in the Extractive Industries* (EPA, 2006)) and Condition 7 of the current planning permission (Planning Ref. PD 06/1599 and ABP Ref. No. 24.225443).

### Aggregate Processing

- 2.92 The principal processing activities for the blasted limestone rock will continue to comprise:
- (a) size reduction through crushing and occasional mechanical breaking
  - (b) sorting of the crushed rock into specific particle sizes by screening.
- All processing activities at the satellite quarry will continue to be undertaken using mobile plant and equipment placed on the quarry floor.
- 2.93 An excavator will be used to directly feed the excavated / blasted rock into a mobile primary crushing / screening plant in front of the working face. The mobile plant will be relocated after every blast over the life of the satellite quarry, as operational requirements dictate.
- 2.94 All processed aggregates accumulating in stockpiles around the screening plant will be loaded directly onto HGVs for haulage through the connecting tunnel and into the existing quarry on the opposite side of the passageway. From there, the aggregates will either be weighed out at the existing weighbridge and taken direct to market or will be carried across the quarry for stockpiling at the proposed aggregate storage area, adjacent to the new concrete batching plant.
- 2.95 Although washing of blast / crushed rock fines was historically undertaken at Cappagh Quarry in the past, this activity has been discontinued in recent years and any associated infrastructure (principally settlement lagoons) and retained fines have been excavated out and/or backfilled, with surrounding areas fully restored as part of ongoing quarry restoration works. No on-site washing of blast / crushed rock fines is required or proposed as part of planned future development at the application site.

### Phasing of Extraction Activities

- 2.96 Following completion of the site preparation works and the tunnel installation works, it is proposed to extend the satellite quarry northwards from the initial excavation opened up in the south-western corner. The quarry will be developed in a phased manner to provide time for advance stripping and storage of topsoil and overburden soils and facilitate its re-use in any ongoing progressive quarry restoration works.
- 2.97 Following removal of topsoil and overburden cover, the area immediately north of the initial (Phase 3A) excavation will be the next to be quarried. This area is identified as Phase 3B in Figure 2-3. The initial working of this area will facilitate the 'opening-up' a series of quarry faces (to the north and east) which allow for the blending of rock of variable quality if required after extractive operations commence.



- 2.98 Thereafter, extraction activities will progress further in sequence, northwards through Phase 3C, eastwards through Phase 3D and south-eastwards through Phase 3E, each phase extending up to the proposed extraction limit indicated in Figures 2-2 and 2-3.
- 2.99 All the while, as topsoil and overburden materials are stripped in advance of extraction, they will be transferred through the sub-surface tunnel for use in the phased restoration of the existing quarry floor on the opposite side of the passageway to grassland, as also indicated in Figures 2-2 and 2-3. The excavated soils may also be used to create tapered slopes at the toe of residual quarry faces or will be stockpiled across the satellite quarry pending subsequent re-use in restoration works there.
- 2.100 Restoration of the Phase 1 area of the existing quarry, that area north of the existing internal haul road which runs broadly north-west to south-east through the centre of the quarry, will progress as soil is stripped in advance of the Phase 3A and Phase 3B excavations at the satellite quarry. Restoration of the Phase 2 area of the existing quarry, broadly to the south of the internal haul road will progress substantially as the Phase 3C area is worked and will continue (if necessary) as the Phase 3D and 3E areas are worked. Thereafter restoration works will proceed on an ongoing basis wherever practicable within the Phase 3 satellite quarry area.

### Final Quarry Restoration

- 2.101 Following cessation of extraction activity across the satellite quarry area, it is envisaged that restoration works will continue across the quarry floor and at faces within the Phase 3 area. As elsewhere within the existing quarry, the lands in this area will be ultimately restored to grassland at a finished level above 10mOD, refer to Figure 2-4.
- 2.102 As part of the final restoration phase, sections of the quarry face will be left intact as a County Geological Site (CGS), in line with suggestions made by the Irish Geological Heritage (IGH) Programme (IGH) of the Geological Survey of Ireland (GSI).

### CONCRETE BATCHING PLANT

- 2.103 Once commissioned and operational, aggregates required for concrete production at the batching plant will principally be sourced from the proposed satellite quarry. These aggregates will be produced and stockpiled on site or transferred via the hopper and conveyor system to the aggregate storage bins.
- 2.104 Coarser sand will most likely have to be sourced from local pits, imported to site by HGV lorries and stockpiled on the hardstand area adjacent to (east of) the plant.
- 2.105 As previously noted, cement will be delivered to the concrete production plant at Cappagh site in bulk tankers from Irish Cement plants at either Platin or Mungret and will be stored in the 4 No. sealed cement silos. The silos will be filled from ground level, under pressure, through a cement fill pipe. A dust control system will be deployed to control any fugitive emissions which might arise when filling the cement silos.
- 2.106 There is an existing electrical (ESB) connection at the application site and this will be used to provide a power supply to the plant. The plant will be supplied with water sourced from the concrete recycling system / settlement lagoons and stored in a 70,000-litre storage tank. Water in the tank will be topped up as and if required by water from the existing on-site groundwater supply well.

### Concrete Production Activities

- 2.107 Readymix concrete production essentially entails blending and mixing of the following input materials in various design proportions:

- Aggregates –sourced from the planned eastern satellite quarry;
- Sand – sourced from local pits / suppliers;
- Water-- sourced from the concrete recycling system / topped up from existing supply well;
- Cement and admixtures – imported to site as demand requires. All admixtures will be kept at the dedicated storage shed to be provided as part of the development and will typically be stored over suitable spill / bunded pallets.

2.108 The readymix concrete production process is outlined below:

- (i) Aggregates are pre-loaded to the 6 No. aggregate storage bins – they are transferred from adjoining stockpiles to the hopper by a mobile loading shovel and then transferred to the storage bins by a rising conveyor system;
- (ii) The required amounts of aggregate are transferred via a conveyor belt to a weigh batcher that measures the proper amounts of each material in a concrete design mix. Cement is transferred by pipe to the mixer from the cement silos;
- (iii) The dry materials will then flow into a stationary mixer where they are blended together for several minutes. After the dry materials are blended, controlled volumes of admixtures and water are added and mixed further. All input weights and volumes are measured and controlled by computer. Admixtures are compounds which are added to concrete in small amounts in order to change the flow and setting properties of the concrete;
- (iv) Readymix concrete lorries collecting concrete from the plant are required to reverse into the loading bay beneath the concrete mixing plant (also known as the batch house).
- (v) Batched concrete from the mixer is then discharged via a chute into the lorry mixer drums and transported to off-site development projects.

2.109 The proposed readymix concrete manufacturing plant at Cappagh Quarry is expected to produce an average of 50,000m<sup>3</sup> of concrete per annum, predominantly for supply to local construction and development projects and agricultural holdings around West Waterford and East Cork. Over a year, this rate of production would equate to an average production rate of approximately 167m<sup>3</sup> per day, assuming production takes place every day for 50 weeks in a calendar year and 5.5 working days in a week (i.e., equivalent of 300 working days / year).

## Water Management

### Surface Water

- 2.110 There will be no emissions to surface water as part of the proposed concrete plant development. A closed loop concrete recycling and settlement system will be installed immediately adjacent to (north of) the concrete plant, as indicated in Figure 2-8.
- 2.111 All water used in washing out concrete trucks and other plant will be directed to a system of settlement lagoons set into the concrete slab. Suspended particulates in the concrete wash out will settle out in these lagoons. Treated water sourced from these lagoons will then be pumped to the on-site water storage tank and recycled for re-use in the concrete production process, wash-down bay or otherwise used for dust suppression purposes across the quarry.
- 2.112 The settled-out particulates / sediment will be periodically excavated from the base of the lagoons, stockpiled and allowed to dry on the adjoining hardstanding area and added to the aggregate stockpiles for recycling in concrete production.
- 2.113 Surface water run-off from the paved slab will be shed northwards and will either infiltrate into the underlying bedrock immediately north of, and beyond the slab, or will be captured locally around the settlement lagoons at the truck wash out area and recycled in concrete production.

*Groundwater*

2.114 There will be no discharge to groundwater from the concrete production activities and all process water / effluent from on-site activities will be treated and re-used / recycled in:

- Concrete production (and therefore transported off-site);
- Wash down of concrete trucks (and recycled again in a closed loop system); or
- Dust suppression across the quarry (when it will be largely taken up by evaporation).

2.115 Additional water for the plant will be sourced, only as and when required, from the on-site groundwater supply well.

*Water Consumption*

2.116 The water consumption figures presented below assume a maximum annual output of 50,000m<sup>3</sup> of readymix concrete per annum from the proposed batching plant at Cappagh Quarry.

**Readymix Concrete Production:**

2.117 The readymix concrete manufacturing plant for readymix concrete production will utilise c.1m<sup>3</sup> of water to produce 6m<sup>3</sup> of concrete. Based on a maximum annual concrete requirement of 50,000m<sup>3</sup> per annum, this equates to an annual water requirement of approx. 8,300m<sup>3</sup>.

2.118 An additional 1m<sup>3</sup> will be added to each truck to maintain the concrete mix during transport. Assuming an average load of 7m<sup>3</sup> per truck, this equates to an additional requirement of 7,150m<sup>3</sup> of water, giving a total annual water requirement for concrete production of 15,450m<sup>3</sup>.

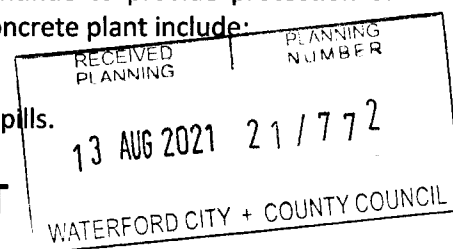
**Concrete Truck Wash Out:**

2.119 The concrete bottle on each truck will be washed out when the vehicle returns to site. The wash down area will comprise a closed loop recycling system which includes settlement system (refer to Figure 2-8), located immediately adjacent to the concrete plant. The wash out process will require approximately 500 litres of water (0.5m<sup>3</sup>) per truck. This equates to approximately 3,575m<sup>3</sup> of water per annum. Much of this wash-out water will be recycled for re-use. Therefore, assuming losses of c.20%, the net water usage of the wash-down facility will be approximately 715m<sup>3</sup> per annum.

2.120 Based on the assessments above, the total maximum water usage for the concrete batching plant is likely to be of the order of 16,165m<sup>3</sup> per annum.

2.121 Measures that are currently in place at the quarry that will continue to provide protection of groundwater during construction and operation of the readymix concrete plant include:

- Bunding of fuel storage tanks;
- Maintenance of spill kits on site to deal with hydrocarbon spills.

**OTHER ASPECTS OF PLANNED DEVELOPMENT****Extraction Rate**

2.122 The existing quarry at Cappagh site is a regionally important and strategically located quarry and is a valuable source of good quality limestone aggregate in close proximity to local markets around Dungarvan, West Waterford, East Cork and the wider East Munster Region. There is a sustained high demand for the aggregates produced at the quarry and it is anticipated that there will be a corresponding high demand for readymix concrete once the proposed concrete batching plant is approved, installed and commissioned at the quarry.



- 2.123 The proposed eastern satellite quarry and new concrete batching plant are required to meet current and future market demands for construction materials in the surrounding local market. The volume of material excavated from the proposed satellite quarry and the volume of readymix concrete produced will vary from day to day and from year to year, based on supply and demand in surrounding local markets.
- 2.124 Details of the historical volumes extracted from the existing quarry between 2007 and the end of 2020 are provided in Appendix 2-B. As can be seen, output / production volumes from the existing quarry peaked in 2007 at 335,181 tonnes, immediately prior to the global financial crisis of 2008.
- 2.125 The proposed satellite quarry development at Cappagh Quarry will not, in and of itself, generate any increase over and above past / established quarry output levels. It is expected that future quarry output (from all combined existing and future extraction, processing and added value activities) will not exceed 400,000 tonnes per annum. This is consistent with maximum output levels permitted by the current quarry planning permission (Planning Ref. No. 06/1599 and An Bord Pleanála Reference No. PL24.225443), which was approved on the basis of a projected maximum quarry output of up to 400,000 tonnes per year.

### Lifespan of Development

- 2.126 Notwithstanding the projected maximum output levels presented above, it is projected for planning purposes that the output of aggregate, stone and related products from the satellite quarry will typically vary between 120,000 tonnes and 150,000 tonnes per annum and that output from the concrete batching plant will typically average 50,000m<sup>3</sup> per annum (consuming approximately 65,000 tonnes of site produced aggregate).
- 2.127 On this basis, with a projected market demand for quarried stone and concrete consuming between 185,000 tonnes and 215,000 tonnes of aggregate per annum, the projected life of the satellite quarry, with an assessed reserve of 3.36 million tonnes, will be approximately 16 to 18 years.
- 2.128 Allowing additional time for any preparatory or site-establishment works and for post quarrying restoration works, it is anticipated that the operational life of the overall satellite quarry development will therefore be up to 20 years, and application is made for planning permission on that basis.

### Traffic Movements

- 2.129 Allowing for periodic variations in demand, it is anticipated that, based on the projected maximum output levels, that the proposed development(s) at the application site will generate a combined **maximum** of 200 HGV movements per day (equivalent to 100 HGV movements inward and 100 HGV movements outward per day).
- 2.130 Traffic Impact Assessment, presented in Chapter 14 of this EIA Report, presents findings of link capacity analysis carried out on the L2018 and L2019 (north and west of Whitechurch Crossroads), the R671 and N72 and determined that the roads will continue to operate within capacity for the assessment years 2022, 2027 and 2037. Junction capacity analysis at the junction of the quarry and L2018, the junction of the L2018 and L2019, and the N72 and R671 junctions indicate that they will also continue to operate within capacity for each of the assessment years 2022, 2027 and 2037.
- 2.131 As noted previously, works will be undertaken at the existing quarry access to provide enhanced sightlines in line with current design standards for traffic egressing the quarry.

- 2.132 A traffic survey undertaken in 2017, reproduced in Appendix 2-C, indicated that the existing passageway is very lightly trafficked and is used by only a small number of cars and/or agricultural vehicles each day, typically between 10 and 20 in total. It is expected that traffic movements along the passageway will remain at a similarly low level over the life of the proposed satellite quarry development. The proposed development of the satellite quarry will not require any modification to the existing passageway access / egress junctions with local roads at either end (previously permitted under Planning Ref. 97/510).

## Working Hours and Employment

- 2.133 It is envisaged that once the proposed tunnel underpass is installed and the satellite quarry and new concrete batching plant are fully operational, there will no change to working hours over and above those currently permitted under Planning Ref. PD 06/1599 and An Bord Pleanála Reference Number: PL 24.225443. Working hours will be from 07:00 hours to 20:00 hours Monday to Friday and 07:00 hours to 14:00 hours on Saturdays, with no working permitted on Sundays or Public / Bank Holidays.
- 2.134 Activities at Cappagh Quarry provide direct employment for up to 10 site-based personnel. It also supports other indirect employment, principally HGV drivers / hauliers and, to a lesser extent, local suppliers who provide fuel, lubricants, plant / equipment, spares etc. and local service providers who undertake plant maintenance and environmental monitoring.
- 2.135 It is expected that the proposed eastern satellite quarry and new concrete batching plant, if approved, will continue to support current employment levels over the life of the development.

## Lighting

- 2.136 As previously noted, there is no fixed or permanent external lighting across the application site, other than at the existing site offices and roads around the quarry entrance. Mobile lighting is currently provided around the quarry as and when required to permit safe operation of plant and machinery during early morning and late evening periods over winter months. This will continue to be the case as the satellite quarry is developed.
- 2.137 Some low-level spot lighting will be provided around the batching plant to facilitate production operations during winter months and minimise any potential light pollution. Lighting will principally be fixed around the vehicle loading bay and other operational areas where safety assessments identify a requirement for it.

## Signage

- 2.138 Existing signage located at the quarry access from the public road identifies the quarry site / location and the quarry operator. Signs advising of 'No Unauthorized Access' and other warning signs are fixed to the existing pillars at the quarry entrance.
- 2.139 Further signage advising of 'No Unauthorized Access' and other warning signs are fixed along the existing perimeter fence and along the local access passageway / eastern quarry boundary. Similar signs will be erected around the perimeter of the proposed satellite quarry.
- 2.140 Appropriate low-level signage will be provided within the quarry complex along the internal haul road to direct HGV traffic making deliveries to, and collecting readymix concrete from, the new concrete batching plant. Signage will also direct traffic leaving the plant and/or egressing the quarry.

## Environmental Monitoring

- 2.141 There is an established programme of environmental monitoring in connection with rock extraction and aggregate processing activities at Cappagh Quarry. This environmental monitoring programme complies with the requirements of the existing planning permission in respect of these activities (Planning Ref. PD 06/1599 and An Bord Pleanála Ref. No. PL 24.225443).
- 2.142 Environmental sampling, monitoring and testing is generally undertaken by independent external laboratories and by independent external consultants as and when required. Blast monitoring is carried out Roadstone personnel. Records of environmental monitoring and testing are held by Roadstone Ltd. on the FLEX electronic recording system and forwarded to the Local Authority as required.
- 2.143 The location of existing environmental monitoring / sampling locations around Cappagh Quarry are identified in Figure 2-13. Some additional monitoring or reconfiguration of existing environmental monitoring arrangements will be made if the proposed satellite quarry is approved, as discussed in relevant EIAR Chapters and shown in Figure 2-14.

## Environmental Management System

- 2.144 Roadstone operates an environmental management programme at Cappagh Quarry to monitor and manage emissions from established operations. Limit values for environmental emissions arising from these activities are identified by the existing planning permission.
- 2.145 The existing EMS (Environmental Management System) will continue to be maintained and updated, over the life of the proposed satellite quarry / concrete plant operations, with regular environmental monitoring of noise, vibration, dust and groundwater quality to ensure that they remain within permitted levels (refer to Chapters 6, 8, 9 and 10 of this EIAR for more details).
- 2.146 The contact details of the quarry operator are clearly displayed on a sign at the main entrance from the public road. Any complaints received about quarry operations or other on-site activities will be logged in the complaint register which will be maintained on site and entered on the FLEX electronic recording system as part of the EMS. All complaints will be fully investigated and assessed by site-based staff.

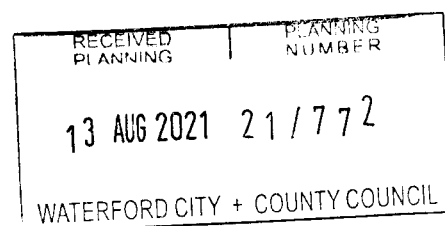


## REFERENCES

**Department of Environment, Heritage and Local Government**, Quarries and Ancillary Activities, *Guidelines for Planning Authorities 2004. Environmental Management in the Extractive Industry: Guidelines for Regulators 2006.*

**Health and Safety Authority** *Guidelines to the Safety, Health and Welfare at Work (Quarries) Regulations 2008.*

**Waterford County Council** Waterford County Development Plan 2011 – 2017.



## FIGURES

**Figure 2-1**  
**Existing Site Layout**

**Figure 2-2**  
**Proposed Site Layout : Phase 1 Restoration and Phase 3A Extraction**

**Figure 2-3**  
**Proposed Site Layout : Phase 2 Restoration and Phase 3B, 3C and 3D Extraction**

**Figure 2-4**  
**Final Quarry Restoration Plan**

**Figure 2-5**  
**Quarry Cross Sections**

**Figure 2-6**  
**Proposed Tunnel Plan, Elevations and Cross-Sections**

**Figure 2-7**  
**Proposed Temporary Passageway Diversion and Tunnel Excavation Cross-Section**

**Figure 2-8**  
**Proposed Concrete Batching Plant : Plan Layout**

**Figure 2-9**  
**Proposed Concrete Batching Plant : Elevations and Cross-Sections**

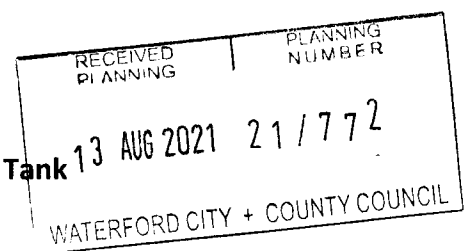
**Figure 2-10**  
**Proposed Concrete Recycling Unit / Settlement Lagoons**

**Figure 2-11**  
**Proposed Batching Office**

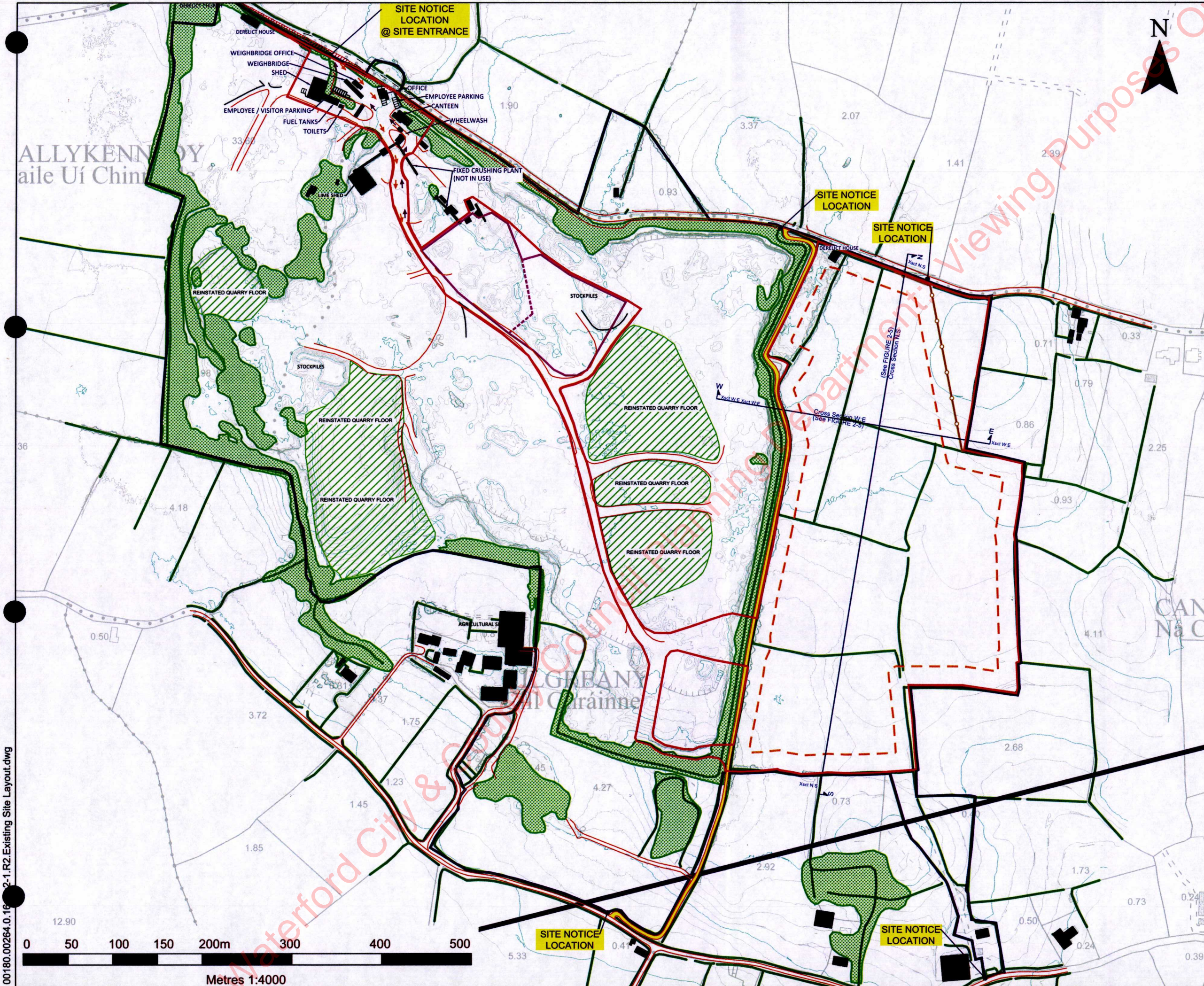
**Figure 2-12**  
**Admixture Storage Shed and Water Storage Tank**

**Figure 2-13**  
**Existing Environmental Monitoring Locations**

**Figure 2-14**  
**Proposed Environmental Monitoring Locations**







**NOTES**

1. VECTOR SURVEY EXTRACT FROM ORDNANCE SURVEY IRELAND

2. ORDNANCE SURVEY IRELAND LICENCE NO. CYAL50167032  
(C) ORDNANCE SURVEY IRELAND/GOVERNMENT OF IRELAND

3. SURVEY COMPLETED ON 2ND FEBRUARY 2018 BY ASM IRELAND AND UPDATED IN DEC 2020

**LEGEND**

[Solid black line]	ROADSTONE LAND INTEREST (C. 58.9 HA)
[Red dashed line]	PLANNING APPLICATION AREA (C. 18.2 HA)
[Red dashed line]	PROPOSED EXTRACTION AREA (C. 9.7 HA)
[Purple dashed line]	PROPOSED CONCRETE PLANT & AGGREGATE STORAGE AREA (C. 1.9 HA)
[Yellow line]	EXISTING PASSAGEWAY
[Blue line with '2.5']	EXISTING GROUND CONTOUR (mOD)
[Black rectangle]	BUILDINGS
[Red dashed line]	TRACKS
[Green stippled area]	DENSE VEGETATION & FORESTRY
[Thin black line]	EXISTING HEDGEROWS
[Thick black line]	OVERHEAD TRANSMISSION LINE
[Red arrow]	TRAFFIC FLOW DIRECTION

RECEIVED PLANNING | PLANNING NUMBER

13 AUG 2021 21/772

WATERFORD CITY + COUNTY COUNCIL

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ENVIRONMENTAL IMPACT ASSESSMENT REPORT

EASTERN SATELLITE QUARRY AND  
NEW CONCRETE PLANT  
CAPPAGH QUARRY, COUNTY WATERFORD

EXISTING SITE LAYOUT

**FIGURE 2-1**

Scale 1:4,000 @ A3

Date JULY 2021

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00180.00264.0.16.Fig2-4.R0.Final Quarry Restoration Plan.dwg



LANDSCAPE AND RESTORATION PROPOSALS

The proposed landscape and restoration works at Cappagh Quarry will be carried out on a phased basis, as described further below. It is proposed to restore the majority of the site to agricultural grassland, which is one of the beneficial afteruses recommended in the EPA Guidelines 'Environmental Management in the Extractive Industry' (2006). There will further be some pockets of native copse planting and inaccessible areas, which will be left for natural regeneration. These will provide natural habitat, another suggested beneficial afteruse.

It should be noted that all existing boundary screening berms and all boundary vegetation will be retained, including the hedgerows / trees along the existing passageway (except for those removed to facilitate the tunnel construction) and hedgerows along the external boundaries of the satellite quarry extension area.

GRASSLAND RESTORATION

Parts of the existing quarry floor have already been restored to grassland. This type of restoration will continue to be carried out on a phased basis, in tandem with and on completion of the proposed extraction works. The different phases of the grassland restoration, in relation the extraction phases are indicated on Drawing PL04. Overburden stripped from the satellite quarry extension area will be spread on those sections of the quarry floor, where the extraction works have been completed. A suitable grassland-seed-mix containing native species will then be seeded.

On completion of all extraction works all plant, structures, stockpiles and machinery will be removed from the site to facilitate the final grassland restoration phase.

NATIVE HEDGE PLANTING

On completion of the tunnel construction works native hedge planting will be carried along both sides of the reinstated passageway, filling the gaps created by the works.

On completion of all grassland restoration works on the quarry floor, native hedges will be planted in a number of locations to break up the large grassland areas and provide additional biodiversity interest.

PLANTED SAFETY BERM

On commencement of the proposed development and in order to secure the boundaries of the satellite quarry extension area, a safety berm will be constructed just outside the proposed quarry footprint. As soon as the berm is completed it will be planted with native shrub/hedgerow species to provide an additional barrier, as well as additional screening vegetation.

NATIVE COPSE PLANTING

Some blocks of native tree and shrub species will be planted on commencement of the proposed development in the field in the north eastern corner of the application area, as well as at the base of the existing northern and eastern quarry faces.

On completion of all grassland restoration works on the quarry floor, further blocks will be planted at the base of the quarry faces within the satellite quarry extension area. This planting will provide screening (of the quarry faces) and biodiversity interest.

Please refer to Planning Drawing PL05 for further details on the proposed planting mixes and planting specifications.

NOTES

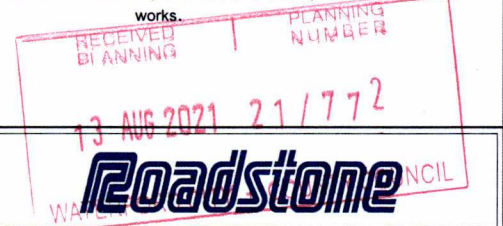
1. VECTOR SURVEY EXTRACT FROM ORDNANCE SURVEY IRELAND.
2. ORDNANCE SURVEY IRELAND LICENCE NO. CYAL50167032 (C) ORDNANCE SURVEY IRELAND/GOVERNMENT OF IRELAND.
3. SURVEY COMPLETED ON 2ND FEBRUARY 2018 BY ASM IRELAND AND UPDATED IN DEC 2020.

LEGEND

- ROADSTONE LAND INTEREST (C. 58.9 HA)
- PLANNING APPLICATION AREA (C. 18.2 HA)

LANDSCAPE & RESTORATION PROPOSALS

- EARLY GRASSLAND RESTORATION AREAS  
Phased implementation, prior to the completion of Extraction Phases 3-C-D-E (refer to Figures 2-1, 2-2 & 2-3).
- NATIVE HEDGE (PLANTING PHASE 1)  
Along the passageway, in the gaps created by the tunnel construction.
- PLANTED SAFETY BERM  
To be planted with native shrub/hedgerow species - to be implemented on commencement of the development.
- NATIVE COPSE PLANTING (PLANTING PHASE 1)  
In north eastern corner of the application area and in front of existing northern / eastern quarry face - to be implemented on commencement of the development.
- FINAL GRASSLAND RESTORATION AREAS  
To be implemented on the completion of all extraction works.
- NATIVE HEDGE (PLANTING PHASE 2)  
On the quarry floor, breaking large grassland areas into smaller parcels - to be implemented on the completion of all extraction works.
- NATIVE COPSE PLANTING (PLANTING PHASE 2)  
Along base of the northern / eastern quarry faces in the satellite quarry extension area - to be implemented on the completion of all extraction works.



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NEW CONCRETE PLANT  
CAPPAGH QUARRY, COUNTY WATERFORD  
FINAL QUARRY RESTORATION PLAN

FIGURE 2-4

Scale 1: 4,000 @ A3 Date JULY 2021

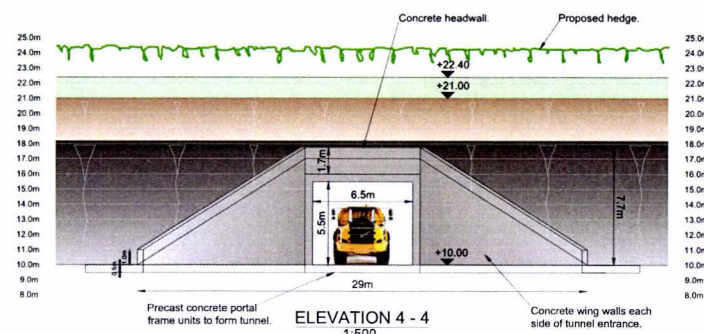
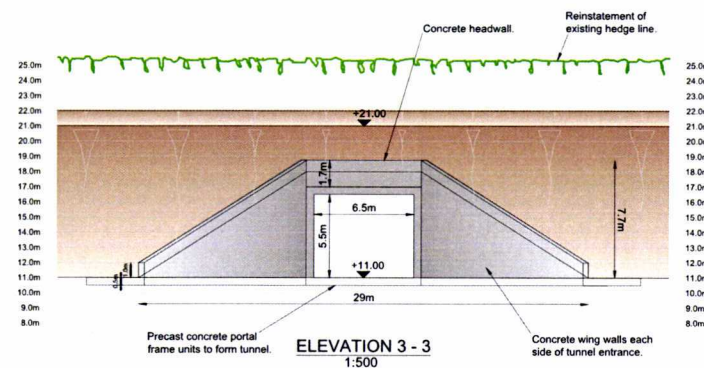
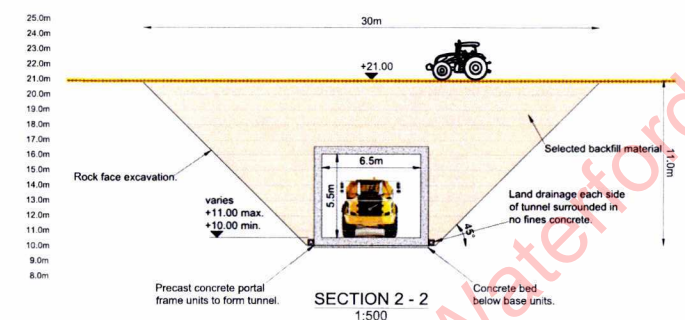
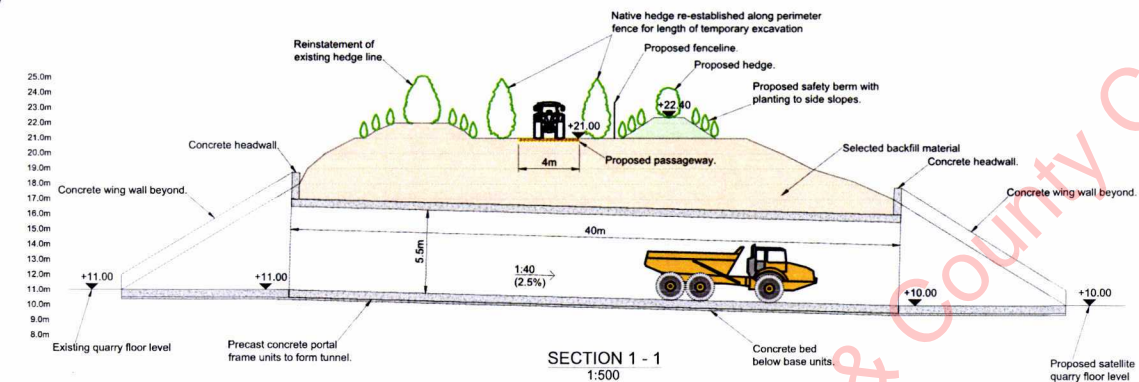






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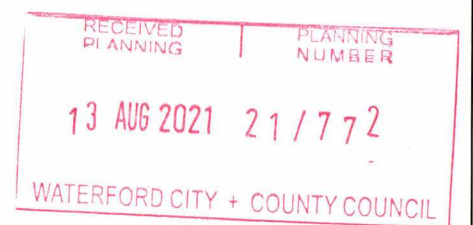
PLAN OF PROPOSED TUNNEL UNDERPASS  
1:500



- NOTES
1. VECTOR SURVEY EXTRACT FROM ORDNANCE SURVEY IRELAND
  2. ORDNANCE SURVEY IRELAND LICENCE NO. CYAL50167032 (C) ORDNANCE SURVEY IRELAND/GOVERNMENT OF IRELAND
  3. SURVEY COMPLETED ON 2ND FEBRUARY 2018 BY ASM IRELAND AND UPDATED IN DEC 2020

LEGEND

	EXISTING / REINSTATED PASSAGEWAY
	PROPOSED SAFETY BERM
	PROPOSED TUNNEL UNDERPASS
	PROPOSED FENCELINE



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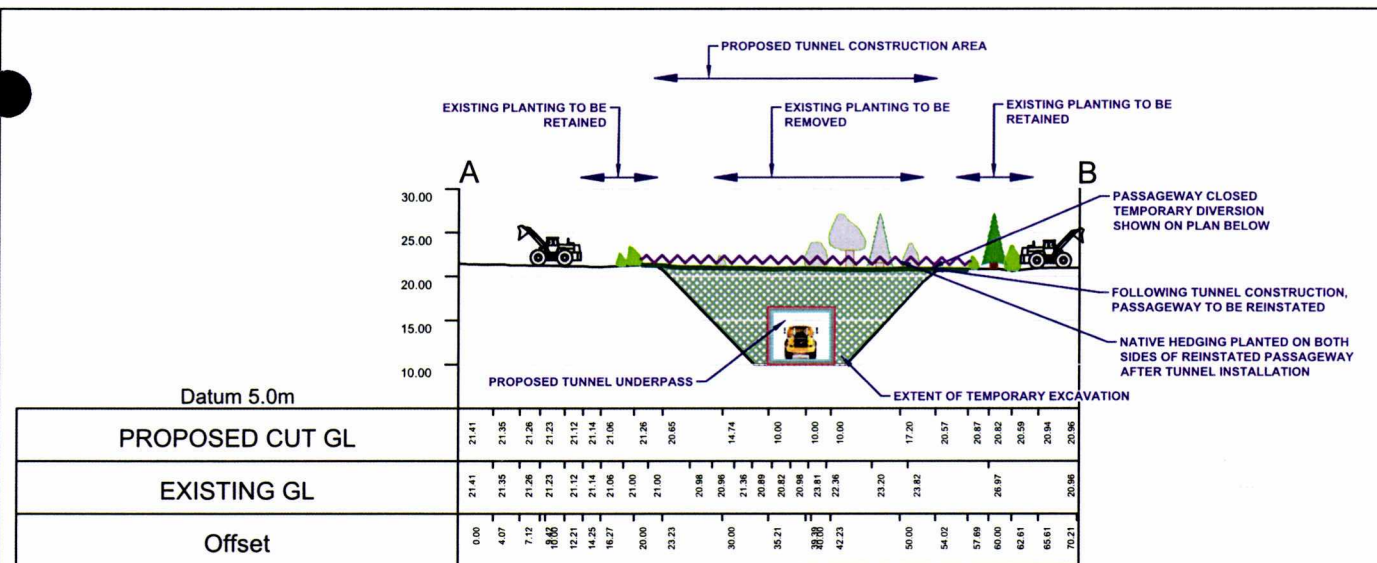
**PROPOSED TUNNEL UNDERPASS DETAILS**

**FIGURE 2-6**

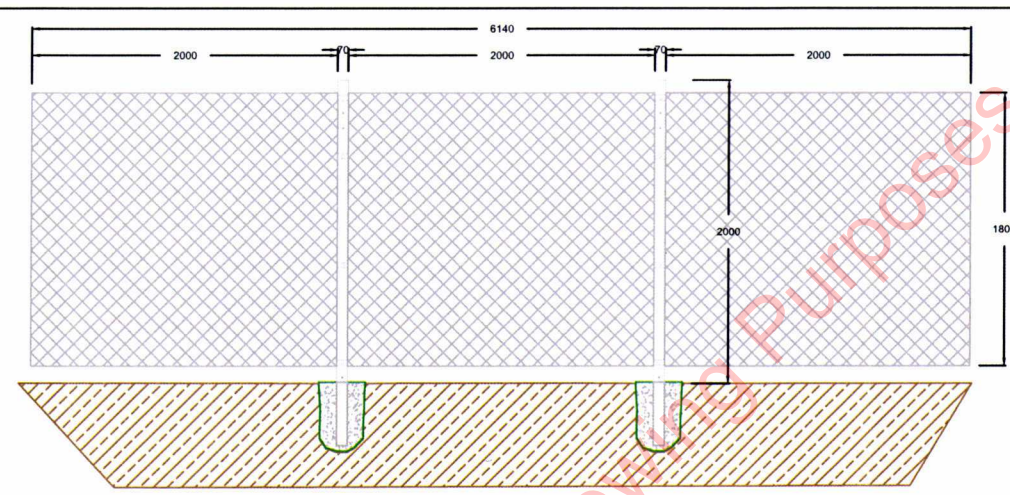
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Date: JULY 2021



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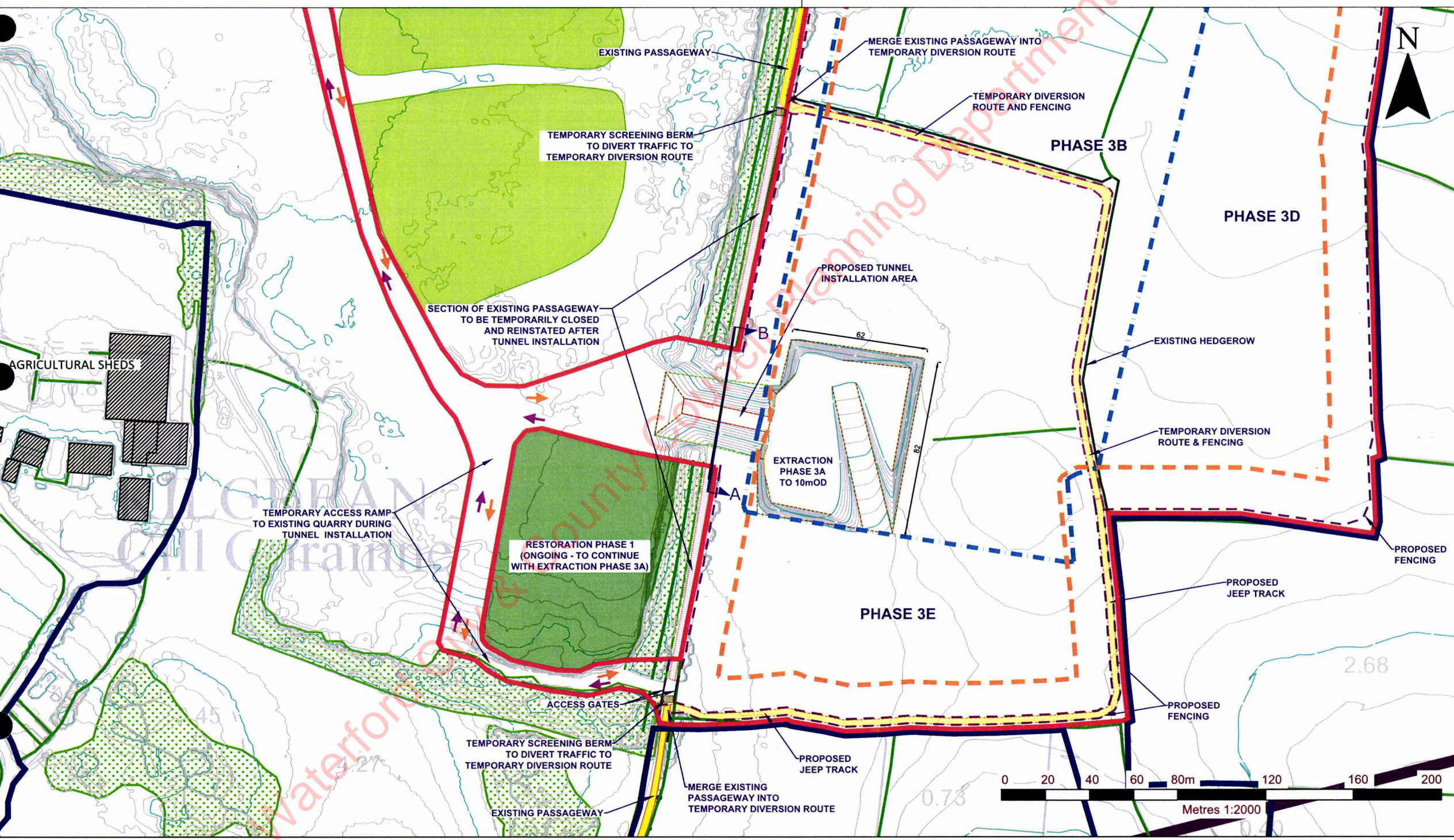
SCHEMATIC SECTION THROUGH TEMPORARY TUNNEL EXCAVATION



- NOTES
1. VECTOR SURVEY EXTRACT FROM ORDNANCE SURVEY IRELAND.
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- LEGEND
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  - PROPOSED CONCRETE PLANT & AGGREGATE STORAGE AREA (C. 1.9 HA)
  - EXISTING PASSAGEWAY
  - PROPOSED FENCE
  - EXISTING GROUND CONTOUR (mOD)
  - BUILDINGS
  - TRACKS
  - DENSE VEGETATION & FORESTRY
  - OVERHEAD TRANSMISSION LINE
  - TRAFFIC FLOW DIRECTION

RECEIVED PLANNING | PLANNING NUMBER  
13 AUG 2021 21/772  
WATERFORD CITY + COUNTY COUNCIL



**Roadstone**

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DUBLIN 14  
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NEW CONCRETE PLANT  
CAPPAGH QUARRY, COUNTY WATERFORD

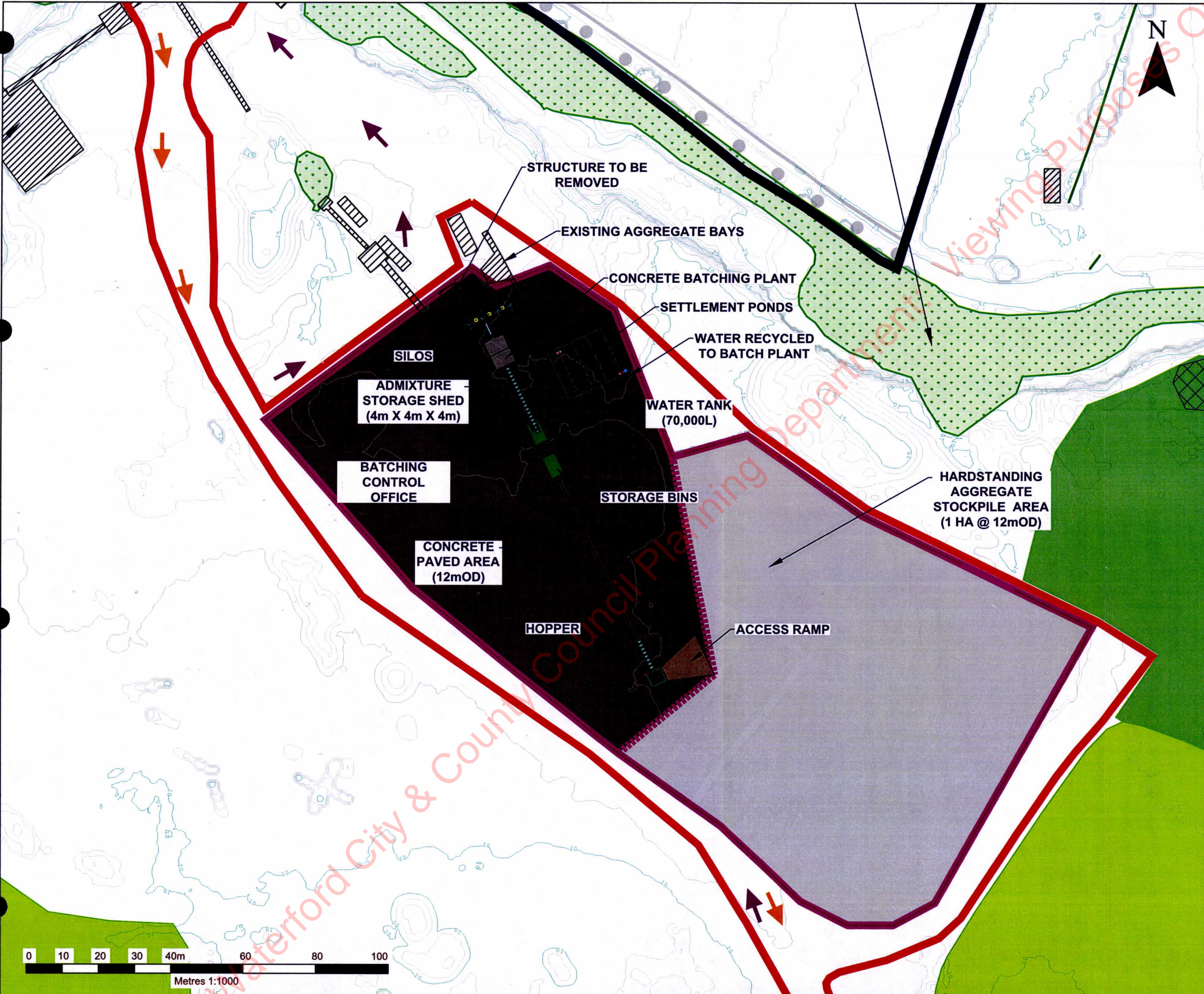
TEMPORARY PASSAGEWAY  
DIVERSION AND TUNNEL EXCAVATION  
PLAN AND CROSS-SECTION

FIGURE 2-7

Scale 1: 2,000 @ A3 Date JULY 2021



00180.00264.0.1 2-8.R0.Proposed Concrete Batching Plant Plan.dwg



**NOTES**

1. VECTOR SURVEY EXTRACT FROM ORDNANCE SURVEY IRELAND

2. ORDNANCE SURVEY IRELAND LICENCE NO. CYAL50167032 (C) ORDNANCE SURVEY IRELAND/GOVERNMENT OF IRELAND

3. SURVEY COMPLETED ON 2ND FEBRUARY 2018 BY ASM IRELAND AND UPDATED IN DEC 2020

**LEGEND**

	ROADSTONE LAND INTEREST (C. 58.9 HA)
	PLANNING APPLICATION AREA (C. 18.2 HA)
	PROPOSED CONCRETE PLANT & AGGREGATE STORAGE AREA (C. 1.9 HA)
	DENSE VEGETATION & FORESTRY
	EXISTING GROUND CONTOUR (mOD)
	BUILDINGS
	TRACKS
	TRAFFIC FLOW DIRECTION

RECEIVED PLANNING

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NEW CONCRETE PLANT  
CAPPAGH QUARRY, COUNTY WATERFORD

PROPOSED CONCRETE BATCHING PLANT:  
PLAN LAYOUT

**FIGURE 2-8**

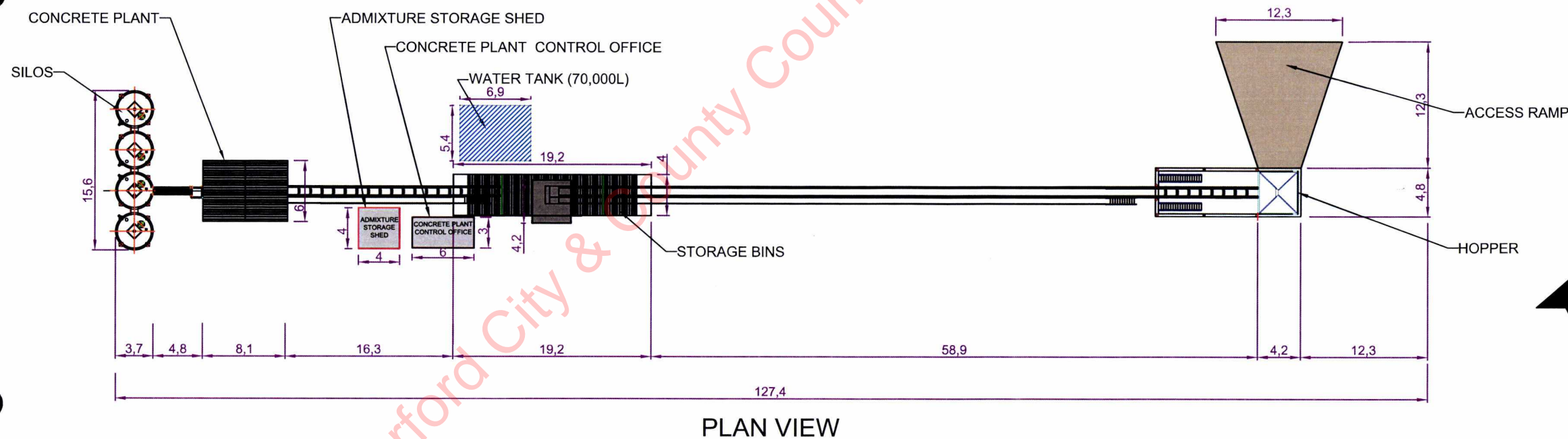
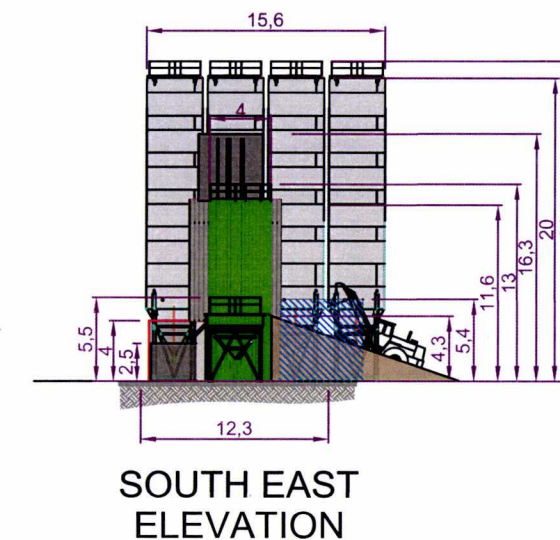
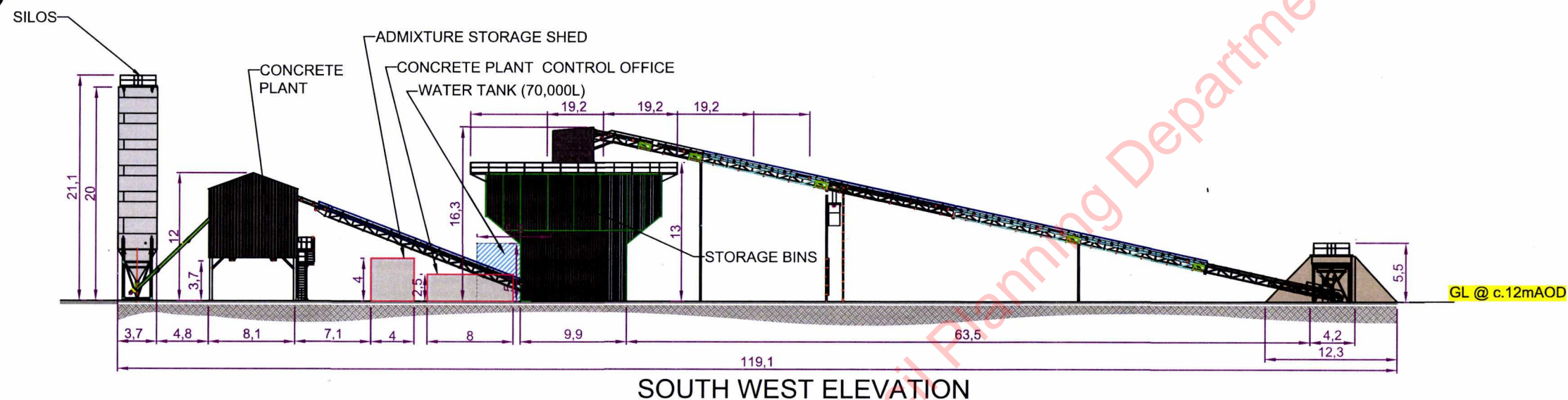
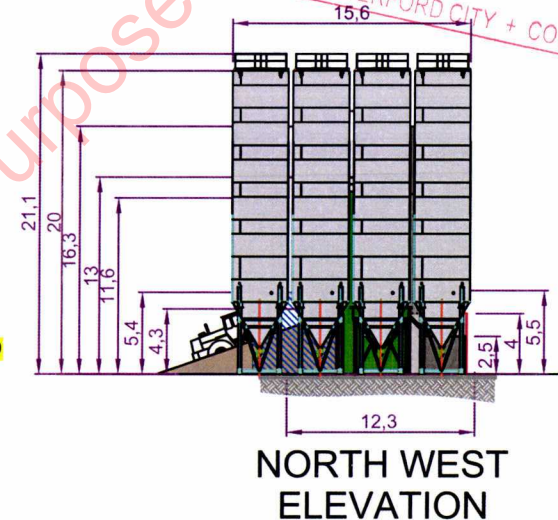
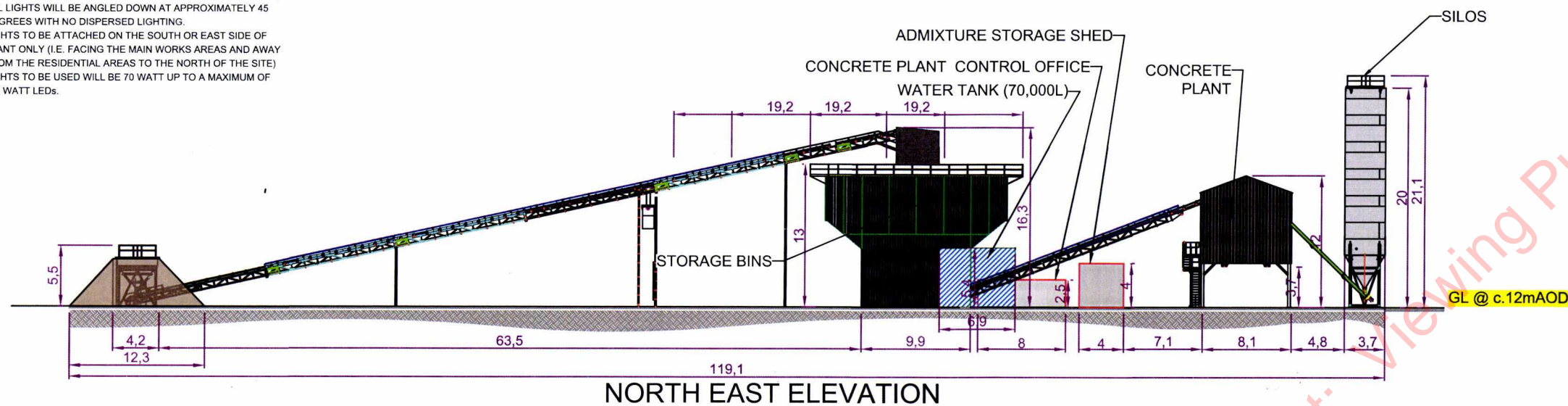
Scale 1:1,000 @ A3

Date JULY 2021



GENERAL INFO:

- ALL DIMENSIONS IN METERS
- ALL LIGHTS WILL BE ATTACHED AT LESS THAN 10M ABOVE GROUND LEVEL (GL OF APPLICATION SITE APPROX. 28M AOD)
- ALL LIGHTS WILL BE ANGLED DOWN AT APPROXIMATELY 45 DEGREES WITH NO DISPERSED LIGHTING.
- LIGHTS TO BE ATTACHED ON THE SOUTH OR EAST SIDE OF PLANT ONLY (I.E. FACING THE MAIN WORKS AREAS AND AWAY FROM THE RESIDENTIAL AREAS TO THE NORTH OF THE SITE)
- LIGHTS TO BE USED WILL BE 70 WATT UP TO A MAXIMUM OF 140 WATT LEDS.



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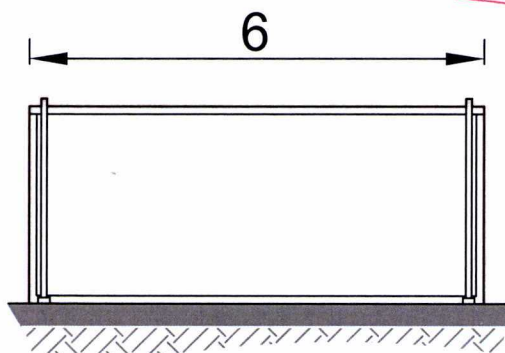
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NEW CONCRETE PLANT  
CAPPAGH QUARRY, COUNTY WATERFORD  
**PROPOSED CONCRETE BATCHING PLANT:  
ELEVATION AND CROSS SECTION**

**FIGURE 2-9**

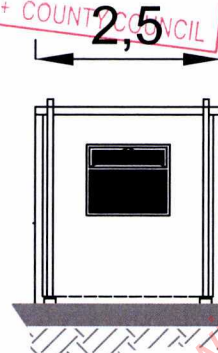
Scale 1:500 @ A3 Date JULY 2021



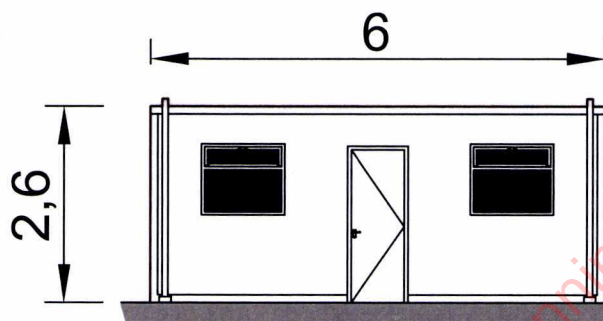




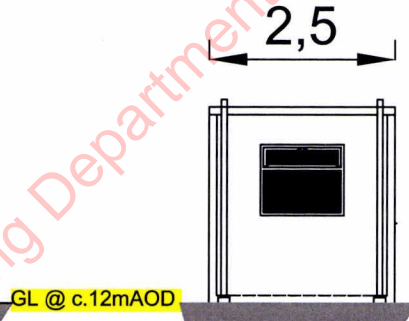
NORTH EAST ELEVATION



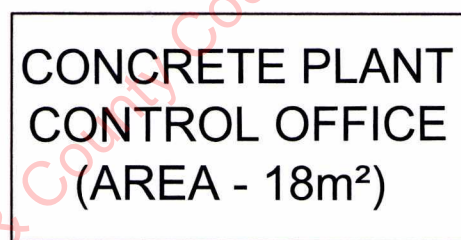
NORTH WEST ELEVATION



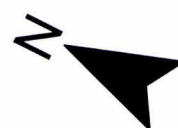
SOUTH WEST ELEVATION



SOUTH EAST ELEVATION



PLAN VIEW



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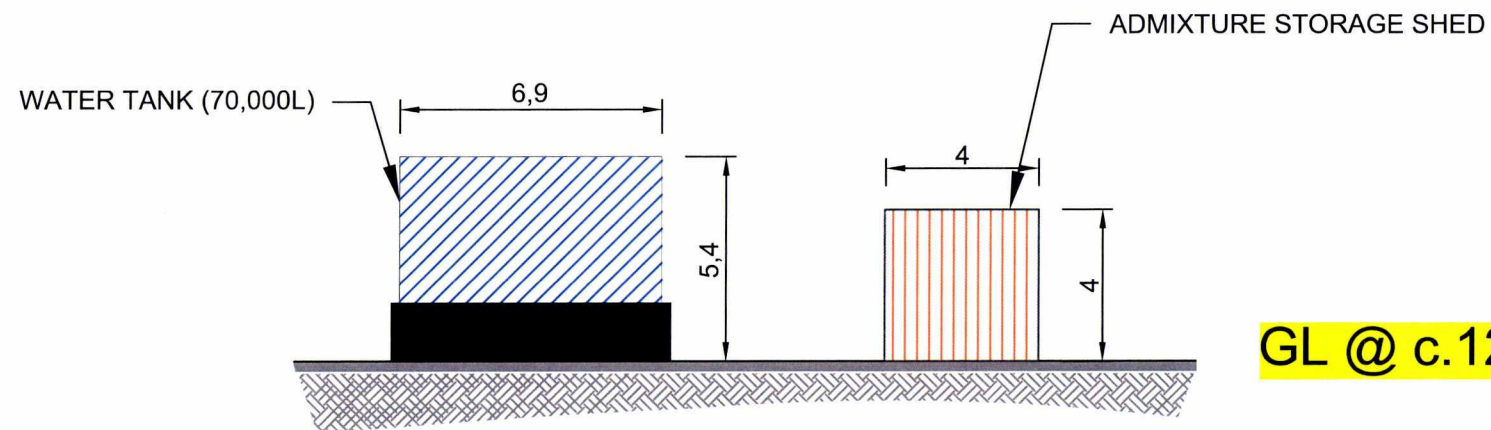
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ENVIRONMENTAL IMPACT ASSESSMENT REPORT  
EASTERN SATELLITE QUARRY AND  
NEW CONCRETE PLANT  
CAPPAGH QUARRY, COUNTY WATERFORD  
**PROPOSED BATCHING OFFICE  
PLAN & ELEVATIONS**

**FIGURE 2-11**

Scale  
1:100 @ A4

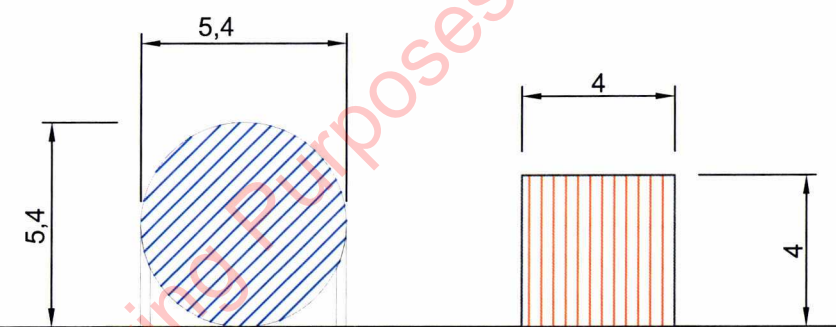
Date  
JULY 2021



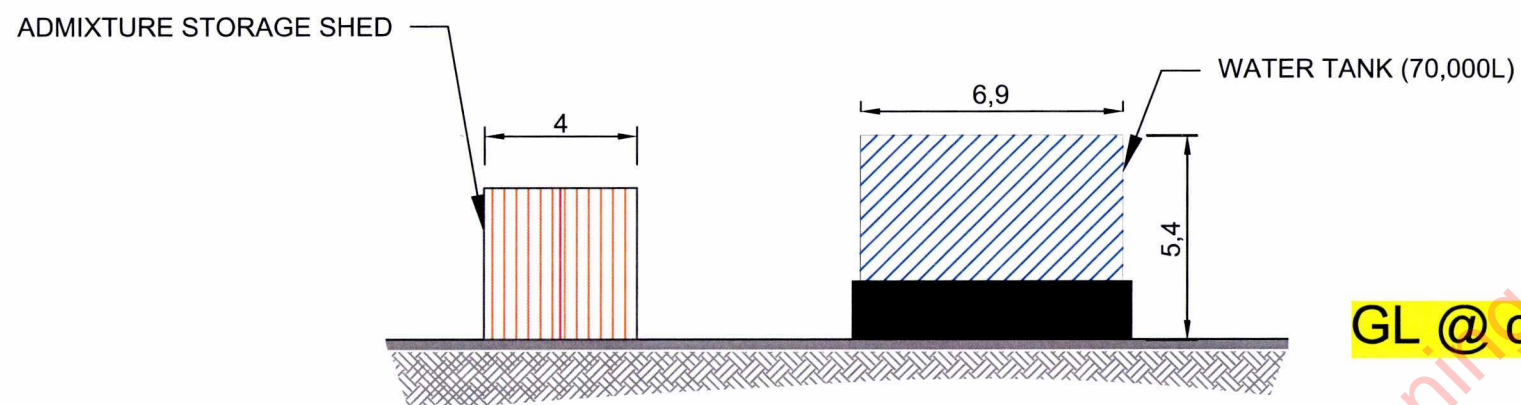


NORTH EAST ELEVATION

GL @ c.12mAOD

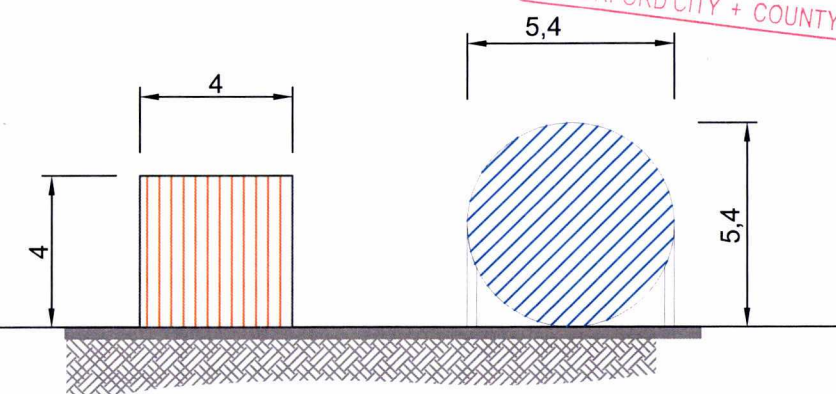


NORTH WEST ELEVATION

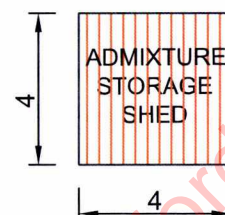
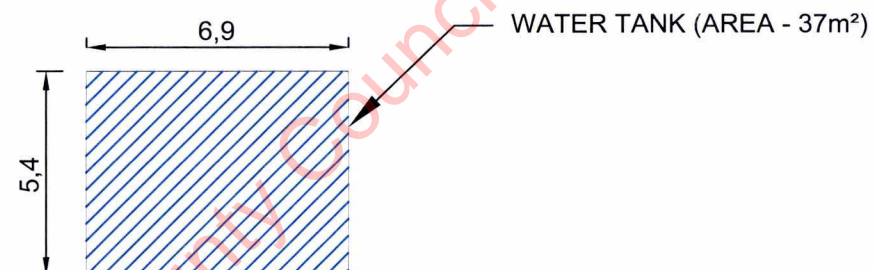


SOUTH WEST ELEVATION

GL @ c.12mAOD




SOUTH EAST ELEVATION



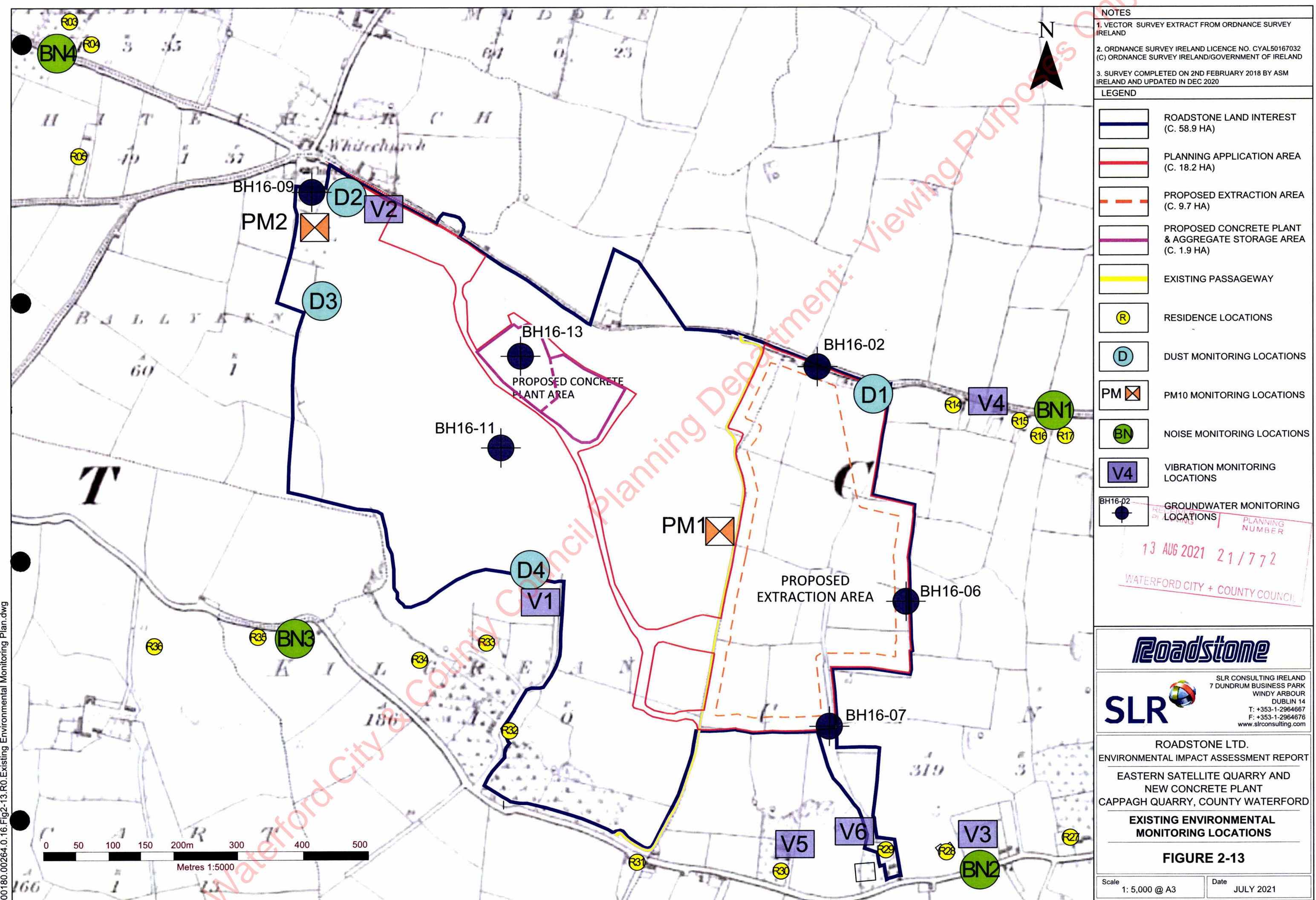
PLAN VIEW



 <p>SLR CONSULTING IRELAND 7 DUNDUM BUSINESS PARK WINDY ARBOUR DUBLIN 14 T: +353-1-2964667 F: +353-1-2964676 www.slrconsulting.com</p>	
<p>ROADSTONE LTD. ENVIRONMENTAL IMPACT ASSESSMENT REPORT EASTERN SATELLITE QUARRY AND NEW CONCRETE PLANT CAPPAGH QUARRY, COUNTY WATERFORD PROPOSED ADMIXTURE STORAGE SHED &amp; WATER STORAGE TANK</p>	
<p><b>FIGURE 2-12</b></p>	
<p>Scale 1:200 @ A3</p>	<p>Date JULY 2021</p>



00180.00264.0.16.Fig2-13.R0.Existing Environmental Monitoring Plan.dwg



**NOTES**  
1. VECTOR SURVEY EXTRACT FROM ORDNANCE SURVEY IRELAND  
2. ORDNANCE SURVEY IRELAND LICENCE NO. CYAL50167032 (C) ORDNANCE SURVEY IRELAND/GOVERNMENT OF IRELAND  
3. SURVEY COMPLETED ON 2ND FEBRUARY 2018 BY ASM IRELAND AND UPDATED IN DEC 2020

**LEGEND**  

	ROADSTONE LAND INTEREST (C. 58.9 HA)
	PLANNING APPLICATION AREA (C. 18.2 HA)
	PROPOSED EXTRACTION AREA (C. 9.7 HA)
	PROPOSED CONCRETE PLANT & AGGREGATE STORAGE AREA (C. 1.9 HA)
	EXISTING PASSAGEWAY
	RESIDENCE LOCATIONS
	DUST MONITORING LOCATIONS
	PM10 MONITORING LOCATIONS
	NOISE MONITORING LOCATIONS
	VIBRATION MONITORING LOCATIONS
	GROUNDWATER MONITORING LOCATIONS

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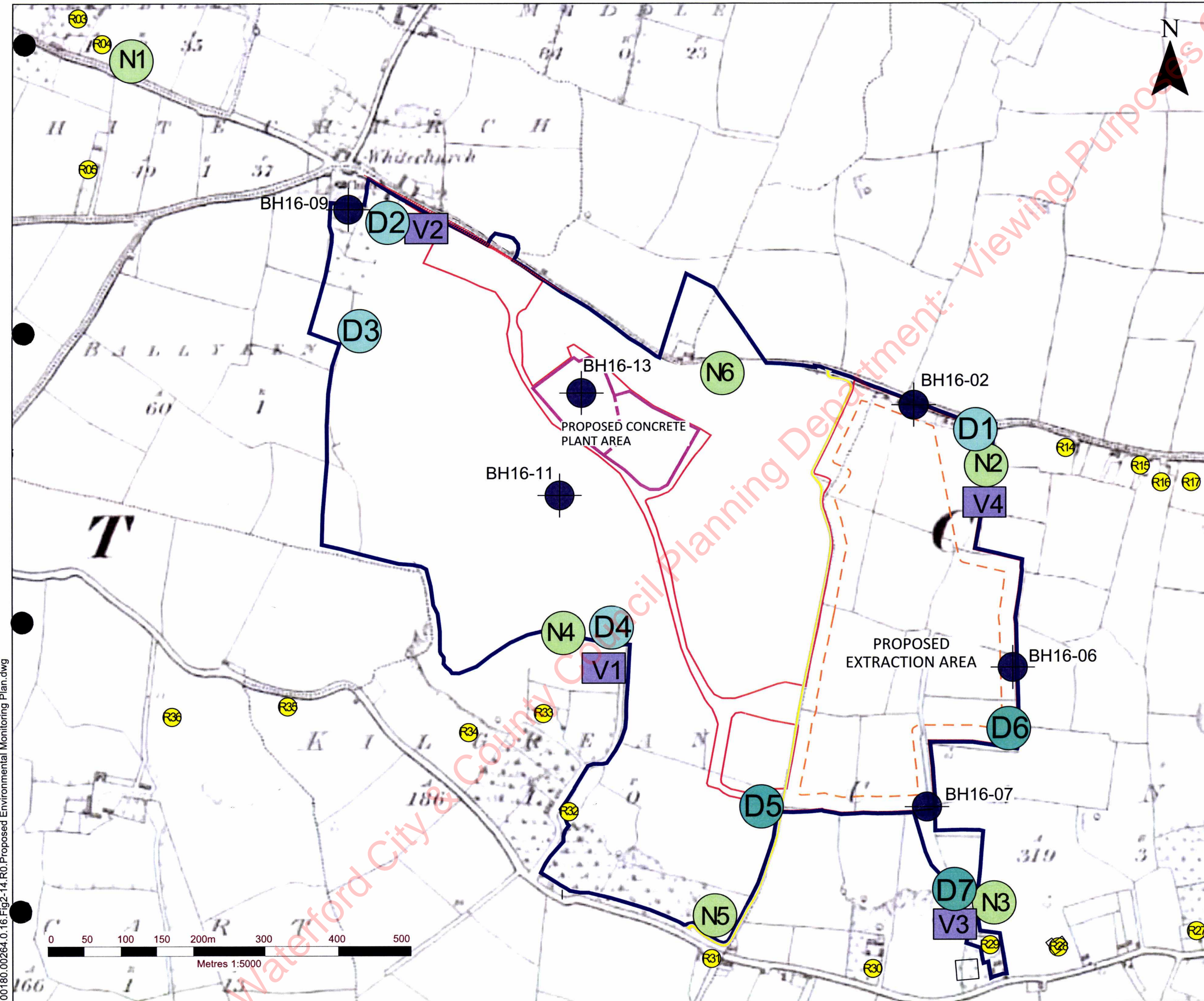
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EASTERN SATELLITE QUARRY AND  
NEW CONCRETE PLANT  
CAPPAGH QUARRY, COUNTY WATERFORD

**EXISTING ENVIRONMENTAL MONITORING LOCATIONS**

**FIGURE 2-13**

Scale 1: 5,000 @ A3	Date JULY 2021
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NOTES

1. VECTOR SURVEY EXTRACT FROM ORDNANCE SURVEY IRELAND

2. ORDNANCE SURVEY IRELAND LICENCE NO. CYAL50167032 (C) ORDNANCE SURVEY IRELAND/GOVERNMENT OF IRELAND

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	PROPOSED EXTRACTION AREA (C. 9.7 HA)
	PROPOSED CONCRETE PLANT & AGGREGATE STORAGE AREA (C. 1.9 HA)
	EXISTING PASSAGEWAY
	RESIDENCE LOCATIONS
	DUST MONITORING LOCATIONS
	ADDITIONAL DUST MONITORING LOCATIONS
	NOISE MONITORING LOCATIONS
	VIBRATION MONITORING LOCATIONS
	GROUNDWATER MONITORING LOCATIONS

RECEIVED PLANNING | PLANNING NUMBER

13 AUG 2021 21/772

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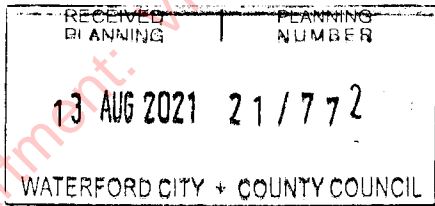
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EASTERN SATELLITE QUARRY AND  
NEW CONCRETE PLANT  
CAPPAGH QUARRY, COUNTY WATERFORD

**PROPOSED ENVIRONMENTAL MONITORING LOCATIONS**

**FIGURE 2-14**

Scale 1: 5,000 @ A3 Date JULY 2021



**APPENDICES**



**APPENDIX 2-A**

**Passageway Agreement with Local Residents**

RECEIVED PLANNING	PLANNING NUMBER
13 AUG 2021	21 / 772
WATERFORD CITY + COUNTY COUNCIL	

# JOHN A WOOD LIMITED

John A. Wood Limited  
Carrigrohane Road  
Cork, Ireland.  
Telephone: 021-542821  
Fax. No.: 021-542840

Reg. Office  
Carrigrohane Road Cork  
Reg. No. 13856  
Reg. in Ireland  
A CRH Group Company

Concrete Products  
Aggregates  
Bituminous Macadam  
Limestone Products



our reference

your reference

date

## **BOARD RESOLUTION**

*It was resolved at a Board Meeting of John A. Wood Ltd. held on 23rd April 1997 that Michael Buckley be empowered to sign on behalf of John A. Wood Ltd. an Agreement between John A. Wood Ltd. of the one part and John O'Brien and Mary Stack of the other part in relation to proceedings between John A. Wood Ltd and Waterford County Council in relation to land at Cappagh, Co. Waterford.*

*Certified to be a true copy of Minute of Board Meeting of John A. Wood Ltd.*

RECEIVED  
PLANNING

PLANNING  
NUMBER

13 AUG 2021 21/772

WATERFORD CITY + COUNTY COUNCIL

Director.

Director/Secretary.

Date: 23rd April, 1997.



COMHAIRLE CHONTAE  
PHORTLAIRGE

27 NOV 2006

RANNOG PLEANALA

THIS AGREEMENT made the 26<sup>th</sup> day of April 1997  
BETWEEN JOHN A. WOOD LIMITED having its registered offices  
at Garrigrohane road, Cork in the County of Cork, limited  
liability company (hereinafter called "the Grantor") of the  
One Part and JOHN O'BRIEN and MARY STACK both of Cappagh  
Dungarvan in the County of Waterford Farmer and Clerk  
respectively (hereinafter called "the Grantees") of the  
Other Part (which expression shall where the context so  
admits or requires shall include their executors,  
administrators assigns, invitees and licensees together with  
the general public resident contiguous to the lands affected  
by this Agreement) of the Other Part.

WHEREAS:

- (1) The Grantor is the registered owner of the lands  
contained in folios 365 and 6704F of the register Co.  
Waterford.
- (2) The Grantees claim that themselves and their antecedents  
from time immemorial enjoyed an unrestricted right of  
passage withh or without vehicles and with or without animals  
over and across the passageway coloured blue on the map  
annexed hereto for all purposes and at all times and the  
Grantors have not accepted said claim.
- (3) The Grantor is carrying out quarrying operations on  
the lands contained in said folios aforesaid.
- (4) The Grantor, to facilitate the execution of earth-works  
has removed the passageway from the location shown blue  
on the map annexed hereto.
- (5) The Grantees in their representative capacity on  
behalf of adjoining neighbours, landowners and the parties  
hereinbefore described have agreed with the grantor that  
the passageway which formerly was located traversing the

lands the subject matter of folios 365 and 6704F of the register Co. Waterford at the location coloured blue on the map annexed hereto shall not be replaced by a passageway to be constructed by the Grantor at the location shown yellow on the map annexed hereto.

NOW THIS AGREEMENT WITNESSETH that in consideration of the premises and in consideration of the Grantees forbearing to sue in respect of the claimed disturbance and claimed obstruction of the passageway over and across the lands at the location coloured blue hereinbefore referred to, the Grantor hereby agrees to grant to the Grantees the following:-

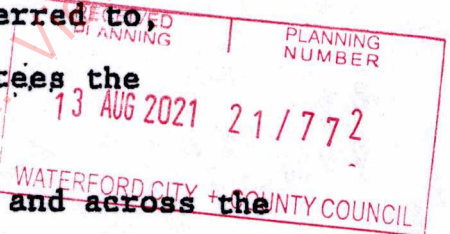
1. To construct a replacement passageway over and across the lands contained in folios 365 and 4704F of the register Co. Waterford along the passageway coloured yellow on the map annexed hereto.

2. To erect a fence on the Western side of said passageway said fence to be stockproof and childproof in the interests of safety and to be responsible for the future maintenance and upkeep of said fence.

(3) The metalled portion of the roadway shall at all locations, be not less than 10 feet wide and shall have two layers of 2" down material and a layer of three-quarter inch screenings, each layer to be compacted with a vibrating roller.

(4) The Grantor hereby agrees to henceforth maintain the surface of said passageway in a good and serviceable condition and to carry out maintenance from time to time as may be reasonable.

(5) The Grantees for their part hereby acknowledge that they shall not seek to have the surface of the passageway so constructed tarred by the Grantor and waive any claim





D Y

K I L G R E A N Y  
CILL GHRÁINNE

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3-24

2-72

2-64

2-55

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2-86

3-62

1-43

1-79

3-53

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47

1-01

10-2

10-4

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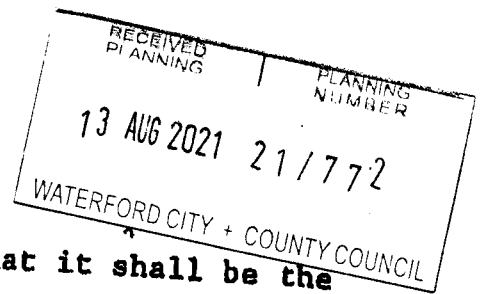
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that they may have in that respect.

(6) The parties hereto acknowledge that it shall be the responsibility of the Grantor to obtain such Planning Permission as may be necessary to facilitate the construction of the passageway aforesaid and the opening of any entrances associated with said passageway.

(7) The Grantees for their part hereby acknowledge that the Grantor shall be entitled without obligation to close up the entrances at the points A and B as soon as the roadway is serviceable at the location coloured yellow on the map annexed hereto.

(8) The Grantees acknowledge the Grantor shall be entitled to carry out blasting operations at their nearby lime stone quarry and the Grantees acknowledge that at the time of any such blasting operations the Gardai and/or Grantor shall be entitled to temporarily close the said passageway for the duration of such blasts such closure generally to be for a duration of approximately 30 minutes and generally to be not more than once per week.

(9) In the event that the Grantor is entitled to extract materials from the lands to the East of the lands coloured yellow on the map annexed hereto the Grantees acknowledge that the Grantor shall be entitled to construct such culvert or bridge as may be necessary to provide access to those lands despite the fact that the said construction may cause temporary interference with the passageway strictly however provided that the grantor will provide a temporary practical alternative passageway and will provide any adequate notice in advance of any such alterations.

(10) The Grantor hereby acknowledges that at no time shall it erect gates or barriers on the passageway hereby created



so as to in anyway obstruct or impede the right of passage acknowledged by this agreement.

If however the Grantor wishes to erect gates so as to enter onto or off the passageway hereby created the Grantees acknowledge that the Grantor shall be entitled so to do provided however that such entrance gates shall be recessed a reasonable distance from the passageway so as to provide relief to passing traffic on the said passageway.

(11) The Grantees for their part hereby acknowledge that the Grantor retains ownership of the said passageway aforesaid subject to the rights in favour of the Grantees herein set forth and it is acknowledged by the Grantees who execute this agreement that they do so in their representative capacity solely and in particular they acknowledge that they do not have any proprietary interest as individuals in the said passageway aforesaid.

(12) The Grantor hereby acknowledges that the Grantees shall be entitled to traverse the passageway at all times in perpetuity for all purposes, with or without vehicles, or animals as if they enjoyed the user of said roadway as a public road taken in charge of the Local Authority.

(13) It is mutually agreed that on compliance by the parties with their obligations arising hereunder all or any disputes between the parties concerning the closure of the passageway from A-B and any claim arising therefrom are fully and finally settled on the distinct understanding that this does not constitute an admission of liability.

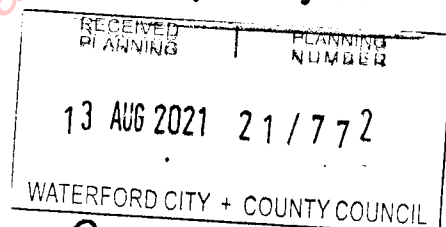
(14) The Grantor hereby assents to the registration of the right-of-way hereinbefore referred to as a burden on the lands of folio 365 Co. Waterford and 6704F Co. Waterford and shall attend to the said registration

in the Land Registry within a period of one month from the date hereof, and shall be solely responsible for the costs thereof, and shall as soon as possible after registration is completed furnish to the Grantees copies of the File Plans of both folios showing the registration of the said burden.

The parties hereto acknowledge that this Agreement shall be made a rule of court in proceedings extant between the Grantors of the One Part and the County Council of the County of Waterford of the Other Part.

IN WITNESS whereof the Grantor has hereunto caused its Common Seal to be affixed and the Grantees have set their hands and affixed their seals the day and year first herein written.

PRESENT when the Common Seal of JOHN A. WOOD LIMITED was affixed hereto:



*John O'Brien*  
*2/11*  
*48 South Wall*  
*Cork*

*Michael Buckley*

SIGNED SEALED & DELIVERED

by the said JOHN O'BRIEN

and MARY STACK in the presence of:

*John O'Brien*  
*2/11*  
*48 South Wall*  
*Cork*

*John O'Brien*

*Mary Stack*



Dated this 24 day of April 1997

BETWEEN:

JOHN A. WOOD LIMITED

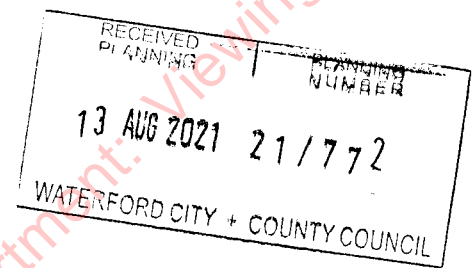
One Part

Sullivan  
Nowlan

A G R E E M E N T

Joseph P. Gordon & Co.,  
Solicitors,  
Burgery,  
Dungarvan,  
Co. Waterford.

Waterford City & County Council Planning Department: Viewing Purposes Only



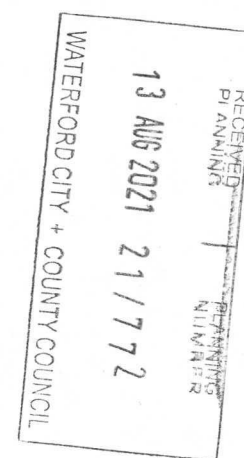
**APPENDIX 2-B**  
**Quarry Output 2007-2020**



**CAPPAGH QUARRY : Annual Output (Tonnes)**

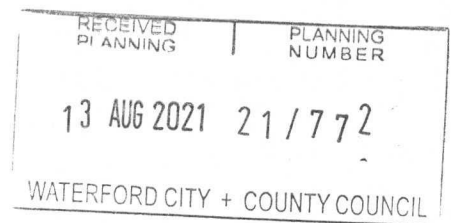
<b>Year</b>	<b>2020</b>	<b>2019</b>	<b>2018</b>	<b>2017</b>	<b>2016</b>	<b>2015</b>	<b>2014</b>	<b>2013</b>	<b>2012</b>	<b>2011</b>	<b>2010</b>	<b>2009</b>	<b>2008</b>	<b>2007</b>
<b>Maximum Extraction Volume</b>	30,168 <sup>a</sup>	82,741	95,195	102,372	128,663	96,720	97,520	92,098	72,832	76,891	126,055	154,130	260,854	335,181

<sup>a</sup> With additional 42,837 tonnes from stockpiles



APPENDIX 2-C

Passageway Traffic Survey (October 2017)





**Traffic Counts at the Existing Passageway**  
for the  
**Roadstone Quarry, Cappagh, Co. Waterford**  
on behalf of  
**Roadstone Ltd**

**PMCE Ref:** P17-075-RP-002

Rev	Prepared By	Reviewed By	Approved By	Issue Date	Reason for Revision
4.0	AOR	PJM	PJM	27 <sup>th</sup> Mar. 2018	Final Report

## 1 Introduction

This report was commissioned by Roadstone Ltd. in October 2017 in connection with a planning application to Waterford County Council for the proposed extension of the existing Roadstone Quarry at Cappagh, Co. Waterford. This report summarises the number and types of vehicles on the existing passageway which runs to the east of the quarry, based on traffic counts obtained over a seven-day period in October 2017.

## 2 Purpose of Passageway

The passageway to the east of the existing quarry is an existing narrow access track which is used primarily for access to the Roadstone agricultural lands, which are farmed by a local farmer, along the eastern boundary of the existing quarry. These agricultural lands are the lands for the proposed extension. The passageway is also used by some locals to provide access between the L2018 and the L6072 (Canty Road) and extends in a north-south direction between the L2018 and the L6072. The passageway has existing permitted junctions with these local roads which are not proposed to be altered as part of the proposals.

## 3 Traffic Volumes

Seven-day, twelve-hour classified turning counts were carried out between Wednesday 18<sup>th</sup> October 2017 to Tuesday 24<sup>th</sup> October 2017 by Abacus Transportation Surveys at two locations on the passageway. The counts were carried out between 7.00am and 7.00pm on each of the seven days, this time period encompassing the main operating hours of the existing quarry and the peak hours on the adjacent roads.

The location of the traffic counts (at Site A and at Site B) are shown in Figure 3-1 and the number and type of vehicles are summarised in Table 3-1.

Surveyed vehicles were categorised as follows: -

- Light vehicles, (e.g. cars and light goods vehicles) - LV;
- Heavy vehicles (e.g. agricultural vehicles) - HV.

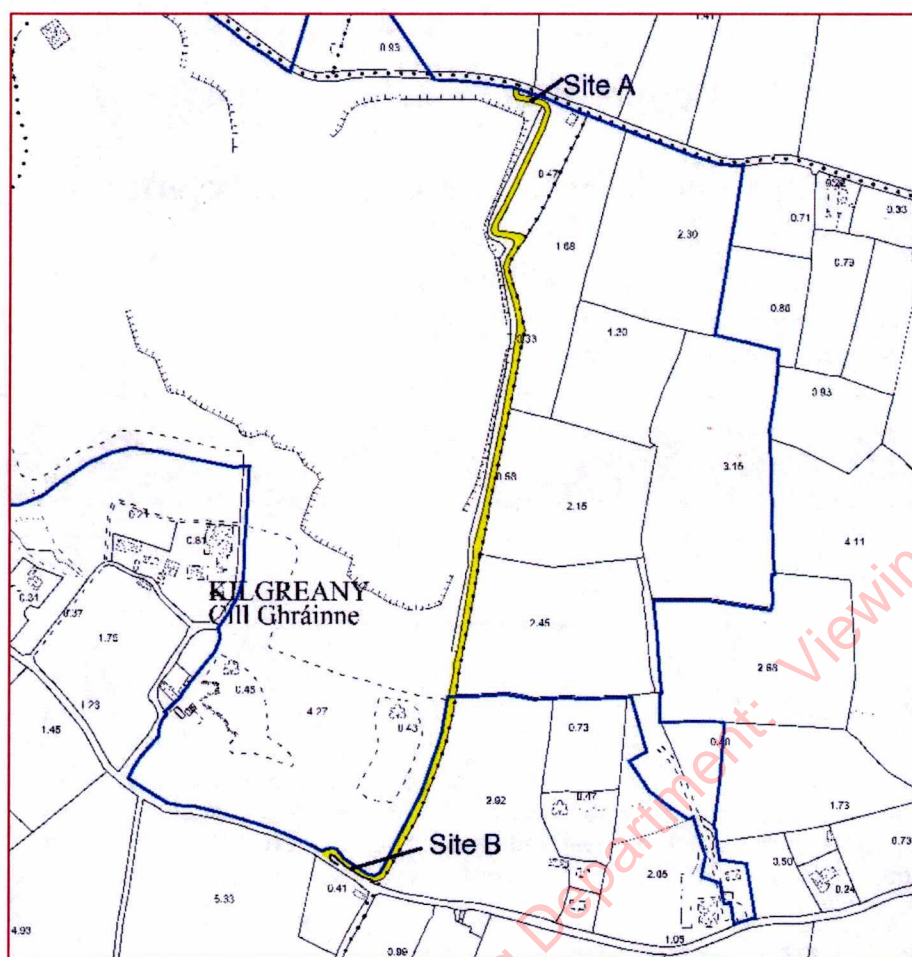


FIGURE 3-1: PASSAGEWAY TRAFFIC COUNT LOCATIONS

TABLE 3-1: TRAFFIC COUNTS ON THE PASSAGEWAY

	Site A – T-junction with Passageway and the L2018				Site B – T-junction with Passageway and the L6072			
	Northbound		Southbound		Northbound		Southbound	
	LV	HV	LV	HV	LV	HV	LV	HV
Wed 18 <sup>th</sup>	3	0	2	1	7	4	4	5
Thurs 19 <sup>th</sup>	3	3	1	2	3	4	1	3
Friday 20 <sup>th</sup>	2	1	1	1	6	3	5	3
Sat 21 <sup>st</sup>	3	2	1	1	3	3	1	3
Sun 22 <sup>nd</sup>	1	0	1	0	1	3	2	3
Mon 23 <sup>rd</sup>	1	1	0	2	1	2	0	3
Tues 24 <sup>th</sup>	2	0	1	0	3	3	2	3



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## INTRODUCTION

### Background

- 3.1 This Chapter of the Environmental Impact Assessment Report (EIAR) addresses the topic of Alternatives in relation to the proposed development of a satellite quarry on lands immediately east of Cappagh Quarry and the local access passageway which delineates its eastern boundary and the tied development of a readymix concrete production facility.
- 3.2 For the purposes of this EIA Chapter, the area within the red line boundary on Figure 1-1 is referred to as 'the application site' while the wider Roadstone landholding, including areas currently under restoration within the blue line boundary on Figure 1-1 is referred to as 'the overall site' or 'Cappagh Quarry'.
- 3.3 Further detail on the proposed development and the application site context is provided in Chapter 2 of this EIA Report.

### Scope of Work / EIA Scoping

- 3.4 In relation to consideration of alternatives the DoHPLG (2018) Guidelines for Planning Authorities and An Bord Pleanála 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."*

### Consultations / Consultees

- 3.5 No consultations were undertaken in preparing this Chapter of the EIA Report.

### Contributors / Author(s)

- 3.6 This chapter of the EIAR was prepared by Tim Paul (MSc, MRICS, CEng, MIQ), Chartered Minerals Surveyor and Chartered Engineer and Derek Luby (MSc. MIEI), Civil Engineer, both with SLR Consulting Ireland.
- 3.7 Tim and Derek are planning and environmental advisors on minerals planning / EIA and development in Ireland and have both been responsible for the scoping, preparation and submission of numerous EIA's for quarry development, including supporting EIS / EIAR documentation. Tim Paul was a lead author of the Environmental Management Guidelines for Extractive Industry (EPA, 2006).

### Difficulties Encountered

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



## CAPPAGH QUARRY

- 3.9 Cappagh Quarry is located in an area which is favourable for continued rock extraction and associated added value activities as a result of a number of existing site specific characteristics including:
- The occurrence of a regionally important high quality limestone resource (Waulsortian Limestone). Quarry development is resource tied (i.e. can only be worked where it is present);
  - Cappagh Quarry is the largest active quarry in the west Waterford / east Cork and south Tipperary region and is strategically important for the supply of construction materials and agricultural ground limestone to these areas;
  - Strategic location and proximity means it is also capable of supplying construction materials to both Cork City and Waterford City when strong demand, tied to high levels of construction activity, warrants it;
  - A long-established history of extraction and related value-added activities, particularly the production of agricultural ground limestone;
  - Ready, established access to the national and regional road network;
  - Use of best practice industry standard extraction and processing methods; and
  - Ongoing implementation of environmental management and monitoring systems.

## CONSIDERATION OF ALTERNATIVES

- 3.10 At the outset, any assessment of possible alternatives to quarry related development must recognise and acknowledge that a considerable constraint is imposed on such development by the location of the available natural resource. It is a well cited truism that mineral resources can only be worked where they occur.
- 3.11 It should also be recognised that quarry / construction products are typically large volume, low value materials and that transportation / haulage costs account for a significant proportion of overall costs to purchasers and/or end-users. There is therefore a strategic and commercial value and benefit to quarries being located in close proximity both to the markets they serve and to high quality national and/or regional road networks.
- 3.12 From an environmental perspective, proximity to markets also means that there are reduced carbon emissions associated with road haulage of quarry products to construction and development sites and, for agricultural ground limestone, to local farm holdings. This accords with the general principles of sustainable development.
- 3.13 Following on from the above, the proposed development of a satellite quarry on lands adjoining Cappagh Quarry and a number of potential alternatives which also provide for the winning and/or production of construction aggregates and agricultural ground limestone are set out below and are subject to a high-level assessment of their relative merits and impacts.
- 3.14 In addressing alternatives, it is considered that there is no fundamental disagreement to the proposition that ancillary construction material production facilities for which aggregates are the main constituent or feedstock (such as a readymix concrete plant) should ideally be located within or adjacent to a quarry or other source of aggregates to minimise the impact of haulage activities.

## Option 1 : Development of Satellite Quarry

- 3.15 This planning application provides for the development of a new satellite quarry on lands immediately to the east of Cappagh Quarry and the existing local access passageway which delineates its eastern boundary. The satellite quarry will be linked to the existing quarry development by way of a 40m long reinforced concrete tunnel underpass running beneath the passageway, connecting them at quarry floor level.
- 3.16 The overall effect of the adjoining satellite quarry development will be to prolong and extend the operational life of pre-existing site infrastructure at Cappagh Quarry, the duration of established site-based activities and any associated emissions or impacts on the surrounding, rural host community.
- 3.17 The quality of the limestone rock at the satellite quarry is similar to the high-quality limestone previously extracted from the existing quarry. The rock from this quarry has been of sufficient high quality and purity that it has supplied agricultural ground limestone ('ground lime') to farm holdings in the surrounding area for many decades. Within the wider East Munster region, similar quality limestone occurs only very locally, on the valley floors between extensive sandstone ridges, and as such presents relatively limited alternative options for extraction.
- 3.18 The development under review provides for continuation of established extractive activity in the local area and ensures there is a continued supply of high-quality aggregate for added-value activities at the existing quarry (principally comprising production of readymix concrete and agricultural ground limestone). It will also sustain existing rural employment and continue to support local suppliers and associated service industries.
- 3.19 Given that
- the existing quarry is a long-time established in the local area;
  - is readily accessible from the N72 National Secondary Road running between Dungarvan and Cappoquin and has a long-established history of traffic movement across the surrounding local road network;
  - much of the required site infrastructure necessary to support future quarrying activity is already in place and there is no requirement to undertake significant site preparation works or incur significant market entry or site establishment costs to access the required natural resource;
  - there are already well-established perimeter berms, vegetation and/or intervening hedgerows screening the application site from many of the surrounding residential properties;
  - the proposed development will not generate any increase in overall aggregate / material output, environmental emissions or traffic levels, over and above those already permitted;
  - the satellite quarry floor will remain above the groundwater table and there will be no requirement for any groundwater abstraction or lowering;
  - a range of mitigation measures will be, or will continue to be implemented to reduce potential development impacts, including the continued operation of environmental management systems;
  - the resultant impact of any continued impacts are assessed as slight adverse, at worst.

Overall, it is considered that, the development of a satellite quarry on adjoining lands, on the opposite site of the local access passageway will extend the operational life of Cappagh Quarry and will have a negligible to slight adverse impact on the surrounding community.



## Option 2 : Extension of Existing Quarry

- 3.20 One option which was given a lot of consideration in the past was to permanently close a section of the existing access passageway, divert it further eastwards, around the northern, eastern and southern perimeter of the application site, and then excavate out the relevant section of passageway to facilitate a quarry extension into the application site and continued working of the eastern quarry face in an easterly direction.
- 3.21 Having regard to objections submitted in response to a recent planning application (2018) which provided for a quarry extension and diversion of a section of the existing passageway, and following internal review within Roadstone and discussions with the Local Authority area planner, Roadstone rejected this option and elected to leave the existing passageway in place and to develop the adjoining lands as a satellite quarry, linked to the existing quarry by way of a tunnel underpass at quarry floor level.

## Option 3 : Development at Greenfield Site

- 3.22 One potential alternative to the development of a satellite quarry on lands adjoining Cappagh Quarry is to identify and develop an entirely new quarry at a hitherto undeveloped location. Any replacement site would ideally be located at a site where limestone rock of comparable high quality to that extracted at Cappagh Quarry occurs (particularly in order to facilitate the production of ground agricultural lime).
- 3.23 The area in which such limestone bedrock outcrops at or close to the ground surface in the surrounding area / region is relatively limited and is largely confined to rural areas along the floor of the River Blackwater valley or the lower lying ground between the Comeragh Mountains and Drum Hills, between Cappoquin and Dungarvan.
- 3.24 At the current time, no suitable alternative replacement limestone quarry location is immediately available or has been identified within the surrounding local area or wider East Munster region. It is generally accepted that the overall timeframe for development of a new 'greenfield' quarry site (from initial site selection for suitable limestone resource / reserves, land acquisition, preparation of a planning application and accompanying EIA Report, through planning process and site development works to the physical extraction of rock and production of aggregates) takes between 5 and 10 years.
- 3.25 In the absence of any immediately identifiable alternative at a greenfield site, construction materials and ground agricultural limestone would need to be imported to the area currently served by Cappagh Quarry from quarries located further afield, at least until such time as a replacement quarry could be brought into service.
- 3.26 Given the predominantly rural nature of an alternative limestone quarry location these areas, any prospective new quarry development would likely give rise to a number of significant additional impacts including
- introduction of quarry development into an area where there is no previous history of comparable scale extractive activity and (conceivably) any other type of industrial activity;
  - generation of increased HGV traffic movements across local road networks where little or none may currently exist or have occurred previously;
  - short-term construction phase impacts associated with the establishment and commissioning of site infrastructure and services;
  - potential generation of increased emissions of noise, vibration and dust;
  - depending on the underlying geology and the depth to groundwater, the quarry may require significant depths of overburden soil stripping or may need to be worked below the water

table. If worked below the groundwater table, any alternative quarry would give rise to groundwater drawdown, with potential impacts on karst features and local supply wells and off-site discharge of surface water run-off / dewatered groundwater to the local drainage network (with possible consequent impacts on surface water flow and quality);

- potential impacts on any nearby cultural or natural heritage features; particularly if there was a hydraulic connection between the greenfield site and a sensitive ecological receptor or a designated Natura 2000 site;
- potential disturbance to the local landscape and potential intrusive visual impacts, at least in the short-to-medium term while perimeter screening vegetation establishes and matures;
- potential increase haul distance to and from markets currently served by Cappagh Quarry, resulting in higher carbon emissions and potential increased cost for construction materials and ground lime to purchasers;
- increased market entry costs associated with exploration for suitable deposits, acquisition of new lands, baseline surveys, application for planning consent and site establishment / set-up costs.

3.27 Having regard to all of the above it is considered that relative to the proposed development of a satellite quarry on lands adjoining Cappagh Quarry, development of a new quarry at a greenfield site is likely to result in notably greater and potentially much more significantly adverse impacts.

#### Option 4 : Importation of Rock from Other Quarries

3.28 Another alternative to the proposed development of a satellite quarry adjacent to Cappagh Quarry is to haul processed (i.e. crushed) aggregate from other more distant quarries in the surrounding region for production of added-value products such as readymix concrete (as proposed) or agricultural ground limestone at Cappagh Quarry.

3.29 The closest Roadstone quarry which produces limestone of similar quality to that at Cappagh is Carrigtwohill Quarry, located approximately 57 km away (or 114 km round trip). Other limestone quarries operated by Roadstone are located at Killough, approximately 75 km away (or 150 km round trip, if the shortest route across the Vee in the Knockmealdown mountains is used), and at Bennettsbridge in County Kilkenny, around 90km away (or 180km round trip). Rock from Kilmacow, Carrolls Cross and Stradbally is not suitable for production of agricultural ground limestone and a round trip of 114km to haul rock from Carrigtwohill is clearly not viable.

3.30 There are few third-party quarries within ready travel distance of Cappagh Quarry which could be a viable alternative for importation of limestone rock. Although Keereen Quarry operates approximately 5km south-west of Cappagh Quarry, the rock at that location comprises sandstones, siltstones and mudstones and is less suitable / unsuitable for current production activities at Cappagh Quarry.

3.31 On review, it is considered that the alternative option to import rock from off-site locations would

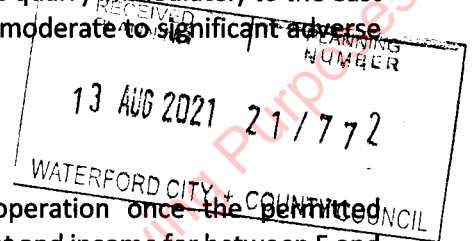
- result in cessation of extraction activities at Cappagh Quarry, the cessation of extraction related emissions and safeguarding of some existing direct employment (associated with added value activities);
- create increased employment for hauliers, an approximate doubling of HGV movements in and out of the quarry (on account of the need for aggregate importation where such a need does not currently exist) and increased carbon emissions associated with increased haulage;
- require an intensification of extraction activities and output from distant quarries, with a potential resultant increase in environmental emissions and/or impacts elsewhere;



- incur additional costs on account of the increased haulage costs.

3.32 Having regard to all of the above, it is considered that this option is likely to result in more significant adverse impacts due to doubling of traffic levels on the local road network, increased production costs and greater carbon emissions and some potentially adverse impacts associated with intensification of output at distant supply quarries. Against this, it is considered that there would be only slightly positive impacts locally as a result of the cessation of quarrying activities.

3.33 Overall therefore, relative to the proposed development of a satellite quarry immediately to the east of Cappagh Quarry, it is considered that this option would result in moderate to significant adverse impacts.



## DO NOTHING SCENARIO

3.34 Under a do-nothing scenario, Cappagh Quarry would cease operation once the permitted extractable resource is exhausted, resulting in the loss of employment and income for between 5 and 10 personnel currently employed directly at the quarry (dependent on output). It would also result in the loss of intermittent employment / income for several others employed in indirect roles (such as contract hauliers / drivers, suppliers of products and support services).

3.35 Although there may be increased employment at other quarries which would intensify output as a result of the displaced demand, economies of scale would most likely mean that there would be a nett loss in employment between that created at other quarries and that lost at Cappagh Quarry.

3.36 From an environmental perspective, any emissions associated with continuation of extraction activities (most notable noise, dust and blasting) would cease and the overall site would be restored in line with the existing planning permission. Over time, with no further site emissions and establishment of vegetation there would be a slight, positive impact on the local environment.

3.37 Notwithstanding any quarry closure, a market demand for construction materials and ground lime would remain and could possibly increase, dependent on the level of construction and development activity within the quarry catchment area, most notably around Dungarvan and west Waterford. Were Cappagh Quarry to cease operations, such demand would need to be met from other quarries supplying aggregate and/or added value products of comparable quality.

3.38 The 'Do nothing scenario' would therefore result in demand displacement and require all output and services heretofore supplied from Cappagh Quarry to be met by the intensification of production activities and an increase in output from one or more quarries across the wider region, most likely all located at a greater distance from the local market.

3.39 This would in turn generate an increase in, and intensification of, HGV movements along the local road network around those quarries. Locally, the social and environmental impacts of such change would be dependent on surrounding land-use and the quality of the local road network serving them.

3.40 Most notably, any increase in haul distance between alternative quarry locations and development sites or local agricultural enterprises would generate increased carbon emissions and increased haulage costs, over and above those which otherwise have been generated had the same materials been sourced and supplied from Cappagh Quarry. Any increase in haulage costs will likely be shouldered by the purchasers / end users of the construction materials sourced from these more distant quarries.

3.41 Over time the displacement of demand to other quarries across the region would hasten the need to provide for the extension of, or deepening of, those quarries (in a like manner to that currently proposed for Cappagh Quarry) as the rate of depletion of proven reserves increases.

- 3.42 In summary therefore, a do-nothing scenario will result in
- the loss of direct and indirect employment at Cappagh Quarry;
  - displacement of demand for construction materials to, and intensification of activities at, other quarries at greater distance across the region;
  - increased haulage distance from other quarries to construction and development sites and/or farmholdings in the local area, resulting in increased carbon emission and an increase in cost to purchasers / end-users
- 3.43 Taking account of each of these factors, it is concluded that relative to the current development proposal, a do-nothing scenario would have an overall moderately adverse impact.

## ALTERNATIVE SOURCE OF AGGREGATES

- 3.44 Over the medium-term, there are no real alternatives to current land-based sources of construction aggregates.
- 3.45 Until End of Waste decisions in respect of Construction and Demolition (C&D) materials are adopted by the Environmental Protection Agency at either a national level or individually agreed (on a single operator basis) with a wide pool of potential suppliers, a sustained and reliable supply of recycled (or secondary) aggregates cannot be relied upon and for the foreseeable future at least, there are no viable alternatives to primary land-won aggregates.
- 3.46 Notwithstanding the above, the volume of C&D waste available and suitable for recycling into secondary aggregates across Ireland is likely to be very low relative to the overall national level of demand for aggregates across the construction and development sector. The demographic spread of the population means that only larger urban centres with sustained and ongoing high levels of site redevelopment and regeneration are capable of generating sufficient volumes of construction and demolition (C&D) waste to justify the establishment and operation of commercial operations capable of producing any significant quantum of secondary aggregates going forward.
- 3.47 In the longer term (>25 years), there may be some scope for extraction of sand and gravel from marine sources, although this could be markedly constrained by possible future development of offshore windfarms.
- 3.48 In the absence of significant volumes of aggregates from recycled / secondary and marine sources, land-based deposits (such as the limestone resources at Cappagh Quarry) will continue to be the main source of construction aggregates in Ireland and specifically for the west Waterford / east Cork and south Tipperary region.

## ALTERNATIVE PROCESSES

- 3.49 Roadstone Ltd. is the leading supplier of construction materials in Ireland and a company with extensive and proved expertise and experience in the field of quarrying, aggregates production and manufacturing of concrete products.
- 3.50 This planning application provides for development of a satellite quarry immediately east of its existing operations at Cappagh Quarry. As it has done previously, Roadstone will continue to use industry standard and best practice excavation and blasting techniques to excavate and fragment the limestone rock at the quarry. The fragmented limestone will also be processed using crushing and screening plant located on the quarry floor and within the quarry area, in line with best practice for the sector. Alternative processes are not therefore considered relevant in this instance.



## CONCLUSION

- 3.51 In light of the foregoing therefore, it is considered that the proposed satellite quarry to be developed to the east of, and linked to, Cappagh Quarry, coupled with the on-site construction and operation of a new concrete batching plant, will result in fewer and notably less significant adverse impacts relative to any other viable alternative.
- 3.52 In summary, the proposed development is considered the most favourable alternative for the following reasons
- The limestone rock reserves are already proven, of comparable high quality, readily extractable (i.e. occur close to existing ground surface);
  - There is no alternative source of comparable high quality rock readily identifiable or available within the surrounding catchment area;
  - Most of the development related impacts at Cappagh Quarry are already long-established within the local area, with the result that the proposed satellite quarry will only result in relative minor incremental change. This compares to other options which could change the character of the surrounding area (for new quarry development) or give rise to more pronounced change and/or impact a greater number of potentially sensitive receptors as a result of intensification of output, emissions and/or traffic levels (at other locations);
  - It safeguards existing employment within the local community and surrounding area and supports the local rural economy, particularly the construction and development sector and local farm enterprises (who could otherwise be disadvantaged by increased costs); and
  - In minimising associated changes in land-use and minimising potential haulage distance to market within the surrounding catchment area, it results in reduced carbon emissions and has a lower carbon footprint than other possible alternatives.

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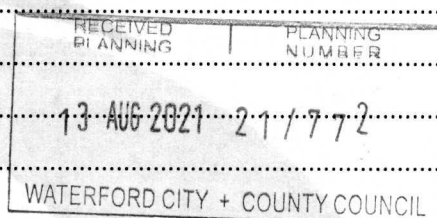
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SLR



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Figure 4-1 Electoral Divisions in Vicinity of Application Site
Figure 4-2 Surrounding Land Use

## INTRODUCTION

### Background

- 4.1 This Chapter of the Environmental Impact Assessment Report (EIAR) addresses the potential effects of the planned future development of a satellite quarry immediately to the east of Cappagh Quarry and the construction and operation of a new concrete batching plant within the existing quarry footprint on population and human health.
- 4.2 Cappagh Quarry is located in the townlands of Kilgreany and Ballykennedy, approximately 8km west of the town of Dungarvan, Co. Waterford. The proposed satellite quarry is almost entirely located in the adjoining townland of Canty to the east, with only a relatively small area (in the north-western corner) located within Kilgreany townland.
- 4.3 The existing quarry is located in the Whitechurch Electoral Division (ED) (Site Code 25036) and is immediately south of, and adjacent to, the Cappagh ED (Site Code 25022), as shown in Figure 4-1. While the primary population and commercial centre for the area is Dungarvan, other secondary population centres include the town of Cappoquin, approximately 8km to the north-west and the town of Lismore, approximately 13km to the west.
- 4.4 The application site lies approximately 1.5 km south of the N72 National Secondary Road between Dungarvan and Cappoquin. Within the surrounding area, land use is primarily agricultural. Dwellings in the vicinity of the application site generally comprise of farmsteads and one-off housing, principally along the local road network. There are two protected structures located immediately beyond the north-western corner of the application site.
- 4.5 The development at Cappagh Quarry comprises the following elements on a 18.2 hectare site:
- development of a satellite quarry immediately to the east of Cappagh Quarry (previously permitted under Planning Permission 06/1599 and An Bord Pleanála PL 24.225443) and the local access passageway which delineates its eastern boundary. The satellite quarry will extend to 13.6 hectares (33.6 acres), of which approximately 9.7 hectares (24.0 acres) will be extracted;
  - construction of a 40m long sub-surface reinforced concrete tunnel underpass (with internal cross-section measuring 6m wide by 5.5m high) under the existing local access passageway (previously permitted under Planning Permission 920/97) to connect the existing quarry to the proposed satellite quarry at quarry floor level;
  - stripping of overburden soils at the satellite quarry for use in construction of environmental bunds and ongoing site restoration works and subsequent excavation of a single quarry bench in limestone bedrock using mechanical excavation and blasting techniques. The proposed quarry faces will vary in height from approximately 8m to 20m and the quarry floor will not extend below 10mOD or into the underlying groundwater body (consistent with Condition 2 of the existing quarry planning permission);
  - processing (crushing and screening) of excavated rock to produce aggregates;
  - demolition of an existing derelict house in the north-western corner of the proposed satellite quarry, removal of existing internal hedgerows, construction of new perimeter fence and installation of access gates leading from the local access passageway to a perimeter track running above and around the satellite quarry;
  - temporary diversion of a section of the existing local access passageway to facilitate construction and installation of the proposed tunnel underpass and re-instatement of the access passageway above it thereafter;



- provision of a temporary access gate and ramp at the existing quarry to facilitate the temporary haulage of materials to and from the satellite quarry and across the existing passageway until the proposed tunnel underpass is in place;
- demolition of concrete supports for former crushing plant;
- construction and operation of a new concrete batching facility (which comprises 4 No. cement silos, batching / mixing unit, aggregate storage bins, an aggregate loading hopper and connecting conveyor systems), all on a concrete paved area on the existing quarry floor, in front of the northern quarry face;
- provision of a batching control office and admixture storage shed;
- construction of a closed loop concrete recycling facility, comprising a concrete truck wash out area, settlement lagoons and 70,000 litre water storage / recycling tank immediately behind (north of) the concrete batching plant;
- construction of an aggregate storage hardstanding area (covering approximately 1 hectare) immediately to the east of the proposed concrete batching plant;
- continued use of established site infrastructure in service of the proposed satellite quarry and new concrete batching plant;
- removal and replanting of the existing boundary hedge, re-alignment of the boundary wall and demolition / removal of an existing structure to the east of the existing quarry access junction in order to provide enhanced sightlines for traffic egressing the quarry;
- implementation of a progressive restoration scheme (in phases) in tandem with extraction activities across the satellite quarry area.

4.6 The application site is located entirely within the Applicant's land ownership and extends across an area of 18.2 hectares (45.0 acres). Of this, the overall satellite quarry area is 13.6 hectares and comprises the proposed extraction area (of approximately 9.7 hectares), the perimeter access track, the 2m high perimeter vegetated safety / screening berm and other associated landscaping / screening areas.

4.7 The remainder of the application site (4.6 hectares) extends across the existing quarry footprint and proposed tunnel underpass. It comprises the site of the proposed new concrete batching plant and adjoining aggregate storage area and includes some pre-existing quarry infrastructure and existing haul roads which will remain in operation for the life of the satellite quarry development.

4.8 The total volume of limestone bedrock to be extracted at the proposed satellite quarry is 1,400,000m<sup>3</sup>, equivalent to approximately 3,360,000 tonnes, assuming an in-situ rock density of 2.4tonnes/m<sup>3</sup>. For further detail of the proposed development and the application site context, refer to Chapter 2 of this EIA Report.

### Scope of Work / EIA Scoping

4.9 The EPA guidelines in relation to the preparation of EIAR<sup>1</sup> note the following in respect of population and human health:

- Assessment of land-use planning, and demographic issues or detailed socio-economic analysis is not generally required;
- Economic development or settlement patterns are only relevant if they give rise to new development and associated effects;

<sup>1</sup> Environmental Protection Agency (2017). *Guidelines on Information to be contained in Environmental Impact Assessment Reports*.

- Human health should be considered in the context of the relevant environmental topics addressed by the EIA Report;
- The effects on human health via relevant pathways (such as air, soil and water) should be considered in the context of accepted standards for exposure, dose or risk;
- Other health and safety issues are addressed under other EU directives.

4.10 On the basis of the guidelines, the scope of this section of the EIA Report is limited to a consideration of employment, human health and amenity in the context of the topics addressed by the EIA Report.

## Consultations / Consultees

4.11 In the course of preparing this Environmental Impact Assessment Report, a pre-planning consultation meeting was held outdoors at the application site on 19th May 2021 between the local area planner for Waterford City and County Council and representatives of SLR Consulting Ireland and Roadstone Limited (Meeting Ref. No. PQ202191). At the meeting, details of the proposed development were outlined in the course of a site walkover and issues of interest or concern to the Planning Authority were identified and discussed. Details of this consultation are presented in Chapter 1 of this EIAR.

4.12 As part of a formal pre-planning consultation process, a number of relevant prescribed bodies and consultees were also contacted by SLR Consulting Ireland by email and post in early March 2021. Each was provided with a summary report and preliminary drawings in respect of the development and invited to provide feedback, particularly on issues which were of concern to them or which they considered should be addressed by an EIA Report.

4.13 Following a review of published development plans and site mapping / surveys, it was considered that there was no requirement for any further formal external consultations to be carried out in respect of human health and population for the purposes of this assessment. There was however significant consultation with other specialist contributors.

## Contributors / Author(s)

4.14 This Chapter of the EIA Report was initially drafted by Crystal Leiker, a Senior Planner with SLR Consulting Ireland. Crystal is a qualified Social Scientist and Town Planner with five years' experience. She holds a Bachelor of Social Science and a MA Planning and Sustainable Development, both from University College Cork.

4.15 The Chapter was subsequently reviewed and updated by Aislinn O'Brien, a Principal Planner with SLR Consulting Ireland. Aislinn is a Chartered Town Planner and a member of the Irish Planning Institute and the Royal Town Planning Institute. She has worked previously on planning and EIA for the waste and extractive sectors and has prepared several EIA Reports thereon.

## Limitations / Difficulties Encountered

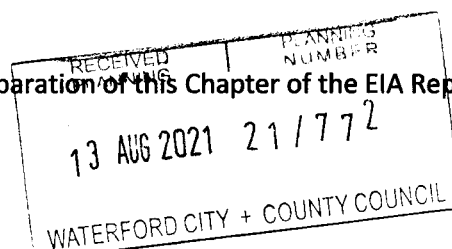
4.16 No limitation or difficulties were encountered in the preparation of this Chapter of the EIA Report.

## REGULATORY BACKGROUND

### Legislation

4.17 There is no specific legislation relevant to this Chapter of the EIA Report. However, the information provided within this Chapter is informed by

- Section 37D and 171A of the Planning and Development Act, 2000 (as amended)
- Section 94 and Schedule 6 of the Planning and Development Regulations, 2001 (as amended)





- EU (Planning and Development) (Environmental Impact Assessment) Regulations 2018

## Planning Policy and Development Control

### *Waterford County Development Plan 2011-2017 (as extended)*

- 4.18 Chapter 10 of the Waterford County Development Plan 2011-2017 (as extended) outlines development management policies for business, commercial and employment developments. It indicates that extractive industries must take place in areas where there is environmental capacity for the activity, with careful siting to minimise impacts on residential amenity, water/groundwater, habitats, archaeology, traffic/roads and environmentally sensitive areas.
- 4.19 The Development Plan requires promoters of quarry development to have regard to the '*Planning Guidelines on Control of Quarries*'. Issues considered important for extractive industry within the county include the ongoing restoration of quarries as activity progresses, as well as the maintenance and restoration of roads and limiting overall impacts. Extractive industries are noted to directly impact upon the population in terms of visual impact and road safety.
- 4.20 Chapter 6, on Economic Development, includes Policy ECD 30 which states that the Council aims
- *To support and facilitate the mineral and aggregate extractive industry where such operations do not have a detrimental environmental effect on other majority land uses or designated or proposed conservation sites in the area of the extraction and do not adversely affect European Conservation Sites.*

## Guidelines

- 4.21 This Chapter of the EIA Report has been prepared on the basis of the draft *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* published by the EPA (2017).

## Technical Standards

- 4.22 There are no technical standards relevant to this Chapter of the EIA Report. Technical standards, if any that are relevant to each pathway (noise, air, soil, water, etc) are addressed elsewhere in this EIA Report.
- 4.23 This Chapter of the EIA Report was prepared utilising Census data of 2011 and 2016, for electoral divisions that both encompass the application site, and are immediately adjacent. All calculations and data are taken from this CSO data.

## Significant Risks

- 4.24 The proposed development is a relatively conventional project which provides for development of a satellite quarry on lands immediately east of Cappagh Quarry and linked to it by a tunnel underpass beneath the dividing local access passageway. It also provides for the establishment and operation of a new concrete production plant within the existing quarry. The concrete plant will be supplied with aggregate produced at the satellite quarry.
- 4.25 The nature and extent of the works involved do not present any risk of a major accident or disaster which would give rise to uncontrolled emissions of dangerous substances to air, land or water which could, in turn, give rise to significant adverse impacts on the population, human health or amenity in the surrounding local area.

## RECEIVING ENVIRONMENT

### Study Area

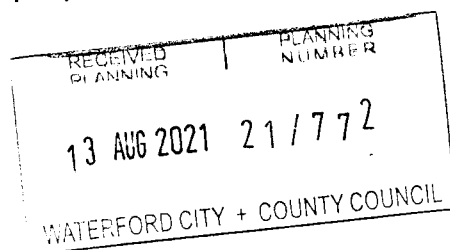
- 4.26 The application site comprises an existing quarry located in the townlands of Kilgreany and Ballykennedy, Co. Waterford, located approximately 8km west of Dungarvan, Co. Waterford and south of the N72 National Secondary Road, together with several agricultural fields to the east, 1 No is Kilgreany townland and 6 No. In Canty townland.
- 4.27 The application site is located within a rural area with a locally flat to gently undulating topography. Within the surrounding area, land use is primarily agricultural with interspersed residential housing which comprises a mix of farmsteads and one-off housing which is generally located along the local road network.
- 4.28 The study area for the purposes of this assessment comprises Whitechurch Electoral Division (ED) (Site Code 25036) in which the application site is situate, and Cappagh ED (Site Code 25022) immediately north of it.

### Baseline Study Methodology

- 4.29 The baseline study with regard to population and human health comprises a desk-top review of online and published resources, information provided by the Applicant, information contained in the other sections of this EIA Report, a review of census information (2011 and 2016) for local Electoral Districts and County Waterford and a review of Live Register Statistics and other local information sources.
- 4.30 A review of existing residential housing and sensitive receptors in the vicinity of the application site was undertaken as part of this study. Ordnance Survey maps and aerial photography were also examined.

### Sources of Information

- 4.31 Baseline information was obtained from the following sources:
- Myplan.ie (<http://myplan.ie/index.html>);
  - Historic Environment Viewer (<http://webgis.archaeology.ie/>);
  - Waterford County Development Plan 2011-2017 (as extended);
  - The environmental topic sections of this EIA Report;
  - OSi Maps;
  - Aerial Photographs;
  - [openstreetmap.org](http://openstreetmap.org);
  - Live Register Statistics;
  - CSO Sap Map data



### Site Context

- 4.32 Cappagh Quarry is located within a gently undulating rural landscape on the limestone floor of a wide valley which runs broadly west to east, between two parallel sandstone ridges. The lands surrounding the quarry and application site are predominantly agricultural in nature. Local fields comprise a mix of grassland and tillage, range in size from small to large and are typically bound by tree-lined hedgerows. There is no forestry across the area and only a number of small blocks of deciduous woodland are present, typically associated with farm properties or old estates.



- 4.33 The application site straddles part of the existing development footprint of Cappagh Quarry and agricultural lands immediately to the east. The eastern portion of the site, to be developed as a satellite quarry, extends across 7 agricultural fields and will be linked to the existing quarry by way of a tunnel underpass beneath the local access passageway which separates them. The satellite quarry area will also include a perimeter access track, a 2m high perimeter vegetated safety / screening berm and associated landscaping / screening areas.
- 4.34 The western portion of the application site extends across the existing quarry footprint and comprises the site of the new concrete batching plant (in front of the northern quarry face) and some pre-existing quarry infrastructure (in the north-western corner of the quarry) which will continue to operate over the life of the proposed satellite quarry.
- 4.35 There are few streams or watercourses in the immediate vicinity of the existing / proposed quarry, which may in part reflect the karstified nature of the rock which occurs in the local area. The River Finisk flows from north to south approximately 2km to the west, while the River Brickey flows west to east approximately 0.5km to the south.
- 4.36 As noted previously, the area round the existing quarry and application site is interspersed with farmsteads and isolated, one-off housing development, predominantly along the local road network. Ground topography and hedgerows, coupled with existing perimeter earth mounds and landscaping, help to screen the existing quarry (and application site) from the view of nearby residential property and the road network.
- 4.37 Access to the Cappagh Quarry is directly from the L2018 Local Road which runs broadly eastwards from its junction with the N72 National Secondary Road at Ballynahemery (close to Finisk Bridge), through the Whitechurch Cross junction with the L2019, past the existing quarry access and along the northern quarry boundary, continuing thereafter towards the north-western outskirts of Dungarvan town. The L2019 Local Road extends northwards from a junction with the R671 Regional Road at Knocknascagh Crossroads (to the west of the existing quarry), and continues in a north-east direction, through Whitechurch Cross, until it meets the N72 at Cappagh.

### Sensitive Receptors

- 4.38 The location and spatial distribution of residential properties units in the vicinity of the application site is presented in Figure 4-2. Review of this figures indicates that there are approximately 52 residential receptors within 1km of the application boundary. Of these,
- there are 3 dwellings at or within 200m of the proposed development boundary;
  - there are 15 dwellings between 200m and 500m of the proposed development boundary;
  - there are 34 dwellings between 500m and 1000m of the proposed development boundary.
- 4.39 In assessing impacts arising from the proposed development, greater focus and attention is placed on those residences within 500m of the application site as they are considered to be at greater risk of potential impact.
- 4.40 Several potential impacts in respect of residential amenity were also considered by this assessment, principally relating to visual amenity. According to the Scenic Landscape Evaluation, contained in Appendix 9 of the Waterford County Development Plan 2011-2017 (as extended), the application site is entirely located within a designated 'normal landscape area' and not within, or adjacent to, any designated sensitive or visually vulnerable area or along any scenic route.

## Other Sensitive Receptors

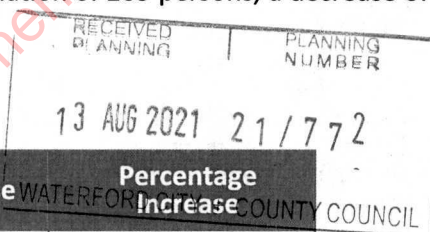
- 4.41 The closest designated nature site to Cappagh Quarry is located along the banks of the River Finisk which flows approximately 1.2km west of the quarry at its closest point. The river forms part of the wider Blackwater River (Cork/Waterford) Special Area of Conservation (SAC, Site Code: 002170).
- 4.42 There is one protected structure (Whitechurch Church, NIAH 22903032) and two protected monuments (Graveslab, Ref. WA02637; Graveyard, Ref. WA02635) located immediately beyond the north-western corner of the application site boundary. There is also a limestone cave identified as a historic monument (WA030-18-) located to the south-west of the existing quarry (and Roadstone property boundary), approximately 230m to the west of the proposed satellite quarry. Further information can be found in the Cultural Heritage chapter of this EIA Report.

## Population

- 4.43 The Census reports for the years 2002 to 2016 produced by the Central Statistics Office (CSO) present population figures in terms of District Electoral Divisions (DED) and their respective populations. The application site is located entirely within the DED of Whitechurch. Population statistics for Whitechurch DED, presented in Table 4-1 below, indicate that it has seen minor increases and declines in population since 2002. In 2016, the DED had a population of 205 persons, a decrease of 4.2% on the population in 2011.

Table 4-1  
Population Change 2002 – 2016<sup>2</sup>

Year	No. Persons	Actual Increase	Percentage Increase
2002	212	2	1 %
2006	209	-3	-1.5 %
2011	216	7	3.3 %
2016	205	-9	-4.2 %



## Employment

- 4.44 The closest Social Welfare Office to the application site is in Dungarvan, servicing Dungarvan and the surrounding areas. The Live Register statistics<sup>3</sup>, show that number of people on the Live Register in December 2020 was 1012, marginally lower than the 1041 which was recorded 12 months previously in December 2019. The lower unemployment figure in December 2020 suggests that local employment was relatively resilient in the face of the restrictions on social contact which were applied in respect of the Covid-19 pandemic at the time.
- 4.45 As previously noted, the application site is located in the Whitechurch Electoral Division (ED) (Site Code 25036) and is adjacent to the Cappagh ED (Site Code 25022). According to the 2016 census results<sup>4</sup>, the Whitechurch ED had a total population of 205. Of the 175 people over the age of 15,
- 88 people were at work;
  - 0 people were looking for their first job;

<sup>2</sup> [http://census.cso.ie/sapmap2016/Results.aspx?Geog\\_Type=ED3409&Geog\\_Code=2AE19629229B13A3E055000000000000](http://census.cso.ie/sapmap2016/Results.aspx?Geog_Type=ED3409&Geog_Code=2AE19629229B13A3E055000000000000)

<sup>3</sup> CSO Live Register Data <https://www.cso.ie/px/pxeirestat/Statire/SelectVarVal/Define.asp?maintable=LRM07&PLanguage=0>

<sup>4</sup> CSO Census 2016 SapMap

[http://census.cso.ie/sapmap2016/Results.aspx?Geog\\_Type=ED3409&Geog\\_Code=2AE196291E6113A3E0550000000000001](http://census.cso.ie/sapmap2016/Results.aspx?Geog_Type=ED3409&Geog_Code=2AE196291E6113A3E0550000000000001)



- 3 people were unemployed;
- Others were students, working at home, retired, unable to work, or other.

4.46 The population of Whitechurch ED and Cappagh ED Rathmore ED is categorised by occupation in Table 4-2 below. The available data indicates that employment in both the Whitechurch and Cappagh ED's leans toward skilled trades, which account for approximately 25% of the total workforce in both ED's. The next largest occupation in both ED's is Professional, at 17.5% and 15% of the workforce in Whitechurch and Cappagh respectively, followed by Process, Plant and Machine Operatives, at 12.1% and 10.6% of the workforce respectively. This employment distribution differs markedly from that for County Waterford as a whole where skilled trades and plant / machine operatives account for a combined 26% of the workforce, as against 37.4% and 36.2% for Whitechurch and Cappagh ED respectively.

Table 4-2  
Persons at Work in Whitechurch and Cappagh ED's and County Waterford by Occupation

Occupation	Whitechurch ED		Cappagh ED		County Waterford	
	No.	%	No.	%	No.	%
Managers, Directors and Senior Officials	5	5.5%	10	5.6%	3,703	7%
Professional Occupations	16	17.6%	27	15.0%	8,135	15%
Associate Professional and Technical Occupations	6	6.6%	19	10.6%	4,979	9%
Administrative and Secretarial Occupations	12	13.2%	17	9.4%	4,527	9%
Skilled Trades Occupations	23	25.3%	46	25.6%	8,223	15%
Caring, Leisure and Other Service Occupations	6	6.6%	14	7.8%	3,725	7%
Sales and Customer Service Occupations	0	0.0%	8	4.4%	4,292	8%
Process, Plant and Machine Operatives	11	12.1%	19	10.6%	4,799	9%
Elementary Occupations	8	8.8%	14	7.8%	4,993	9%
Not stated	4	4.4%	6	3.3%	5,690	11%
TOTAL	91	100.00%	180	100.00%	53,066	100%

4.47 A breakdown of the industry in which those at work are employed is provided below in Table 4.2, The table shows that the primary industry providing employment in both ED's and the County as a whole appears to be the professional services. Whitechurch ED also has a high percentage of its residents employed in the Agriculture, Forestry and Fishing sector, at 25% overall. Cappagh ED has a high percentage of its residents employed in the commerce and trade industry (20%).

Table 4-3  
Persons at Work in Whitechurch and Cappagh ED's and County Waterford by Industry

Industry	Whitechurch ED		Cappagh ED		County Waterford	
Industry	No.	%	No	%	No.	%
Agriculture, forestry and fishing	22	25%	23	13%	2589	6%
Building and construction	3	3%	11	6%	2052	5%
Manufacturing industries	14	16%	26	15%	7418	16%
Commerce and trade	7	8%	34	20%	9513	21%
Transport and communications	8	9%	11	6%	2383	5%
Public administration	2	2%	8	5%	1979	4%
Professional services	23	26%	42	25%	11535	25%
Other	9	10%	16	9%	8126	18%
Total	88	100%	171	100%	45595	100%

## IMPACT ASSESSMENT

### Evaluation Methodology

4.48 The evaluation of effects on employment, human health and amenity comprises a qualitative assessment based on both quantitative and qualitative analysis of potential effects on the environment undertaken in other sections of this EIA Report. The assessment also takes into account a review of relevant literature and professional judgement in relation to impact on population and human health.

### Employment

#### Construction Stage Impacts

4.49 At the outset of the proposed satellite quarry development, it will be necessary to complete some initial preparatory site works, summarised below

- demolition of the property located in the north-western corner of the satellite quarry under the supervision of a bat expert;
- stripping of topsoil (under archaeological supervision) and overburden in advance of rock extraction from the area immediately in front of and around the proposed tunnel portal, at the southern end of the satellite quarry (Phase 3A excavation).
- removal of hedgerows, construction of new perimeter fence and installation of access gates leading from the local access passageway to the perimeter track running above and around the satellite quarry;
- development of a temporary excavation across the local access passageway to facilitate construction / installation of the tunnel underpass linking the quarry on either side and re-instatement of the passageway, screening berms, fencing and planting above it thereafter;
- temporary diversion of a section of the existing local access passageway for the duration of the tunnel underpass construction works;



- construction of a temporary access gate and ramp at the existing quarry to facilitate temporary haulage of excavated soil / rock / aggregate materials to and from the satellite quarry and across the existing passageway until the proposed tunnel underpass is in place.
- 4.50 Construction and installation works for the proposed concrete batching plant and adjoining concrete paved aggregate storage area will include the following activities :
- demolition of concrete supports for the former fixed crushing plant;
  - raising of ground level and construction of a level development platform / hardstanding area (using site won materials) around the proposed development footprint for the concrete batching plant and the adjoining aggregate storage area;
  - construction of the concrete foundations and concrete slab on which the batching plant will be erected and supported;
  - importation of the various structural elements of the plant, much of which is pre-constructed / pre-assembled off-site, on specialist low loader / machinery transport vehicles;
  - construction and commissioning of the concrete batching plant, including cement silos, mixer plant, aggregate storage bins, intake hopper and conveyor systems;
  - construction / installation of the batching office (portacabin), admixture storage shed and water storage tank;
  - construction of the concrete recycling facility / settlement lagoons using in-situ concrete construction techniques and commissioning of water recycling infrastructure.
- 4.51 The preparatory works stage will provide employment for existing Roadstone employees undertaking initial Phase 3A excavation works. It will also provide some short-term employment for a range of construction operatives and professionals. These will principally comprise plant / machinery operators and quarry / construction managers who will plan and co-ordinate work assignments for several others undertaking the preparatory site works around the satellite quarry area and at the proposed concrete batching plant.
- 4.52 Further short-term employment will be generated for specialist contractors involved in the construction and installation of the tunnel underpass and the erection and commissioning of the readymix concrete plant. Overall, it is considered that these initial site development works will have a direct and indirect, temporary and minor positive effect on local employment.

## Operational Stage Impacts

- 4.53 When fully operational, it is expected that future quarry output (from all combined existing and future extraction, processing and added value activities, including concrete production) will not exceed a **maximum** of 400,000 tonnes per annum. Average output levels are however expected to be lower, and for planning purposes, it is estimated that output of stone and related products from the satellite quarry will average around 150,000 tonnes per annum and that output from the concrete batching plant will average 50,000m<sup>3</sup> per annum (consuming approximately 65,000 tonnes of site produced aggregate).
- 4.54 These activities, together with ongoing phased restoration works, will provide continued direct employment for a minimum of 5 and up to a maximum of 10 site-based personnel on a full time equivalent (FTE) basis for the projected life of the development. It will also support and sustain other, indirect employment, principally for HGV drivers / hauliers carrying construction materials to and from the site. It will also help to support employment amongst local suppliers who provide fuel, lubricants, plant / equipment, spares etc. and local service providers who undertake plant maintenance and environmental monitoring.

- 4.55 In addition, the proposed development will contribute indirectly to supporting and sustaining both the local and regional economy through the continued provision of much construction materials for development and infrastructure projects and ground limestone for the agriculture sector.
- 4.56 The employment impacts associated with the operational phase of the proposed development are therefore considered to have a medium to long-term, direct and indirect, minor positive effect within the surrounding area.

## Post-Operational Stage Impacts

- 4.57 During both the operational and post operational period, restoration works will continue across the existing quarry footprint. On cessation of rock extraction activities and downstream aggregate, concrete and ground limestone production activities at the quarry, all related direct employment at the quarry will be lost, as will any related indirect employment. Some intermittent, short-term employment will be provided over a subsequent 2-year period as final restoration works are completed across the satellite quarry footprint and the quarry floor is restored to grassland and agricultural use.
- 4.58 The employment impacts associated with the post-operational phase of the proposed development are considered to have a short-term, direct and indirect, minor positive effect within the surrounding area.

## Human Health

- 4.59 Ultimately, all of the effects of a development on the environment impinge upon human beings. Direct effects relate to matters such as water and air quality, noise, and changes to landscape character. Indirect effects relate to such matters as flora and fauna.
- 4.60 The impact of the proposed development of a satellite quarry and readymix concrete production activities at Cappagh Quarry is addressed in this sub-section by means of an appraisal of the effects of the proposed development on the environment in general, of which human beings are an integral part. The key pathways in relation to human health in this instance are air, noise, water and soil.

## Construction Stage Impacts

- 4.61 The preparatory works to be undertaken at the application site during the construction / site establishment stage are outlined previously under the 'Employment' sub-heading. These works have the potential to generate impacts on air quality, noise, water and soils which may include the following:
- the generation of dust, particularly during extended periods of dry weather, through the excavation, handling and placement of soil / subsoil / rock, the movement of haulage trucks and earthmoving equipment during site stripping works, screening berm construction activities and the transfer of excess excavated material / aggregate across to the pre-existing quarry (until such time as the tunnel underpass is in place);
  - the generation of noise by the movement and operation of haulage trucks and earthmoving plant, rock extraction and construction activities around the tunnel underpass, production of aggregates from rock excavated in front of and around the tunnel portal (Phase 3A extraction works) and construction of the readymix concrete batching plant;
  - an increased risk of accidental leakage or spillage of hazardous materials such as fuel / oil into the underlying ground and ultimately to groundwater.
- 4.62 As outlined in Chapters 7, 8 and 10 of this EIA Report, a number of mitigation measures are proposed to control and minimise these effects and to ensure that the residual effects of the proposed development on human health during the construction stage are acceptable and not significant. On



this basis, it is considered that, with implementation of the proposed mitigation measures, there would be no likely significant temporary or permanent effects on human health during the construction stage of this development.

### *Operational Stage Impacts*

- 4.63 The operational stage of the development entails the phased extraction of rock across the satellite quarry area, production of readymix concrete at the batching plant area and ongoing phased restoration works across the quarry floor. These activities will be ongoing for a period of 16 to 18 years. During this operational stage, the potential impacts on air quality, noise, water and soils may include the following
- 4.64 **Air Quality** : In the absence of any mitigation measures, the risk of impact from dust emissions ranging from insignificant to moderate adverse at receptors located within 500 meters of the application site boundary. A number of mitigation measures are proposed to minimise the potential generation / migration of fugitive dust from site activities and to ensure that emissions comply with recognised best practice threshold limits for the extractive sector. The implementation of these measures will reduce the dust impact at receptors within 500m to mostly insignificant with the exception of five nearby properties where the impact is classified as acceptable. Further details are provided in Chapter 8 of this EIA Report.
- 4.65 **Noise** : A noise impact assessment undertaken in line with the Guidelines for Noise Impact Assessment produced by the Institute of Environmental Management and Assessment (IEMA), has determined that the cumulative long-term noise impact from the proposed development at all receptors is NEGLIGIBLE. Further details are provided in Chapter 10 of this EIA Report.
- 4.66 **Water** : A number of sensitive water receptors have been identified in the receiving environment around the application site. There is no discharge from the application site to any surface watercourses and there will therefore be no direct impact on surface water quality during the operational stage of the planned development. The hydrogeological impact assessment has identified a potential for operational activities to impact groundwater quality given the karstified nature of the underlying bedrock and the proximity of local domestic supplies and the Dungarvan Public Water Supply boreholes. With respect to these receptors and the potential for significant adverse impacts, critical mitigation measures will focus on the storage and management of fuels and hazardous materials at the quarry / application site during the operational stage. Several of the referenced measures are already implemented at the existing quarry and have proven effective in safely managing these materials and preventing accidental leaks or spills. Further details are provided in Chapter 7 of this EIA Report.
- 4.67 As outlined above and in the referenced EIA topic chapters, mitigation measures are proposed to control and minimise environmental emissions and ensure that the residual effects of the proposed development on human health are acceptable and not significant. On this basis, it is considered that, with implementation of the referenced mitigation measures, there would be no likely significant temporary or permanent effects on human health during the operational stage of the planned development.

### *Post-Operational Stage Impacts*

- 4.68 Following cessation of quarrying activities and completion of concrete plant decommissioning and final restoration works across the application site and wider quarry area, any potential development effects on air, noise and water would cease and there would be no consequent effects for human health.

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WATERFORD CITY & COUNTY COUNCIL

## Amenity

- 4.69 Potential effects on the amenity of the area surrounding the application site arising as a result of the proposed development relate mainly to potential nuisance from noise, blast vibrations, dust, traffic, and visual effects. Any such effects would persist for the duration of the proposed development and would effectively cease on completion of extraction and concrete production activities.

### Construction and Operational Stage Impacts

- 4.70 The preparatory works to be undertaken at the application during the construction / site establishment stage are outlined previously under the 'Employment' sub-heading. These works have the potential to generate dust, noise and vibration, which could also potentially cause nuisance. They will also generate a small increase in intermittent van / HGV movements over the local road network.
- 4.71 The activities during the operational stage, outlined previously under the 'Employment' sub-heading will also have the have the potential to generate dust, noise and blast induced vibration, which could potentially cause nuisance, particularly as a result of .
- generation of dust during excavation, blasting and rock crushing during extended periods of dry weather, through the handling of aggregates and other construction materials (cement, sand, ground limestone) and the movement of haulage trucks and concrete lorries across and between the two quarries;
  - the generation of noise by, rock crushing and readymix concrete production activities and the movement of haulage trucks and concrete lorries;
  - the generation of ground induced vibrations by rock blasting;
  - the potential for increased risk of accidental leakage or spillage of materials such as fuel / oil into the underlying ground and ultimately to groundwater; and
  - the potential visual impact of new face exposures and site-based activities.
- 4.72 The gently undulating topography surrounding the quarry and application site, as well as established hedgerows and perimeter screening berms, reduce the landscape and visual effects of the existing quarry development and help screen it from view across much of the surrounding area.
- 4.73 No existing vegetation will be removed around the perimeter of either the existing quarry or the eastern satellite quarry, other than locally around the temporary excavation to install the proposed tunnel underpass beneath the local access passageway. After the tunnel underpass has been installed and the excavation backfilled to ground level, screening / safety berms and chainlink fencing will be constructed on either side of the reinstated passageway. The berms will be planted with a mix of native plants and hedging to re-establish and strengthen visual screening by vegetation.
- 4.74 There will be no significant landscape or visual impacts arising from the satellite quarry development and installation of the new readymix concrete plant, in part because of several landscaping measures which have been incorporated into the development proposal. It is considered important to maintain, and where possible fortify, existing perimeter vegetation and woodland through further planting and landscaping, as it assists with visual screening of the development and mitigation of any noise and dust disturbance which may be associated with site-based activities.
- 4.75 As outlined in Chapters 7, 8, 10 and 13 of this EIA Report, a number of mitigation measures are proposed to control and minimise these effects (and any associated nuisance effects) at the closest sensitive receptors and to ensure that the residual effects of the proposed development on residential amenity are acceptable and not significant for the duration of the construction and operational phases.



## **Post – Operational Stage Impacts**

- 4.76 Following cessation of quarrying activities and completion of plant decommissioning and final restoration works across the floor of the satellite quarry, any potential development effects on air, noise and water would be eliminated.
- 4.77 The assessment of landscape and visual impacts presented in Chapter 13 of this EIA Report concluded that the visual impact of the proposed development will be negligible on completion of final restoration works, as planting matures and the quarry faces weather and thereby integrate into the surrounding rural landscape. On this basis, it is considered that over the post-operational stage, there would be no likely long-term significant effects on amenity arising from the proposed development.

## **Traffic**

- 4.78 The traffic to and from the proposed development at the application site will use the same site entrance as that permitted by existing quarry planning permission. Prior to commencement of extractive or production activities, works will be undertaken to improve sightlines at the quarry access and ensure that they comply with modern design standards and the requirements of the current Waterford City and County Development Plan. These works will enhance the road safety aspects of the development.

## **Construction Stage Impacts**

- 4.79 The existing access passageway which runs between the eastern boundary of the existing quarry and proposed satellite quarry provides a link for local landowners and residents between the Whitechurch Road (L2018 Local Road) and the Cauty Road which runs broadly parallel, but 800m to the south.
- 4.80 During the construction works period, both prior to, and during, the tunnel underpass installation, soil, rock and aggregate will be transferred between the satellite quarry and existing quarry at ground level. This will require HGV / haulage trucks to cross the existing local access passageway, between the access gates installed on each side (at the southern end of each quarry).
- 4.81 Given the limited duration of the construction works, the relatively low traffic levels along the passageway, its relatively straight north-south alignment and the enhanced visibility afforded to HGV / truck drivers from the elevated seat position in driver cabins, traffic safety risks associated with crossing traffic movements will be relatively low.
- 4.82 Notwithstanding this, it will be necessary to implement a number of mitigation measures to further enhance traffic safety and reduce risks associated with crossing movements to an acceptable level. As indicated in Chapter 14 of this EIAR (Traffic), these measures include
- cutting back vegetation around the proposed access gates and crossing point to enhance traffic visibility, particularly if works progress over spring and/or summer months; and
  - provision of traffic signage along the passageway and the temporary haulage route between the two quarries to warn of crossing traffic ahead.
- 4.83 To facilitate opening of a temporary excavation across the local access passageway and the proposed installation and backfilling of a tunnel underpass linking the quarries on either side, it will be necessary to temporarily close the passageway to traffic for the duration of these works and to divert any occasional light vehicular or agricultural traffic which may use it away from the works area and along a temporary track which follows established field boundaries.
- 4.84 Following completion of the tunnel underpass and subsequent backfilling to ground level, the access passageway will be re-instated to the same alignment and standard as at the present time. Perimeter

bunds and chainlink fencing will also be re-established either side of the passageway and bunds will be planted with a mix of native plants and hedging to re-establish the visual screening provided by vegetation. Further details in respect of the temporary passageway diversion are presented in Chapter 2 of this EIA Report.

- 4.85 Recent traffic surveys indicate that there is a maximum of between 10 and 20 traffic movements along the access passageway daily, comprising a mix of light vehicles and heavier agricultural machinery. Although the temporary passageway diversion will ensure that there is no disruption to traffic movements flows between the two local roads, it will give rise to some minor inconvenience to those in the local community who currently use it and will require them to travel a slightly greater distance over a newly placed track, with more turning movements than would usually be the case.
- 4.86 The configuration and routing of the temporary passageway diversion will provide for a complete separation of any construction or quarry traffic from the established passageway traffic and will avoid crossing movements between them for the duration of the tunnel installation works.
- 4.87 In light of the above, the impact of the proposed passageway closure and diversion is assessed as a minor, temporary adverse impact, principally as a result of the temporary inconvenience caused to occasional users of the passageway.

## Operational Stage Impacts

- 4.88 The proposed development at Cappagh Quarry will continue to generate traffic across the local road network, as it has done for much of the recent past. Link capacity analysis was undertaken for the L2018 and L2019 Local Roads which run north and west of the Whitechurch Crossroads, the R671 Regional Road and the N72 National Secondary Roads, all of which carry quarry generated traffic. In all cases, the analyses determined that these roads would continue to operate within capacity for each of the assessment years 2022, 2027 and 2037.
- 4.89 Junction capacity analysis at the junction of the quarry access and the L2018 Local Road, the junction of the L2018 and L2019 at Whitechurch Crossroads and at the N72 and R671 junctions indicate that they will continue to operate within capacity for each of the assessment years indicated above, with no significant long-term adverse impacts and will not inconvenience the local community.

## Post-Operational Stage Impacts

- 4.90 On completion of plant decommissioning and final restoration works across the quarry floor, there will be a permanent reduction in HGV traffic movements over the public road network and through the junction at Whitechurch Crossroads, with consequent improvement of the human environment.
- 4.91 The detailed assessment of development impacts across the local road network, presented in Chapter 14 of this EIA Report, concluded that it will not have a likely significant effect on the existing capacity of local roads and junctions or on road traffic safety.

## Unplanned Events

- 4.92 According to the EPA guidelines, unplanned events, such as accidents, can include *“spill from traffic accidents, floods or landslides 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)”*.
- 4.93 In this instance, the vulnerability of the proposed development to accidents, unplanned events or natural disasters is relatively limited owing to
- the relatively straight-forward nature of the proposed preparatory works, rock extraction and production activities and final restoration works;



- the nature of the materials to be handled on-site and the relatively isolated, rural location of the proposed works;
  - the proven capability and performance of the plant, equipment and technologies to be used in executing the works; and
  - the well-established procedures which will be employed to manage and control the works.
- 4.94 Unplanned events in relation to the proposed development could potentially relate to:
- instability arising from over-high and/or over-steep rock faces or materials stockpiles across the application site;
  - accidental spills from vehicles moving to and from the site and across the local road network;
  - flooding.
- 4.95 Localised instability associated with over-high or over-steep rock faces and/or stockpiles principally present a risk to the human health and safety of personnel working in the quarry. This will be managed and mitigated through active implementation of site health and safety regulations and management of the works to control the height and gradient of quarry faces and aggregate stockpiles. Any instability, were it ever to arise, is likely to involve only minor volumes of material and unlikely to have any significant impacts on employment, human health or amenity beyond the quarry.
- 4.96 Chapter 14 of this EIA Report indicates that the local road network would not be significantly impacted by traffic generated by the development. The risk of an accident resulting in a fuel or oil spillage is considered to be no greater in relation to the proposed development than for previously permitted extraction activities or for any other form of existing development that relies on the transportation of goods and materials by HGV. The potential for significant impacts on employment, human health in the wider population or amenity as a result of a road spillage is likely to be low and relatively localised and any potential impacts would most likely be temporary.
- 4.97 The risk of flooding is considered separately in Chapter 7, Water, of this EIA Report.

### Cumulative / Synergistic Impacts

- 4.98 A search of the Waterford City and County Council online planning search facilities indicates that no other major or non-residential development is planned or has been granted planning permission in the last five years in the vicinity of the application site or in surrounding townlands. As such there is no potential for other development to create significant adverse cumulative impacts on the local environment.
- 4.99 The only environmental consideration that has the potential for significant cumulative impact on population and human health, and in particular on residential amenity, is future increases in traffic volumes associated with increased development and population over time.
- 4.100 The future impact of growth in traffic levels on road capacity are considered in the Traffic Impact Assessment presented in Chapter 14 of this EIA Report. That assessment concludes that the proposed development would not have any likely significant adverse impact on road capacity and traffic safety across the local road network.

### Interaction with other Environmental Receptors

- 4.101 As mentioned above, all environmental factors ultimately impact upon, and interact with human beings to some degree or other. These impacts are discussed in detail in the relevant Chapters of this EIA Report as follows: -
- Chapter 7 – Water (Hydrology and Hydrogeology)

- Chapter 8 – Air Quality
- Chapter 10 -- Noise and Vibration
- Chapter 11 - Material Assets
- Chapter 13 - Landscape
- Chapter 14 – Traffic

## Transboundary Impacts

4.102 Given the location of the application site, it is not anticipated that the impacts of the proposed development would have any significant transboundary effects on population and human health.

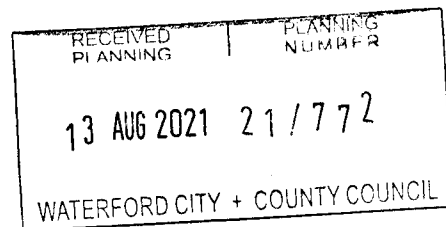
## 'Do-nothing Scenario'

- 4.103 In a 'do-nothing scenario', the existing quarry would cease operations and the quarry floor would be restored to grassland. Other areas would be gradually colonised by natural vegetation over time. The seven fields which make up the proposed satellite quarry would also remain in agricultural use, primarily as grassland.
- 4.104 The cessation of quarry operations and its subsequent closure would result in the loss of employment for those currently directly employed there. It would likely also result in the intensification of extraction and concrete production activities at other quarry locations, possibly at greater distance.

## MITIGATION MEASURES

4.105 Mitigation measures to be adopted in relation to population and human health during the construction stage and for the duration of the proposed extraction and concrete production activities are focussed on minimising any impacts (primarily those relating to noise, blasting, dust and traffic on surrounding sensitive receptors. These measures are discussed in the following chapters of this EIA Report:

- Chapter 7 - Water (Hydrology and Hydrogeology)
- Chapter 8 - Air Quality
- Chapter 10 - Noise
- Chapter 11 - Material Assets
- Chapter 13 - Landscape
- Chapter 14 - Traffic



4.106 As will be seen from a review of the relevant EIA Report Chapters, these mitigation measures include, but are not limited to, the following :

- the use of a mobile water bowsers to suppress dust emissions during dry weather periods;
- the use of a wheelwash to prevent the deposition of dust on the public road;
- restriction of site activities to defined working hours, as previously approved;
- maintaining plant and equipment and managing work activities to ensure compliance with specified noise and ground borne vibration emission levels;
- the retention, maintenance (and strengthening) of existing boundary hedgerows, screening berms and boundary fences to provide acoustic, dust and visual screening;
- the refuelling of plant and machinery over designated sealed and drained surfaces.



- 4.107 In addition, to the proposed mitigation measures, it is anticipated that impacts associated with the proposed quarrying and concrete production activities will be further regulated and controlled by conditions attached to any planning permission granted by the Planning Authority in due course.
- 4.108 All site based activities and associated environmental emissions will be subject to continuous, ongoing monitoring to ensure compliance with emission limit values (ELV's) set by the Planning Authority.

### RESIDUAL IMPACT ASSESSMENT

#### Construction and Operational Stage

- 4.109 Review of the identified potential impacts on the receiving environment, following implementation of appropriate mitigation measures at the application site indicates that there are no significant residual impacts with respect to population, human health and amenity during the construction and operational stages of the proposed development.
- 4.110 It is therefore considered that, subject to implementation of the mitigation measures outlined in Chapters 7, 8, 10, 13 and 14 of this EIA Report, the proposed development will not cause any significant impact on the population, human health and amenity of the surrounding area.

#### Post – Operational Stage

- 4.111 As all potential impacts on the receiving environment are eliminated following cessation of activities at the application site, the proposed development will have no significant residual impacts with respect to population and human health during the post-operational stage.

### MONITORING

- 4.112 As outlined in Chapters 7, 8 and 10 of this EIA Report, continued environmental monitoring will be undertaken in respect of noise, blasting, air quality and groundwater for the duration of the planned rock extraction and concrete production activities at the application site.
- 4.113 The results of any ongoing noise, dust, surface water and groundwater monitoring around the application site and the wider quarry footprint and will be reviewed periodically and monitoring locations will be revised, where and when necessary. All environmental monitoring results will be submitted to the Planning Authority on a regular basis in accordance with consent requirements, for review and record purposes.

## REFERENCES

Central Statistics Office (2019).

Waterford County Council (2011) Waterford County Development Plan 2011-2017.

Planning and Development Act, 2000 (as amended).

Planning and Development Regulations, 2001 (as amended).

Environmental Protection Agency (2017). *Guidelines on the Information to be contained in Environmental Impact Assessment Reports*. EPA.

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## FIGURES

Figure 4-1  
Electoral Divisions in Vicinity of Application Site

Figure 4-2  
Surrounding Land Use

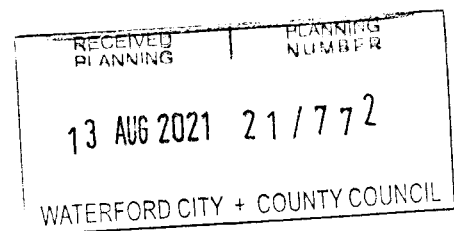


Figure 4-1  
Electoral Divisions in Vicinity of Application Site





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**NOTES**

1. MAPPING EXTRACT FROM 6 INCH MAP SHEET WD030 FROM ORDNANCE SURVEY IRELAND AND DISCOVERYSHEET NO. 82

2. ORDNANCE SURVEY IRELAND LICENCE NO. CYAL50167032 (C) ORDNANCE SURVEY IRELAND/GOVERNMENT OF IRELAND

**LEGEND**

	ROADSTONE LAND INTEREST (C. 58.9 HA)
	PLANNING APPLICATION AREA (C. 18.2 HA)
	PROPOSED EXTRACTION AREA (C. 9.7 HA)
	PROPOSED CONCRETE PLANT & AGGREGATE STORAGE AREA (C. 1.9 HA)
	EXISTING PASSAGEWAY
	OVERHEAD TRANSMISSION LINES
	RESIDENCE LOCATIONS
	1KM OFFSET FROM PLANNING APPLICATION AREA
	BLACKWATER RIVER SPECIAL AREAS OF CONSERVATION (SITE CODE 002170)

**RECEIVED PLANNING**

**PLANNING NUMBER**

**13 AUG 2021 21/1772**

**WATERFORD CITY + COUNTY COUNCIL**

**Roadstone**

**SLR**

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**ROADSTONE LTD.**

**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**

**EASTERN SATELLITE QUARRY AND  
NEW CONCRETE PLANT  
CAPPAGH QUARRY, COUNTY WATERFORD**

**SURROUNDING LAND USE**

**FIGURE 4-2**

Scale 1: 12,500 @ A3

Date JULY 2021



Waterford City & County Council Planning Department: Viewing Purposes Only!

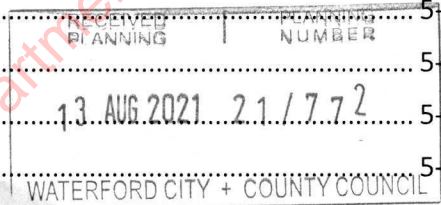
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SLR



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## INTRODUCTION

- 5.1 This Biodiversity Chapter forms part of the Environmental Impact Assessment Report (EIAR) is prepared for Roadstone Ltd. in support of a planning application for a proposed satellite quarry to be developed on lands immediately east of Cappagh Quarry and the construction and operation of a new concrete batching plant within the existing quarry.

### Background

- 5.2 Cappagh Quarry is located in the townlands of Kilgreany and Ballykenedy, approximately 8km west of the town of Dungarvan, Co. Waterford and has been in operation since 1952. The quarry was acquired by John A. Wood Ltd (now part of Roadstone) in 1969. The quarry was formally registered in 2005 and subsequent to this, formal planning permission was granted for continuation of quarrying activities, including the processing of aggregates and associated works (Planning Ref. No. 06/1599).
- 5.3 Roadstone Ltd. proposes to develop a satellite quarry on lands comprising seven agricultural fields immediately east of the existing quarry, one of which is in the north-eastern corner of Kilgreany townland, with the remaining six in the adjoining townland of Canty. The existing passageway separating the satellite quarry from the existing quarry will be retained and a tunnel underpass installed beneath it to link the quarries either side at quarry floor level.
- 5.4 It is also proposed to construct and operate a new concrete plant within the existing quarry footprint, on the quarry floor, immediately in front of the northern quarry face. To facilitate the works, permission is also sought to demolish a derelict building within the satellite quarry area fronting onto the L2018 Local Road

### Site Description

- 5.5 The application site, comprises a portion of the existing Cappagh Quarry in the townlands of Ballykenedy and Kilgreany, and a satellite quarry area of approximately 13.6 hectares to the east which straddles part of Kilgreany and Canty townlands. The site is centred at Irish Transverse Mercator (ITM) Co-ordinates 617670 594802, approximately 8 km west of Dungarvan town centre.
- 5.6 The lands immediately surrounding the existing quarry are dominated by intensive agriculture, primarily pasturelands separated by heavily managed hedgerows. There are remote small stands of woodland in the surrounding area with larger areas of forestry in the wider landscape. There are no watercourses within or adjacent to the site. The application site is bounded to the north by the L2018 Local Road and by agricultural lands on all other sides.

### Details of the Proposed Development

- 5.7 The proposed development at Cappagh Quarry is located within an overall application site area of 18.2 hectares (45.0 acres) and provides for the following: -
- development of a satellite quarry immediately to the east of Cappagh Quarry (previously permitted under Planning Permission 06/1599 and An Bord Pleanála PL 24.225443) and the local access passageway which delineates its eastern boundary. The satellite quarry will extend to 13.6 hectares (33.6 acres), of which approximately 9.7 hectares (24.0 acres) will be extracted;
  - construction of a 40m long sub-surface reinforced concrete tunnel underpass (with internal cross-section measuring 6m wide by 5.5m high) under the existing local access passageway (previously permitted under Planning Permission 920/97) to connect the existing quarry to the proposed satellite quarry at quarry floor level;



- stripping of overburden soils at the satellite quarry for use in construction of environmental bunds and ongoing site restoration works and subsequent excavation of a single quarry bench in limestone bedrock using mechanical excavation and blasting techniques. The proposed quarry faces will vary in height from approximately 8m to 20m and the quarry floor will not extend below 10mOD or into the underlying groundwater body (consistent with Condition 2 of the existing quarry planning permission);
  - processing (crushing and screening) of excavated rock to produce aggregates;
  - demolition of an existing derelict house in the north-western corner of the proposed satellite quarry, removal of existing internal hedgerows, construction of new perimeter fence and installation of access gates leading from the local access passageway to a perimeter track running above and around the satellite quarry;
  - temporary diversion of a section of the existing local access passageway to facilitate construction and installation of the proposed tunnel underpass and re-instatement of the access passageway above it thereafter;
  - provision of a temporary access gate and ramp at the existing quarry to facilitate the temporary haulage of materials to and from the satellite quarry and across the existing passageway until the proposed tunnel underpass is in place;
  - demolition of concrete supports for former crushing plant;
  - construction and operation of a new concrete batching facility (which comprises 4 No. cement silos, batching / mixing unit, aggregate storage bins, an aggregate loading hopper and connecting conveyor systems), all on a concrete paved area on the existing quarry floor, in front of the northern quarry face;
  - provision of a batching control office and admixture storage shed;
  - construction of a closed loop concrete recycling facility, comprising a concrete truck wash out area, settlement lagoons and 70,000 litre water storage / recycling tank immediately behind (north of) the concrete batching plant;
  - construction of an aggregate storage hardstanding area (covering approximately 1 hectare) immediately to the east of the proposed concrete batching plant;
  - continued use of established site infrastructure in service of the proposed satellite quarry and new concrete batching plant;
  - removal and replanting of the existing boundary hedge, re-alignment of the boundary wall and demolition / removal of an existing structure to the east of the existing quarry access junction in order to provide enhanced sightlines for traffic egressing the quarry;
  - implementation of a progressive restoration scheme (in phases) in tandem with extraction activities across the satellite quarry area.
- 5.8 The overall satellite quarry area of 13.6 hectares comprises the proposed extraction area (of approximately 9.7 hectares), the perimeter access track, the 2m high perimeter vegetated safety / screening berm and other associated landscaping / screening areas.
- 5.9 The total volume of limestone bedrock to be extracted by way of the planned eastern satellite quarry is 1,400,000m<sup>3</sup>, equivalent to approximately 3,360,000 tonnes assuming an in-situ rock density of 2.4 tonnes/m<sup>3</sup>.
- 5.10 The projected life of the satellite quarry will be approximately 16 to 18 years, dependent on the rate of quarry output. Allowing additional time for preparatory / site establishment works and post quarrying restoration works, it is anticipated that the operational life of the overall development will be up to 20 years, and application is made for planning permission on that basis.

- 5.11 Further information on the proposed development, site activities, environmental management systems and controls at the application site are provided in the Chapter 2 of this EIA Report.

### Purpose of this Chapter

- 5.12 The purpose of this Biodiversity Chapter is to summarise the baseline ecological conditions at the application site and to identify all potentially significant ecological effects associated with the proposed development. Where necessary, appropriate mitigation measures will be set out to reduce residual effects to a suitable level.
- 5.13 This Chapter will inform the application for the proposed development at Cappagh Quarry within the townlands of Ballykenedy, Kilgreany and Canty, Co. Waterford. This Chapter forms part of the EIAR that will be submitted with the planning application to assist the competent authority, in this case Waterford City and County Council, to carry out an Environmental Impact Assessment (EIA) of the proposed development at the application site.

### Evidence of Technical Competence and Experience

- 5.14 This biodiversity chapter was prepared by SLR Associate Ecologist Michael Bailey BSc MSc MCIEEM.
- 5.15 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 the UK, and of agricultural, mining and renewable energy projects across Africa. He is a member of the Chartered Institute of Ecology and Environmental Management (MCIEEM).
- 5.16 SLR ecologists Owen Twomey and Aisling Kinsella carried out the supporting field surveys.

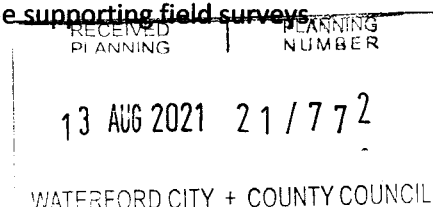
## RELEVANT LEGISLATION AND POLICY

### Legislation

- 5.17 The main pieces of legislation in terms of ecology in regard to developments such as this are as follows;
- The EIA Directive (2011/92/EU)
  - The Habitats Directive (92/43/EEC)
  - The Wildlife Acts 1976 to 2018
  - The Floral (Protection) Order 2015
- 5.18 Summary details in respect of this legislation is presented in Appendix 5-A of this Chapter.

### Local Policy

- 5.19 The relevant local planning policies have been identified in the Waterford County Development Plan 2011 – 2017 and have been listed in Appendix 5-A of this Chapter. These policies are specific to “Chapter 8: Environment and Heritage” of the County Development Plan and are concerned with the Natural Heritage and Environmental policies and objectives. In broad terms these objectives and policies aim to ensure correct measures are put in place to identify and protect natural heritage and important environmental features within Waterford County. The full list of relevant policies and objectives are summarised in Appendix 5-A.





## METHODOLOGY

- 5.20 The methods used to carry out the survey of the application site, to evaluate the ecological value and to prepare the assessment are outlined in the following sections of this EIA Chapter.

### Scope

- 5.21 The scope of this assessment Chapter is to describe the baseline ecological conditions within the application site and the potential effects that could arise from the proposed development. The study area used for the surveys and this report is the proposed project area (as defined by the red line boundary). This report will determine the zone of influence of the development and if important ecological features could be significantly affected. Important ecological features include, sites designated for nature conservation, protected habitats and species, as well as habitats and species of principal importance for conservation of biodiversity. An assessment of the effects of the proposed development on these features will be carried out and mitigation measures will be recommended where deemed necessary.

### Zone of Influence

- 5.22 The 'zone of influence' for a project is the area over which ecological features may be subject to significant effects because of the proposed project and associated activities. This is likely to extend beyond the development site, for example where there are ecological or hydrological links beyond the site boundaries. The zone of influence will vary for different ecological features depending on their sensitivity to an environmental change (CIEEM, 2018).
- 5.23 The zone of influence for a project can be identified through a review of the nature of the proposed development, known impacts likely to arise as a result of the development type, distance from ecologically sensitive sites and the features of interest of sites designated for nature conservation. The desk study carried out for the proposed development includes identification of the potential zone of influence.
- 5.24 The potential zone of influence for a quarry project such as this is not likely to extend significantly beyond the application site largely due to the scale of the project, combined with the enclosed and localised nature of the excavation work and the proposed phased development and restoration over time. The zone of influence is increased if there is potential for impacts on groundwater or surface or ecological connections to features outside this area that may be significantly affected by the proposed development.
- 5.25 The proposed development will result in a continuation of established quarry activity, albeit on lands further to the east of the existing quarry. As a result, there will be potential changes in dust emissions and vibration levels. However, there will be no emissions to surface water as part of the proposed development. Extraction will not extend below 10mOD or into the underlying groundwater body. Rainwater within the quarry footprint will percolate to ground water.
- 5.26 There are no watercourses within or adjacent to the application site. It is not proposed to discharge water to watercourses and it is not proposed to excavate below the local water table. There are no other ecological features within or directly adjacent to the site that have the potential to act as an impact pathway beyond the extents of the site. The potential zone of influence considered to be proportionate and appropriate for the proposed development is 2 km for factors such as habitat loss, noise, air quality and vibration.

## Baseline Data Collection

### Desk Study

- 5.27 A desk study was carried out to collate the available existing ecological information on the application site. The site and the surrounding area were viewed using existing available satellite imagery<sup>1</sup>. High resolution aerial imagery of the site obtained as part of a drone survey has been provided to SLR. The imagery was examined during the desk study and has been incorporated into mapping figures.
- 5.28 The National Parks and Wildlife Service (NPWS)<sup>2</sup> and the National Biodiversity Data Centre (NBDC)<sup>3</sup> online resources were accessed for information on sites designated for nature conservation and on protected habitats and species. Only records for the past 10 years are considered within this report as older records are unlikely to still be relevant given their age and the changes in land management that has occurred in the intervening period. Environmental Protection Agency (EPA) Maps<sup>4</sup> was accessed for other environmental information, such as surface water features, relevant to preparation of this report.
- 5.29 Waterford City and County Council website was accessed for information on relevant planning policy while the planning portal<sup>5</sup> was accessed for information on other planning applications within the immediate surrounding area.
- 5.30 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 List are of medium conservation concern and Green List are not considered threatened. The BirdWatch Ireland website<sup>6</sup> was accessed for information on birds of conservation concern.
- 5.31 The conservation status of mammals within Ireland and Europe is evaluated using one or more of the following documents; Wildlife Acts (1976 - 2012), the Red List of Terrestrial Mammals (Marnell *et al.*, 2009) and the EU Habitats Directive 92/43/EEC.
- 5.32 Cappagh Quarry has previously been subject to ecological assessment for planning purposes and any relevant reports were reviewed as part of the desk study for this report (Golders, 2018).
- 5.33 Chapters of this EIAR prepared by other disciplines, such as Chapter 7 Water and Chapter 8 Air Quality, were reviewed during the desk study. The Appropriate Assessment Screening Report / Natura Impact Statement prepared for the development was also reviewed during the desk study.

### Field Survey(s)

- 5.34 The application site was visited on 09 April 2019 and a walkover survey was carried out by SLR ecologist Owen Twomey. The walkover survey was carried out in periodic light drizzle and a temperature of 11°C. It was overcast with cloud cover of 8 oktas<sup>7</sup> and there was a light F2<sup>8</sup> breeze.

<sup>1</sup> <https://www.google.ie/maps> & <http://www.bing.com/maps/> (last accessed 07 July 2021)

<sup>2</sup> [www.npws.ie](http://www.npws.ie) (last accessed 07 July 2021)

<sup>3</sup> <http://maps.biodiversityireland.ie/#/Map> (last accessed 07 July 2021)

<sup>4</sup> <http://gis.epa.ie/> (last accessed 07 July 2021)

<sup>5</sup> <http://www.waterfordcouncil.ie/departments/planning/planning-enquiries/online-planning-enquiries.htm/> (last accessed 07 July 2021)

<sup>6</sup> <https://www.birdwatchireland.ie/> (last accessed 07 July 2021)

<sup>7</sup> Cloud amount is reported in oktas or eighths. Okta is a unit used in expressing the extent of cloud cover, equal to one eighth of the sky. <https://www.metoffice.gov.uk/guide/weather/observations-guide/how-we-measure-cloud>

<sup>8</sup> Force 2 on the Beaufort Wind Scale <https://www.met.ie/climate/wind.asp>



The objective of the site visit was to undertake a walkover survey to better understand the ecology of the site and to determine its ecological value.

- 5.35 A second field survey was carried out by SLR ecologist Aisling Kinsella on 10 December 2020. The objective of the second visit was to determine if the ecological conditions had changed from those observed during the first survey in April 2019. The second walkover survey was carried out in clear conditions with a temperature of 8°C, cloud cover of 2 oktas and a light F2 breeze.
- 5.36 The most recent site survey was conducted by SLR ecologist Michael Bailey on 21 July 2021. The objective of the third visit was to determine if the seasonal ecological conditions had changed from those observed during the first and second surveys in April 2019 and December 2020. The third walkover survey was carried out in clear and dry conditions with a temperature of 21°C, cloud cover of 1 okta and a light F2 breeze.
- 5.37 Habitats were identified and classified using 'A Guide to Habitats in Ireland' (Fossitt, 2000) during walkover surveys. The dominant plant species present in each habitat type were recorded. Species nomenclature follows Parnell & Curtis (2012) for scientific and English names of vascular plants.
- 5.38 Incidental sightings or evidence of birds, mammals or amphibians were noted during the walkover surveys. Trees or structures suitable for bat roosts within the application site and potential suitable bat foraging habitat were also noted.

## Limitations

### Desk Study

- 5.39 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 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.

### Field Survey(s)

- 5.40 There were no limitations encountered during the field surveys. The three surveys were carried out to cover the optimal seasons for terrestrial habitat, mammal and bird breeding and botanical surveying. The surveys were carried out in suitable weather conditions. All areas of the application site were accessible, including the building to be demolished.

## Assessment Approach

- 5.41 The ecological evaluation and impact assessment approach used in this Chapter is based on Guidelines for Ecological Impact Assessment in the United Kingdom and Ireland ("CIEEM guidelines") (CIEEM, 2018).

### Important Ecological Features

- 5.42 Ecological features can be important for a variety of reasons. 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.
- 5.43 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 (Waterford)
- Townland (Ballykennedy, Kilgreany and Canty);
- Local (intermediate area between application site and Townland); and
- Site (area within the application site boundary).

- 5.44 The above frame of reference is applied to the ecological features identified during the desk study and surveys to inform this report.
- 5.45 In assigning a level of value to 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 Birds of Conservation Concern (Colhoun and Cummins 2013, and Gilbert, Stanbury and Lewis 2021).
- 5.46 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.
- 5.47 For the purposes of this report, ecological features of Local importance or greater and/or subject to legal protection have been subject to detailed assessment. Effects on other ecological features are considered unlikely to be significant in legal or policy terms.

## IMPACT ASSESSMENT

- 5.48 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.
- 5.49 When describing impacts, reference has been made to the following characteristics, as appropriate:
- Positive or negative;
  - Extent;
  - Magnitude;
  - Duration;
  - Timing;
  - Frequency; and
  - Reversibility.

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- 5.50 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.
- 5.51 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

- 5.52 The concept of ecological significance is addressed in Paragraphs 5.24 through to 5.28 of the CIEEM guidelines. Significance is a concept related to the weight that should be attached to effects when decisions are made. For the purpose of EclA, a 'significant effect' is 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 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.

### Cumulative Effects

- 5.53 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.
- 5.54 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

- 5.55 When seeking mitigation or compensation solutions, efforts should be consistent with the geographical scale at which an effect is significant. For example, mitigation and compensation for effects on a species population significant at a county scale should ensure no net loss of the

population at a county scale. The relative geographical scale at which the effect is significant will have a bearing on the required outcome which must be achieved.

- 5.56 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.
- 5.57 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

- 5.58 The following sections of this Chapter set out the baseline ecological conditions at the applications site using the findings of the desk study and surveys.

### Designated Sites

- 5.59 Sites which have been designated for nature conservation within the Zone of Influence of the proposed project are discussed in this section. These designations may include; Natura 2000 sites, Natural Heritage Areas, National Parks, Nature Reserves, Wildfowl Sanctuaries and Ramsar Sites.
- 5.60 The proposed development area is not within or adjacent to any site designated for nature conservation or subject to any nature conservation designations.

### Natura 2000 Sites

- 5.61 There is one Natura 2000 site within the 2 km of the proposed development; Blackwater River (Cork/Waterford) Special Area of Conservation (SAC, Site Code 002170). This SAC is approximately 1.3 km west of the application site when measured in a straight line from the closest point (refer to Figure 5-1).
- 5.62 The application site is not connected via ecological features such as hedgerows or treelines or surface water pathways to any Natura 2000 site. Natura 2000 sites can be considered to be sufficiently distant from, and unconnected to, the proposed development to not be affected by the potential impacts and resultant effects.
- 5.63 The next closest Natura 2000 site is Dungarvan Harbour Special Protection Area (SPA) which is located approximately 6.8 km east of the application site. While Dungarvan Harbour SPA is more than 5km from the application site and there is no surface ecological connectivity, such as along watercourses, hedgerows or treelines, between the site and this SPA, consideration has been given *ex situ* effects and whether the birds listed as Qualifying Interests for Dungarvan Harbour SPA might also use the existing or satellite quarry sites and the surrounding area.



- 5.64 The AA Screening Report and Natura Impact Statement prepared in support of this application found that an unlikely but large-scale, uncontrolled, accidental emissions of pollutants from the proposed development may give rise to a deterioration in groundwater quality or changes in groundwater chemistry which alone could have a very low risk, or a slightly higher risk when considered in combination with other non-project related pollution events, to the health and/or distribution of wintering birds in Dungarvan Harbour SPA. The effects described could potentially undermine the conservation objectives for the features of interest, and this in turn could adversely affect the integrity of Dungarvan Harbour SPA.
- 5.65 An NIS has therefore been prepared to assess the effects of the proposed development on the SPA. However, Waterford County Council, as the Competent Authority in this case, will carry out the screening for appropriate assessment and may itself determine that significant effects on Natura 2000 sites are not likely as a result of the project.

### Natural Heritage Areas

- 5.66 There are no Natural Heritage Areas (NHA) or proposed Natural Heritage Areas (pNHA) within 2 km of the proposed development.
- 5.67 The application site is not connected via ecological features such as hedgerows or treelines or surface water pathways to any Natural Heritage Areas. Natural Heritage Areas can be considered to be sufficiently distant from and unconnected to the proposed development to not be affected by the potential impacts and resultant effects. Natural Heritage Areas are therefore scoped out and excluded from any further consideration in this assessment.

### Habitats

- 5.68 Figure 5.2 identifies the habitats recorded during the ecological walkover survey carried out in 2019 and updated in 2020. The habitats are discussed in detail below and their ecological importance assessed.

### BL3 – Built Ground and Artificial Surfaces

- 5.69 The existing local access passageway which runs north and south between the existing quarry and satellite quarry area is comprised of a gravelled track. This habitat is artificial in nature and is generally devoid of vegetation. Any plant diversity within this habitat is limited to the marginal habitat where the road meets the adjacent hedgerow (WL1), treeline (WL2) or scrub habitat (WS1). There are some ruderal species present occasionally on the less disturbed centreline of the passageway track.
- 5.70 The artificial nature of this habitat and lack of biodiversity in this habitat gives it a negligible ecological value. This habitat is assessed as important at the Site level and is scoped out of further consideration in this assessment.

### ED3 – Recolonising Bare Ground

- 5.71 Recolonising bare ground (Plate 5-1) is present towards the north of the proposed satellite quarry area. Two small areas (combined area ca. 0.1 ha) of this habitat type are present in the narrow parcel of land behind the building to be demolished. This habitat is typical of areas which have recently been disturbed but have since allowed vegetation to recolonise.
- 5.72 Species recorded include common species such as cleavers *Gallium aparine*, bush vetch *Vicia sepium*, Spanish bluebell *Hyacinthoides hispanica*, common knapweed *Centaurea nigra*, ribwort plantain *Plantago lanceolata*, common field speedwell *Veronica persica*, prickly sow thistle *Sonchus asper*, bramble *Rubus fruticosus* agg., ivy *Helix hedera*, cut-leaved cranesbill *Geranium dissectum*, ground ivy *Glechoma hederacea*, spear thistle *Cirsium vulgare*, red dead-nettle *Lamium purpureum*, common

ragwort *Senecio jacobaea*, curly-leaved dock *Rumex crispus*, gorse *Ulex europaeus*, nettle *Urtica dioica*, dandelion *Taraxacum* sp., butterfly-bush *Buddleja davidii*, white clover *Trifolium repens*, creeping buttercup *Ranunculus repens*, daisy *Bellis perennis*, primrose *Primula vulgaris*, wild strawberry *Fragaria vesca*, creeping cinquefoil *Potentilla reptans* and rape *Brassica napus*.

- 5.73 This habitat is transient in nature and arises from disturbing areas. This habitat is common and widespread across Ireland. This habitat is assessed as important at the Site level and is scoped out of further assessment.

#### ED4 – Active Quarries and Mines

- 5.74 Active quarry (Plate 5-2) comprises the existing quarry area within the application site and accounts for approximately 4.6 ha of the overall application area. This habitat can be broadly described as the working area of the existing quarry with exposed rock faces and bare ground with sparsely recolonised by ruderal species. The active quarry includes some smaller areas of standing water, scrub and recolonising bare ground habitats which are not of sufficient size to be mapped or assessed individually.

- 5.75 Species recorded are concentrated in areas with less activity and along its edges. The species recorded are typical of disturbed ground and are commonly occurring ruderal species. These include young birch *Betula pendula pubescens* and willow *Salix* sp. saplings, colt's foot *Tussilago farfara*, cats-ear *Hypochaeris radicata*, gorse, butterfly bush, wild strawberry, ribwort plantain, white clover, self-heal *Prunella vulgaris*, spear thistle, weld *Reseda luteola*, lesser spearwort *Ranunculus flammula*, ox-eye daisy *Leucanthemum vulgare*, scentless mayweed *Tripleurospermum inodorum*, cow parsley *Anthriscus sylvestris*, common sorrel *Rumex acetosa*, and knapweed. Soft rush *Juncus effusus* and bulrush *Typha latifolia* abundant in wetter areas of the pit.

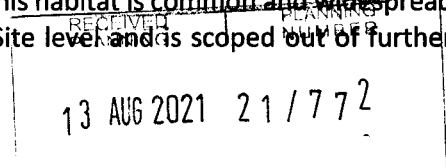
- 5.76 The active quarry habitat would be evaluated as important at Site level. This habitat is species poor and the species that do occur are common and widespread. This habitat is common and widespread across Ireland. This habitat is assessed as important at the Site level and is scoped out of further assessment.

#### GA1 – Improved Agricultural Grassland

- 5.77 Improved agricultural grassland (Plate 5-3) comprises six fields of a combined area of approximately 13 ha in the proposed satellite quarry area. These lands have been cultivated and managed for the production of pastureland for cattle. These fields have been planted with perennial ryegrass *Lolium perenne* and are largely homogenous in nature. Any plant diversity present in this habitat is primarily confined to its marginal areas where the fields meet linear habitats such as hedgerows (WL1) and treelines (WL2).

- 5.78 Plant species in these marginal areas are similar to that recorded in the surrounding hedgerows and treelines. These include lesser celandine *Ranunculus ficaria*, Spanish bluebell, common hogweed *Heracleum sphondylium*, common dog-violet *Viola riviniana*, bush vetch, cleavers, nettle, ivy, alexanders *Smyrniolus olusatrum*, primrose, bramble, hart's-tongue fern *Phyllitis scolopendrium*, lords and ladies *Arum maculatum*, spear thistle, common field speedwell, red dead-nettle, petty spurge *Euphorbia peplus*, white clover, curly leaved dock and hairy bitter-cress *Cardamine hirsuta*,

- 5.79 Improved agricultural grassland is one of the most common and widespread habitats occurring in Ireland. Improved agricultural grassland habitat is species poor and highly modified by agricultural practices. This habitat is evaluated as not important and is scoped out of further consideration in this assessment.





**WD1/BL3 – Mixed Broadleaved Woodland / Buildings and Artificial Surfaces**

- 5.80 The area surrounding the building to be demolished (Plate 5-4) in the north-western corner of the satellite quarry area (approximately 0.1 ha) is best described as a mixture of mixed broadleaved woodland and buildings and artificial surfaces. The building to be demolished is a derelict single storey block and render building in a general state of disrepair. There is a small stone outbuilding a small distance from the main building. The area surrounding the building comprises an overgrown garden with a high percentage of ornamental tree and shrub species such as Leyland cypress *Cupressus × leylandii*, maple *Acer* sp. and laurel *Prunus* sp.
- 5.81 This habitat comprises a small area which is comprised of a highly modified environment. The species present within this habitat are largely planted ornamentals which are non-native. This habitat is evaluated as not important and is scoped out of further consideration in this assessment.

**WS1 – Scrub**

- 5.82 Approximately 0.5 ha of scrub habitat is present within the proposed satellite quarry area (Plate 5-5). This habitat is present within a small section of unmanaged land and also between the existing local access passageway and existing quarry. This habitat is dominated by bramble with occasional gorse, blackthorn *Prunus spinosa* and young hawthorn *Crataegus monogyna* and elder *Sambucus nigra* trees. Dog rose *Rosa Canina* was infrequent. Rank grasses such as perennial ryegrass and cocksfoot *Dactylis glomerata* along with floral species such as Spanish blue bell, common hogweed, nettle was also recorded, primarily around the edge habitat.
- 5.83 Within the application site, this habitat is species poor and forms a small area. This type of species poor scrub habitat is common and widespread throughout Ireland. This habitat is evaluated as important at the Site level only and is scoped out of further consideration in this assessment.

**WL1 – Hedgerow**

- 5.84 There is approximately 2.9 km of hedgerow within and on the borders of the application site (Plate 5-6). The hedgerows in the centre of the site are generally heavily maintained and cut to 2m or lower with frequent gaps resulting in poorer quality than the hedges bordering the site. Hedges are often accompanied by either low stone walls or earth embankments.
- 5.85 Hawthorn is the dominant tree species within the hedge. Other tree species recorded include lesser amounts of blackthorn, holly *Ilex aquifolium*, alder *Alnus glutinosa*, ash *Fraxinus excelsior*, elder, sycamore *Acer pseudoplatanus*, willow *Salix* sp. and wild privet *Ligustrum vulgare*. Occasional mature trees up to 10 m high, primarily ash, are scattered within hedges. Ivy *Hedera helix* is the most common ground flora recorded within the hedgerows. Other ground flora recorded include herb Robert *Geranium robertianum*, alexanders, vetch *Vicia* sp., nettle, dock *Rumex* sp., spear thistle, wild strawberry, creeping buttercup, doves-foot cranes-bill *Geranium molle*, ribwort plantain, hart's-tongue fern, common hogweed, fumitory *Fumaria* sp., ground ivy, cow parsley, spurge *Euphorbia*, primrose *Primula vulgaris*, lesser celandine, Spanish bluebell, bramble, red dead-nettle and dog violet *Viola riviniana*.
- 5.86 Hedgerows within the application site provide ecological connectivity to the larger hedgerow network in the surrounding area. The hedgerows on the boundary of the site are typically more species diverse and better structured than the internal hedges. Hedgerows within the application site are evaluated as important at the Local Level.

## Species

- 5.87 The NBDC database was searched for records of rare and/or protected species from the 1 km grid squares X1794, X1795, X1894 and X1895 within which the application site is located. Only records for the past 10 years are considered within this report as older records are unlikely to still be relevant given their age and the changes in land management that has occurred in the intervening period. There are no records of protected and/or rare species within the relevant grid squares for the past 10 years.
- 5.88 The absence of recent (within 10 years) records of species from the NBDC database does not necessarily imply that a species does not occur within the search area, rather that it has not formally been recorded as present.

## Bats

- 5.89 The building to be demolished as part of the proposed development was examined for its potential to support roosting bat species. The proposed satellite quarry area was also examined for bat activity. A bat survey report was prepared as part of this assessment is provided in Appendix 5-B.
- 5.90 There were no potential roost features (PRF) found in any of the trees surveyed within the application site. The emergence survey carried out in May 2019 recorded no bats emerging from the derelict building, indicating that it was not used as a roost at that time. The proposed satellite quarry area was used for commuting and foraging by low numbers of common pipistrelle *Pipistrellus* and soprano pipistrelles *Pipistrellus pygmaeus*.
- 5.91 All species of bat occurring in Ireland are protected under the Annex IV of EU Habitats Directive, which is transposed into Irish law through the EC (Birds and Natural Habitats) Regulations 2011. Bats are also protected under the Wildlife Acts 1976 - 2018. Under this legislation it is an offence to intentionally kill or injure a bat or intentionally destroy or disturb a breeding place or resting place. The application site is evaluated as important at the Local Level for commuting and foraging bats.

## Birds

- 5.92 Peregrine falcon *Falco peregrinus* was recorded within the existing quarry, outside of the application site area, during the walkover surveys in December 2020 and July 2021. The peregrine was observed in the western part of the existing quarry area and a potential nest was also observed on the western cliff face which has suitable rock ledges. Peregrine is protected under Annex I of the EU Birds Directive.
- 5.93 Sand martins (*Riparia riparia*) were observed nesting in a sand bank in the north-western corner of the existing quarry, outside of the application site, and will not be disturbed by the proposed development.
- 5.94 Numerous swallow *Hirundo rustica* nests (Plate 5-7) were recorded within the derelict building within the proposed satellite quarry area. Nests were of varying age and condition, but some showed signs of recent use. Swallow is an amber listed species on BoCCI due to concerns over the European breeding population.
- 5.95 Other bird species recorded within the application site include common, widespread and green listed species such as little egret *Egretta garzetta*, song thrush *Turdus philomelos*, mistle thrush *Turdus viscivorus*, redwing *Turdus iliacus*, wren *Troglodytes*, blackbird *Turdus merula*, goldfinch *Carduelis*, chaffinch *Fringilla coelebs*, pied wagtail *Motacilla alba*, robin *Erithacus rubecula*, jackdaw *Corvus monedula*, hooded crow *Corvus cornix* and rook *Corvus frugilegus*. All bird species observed are green listed under the Birds of Conservation Concern Ireland (BoCCI).



- 5.96 Bird species in Ireland, their nests and eggs, are protected under the Wildlife Acts. There is evidence of breeding of swallows, an amber listed species is within the application site. Peregrine is also present in the vicinity of the site and may potentially be breeding there. The bird population of the site is evaluated as important at the Townland level.

#### Other Mammals

- 5.97 Evidence of rabbit *Oryctolagus cuniculus* within the application site consisted of including droppings, digging and burrow entrances. Evidence of fox *Vulpes* in the site consisted of mammal paths and a carcass. No other records or evidence of mammal use of the application site were detected during the ecological site walkover.
- 5.98 The population of mammals, such as rabbits and fox, using the site would be evaluated as not important and can be scoped out of further detailed assessment.

### Summary of Important Ecological Features

- 5.99 Table 5-1 below 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 not carrying forward any features for detailed assessment.

Table 5-1  
Summary of Important Ecological Features Subject to Detailed Assessment

Ecological Feature		Scale of importance	Comments on Legal Status and/or Importance
<b>Habitats</b>	WL1 - Hedgerows	Local	Protected in several policies and objectives and goals of Waterford County Development Plan.
<b>Species</b>	Birds (Peregrine and Swallow)	Townland	Wildlife Acts 1976 – 2018 confers protection on breeding birds. Referenced also in several policies, objectives and goals of Waterford County Development plan. Swallow is Amber listed in BoCCI. Peregrine is protected under Annex I of the EU Birds Directive.
	Bats	Local	Wildlife Acts 1976 – 2018 and Annex IV of the Habitats Directive confers protection on all Irish bat species and their roosts. Referenced in several policies and objectives of Waterford County Development Plan.

## DETAILED PROJECT DESCRIPTION

- 5.100 The full description of the proposed project is contained within Chapter 2 of this EIA Report (Project Description). A summary of the proposed development is presented below for the purposes of this ecological assessment.
- 5.101 The proposed development comprises a satellite quarry immediately to the east of Cappagh Quarry, linked to it by a sub-surface tunnel beneath the existing local access passageway, and the construction and operation of a new concrete batching plant on a paved concrete slab over the quarry floor at the northern end of the quarry.
- 5.102 The projected life of the satellite quarry development will be approximately 16 to 18 years. Allowing additional time for preparatory and establishment works and post quarrying restoration works, it is

anticipated that the operational life of the overall development will up to 20 years, and application is made for planning permission on that basis.

- 5.103 There is no requirement for any new / additional site infrastructure to service the proposed development. All pre-existing quarry infrastructure, including but not limited to site offices, staff welfare facilities, maintenance workshop, bundled fuel storage facility, weighbridge, wheelwash, car parking area and utilities will continue in service for the duration of the proposed satellite quarry development and/or the operational life of the new concrete batching plant.

### Eastern Satellite Quarry

- 5.104 The proposed development comprises an eastern satellite quarry which will be excavated in 5 separate phases (designated Phases 3A to 3E), in tandem with the final progressive phased restoration of the existing quarry. The plan extent and sequencing of the proposed satellite quarry development and the associated phasing of the quarry restoration works is described in detail in the accompanying EIAR (and shown in Figure 2-2 and Figure 2-3 of the EIAR). The final overall quarry restoration plan, to be implemented on completion of extraction activities at the satellite quarry, is also provided in the EIAR.
- 5.105 The total area of the eastern satellite quarry is 13.6 hectares, of which 9.7 hectares will be extracted. The remaining site area will comprise the perimeter access track, the 2m high perimeter vegetated safety / screening berm and other associated landscaping / screening areas.
- 5.106 The existing uninhabited, derelict house in north-western corner of the satellite quarry area will be demolished and existing hedgerows along the internal field boundaries will be removed in order to facilitate the satellite quarry development.
- 5.107 The satellite quarry itself will comprise excavation of a single quarry bench in limestone bedrock, varying in height from approximately 8m to 20m, from existing ground level to current quarry floor level. The quarry floor in the satellite quarry will not extend below 10mOD or into the underlying groundwater body, consistent with Condition 2 of the existing planning permission (Planning Ref. 06/1599 and An Bord Pleanála Ref. PL 24.225443).

### Sub-Surface Connecting Tunnel

- 5.108 It is proposed to connect the existing quarry to the satellite quarry by way of a reinforced concrete box tunnel. The tunnel link is to be located toward the southern end of the satellite quarry where existing ground levels are lowest, at approximately 21mOD to 22mOD and where consequently, the depth and extent of any temporary excavations required to install the tunnel link will be minimised.
- 5.109 The location of the tunnel crossing will extend from the satellite quarry (at the north-western corner of the most southerly field) and beneath the local access passageway (previously permitted under Planning Permission 920/97), to daylight at the existing eastern quarry face, close to the main internal haul road running through the middle of the quarry and back to the existing site infrastructure area.
- 5.110 The connecting tunnel between the two quarries will be 40m long and will be accessed at quarry floor level on both sides, falling from approximately 11mOD at the entrance from the existing quarry to 10mOD at the exit into the proposed satellite quarry. The tunnel will have an internal cross-section measuring 6m wide by 5.5m high. Plan details for the proposed tunnel, together with elevations and cross-sections are provided in the EIAR.
- 5.111 The construction and installation of the connecting tunnel will require a section of the existing local access passageway to be temporarily diverted to facilitate the required rock excavation to quarry floor level. The proposed diversion route will follow the line of existing / former hedgerows along the two southernmost fields of the satellite quarry area, as shown in the accompanying EIAR.

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- 5.112 The base of the rock excavation will need to be oversized of the proposed tunnel dimensions to facilitate the construction works and it is likely that excavation side slopes will be developed in rock at an overall slope angle of approximately 45°.
- 5.113 The diverted roadway will be 3m wide and will typically comprise approximately 300mm of crushed aggregate roadbase / hardstanding on glacial till subgrade and/or near-surface bedrock. Although dependent on the timing of the tunnel installation works, it is likely that the diverted roadway may tie into the perimeter access / jeep track to be constructed around the southern and south-eastern boundary of the satellite quarry.

## Concrete Batching Plant

- 5.114 The proposed new concrete batching facility will be located on the quarry floor at the northern end of the existing quarry, immediately east of the established site infrastructure area. In order to provide some increased protection to the underlying groundwater table, ground levels around the batching plant will be raised to create a level paved / hardstanding platform area at 12mOD.
- 5.115 The proposed concrete batching facility will comprise 4 No. cement silos, each just over 21m high, a batching / mixing unit, aggregate storage bins, an aggregate loading hopper and connecting conveyor systems, all on a concrete paved area in front of the northern quarry face.
- 5.116 Aggregates produced on site (by processing blasted rock from the proposed satellite quarry area) will be stored in the 4 No. aggregate storage bins. Cement will be delivered to site in bulk and stored in the 4 No. sealed cement silos. The concrete mixing unit (batching tower) will be provided with noise reducing cladding to eliminate / reduce both fugitive dust and noise. Readymix concrete lorries are required to reverse into a partially enclosed loading bay beneath the concrete mixing plant, so that batched concrete from the plant can be discharged via a chute into the lorry mixer drums.
- 5.117 As part of the development, a batching control office (portacabin) and an admixture storage shed will also be provided beside the batching plant. A 70,000-litre water storage tank will also be provided to the rear of the plant.
- 5.118 Provision is also made for construction of a closed loop concrete recycling facility, comprising a concrete truck wash out area, settlement lagoons, submerged pumps and a pipeline connection to transfer recycled water to the 70,000-litre water storage tank immediately behind (north of) the concrete batching plant. The concrete base of the settlement lagoons will not extend below 10mOD in order to avoid impacting the underlying groundwater table.
- 5.119 All of the above elements will be constructed over a 300mm thick concrete slab extending across an area of approximately 0.9ha. Surface water run-off from the paved slab will be shed northwards and will either infiltrate into the underlying bedrock immediately north of, and beyond the slab, or will be captured locally around the concrete recycling facility and the settlement lagoons at the truck wash out area and will ultimately be recycled in concrete production.
- 5.120 Processed aggregates (from the satellite quarry) and imported sand from other local quarries will be stockpiled on a dedicated hardstand area to be established immediately east of, and adjacent to, the concrete batching plant. This stockpile area will have a plan area of approximately 1 hectare. There will be little, if any surface water run-off across this area and any rainfall is likely to infiltrate diffusely to the underlying groundwater table.
- 5.121 Some low-level spot lighting will be provided around the batching plant to facilitate production operations during winter months and minimise any potential light pollution. Lighting will principally be fixed around the vehicle loading bay and other operational areas where safety assessments identify a requirement for it.

## Site Preparation Works

### Satellite Quarry Area

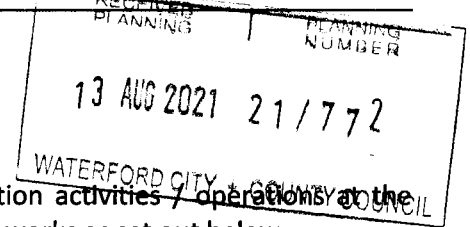
5.122 Prior to the commencement of initial blasting and rock extraction activities / operations at the satellite quarry area, it will be necessary to complete preparatory works as set out below.

5.123 The initial stage of the preparatory works for the satellite quarry will entail:

- demolition of the 'Old House' in the north-western corner of the satellite quarry under the supervision of a bat expert;
- strengthening of the existing hedgerow boundary around the entire perimeter of the satellite quarry by planting of native stockproof hedging where feasible and appropriate to do so;
- construction of a 2.4m high chain link fence around the entire perimeter of the satellite quarry, offset 2m from the centreline of existing boundary hedgerows;
- installation of gates (2.4m high) on the western side of the satellite quarry, to facilitate ground level access from the local access passageway at both the northern and southern end;
- installation of temporary gates (2.4m high) and a ramp in the south-eastern corner of the existing quarry, to facilitate temporary haulage of materials to and from the satellite quarry and across the access passageway until such time as the proposed tunnel underpass is built and in use;
- construction of a 3m wide jeep / access track immediately inside the fenceline along the northern, eastern and southern perimeter of the satellite quarry. The jeep / access track will be grassed (with no hardcore surface or sub-base);
- stripping of topsoil and overburden subsoil cover in advance of the initial phase of rock extraction at the southern end the satellite quarry (identified as Phase 3A extraction), from the area immediately in front of and around the proposed tunnel portal;
- construction of a 2m high perimeter screening / safety berm around the entire quarry perimeter (inside of the jeep / access track) using topsoil and overburden subsoil stripped across the initial (Phase 3A) extraction area and its subsequent planting with semi-natural woodland species and a spruce hedge;
- overground transfer of any excess topsoil and subsoil excavated across the initial Phase 3A excavation area at the satellite quarry to the existing quarry for re-use in ongoing restoration works. Excess soils will be transferred by way of haulage trucks running at ground level, between the quarry access gates referenced above, across the existing access passageway and down the temporary ramp to the existing quarry. Excess rock, crushed rock and aggregate will also be transferred across to the existing quarry until such time as the tunnel underpass is built and in use;
- planting of a triangular area at the north-eastern corner of the proposed satellite quarry, extending to approximately 0.61 hectares with semi-natural woodland species.

5.124 Where feasible and appropriate, existing boundary hedgerows will be strengthened by planting further native species-rich hedgerows. This planting will comprise native species of local provenance, including wild privet *Ligustrum vulgare*, dogwood *Cornus sanguineus*, guelder rose *Viburnum opulus*, hazel *Corylus avellana*, hawthorn *Crataegus monogyna* and blackthorn *Prunus spinosa*. The triangular area in the north-eastern corner of the satellite quarry area will be planted with similar species.

5.125 It is envisaged that the access / jeep track will be grassed except for a short period during the proposed tunnel installation and construction works, when the existing local access passageway will





be temporarily diverted and will likely run across the southern section of the track. The construction of the diverted passageway will comprise 300mm of compacted aggregate roadbase / hardstanding over the underlying subgrade.

- 5.126 On completion of the tunnel installation works and re-instatement of the existing passageway, the roadbase / hardstanding materials will be removed and the grass track over the south section of the diverted route will be re-instated. The excavated roadbase materials will be screened, stockpiled and supplied as aggregate for appropriate re-use within the existing quarry or for off-site construction projects.
- 5.127 The proposed perimeter berm will be 2m high with 1 in 1.5 slopes on either side, 8 m wide at the base and 2 m wide on the crest. The sides and top of the berm will be planted with a variety of age classes ranging from feathered whips up to 10-12 cm girth trees in order to strike a balance between immediate screening effect, establishment potential and the density of screening. Hedging will be planted along the crest.
- 5.128 The proposed screening berms to be located around the perimeter of the satellite quarry will be left intact for the life of the quarry (and likely in perpetuity to continue to provide biodiversity enhancement to the application site and the local environment). The growth and establishment of vegetation along this perimeter will also help to mitigate against noise and potential dust emissions from future quarry operations and reduce the visual impact of the development from the passageway, public road network and surrounding lands.

#### **Tunnel Installation Works and Temporary Passageway Diversion**

- 5.129 In order to construct the proposed sub-surface tunnel linking the existing quarry to the proposed satellite quarry, it will initially be necessary to open up an initial excavation in overburden soils and underlying rock at the southern end of the satellite quarry and to create a sunken area extending down to the proposed quarry floor level in front of and around the proposed tunnel portal (Extraction Phase 3A) .
- 5.130 Thereafter, it will be necessary to temporarily close a section of the existing passageway and to divert any occasional traffic travelling over it around the initial (Phase 3A) quarry excavation to facilitate opening of the temporary excavation across the passageway and the installation of precast sections of the sub-surface tunnel which will link the existing quarry to the proposed satellite quarry at quarry floor level. As a precautionary measure, a temporary safety berm up to 2m high will be placed across the passageway at either end of the closed section to restrict traffic / human access.
- 5.131 It is envisaged that the diverted section of passageway will closely track the existing field boundaries / hedgerows around the two southernmost fields of the satellite quarry area in which the initial quarry excavations will be developed. The diverted track will be 3m wide, unpaved and will comprise approximately 300mm of crushed aggregate roadbase / hardstanding overlying glacial till subsoil and/or near-surface bedrock. A chainlink fence will be erected on either side of the diverted track to restrict access to the initial excavation / works area.
- 5.132 The initial quarry excavation will straddle the two southernmost fields of the satellite quarry area and will have a plan footprint area of approximately 1 hectare (inclusive of side slopes and rock benches). Excavations will be undertaken using conventional mechanical excavators (in overburden soil and weathered rock) and by blasting (in competent rock). Much of the excavated topsoil and overburden soils will be used to construct the perimeter screening berm around the satellite quarry area.
- 5.133 Excess topsoil and overburden soils will be either temporarily stockpiled within the satellite quarry, beyond the excavation footprint or, more likely, will be transferred by haulage trucks at ground level, across the existing passageway, for use in ongoing restoration works at the existing quarry. The haul

route will run between the proposed new access gates at the southern end of both the existing quarry and proposed satellite quarry.

- 5.134 During the initial (construction stage) excavations (Phase 3A), the excavated weathered rock and competent rock will be stockpiled at ground level within the satellite quarry, north of and beyond the initial excavation footprint. The stockpiled rock will subsequently be crushed and screened on site (at existing ground level) to produce aggregate. Noise generated by these activities will be partially screened by material stockpiles and by rising ground levels over the intervening distance between the works area and residential receptors to the north and south.
- 5.135 Some of the crushed rock will be stockpiled at the satellite quarry pending subsequent use in backfilling of the temporary tunnel excavation and re-instatement of the perimeter berm on the eastern side of the existing quarry. Excess crushed rock / aggregate will be transferred by haulage trucks across the passageway (and new southern access gates) to the existing quarry. These aggregates will then be dispatched off-site or will be stockpiled pending use to produce readymixed concrete.
- 5.136 The proposed temporary tunnel excavation will be developed in soil and rock at an overall slope angle of approximately 45° and will extend approximately 0.5m below the proposed tunnel floor levels of 10mOD to 11mOD. This temporary excavation will be oversized to facilitate the tunnel construction works and will extend from the eastern face of the existing quarry into the initial quarry excavation developed on the other side of the local access passageway.
- 5.137 The connecting tunnel linking the two quarries will most likely comprise several precast concrete box sections produced off-site by a specialist precast concrete manufacturer and transferred to site by flat, low-body trailers. The precast concrete sections will be brought through the existing quarry to the existing eastern quarry face and then lifted and lowered into position within the prepared excavation by a mobile crane.
- 5.138 After the tunnel sections have been connected and sealed, the tunnel excavation will be backfilled with stockpiled, pre-crushed aggregate up to existing ground level and the local access passageway reinstated to run north-south across it. Galvanised chainlink fencing, perimeter screening berms and planting will all then be established over the backfilled excavation, on either side of the reinstated passageway.
- 5.139 Thereafter, the temporary safety berms at either end of the closed section of passageway will be removed, traffic movements will be reinstated along the passageway, all temporary works or infrastructure required to facilitate the tunnel installation works will be removed and any remaining sections of boundary fence, perimeter track and/or screening berm around the satellite quarry completed and secured.

## Concrete Batching Plant

- 5.140 The construction and installation of the proposed concrete batching plant will entail the following works in front of the northern quarry face:
- demolition of concrete supports for the former fixed crushing plant.
  - raising of ground level and construction of a level development platform / hardstanding area (using site won materials) around the proposed development footprint for the concrete batching plant and the adjoining aggregate storage area.
  - construction of the concrete foundations and concrete slab on which the batching plant will be erected and supported.
  - importation of the various structural elements of the plant, much of which is pre-constructed / pre-assembled off-site, on specialist low loader / machinery transport vehicles.



- construction and commissioning of the concrete batching plant, including cement silos, mixer plant, aggregate storage bins, intake hopper and conveyor systems.
- construction / installation of the batching office (portacabin), admixture storage shed and water storage tank.
- construction of the concrete recycling facility / settlement lagoons using in-situ concrete construction techniques and commissioning of water recycling infrastructure.

## Water Management

### Surface Water

- 5.141 There will be no emissions to surface water as part of the proposed concrete plant development. A closed loop concrete recycling and settlement system will be installed immediately adjacent to (north of) the concrete plant.
- 5.142 All water used in washing out concrete trucks and other plant will be directed to a system of settlement lagoons set into the concrete slab. Suspended particulates in the concrete wash out will settle out in these lagoons. Treated water sourced from these lagoons will then be pumped to the on-site water storage tank and recycled for re-use in the concrete production process, wash-down bay or otherwise used for dust suppression purposes across the quarry.
- 5.143 The settled-out particulates / sediment will be periodically excavated from the base of the lagoons, stockpiled and allowed to dry on the adjoining hardstanding area and added to the aggregate stockpiles for recycling in concrete production.
- 5.144 Surface water run-off from the paved slab will be shed northwards and will either infiltrate into the underlying bedrock immediately north of, and beyond the slab, or will be captured locally around the settlement lagoons at the truck wash out area and recycled in concrete production.

### Groundwater

- 5.145 There will be no discharge to groundwater from the concrete production activities and all process water / effluent from on-site activities will be treated and re-used / recycled in:
- Concrete production (and therefore transported off-site).
  - Wash down of concrete trucks (and recycled again in a closed loop system); or
  - Dust suppression across the quarry (when it will be largely taken up by evaporation).
- 5.146 Additional water for the plant will be sourced, only as and when required, from the on-site groundwater supply well.

### Water Consumption

- 5.147 The water consumption for both the Readymix concrete production and the concrete truck washout is estimated to be approximately 16,165m<sup>3</sup>/yr. of which 15,450m<sup>3</sup> is required for concrete production, and approximately 715m<sup>3</sup> will be required to replace losses through evaporation and seepage of recycled water into the ground
- 5.148 Taking the above into account, the potential impacts of the proposed development are outlined in the following sections.

## Do Nothing Impact

- 5.149 In the absence of the proposed development, it is assumed that quarry activities will cease and that farming activities currently being carried out within the application site at Cappagh will continue and the Do-Nothing Impact will result in no significant change in the ecological interest of the site.

## Hedgerow – WL1

### Potential Impacts

- 5.150 It is proposed to remove approximately 850m of hedgerow within the satellite quarry in the northern and eastern area of the application site (refer to Figure 5-2). This represents a significant proportion of the total length hedgerow within and around the existing application site. No external hedgerows on the boundaries of the proposed satellite quarry area will be removed.
- 5.151 The removal of hedgerows will be significant at the Local Level.

### Proposed Mitigation Measures

- 5.152 No specific mitigation measures are required outside that of the proposed restoration scheme described in Chapter 2 (Project Description) and Chapter 13 (Landscape) of this EIA Report (and also shown in EIA Figure 2-4).
- 5.153 The proposed restoration scheme provides for the planting of the perimeter screening berm to be constructed around the satellite quarry area with semi-natural woodland species and a spruce hedge at the outset of the development. It also provides for the planting of the triangular area which extends to approximately 0.61 hectares at the north-eastern corner of the satellite quarry area with semi-natural woodland species at the same time.
- 5.154 On completion of extractive activities and the restoration of the satellite quarry floor to grassland, it is also proposed to re-establish some native hedges across the quarry footprint to provide some additional long-term biodiversity interest. Some additional planting of blocks semi-natural woodland species will also be undertaken at the base of quarry faces.
- 5.155 All hedges planted as part of the proposed restoration plan will be comprised of native and typically occurring species present in the local vegetation and/or hedgerows. Hawthorn and blackthorn will be the most common species used with hazel, holly, crab apple and elder also being present. These will form two rows to be planted 40 cm apart. Transplants to be planted randomly with no more than 3 plants of the same species in one group. Planting will be carried out in the appropriate season by a suitably qualified landscape contractor. All plants will be protected with spiral guards or alternatively with rabbit proof fencing.
- 5.156 Aftercare will consist of establishment maintenance for 2 years following the planting works (minimum 3 maintenance visits per year). This will include weed control, replacement planting where required and the adjustment/removal of tree ties and spiral guards.

### Significance of Residual Effects.

- 5.157 There will be a combination of hedgerow removal and planting on a phased basis over the life of the proposed development. There will be a residual effect due to the loss of this habitat until newly planted hedgerows are sufficiently mature to adequately mitigate those lost. However, it is considered that while there will be a temporary residual effect on hedgerows within the application site, this effect would not be significant. Once sufficiently matured the planted hedgerows will result in a long-term positive effect.

## Bats

### Potential Impacts

- 5.158 No roosting bats were recorded at the building to be demolished as part of the proposed development. No other potential roost features were recorded within the application site.



- 5.159 Low numbers of common and widespread bat species were recorded during active surveys carried out within the proposed satellite quarry area. The proposed development will result in the temporary loss of approximately 850m of hedgerow within the proposed satellite quarry extraction area. Overall, these hedgerows are assessed as being of low suitability for foraging and commuting bats.
- 5.160 There is no fixed or permanent external lighting across the application site, other than at the existing site offices and roads around the site entrance. Mobile lighting is provided elsewhere around the quarry as and when required to permit safe operation of plant and machinery over winter months.
- 5.161 Any effect to commuting or foraging bats as a result of the proposed development will be temporary and is not likely to be significant beyond the Site level.

### Proposed Mitigation Measures

- 5.162 No specific mitigation measures outside that of the proposed restoration plan are required.
- 5.163 Native hedges will be planted as part of the proposed site restoration scheme and represents a long-term increase to the number of hedges within the application site. The lands within the site will be return to grassland once operations cease.

### Significance of Residual Effects

- 5.164 The residual effect on bats within the application site would not be significant.

## Birds

### Potential impacts

- 5.165 The proposed development will result in the temporary loss of hedgerows within the application site. This represents loss of potential nesting habitat for commonly occurring bird species.
- 5.166 Peregrine falcon is present in the western part of the existing quarry area and potentially nesting on the western cliff face which has suitable rock ledges. It is not proposed to destroy this quarry face as part of the proposed development. There will be no change to current / pre-established quarrying activities, such as blasting, as a result of the satellite quarry development. There will be no increased disturbance to peregrine as a result. Quarry faces within the worked-out quarry will be left intact as part of the proposed restoration plan. No significant effect to peregrine falcon is anticipated.
- 5.167 Sand martins (*Riparia riparia*) were observed nesting in a sand bank in the north-western corner of the existing quarry, outside of the application site and will not be disturbed by the proposed development.
- 5.168 Swallow are breeding within the derelict building within the proposed satellite quarry area. There are large amounts of suitable outbuildings, agricultural sheds and derelict buildings (i.e. Whitechurch Church) within the local area which offer alternative breeding habitat. The loss of the derelict building as breeding habitat would not be considered significant beyond the Site level.

### Proposed Mitigation Measures

- 5.169 The demolition of the derelict building and vegetation clearance within the application site will be carried out outside of the bird nesting season (1st March – 31st August inclusive).
- 5.170 Native hedges will be planted as part of the site restoration scheme. This represents a long-term increase to the number of hedges within the application site.

### Significance of Residual Effects

- 5.171 The residual effect on the bird assemblage within the application site would not be significant.

## Cumulative Effects

- 5.172 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.
- 5.173 The potential for cumulative effects must be considered due to the potential for other plans and projects acting in-combination with the proposed development to cause significant effects. To identify other plans and projects that could act together with the proposed development, the online planning portal for Waterford County Council was accessed.
- 5.174 The plans and projects considered for their potential to act in-combination with the proposed project are as follows:
- Waterford County Development Plan 2011 – 2017.
- 5.175 The effects of the proposed project are not likely to be significant and will be localised i.e. confined to the application site and the immediate area. There are no strategies or objectives in the Waterford County Development Plan 2011 – 2017 that are likely to result in significant effects when considered in-combination with the proposed project.
- 5.176 Recent (i.e. within 6 years) planning applications in the surrounding area are limited to relatively minor developments such as one-off housing (including retentions and extensions), and agricultural buildings. There are no proposed developments in the surrounding area that when considered together with the proposed development are likely to give rise to cumulative effects. It is considered that there is no pathway for the proposed development to act in-combination with other plans and projects.

## Summary of Effects

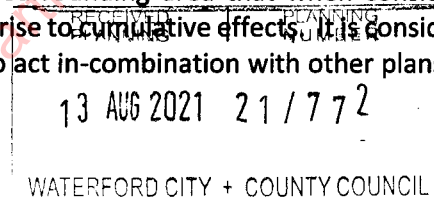


Table 5- 2  
Summary of Important Features, Effects and Proposed Mitigation

Ecological Feature	Effect	Proposed Mitigation	Means of Delivering Mitigation	Residual Effects
WL1 – Hedgerow	Local level	Replanting of c. 3,750m of native hedge as part of the Landscape Restoration Plan.	Landscape plan and quarry operator	Not significant
Bats	Site Level	No mitigation required outside of the proposed landscape plan.	-	Not significant
Birds	Site Level	Removal of vegetation and demolition of derelict building will be carried out outside the bird breeding season (1 March – 31 August inclusive). No further mitigation required outside of the proposed landscape plan.	Landscape plan and quarry operator	Not significant

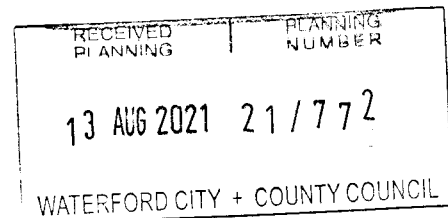


## CONCLUSIONS

- 5.177 The proposed satellite quarry development and new concrete plant at Cappagh, Co. Waterford will result in localised effects on the ecology of the application site.
- 5.178 There will be no effect on sites designated for nature conservation as a result of the proposed development. There will be a loss of agricultural grassland, hedgerow and scrub within the site as a result of the proposed development. These habitats will be restored as part of the restoration plan of the proposed project. The restoration plan will result in a net increase in the amount of hedgerow. The habitats within the application site are commonly occurring, widespread and resilient.
- 5.179 Swallows nest within a derelict building within the satellite quarry area and peregrine is present within the existing quarry. Small numbers of common bat species have been recorded commuting and foraging within the application site. Mitigation measures for important ecological features which may be affected by the proposed development have been recommended.
- 5.180 The residual effects of the development after mitigation would not be significant.

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FIGURES

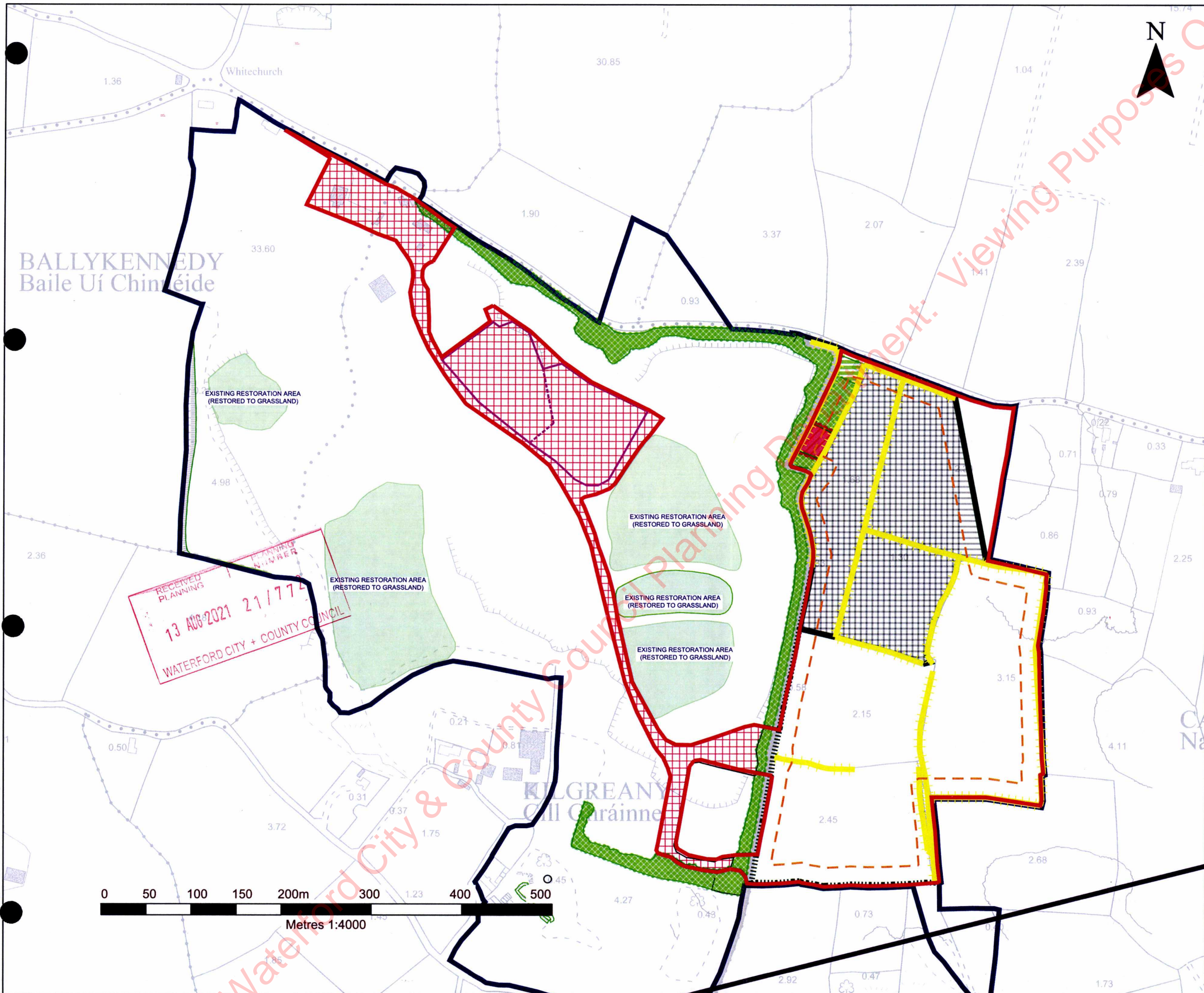
Figure 5-1  
Sites Designated for Nature Conservation

Figure 5-2  
Habitat Map

RECEIVED PLANNING	PLANNING NUMBER
13 AUG 2021	21 / 772
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00180.00264.0.16.Fig5-1.R0.Habitat Map.dwg



**NOTES**  
1. VECTOR SURVEY EXTRACT FROM ORDNANCE SURVEY IRELAND  
2. ORDNANCE SURVEY IRELAND LICENCE NO. CYAL50167032 (C) ORDNANCE SURVEY IRELAND/GOVERNMENT OF IRELAND  
3. SURVEY COMPLETED ON 2ND FEBRUARY 2018 BY ASM IRELAND AND UPDATED IN DEC 2020

**LEGEND**  

	ROADSTONE LAND INTEREST (C. 58.9 HA)
	PLANNING APPLICATION AREA (C. 18.2 HA)
	PROPOSED EXTRACTION AREA (C. 9.7 HA)
	PROPOSED CONCRETE PLANT & AGGREGATE STORAGE AREA (C. 1.9 HA)
	WL1 - HEDGEROW
	WL2 - TREELINE
	BC3 - TILLED LAND
	BL3 - BUILDING & ARTIFICIAL SURFACE
	ED3 - RECOLONISING BARE SURFACES
	ED4 - ACTIVE QUARRIES AND MINES
	WD1 - MIXED BROADLEAVED WOODLAND
	WS1 - SCRUB
	GA1 - IMPROVED AGRICULTURAL GRASSLAND

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ROADSTONE LTD.  
ENVIRONMENTAL IMPACT ASSESSMENT REPORT  
EASTERN SATELLITE QUARRY AND  
NEW CONCRETE PLANT  
CAPPAGH QUARRY, COUNTY WATERFORD  
**HABITAT MAP**  
**FIGURE 5-1**

Scale 1:4,000 @ A3  
Date JULY 2021



00180.00264.0.16.Fig5-2.R0.Designated Sites.dwg



**NOTES**

1. EXTRACT FROM FROM ORDNANCE SURVEY IRELAND  
DISCOVERY SERIES SHEET NO. 82

2. ORDNANCE SURVEY IRELAND LICENCE NO. CYAL50167032 (C)  
ORDNANCE SURVEY & GOVERNMENT OF IRELAND

**LEGEND**

- ROADSTONE LAND INTEREST  
(C. 58.9 HA)
- PLANNING APPLICATION AREA  
(C. 18.2 HA)
- BLACKWATER RIVER SPECIAL  
AREAS OF CONSERVATION  
(SITE CODE 002170)
- DUNGARVAN HARBOUR  
SPECIAL PROTECTED AREAS  
(SITE CODE 004032)
- 5KM OFFSET FROM PLANNING  
APPLICATION AREA

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**Roadstone**

**SLR**

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**ROADSTONE LTD.**  
ENVIRONMENTAL IMPACT ASSESSMENT REPORT

**EASTERN SATELLITE QUARRY AND  
NEW CONCRETE PLANT  
CAPPAGH QUARRY, COUNTY WATERFORD**

**DESIGNATED SITES**

**FIGURE 5-2**

Scale 1:40,000 @ A3

Date JULY 2021



**PLATES**

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Plate 5-1 ED3 - Recolonising bare ground



Plate 5-2 ED4 - Active quarries and mines



Plate 5-3 GA1 - Improved agricultural grassland



Plate 5-4 WD1/BL3 - Mixed broadleaved woodland / Buildings and artificial surfaces



Plate 5-5 WS1- Scrub



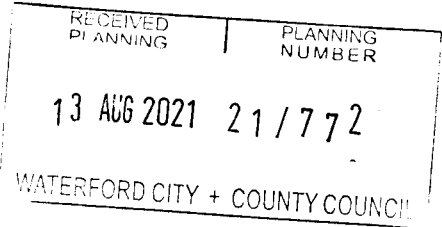
Plate 5-6 WL1 - Hedgerow



Plate 5-7 Swallow nest



**APPENDIX 5-A**  
**Relevant Legislation and Planning Policy**



## RELEVANT LEGISLATION<sup>9</sup>

### 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, 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.

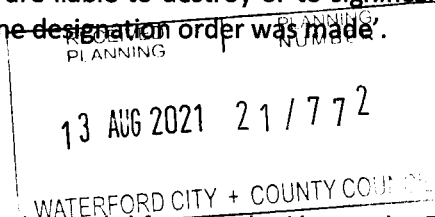
The Natura 2000 network of protected areas is known as Special Areas of Conservation (SAC) and Special Protection Areas (SPA). In general terms, they are considered to be of exceptional importance in terms of rare, endangered or vulnerable habitats and species within the European Community. The requirements 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 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.'

<sup>9</sup> Please note that the summary of relevant legislation provided herein is intended for general guidance only. The original legislation should be consulted for definitive information





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

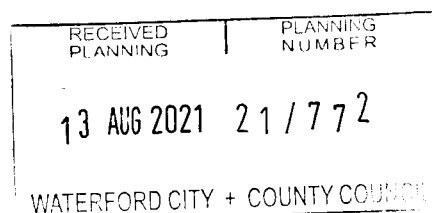
### Waterford County Development Plan

The relevant planning policies as extracted from Volume 1 of the Waterford County Development Plan 2011 – 2017 (Chapter 8<sup>10</sup>: Environment and Heritage) are set out below. The Tables referred to within the policies and objectives can be found within Chapter 7 of the Offaly County Development Plan 2014 – 2020.

- Policy ENV 1 To comply with the requirements of Directive 2001/42/EC on the assessment of certain plans and programmes on the environment- The SEA Directive and associated Planning and Development (Strategic Environmental Assessment) Regulations 2004 and carry out screening of all land use and non-land use plans as required under the regulations.
- Policy ENV 6 It is a policy of the Council to preserve and protect groundwater and surface water quality taking into consideration the Groundwater Protection Scheme prior to approving development. Proposals for new development shall comply with the relevant EPA Code of Practice: Wastewater Treatment and Disposal Systems Serving Single Houses (2009).
- Policy ENV 7 It is a policy of the Council to comply with the objectives, policies and Programme of Measures of the Water Framework Directive and the South Eastern and South Western River Basin District Management Plans.
- Policy ENV 8 It is a policy of the Council to comply with the 2009 Surface Water Regulations, Waste Water Discharge Regulations (2007), Urban Waste Water Treatment Regulations (2004) and the EPA Code of Practice for Wastewater Treatment and Disposal Systems Serving Single Houses (2009).
- Policy ENV 9 The Council will comply with the 2007 Waste Water (Discharge) Regulations and evaluate the adequacy of wastewater collection and disposal facilities prior to approving development.
- Policy NH 1 To implement and review the County Waterford Heritage Plan and Local Biodiversity Action Plan in partnership with all relevant stakeholders and subject to available resources.
- Policy NH 2 To conserve, manage and enhance the natural heritage, biodiversity, landscape and environment of County Waterford in recognition of its importance as a non-renewable resource, the unique identity and character of the County and as a natural resource asset.
- Policy NH 3 To ensure as far as possible that development does not impact adversely on wildlife habitats and species. In the interests of sustainability, biodiversity should be conserved for the benefit of future generations.
- Policy NH 4 To protect plant, animal species and habitats which have been identified by the Habitats Directive, Bird Directive, Wildlife Act (1976) and Wildlife (Amendment) Act 2000 and the Flora Protection order S.I. No. 94 of 1999.

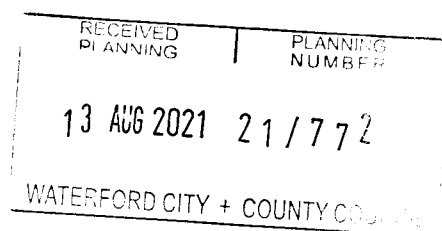
<sup>10</sup> <http://www.waterfordcouncil.ie/media/plans-strategies/development-plan/county/Volume%201%20-%20Written%20Statement/Chapter%201.pdf>

- Policy NH 5 To encourage the retention and creation of green corridors within and between built up urban areas.
- Policy NH 6 To conserve the favourable conservation status of species and habitats within Special Areas of Conservation and Special Protection Areas.
- Policy NH 7 To assess all proposed developments which are likely to impact (directly or through indirect or cumulative impacts) on designated sites for nature conservation or sites proposed for designation and protected species in accordance with Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities issued by the Department of Environment, Heritage and Local Government (2009).
- Policy NH 8 To ensure a sufficient level of information is provided in development applications to enable a comprehensive screening for Appropriate Assessment to be undertaken and to enable a fully informed assessment of impacts on biodiversity to be made. Ecological impact assessments submitted in support of development proposals shall be carried out by appropriately qualified professionals and ecological survey work carried out at optimal survey time to ensure accurate collation of ecological data.
- Obj. NH 1 It is an objective of the Council to comply with Article 6 of the Habitats Directive at each level of the development planning process from County Development Plan, Local Area Plan to project level to ensure that there is no significant adverse impact on the integrity of Natura 2000 sites and that the requirements of Articles 6(3) and 6(4) of the Habitats Directive are fully satisfied.
- Policy NH 9 To ensure that development proposals in areas identified as being of nature conservation value will not impact adversely on the integrity and habitat value of the site.
- Policy NH 10 To protect and conserve pNHAs and NHAs in the County.
- Policy NH 11 To encourage the retention and creation of sites of local biodiversity value, ecological corridors and networks that connect areas of high conservation value such as woodlands, hedgerows, earth banks and wetlands.
- Policy NH 17 To protect hedgerows in all new developments, particularly species rich roadside and townland boundary hedgerows.
- Policy NH 18 To protect and preserve existing hedgerows and seek their replacement with new hedgerows with native species of local provenance where their removal is necessary during the course of road works or other works. There will be a presumption against the removal of hedgerows where there is a reasonable alternative.
- Policy NH 19 To encourage the replanting and extension of woodland cover within the County, in particular mixed forests and broadleaf forests, in order to ensure the preservation and enhancement of the arboreal landscape in the County.
- Policy NH 20 The Council will preserve and enhance the amenity and biodiversity value of the County by preserving as far as possible trees, woodlands and hedgerows and will consider Tree Preservation Orders in order to protect trees of significance throughout the County. Existing TPOs are listed in Appendix A12.





**APPENDIX 5-B**  
**Bat Survey Report**



# BAT SURVEY REPORT

**Cappagh Quarry Development, Co. Waterford**

Prepared for: Roadstone Ltd.



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SLR Ref: 501.00180.00264  
Version No: 2  
February 2021

**SLR**





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DATE	Revision No	Prepared by	Reviewed by	Approved by	Status	Comments
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18/01/2021	1	Owen Twomey	Elaine Dromey	Elaine Dromey	Draft	Updated draft- For internal review.
12/02/2021	2	Owen Twomey	Elaine Dromey	Elaine Dromey	Final	Issued

## BASIS OF REPORT

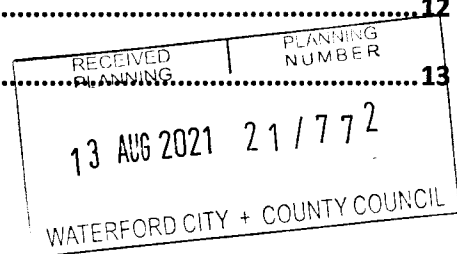
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## APPENDIX

Appendix AA Bat Conservation Trust Guidelines for Assessing the Potential Suitability of Proposed Development Sites for Bats.	
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## 1.0 INTRODUCTION

SLR Consulting (Ireland) Ltd. was commissioned by Roadstone Ltd. in May 2019 to carry out bat surveys to inform proposed development at Cappagh Quarry, Co. Waterford.

### 1.1 General Description of the Site

The application site ("the Site"), consists of a portion of the existing Cappagh Quarry in the townlands of Ballykennedy and Kilgreany, and an additional area of ca 13.6 ha to the east in the townland of Canty which it is intended to develop as a satellite quarry. The Site is centred at approximate Irish Transverse Mercator (ITM) coordinates 617670 594802 approximately 8 km west of Dungarvan town centre.

The lands within the proposed satellite quarry area are dominated by intensive agriculture - primarily pasturelands separated by heavily managed hedgerows. There is also a derelict house within the Site.

The land use surrounding the Site is dominated by intensive agriculture. There are remote small stands of woodland in the surrounding area with larger areas of forestry in the wider landscape. There are no watercourses within or adjacent to the Site. The Site is bounded to the north by the L2018 local road and by agricultural lands on all other sides.

### 1.2 Brief Project Description

The proposed development at Cappagh Quarry includes the lateral extension of the quarry into agricultural lands to the east of the existing quarry. The proposed development comprises a satellite quarry which will be connected to the existing quarry by way of a sub-surface tunnel underpass beneath the local access passageway which separates them.

The proposed satellite quarry has a total area of ca. 13.6 hectares, of which ca. 9.7 will be quarried. The proposed development will require the demolition of the derelict property at the northern end of the proposed satellite quarry footprint (see Figure 1).

### 1.3 Purpose of this Report

The purpose of this report is to provide supporting information to Roadstone Ltd. for the proposed development at Cappagh Quarry, Co. Waterford in relation to the suitability of the proposed satellite quarry area to support bat species.

The aim of this report is to;

- Describe the baseline data collection methodologies used;
- Collate and present the results of the bat surveys;
- Advise on any required mitigation and the requirement for a derogation licence.

### 1.4 Evidence of Technical Competence and Experience

SLR Senior Ecologist Owen Twomey carried out the bat surveys, call analysis and prepared this report. SLR Principal Ecologist Elaine Dromey MCIEEM carried out the bat surveys and the technical review of this report.

Owen Twomey has worked in ecological consultancy since 2016. Owen holds a BSc in Environmental Science (Zoology) and a Postgraduate Diploma in Ecological Assessment. Owen has carried out bat surveys and prepared bat survey reports for a wide range of projects during his career.

Elaine Dromey holds a BSc in Earth Science from University College Cork and an MSc in Vegetation Survey and Assessment from the University of Reading, UK. She is a full member of the Chartered Institute of Ecology and Environmental Management and has worked as an ecological consultant for 16 years.

## 1.5 Legislation and Policy

### 1.5.1 Legislation

All species of bat occurring in Ireland are protected under the Annex IV of EU Habitats Directive, which is transposed into Irish law through the EC (Birds and Natural Habitats) Regulations 2011. Section 51(2) of the Regulations makes it an offence to:

- deliberately capture or kill any specimen of these species in the wild,
- deliberately disturb these species particularly during the period of breeding, rearing, hibernation and migration, or
- damage or destroy a breeding site or resting place of such an animal.

Bats are also protected under the Wildlife Acts 1976 - 2018. Under this legislation it is an offence to intentionally kill or injure a bat or intentionally destroy or disturb a breeding place or resting place. It is also an offence under the Wildlife Acts if anyone wilfully interferes with or destroys the breeding place or resting place of a bat.

### 1.5.2 Derogation Licences<sup>1</sup>

In certain circumstances, under both the Wildlife Act and the Habitats Directive, a person may apply for a derogation licence. Applications for a derogation licence must be made in writing, including survey results and proposed mitigation measures, to:

Wildlife Licensing Unit,  
National Parks and Wildlife Service,  
Department of Arts, Heritage and the Gaeltacht,  
7 Ely Place,  
Dublin 2.  
Email: [wildlifelicence@chg.gov.ie](mailto:wildlifelicence@chg.gov.ie)

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#### Licence to Interfere with or Destroy the Breeding Places of Any Wild Animals

Section 23 (5)(d) of the Wildlife Acts 1976 - 2018 states that any person who wilfully interferes with or destroys the breeding place or resting place of any protected wild animal, shall be guilty of an offence.

This is followed up by Section 23 (7)(c) of the Wildlife Acts 1976 - 2018 which states that:

*"while constructing a road or while carrying on any archaeological operation, building operation or work of engineering construction, or while constructing or carrying on such other operation or work as may be prescribed, unintentionally to kill or injure such an animal or unintentionally to destroy or injure the breeding place or resting place of such an animal."*

However, it is permitted to destroy breeding or resting places in certain circumstances under a derogation afforded by Section 23 (7)(iv) which states that:

*"nothing in this section shall make unlawful, (iv) anything which is duly done pursuant to a licence or other permission granted or issued pursuant to the Wildlife Acts, 1976 and 2000, or which is duly done pursuant to any other statute or statutory instrument, which is permitted to be done under such a statute or instrument or which is done pursuant to and in accordance with a licence or other permission granted or issued pursuant to such a statute or instrument or anything caused by or which results from, or is consequent upon or the effect of any other act or thing which is lawfully done."*

<sup>1</sup> Information and text obtained from <https://www.npws.ie/licences>



### Licence to Disturb Breeding or Resting Places

Article 16 of the Habitats Directive provides for derogations. These may be issued *“provided there is no satisfactory alternative and the derogation is not detrimental to the maintenance of the populations of the species concerned at a favourable conservation status”*

If the proposed activity can be timed, organised and carried out so as to avoid committing offences under Irish wildlife legislation and the EU Habitats Regulations, then no derogation is required.

Waterford City & County Council Planning Department: Viewing Purposes Only

## 2.0 METHODS

### 2.1 Desk Study

A desk study was carried out to collate the available existing information on the suitability of the derelict building and surrounding area to support bat species. The Site and the surrounding area were viewed using existing available satellite imagery<sup>2</sup>. High resolution aerial imagery of the Site has been collected by SLR as part of a drone survey. This imagery was examined during the desk study.

The National Biodiversity Data Centre (NBDC)<sup>3</sup> online resource was accessed for information on previous records of bat species within the four 1 km<sup>2</sup> grid squares within which the Site is located (X1794, X1795, X1894, X1895).

The relative importance of the surrounding landscape for bat was examined using the GIS layers produced by Lundy et al. (2011). This study analysed data contained in the Irish National Bat Database, maintained by Bat Conservation Ireland and the National Lesser Horseshoe Bat database maintained by National Parks and Wildlife Service (NPWS). The analysis was done for all bat species that commonly occur in Ireland. The relative importance is measured using a suitability index which scales from 0 (least suitable) to 100 (most suitable).

The bat survey report produced previously at Cappagh Quarry (Golders 2018) was also reviewed as part of this survey.

### 2.2 Daytime Assessment

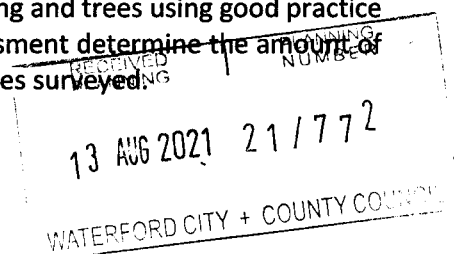
The Site was visited on 09 April 2019 to carry out a Preliminary Roost Assessment (PRA) of the derelict building. A PRA of the trees within the Site was carried out from ground level which were examined for Potential Roost Features (PRF)

The assessment of the derelict building consisted of a visual inspection of the exterior and interior for potential features to provide opportunities for roosting by bats. Examples of potential features include crevices, holes, loft spaces and loose or damaged tiles. Binoculars and a high-powered torch were used to search for the presence of potential roost features. External evidence searched for included:

- Staining, beneath or around a hole/crack/lifted roof tile, caused by the natural oils in bat fur;
- Scratch marks around a hole/crack/lifted roof tile caused by bat claws;
- Bat droppings beneath a hole/crack, or resting area;
- Bat droppings and/or insect remains beneath a feeding area, where internal inspections were undertaken;
- A characteristic odour of bats and/or droppings; and
- Dead bats - usually young from a nursery roost site.

The assessment of the trees within the Site consisted of a visual inspection from the ground using binoculars to examine for PRFs. PRFs include features which may support roosting bats such as such as holes and cavities, cracks and splits in major limbs, loose bark, ivy cover and dense epicormic growth.

The findings of the daytime assessment are used to evaluate the building and trees using good practice guidance (BCT 2016) (Appendix AA). The findings of the daytime assessment determine the amount of survey effort required to establish bat presence / absence in the features surveyed.



<sup>2</sup> <https://www.google.ie/maps> & <http://www.bing.com/maps/> (last accessed 13 January 2021)

<sup>3</sup> <http://maps.biodiversityireland.ie/#/Map> (last accessed 13 January 2021)



## 2.3 Emergence Survey

A dusk emergence survey was carried out at the derelict building a team of two surveyors on 19 May 2019. The aim of the survey was to determine if the structure is being used by bats as a daytime roost, and if so to identify the roost entrances / exits, the species of bat using the building as a roost and an estimation of the numbers of bats using the roost.

The surveyors were positioned so that they could observe all sides of the building, including features considered most likely to provide access to suitable potential roost features. Both surveyors used handheld ultrasonic bat detectors with recording functions<sup>4</sup> in order to allow them to hear, visualise and record the calls emitted by any bats that might emerge from the building.

The surveyors were in position from 30 minutes prior to sunset and continued up to one and a half hours after sunset. Details of any bat recorded emerging the building such as species, time of record, and location of exit were noted.

All recordings were further analysed in the office and using Kaleidoscope Software and the Bat Classify tool. This software uses an automatic identification algorithm to indicate which species most likely made each call recorded. Recordings were subsequently quality assessed by hand.

## 2.4 Activity Survey

Activity surveys were carried out throughout the Site on 19 May 2019 after the emergence survey. Activity surveys were carried out using the same equipment<sup>4</sup>. The purpose of this survey was to assess the level use of the Site for activities such as commuting, foraging or social behaviour and which bat species may be present.

These surveys consisted of walking a predetermined transect through the Site continuously recording bat activity and sampling all habitat types present. Transects were walked at a constant speed. Transects were supplemented by spot counts where the surveyors remained stationary for 5 minutes at locations along the transect chosen to represent the different habitat types present. Details of bat recordings such as number of bats, flight direction, flight height and behaviour were noted where observable.

All recordings were further analysed in the office and using Kaleidoscope Software and the Bat Classify tool. This software uses an automatic identification algorithm to indicate which species most likely made each call recorded. Recordings were subsequently quality assessed by hand. The coordinates of each record were used to create a map of the records (see Figure 1).

## 2.5 Static Survey

A static bat detector<sup>5</sup> was positioned at a likely entry point at the derelict house and left to automatically record bat activity in the surrounding area for a period of seven nights (20 – 26 May 2019) (see Figure 1). The static detector records the frequency of bat call detected as well as the time and date of each call. The purpose of the static survey was to supplement the surveys carried out on 19 May 2019 and to facilitate the collection of further qualitative data on the species present over a longer period of time.

Recordings collected by the static detector were downloaded from the device after the survey and analysed in the office. Analook software was used to analyse the zero-crossing data collected and used to identify the species of each call.

<sup>4</sup> Echo Meter Touch 2 Pro and Echo Meter EM3

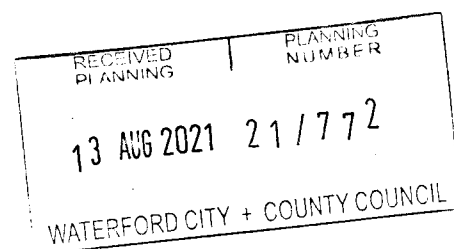
<sup>5</sup> Anabat Express

## 2.6 Limitations

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 species not identified during the data search do in fact occur within the vicinity of the site but have not been recorded previously.

The roof cavity of the derelict building was not accessible for health and safety reasons as it is in a state of disrepair. However, portions of the roof cavity were observable from the ground level due to large portions of the ceiling being damaged.

There were no limitations encountered during the activity survey. There were no barriers to access within the Site and the weather was not limiting. There were no seasonal limitations encountered during the survey as May is within the optimal period for bat surveys.





## 3.0 RESULTS

### 3.1 Desk study

There are no records of bat species for the four 1 km<sup>2</sup> grid squares within which the Site is located (X1794, X1795, X1894, X1895).

The Site and the surrounding landscape have a total suitability index of 30.56 out of 100, indicating a generally low relative importance for bat species. The suitability index given for each Irish bat species is shown in Table 1.

Table 1  
Relative Landscape Importance of the Site and Surrounding Area for Bat Species

Species	Suitability Index <sup>6</sup>
Common pipistrelle <i>Pipistrellus</i>	50
Brown long-eared bat <i>Plecotus auritus</i>	48
Natterers' bat <i>Myotis nattereri</i>	44
Soprano pipistrelle <i>Pipistrellus pygmaeus</i>	40
Leisler's bat <i>Nyctalus leisleri</i>	39
Daubenton's bat <i>Myotis daubentonii</i>	27
Whiskered bat <i>Myotis mystacinus</i>	20
Lesser horseshoe bat <i>Rhinolophus hipposideros</i>	7
Nathusius' pipistrelle <i>Pipistrellus nathusii</i>	0

The highest relative suitability is for common pipistrelle. With exception of Natterer's bat, the 5 highest suitability's is for the more common bat species found in Ireland. This is not unexpected given the commonly occurring largely intensive agricultural landscape in the surrounding area.

The bat survey carried out at the derelict building in October 2017 assessed the building as having Low bat roosting potential. The survey did not record any bats emerging from the derelict building and only recorded a single common pipistrelle social calling, commuting and foraging around the building and nearby road. The report evaluation the building as not being a roost at that time but that it may offer transient bat roosting potential to common and widespread species during the active season (May to August inclusive).

### 3.2 Daytime Assessment

The derelict building consists of a small single storey main structure of a block and render design with a pitched tiled roof (Plate 1). There is also a minor flat roofed extension and small lean to with a corrugated roof.

<sup>6</sup> The relative importance is measured using a suitability index which scales from 0 (least suitable) to 100 (most suitable).

The building is in varying stage of disrepair and largely open to the elements with most windows broken and sections of the roof collapsed. There are large amounts of water damage throughout the building with portions of the wooden flooring completely rotted away. The pitched roof section of the building contains a roof void, but this was inaccessible due to health and safety reasons as a result of the damaged nature of the structure. The exterior of the building is likewise in a state of disrepair and also largely encroached by vegetation. A large amount of ivy is growing is also on the exterior render.

No evidence of bats, such as droppings, grease marks or other staining, scratch marks or foraging remains were noted on the interior or exterior of the building.

Due to the largely damaged nature of the structure, there are numerous potential points of entry for bats. However, the majority of the open building is open to the prevailing weather conditions such as precipitation and wind. This exposed nature would reduce the suitability of the open building. Several cavities in the external structure with the potential to support roosting bats were noted. These consisted of decayed sections of timber opening sections of the block wall (Plate 2) and cavities behind the fascia and soffit. The derelict building is assessed as having Low suitability to support roosting bats.

No PRFs were noted in the trees assessed within the Site. The majority of the hedgerows present are heavily maintained and cut with infrequent mature trees. The trees that do occur are dominated by ash *Fraxinus excelsior* up to 10 m tall. The trees within the Site are assessed as having Negligible suitability to support roosting bats. The hedgerows within the Site are assessed as having Low suitability to support foraging and commuting bats.

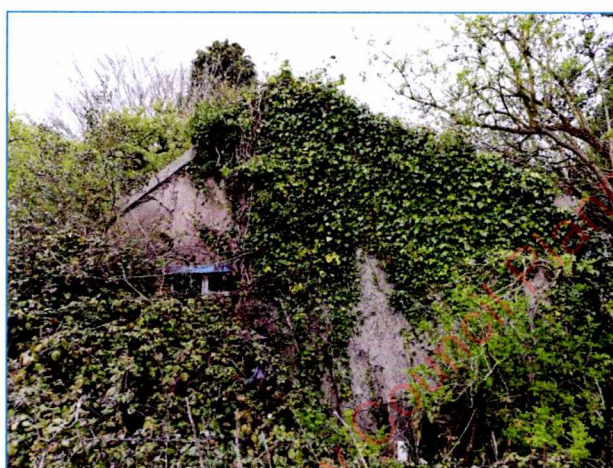


Plate 1. Southern Gable of Derelict Building



Plate 2. Potential Entry Point

### 3.3 Emergence Survey

Weather conditions at the beginning of the emergence survey were suitable. Temperature was ca. 12 °C with a light cool breeze, overcast and dry.

No bats were observed exiting the derelict building during the emergence survey. Low numbers of foraging and commuting soprano pipistrelle and common pipistrelles were recorded using the surrounding area after sunset.

### 3.4 Activity Survey

The route of the walked transect, along with the locations of the spot counts, can be seen in Figure 1. The total number of calls recorded can be seen in Table 2.



**Table 2**  
**Records from Activity Survey**

Species	Total calls recorded
Common pipistrelle	11
Soprano pipistrelle	12

It is important to note that the number of calls does not relate to the numbers of bats present. One bat will make multiple calls, particularly during foraging, and may be encountered multiple times during a survey.

The calls recorded during the survey were primarily commuting and foraging call and would indicate a low level of use by common and widespread pipistrelle species. Examples of calls, recorded in full spectrum during the activity survey, made by each species can be found below in Figures 2 and 3.

### 3.5 Static Survey

The total number of calls recorded by the static detector over 7 nights from May 20 to 26 2019 can be seen in Table 3. It is important to note that the number of calls does not relate to the numbers of bats present. One bat will make multiple calls, particularly during foraging, and may circle the same areas many times in one night.

**Table 3**  
**Records Collected by Static Detector**

Night	Species	Total Calls	First Call	Last Call
20/05/2019	Soprano pipistrelle	4	21:56	22:01
	Common pipistrelle	14	22:02	23:07
	Leisler's bat	2	22:45	23:23
21/05/2019	Soprano pipistrelle	20	21:56	05:04
	Common pipistrelle	13	22:01	01:20
	Leisler's bat	1	22:36	NA
22/05/2019	Soprano pipistrelle	39	21:47	04:58
	Common pipistrelle	27	22:03	05:00
23/05/2019	Soprano pipistrelle	31	21:49	04:54
	Common pipistrelle	24	22:03	04:53
24/05/2019	Soprano pipistrelle	30	21:53	05:01
	Common pipistrelle	2	23:02	04:29
	Leisler's bat	1	00:35	NA

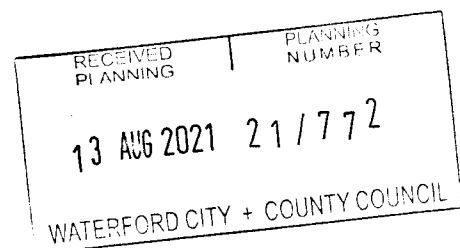
Night	Species	Total Calls	First Call	Last Call
25/05/2019	Soprano pipistrelle	8	21:58	04:55
	Common pipistrelle	2	22:24	23:49
	Leisler's bat	9	22:13	04:53
26/05/2019	Soprano pipistrelle	2	23:35	00:05
	Common pipistrelle	4	22:22	04:21
	Leisler's bat	2	22:18	22:27
	<i>Myotis</i> species	1	22:31	NA

The results for the pipistrelle species recorded during this period again indicate that there is a relatively low constant use of this area for these common and widespread species.

Low numbers of Leislers' bat were recorded on 5 of the nights. Leisler's bat is Irelands only "big bat" species which has a louder call than other native species which can be detected at a further distance. Leisler's bat also commutes further over longer distances than other species at greater heights. This species typically leaves its roost early, usually around sunset. The low numbers of calls detected and the times at which they were detected indicate that the area is occasionally passed by commuting Leisler's bat.

A single *Myotis* species was recorded on the night of May 26. All *Myotis* species produce very similar calls over a wide range of frequencies. As a result, they are not readily identifiable, even using computer analyses; and are typically treated as a group. A single call on one night would indicate that the area is not regularly used by this species.

Examples of calls, recorded in zero crossing during the static survey, made by these additional species (Leisler's bat and *Myotis* species) can be found below in Figures 4 and 5.





## 4.0 EVALUATION

There was no PRFs found in any of the trees surveyed within the Site. The emergence survey carried out in May 2019 recorded no bats emerging from the derelict building, indicating that it was not used as a roost at that time. The activity survey and static detector survey both indicate that the Site is used for commuting and foraging by low numbers of common and soprano pipistrelles.

The derelict building is evaluated at Low suitability to support roosting bats. Due to the transient nature of the derelict building may be used opportunistically by of bats however no roosting bats were present at the time of survey in 2019 or 2017. The demolition of this building would not have a significant effect on the local bat population. Based on the recorded bat activity the Site is used for foraging and commuting by low numbers of common and widespread pipistrelle species. This habitat is evaluated as Low suitability to support commuting and foraging bats. Similarly, the loss of this habitat will not have a Significant effect on the local bat population.

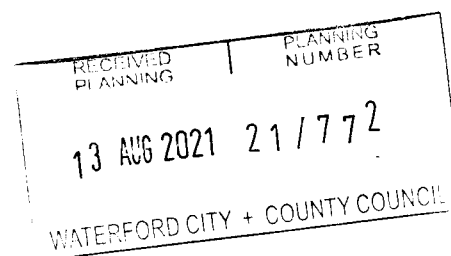
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**Collins, J., (2016).** *Bat surveys for Professional Ecologists: Good practice guidelines (3rd Edition)*. Bat Conservation Trust.

**Golders, (2018).** APPENDIX 4.1 Bat Survey and Assessment of Bat Roost Potential - October 2017

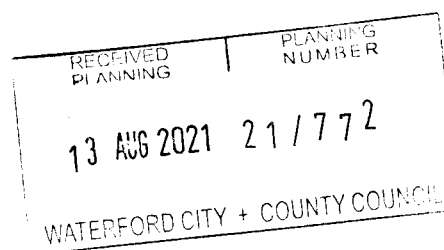
**Marnell, F., N. Kingston & D. Looney (2009).** *Ireland Red List No. 3: Terrestrial Mammals*. National Parks and Wildlife Service.

**Lundy MG, Aughney T, Montgomery WI, Roche N (2011)** Landscape conservation for Irish bats & species-specific roosting characteristics. Bat Conservation Ireland.





## FIGURES





00180.00264.0.16.Fig1.R0.Bat Survey Results.dwg



**NOTES**

1. MAPPING EXTRACT FROM 6 INCH MAP SHEET WD030 FROM ORDNANCE SURVEY IRELAND

2. ORDNANCE SURVEY IRELAND LICENCE NO. CYAL50167032  
(C) ORDNANCE SURVEY & GOVERNMENT OF IRELAND

LEGEND	
	ROADSTONE LAND INTEREST (C. 58.9 HA)
	PLANNING APPLICATION AREA (C. 18.2 HA)
	PROPOSED EXTRACTION AREA (C. 9.7 HA)
	PROPOSED CONCRETE PLANT & AGGREGATE STORAGE AREA (C. 1.9 HA)
	DERELICT HOUSE
	SPOT COUNT LOCATION
	TRANSECT ROUTE
	COMMON PIPISTRELLE CALL
	SOPRANO PIPISTRELLE CALL

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NEW CONCRETE PLANT  
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BAT SURVEY

FIGURE 1

Scale 1:2,500 @ A3

Date JULY 2021



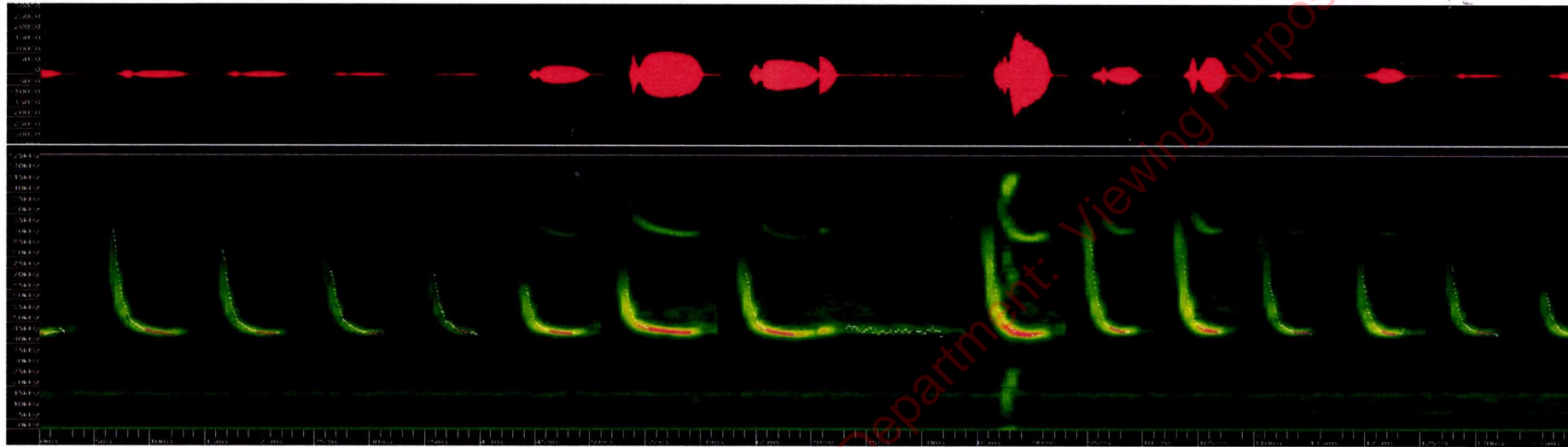


Figure 2. Full spectrum sonogram of common pipistrelle call showing stereotypical “hockey stick” shape and frequency from 45 kHz

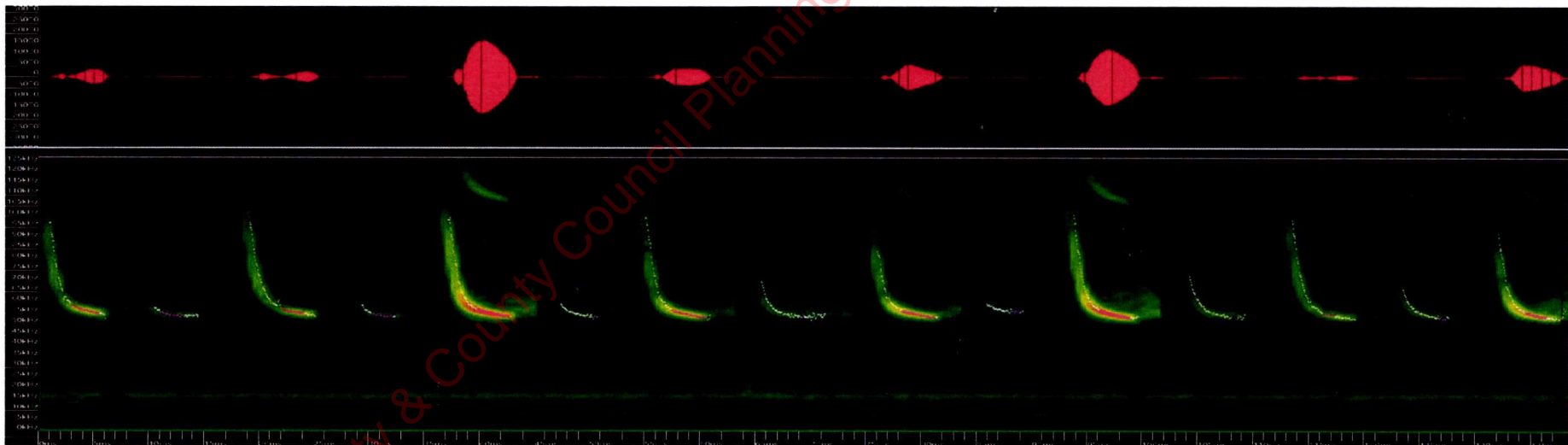


Figure 3. Full spectrum sonogram of soprano pipistrelle call showing stereotypical “hockey stick” shape and frequency from 55 kHz

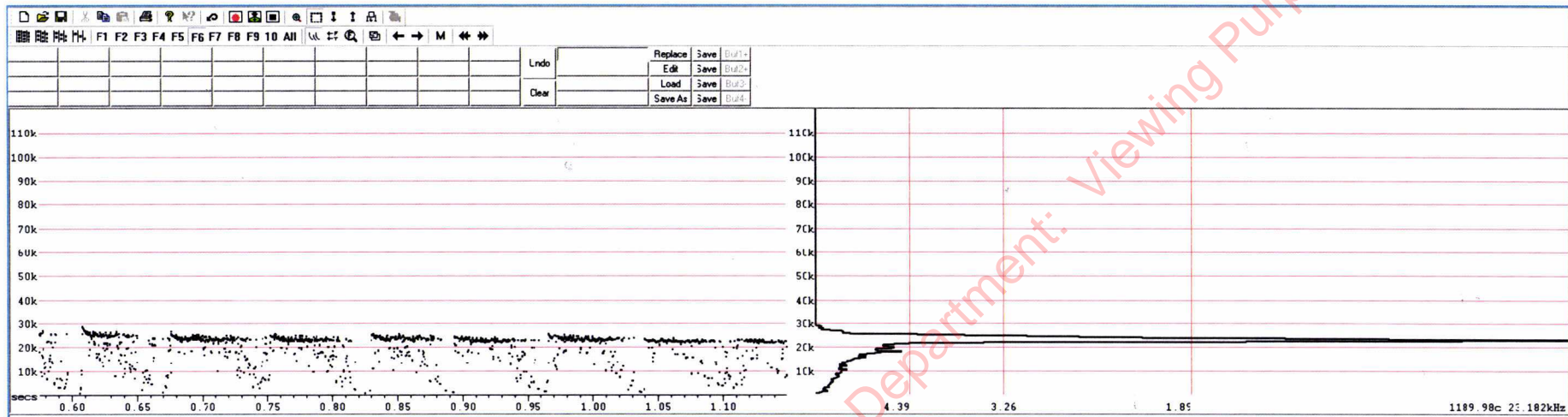


Figure 4. Zero crossing sonogram (compressed) with cycles showing Leiser's bat calls at peak frequency of 24 kHz

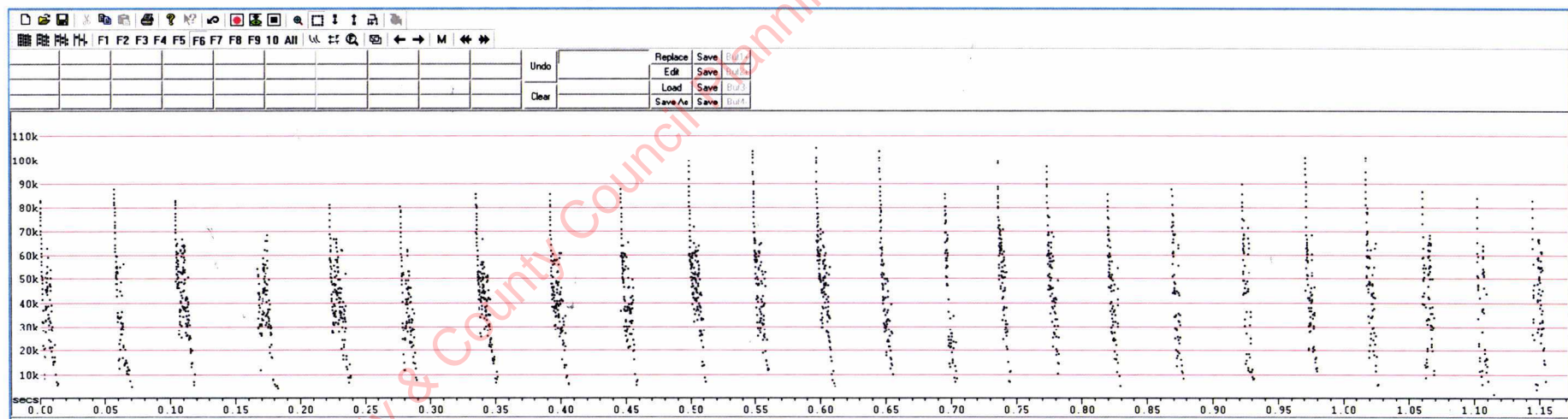
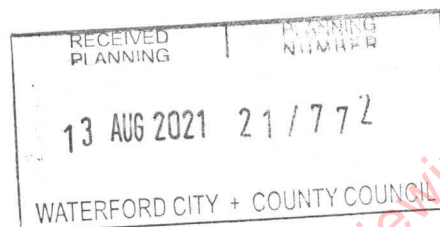


Figure 5. Zero crossing sonogram (uncompressed) showing *Myotis* species emitting along a wide frequency from 25 – 75 kHz





## APPENDIX A

### Bat Conservation Trust Guidelines for Assessing the Potential Suitability of Proposed Development Sites for Bats

### Guidelines for Assessing the Potential Suitability of Proposed Development Sites for Bats

Suitability	Description of Roosting Habitats	Description of Commuting and Foraging Habitats
Negligible	A building, structure, tree or other feature with negligible habitat features likely to be used by bats.	Negligible habitat features on site likely to be used by commuting or foraging bats.
Low	<p>A building or structure with one or more potential roost features that could be used by individual bats opportunistically, but do not provide enough space, shelter, protection or appropriate conditions (for example temperature, humidity, height above ground, light levels, levels of disturbance) and/or suitable surrounding habitat to be used on a regular basis, or by larger numbers of bats. Buildings in this category are unlikely to support a maternity colony or be used by hibernating bats.</p> <p>A tree of sufficient size and age to contain potential roost features but with none seen from the ground, or features seen with only very limited roosting potential (i.e., some small cracks or crevices, low ivy cover).</p>	<p>Habitat that could be used by small numbers of commuting bats such as a gappy hedgerow or un-vegetated stream, but isolated and not very well connected to the surrounding landscape by other habitat and/or features.</p> <p>Suitable but isolated habitat that could be used by small numbers of foraging bats.</p>
Moderate	<p>A building, structure, tree or other feature with one or more potential roost sites that could be used by bats due to their size, shelter, protection or appropriate conditions (for example temperature, humidity, height above ground, light levels, levels of disturbance) and surrounding habitat but unlikely to support a roost of high conservation value status.</p> <p>Buildings, structures and trees falling into this category would not be expected to support a maternity colony, or significant hibernation or transitory roost.</p>	<p>Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub or linked back gardens.</p> <p>Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water.</p>
High	<p>A building, structure, tree or other feature with one or more potential roost sites that are obviously suitable for use by large numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection or appropriate conditions (for example temperature, humidity, height above ground, light levels, levels of disturbance) and surrounding habitat.</p> <p>Buildings, structures and trees falling into this category may be expected to support a maternity colony, or significant hibernation or a significant transitory roost.</p>	<p>Continuous high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edge.</p> <p>High-quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, tree-lined watercourses and grazed parkland.</p> <p>Site is close to and connected to known roost.</p>



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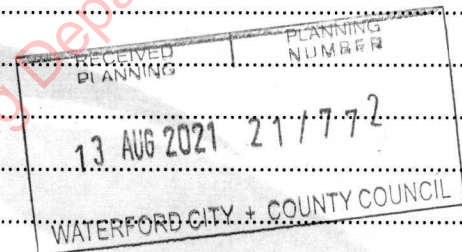
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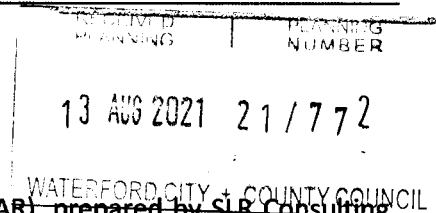
## APPENDICES

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Appendix 6-B Borehole / Well Installation Logs
Appendix 6-C Geophysical Site Report – Cappagh Quarry
Appendix 6-D Geological Heritage Site Reports – Cappagh Quarry

## INTRODUCTION

### Background

- 6.1 This Chapter of the Environmental Impact Assessment Report (EIAR), prepared by SLR Consulting Ireland, addresses the potential effects of the planned development of a satellite quarry immediately to the east of Cappagh Quarry and the construction and operation of a new concrete batching plant on land, soil and geology. The existing quarry is located in the townlands of Kilgreany and Ballykennedy, approximately 8km west of the town of Dungarvan, Co. Waterford. The proposed satellite quarry is almost entirely located in the adjoining townland of Canty to the east, with only a relatively small area (in the north-western corner) located within Kilgreany townland.
- 6.2 The development, within an overall application site area of 18.2 hectares (45 acres) comprises:
- development of a satellite quarry immediately to the east of Cappagh Quarry (previously permitted under Planning Permission 06/1599 and An Bord Pleanála PL 24.225443) and the local access passageway which delineates its eastern boundary. The satellite quarry will extend to 13.6 hectares (33.6 acres), of which approximately 9.7 hectares (24.0 acres) will be extracted;
  - construction of a 40m long sub-surface reinforced concrete tunnel underpass (with internal cross-section measuring 6m wide by 5.5m high) under the existing local access passageway (previously permitted under Planning Permission 920/97) to connect the existing quarry to the proposed satellite quarry at quarry floor level;
  - stripping of overburden soils at the satellite quarry for use in construction of environmental bunds and ongoing site restoration works and subsequent excavation of a single quarry bench in limestone bedrock using mechanical excavation and blasting techniques. The proposed quarry faces will vary in height from approximately 8m to 20m and the quarry floor will not extend below 10mOD or into the underlying groundwater body (consistent with Condition 2 of the existing quarry planning permission);
  - processing (crushing and screening) of excavated rock to produce;
  - demolition of an existing derelict house in the north-western corner of the proposed satellite quarry, removal of existing internal hedgerows, construction of new perimeter fence and installation of access gates leading from the local access passageway to a perimeter track running above and around the satellite quarry;
  - temporary diversion of a section of the existing local access passageway to facilitate construction and installation of the proposed tunnel underpass and re-instatement of the access passageway above it thereafter;
  - provision of a temporary access gate and ramp at the existing quarry to facilitate the temporary haulage of materials to and from the satellite quarry and across the existing passageway until the proposed tunnel underpass is in place;
  - demolition of concrete supports for former crushing plant;
  - construction and operation of a new concrete batching facility (which comprises 4 No. cement silos, batching / mixing unit, aggregate storage bins, an aggregate loading hopper and connecting conveyor systems), all on a concrete paved area on the existing quarry floor, in front of the northern quarry face;
  - provision of a batching control office and admixture storage shed;





- construction of a closed loop concrete recycling facility, comprising a concrete truck wash out area, settlement lagoons and 70,000 litre water storage / recycling tank immediately behind (north of) the concrete batching plant;
- construction of an aggregate storage hardstanding area (covering approximately 1 hectare) immediately to the east of the proposed concrete batching plant;
- continued use of established site infrastructure in service of the proposed satellite quarry and new concrete batching plant;
- removal and replanting of the existing boundary hedge, re-alignment of the boundary wall and demolition / removal of an existing structure to the east of the existing quarry access junction in order to provide enhanced sightlines for traffic egressing the quarry;
- implementation of a progressive restoration scheme (in phases) in tandem with extraction activities across the satellite quarry area.

## Scope of Work / EIA Scoping

- 6.3 This EIAR is based on a desk study of the site / surrounding lands using published geological data, information from the existing quarry face exposures, groundwater borehole logs and walkover site visits previously carried out by SLR.

## Consultations / Consultees

- 6.4 In the course of preparing this Environmental Impact Assessment Report, a pre-planning consultation meeting was held outdoors at the application site on 19th May 2021 between the local area planner for Waterford City and County Council and representatives of SLR Consulting Ireland and Roadstone Limited (Meeting Ref. No. PQ202191). At the meeting, details of the proposed development were outlined in the course of a site walkover and issues of interest or concern to the Planning Authority were identified and discussed. Details of this consultation are presented in Chapter 1 of this EIAR.
- 6.5 Following a review of published development plans and site surveys, it was considered appropriate to formally consult with the Geological Survey of Ireland (GSI) in respect of land, soils and geology aspects of the proposed development EIA purposes. There was also significant consultation with other specialist contributors to this EIA Report.
- 6.6 In its consultation response, reproduced in Appendix 6-A, the GSI noted that there are currently two County Geological Sites (CGSs) at, or in the vicinity of, the proposed development. GSI stated that there are no impacts or restrictions on normal quarry operations, arising from CGS status at the application site. This issue is considered further in subsequent sections of this EIA Chapter.

## Author

- 6.7 This EIA Chapter relates to the Land, Soils and Geology aspects of the proposed development of a satellite quarry adjacent to Cappagh Quarry and the construction of a new concrete batching plant within the existing quarry. It was prepared by Paul Gordon (EurGeol PGeo) of SLR Consulting. Paul has a BSc in Geology and an MSc in Environmental Management and has over 20 years' professional experience, primarily in the Irish minerals industry.

## Limitations / Difficulties Encountered

- 6.8 This EIAR has been prepared based on available desktop information, inspection of the existing quarry faces, groundwater well logs, geophysical survey, a recent geotechnical safety and stability assessment of the site and professional experience.
- 6.9 No difficulties were encountered in the preparation of this EIA Chapter.

## REGULATORY BACKGROUND

### EU Directives

- 6.10 The following European Union (EU) Directives relate to Land, Soils and Geology and inform the planning / environmental assessment presented in this Chapter:
- Environmental Impact Assessment Directive (2011/92/EU);
  - Environmental Impact Assessment Directive (2014/52/EU);
  - European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (S.I. 296 of 2018);
  - The management of waste from extractive industries (2006/21/EC); and
  - Environmental Liability Directive (2004/35/EC).
- 6.11 The EU EIA Directive regulates the environmental impact assessment process and type of information and assessment to be provided in this EIAR Chapter.

### Irish Legislation

- 6.12 The following national legislation relates to Land, Soils and Geology informs the planning / environmental assessment presented in this Chapter.
- The Planning and Development Acts, 2000 as amended;
  - The Planning and Development Regulations (S.I. 600 of 2001) and subsequent amendments thereto, including, S.I. No. 364 of 2005, S.I. 685 of 2006.
  - The European Communities (Environmental Impact Assessment) Regulations, S.I. No. 349 of 1989, and subsequent amendments (including 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 European Union (Planning and Development) (Environmental Impact Assessment) Regulations (S.I. No. 543 of 2014) and European Union (Planning and Development) (Environmental Impact Assessment) Regulations (S.I. No. 296 of 2018);
  - European Union (Environmental Impact Assessment and Habitats) Regulations S.I. No. 473 of 2011, and European Union (Environmental Impact Assessment and Habitats) (No.2) Regulations S.I. No. 584 of 2011);
  - European Union (Environmental Impact Assessment) (Minerals Development Act 1940) (Amendment) Regulations, S.I. No. 384 of 2018, and subsequent amendment (including S.I. No. 164 of 2019).

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### Planning Policy and Development Control

- 6.13 The Planning Policy and Development Control relating to Land, Soils and Geology at the application site is governed by the Waterford County Development Plan (CDP) 2011-2017. The life of the plan has been extended and still remains force pending its replacement. The development plans set out conservation objectives in relation to natural heritage and landscape, including geological heritage.
- 6.14 The current CDP recognises the value and importance of the extractive industry to the economy of the county. It includes two policies / development objectives which relate to land-use and the fact that quarry development is a resource-based / resource-tied land use.



- 6.15 Policy ECD 10 states that it is the policy of the Council to:
- *aim, subject to resources, to identify areas containing significant aggregate resources and to safeguard these valuable un-worked deposits for future extraction.*
- 6.16 Policy ECD 30 states that it is the policy of the Council to:
- *support and facilitate the mineral and aggregate extractive industry where such operations do not have a detrimental effect on other majority land uses, or designated or proposed conservation sites in the area of the extraction and do not adversely affect European Conservation Sites.*
- 6.17 The current CDP also refers to the need to manage the landscape, while acknowledging that changes in landscape are inevitable. A separate assessment of the impact of the proposed development on landscape and visual amenity is presented in Chapter 13 of this EIAR Report.

## Guidelines

- 6.18 This Land, Soils and Geology Chapter of this EIA Report has been prepared having regard to the following guidelines:
- Environmental Protection Agency (2017) *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports*. Draft dated May 2017. Environmental Protection Agency, Johnstown Castle Estate, Co. Wexford.
  - DoEHLG (2010) *Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities*;
  - Environmental Protection Agency (2002) *Guidelines on the information to be contained in Environmental Impact Statements*;
  - Environmental Protection Agency (2003) *Advice Notes on current practice (in the preparation of Environmental Impact Statements)*;
  - 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) *Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes*.
  - National Roads Authority (2006) *A Guide to Landscape Treatments for National Road Schemes in Ireland*; and
  - Transport Infrastructure Ireland (June, 2013). *Specification for Road Works Series 600 – Earthworks*.

## RECEIVING ENVIRONMENT

### Study Area

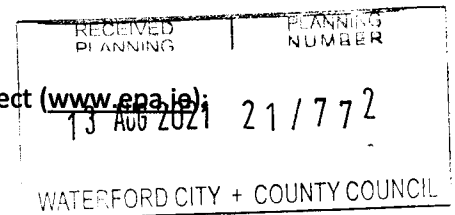
- 6.19 The study area for the Land, Soils and Geology Chapter of this EIAR Report comprises two principal areas:
- the existing quarry extraction area and proposed satellite quarry area adjoining it; and
  - the surrounding area, within approximately 1km of the application site boundary.

## Baseline Study Methodology

- 6.20 The baseline study undertaken for Land, Soils and Geology, here involves a review of published literature and information, borehole information, geophysical survey and the findings from a walkover survey of the site and the context of the site within the surrounding area.
- 6.21 This section 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.
- 6.22 The baseline study is a qualitative assessment of the available information based on professional experience and interpretation of the available data.

## Sources of Information

- 6.23 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](http://www.gsi.ie));
  - Teagasc soil and subsoil mapping for Irish Forestry Soils Project ([www.epa.ie](http://www.epa.ie));
  - Irish Soils Information System ([www.teagasc.ie/soils](http://www.teagasc.ie/soils));
  - Irish Geological Heritage Programme ([www.gsi.ie](http://www.gsi.ie)); and
  - Ordnance Survey of Ireland ([www.osi.ie](http://www.osi.ie)).
- 6.24 Three groundwater monitoring boreholes (identified as BH16-09, BH16-11 and BH16-13) were drilled across the current quarry footprint in 2016 to provide information on groundwater levels beneath the quarry and to facilitate subsequent sampling and testing of groundwater quality. Three further wells (BH16-02, BH16-06 and BH16-07) were installed across the proposed satellite quarry footprint at the same time. In addition to groundwater data, borehole installation records can also provide an indication of the geology at the application site. Copies of the borehole / well installation logs are reproduced in Appendix 6-B.
- 6.25 A geophysical survey, using Electrical Resistivity Imaging was conducted at the quarry in 2016-2017. The report on the survey and its findings is reproduced in Appendix 6-C.
- 6.26 In recent years, Cappagh Quarry has also been visited periodically by SLR's engineering geologists to undertake geotechnical assessments and aggregate compliance audits. In the course of these visits, the existing quarry faces exposures have been inspected and the information gathered has helped to inform this assessment of the local geological environment at and around the application site.



## Land Baseline

- 6.27 Within the EU EIA 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.



- 6.28 The introductory preamble to EU Directive 2014/52/EU references 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'.*
- 6.29 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.
- 6.30 The application site includes an area within an existing quarry where soils and subsoils have been stripped previously to facilitate extraction of underlying rock and have been re-used in construction of perimeter screening berms or partial restoration of areas around the existing quarry. Excess soils have been stockpiled around the quarry for use in future restoration works.
- 6.31 Currently the area to be developed as a satellite quarry, on adjoining lands to the east, is used for agricultural purposes, principally as pasture / grassland, although they have supported the growing of crops (tillage) in the past. Other than the existing derelict cottage (which is to be demolished as part of the proposed development), historical mapping indicates that there has been no other development on these lands.
- 6.32 The extraction of bedrock at the application site is a tied resource land use activity, as it is dependent on the occurrence and suitability of the underlying rock for intended use as construction aggregate and/or for concrete production. As such it may be classified as a natural resource.
- 6.33 In terms of land take, the proposed development will result in a loss of c 13.6ha of land which is currently in agricultural use to facilitate development of the planned satellite quarry.

## 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 have already been removed across the plan footprint of the existing quarry but remain essentially undisturbed in-situ across the planned satellite quarry area.

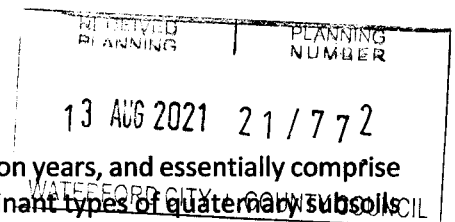
### National Soils Mapping

- 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 ([www.teagasc.ie/soils](http://www.teagasc.ie/soils)).
- 6.39 The ISIS project has identified a number of Soil Associations across Ireland, which are each comprised of a range of 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 association at the application site is classified as the Clashmore Soil Association (ISIS Code 1100n); refer to Figure 6-1. The Clashmore Soil Association is indicated to comprise Brown Earths, Luvisols, Lithosols and Gleys, related to fine soil textures on sandstone glacial till subsoils<sup>1</sup>. The Brown Earths will generally have better drainage than other soils in this series and are considered to be free draining.
- 6.41 The Clashmore series is defined as coarse loamy drift with sandstones, which means that these soils are naturally moderately draining, and are considered to have good agricultural potential being friable deep soils with plentiful, well-developed roots, a high base saturation with good nutrient retention (Creamer *et. al.*, 2018).

### Subsoils Baseline

#### Regional Subsoils

- 6.42 Quaternary (subsoil) deposits were laid down during the last 2 million years, and essentially comprise the unconsolidated materials overlying bedrock. The two predominant types of quaternary subsoils in Ireland are glacial till, deposited at the base of ice sheets, and sand and gravel deposits, associated with the melting of the ice sheets and are generally termed 'glaciofluvial outwash sands and gravels'. Other extensive Quaternary subsoils in Ireland include peat, river alluvium and coastal process deposits. Most Quaternary subsoils in Ireland were deposited after the maximum of the last glaciation, the Midlandian, which occurred approximately 17,000 years ago.
- 6.43 The subsoils across Ireland have been mapped 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 Subsoils in the existing quarry area have been removed to facilitate the extraction of rock. Mapping by the IFS Project indicates that the subsoils across the proposed eastern satellite quarry largely comprise till derived from Devonian sandstone, with a small area of surface karst in the north-eastern corner, refer to Figure 6-2. The presence of exposed karst / rock outcrop in the north-eastern area corner of the satellite quarry area is not obvious from aerial imagery.
- 6.45 Within the surrounding area, alluvium is mapped within 1km of the application site, around the River Brickey to the southeast, and within 2km of the existing quarry access, around the Finisk River, to the northwest.
- 6.46 Site observations and previous borehole drilling indicate that soil cover, where present, is thin, with a maximum depth of 2m encountered in boreholes.



<sup>1</sup> EPA Report No. 130 (2014), Irish Soil Information System: Synthesis Report



## Bedrock Geology Baseline

### Regional Setting

- 6.47 Geological Survey of Ireland (GSI) 1:100,000 bedrock mapping indicates that Cappagh Quarry occurs within the Waulsortian Limestones of the Lower Carboniferous, refer to Figure 6-3. The Waulsortian Limestone is described as a pale grey, massive, clean limestone, formed by large mud mounds. The Waulsortian Limestone is known to vary considerably in thickness, from <50m to >700m. In the Cappagh area, it is estimated to be up to 500m thick.

### Local Bedrock Geology

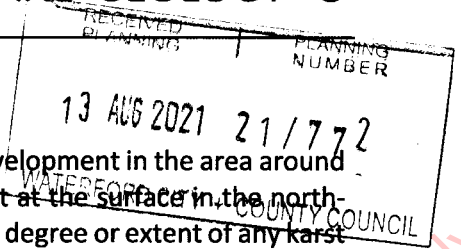
- 6.48 Examination of existing face exposures at Cappagh Quarry confirms that the quarry is entirely developed within Waulsortian Limestone. The limestone is typically massive to poorly bedded and is classified as a boundstone to wackestone.
- 6.49 While shale horizons are commonly found between individual mud mounds, no significant shale is noted to occur at Cappagh. Boreholes logs indicate that the Waulsortian Limestone extends to at least 30m depth below the ground surface. A summary of borehole installation records is provided in Table 6-1, while borehole records are reproduced in Appendix 6-B.
- 6.50 A geophysical resistivity survey undertaken previously across the satellite quarry area indicated that it is underlain by competent limestone bedrock with some associated karst features. A key objective of the geophysical survey was to provide information on any variation in the quality of the underlying bedrock or the depth to bedrock to a depth of c. 30m to 40m below the ground surface.
- 6.51 The geophysical survey comprised nine resistivity profiles and results indicated varying overburden thicknesses of up to c. 5m thickness, underlain primarily by competent limestone bedrock with localised small-scale possible karst features.

Table 6-1  
Borehole Summary

Borehole ID	Easting (ING)	Northing (ING)	Elevation (mOD)	Depth to bedrock (m)	Bedrock Description	Final Depth (m)
BH16-02	218045	094947	29.2	0.7	Pale grey limestone	34.5
BH16-06	218186	094582	24.8	0.7	Pale grey limestone	30.0
BH16-07	218065	094390	23.4	1.0	Pale grey limestone	30.0
BH16-09	217272	095208	17.4	2.0	Pale grey limestone	19.5
BH16-11	217556	094824	10.1	0.0	Pale grey limestone	11.0
BH16-13	217592	094969	11.6	2.0	Pale grey limestone	14.3

### Structure

- 6.52 Cappagh Quarry is located within the Lismore syncline, the axis of which runs through or close to the quarry, in an approximately east-west orientation.
- 6.53 Bedding is poorly developed, as is normal for the Waulsortian Limestone, and bedding dips are as likely to be depositional as structural.
- 6.54 There is strong north-south jointing visible in the existing quarry faces which will need to be addressed in quarry operating procedures to ensure that the risk of toppling is minimised.



## Karstification

- 6.55 A review of the GSI karst database indicates that there is some karst development in the area around Cappagh Quarry. Although the Teagasc subsoils mapping records karst at the surface in the north-western and central areas of the existing quarry, it does not indicate the degree or extent of any karst development.
- 6.56 Teagasc mapping also indicates the presence of karstified bedrock at surface in the north-eastern corner of the proposed satellite quarry area. However, a review of aerial photography and historical mapping does not indicate the presence of exposed karst / bedrock at the surface in this area.
- 6.57 The IGH Site report for Cappagh Quarry (reproduced in Appendix 6-D) concentrated primarily on the Carboniferous stratigraphy but it also identified karst features of interest including solution pipes, sand filled dolines exposed in the quarry face, epikarst and expanded joints with brown deposits of the mineral calcite on them and a small cave in the south-western corner of the quarry which was inaccessible at the time of the quarry / site survey.
- 6.58 There are five cave karst features identified in GSI Irish Geological Heritage records within approximately 1km of the application site. No other karst feature is recorded near the site
- 6.59 While no karst features are noted in GSI Irish Geological Heritage records within the proposed quarry satellite quarry area or immediately adjacent to it, karst features have been identified in some areas of the existing quarry, particularly on the eastern side of the quarry. It is understood from previous site visits and inspections that these features have not had a significant impact on past extractive activities at the quarry.
- 6.60 Cavities, interpreted to be karst-related, are noted in the logs for boreholes 16-02, 16-06 and 16-09, albeit these are generally small (cavities <1m thick) and appear to be the only potential karst features identified during drilling (refer to borehole logs in Appendix 6-B).
- 6.61 The geophysical survey over the proposed satellite quarry area indicated varying overburden thicknesses of up to c. 5m thickness, underlain primarily by competent limestone bedrock with localised small scale possible karst features.

## Geological Heritage Baseline

- 6.62 The Geological Survey of Ireland (GSI) Irish Geological Heritage (IGH) Programme of audited sites was reviewed ([www.gsi.ie](http://www.gsi.ie)) to establish if any geological heritage issues were present in the vicinity of Cappagh Quarry. An audit of County Geological Sites in County Waterford was completed in 2011 and revised in early 2012.
- 6.63 The existing quarry is designated as an Irish Geological Heritage (IGH) site (Site Code WD013). The IGH designation is principally for the value and importance of Waulsortian Limestone exposures under the Carboniferous Limestone theme.
- 6.64 As previously noted, the IGH site report records that there are karstic features in the quarry faces and that these may be of post-glacial age. The designated IGH site boundary at Cappagh Quarry comprises the existing quarry footprint and does not extend eastwards into the proposed satellite quarry area, refer to Figure 6-4.
- 6.65 There are five caves or cave systems mapped within approximately 1km of the application site, each of which is also designated an IGH site, refer to Figure 6-4.
- 6.66 The Waterford County Development Plan (2011-2017) does not identify or designate any other sites immediately adjacent to the existing quarry or the proposed satellite quarry area to the east as a County Geological Site (CGS).



## Sensitive Receptors

- 6.67 In terms of land, soils and geology baseline considered here, the sensitive receptors identified by this baseline study include
- (i) the lands to be developed as a satellite quarry which are currently in productive agricultural use and hold largely undisturbed agricultural grade soils, and
  - (ii) the geological heritage sites detailed above.
- 6.68 The identified Geological Heritage site comprises the full extent of the existing quarry. Future development of a separate satellite quarry to the east will create additional exposures in the underlying bedrock and will not impact any pre-existing rock exposures in the existing quarry.
- 6.69 The development of the satellite quarry will involve continual replacement of bedrock exposures by fresh / new exposures as the quarry pushes eastwards, northwards and southwards, towards the proposed excavation boundary. The cave systems mapped within 1km of the application site will not be affected by the proposed satellite quarry or the new concrete batching plant.

## IMPACT ASSESSMENT

### Evaluation Methodology

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

### Evaluation of Impacts

- 6.71 This assessment will focus on the potential impact of the proposed development, comprising development of a satellite quarry to the east of Cappagh Quarry (and linked to it by a tunnel underpass) and the establishment and operation of a new concrete plant within the existing quarry footprint on land, soils and geology in the surrounding area.
- 6.72 The proposed development will result in the direct loss of agricultural land across the satellite quarry footprint. On permanent cessation of quarrying activity, these lands will be restored to grassland and agricultural land use, refer to EIAR Figure 2.4. The geological heritage of the existing quarry will be preserved as all of the existing quarry faces will remain unaltered and exposed. The heritage value is likely to be enhanced by the future extraction of rock across the satellite quarry area – this is expected to expose additional geological / karst features and will likely further enhance geological insight and knowledge of the Waulsortian Limestone formation in the local area.
- 6.73 The status and importance of existing land, soil and geology attributes identified at the application site is assessed in Table 6-2 below.

Table 6-2  
Status and Importance Land, Soil and Geology Attributes

Attribute	Status / Occurrence	Importance
Land	<p>The lands for the proposed satellite quarry development are currently used for agricultural purposes, principally grassland and occasional tillage. The agricultural land is well drained.</p> <p>The lands within the existing quarry have been excavated for rock and currently host site infrastructure and access / haul roads.</p> <p>Parts of the quarry void have been restored with subsoil and topsoil and a natural grassland / scrub habitat is establishing across these areas.</p>	<p>Agricultural land has a value in terms of its ability to support agriculture and it is considered to be of High Importance at the local and regional scale only, due to its free-draining nature and suitability for food production.</p> <p>The lands at the existing quarry void are disturbed by extractive development and are not suitable for any productive use or a wide range of other prospective land-uses. They are therefore considered to be of low importance.</p>
Soils	<p>The soils at the proposed satellite quarry area are free draining. The Clashmore Soil Association has a relatively wide distribution across the Carboniferous limestones of Munster.</p> <p>Soils have previously been stripped across the existing extraction area. Some soils have been used to restore part of the quarry which is no longer used for rock extraction.</p>	<p>The soils are considered to be of High importance at a local scale as they are free draining, versatile and productive.</p> <p>As the soils are largely free-draining they can be used for agriculture without the requirement for any significant drainage improvement works.</p>
Subsoils	<p>The subsoils at the proposed satellite quarry area comprise tills derived from Devonian sandstone and are widespread in Munster. These subsoils do not have any particular value or status.</p> <p>Subsoils have previously been stripped across the existing extraction area. Some subsoils have been used to restore part of the quarry which is no longer used for rock extraction.</p>	<p>The existing subsoils at the proposed satellite quarry area are considered to be of Moderate importance at local scale as they support development of free draining soils.</p>
Geology	<p>The bedrock at the application site does not have any formal designated status.</p> <p>The bedrock at the proposed satellite quarry area is covered by a relatively thin layer of soil / subsoil.</p> <p>Bedrock is exposed in existing quarry faces.</p> <p>Bedrock across restored areas of the quarry floor is covered by subsoil and soil.</p>	<p>In terms of the proposed development, the bedrock geology is of High economic importance at the local and regional level given its quality and suitability for production of construction aggregates.</p>
Geological Heritage	<p>The existing quarry is designated as a County Geological Site.</p>	<p>The exposed Waulsortian Limestone is of high heritage importance at a local and regional level, being described as one of the best exposures of this rock in the county.</p>



- 6.74 The magnitude of likely development impacts on the land, soils and geology attributes identified in Table 6-2 above is assessed in Table 6-3 below: -

Table 6-3  
Magnitude of Potential Impacts on Land, Soil and Geology (with No Mitigation)

Attribute	Impact of Proposed Development on Land, Soil and Geology	Magnitude of Potential Impact (with No Mitigation)
Land	Loss of relatively small area of productive agricultural lands within the satellite quarry area during the period of rock extraction.	Moderate impact on land-use across the satellite quarry area for the duration of rock extraction activities.
Soils	Soils will be stripped and stored on site or used in the formation of screening berms. Ultimately to be re-used in reinstating and restoring the lands to a natural grassland/ scrub habitat.	Moderate impact at a local level during the period of rock extraction.
Geology	Permanent loss of limestone rock	Permanent loss of resource locally within the satellite quarry area which will be used to supply construction materials to the local and regional construction industry. Low impact considering the small scale of the loss of resource compared to the large extent of limestone rock resource regionally.
Geological Heritage	Designated geological heritage features retained across the existing quarry footprint, with additional feature likely to be exposed in new faces / exposures across satellite quarry area	Positive impact as the development will preserve the existing geological heritage features and provide additional geological / face exposures across the satellite quarry area.

#### Indirect Impacts

- 6.75 There will be no indirect impacts on land, soils or geology as a result of future quarry development and concrete production activities at the application site.

#### Unplanned Events (i.e. Accidents)

- 6.76 Unplanned events in relation to the proposed development could potentially arise from instability caused by over-steep placement of geological materials (rock / aggregate) in stockpiles across the application site.
- 6.77 Ground instability, specifically instability of quarry faces, also has the potential to impact quarry operations and/or adjoining lands. Were any instability ever to arise from the proposed development however, it is likely to be localised at small areas and confined within the application site.
- 6.78 Operations at the quarry will adhere to the Health and Safety Authority Safe Quarry Guidelines in relation to the Safety Health and Welfare at Work (Quarries) Regulations (2008 to 2019). The implementation of recommended best practice measures as part of the quarry safety management

system, including regular quarry face inspections, will limit the potential for unplanned events such as stockpile or quarry face instability.

## Cumulative Impacts

- 6.79 A search of the Waterford County Council online planning website indicates that there are no other major planned developments in the vicinity of the existing quarry or in surrounding townlands which have been granted planning permission within the last five years and have the potential to give rise to any significant adverse cumulative impacts on land, soils and geology in the local area.

## Interaction with Other Impacts

- 6.80 There is potential for some development interactions between land, soils or geology attributes and other media as a result of the proposed development. The interaction between soils / geology and potential impacts on the water environment is addressed in Chapter 7 Water (Hydrology and Hydrogeology) of this EIA Report.
- 6.81 The potential for soil particulates to become airborne and generate dust is addressed in Chapter 8 (Air Quality). Potential interactions with existing archaeological resources are addressed in Chapter 12 (Cultural Heritage), while interactions with the local landscape are addressed in Chapter 13 (Landscape and Visual Amenity).

## 'Do-nothing Scenario'

- 6.82 Under the 'do nothing scenario' the existing quarry void will remain and there will be no adverse impact arising from the loss of productive agricultural lands and soils at the satellite quarry area. There will be a neutral impact in relation to the continued exposure of existing quarry faces at the designated Geological Heritage site.

## MITIGATION MEASURES

- 6.83 Mitigation measures are outlined below to mitigate potential impacts of the proposed satellite quarry to be developed to the east of Cappagh Quarry and operation of the new concrete production plant on Land, Soil and Geology within the local environment.

## Construction / Site Preparation Works Stage

- 6.84 Excavated soils will be managed on site in line with best practice national guidelines (National Roads Authority, 2006) and Specification for Road Works Series 600 – Earthworks (Transport Infrastructure Ireland, March 2013).
- 6.85 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 increases with increasing soil wetness. Good practice measures will be implemented across the application site in order to preserve the structure and integrity of the existing soils and limit the effects of erosion on stockpiles soils during excavation and storage.
- 6.86 A specific Soil Management Plan will be developed in advance of the proposed site works which will incorporate best practice measures for the handling and management of excavated soils, in particular, avoidance of severe soil deformation and minimisation of soil compaction by excavators and dump trucks.
- 6.87 Stockpiles of 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 topsoil materials for later re-use.



- 6.88 There will be no effect on the underlying bedrock geology nor on the geological heritage sites during the construction stage, other than the loss of a small section of the existing eastern quarry face when the temporary excavation is opened beneath the passageway to facilitate the construction and installation of tunnel underpass. This impact will be offset by the temporary exposure of additional rock faces in the excavation, which will be photographed and recorded to further augment the geological heritage value of the quarry. No further mitigation measures are required.

## Operational Stage

- 6.89 Phased soil stripping will be carried out in accordance overall extraction phasing plan across the proposed satellite quarry area and will incorporate best practice mitigation measures alluded to above. No additional mitigation measures are required for soil excavation and handling during the operational stage.
- 6.90 During the operational stage the limestone bedrock will be excavated, blasted and processed at the application site. Operations at the both the existing quarry and satellite quarry will continue to adhere to the Health and Safety Authority Safe Quarry Guidelines in relation to the Safety Health and Welfare at Work (Quarries) Regulations (2008-2019). This will limit the potential for unplanned events such as instability in rock and aggregate stockpiles and at quarry faces.
- 6.91 As the satellite quarry is developed and extended, fresh geological exposures will be developed which will likely enhance and further build on the geological heritage value of the existing quarry. The Applicant will continue to liaise with the Geological Survey of Ireland and will facilitate appropriate future inspection and recording of short-term face exposures as quarrying progresses. This will further contribute to the overall geological heritage value of quarrying activities in the local area and, depending on the nature and extent of any features exposed during the extraction phase, could markedly enhance it.
- 6.92 On foot of a request by the Geological Survey of Ireland (GSI) in its response to pre-planning consultations, the Applicant will commit to preservation of a representative section of the existing quarry face for future examination by geoscientists, subject to appropriate consideration of personnel safety and rock face geotechnical stability issues.

## Post-Operational Stage

- 6.93 Following completion of extraction operations, stripped / excavated soils stored across the application site and wider quarry area will be used to restore the floor of the satellite quarry to a natural grassland / scrub habitat, refer to Chapter 2 of this EIA Report.
- 6.94 Features of geological heritage interest on perimeter faces will be preserved and incorporated into the final restoration scheme, consistent with the geological heritage objectives for the wider quarry site.

## RESIDUAL IMPACT ASSESSMENT

- 6.95 The residual impacts on land, soil and geology are those impacts which remain following the implementation of mitigation measures outlined above.

### Construction / Site Preparation Works Stage

- 6.96 Much of the soil resource stripped and excavated at construction stage will be re-used for construction of new perimeter screening mounds and ongoing restoration of the existing quarry to a natural grassland / scrub habitat. With the implementation of these mitigation measures, the residual impact on Land and Soils is judged to reduce from Moderate to Low.

## Operational Stage

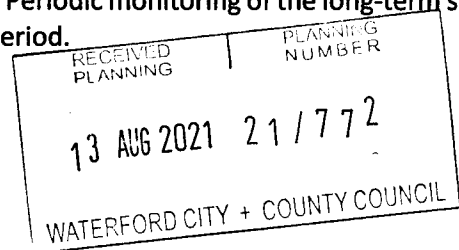
- 6.97 Phased soil stripping will be carried out in accordance with the overall extraction phasing plan and will incorporate a number of mitigation measures, similar to those to be applied for the construction stage works. With the implementation of these mitigation measures, the residual impact on land and soil is judged to reduce from Moderate to Low.
- 6.98 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 to 2019). The implementation of recommended best practice measures as part of the quarry safety management system, including regular quarry face inspections, will limit the potential for unplanned events such as stockpile or quarry face instability. With the implementation of these measures, the residual impact of the proposed development on land is judged to reduce from Low to Imperceptible.
- 6.99 As the satellite quarry is developed, further face exposures will be developed and will likely further add to the overall geological heritage value of the quarry complex. This will result in a net positive impact in terms of the geological heritage.

## Post-Operational Stage

- 6.100 Following completion of extraction operations, excess soils stored across the quarries will be re-used to restore the quarry floor to a natural grassland / scrub habitat. With the implementation of these measures, the residual impact on land and soils is judged to reduce from Moderate to Low.
- 6.101 Features of geological heritage interest will be preserved and incorporated into the final restoration scheme, consistent with the geological heritage objectives for the overall quarry. With the implementation of this mitigation measure there will be a positive residual impact on geological heritage.

## MONITORING

- 6.102 Following the final restoration of the overall quarry complex (existing and satellite quarries), some aftercare monitoring will be required to ensure that the restoration works are successful and the grass / vegetation cover becomes well established, minimising the potential for soil erosion across restored surfaces, refer to Chapter 2 of this EIA Report. Periodic monitoring of the long-term stability of final quarry faces will also be undertaken over this period.





## REFERENCES

**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 22 (1:100,000)**, Geology of East Cork and Waterford and accompanying geological memoir (1995).

**Golder Associates (2018)**, Cappagh EIAR.

**Institute of Geologists of Ireland (2013)** 'Guidelines for the preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements'.

**National Roads Authority (2006)** A Guide to Landscape Treatments for National Road Schemes in Ireland

**Teagasc, 2004**, Ireland Subsoil Parent Materials Map (digital version).

**Teagasc, 2007**, Ireland Soils Map (digital version).

**Transport Infrastructure Ireland (March, 2013)**. Specification for Road Works Series 600 -Earthworks

**Waterford County Development Plan 2011 – 2017** (extended)

## FIGURES

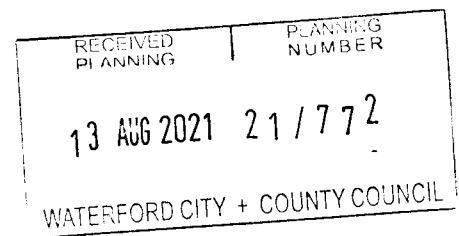
Figure 6-1  
Regional Soils Map

Figure 6-2  
Regional Subsoils Map

Figure 6-3  
Geology Map

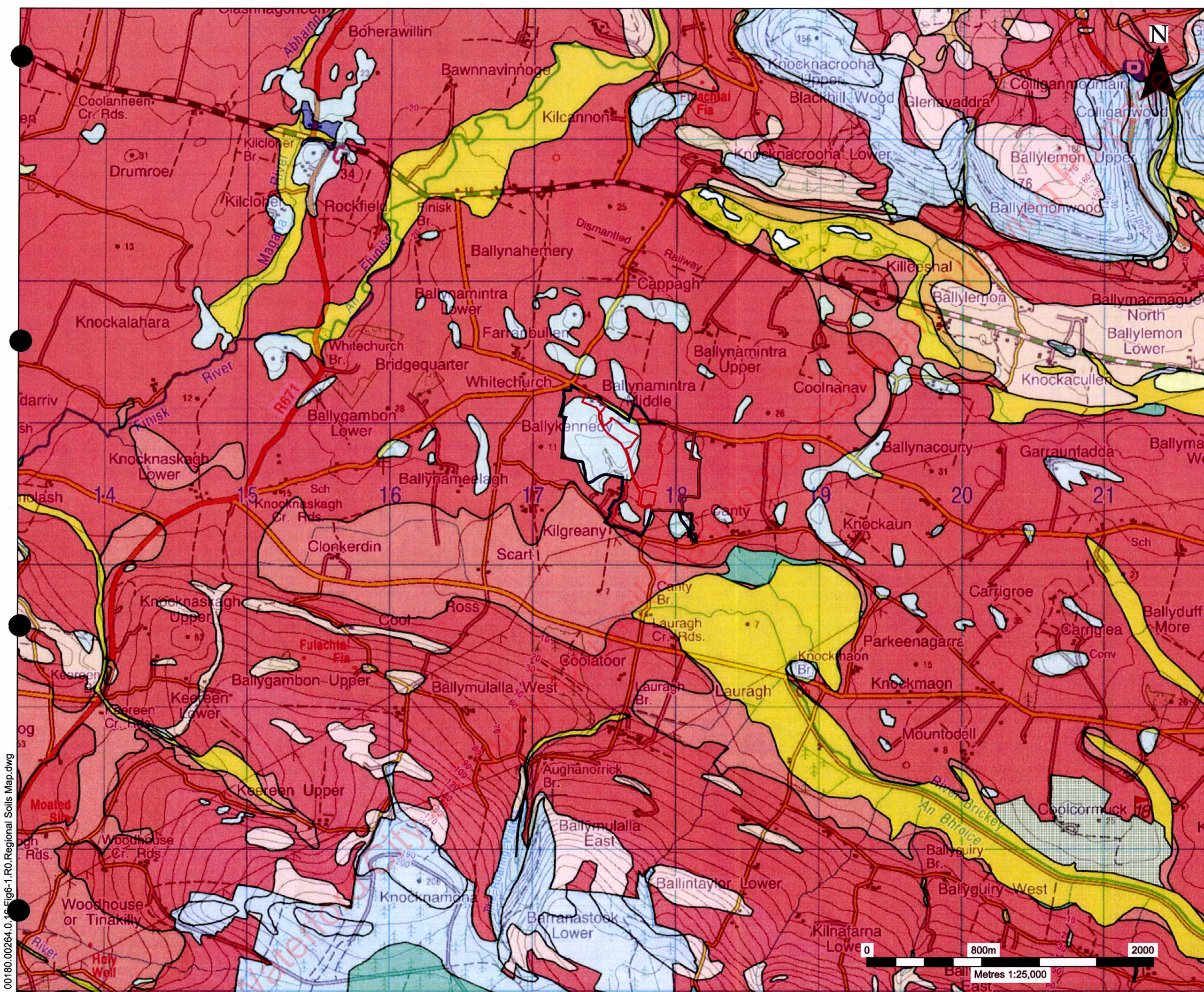
Figure 6-4  
Geology Heritage Sites

Figure 6-5  
Borehole Locations





00180.00264.0.16.Fig6-1.R0.Regional Soils Map.dwg



**NOTES**

1. EXTRACT FROM FROM ORDNANCE SURVEY IRELAND  
DISCOVERY SERIES SHEET NO. 82

2. ORDNANCE SURVEY IRELAND LICENCE NO. CYAL50167032 (C)  
ORDNANCE SURVEY & GOVERNMENT OF IRELAND

**LEGEND**

	ROADSTONE LAND INTEREST (C. 58.9 HA)
	PLANNING APPLICATION AREA (C. 18.2 HA)
	MINERAL ALLUVIUM
	ACID BROWN EARTHS / BROWN PODZOLICS
	PEATY GLEYS ACIDIC
	LITHOSOLS / REGOSOLS
	RENZINAS / LITHOSOLS

RECEIVED PLANNING | PLANNING NUMBER

13 AUG 2021 21/772

WATERFORD CITY + COUNTY COUNCIL

**Roadstone**

SLR CONSULTING IRELAND  
7 DUNDUM BUSINESS PARK  
WINDY ARBOUR  
DUBLIN 14  
T: +353-1-2964667  
F: +353-1-2964676  
www.slrconsulting.com

**SLR**

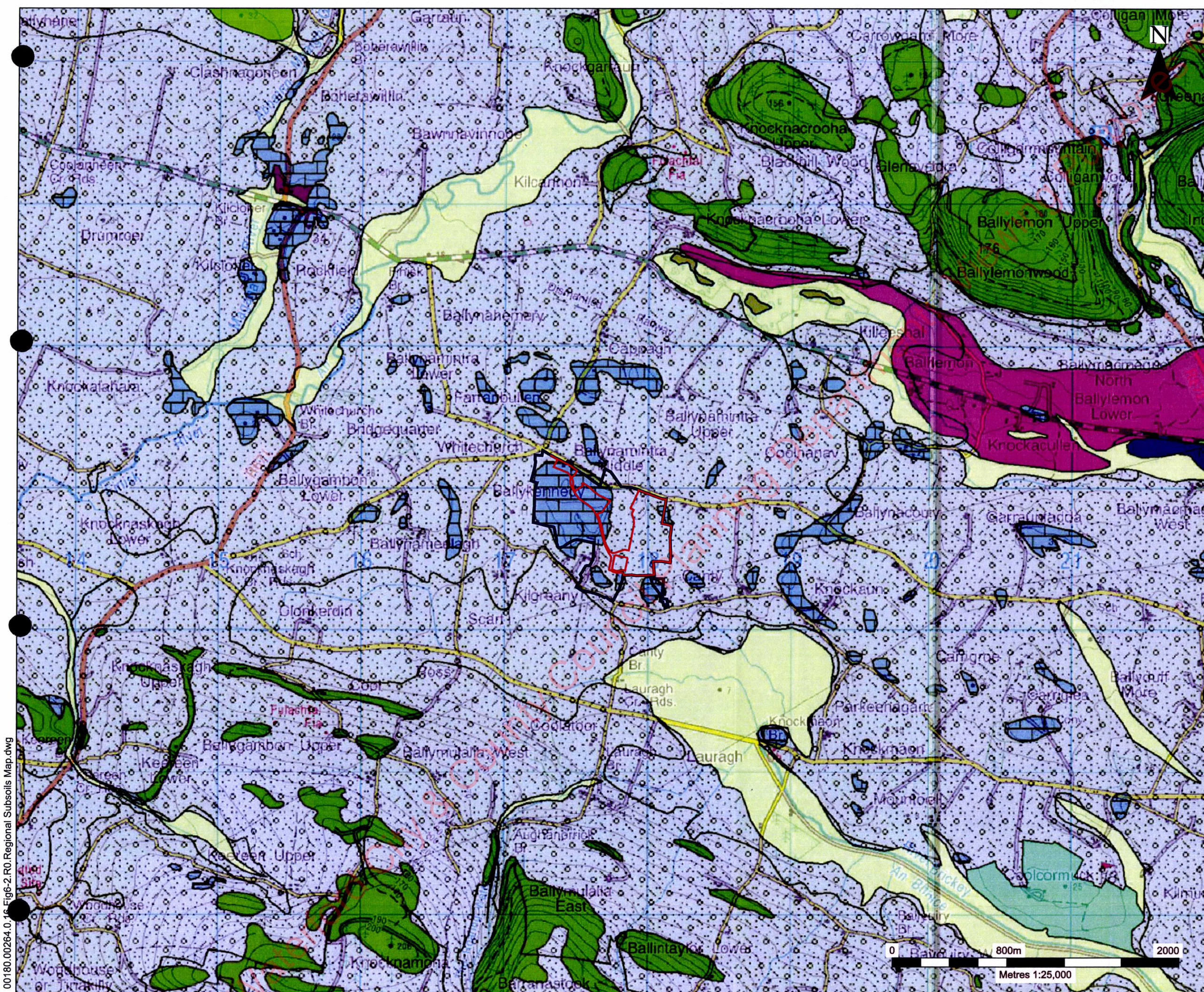
ROADSTONE LTD.  
ENVIRONMENTAL IMPACT ASSESSMENT REPORT  
EASTERN SATELLITE QUARRY AND  
NEW CONCRETE PLANT  
CAPPAGH QUARRY, COUNTY WATERFORD  
REGIONAL SOILS MAP

**FIGURE 6-1**

Scale 1:25,000 @ A3 | Date JULY 2021



00180.00264.0.16 Fig6-2.R0 Regional Subsoils Map.dwg



**NOTES**

1. EXTRACT FROM FROM ORDNANCE SURVEY IRELAND  
DISCOVERY SERIES SHEET NO. 82

2. ORDNANCE SURVEY IRELAND LICENCE NO. CYAL50167032  
(C) ORDNANCE SURVEY & GOVERNMENT OF IRELAND

**LEGEND**

	ROADSTONE LAND INTEREST (C. 58.9 HA)
	PLANNING APPLICATION AREA (C. 18.2 HA)
	ALLUVIUM
	TILL - DEVONIAN SANDSTONE
	BEDROCK AT SURFACE - CALCAREOUS

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WATERFORD CITY + COUNTY C.

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ENVIRONMENTAL IMPACT ASSESSMENT REPORT

EASTERN SATELLITE QUARRY AND  
NEW CONCRETE PLANT  
CAPPAGH QUARRY, COUNTY WATERFORD

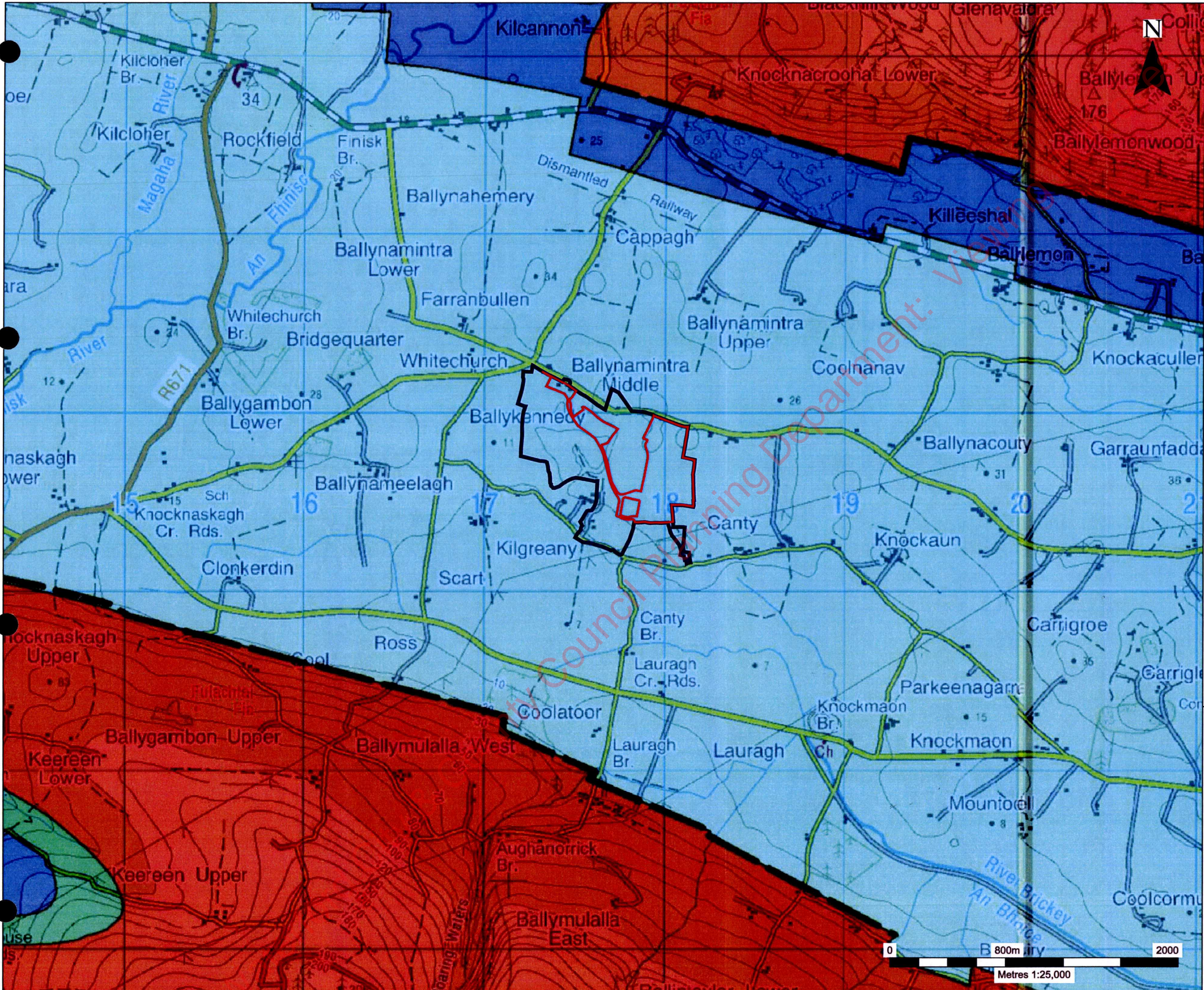
**REGIONAL SUBSOILS MAP**

**FIGURE 6-2**

Scale 1:25,000 @ A3	Date JULY 2021
------------------------	-------------------



00180.00264.0.16 Fig6-3.R0.Geology Bedrock.dwg



**NOTES**  
1. EXTRACT FROM FROM ORDNANCE SURVEY IRELAND  
DISCOVERY SERIES SHEET NO. 82  
2. ORDNANCE SURVEY IRELAND LICENCE NO. CYAL50167032  
(C) ORDNANCE SURVEY & GOVERNMENT OF IRELAND

LEGEND	
	ROADSTONE LAND INTEREST (C. 58.9 HA)
	PLANNING APPLICATION AREA (C. 18.2 HA)
	WAULSORTIAN LIMESTONE
	BALLYSTEEEN LIMESTONE
	LOWER LIMESTONE SHALES
	OLD RED SANDSTONE
	FAULT

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CAPPAGH QUARRY, COUNTY WATERFORD

**GEOLOGY MAP**

**FIGURE 6-3**

Scale  
1:25,000 @ A3

Date  
JULY 2021





**NOTES**

1. EXTRACT FROM FROM ORDNANCE SURVEY IRELAND  
DISCOVERY SERIES SHEET NO. 82

2. ORDNANCE SURVEY IRELAND LICENCE NO. CYAL50167032  
(C) ORDNANCE SURVEY & GOVERNMENT OF IRELAND

**LEGEND**

ROADSTONE LAND INTEREST  
(C. 58.9 HA)

PLANNING APPLICATION AREA  
(C. 18.2 HA)

PROPOSED EXTRACTION AREA  
(C. 9.7 HA)

IGH SITES

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PLANNING

PLANNING  
NUMBER

13 AUG 2021 21/772

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EASTERN SATELLITE QUARRY AND  
NEW CONCRETE PLANT  
CAPPAGH QUARRY, COUNTY WATERFORD

**GEOLOGY HERITAGE SITES**

**FIGURE 6-4**

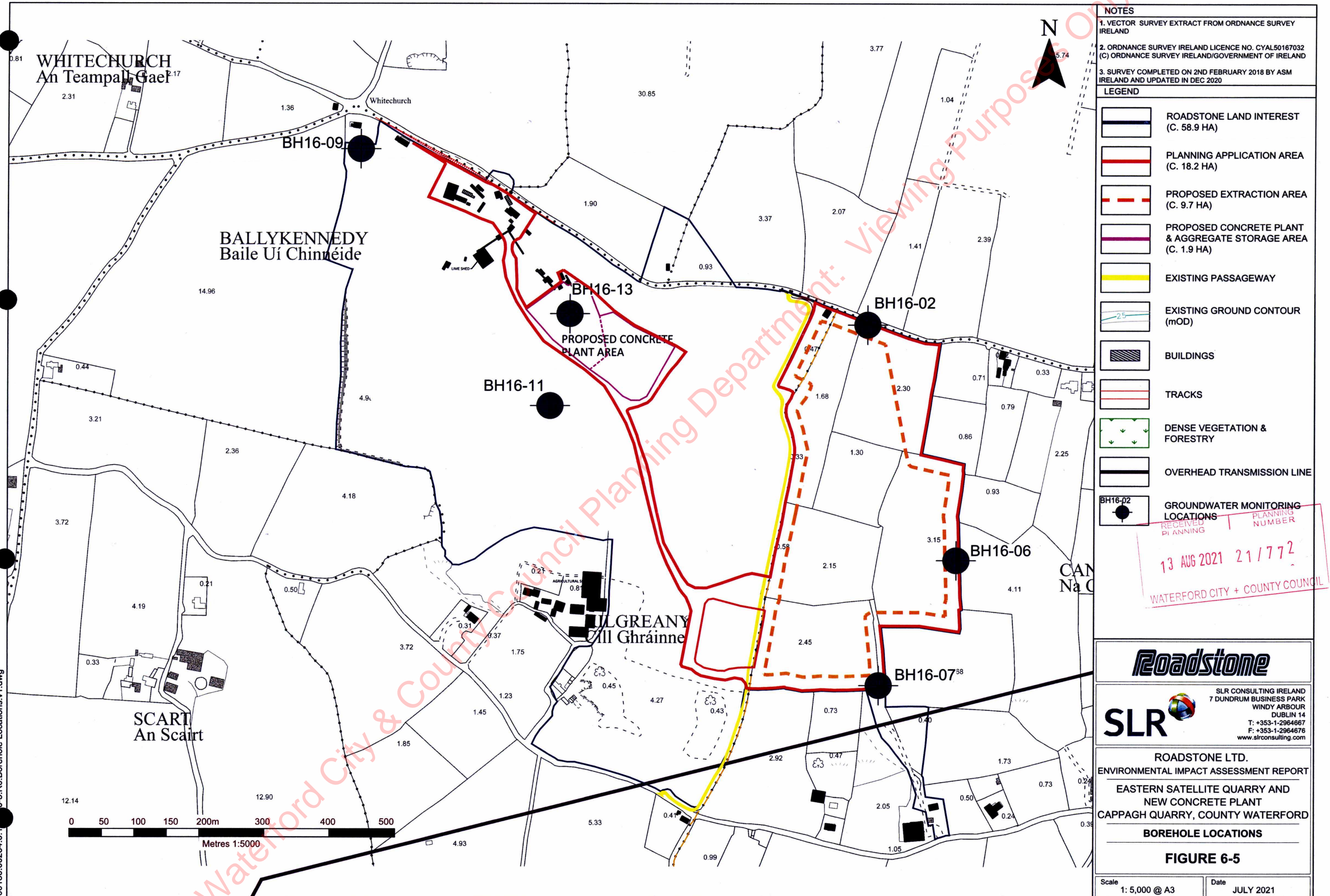
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1:10,000 @ A3

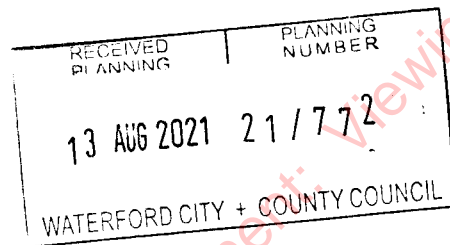
Date  
JULY 2021

00180.00264.0.16.Fig6-4.R0.Geoheritage Sites.dwg



00180.00264.0.1 6-5.R0.Borehole Locations.v1.dwg





**APPENDIX 6-A**  
**GSI Consultation Feedback**





An Roinn Comhshaoil,  
Aeráide agus Cumarsáide  
Department of the Environment,  
Climate and Communications



**Geological Survey**  
Suirbhéireacht Gheolaíochta  
Ireland | Éireann

Derek Luby  
SLR Consulting Ireland  
7 Dundrum Business Park,  
Windy Arbour,  
Dublin D14 N2Y7

11 March 2021

**Re: Cappagh Quarry, Co. Waterford: Pre-planning Consultation**

**Your Ref:**

**Our Ref:21/64**

RECEIVED PLANNING	PLANNING NUMBER
13 AUG 2021	21/772
WATERFORD CITY & COUNTY COUNCIL	

Dear Mr. Luby,

Geological Survey Ireland is the national earth science agency and is a division of the Department of the Environment, Climate and Communications. We provide independent geological information and advice and gather various data for that purpose. Please see our [website](#) for data availability. We recommend using these various data sets, when conducting the EIAR, SEA, planning and scoping processes. Use of our data or maps should be attributed correctly to 'Geological Survey Ireland'.

With reference to your letter dated 02 March 2021, concerning the Cappagh Quarry, Co. Waterford: Pre-planning Consultation, Geological Survey Ireland would like to make the following comments.

#### **Geoheritage**

Geological Survey Ireland is in partnership with the National Parks and Wildlife Service (NPWS, Department of Housing, Local Government and Heritage), to identify and select important geological and geomorphological sites throughout the country for designation as geological NHAs (Natural Heritage Areas). This is addressed by the Geoheritage Programme of Geological Survey Ireland, under 16 different geological themes, in which the minimum number of scientifically significant sites that best represent the theme are rigorously selected by a panel of theme experts.

County Geological Sites (CGSs), as adopted under the National Heritage Plan, include additional sites that may also be of national importance, but which were not selected as the very best examples for NHA designation. All geological heritage sites identified by Geological Survey Ireland are categorised as CGS pending any further NHA designation by NPWS. CGSs are now routinely included in County Development Plans and in the GIS of planning departments, to ensure the recognition and appropriate protection of geological heritage within the planning system. CGSs can be viewed online under the Geological Heritage tab on the online [Map Viewer](#).

The audits for Co. Waterford were completed in 2011 and were revised in 2012. The full report details can be found [here](#). Our records show that there are CGSs within and in the vicinity of the proposed quarry extension.

**Cappagh Quarry, Co. Waterford (217588, 94836)**, under IGH themes: IGH 1 Karst and IGH 8 Lower Carboniferous. Link to site report: [WD013](#). The quarry is excavated in Carboniferous Limestone of the Waulsortian Formation. There are karstic features in the quarry walls which may be of Holocene (post-glacial) age or they may have begun forming during the Quaternary Period. The quarry is one of the best places to see Waulsortian rocks in County Waterford. Additional features of interest here are the extensive expressions of karstified limestone. There are solution pipes, sand filled dolines (enclosed depressions), epikarst and expanded joints with brown deposits of the mineral calcite on them. As an active quarry, the CGS status has no impact or restriction on the normal permitted operation of the quarry.

**Kilgreany Cave, Co. Waterford (217638, 94379)**, under IGH theme: IGH 1 Karst. Link to site report: [WD040](#). The cave is formed within Carboniferous limestone rock. It probably began forming in an interglacial period during the Quaternary (i.e. during the last 1.6 million years) and may have continued forming during the early part of the Holocene (post-glacial) period.



The Cappagh Quarry site report written at the time of the audit, 2011, stated that as an active quarry, the CGS status has no impact or restriction on the normal permitted operation of the quarry. It was also stated that there may be opportunities for active engagement with the operators to preserve some interesting quarry faces, such as the heavily karstified eastern side, depending on planned end-use or restoration plans.

With the proposed quarry extension plan, there will be impacts on the integrity of current CGS. However, we note that this has been addressed within the scoping report and while the current eastern face of the quarry (the face with the most relevant geological and karst features) will be removed a new face will be exposed. Ideally, the site should not be damaged or integrity impacted or reduced in any manner due to the proposed development. However, in cases such as this where the integrity cannot be preserved we would ask that careful consideration be given in design to accommodating preservation of final quarry faces and access to the site during extraction to record the exposures to strengthen our knowledge and datasets. Please contact Clare Glanville ([Clare.Glanville@gsi.ie](mailto:Clare.Glanville@gsi.ie)) for further information and possible mitigation measures if applicable.

We are pleased to see in the restoration phase that the quarry floor will be returned to grassland at a level of 10mOD resulting in some quarry faces remaining intact. Geological Survey Ireland requests that the operator (Roadstone Ltd) might assist our geological heritage goals with the following (and ideally this would be written into the restoration / closure plan):

1. Allowing access to quarry faces by appropriate scientists (upon request and with due regards to Health and Safety requirements) during quarrying to check for interesting new stratigraphies / relationships as they might become exposed and to establish if the quarry site is worthy of recognition post extraction and through aftercare/restoration planning.
2. If deemed appropriate in (1) above, leaving a representative section of the quarry face at the end of the quarry life or inclusion of information panels to promote the geology to the public or develop tourism or educational resources if appropriate depending on the future use of the site. Natural exposures are few, or deeply weathered, this measure would permit on-going improvement of geological knowledge of the subsurface.

The Geoheritage Programme tries to promote a partnership between geological heritage and active quarrying, with such measures as those outlined in the 'Geological Heritage Guidelines for the Extractive Industry', which can be downloaded [here](#). This document, written in association with Irish Concrete Federation, acts as a comprehensive guide in the sustainable extraction of natural resources while preserving the geological heritage of Ireland.

### **Groundwater**

Groundwater is important as a source of drinking water, and it supports river flows, lake levels and ecosystems. It contains natural substances dissolved from the soils and rocks that it flows through, and can also be contaminated by human actions on the land surface. As a clean, but vulnerable, resource, groundwater needs to be understood, managed and protected.

We are pleased to see extensive use and reference to Geological Survey Ireland's datasets within the water section of the pre-planning consultation briefing report. While the information below appears to have, in the main, been considered within the report it is provided here for reference purposes if required.

Proposed developments need to consider any potential impact on specific groundwater abstractions and on groundwater resources in general. We recommend using the groundwater maps on our [Map viewer](#), which should include: wells; drinking water source protection areas; the national map suite - aquifer, groundwater vulnerability, groundwater recharge and subsoil permeability maps. For areas underlain by limestone, please refer to the karst specific data layers (karst features, tracer test database; turlough water levels ([gwlevel.ie](http://gwlevel.ie))).





Background information is also provided in the Groundwater Body Descriptions. Please read all disclaimers carefully when using Geological Survey Ireland data.

Groundwater flooding maps (historic & predictive) are available through our [web viewers](#). The historic flood maps provide information of historic flooding, both surface water and groundwater. The predictive groundwater flood map provides information on the probability of future karst groundwater flooding (where available). For information on the development and limitations of these flood maps, please check the user guidance notes on our website.

### **Geological Mapping**

Geological Survey Ireland maintains online datasets of bedrock and subsoils geological mapping that are reliable and accessible. We would encourage you to use these data which can be found [here](#), in your future assessments.

### **Geotechnical Database Resources**

Geological Survey Ireland continues to populate and develop our national geotechnical database and viewer with site investigation data submitted voluntarily by industry. The current database holding is over 7500 reports with 134,000 boreholes; 31,000 of which are digitised which can be accessed through downloads from our [Geotechnical Map Viewer](#). We would encourage the use of this database as part of any baseline geological assessment of the proposed development as it can provide invaluable baseline data for the region or vicinity of proposed development areas. This information may be beneficial and cost saving for any site specific investigations that may be designed as part of the project.

### **Geohazards**

Geohazards can cause widespread damage to landscapes, wildlife, human property and human life. In Ireland, landslides, flooding and coastal erosion are the most prevalent of these hazards. We recommend that geohazards be taken into consideration, especially when developing areas where these risks are prevalent, and we encourage the use of our data when doing so. We note and commend the inclusion of potential impacts to the adjacent CGS (Kilgreany Cave) from vibration and land movement, and the consideration of slope stability in general. We note that flooding is identified and discussed as a potential issue under climate change in the pre-planning consultation briefing report. We provide the following information for reference purposes.

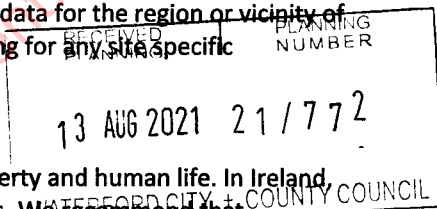
Geological Survey Ireland has information available on landslides in Ireland via the National Landslide Database and Landslide Susceptibility Map both of which are available for viewing on our dedicated [Map Viewer](#). Associated guidance documentation relating to the National Landslide Susceptibility Map is also available.

Geological Survey Ireland also engaged in a national project on Groundwater Flooding. The data from this project may be useful in relation to Flood Risk Assessment (FRA) and management plans, and is described in more detail under 'Groundwater' above.

### **Guidelines**

The following guidelines may also be of assistance:

- Institute of Geologists of Ireland, 2013. Guidelines for the Preparation of the Soils, Geology and Hydrogeology Chapters of Geology in Environmental Impact Statements.
- Department of Environment, Heritage and Local Government, 2004. Quarries and Ancillary Activities, Guidelines for Planning Authorities.
- Environmental Protection Agency, 2006. Environmental Management in the Extractive Industry: Non-Scheduled Minerals.
- Geological Survey of Ireland - Irish Concrete Federation, 2008. Geological Heritage Guidelines for the Extractive Industry.





#### **Other Comments**

Should development go ahead, all other factors considered, Geological Survey Ireland would much appreciate a copy of reports detailing any site investigations carried out. As discussed under Geoheritage above, we would ask that significant quarry faces remaining upon cessation of extractive works be designed to remain visible as rock exposure rather than covered with soil and vegetated, in accordance with safety guidelines and engineering constraints. This measure would permit on-going improvement of geological knowledge of the subsurface and could enhance the knowledge around this geoheritage site. Alternatively, we ask that a digital photographic record of significant new excavations could be provided. Potential visits from Geological Survey Ireland to personally document exposures could also be arranged.

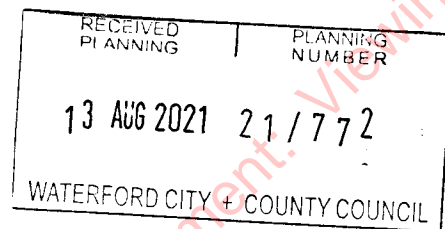
The data would be added to Geological Survey Ireland's national database of site investigation boreholes, implemented to provide a better service to the civil engineering sector. Data can be sent to Beatriz Mozo, Geological Mapping Unit, at [Beatriz.Mozo@gsi.ie](mailto:Beatriz.Mozo@gsi.ie), 01-678 2795.

I hope that these comments are of assistance, and if we can be of any further help, please do not hesitate to contact me ([Trish.SmulLEN@gsi.ie](mailto:Trish.SmulLEN@gsi.ie)), or my colleague Clare Glanville ([Clare.Glanville@gsi.ie](mailto:Clare.Glanville@gsi.ie)).

Yours sincerely,

Clare Glanville  
**Senior Geologist**  
Geological Survey Ireland






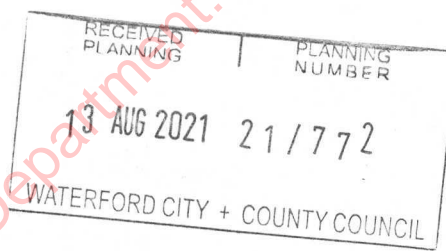
**APPENDIX 6-B**  
**Borehole / Well Installation Logs**

# BOREHOLE LOG

Project Water Monitoring Borehole Installation				BOREHOLE No  <b>BH16-02</b>
Job No 1450710105	Date 21-01-16	Ground Level (m) 29,23	Co-Ordinates (Irish National Grid) E 218.045,0 N 94.947,0	
Contractor				Sheet  1 of 1

SAMPLES & TESTS			STRATA				Geology	Instrument/Backfill
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)		
				28,53		0,70		
						(20,30)		
				8,23		21,00		
				7,23		22,00		
						(12,50)		
				-5,27		34,50		

OVERBURDEN  
Medium brown, silty, gravelly, soft to very soft CLAY with low to intermediate plasticity. Gravels are sub angular to angular and <4cm in diameter.  
LIMESTONE  
Pale grey, very fine powdered return.





CAVITY  
No recovery  
LIMESTONE  
Pale grey, fine powdered return. Water presence at 22m.

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
All dimensions in metres Scale 1:250		Client Roadstone				Method/ Plant Used Titon 500 Blast Rig					Logged By C. MAGUIRE



## BOREHOLE LOG

Project <b>Water Monitoring Borehole Installation</b>				BOREHOLE No <b>BH16-06</b>	
Job No <b>1450710105</b>	Date <b>22-01-16</b>	Ground Level (m) <b>24,84</b>	Co-Ordinates (Irish National Grid) <b>E 218.186,0 N 94.582,0</b>		
Contractor				Sheet <b>1 of 1</b>	


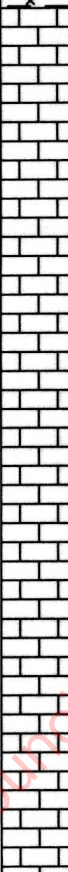
SAMPLES & TESTS			STRATA					Geology	Instrument	Backfill	
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION				
			<div>1</div>	24,14		0,70	OVERBURDEN Medium brown, very soft to soft, silty CLAY with intermediate to high plasticity. Traces of roots and organics.				
							(15,30)	LIMESTONE Pale grey very fine powdered return			
					8,84		16,00				
					8,34		16,50	CAVITY			
					7,34		17,50	No recovery. Water encountered in hole at 16.5m.			
					6,34		18,50	LIMESTONE			
								Pale grey very fine powdered return			
								CAVITY			
								No recovery			
								LIMESTONE			
							Pale grey very fine powdered return				
						(11,50)					
				-5,16		30,00					

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
											EOH at 30m. Slotted pipe from 30m to 6m and plain pipe from 6m to surface.

All dimensions in metres Scale 1:250	Client <b>Roadstone</b>	Method/ Plant Used <b>Titon 500 Blast Rig</b>	Logged By <b>C. MAGUIRE</b>
---	-------------------------	--	--------------------------------



Project <b>Water Monitoring Borehole Installation</b>				BOREHOLE No  <b>BH16-07</b>
Job No <b>1450710105</b>	Date <b>25-01-16</b>	Ground Level (m) <b>23,36</b>	Co-Ordinates (Irish National Grid) <b>E 218.065,0 N 94.390,0</b>	
Contractor				Sheet  <b>1 of 1</b>

SAMPLES & TESTS			STRATA					Geology	Instrument	Backfill
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION			
				22,36		1,00	OVERBURDEN Medium brown, soft, silty gravelly CLAY with intermediate to high plasticity. Gravel is sub rounded to sub angular in shape and <4cm in diameter. LIMESTONE Pale grey very fine powdered return. Water presence at 25m.			
						(29,00)				
			↓	-6,64		30,00				

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
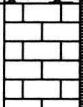
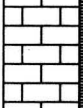
Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS	
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To		
											EOH at 30m. Slotted pipe from 30m to 6m and plain pipe from 6m to surface.	
All dimensions in metres Scale 1:250		Client    Roadstone				Method/ Plant Used    Titon 500 Blast Rig					Logged By C. MAGUIRE	

AGS3 UK BH CAPPAGH DRILLING JAN16.GPJ GINT STD AGS3 1.GDT 21/2/17



## BOREHOLE LOG

Project <b>Water Monitoring Borehole Installation</b>				BOREHOLE No  <b>BH16-09</b>	
Job No <b>1450710105</b>	Date <b>25-01-16</b>	Ground Level (m) <b>17,38</b>	Co-Ordinates (Irish National Grid) <b>E 217.272,0 N 95.208,0</b>		
Contractor				Sheet <b>1 of 1</b>	

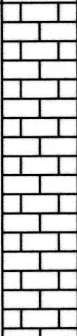
SAMPLES & TESTS			STRATA					Geology	Instrument/Backfill	
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION			
				15,38		(2,00) 2,00	OVERBURDEN Pale brown, very loose to loose, sandy clayey GRAVEL. Gravel is sub rounded to sub angular and <5cm in diameter. Sand is fine to coarse. Clay has non to low plasticity.			
							(5,00)	LIMESTONE Fine powder and some pale grey, fine grained, sub rounded to sub angular limestone gravels recovered.		
					10,38		7,00			
					9,98		7,40	CAVITY No recovery. Water present at 7m.		
							(12,10)	LIMESTONE Fine powder and some pale grey, fine grained, sub rounded to sub angular limestone gravels recovered.		
				-2,12		19,50				

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
											EOH at 19,5m. Slotted pipe from 19.5m to 1.5m and plain pipe from 1.5m to surface.

All dimensions in metres Scale 1:250	Client <b>Roadstone</b>	Method/ Plant Used <b>Titon 500 Blast Rig</b>	Logged By <b>C. MAGUIRE</b>
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Project				<b>BOREHOLE No</b>  <b>BH16-11</b>
Water Monitoring Borehole Installation				
Job No	Date	Ground Level (m)	Co-Ordinates (Irish National Grid)	
1450710105	27-01-16	10,11	E 217.556,0 N 94.824,0	
Contractor				Sheet  1 of 1

SAMPLES & TESTS			STRATA					Geology	Instrument	Backfill
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION			
						(11,00)  11,00	LIMESTONE Pale grey powdered return. Water presence at 0.2m.			
				-0,89						
							<div>RECEIVED PLANNING</div> <div>PLANNING NUMBER</div> <div>13 AUG 2021 21 / 772</div> <div>WATERFORD CITY + COUNTY COUNCIL</div>			



Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
											EOH at 11m. Slotted pipe from 11m to surface.
All dimensions in metres Scale 1:250		Client Roadstone				Method/ Plant Used Titon 500 Blast Rig					Logged By C. MAGUIRE

AGS3 UK BH CAPPAGH DRILLING JAN16.GPJ GINT STD AGS3\_1.GDT 21/2/17



## BOREHOLE LOG

Project <b>Water Monitoring Borehole Installation</b>				BOREHOLE No <b>BH16-13</b>	
Job No <b>1450710105</b>	Date <b>27-01-16</b>	Ground Level (m) <b>11,56</b>	Co-Ordinates (Irish National Grid) <b>E 217.592,0 N 94.969,0</b>		
Contractor				Sheet <b>1 of 1</b>	

SAMPLES & TESTS			STRATA					Geology	Instrument	Backfill	
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION				
				9,56		(2,00) 2,00	<b>MADEGROUND</b> Pale brown to grey, sandy gravelly clayey MADEGROUND. Gravels sub rounded to sub angular and <5cm diameter. Clay has low to intermediate plasticity. Sands are fine to coarse grained. <b>LIMESTONE</b> Pale grey powder return. Water presence at 5m.				
								(12,30)			
					-2,74			14,30			

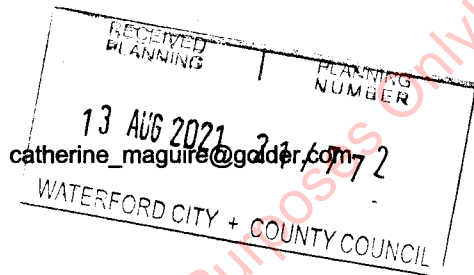
Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Date	Time	Depth	Casing Depth	Casing Dia. mm	Water Dpt	From	To	Hours	From	To	
											EOH at 14,3m. Slotted pipe from 14.3m to 2.5m and plain pipe from 2.5m to surface.

All dimensions in metres Scale 1:250	Client <b>Roadstone</b>	Method/ Plant Used <b>Titon 500 Blast Rig</b>	Logged By <b>C. MAGUIRE</b>
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**APPENDIX 6-C**  
**Geophysical Site Report – Cappagh Quarry**

RECEIVED PLANNING	PLANNING NUMBER
13 AUG 2021	21/772
WATERFORD CITY + COUNTY COUNCIL	



**DATE** 12/02/17**PROJECT NO.** 14507150105.TM01**TO** Patrick Gibney  
Roadstone, Cappagh Quarry, Waterford**CC** Barry Balding, Conor Wall**FROM** Catherine Maguire**EMAIL** catherine\_maguire@golder.com**ERI SURVEY FINDINGS, CAPPAGH QUARRY EXTENSION AREA**

Golder Associates (Golder) Ireland was commissioned by Roadstone, Cappagh Quarry, Waterford (Cappagh) to undertake a geophysical survey over a proposed extension area east of the existing quarry. Electrical Resistivity Imaging (ERI) was used to provide insight into the underlying geology. The ERI survey comprised of nine parallel lines, approximately 60 m apart, trending in a W-E direction (Figure A). Data was collected over a total line length of 2,088 m.

**Line 1** runs across the most northern section of the extension area, parallel to the public main road and is 219 m in length. The pseudosection for Line 1 typically displays resistivity values ( $>2600$  ohm metres ( $\Omega\text{m}$ )) associated with competent limestone bedrock. The resistivity values ( $<400$   $\Omega\text{m}$ ) in the near surface appear to indicate that the bedrock is overlain by a generally uniform layer of overburden of up to ca. 4.5m in thickness (Figure 1).

**Line 2** runs parallel to Line 1 and is 213 m in length. The pseudosection for Line 2 displays similar resistivity values ( $>2600$   $\Omega\text{m}$ ) to those measured along Line 1, indicating the likely presence of competent limestone bedrock overlain by a uniform layer of overburden ( $<400$   $\Omega\text{m}$ ) of up to ca. 2.5 m in thickness (Figure 2).

**Line 3** runs parallel to Line 2 and is 207 m in length. The pseudosection for Line 3 displays similar resistivity values ( $>2600$   $\Omega\text{m}$ ) to those measured along Lines 1 and 2, indicating the likely presence of competent limestone bedrock overlain by an undulating layer of overburden up to ca. 4 m in thickness. In general the overburden ( $<400$   $\Omega\text{m}$ ) is relatively thin ( $<1$  m) along the western part of the line and increases with depth along the eastern part of the line (Figure 3).

**Line 4** is 240 m in length. The pseudosection for Line 4 displays an undulating layer of overburden with a possible karst feature ( $<400$   $\Omega\text{m}$ ) underlying its western end. Resistivity values between the range of 400 and 2600  $\Omega\text{m}$  indicate the presence of possible weathered or fractured bedrock below this feature. A zone of resistivity values of generally  $<2600$   $\Omega\text{m}$  occurs towards the centre of the pseudosection from between 4 to 20 m. This may also represent an area of fractured or weathered bedrock underlying the line (Figure 4).

**Line 5** is 270 m in length. A possible karst feature underlain by fractured or weathered bedrock ( $<2600$   $\Omega\text{m}$ ) can be identified as underlying the central part of the line (Figure 5). Another possible karst feature can be identified underlying the eastern part of the line. The most eastern part of the pseudosection exhibits low resistivity values of  $<400$   $\Omega\text{m}$ , indicating the presence of additional karst features along this part of the line (Figure 5). The karst features do not appear to continue in a southerly direction as resistivity values for Line 6 indicate the presence of competent bedrock ( $>2600$   $\Omega\text{m}$ ).

**Line 6** is 282 m in length. The most western part of the line displays low resistivity values ( $<400$   $\Omega\text{m}$ ). These values may represent thickening overburden. This is underlain by an area of competent bedrock ( $>2600$   $\Omega\text{m}$ ). The centre of the line displays an area of possible weathered or fractured bedrock ( $<2600$   $\Omega\text{m}$ ) which is surrounded by what appears to be competent bedrock ( $>2600$   $\Omega\text{m}$ ). The western part of the line displays a thin layer of overburden, ca.  $<2\text{m}$  in thickness (Figure 6).

**Line 7** is 297 m in length. The western part of the pseudosection displays values of ca.  $<400$   $\Omega\text{m}$  which may represent a possible karst feature or weathered bedrock. The overburden layer along this line ranges from ca. 1 to 5 m in thickness (Figure 7).

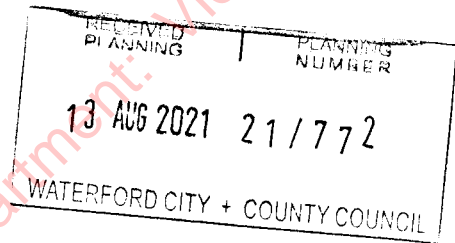
**Line 8** is 180 m in length and typically displays resistivity values associated with competent limestone bedrock ( $>2600 \Omega\text{m}$ ), with the exception of an area along its most western edge which displays values of  $<500 \Omega\text{m}$ . This may represent a possible karst feature or weathered bedrock (Figure 8).

**Line 9** is 180 m in length and is similar to Line 8, displaying resistivity values ( $>2600 \Omega\text{m}$ ) indicative of competent bedrock with the exception of a possible karst feature occurring along its western edge ( $<400 \Omega\text{m}$ ) (Figure 9).

**Conclusions:**

- Resistivity Lines 1 to 3 display resistivity values ( $>2600 \Omega\text{m}$ ) indicative of competent limestone bedrock with undulating overburden of up to ca. 4.5 m in thickness;
- Resistivity lines 4 and 5 indicate the presence of possible karst features or weathered bedrock;
- Possible karst features have been identified on Lines 4 to 9. Line 5 displays a possible karst feature which is well defined by a steep gradient in resistivity contours (i.e. the sharp contrast between competent bedrock and a clay/debris filled void); and
- The majority of the extension site is underlain by competent limestone bedrock. Based on an analysis of the ERI data the northern and southern sections of the extension area show the most consistent competent bedrock.





**APPENDIX 6-D**  
**Geological Heritage Site Reports – Cappagh Quarry**

## WATERFORD - COUNTY GEOLOGICAL SITE REPORT

<b>NAME OF SITE</b>	Cappagh Quarry
Other names used for site	
<b>IGH THEME</b>	IGH1 Karst; IGH8 Lower Carboniferous
<b>TOWNLAND(S)</b>	Kilgreany
<b>NEAREST TOWN</b>	Dungarvan
<b>SIX INCH MAP NUMBER</b>	Waterford 30
<b>NATIONAL GRID REFERENCE</b>	217600 94900
<b>1:50,000 O.S. SHEET NUMBER</b>	82                      1/2 inch Sheet No.      22

### Outline Site Description

A large working quarry, extracting limestone for aggregate and making concrete blocks.

### Geological System/Age and Primary Rock Type

The quarry is excavated in Carboniferous Limestone of the Waulsortian Formation. There are karstic features in the quarry walls which may be of Holocene (post-glacial) age or they may have begun forming during the Quaternary Period (Ice Age).

### Main Geological or Geomorphological Interest

The quarry is one of the best places to see Waulsortian rocks in County Waterford, and the rocks here are typical of the entire valley from Dungarvan Harbour eastwards to Lismore and beyond. The rocks are in the core of a geological structure called a syncline which is a downfold of the strata. Hence some of the quarry walls show vertical bedded rocks, although most of the limestone is quite massive, typical of the Waulsortian limestone.

Additional features of interest here are the extensive expressions of karstified limestone. There are solution pipes, sand filled dolines (enclosed depressions), epikarst and expanded joints with brown deposits of the mineral calcite on them. There was a minor cave in the south west corner of the quarry but it is now inaccessible due to the construction of a settling pond adjacent to the face.

### Site Importance

The quarry is worth recording as a County Geological Site since it provides a significant window into the underlying geology of the Dungarvan valley, whose rocks are largely only seen otherwise at the coast and in caves.

### Management/promotion issues

As an active quarry, the CGS status has no impact or restriction on the normal permitted operation of the quarry. Unless the operators (John A. Wood) have additional land banks adjoining the existing footprint, it would appear that the quarry is close to the limits of the rock reserve, without working below the water table. There may be opportunities for active engagement with the operators to preserve some interesting quarry faces, such as the heavily karstified eastern side, depending on planned end-use or restoration plans. Further information on possibilities is explored in the GSI and Irish Concrete Federation publication of *Geological Heritage Guidelines for the Extractive Industry* by Sarah Gatley and Matthew Parkes.





View of sand filled doline (enclosed depression) in eastern wall of Cappagh Quarry.



Near-vertical bedding in the Waulsortian limestone of western face of Cappagh Quarry.



View of karstified limestone at northern face of quarry, showing epikarst – expanded joints and fractures in top few meters of limestone bedrock.







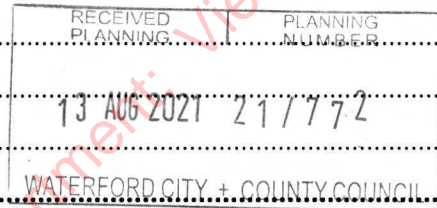
Waterford City & County Council Planning Department: Viewing Purposes Only!

Waterford City & County Council Planning Department: Viewing Purposes Only!



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Figure 7-8 Karst Features (GSI Karst Database)



# WATER (HYDROLOGY AND HYDROGEOLOGY) 7

## APPENDICES

Appendix 7-A Legislation, Guidelines and Standards

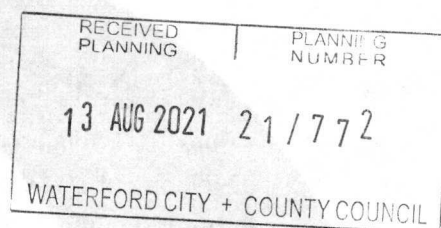
Appendix 7-B Initial Characterisation of Groundwater Body (GSI)

Appendix 7-C Well Survey Results (March 2019)

Appendix 7-D Groundwater Sampling Field Record Sheets

Appendix 7-E Laboratory Reports

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SLR

## INTRODUCTION

### Background

- 7.1 SLR Consulting Ireland (SLR) was commissioned by Roadstone Limited to prepare a hydrological and hydrogeological assessment in respect of a proposed development of a satellite quarry on lands to the east of Cappagh Quarry, Co. Waterford and the construction and operation of a new concrete batching plant on the quarry floor at the northern end of the existing quarry.
- 7.2 The application site comprises part of the existing quarry in which a number of established quarry facilities, such as the site offices, staff welfare facilities, weighbridge, wheelwash etc. and the proposed new concrete batching plant are located, as well as seven agricultural fields to the east which will be developed as the proposed satellite quarry.
- 7.3 The satellite quarry will be separated from the existing quarry by a local access passageway, which will be retained, and will be linked to the existing quarry at quarry floor level by a tunnel underpass running beneath the passageway. The quarry will comprise a single bench excavation in limestone bedrock, varying in height from approximately 8m to 20m from existing ground level to quarry floor level. The quarry floor level across the satellite quarry will not extend below 10mOD or into the underlying groundwater body.
- 7.4 This Chapter of the EIA Report provides a description of the water environment, including surface water (hydrology) and groundwater (hydrogeology), around the application site in the context of its local and regional setting. It also assesses the potential impacts of the proposed development on surface water and groundwater receptors. Impact assessment is focused on the quality and quantity of both surface water and groundwater.
- 7.5 Unmitigated potential impacts on hydrology and hydrogeology are considered in the initial assessment, before any appropriate mitigation measures for identified impacts are considered. Potential impacts are then re-assessed assuming the proposed mitigation measures are in place.

### Development Proposal

- 7.6 The development, within an overall application site area of 18.2 hectares (45.0 acres) comprises:
- development of a satellite quarry immediately to the east of Cappagh Quarry (previously permitted under Planning Permission 06/1599 and An Bord Pleanála PL 24.225443) and the local access passageway which delineates its eastern boundary. The satellite quarry will extend to 13.6 hectares (33.6 acres), of which approximately 9.7 hectares (24.0 acres) will be extracted;
  - construction of a 40m long sub-surface reinforced concrete tunnel underpass (with internal cross-section measuring 6m wide by 5.5m high) under the existing local access passageway (previously permitted under Planning Permission 920/97) to connect the existing quarry to the proposed satellite quarry at quarry floor level;
  - stripping of overburden soils at the satellite quarry for use in construction of environmental bunds and ongoing site restoration works and subsequent excavation of a single quarry bench in limestone bedrock using mechanical excavation and blasting techniques. The proposed quarry faces will vary in height from approximately 8m to 20m and the quarry floor will not extend below 10mOD or into the underlying groundwater body (consistent with Condition 2 of the existing quarry planning permission);
  - processing (crushing and screening) of excavated rock to produce aggregates;
  - demolition of an existing derelict house in the north-western corner of the proposed



satellite quarry, removal of existing internal hedgerows, construction of new perimeter fence and installation of access gates leading from the local access passageway to a perimeter track running above and around the satellite quarry;

- temporary diversion of a section of the existing local access passageway to facilitate construction and installation of the proposed tunnel underpass and re-instatement of the access passageway above it thereafter;
- provision of a temporary access gate and ramp at the existing quarry to facilitate the temporary haulage of materials to and from the satellite quarry and across the existing passageway until the proposed tunnel underpass is in place;
- demolition of concrete supports for former crushing plant;
- construction and operation of a new concrete batching facility (which comprises 4 No. cement silos, batching / mixing unit, aggregate storage bins, an aggregate loading hopper and connecting conveyor systems), all on a concrete paved area on the existing quarry floor, in front of the northern quarry face;
- provision of a batching control office and admixture storage shed;
- construction of a closed loop concrete recycling facility, comprising a concrete truck wash out area, settlement lagoons and 70,000 litre water storage / recycling tank immediately behind (north of) the concrete batching plant;
- construction of an aggregate storage hardstanding area (covering approximately 1 hectare) immediately to the east of the proposed concrete batching plant;
- continued use of established site infrastructure in service of the proposed satellite quarry and new concrete batching plant;
- removal and replanting of the existing boundary hedge, re-alignment of the boundary wall and demolition / removal of an existing structure to the east of the existing quarry access junction in order to provide enhanced sightlines for traffic egressing the quarry;
- implementation of a progressive restoration scheme (in phases) in tandem with extraction activities across the satellite quarry area.

7.7 Further information on the proposed development, site-based activities, environmental management systems and existing water management systems at the quarry and application site are provided in Chapter 2 of this EIA Report.

### Scope of Work / EIA Scoping

7.8 The scope of this EIA Chapter includes:

- An assessment of the existing water (hydrology and hydrogeology) within and close to the application site;
- An assessment of the potential impact of the proposed satellite quarry development and new concrete batching plant on surface water and groundwater; and
- Where necessary, recommendation(s) of mitigation measures to reduce or eliminate any potential impact(s) identified.

### Consultations / Consultees

7.9 In the course of preparing this Environmental Impact Assessment Report, a pre-planning consultation meeting was held outdoors at the application site on 19th May 2021 between the local area planner for Waterford City and County Council and representatives of SLR Consulting Ireland and Roadstone Limited (Meeting Ref. No. PQ202191).



- 7.10 At the meeting, details of the proposed development were outlined and several issues of interest or concern to the Planning Authority were identified and discussed, including the potential impact of environmental emissions on neighbouring residents and property.
- 7.11 As part of a formal pre-planning consultation process, a number of relevant prescribed bodies and consultees, including the local Environmental Health Officer, were contacted by SLR Consulting Ireland by email and post in early March 2021. Each was provided with a summary report and preliminary drawings in respect of the development and invited to provide feedback, particularly on issues which were of concern to them or which they considered should be addressed by an EIA Report. Details of the consultation are presented in Chapter 1 of this EIAR.
- 7.12 Following a review of published development plans and a site survey, it was considered that there was no requirement for any further formal external consultations to be carried out in respect of surface water and groundwater for the purposes of this assessment. There was however significant consultation with other specialist contributors to this EIA Report.

## Contributors / Author(s)

- 7.13 This Chapter of the EIAR was prepared by SLR. The project team consists of:
- Clodagh Gillen BSc., MSc., (Hydrogeology)
  - Dominica Baird BSc., MSc. (Hydrogeology), CGeol, EurGeol, MIAH
  - Peter Glanville MSc., PhD., PGeo, EurGeol

## Limitations / Difficulties Encountered

- 7.14 The assessment of the hydrological and hydrogeological environment is based on published information, site visits and site investigations including water sampling undertaken in 2019 and 2020.
- 7.15 The assessment presented in this Chapter should be viewed as a largely qualitative assessment of the potential development on the local hydrological and hydrogeological environment.

## REGULATORY BACKGROUND

### Legislation

- 7.14 The key European Directives / European Union Legislation which apply to this Chapter of the EIA Report 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).

Other European Directives to which this EIAR makes reference, or has had regard, are listed in Appendix 7-A.

- 7.15 Irish Government Acts, National Legislation and Regulations which apply to this Chapter of the EIA Report and to this hydrology and hydrogeology assessment are also listed in Appendix 7-A.
- 7.16 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

- 7.17 There are no planning policy and development control regulations that specifically apply to this hydrology and hydrogeology assessment.

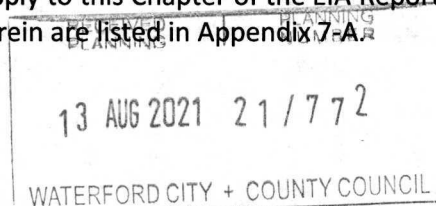
## Guidelines and Technical Standards

- 7.18 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; and
  - National Roads Authority, 2008. Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes.
- 7.19 Additional guidelines and technical standards which apply to this Chapter of the EIA Report and the hydrology and hydrogeology assessment presented herein are listed in Appendix 7-A.

## RECEIVING ENVIRONMENT

### Study Area

- 7.20 Cappagh Quarry is located in the townlands of Kilgreany and Ballykenedy in west Co. Waterford. The proposed quarry satellite comprises 7 agricultural fields located in the adjoining townland of Canty, to the east. The quarry and application site are located approximately 8km east of the town of Dungarvan, Co. Waterford and are accessed via the L2018 Local Road.
- 7.21 The existing quarry and application site are surrounded in all directions by agricultural land. The L2018 Local Road runs along the northern quarry boundary. A local access passageway which runs immediately beyond the eastern boundary of the existing quarry is to be retained and the proposed satellite quarry will be developed on the agricultural lands to the east of it.
- 7.22 The total area of the proposed satellite quarry is 13.6 hectares, of which 9.7 hectares will be extracted. The proposed level of the satellite quarry floor is at 10mOD, above the identified winter groundwater level.
- 7.23 Activities at the proposed satellite quarry will include the extraction, blasting, crushing, and screening of limestone bedrock to produce construction aggregates and agricultural ground limestone and use of site-won aggregate in the production of readymix concrete at the new batching plant.



## Baseline Study Methodology

- 7.24 The methodology used in the investigation follows the guidelines and advice notes provided by the Environmental Protection Agency (EPA) on environmental impact assessments, with due regard to the guidelines published by the Institute of Geologists of Ireland's (IGI) (2013).
- 7.25 The methodology involved in this assessment of the hydrogeology and hydrology at the application site can be summarised as follows:
- Review of existing reports and EIAR;
  - A desk study in which existing data and relevant regional data sources for the area were examined;
  - Site visits in which the aspects of the sites hydrology and hydrogeology were identified and assessed;
  - Sampling of groundwater and water from the site; and
  - Analysis of the information gathered.

## Sources of Information

- 7.26 Existing reports and previous EIA Reports were reviewed including:
- The Environment Impact Statement prepared in support of the planning application for continued working of the quarry submitted by John A. Wood Ltd. and dated October 2006; and
  - The Environment Impact Statement for proposed quarry development previously prepared by Golder Associates (Ref. 1450710105.R05.01.A0) and dated April 2018.
- 7.27 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 below.

Table 7-1  
Regional Data Consultation

Theme	Source
<b>Soils</b>	<ul style="list-style-type: none"> <li>• Teagasc (Irish Soils Information System)</li> </ul>
<b>Subsoil Geology</b>	<ul style="list-style-type: none"> <li>• Teagasc / GSI / EPA (Subsoil Mapping)</li> </ul>
<b>Bedrock Geology</b>	<ul style="list-style-type: none"> <li>• GSI (Bedrock Geology)</li> </ul>
<b>Surface Water</b>	<ul style="list-style-type: none"> <li>• OSi (Discovery Series mapping)</li> <li>• Environmental Protection Agency (Water Framework Directive data and catchment flow)</li> <li>• OPW Flood Mapping</li> </ul>
<b>Groundwater</b>	<ul style="list-style-type: none"> <li>• GSI (bedrock and gravel aquifer)</li> <li>• GSI (Groundwater body description documents) and</li> <li>• Environmental Protection Agency (Water Framework Directive data)</li> </ul>
<b>Climate</b>	<ul style="list-style-type: none"> <li>• Met Éireann (Rainfall data)</li> </ul>
<b>Protected Areas, Environmental Pressures</b>	<ul style="list-style-type: none"> <li>• Environmental Protection Agency (Water Framework Directive data)</li> <li>• National Parks and Wildlife Service (Designated Areas)</li> </ul>



- 7.28 Site visits were made by SLR's hydrogeologists on a quarterly basis between January 2019 and November 2020, and by an SLR hydrologist on the 29<sup>th</sup> January 2019. During the site visits SLR staff met with the quarry manager and inspected the water management system at the existing quarry and also monitored and sampled the groundwater wells across the existing quarry and proposed satellite quarry area.

## Topography, Physical Features, and Land-use

- 7.29 The application site location and its context within the surrounding topography including the valley feature, river and streams and Dungarvan harbour and estuary complex are shown on the 1:50,000 scale Discovery Series map in Figure 1.1 of this EIA Report.
- 7.30 The application site is located on the floor of a steep sided valley trending east-west. The site is located in a relatively flat area where ground levels range between 10m to 30mOD. Areas to the east and west of the site have a similar topography. The Drum Hills are located c. 1.5km to the south, extending broadly east-west, reaching a maximum elevation of 260mOD. The foothills of the Knockmealdown Mountains are located c. 2km to the north, extending broadly east-west, and rising to a maximum elevation of 790mOD.
- 7.31 The Brickey River flows in an easterly direction c. 1km south of the application site. The Finisk River flows in a southerly direction c. 2km to the west of the site. Dungarvan Harbour is c. 8.5 km east with the Celtic Sea beyond.
- 7.32 There are a number of karst features, including caves, springs and turloughs in the vicinity of the application site. These are discussed in detail later in this Chapter.
- 7.33 Land-use at the existing site includes the extraction, blasting, crushing and screening of limestone bedrock to produce construction aggregates and agricultural ground limestone. The surrounding land use is predominantly farm based, principally grassland / grazing and tillage, with some occasional areas of forestry and dispersed residential housing. Dungarvan is the nearest town and is located c. 8km to the east.

## Rainfall and Climate

- 7.34 The nearest rainfall gauging station is Cork Airport, which is located 7.5km south-west of the site. The Average Annual Rainfall (AAR) in Cork Airport is 1,227.9 mm, for the 30-year period 1981-2010 (Met Éireann, 2018). Average monthly rainfall values for the 30-year period 1981-2010 are shown in Table 7-2 below.

Table 7-2  
Long Term Average Total Monthly Rainfall (mm) at Cork Airport (1981-2010)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
131.4	97.8	97.6	76.5	82.3	80.9	78.8	96.8	94.6	138.2	120.0	133.1

## Soils and Geology

### Soils and Subsoils

- 7.35 The soil association at the application site is classified as the Clashmore Soil Association (ISIS Code 1100n), describes as a coarse, loamy drift with siliceous stones. The Clashmore Soil Association is indicated to comprise Brown Earths, Luvisols, Lithosols and Gleys and is related to fine soil textures

on sandstone glacial till subsoils<sup>1</sup>. The Brown Earths generally have better drainage than other soils in this series and are considered to be free draining.

- 7.36 Teagasc soil mapping indicates that bedrock extends across the surface over the majority of the existing quarry footprint, refer to Figure 6-1 of this EIA Report.
- 7.37 Online mapping published on the Geological Survey of Ireland (GSI) website indicates that satellite quarry area is underlain by moderately permeable subsoil comprising till derived from Devonian sandstones, refer to Figure 6-2.
- 7.38 It is noted that most of the existing soils and subsoils across the satellite quarry area will be removed to facilitate extraction of the underlying bedrock.

### *Local Bedrock Geology*

- 7.39 The GSI 1:100,000 geological map (Sheet 22) shows the existing quarry and application site to be underlain by Waulsortian Limestones, comprising pale-grey, crudely bedded or massive unbedded lime-mudstone from the Carboniferous Period, refer to Figure 6-3.
- 7.40 The application site is located on a syncline fold. The syncline and anticline geological folds run broadly east-west across the region. The valley floor of the syncline, on which the application site is located, comprises a relatively flat expanse of land between the Drum Hills and the Knockmealdown Mountains.
- 7.41 There is a change in the underlying bedrock geology at the base of the Drum Hills to the south of the application site and the foothills of the Knockmealdown and Comeragh Mountains to the north. The topographically higher ground to the north and south comprises Old Red Sandstone rocks.

### **Surface Water - Hydrology**

- 7.42 The application site is located entirely within the Water Framework Directive (WFD) Colligan-Mahon Catchment and the Colligan Sub-Catchment. It is also located within the Brickey WFD River Sub-Basin.
- 7.43 There are no hydrological features at the application site or immediately adjacent to it. There are a number of hydrological features at a greater distance, principally the Brickey River and the Finisk River. The Brickey River is c. 1km south of the application site and flows in an easterly direction. The Finisk River is c. 2km west of the application site and flows in a southerly direction. The Celtic Sea is c. 8.5km to the east, at Dungarvan.
- 7.44 The Brickey River is not in a designated shellfish, salmonid or nutrient sensitive area, nor is it located in a Special Area of Conservation (SAC). However, it does intersect with a Special Protection Area (SPA) at Dungarvan Harbour (Site Code 004032), refer to [www.catchments.ie](http://www.catchments.ie).
- 7.45 The Finisk River is not in a designated shellfish or salmonid area, nor is it located in a SPA. However, it is in a nutrient sensitive area and does comprise part of an SAC Habitat and SAC Species (Blackwater River (Cork /Waterford), Site Code 002170).
- 7.46 The transitional and coastal waters at Dungarvan Harbour are a designated shellfish area, and hence surface waters around Dungarvan Town are also within a shellfish area. The transitional and coastal waters also intersect the Dungarvan Harbour SPA Habitat. Coastal waters intersect a SAC Habitat and SAC Species, refer to Chapter 5 of this EIA Report (Biodiversity).

<sup>1</sup> EPA Report No. 130 (2014), Irish Soil Information System: Synthesis Report



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## Surface Water Abstractions

- 7.47 Surface water in the Brickey and Finisk Rivers is not abstracted for drinking water purposes and the rivers are not designated by the EPA as having a particular recreational use, refer to [www.catchments.ie](http://www.catchments.ie).
- 7.48 There are agricultural and domestic wastewater pressures on the Brickey River. There are no listed environmental pressures identified along the Finisk River, refer to [www.catchments.ie](http://www.catchments.ie).

## Surface Water Quality

- 7.49 The Brickey River is poor status according to the EPA River Waterbody WFD Status Report for 2013-2018 and is at risk of deteriorating further.
- 7.50 The Finisk River is good status according to the EPA River Waterbody WFD Status Report for 2013-2018 and is not at risk of deteriorating further.

## Surface Water Flows

- 7.51 There are no water flow monitoring stations on either the Brickey or Finisk Rivers. The closest stations are located c.22km west of the application site, along the Blackwater and Bride Rivers, at a distance where flow levels would not be representative of the rivers closer to the application site.

## Flooding

- 7.52 The Office of Public Works (OPW) is the Irish Government agency with statutory responsibility for management of flooding in Ireland. Published flooding mapping on the OPW website ([www.floodinfo.ie](http://www.floodinfo.ie)) indicates that there is no flood risk to the application site from river or coastal flooding. OPW flood information indicates potential for flooding along the Blackwater River c. 7.7km west of the application site, and in Dungarvan Town to the east, principally from coastal / tidal flooding in Dungarvan Harbour. There are several recurring past flood events recorded in these areas.

## Water Management

- 7.53 The existing quarry has been worked above the groundwater table and the proposed eastern satellite quarry will also be restricted to extraction above the groundwater. Floor level at the existing quarry and proposed future satellite quarry area is at a minimum level of 10mOD and above the identified winter groundwater level.
- 7.54 There is no active dewatering or surface water management system at the existing quarry and no discharge from the quarry to any surface water course. Rainfall at the quarry runs off and percolates naturally to the ground. The water management measures which will be implemented across the proposed satellite quarry area are identified in later sections of this EIA Chapter.
- 7.55 The construction and operation of a new concrete batching plant on a hardstanding area on the existing quarry floor, at the northern end of the quarry will require water management measures. The washout water from concrete trucks will be captured, treated and recirculated through a closed water treatment system comprising a series of settlement lagoons and a 70,000-litre recycled water storage tank. There will be no discharge from this closed system to any surface water or groundwater at the application site.
- 7.56 The washout settlement lagoons will be constructed of cast in situ concrete, and will be completely sealed, with no contact with the underlying groundwater table. Storm surface water drainage from the sealed area around the concrete batching plant will also be directed to, and captured by, the settlement lagoons at the truck wash out area and will ultimately be pumped to the water storage tank and recycled in concrete production.

- 7.57 Admixtures will be used in the production of concrete at the batching plant. These will be stored on spill pallets which are bunded to 110% of the maximum volume under cover in a dedicated storage shed beside the concrete plant, refer to Figure 2-6 in Chapter 2 of this EIA Report.

### Groundwater - Hydrogeology

- 7.58 There are a number of groundwater features in the vicinity of the site, the principal one being the regionally important bedrock aquifer beneath the existing quarry and application site.

#### *Bedrock Aquifer*

- 7.59 Bedrock aquifer maps published on the GSI online database provide a classification of bedrock aquifer types. The groundwater in the limestone bedrock underlying the application site is classified as a 'Regionally Important Aquifer – karstified (diffuse) (Rkd)', refer to Figure 7-1.
- 7.60 A Regionally Important aquifer is defined by the GSI as offering the potential for excellent yields, in excess of 400m<sup>3</sup>/day; karstified refers to the bedrock and diffuse refers to the groundwater flow. As flow in the aquifer is more diffuse than conduit, aquifer storage is higher.
- 7.61 There are no sand and gravel aquifers in the vicinity of the application site.

#### *Groundwater Body*

- 7.62 The application site lies within the Dungarvan Groundwater Body (GWB). Initial characterisation of the GWB has been developed by the GSI, and augmented by the River Basin District (RBD) Consultants and is presented in Appendix 7-B. A summary of the groundwater body characterisation is presented below.
- 7.63 The application site is located within the Dungarvan Groundwater Body (GWB), as indicated in Figure 7-2. The Dungarvan GWB covers an area of 58.6km<sup>2</sup> and is classified a high yielding.
- 7.64 The groundwater is of good status according to the EPA Ground Waterbody WFD Status Report for 2013-2018, and the risk of deterioration is indicated to be under review.
- 7.65 The Dungarvan GWB characterisation report states that Waulsortian Limestone units are typically 300-500m thick. However, in all aquifers within this GWB, most groundwater flow occurs within the top 30m-40m of the aquifer, in the layer that comprises a weathered and fractured zone. Deeper flows generally occur along isolated faults or significant fractures in the bedrock.
- 7.66 Groundwater to the east of Whitechurch (which includes quarry / application site) flows east towards Dungarvan Harbour.
- 7.67 Bedrock permeability generally decreases rapidly with depth in all aquifers. In general, transmissivities are reported to be in the range 900-13,000m<sup>2</sup>/d. The central area of the syncline (the application site is located on a syncline fold) has higher permeability (15-180m/d) than the limestone to the north and south (15-70m/d), this is due to a higher degree of fracturing and faulting associated with the syncline. Aquifer storativity can be as high as 5% but as low as 1% at depth. The effective porosity is estimated to be 2.5%.
- 7.68 The main recharge mechanism to limestones on the valley floor is likely to be increased as a result of surface water run-off from the surrounding, less permeable and topographically higher Old Red Sandstone rocks along the valley sides. The sandy till facilitates significant recharge in most areas.
- 7.69 Groundwater generally discharges in a narrow zone along major rivers. This may be in the form of general baseflow via springs or through sand and gravels that are in continuity with the rivers. Significant quantities of groundwater from the limestones of the Lismore-Dungarvan syncline are understood to discharge into the Blackwater, Brickey, lower Finisk and Colligan Rivers, in addition to Dungarvan Harbour.



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- 7.70 The hydro-chemical signature of the groundwater is calcium-bicarbonate, implying a relatively rapid flow system. The groundwater is moderately hard (212-244mg/l CaCO<sub>3</sub>), conductivities are in the range 471-512µS/cm and chloride levels are slightly elevated, likely due to the proximity of the sea.
- 7.71 The identified environmental pressures on the Dungarvan GWB are principally from anthropogenic activities.

## Groundwater Vulnerability

- 7.72 The GSI has developed a groundwater vulnerability classification for Ireland, refer to Table 7-3. The groundwater vulnerability at a particular point is controlled by the natural geological and hydrogeological characteristics at that point. The vulnerability depends on the nature of the subsoils (i.e. their permeability characteristics), the type of recharge (point or diffuse) and the thickness of the unsaturated zone (depth to groundwater).
- 7.73 The vulnerability of the current site ranges from 'X' or Extreme (rock at or near the surface or karst) to 'High'. The majority of the satellite quarry area is classified as being of 'High' vulnerability high with small areas mapped as being of Extreme and 'X' vulnerability, suggesting the presence of less than 3m of subsoil cover. An aquifer vulnerability map of the area is reproduced in Figure 7-3.

Table 7-3  
Vulnerability Rating

Vulnerability Rating	Hydrogeological Conditions				
	Subsoil Permeability (Type) and Thickness			Unsaturated Zone	Karst Features
	High permeability (sand/gravel)	Moderate permeability (e.g. Sandy subsoil)	Low permeability (e.g. Clayey subsoil, clay, peat)	(Sand/gravel aquifers only)	(<30 m radius)
<b>Extreme (E)</b>	0 - 3.0m	0 - 3.0m	0 - 3.0m	0 - 3.0m	-
<b>High (H)</b>	> 3.0m	3.0 - 10.0m	3.0 - 5.0m	> 3.0m	N/A
<b>Moderate (M)</b>	N/A	> 10.0m	5.0 - 10.0m	N/A	N/A
<b>Low (L)</b>	N/A	N/A	> 10.0m	N/A	N/A

Notes: (1) N/A = not applicable.  
(2) Precise permeability values cannot be given at present.  
(3) Release point of contaminants is assumed to be 1-2 m below ground surface.

## Groundwater Recharge

- 7.74 GSI Groundwater Recharge mapping published by the GSI shows an effective rainfall for the application site of 786mm/yr. Evapotranspiration is therefore 441.9mm/yr. (Evapotranspiration = Rainfall – Effective Rainfall). Met Eireann report potential evapotranspiration as 516.3mm/yr. Potential evaporation will always be higher than the actual value.
- 7.75 As previously noted, the main recharge mechanism to the valley floor limestones is likely to be increased as a result of surface water run-off from the surrounding less permeable slopes on the side of the valley. Where present, sandy till probably allows significant recharge to occur.
- 7.76 The satellite quarry area comprises grassed fields which have on occasion been used for growing crops. The glacial till subsoil across this area reduces recharge to the underlying bedrock aquifer, as it is likely to be moderately permeable and several metres thick.

- 7.77 GSI Groundwater Recharge mapping indicate recharge values of 472mm/yr across the satellite quarry area compared to 668mm/y across the existing quarry footprint where it is absent. When vegetation cover is removed across the satellite quarry area, and soils / bare rock exposed, recharge will increase.

## *Groundwater Abstraction and Wells*

- 7.78 The GSI online database shows the presence of a number of groundwater boreholes within c. 2km of the application site, refer to Figure 7-4. While the use of most boreholes is not stated, one is reported to be used for agriculture and domestic purposes. Yields of boreholes range are reported to range from poor to good.
- 7.79 A local well survey was undertaken in the vicinity of the application site (see below) and dwellings in the local area have individual private groundwater wells for domestic supplies. The nearest domestic dwelling is just over 100m east, and down-gradient in terms of groundwater flow direction of the proposed satellite quarry area.
- 7.80 It is understood from the local well survey that there are no mains water supply or group water scheme supplies in the area around the application site.

## *Public Water Supplies*

- 7.81 The public water supply at Dungarvan is approximately 5.5km to the east of the application site, close to the River Colligan, and comprises four groundwater abstraction wells to a maximum depth of 27.5m bgl. The wells have a maximum abstraction rate of 7,194m<sup>3</sup>/d based on a seven-day pumping test.
- 7.82 A source protection report for the Dungarvan PWS has been prepared by the GSI (1998) and numerical modelling undertaken to identify the inner and outer source protection zones for the supply wells. The existing quarry and application site lie outside of the identified source protection zones to the PWS wells.
- 7.83 The application site is not located within a drinking water protection zone. The closest protection zone is that around the Dungarvan Public Water Supply, which is 1.5km east of the application site at its closest point. There is another protection zone around the Lismore - Cappoquin Public Water Supply located c. 5km to the north-west. The protection zones are shown in Figure 7-5.

## *Local Well Survey*

- 7.84 A local well screening was carried out by Tobin Consulting Engineers in 2006 for the S261 application for the existing quarry, based on the GSI well database. Twelve groundwater abstractions were identified, refer to Table 7-4 for details. Figure 7-6 shows identified boreholes within 2km of the quarry.

Table 7-4  
Details of Groundwater Wells within 2km of Application Site

GSI ID Number	Townland	Easting	Northing	Depth to Bedrock (m)	Depth (m)	Yield (m <sup>3</sup> /day)
<b>GW1*</b>	Kilcannon	216858	096692	-	-	-
<b>GW2*</b>	Cappagh	217114	096704	0.2	45.7	98.2
<b>GW3*</b>	Cappagh	218007	096631	0	-	-
<b>GW4</b>	Bridgequarter	216444	095577	18.3	19.2	164



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GSI ID Number	Townland	Easting	Northing	Depth to Bedrock (m)	Depth (m)	Yield (m <sup>3</sup> /day)
<b>GW5</b>	Farrenbullen	216863	095534	-	10.7	-
<b>GW6</b>	Ballynamindra	217357	095469	21.3	39.6	24
<b>GW7</b>	Scart	216917	094429	-	12	-
<b>GW8</b>	Canty	218421	094307	7.3	17.7	16.4
<b>GW9</b>	Canty	218678	094305	3.7	21.3	10.9
<b>GW10</b>	Knockaun	218207	094213	-	47.7	-
<b>GW11*</b>	Ballymulalla	216148	093131	6.1	19.8	21.8
<b>GW12*</b>	Lauragh	218036	093292	4	36.6	54.5

\* >1km from the site

- 7.85 The depth to bedrock across the wells surveyed varies from 0m to 21.3m. There is no information available on depth to water table in any of the wells.
- 7.86 The well yields, where reported, vary from 10.9m<sup>3</sup>/day (poor yield classification) to 164m<sup>3</sup>/day (good yield classification). Table 7-5 presents information on GSI classification of well yield categories.

Table 7-5  
GSI Classification of Well Yield Categories

Well Yield Category	GSI Well Yield Range (m <sup>3</sup> /day)
<b>Poor</b>	< 40
<b>Moderate</b>	40-100
<b>Good</b>	100-400
<b>Excellent</b>	> 400

- 7.87 SLR carried out a review of the existing well survey and identified a number of new residences in the local area which had not been included in the previous 2006 survey. Recent aerial photographs were compared to the 2006 Ordnance Survey map to identify new houses within 600m of the satellite quarry area. Two additional residences and boreholes were identified by this review, see Table 7-6 below and figure 7-6 for residence / well locations.
- 7.88 SLR undertook a supplementary well survey on 28<sup>th</sup> March 2019, refer to Appendix 7-C. There is no available information on depth to bedrock, yield or well depth for these wells.

Table 7-6  
SLR Supplementary Well Survey March 2019

Well Number	Townland	Easting	Northing	Approximate Distance from Centre of Satellite Quarry Area (m)
<b>13</b>	Kilgreany	217465	094557	600
<b>14</b>	Kilgreany	217759	094218	500

## Site Boreholes

- 7.89 There were three groundwater monitoring boreholes installed in 2016 within the current quarry footprint (designated BH16-09, BH16-11 and BH16-13) and three in the proposed satellite quarry area (designated BH16-02, BH16-06 and BH16-07) in 2016. The borehole / installation logs can be seen in Appendix 6-A. The six groundwater monitoring boreholes were extended into the limestone, described as light grey and containing water bearing cavities or karst features. The depth of the boreholes ranged from 11m to 34.5m and the slotted (intake) section of the boreholes was everywhere in the limestone bedrock.
- 7.90 Site staff at the quarry use (and will continue to use) the existing toilet, hand washing and welfare facilities provided at the main site offices and staff canteen. Process water, together with water for toilet, hand washing and welfare facilities at the main site offices and staff canteen is sourced from an existing groundwater production well on-site. Potable (drinking) water at site offices and welfare facilities is currently (and will continue to be) supplied from off-site and delivered to site as required.

## Site Groundwater Levels

### Methodology

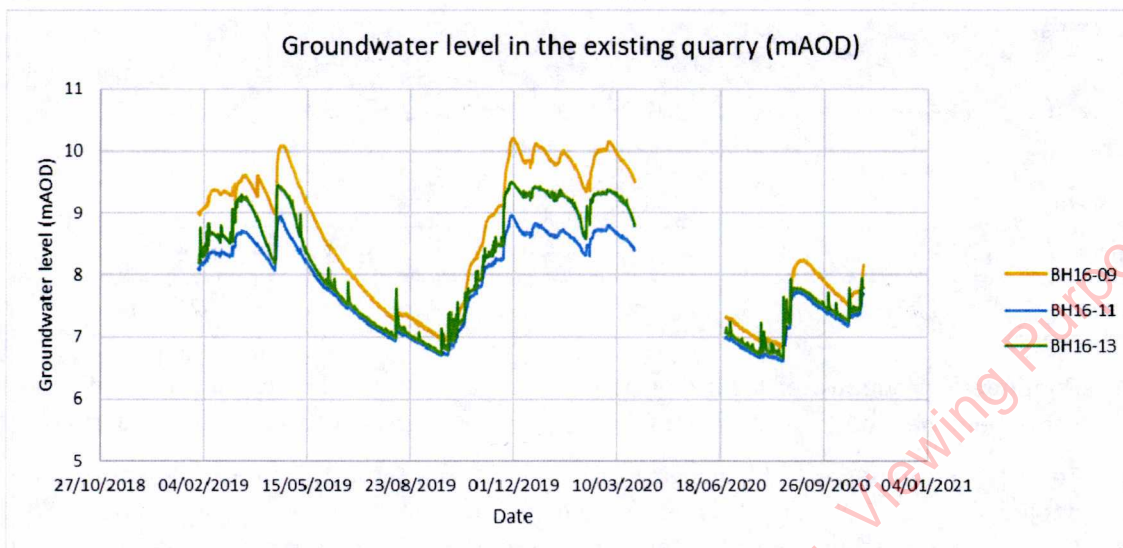
- 7.91 Six on-site groundwater monitoring boreholes were installed at the application site in 2016.
- 7.92 On 29<sup>th</sup> January 2019, groundwater monitoring loggers were set by SLR to record groundwater levels every hour. The barometer (In-Situ Rugged Baro Troll) installed in BH16-09 (in the existing quarry area) was also set to record atmospheric pressure every hour. One barometer is deemed sufficient for monitoring within a 25km<sup>2</sup> area as per the manufacturer's instructions and as such, only one barometric logger was required for the calibration of the groundwater level loggers for this site.
- 7.93 Since Q1 2019, manual water level readings have been taken every quarter to verify and calibrate the groundwater level data on the loggers. The groundwater level logger data was merged with the barometric logger data and adjusted to the manual water level readings from the site. The latest data download was undertaken on 4<sup>th</sup> November 2020.

### Groundwater Level Results

- 7.94 Groundwater levels from January 2019 to November 2020 can be seen in Plot 7-1 and Plot 7-2 below. The recorded levels are also summarised in Table 7-7. The groundwater levels beneath the site including a cross section of the existing quarry and proposed satellite quarry area is shown in Figure 7-7.
- 7.95 All loggers stopped on 26<sup>th</sup> March 2020 on account of expiry of battery life of the loggers. A site visit was due in April 2020 but was not ultimately undertaken on account of restrictions imposed on account of the COVID-19 pandemic at that time. Loggers were reset and commenced recording again on 22<sup>nd</sup> June 2020.
- 7.96 Groundwater levels are examined to determine if they exceeded a level of 10mOD (the proposed quarry floor level) across the satellite quarry area. The groundwater level in borehole BH16-09 at the extreme western boundary and upgradient end, of the existing landholding was recorded slightly above 10mOD on a number of occasions, see Plot 7-1 below.

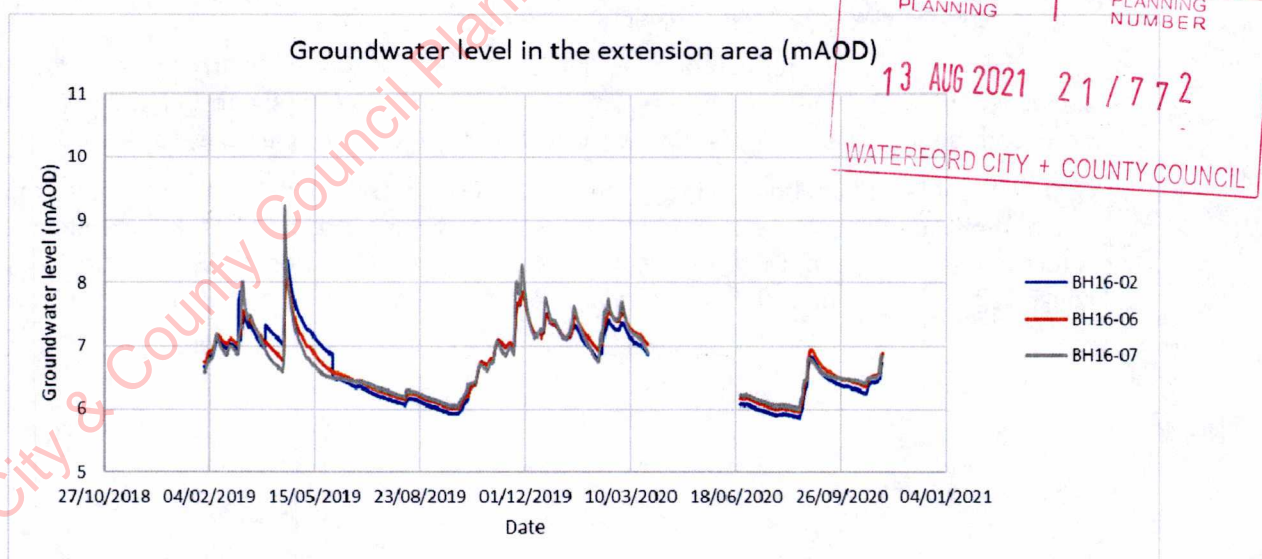


**Plot 7-1**  
**Groundwater Levels in Existing Quarry (January 2019 to November 2020)**



7.97 Groundwater levels in the satellite quarry area (as measured by BH16-02, BH16-06, BH16-07 in Plot 7-2) did not exceed 10mOD (the proposed extraction level) between January 2019 and November 2020 and only exceeded 9mOD (1m below the proposed quarry floor level) on one occasion (in BH16-07) between January 2019 and November 2020, refer to Plot 7-2 below. Borehole BH16-07, is located in the extreme south-eastern corner of the proposed satellite quarry area, refer to Figure 7-6.

**Plot 7-2**  
**Groundwater Levels in Eastern Satellite Quarry Area (January 2019 to November 2020)**



- (i) **April 2019:** Groundwater levels exceeded 9m OD at BH16-07. The maximum water level was 9.24mOD on 16th April 2019. Water level was greater than 9m for 13 hours. The groundwater level did not exceed 10mOD during this event.

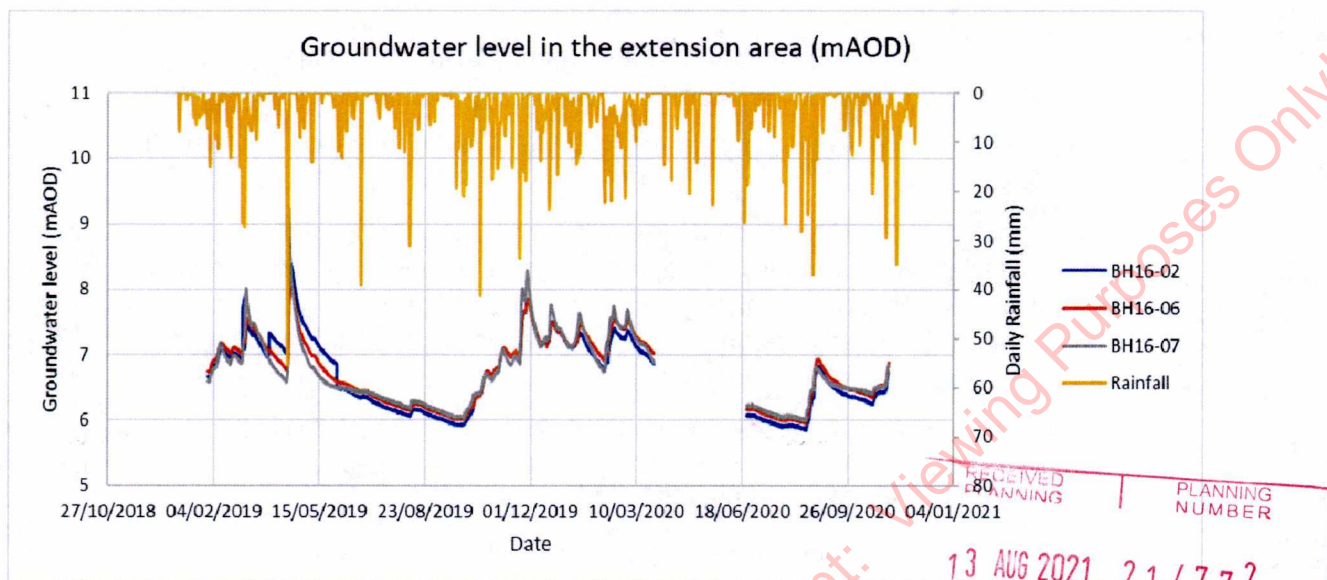
**Table 7-7**  
**Summary of 2019 and 2020 Groundwater Levels at On-Site Boreholes (mOD)**

	Satellite Quarry Area			Existing Quarry		
	BH16-02	BH16-06	BH16-07	BH16-09	BH16-11	BH16-13
<b>Average</b>	6.70	6.74	6.73	8.52	7.82	8.07
<b>Maximum</b>	8.39	8.13	9.24	10.20	8.96	9.51
<b>Minimum</b>	5.85	5.95	5.98	6.83	6.62	6.66
<b>Range</b>	2.55 m	2.18 m	3.25 m	3.37 m	2.35 m	2.84 m

- 7.98 Continuous groundwater level monitoring is ongoing at the quarry, and groundwater levels will continue to be monitored during the proposed satellite quarry development, if permitted.
- 7.99 The nearest synoptic rainfall gauging station is at Cork Airport, located c. 75km south-west of the application site. Daily rainfall data from January 2019 to November 2020 is plotted in Plot 7-3 below. Groundwater level data in the satellite quarry area is also plotted for comparison. As can be seen the groundwater levels broadly follow rainfall patterns.
- 7.100 Some rainfall events were not reflected in the groundwater levels; for example, there was high daily rainfall on 23<sup>rd</sup> June and 8<sup>th</sup> August 2019 (39mm and 31mm, respectively) however, groundwater levels did not increase. It should be noted that the Met Eireann station is located over 75km away and may not fully be entirely reflective of rainfall patterns at the application site.
- 7.101 As previously mentioned, in April 2019 groundwater levels exceeded 9mOD at BH16-07. Rainfall was very high on the 14<sup>th</sup> and 15<sup>th</sup> April 2019 (30mm and 55mm, respectively) and groundwater levels at BH16-07 reached a peak of 9.24mOD on 16<sup>th</sup> April 2019. 55mm was the highest recorded daily rainfall at Cork Airport between January 2019 and November 2020.
- 7.102 The maximum groundwater contours (April 2019) across the existing quarry and application site are shown in Figure 7-7. As can be seen, the groundwater flow direction beneath the quarry and proposed satellite quarry area is from west to east, down the syncline valley towards Dungarvan.
- 7.103 Groundwater levels are indicated to fall from just over 10.2 mOD (BH16-09) at the extreme western end of the landholding to below 8.13 mOD (BH16-06) at the eastern end of the satellite quarry area, refer to Figure 7-7 and Table 7-7 above. Maximum groundwater levels beneath the proposed concrete batching plant at the existing quarry are between 9.5 mOD and 10 mOD, see Figure 7-7.



**Plot 7-3**  
**Daily Rainfall Data (Cork Airport) vs Groundwater Levels at Satellite Quarry Area**



## Groundwater Quality

- 7.104 On the 27<sup>th</sup> and 28<sup>th</sup> March 2019 and the 3<sup>rd</sup> and 4<sup>th</sup> November 2020, groundwater samples were collected by SLR personnel from each of the six groundwater monitoring wells to test water quality. A Waterra pump and tubing were used to pump water from depth in the borehole and ensure that recent surface water inflow was not collected. Each borehole was purged of three well volumes prior to taking the groundwater sample, refer to Appendix 7-D for a copy of the field record sheets.
- 7.105 Boreholes BH16-9, BH16-13 and BH16-11 are all upgradient of the proposed satellite quarry area, while boreholes BH16-02, BH16-06 and BH16-07 are all downgradient of it, refer to Figure 7-6.
- 7.106 The samples were collected in the appropriate sample containers, which are supplied by the laboratory for the required analysis. Sample containers were filled so that there was minimum free air space. The containers were securely sealed so that there was no loss of volatile components such as moisture and no separation of components. All sample containers were clearly and uniquely labelled with details including ID and sampling date.
- 7.107 All samples were placed into a cooler box with ice packs to maintain a temperature at  $5^{\circ}\text{C} \pm 3^{\circ}\text{C}$ . In March 2019 the samples were forwarded to City Analysts Ltd for analysis, in November 2020 the samples were forwarded to ALS Ltd for analysis. The analysis required for each sample was listed on the Chain of Custody Record which accompanied samples.
- 7.108 The water quality test results are screened against the threshold limits set out in the EU Environmental Objectives (Groundwater) Regulations (SI No 366 of 2016) and the EU Drinking Water Regulations (SI No 122 of 2014). EPA Interim Guideline Values (IGV) are used if there are no other criteria available to screen against.
- 7.109 Laboratory reports are presented in Appendix 7-E. Inorganics and metals results are presented in a summary format in Table 7-8 below, EPHs and VOCs are not included because they were all reported below detection limit. The results are briefly summarised as follows:
- Nitrate exceeded DW Regs and/or GW Regs threshold values of 50mg/l and 37.5mg/l, respectively, in all boreholes in March 2019 and in four boreholes in November 2020;

## WATER (HYDROLOGY AND HYDROGEOLOGY) 7

- Orthophosphate as  $\text{PO}_4$  exceeded EPA IGVs of 0.03mg/l in two boreholes in March 2019 and in at least one (limit of detection (LoD) was higher than the criteria) borehole in November 2020;
- Extractable Petroleum Hydrocarbon (EPH) Range >C10 - C40 (aq) was below detection limit in all boreholes in March 2019 and November 2020; and
- All tested VOCs were below detection limit in all boreholes in March 2019 and November 2020.

7.110 These results suggest that the groundwater beneath the existing quarry and application site is being impacted by external activities, principally by agriculture, which is the predominant land use within the surrounding area. Accumulation of both nitrates and orthophosphate in soil are increased by the long-term use of inorganic fertilisers and manures, which can leach into groundwater supplies over time.

7.111 A third party previously collected groundwater samples on the 3<sup>rd</sup> March 2016 from each of the six boreholes (two samples taken from BH16-09) to test the water quality. The samples were forwarded to Jones Environmental Laboratory for analysis.

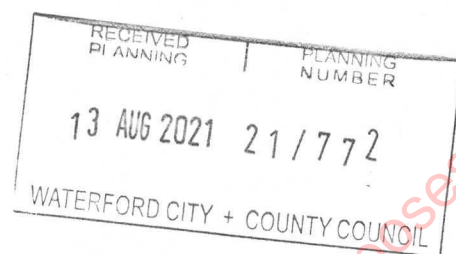
7.112 The results were screened against the threshold values in the Groundwater Regulations (SI No 366 of 2016) and Drinking Water Regulations (SI No 122 of 2014). EPA IGVs were used for screening purposes in the absence of other criteria.

7.113 Laboratory reports are presented in Appendix 7-E. Inorganics, metals, and some miscellaneous are presented in summary format in Table 7-9 below. EPHs, GROs, and VOCs are excluded because they were all below detection limit. The 2016 results are briefly summarised as follows:

- Nitrate exceeded GW Regs of 37.5mg/l in downgradient borehole BH16-07 with a concentration of 46.7mg/l;
- Nitrite exceeded GW and DW Regs of max. 0.5mg/l in upgradient borehole BH16-09 with a concentration of 0.58 mg/l;
- Orthophosphate as  $\text{PO}_4$  exceeded EPA IGVs of 0.03mg/l in at least three (LoD was higher than the criteria) boreholes;
- Potassium exceeded EPA IGVs of 5mg/l in three boreholes with a maximum concentration of 71.8 mg/l;
- Hardness exceeded EPA IGVs of 200mg/l in all boreholes with a maximum concentration of 412mg/l however, this is expected given the limestone geology; and
- All tested EPHs, GROs, and VOCs were below detection limit in all boreholes.

7.114 As with the more recent groundwater monitoring rounds, the results of 2016 monitoring round also suggest that the groundwater beneath the existing quarry and application site at that time was also being impacted by external activities, principally by agriculture.





## WATER (HYDROLOGY AND HYDROGEOLOGY) 7

Table 7-8  
Groundwater Quality Results (March 2019 and November 2020)

Parameter	Unit	March 2019							November 2020				
		BH16-02	BH16-06	BH16-07	BH16-09	BH16-11	BH16-13	BH16-02	BH16-06	BH16-07	BH16-09	BH16-11	BH16-13
Inorganics													
Alkalinity, Total as CaCO <sub>3</sub>	mg/l	252.959	249.83	326.012	288.479	253.382	295.795	233	251	383	275	267	262
Ammoniacal Nitrogen as NH <sub>4</sub>	mg/l	0.032	<0.013	<0.013	<0.013	<0.013	<0.013	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Chloride	mg/l	24.024	26.892	31.301	29.977	24.424	23.463	22.2	20.8	22.1	19.1	22.4	11.6
Conductivity @ 20°C	mS/cm	0.543	0.538	0.773	0.623	0.545	0.602	0.554	0.551	0.774	0.56	0.585	0.229
Fluoride	mg/l	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Nitrate as NO <sub>3</sub>	mg/l	41.716	44.512	82.457	50.813	42.023	50.414	50.1	38.1	54.4	32.5	44.9	11.9
Nitrite as NO <sub>2</sub>	mg/l	0.109	<0.066	<0.066	<0.066	<0.066	<0.066	0.07	<0.05	<0.05	<0.05	<0.05	0.059
pH	pH Units	7.38	7.37	7.15	7.21	7.35	7.32	7.43	7.46	7.19	7.37	7.34	7.95
Phosphate (Ortho as P)	mg/l	<0.025	0.025	0.032	<0.025	<0.025	<0.025	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Phosphate (Ortho as PO <sub>4</sub> )	mg/l	<0.025	0.075	0.097	<0.025	<0.025	<0.025	0.051	<0.05	<0.05	<0.05	<0.05	<0.05
Sulphate	mg/l	<20	<20	<20	<20	<20	<20	13.1	12.9	14.3	9.8	23.5	7.9
Filtered (Dissolved) Metals													
Antimony	µg/l	0.2	0.2	0.3	0.2	0.3	0.5	<1	<1	<1	<1	<1	<1
Arsenic	µg/l	0.2	0.3	1	0.2	0.3	0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

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Parameter	Unit	March 2019						November 2020					
		BH16-02	BH16-06	BH16-07	BH16-09	BH16-11	BH16-13	BH16-02	BH16-06	BH16-07	BH16-09	BH16-11	BH16-13
Barium	µg/l	25.2	27	45.3	17.6	20.6	14.2	19.8	9.57	26.4	10	10.9	<10
Boron	µg/l	20	20	30	30	30	20	<10	<10	15.9	<10	11	<10
Cadmium	µg/l	0.1	0.3	0.4	0.1	0.2	0.2	<0.08	<0.08	<0.08	<0.08	<0.08	<0.08
Chromium	µg/l	1.5	1.8	<1	<1	2.3	1.4	3.93	3.94	<1	<1	2.9	4.64
Cobalt	µg/l	<1	<1	<1	<1	<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Copper	µg/l	<3	5	<3	4	5	<3	0.478	0.357	0.93	<0.3	<0.3	0.44
Lead	µg/l	<0.3	0.8	<0.3	0.8	1.5	1.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Mercury	µg/l	<0.02	0.04	0.15	0.04	0.1	0.03	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Molybdenum	µg/l	<1	<1	<1	<1	<1	<1	<3	<3	<3	<3	<3	<3
Nickel	µg/l	2	2.2	2	0.9	3.5	1.1	0.586	<0.4	<0.4	<0.4	<0.4	<0.4
Phosphorus	µg/l	<50	<50	<50	<50	<50	<50	23.6	<10	<10	<10	<10	<10
Selenium	µg/l	1.2	1.7	1.4	1.4	1.7	1.4	<1	<1	1.23	<1	<1	<1
Zinc	µg/l	7.6	26	13	4.7	17	15	2.99	<1	4.83	1.07	2.06	<1
Parameters exceed one or more of the assessment criteria													





## WATER (HYDROLOGY AND HYDROGEOLOGY) 7

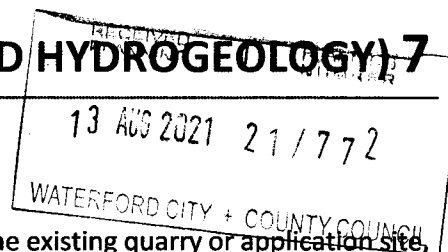
Table 7-9  
Groundwater Quality Results (March 2016)

Parameter	Unit	BH16-02	BH16-06	BH16-07	BH16-09	BH16-09D	BH16-11	BH16-13
<b>Inorganics</b>								
Alkalinity, Total as CaCO <sub>3</sub>	mg/l	246	272	658	344	336	264	790
Ammoniacal Nitrogen as NH <sub>4</sub>	mg/l	0.19	0.08	0.18	<0.03	0.07	0.05	0.04
Chloride	mg/l	23.6	22.4	27.7	20	20.3	21.1	20.5
Conductivity @ 20°C	mS/cm	0.534	0.564	0.955	0.606	0.602	0.626	0.668
Fluoride	mg/l	-	-	-	-	-	-	-
Nitrate as NO <sub>3</sub>	mg/l	24.4	28.6	46.7	28.5	26.9	29.5	32.4
Nitrite as NO <sub>2</sub>	mg/l	0.25	0.02	<0.02	0.58	0.58	<0.02	<0.02
pH	pH Units	7.64	7.68	7.32	7.72	7.74	7.47	7.47
Phosphate (Ortho as P)	mg/l	-	-	-	-	-	-	-
Phosphate (Ortho as PO <sub>4</sub> )	mg/l	0.07	<0.06	<0.06	0.06	0.06	<0.06	<0.06
Sulphate	mg/l	11.9	12.97	21.16	13.66	13.65	15.05	13.75
<b>Filtered (Dissolved) Metals</b>								
Arsenic	µg/l	1.3	<0.09	<0.9	<0.9	<0.9	<0.9	<0.9
Cadmium	µg/l	<0.03	0.3	<0.03	<0.03	<0.03	<0.03	<0.03
Chromium	µg/l	1	0.8	0.5	1.1	1.7	1.1	0.9
Copper	µg/l	<3	<3	<3	<3	<3	<3	<3
Lead	µg/l	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Mercury	µg/l	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

## WATER (HYDROLOGY AND HYDROGEOLOGY) 7

Parameter	Unit	BH16-02	BH16-06	BH16-07	BH16-09	BH16-09D	BH16-11	BH16-13
Nickel	µg/l	<0.2	<0.2	0.4	<0.2	<0.2	<0.2	<0.2
Selenium	µg/l	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2	<1.2
Zinc	µg/l	4.8	2.6	9.1	2.4	2.2	7.4	2.9
Aluminium	µg/l	6.5	5.1	3.7	7	2.8	<1.5	<1.5
Calcium	µg/l	89	94.9	124	105.9	102	101	118.5
Iron	µg/l	15.9	8.2	<4.7	<4.7	<4.7	<4.7	<4.7
Magnesium	mg/l	11.2	14.9	24.4	9	8.7	11.9	17
Manganese	µg/l	3.1	<1.5	3.2	<1.5	<1.5	<1.5	<1.5
Potassium	mg/l	5	2.5	71.8	11.8	10.9	3.6	2.4
Sodium	mg/l	11.2	13.1	17.5	12.9	12.3	11.5	10.7
<b>Miscellaneous</b>								
Total Hardness Dissolved as CaCO <sub>3</sub>	mg/l	270	300	412	303	292	302	368
Total Oxidised Nitrogen as N	mg/l	5.6	6.5	10.6	6.6	6.3	6.7	7.3
Dissolved Oxygen	mg/l	2	10	7	12	12	10	10
Total Organic Carbon	mg/l	5	<2	5	<2	<2	<2	<10AA
Total Dissolved Solids	mg/l	368	178	642	418	420	392	460
Parameters exceed one or more of the assessment criteria								





## Karst

- 7.115 Although there are no mapped karst features at the surface at the existing quarry or application site, the available borehole / installation logs indicate the presence of minor cavities and possible karst dissolution along discontinuities in the rock, refer to Chapter 6 of this EIA Report.
- 7.116 The groundwater in the limestone bedrock underlying the existing quarry and application site is classified as a regionally important aquifer which is karstified (diffuse). This classification recognises the presence of karst features in the bedrock.
- 7.117 The existing quarry floor is above the groundwater level, in part to avoid intersecting any karst features or conduits which may contain or transmit groundwater. The floor of the satellite quarry area will be above 10mOD and the winter groundwater level and as such, groundwater levels will not be impacted by the proposed development. Groundwater level loggers will remain in the existing boreholes and continue to collect groundwater level data.
- 7.118 There are karst features in the vicinity of the existing quarry recorded in the GSI karst database, refer to Figure 7-8. These include caves and enclosed depressions within 1km of the application site boundary, and site springs, turloughs, swallow holes, caves and enclosed depressions within 5km.
- 7.119 There are two caves located immediately to the south of the existing quarry, Kilgreany Cave and Carrigmurrish Cave. Information of Kilgreany Cave is provided in Chapter 12 of this EIA Report (Cultural Heritage). The proposed satellite quarry will be farther away from both Kilgreany and Carrigmurrish Caves than the existing the quarrying footprint.
- 7.120 There are no enclosed depressions or other potential karst features identified at the surface of the proposed satellite quarry area.

## Protected Areas

- 7.121 The National Parks and Wildlife Services (NPWS) map viewer indicates that the Blackwater River (Cork/ Waterford) Special Area of Conservation (SAC) is located c. 1.3km west of the application site at its closest point. The Finisk River is also included in this SAC. The same site is also designated as the Blackwater River and Estuary proposed Natural Heritage Area (pNHA).
- 7.122 Dungarvan Harbour c. 8 km east of the application site, the land immediately beside the harbour, associated rivers in Dungarvan Town, and the coast north and south of the harbour are all part of the Dungarvan Harbour Special Protection Area (SPA). These areas also constitute the Dungarvan Harbour pNHA.
- 7.123 The Blackwater Estuary SPA is located c. 12km south-west of the application site. The same area is also designated the Blackwater River (Cork/ Waterford) SAC and the Blackwater River and Estuary pNHA.
- 7.124 The Comeragh Mountains SAC is located c. 13km to the north-east of the application site. The same area is also designated the Comeragh Mountains pNHA.
- 7.125 There are no Natural Heritage Areas in the immediate vicinity of the application site.
- 7.126 The groundwater intersects a designated shellfish area and SPA Habitat at Dungarvan Harbour SAC. The Brickey River intersects the SPA at Dungarvan Harbour, the Finisk River is part of a SAC Habitat and Species and is in a nutrient sensitive area. The transitional and coastal waters in Dungarvan Harbour are a shellfish area and intersect a SPA Habitat, the coastal waters intersect a SAC Habitat and Species.

## WATER (HYDROLOGY AND HYDROGEOLOGY) 7

7.127 A summary of the hydraulic connectivity (surface water and groundwater) between the application site and the protected areas is outlined and summarised in Table 7-10 below.

**Table 7-10**  
**Protected Areas Summary**

Protected Areas	Location in Relation to Application Site	Surface Water and Groundwater Connectivity
Blackwater River (Cork/Waterford) SAC (002170)/ Blackwater River and Estuary pNHA (000072)	2km west at closest point	Located in a separate GWB from the application site (the Lismore GWB). No direct hydraulic continuity with the groundwater in bedrock beneath the quarry. Groundwater underlying the site is in the Dungarvan GWB and naturally flows east towards Dungarvan Harbour (away from the SAC / pNHA).
Dungarvan Harbour SPA (004032)/ pNHA (000663)	8km east	Located in the same GWB but at distance from the application site. Groundwater underlying the site naturally flows east towards Dungarvan Harbour.
Blackwater Estuary SPA (004028)	12km south-west of site	Located at distance and within separate aquifer and GWB from the site. No direct hydraulic continuity with the groundwater in bedrock beneath the quarry.
Comeragh Mountains SAC (001952)/ pNHA (001952)	13km north-east	Located at distance and within separate aquifer and GWB from the site. No direct hydraulic continuity with the groundwater in bedrock beneath the quarry.

### Sensitive Receptors

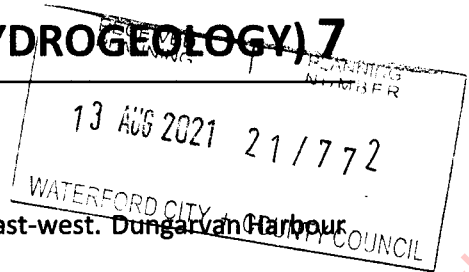
7.128 The following sensitive receptors have been identified in the receiving environment:

- The River Brickey, which is the closest surface water receptor;
- Regionally important, karstified bedrock aquifer with nearby karst features;
- Nearby domestic and agricultural local groundwater supply wells;
- Public Water Supplies and identified source protection zones; and
- Dungarvan Harbour SPA / pNHA.

7.129 While there is no discharge of water from the site to a surface watercourse or to the ground, the existing quarry has been worked above the groundwater table. The proposed satellite quarry area will also be worked above the groundwater table. There are potential pathways from the existing quarry and application site to the identified sensitive receptors via karst bedrock on the valley floor.

7.130 Karst features in the bedrock of the valley syncline may create preferential pathways from the application site to the identified receptors. In addition the, the GWB report gives high permeability estimates and the valley floor syncline is known to be geologically fractured. The nature of the geology and the karst environment in the syncline means that there is the potential for groundwater flow paths between the site and receptors.





## Site Baseline Summary

- 7.131 Cappagh Quarry is located on the floor of a steep sided valley trending east-west. Dungarvan Harbour is located c. 8.5km east.
- 7.132 The Average Annual Rainfall at the closest synoptic rainfall gauging station (75km south-west) is 1227.9mm. GSI mapping indicates that at the current time, groundwater recharge is 472mm/yr across the proposed eastern satellite quarry area and 668mm/yr across the existing quarry footprint.
- 7.133 The subsoil underlying the satellite quarry area is moderately permeable and is overlain by well-drained soil. Both are derived principally from sandstones. Across the existing quarry footprint, subsoil and soil have been removed and bedrock is exposed at the surface. The existing quarry and the satellite quarry area are underlain by Waulsortian Limestones, comprising crudely bedded or massive unbedded lime-mudstone.
- 7.134 There are no hydrological features at the quarry / application site. The Brickey River is c. 1km south of the site and flows in an approximately easterly direction. The Finisk River is c. 2km west of the site and flows in an approximately southerly direction. The Celtic Sea is c. 8.5km east of the site.
- 7.135 The Brickey River intersects a SPA, the Finisk River intersects a SAC Habitat and Species and is in a nutrient sensitive area. The transitional and coastal waters in Dungarvan Harbour are designated a shellfish area and intersect a SPA Habitat. The coastal waters intersect a SAC Habitat and Species.
- 7.136 The Brickey River is classified as 'Poor' status and at risk of deterioration. The Finisk River is classified as being of 'Good' status and not at risk of deterioration.
- 7.137 The groundwater in the bedrock limestone is classified as a 'Regionally Important Aquifer – karstified (diffuse)'. The site is within the Dungarvan Groundwater Body and is currently of Good Status.
- 7.138 Groundwater vulnerability classification of the existing quarry and application site ranges from 'X – rock at or near surface or karst' to 'Extreme' to 'High'. The satellite quarry area is mostly classified as being of 'High' vulnerability, with small areas of designated as 'Extreme' and 'X – rock near surface or karst'.
- 7.139 There are numerous identified karst features in the vicinity of the site. The limestone bedrock in the syncline valley is karstified and there offers potential for flow paths in the bedrock.
- 7.140 While the quarry / application site is not located within an identified drinking water protection area there are a number of Public Water Supplies in the area. The Dungarvan Public Water Supply outer source protection zone is c. 1.5km to the north east at it closest point. The source protection ozone for the Lismore - Cappoquin Public Water Supply (PWS) is located c. 5km to the north-west.
- 7.141 There are several private boreholes surrounding the quarry / application site. The yields from these wells reportedly range from poor to good.
- 7.142 Groundwater levels across the proposed satellite quarry area did not exceed the proposed quarry floor level (of 10mOD) between January 2019 and November 2020. Groundwater levels only exceeded 9mOD in one borehole for a period of a few hours following very heavy rainfall on one day in April 2019.
- 7.143 Groundwater quality monitoring at the quarry and application site indicates exceedances of nitrate and orthophosphate (as PO<sub>4</sub>) which suggest it is impacted by agricultural activity in the surrounding area.
- 7.144 The Dungarvan Harbour SPA / pNHA is located 8.5 km east and down hydraulic gradient of the application site, in the same Groundwater Body. The groundwater intersects a shellfish area and SPA Habitat at Dungarvan Harbour SAC.

## IMPACT ASSESSMENT

### Evaluation Methodology

- 7.145 The impacts on the local surface water and groundwater environment of the proposed satellite quarry area and new concrete batching plant are assessed in this chapter.
- 7.146 The methodology applied here is a qualitative 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 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. This approach allows effort to be focused on reducing risk where the greatest benefit may result.
- 7.147 The assessment of risk is based on a matrix on importance of attributes and magnitude of impacts. Various criteria tables outline the assessments for the likelihood and magnitude of hydrological and hydrogeological impacts. These can be found in Appendix 7-F.
- 7.148 In addition to their nature and significance, the potential impacts will be assessed in terms of their duration, whether they are direct or indirect impacts. Any cumulative impact of the potential impacts will be assessed.
- 7.149 The following sections of this Chapter identify the potential impacts of the proposed development on the hydrogeological and hydrological environments. It also assesses the likelihood of occurrence of each identified impact in accordance with Appendix 7-F. It should be noted that the impacts are initially assessed with no mitigation or design measures incorporated to reduce the risk.
- 7.150 The potential direct and indirect impacts to surface waters and groundwater during the construction, operation and post-operation stages are discussed below.

### Construction Stage Impacts

- 7.151 In the context of the proposed development, the construction stage in this case is taken to be the preparatory works across the satellite quarry area, including the tunnel underpass installation works, initial extraction of the rock material and the erection of the concrete batching plant and associated infrastructure. The quarry preparation work involves the removal, storage and placement of soils and subsoils across the satellite quarry area and transfer / haulage of these materials and aggregates by HGV across the passageway to the existing quarry.

#### *Direct Impacts*

- 7.152 There will be a potential direct impact on groundwater quality beneath the satellite quarry area as a result of the removal of the soils and subsoil material particularly from accidental spillages and also from increased suspended solids in any run-off to ground.
- 7.153 There will be a potential direct impact on groundwater quality during construction works associated with the tunnel underpass installation works, particularly from any accidental spillages and also from increased suspended solids in any run-off.
- 7.154 There will be a potential direct impact on groundwater quality beneath the proposed new concrete batching plant during construction particularly from any accidental spillages and also from increased suspended solids in any run-off.
- 7.155 No direct impacts on surface water are anticipated from the construction stage. There is no discharge from the site to any surface watercourses and therefore there is and will continue to be no direct impacts on surface water quality or quantity during this stage.



# WATER (HYDROLOGY AND HYDROGEOLOGY) 7

## Indirect Impacts

7.156 No indirect impacts are anticipated from the construction stage on surface water and groundwater.

## Operational Stage Impacts

7.157 The proposed quarry satellite quarry area will be adjacent to an existing working quarry that has been in operation since c. 1952. The level of activity proposed at the site will be in keeping with the level of activity which has historically, and is currently, taking place at the existing quarry. There will be no intensification of the rate of extraction at the application site over previously permitted levels.

## Direct Impacts

### Surface Water

7.158 There is no discharge from the site to any surface watercourses and therefore there is and will continue to be no direct impacts on surface water quality or quantity during the operational stage.

### Groundwater

7.159 Extraction across the satellite quarry area will be above the groundwater table and no dewatering will be required. There will therefore be no impact on groundwater flows or throughput quantity during this stage.

7.160 The bedrock aquifer at the application site is considered to be of Very **High** importance as it is a regionally important karst aquifer which is linked to a designated nature site, albeit at some distance.

7.161 The magnitude of the potential for increased infiltration of suspended solids / fine particulate rock as a result of extraction activities and site traffic over unpaved areas is considered to be **negligible to small adverse**. Although such an impact could conceivably occur, it is considered that on balance, the magnitude of any potential impact would be negligible to small given :

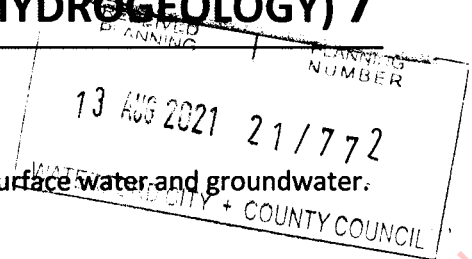
- (i) the current good quality of the groundwater beneath the existing quarry;
- (ii) the natural and local origin of any particulate material;
- (iii) the existence of an unsaturated zone above the groundwater table (which would be expected to reduce particulate mobility);
- (iv) the absence of any significant consequences for groundwater (suspended solids is not generally recognised as a groundwater quality parameter and there is no accepted reference test to measure and quantify suspended solids in groundwater).

7.162 The magnitude of the potential impacts on the groundwater quality from accidental fuel spillages is considered to be **moderate adverse** as there is the potential medium risk of pollution to groundwater from routine run-off / infiltration during this stage.

7.163 Without mitigation, the magnitude of the potential impact from blasting and site traffic, with increased suspended solids is considered to be **negligible to small adverse**. As the importance of the groundwater attribute is **High**, the potential impact to the groundwater quality without mitigation is classified as **Imperceptible to Slight**.

7.164 Without mitigation, the magnitude of the potential impact on groundwater quality from accidental fuel spillage is considered to be **moderate adverse**. As the importance of the groundwater attribute is **High**, the potential impact to the groundwater quality without mitigation is classified as **Moderate to Significant** based on the presence of karst features in the bedrock.

7.165 The operation of the concrete batching plant has the potential to result in a deterioration in groundwater quality from washout and the accidental leakage of concrete admixtures. The new concrete batching plant includes measures for recycling and treatment of concrete returns and truck



# WATER (HYDROLOGY AND HYDROGEOLOGY) 7

wash out, with provision made for recycling of wash water within a closed system as part of the overall concrete plant design. The design also includes provision for bunded and covered storage of concrete admixtures at the facility. These management measures are built into the plant design and as no additional measures are required, the potential impacts for the operation of the concrete batching plant are not considered here any further.

## Indirect Impacts

### Surface Water

- 7.166 It is likely that the Brickey River c. 1km south of the application site is fed by groundwater flowing beneath the application site. Therefore, any potential direct impacts to the groundwater are also potential indirect impacts to this surface water body. The Brickey River is considered to be of **medium** importance as it is reported as being of 'Poor' status (Q3).
- 7.167 Groundwater impacted by fuel spillage has the potential to laterally migrate through the ground and eventually discharge to a surface water body. Without mitigation, the magnitude of the potential impact on surface water quality is considered to be **small adverse**. As the importance of the surface water body is **Medium**, the potential impact to the surface water quality without mitigation is classified as **Slight**.

### Groundwater

- 7.168 Although the application site is located outside of the identified protection zones for the Dungarvan PWS, given the karstified nature of the limestone geology, there is a potential indirect impact on the public supply if there are pathways in the karst connecting the application site to it.
- 7.169 As the Dungarvan PWS is partially located in the same aquifer as the application site, without mitigation, the magnitude of the potential impact of an accidental fuel spill on groundwater quality is considered to be **small adverse**. As the importance of the PWS is considered to be **Very High**; the potential impact to groundwater quality at the public supply wells without mitigation is **Significant**.
- 7.170 Several residences in the surrounding area have domestic and/or agricultural groundwater supply boreholes located in the same aquifer as that which extends beneath the existing quarry and application site. The closest wells will be located c. 150m downgradient of the proposed satellite quarry area.
- 7.171 As there is no surface water run-off, no discharge to surface water and no groundwater drawdown (given that the quarry floor level across the proposed satellite quarry area will remain above the water table), there will be no impact on yields at boreholes at nearby residential receptors.
- 7.172 However, any potential direct impacts to groundwater quality beneath the application site will also give rise to indirect impacts at nearby private supply wells. Given that these wells are located in the same aquifer as the application site, without mitigation, the magnitude of the potential impact on groundwater quality at the wells is considered to be **moderate adverse**. As the importance of the private supply wells is **High**, the potential impact to the groundwater quality at the wells without mitigation is **Significant**.

### Protected Areas

- 7.173 The Dungarvan SPA / pNHA is located in the same GWB as the application site and the underlying groundwater flows naturally in an easterly direction towards Dungarvan Harbour. However, it is located 8.5km further down-gradient of the application site.
- 7.174 All other protected areas are located at distance and within separate aquifer and GWB, and therefore will not be in direct hydraulic continuity with the groundwater in the bedrock beneath the quarry and application site.



## WATER (HYDROLOGY AND HYDROGEOLOGY) 7

- 7.175 The proposed quarry floor level across the satellite quarry area is 10mOD and as such, the proposed development will have no requirement for any dewatering. As designated nature areas are in separate GWBs and / or located at some distance from the site, it is concluded on this basis that no indirect impacts will arise at these locations as a result of the proposed development.
- 7.176 All SACs and SPAs are considered to be of '**extremely high**' importance as they are valued ecosystems, protected by EU and national legislation.
- 7.177 Without mitigation, the magnitude of the potential impact on groundwater quality and the Dungarvan SPA / pNHA is considered to be **negligible** owing to its separation distance from the application site. Although the importance of the designated area is **Extremely High** the potential impact to the Dungarvan SPA / pNHA without mitigation is deemed to be **imperceptible**.

### Post – Operational Stage Impacts

#### *Direct Impacts*

- 7.178 A restoration scheme has been prepared for the existing quarry and proposed satellite quarry area and will be fully implemented following permanent cessation of quarrying activities, refer to Chapter 2 of the EIA Report. On cessation of all extractive, production and restoration activities, no direct impacts are anticipated on the water environment at the post-operational stage.

#### *Indirect Impacts*

- 7.179 On cessation of all extractive, production and restoration activities, no indirect impacts are anticipated on the water environment at the post-operational stage.

### Unplanned Events

- 7.180 Unplanned events within the application site, such as accidents, have the potential to result in adverse impact on groundwater quality (directly) or on surface water quality (indirectly). However, the most likely accident to arise at the application site would result in fuel spillage with an adverse impact on water quality, which has been addressed and considered in the assessments presented above.

### Transboundary Impacts

- 7.181 The application site does not cross any international boundaries. Hence transboundary impacts are disregarded.

### The 'Do-Nothing Scenario'

- 7.182 If the proposed quarry satellite quarry area does not proceed, the proposed footprint area will continue to remain in agricultural use.

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# WATER (HYDROLOGY AND HYDROGEOLOGY) 7

## Summary

7.183 A summary of the key potential impacts identified and their associated risk to surface water and groundwater is outlined in Table 7-11 below.

Table 7-11  
Unmitigated Risk and Magnitude for Identified Key Potential Impacts

Potential Impact and attribute	Spatial Impact, Duration, Direct/Indirect	Importance of Attribute	Magnitude of Impact	Potential Impact	Mitigation Proposed?
Increased suspended solids / particulates in groundwater due to blasting and site traffic. <b>Attribute:</b> regionally important karstified aquifer	Local, Short Term, Direct	High	Negligible to small adverse	Imperceptible to slight	Yes
Fuel leak and / or spill on groundwater quality. <b>Attribute:</b> regionally important karstified aquifer	Local, Short Term, Direct	High	Moderate adverse	Moderate to Significant	Yes
Reduction in groundwater quality from increased suspended solids and fuel leak and/or spill. <b>Attribute:</b> local river	Local, Short Term, indirect	Medium	Small adverse	Medium	Yes
Reduction in groundwater quality from increased suspended solids and fuel leak and/or spill. <b>Attribute:</b> Dungarvan Public Water Supply and source protection zones	Local, Short Term, indirect	High	Moderate adverse	Significant	Yes
Reduction in groundwater quality from increased suspended solids and fuel leak and/or spill. <b>Attribute:</b> local groundwater supplies to domestic properties	Local, Short Term, indirect	High	Moderate adverse	Significant	Yes
Reduction in groundwater quality from increased suspended solids and fuel leak and/or spill. <b>Attribute:</b> Dungarvan Harbour SPA / pNHA	Local, Short Term, indirect	Extremely High	Negligible	Imperceptible	Yes



# WATER (HYDROLOGY AND HYDROGEOLOGY) 7

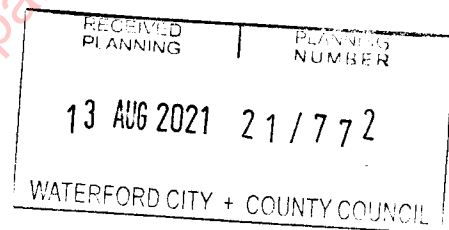
Potential Impact and attribute	Spatial Impact, Duration, Direct/Indirect	Importance of Attribute	Magnitude of Impact	Potential Impact	Mitigation Proposed?
Reduction in groundwater quality from increased suspended solids and fuel leak and/or spill. <b>Attribute:</b> bedrock aquifer and groundwater supplies	Local, Short Term, indirect	Extremely High	Moderate adverse	Significant	Yes

## MITIGATION MEASURES

7.184 Measures are in place at the existing quarry to prevent any reduction in the quality of the groundwater and surface water at and beneath it and within the surrounding local area. These measures are in accordance with the “best practice / possible remedial measures” set out in Chapter 3.4 of the DoEHLG (2004) publication ‘*Quarries and Ancillary Activities: Guidelines for Planning Authorities*’.

7.185 Mitigation measures are set out here using the following hierarchy of measures:

- Avoidance;
- Prevention;
- Reduction;
- Remedy; and
- Offsetting.



## Construction and Operational Stages

### Surface Water

7.186 No discharge of water from the quarry / application site is made to any on-site or off-site watercourse. Hence there are no direct impacts to surface water.

7.187 Notwithstanding this, silt fencing will be placed down-slope of the satellite quarry area prior to commencement of soil stripping works to minimise sediment transport off-site. The fencing will be embedded in the soil to ensure all surface water run-off moving off-site is captured and filtered.

### Groundwater

7.188 The floor of the satellite quarry area will be at 10mOD, above the winter groundwater level and as such, groundwater levels will not be affected by the development. Groundwater level loggers will remain in the existing boreholes and will continue to collect groundwater level data.

7.189 Surface water held in ponds or closed depressions will be allowed to infiltrate to ground or evaporate. Prior to commencement of soil stripping works, silt fencing will be placed down-gradient of the satellite quarry area to minimise sediment transport off-site.

7.190 Daily monitoring of the overburden stripping / landscaping works will be undertaken by a competent person. All necessary preventative measures will be implemented to ensure no entrained sediment or deleterious matter will enter any downstream receiving waters.

7.191 All soil and subsoil overburden stockpiles / perimeter mounds will be vegetated as soon as possible to minimise the risk of rain / wind erosion and the generation of suspended solids in any run-off.

## WATER (HYDROLOGY AND HYDROGEOLOGY) 7

- 7.192 Restoration using topsoil and overburden will be carried out on an on-going basis to reduce the vulnerability of the bedrock aquifer to possible contamination by surface activities.
- 7.193 The impact assessment presented in this Chapter has identified the potential impact on the groundwater quality as being significant, based on the karst environment in the area, and particularly in respect of the identified key sensitive receptors, the Dungarvan Public Water Supply and local domestic supplies. Therefore, with respect to these receptors and the potential for significant adverse impacts the following critical mitigation measures around the storage and management of fuels and other chemicals will be implemented at the application site.
- 7.194 Many of the mitigation measures identified below are already implemented at the quarry to manage hydrocarbons and to prevent accidental leaks and/or spills. These measures will continue to be implemented over the lifecycle of the proposed satellite quarry and concrete batching plant, for the duration of the associated construction and operational stages.
- 7.195 The measures to be implemented at the site include the following:
- no refuelling or plant/ machinery maintenance and repairs will take place on the quarry floor to prevent accidental spillages infiltrating to ground or being washed off in surface water;
  - Most mobile plant, machinery (and HGVs and lorries on occasion) will be refuelled at the existing refuelling area, located beside the maintenance shed / workshop. Refuelling at this location takes place over a sealed surface with surface water run-off directed to a hydrocarbon separator;
  - refuelling of mobile crushing plant and excavators on the quarry floor will be undertaken using double skinned bowsers;
  - all plant/ machinery maintenance and repairs will take place under cover in the existing maintenance shed at the quarry or on the external paved area beside it;
  - all plant will be regularly maintained and inspected daily for leaks of fuels, lubricating oil or other contaminating liquids;
  - all oils and greases are stored under cover in the maintenance shed;
  - fuel storage will continue at the existing bunded fuel storage facility at the quarry;
  - all petroleum-based products (lubricating oils etc.) will be stored on drip trays under cover in the existing maintenance shed to prevent pollution due to accidental leakages;
  - waste oil and grease containers are also stored on drip trays under cover in the maintenance shed. Waste containers are collected and disposed of by a suitably licenced contractor;
  - concrete additives will be stored in a dedicated storage shed to be constructed bedside the concrete batching plant. Within the shed they will be stored in double skinned tanks and/or over bunded areas to prevent spillages and leaks to ground;
  - an emergency spill response kit (with containment booms, absorbent materials and drip tray) is kept on-site to contain/ stop the migration of any accidental spillages, should they occur;
  - plant operators will be briefed during 'toolbox' talks and site induction on where the spill kit is kept and how and when it is deployed;
  - regular visual inspection and testing of the integrity of tanks, drums, bunded pallets and double skinned containers;
  - implementation of a traffic management system at the quarry to reduce conflicts between vehicles and the potential risk of collisions and associated fuel spills or oil;



## WATER (HYDROLOGY AND HYDROGEOLOGY) 7

- enforcement of speed limits across the quarry to further reduce the likelihood and significance of collisions and the potential risk of fuel spills and to also reduce the potential to generate dust / particulates;
- routing all quarry traffic over paved or hardstanding surfaces and maintaining such surfaces to avoid build up or accumulation of mud and avoidance of trafficking over or through restored surfaces or claybound materials / fines to avoid disturbance and minimise potential for generation of suspended solids and particulates (dust);
- routing all exiting HGVs / trucks exiting the quarry through a wheelwash to prevent mud and debris being carried off-site onto the public road.

7.196 Baseline groundwater quality monitoring at the quarry does not identify the presence of any hydrocarbons in the groundwater. This strongly indicates that the existing environmental management measures in respect of the storage and management of hydrocarbons at the quarry has been successful in preventing any adverse impact on groundwater quality.

7.197 When the concrete batching plant is operational, returning concrete trucks will be washed out at a dedicated washout area at the side of the plant. The wash-water from the trucks will be recycled through a closed system of settlement tanks, with the water being pumped to a storage tank for re-use in the manufacture of concrete and/or in truck washout. Water levels will be topped up and settlement tanks cleared of sediment at intervals as required.

7.198 Although remedial measures are proposed to mitigate against any potential adverse impacts on the receiving environment, it is further recommended that the groundwater at each of the 6 No. existing groundwater wells is sampled and analysed by an accredited laboratory twice a year.

7.199 Taken together, these mitigation measures will reduce the identified potential impacts on the groundwater beneath the site. Specifically, the measures will ensure that the magnitude of any potential impact from any accidental spillage of fuels, lubricants and other chemicals will be reduced from **moderate adverse** to **negligible to small adverse**, with a consequential reduction in the significance of any impact being reduced from **Moderate / Significant** to **Imperceptible to Slight**.

### Post – Operational Stage

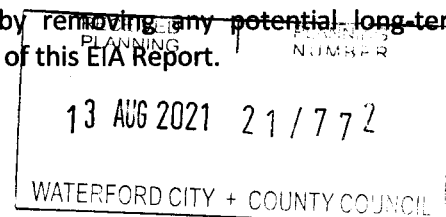
7.200 All chemicals and petroleum-based products, mechanical and electrical equipment, plant and machinery will be removed from the quarry and application site on permanent cessation of quarrying activities as part of the final restoration scheme, thereby removing any potential long-term associated risk to the water environment, refer to Chapter 2 of this EIA Report.

## RESIDUAL IMPACT ASSESSMENT

### Construction and Operational Stages

7.201 It is reiterated that baseline groundwater quality monitoring at the existing quarry does not identify the presence of any hydrocarbon contamination in groundwater beneath the quarry and that this is strongly supportive of the assessment that existing environmental management measures have been successful in preventing any adverse impact on groundwater quality

7.202 With the above listed mitigation measures in place at the quarry and application site during the construction and operational stages associated with the proposed development, the potential impacts are reduced to imperceptible to slight and there will be no residual significant negative impacts on the surface water and groundwater aspects of the receiving environment.



# WATER (HYDROLOGY AND HYDROGEOLOGY) 7

## Post - Operational Stage

- 7.203 With the removal of all plant, equipment, fuels and chemicals from the quarry and application site, any potential long-term associated risk to the water environment will be removed and there will be no significant long-term residual impact with respect to surface water and groundwater following final site restoration.

## MONITORING

### Groundwater

- 7.204 The following programme of groundwater monitoring will be implemented by the Applicant at the existing quarry and application site;
- Groundwater level data loggers will remain in place and continue to collect data. This data will be downloaded at each of the 6. No existing groundwater monitoring wells on a quarterly basis by an independent consultant;
  - An independent consultant will continue to be contracted to analyse the groundwater monitoring data and provide an interpretive report thereon on an annual basis; and
  - Groundwater quality testing will be undertaken on samples recovered from the groundwater monitoring boreholes on a biannual basis.
- 7.205 The groundwater monitoring regime will remain in place for the life of the satellite quarry area and for a limited closure and aftercare period thereafter.
- 7.206 The proposed groundwater quality sampling schedule is set out in Table 7-12 below.

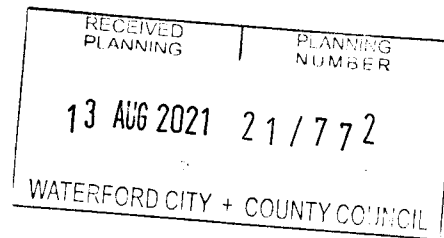
Table 7-12  
Proposed Schedule for Biannual and Annual Groundwater Monitoring

Parameter	Monitoring Frequency
Groundwater Level	Biannually
pH	Biannually
Conductivity	Biannually
Ammoniacal Nitrogen as NH <sub>3</sub>	Biannually
Ammoniacal Nitrogen as NH <sub>4</sub>	Biannually
Antimony	Biannually
Barium	Biannually
VOC's	Biannually
Chloride	Biannually
COD	Biannually
Fluoride	Biannually
Iron	Biannually
Magnesium	Biannually



## WATER (HYDROLOGY AND HYDROGEOLOGY) 7

Parameter	Monitoring Frequency
Manganese	Biannually
Dissolved Oxygen	Biannually
Orthophosphate as P	Biannually
Orthophosphate as PO4	Biannually
Sulphate soluble	Biannually
Total Dissolved Solids	Biannually
Toxic 9 Metals <sup>1</sup>	Annually
TPH CWG (C6-C40)	Annually



## FIGURES

Figure 7-1  
Bedrock Aquifer

Figure 7-2  
Groundwater Body

Figure 7-3  
Groundwater Vulnerability

Figure 7-4  
GSI Wells

Figure 7-5  
Drinking Water Protection Areas

Figure 7-6  
Borehole / Well Locations

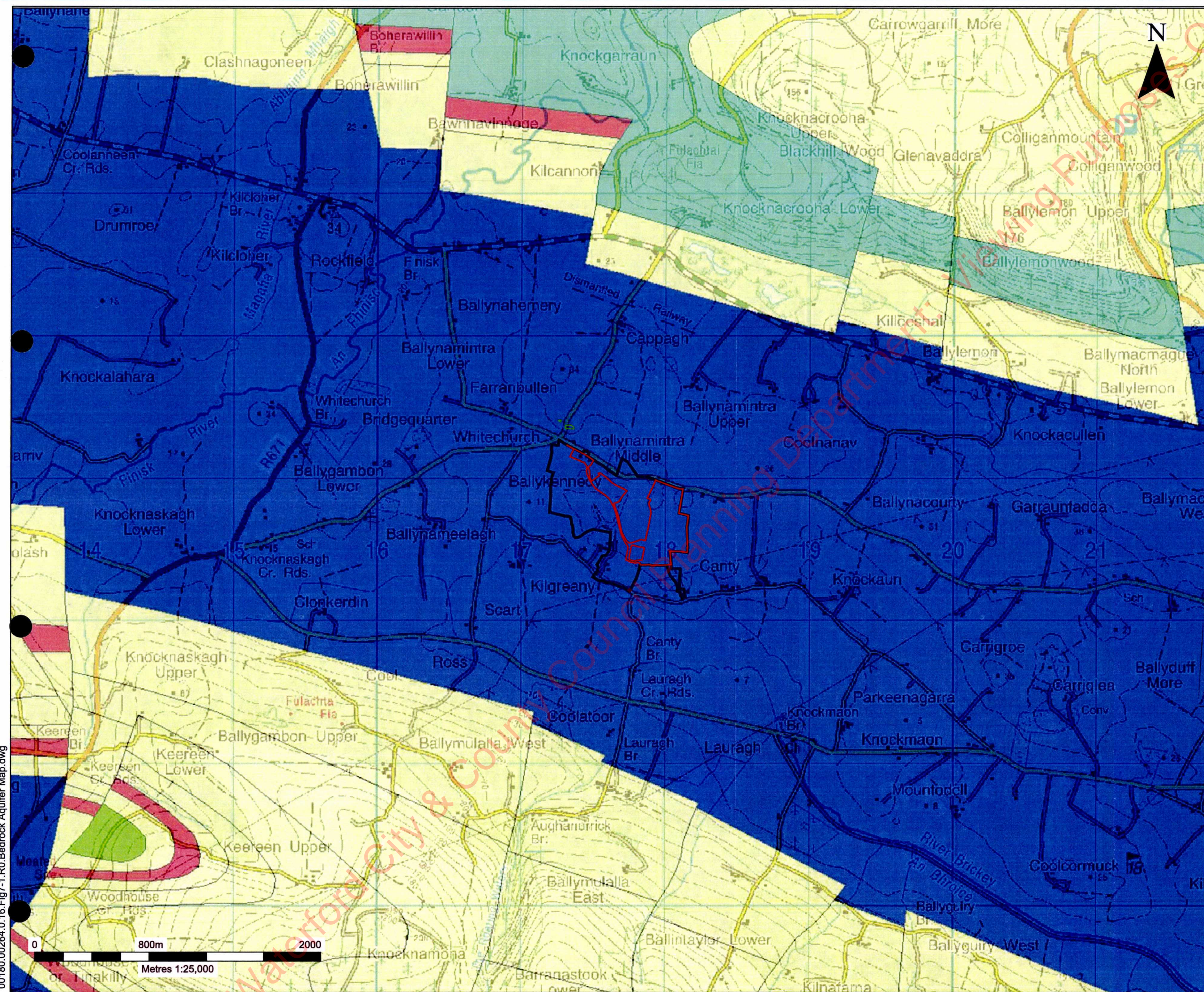
Figure 7-7  
Groundwater Contours and Cross-Sections

Figure 7-8  
Karst Features (GSI Karst Database)





00180.00264.0.16.Fig7-1.R0.Bedrock Aquifer Map.dwg



**NOTES**  
1. EXTRACT FROM FROM ORDNANCE SURVEY IRELAND  
DISCOVERY SERIES SHEET NO. 82  
2. ORDNANCE SURVEY IRELAND LICENCE NO. CYAL50167032  
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**LEGEND**  

ROADSTONE LAND INTEREST  
(C. 58.9 HA)

PLANNING APPLICATION AREA  
(C. 18.2 HA)

Regionally Important Aquifer -  
Karstified diffuse (Rkd)

Regionally Important Aquifer -  
Karstified conduit (Rkc)

Regionally Important Aquifer -  
Karstified (Rk)

Regionally Important Aquifer -  
Fissured bedrock (Rf)

Locally Important Aquifer -  
Karstified (Lk)

Locally Important Aquifer -  
Bedrock which is Generally  
Moderately Productive (Lm)

Locally Important Aquifer -  
Bedrock which is Moderately  
Productive only in Local Zones  
(LI)

Poor Aquifer - Bedrock which is  
Generally Unproductive except  
for Local Zones (PI)

Poor Aquifer - Bedrock which is  
Generally Unproductive (Pu)

Lake

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NEW CONCRETE PLANT  
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BEDROCK AQUIFER MAP

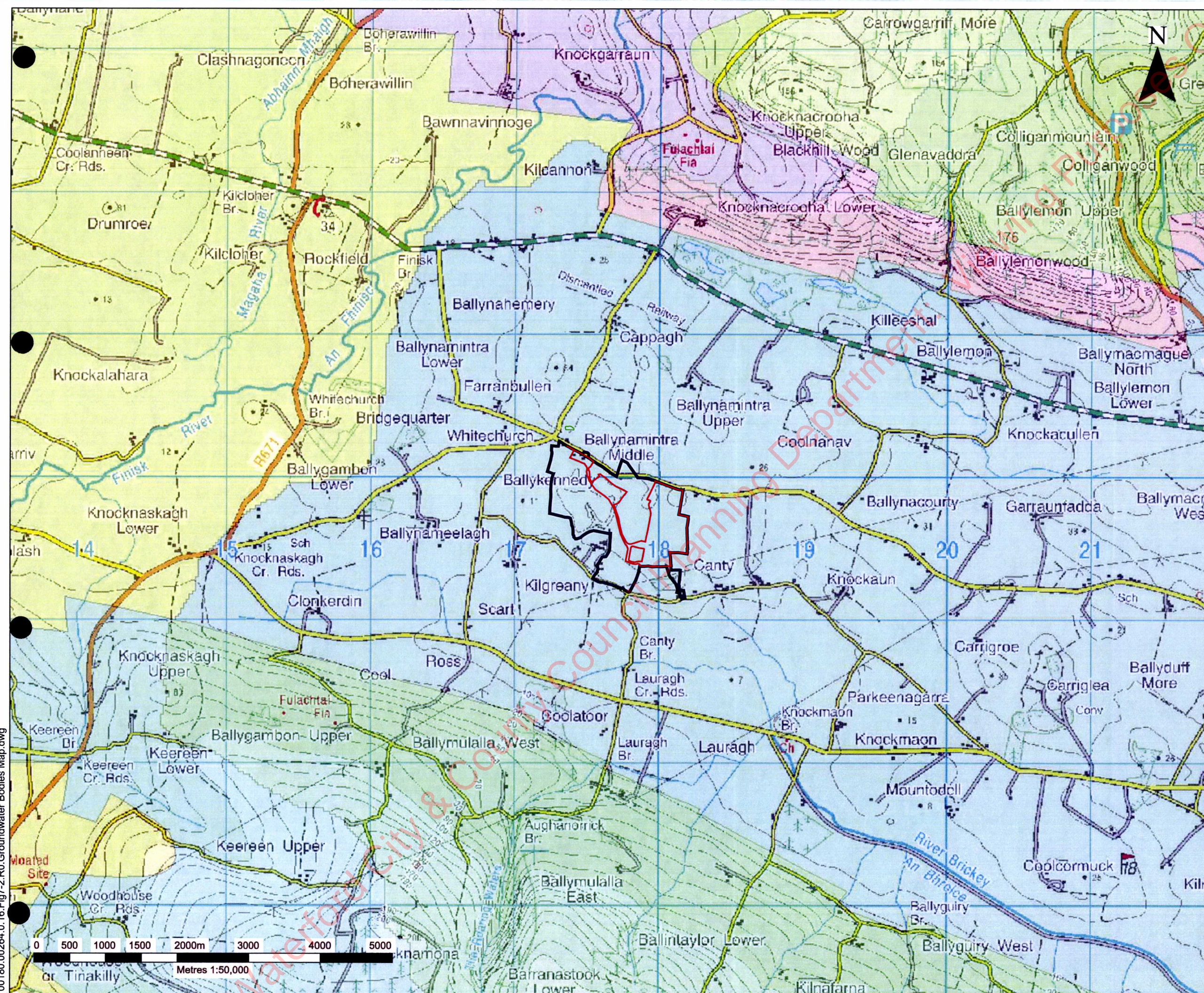
**FIGURE 7-1**

Scale  
1:25,000 @ A3

Date  
APRIL 2021



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**NOTES**

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**LEGEND**

ROADSTONE LAND INTEREST  
(C. 58.9 HA)

PLANNING APPLICATION AREA  
(C. 18.2 HA)

**Groundwater Bodies**

Source: EPA 2015

- Ballyknock
- Cappoquin Kiltorcan
- Dungarvan
- Glenville
- Helvick Head
- Kilrion
- Knockmealdown
- Lismore
- Tallow

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**GROUNDWATER BODIES MAP**

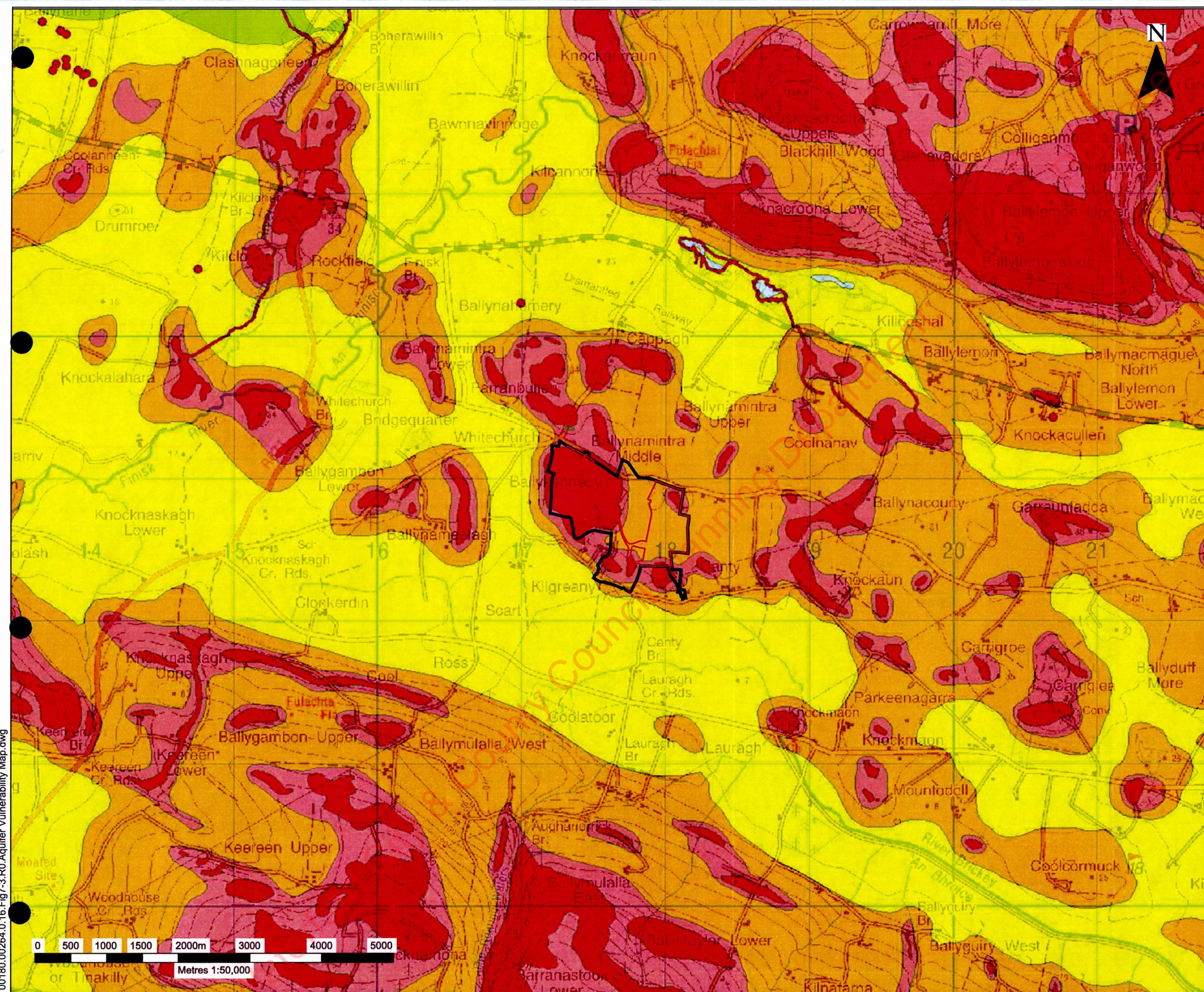
**FIGURE 7-2**

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JULY 2021



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**NOTES**  
1. EXTRACT FROM FROM ORDNANCE SURVEY IRELAND  
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2. ORDNANCE SURVEY IRELAND LICENCE NO. CYAL50167032  
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**LEGEND**  

ROADSTONE LAND INTEREST  
(C. 58.9 HA)

PLANNING APPLICATION AREA  
(C. 18.2 HA)

Rock at or near surface or karst

Extreme

High

Moderate

Low

Water

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AQUIFER VULNERABILITY MAP

**FIGURE 7-3**

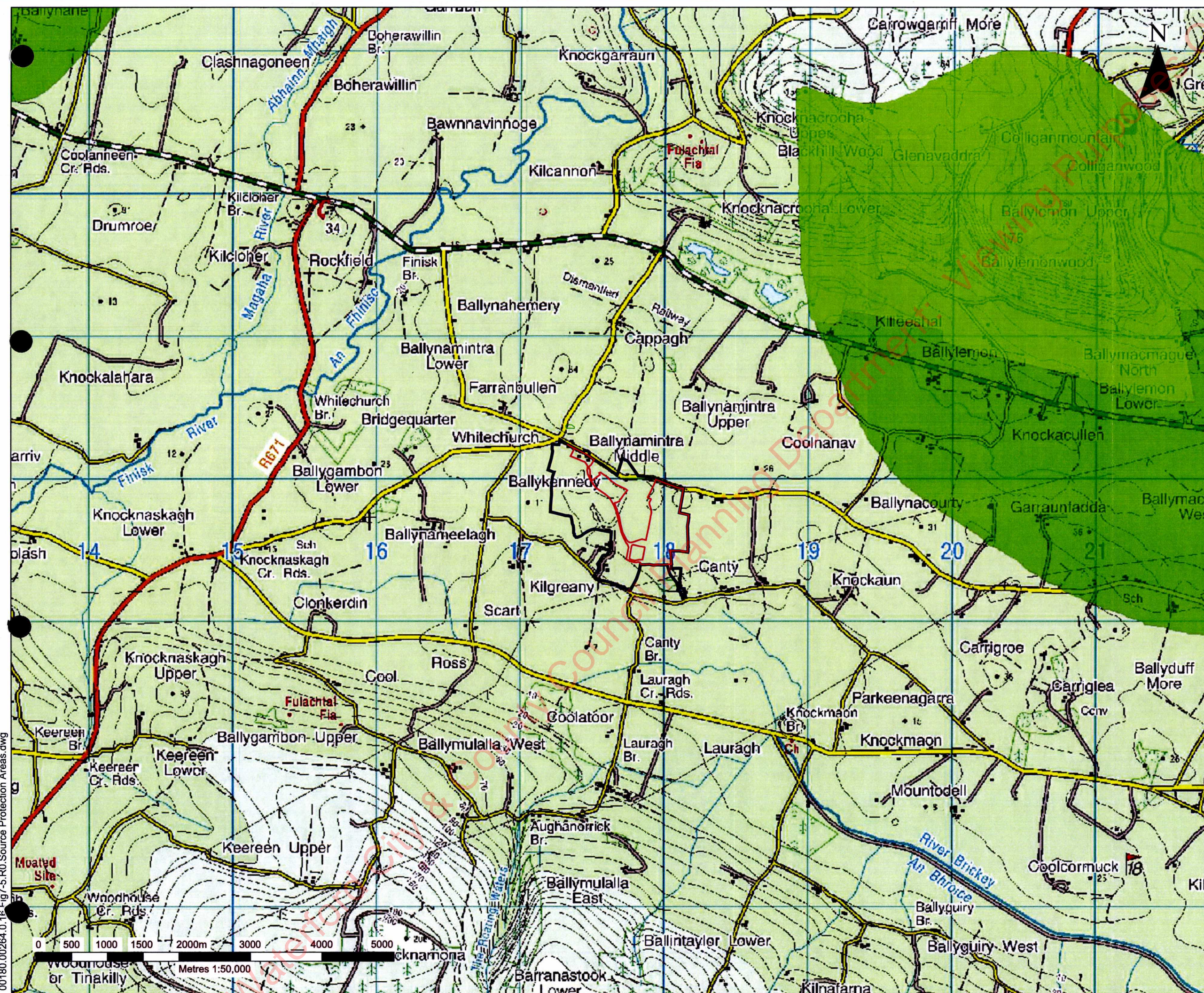
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1:25,000 @ A3

Date  
JULY 2021









**NOTES**

1. EXTRACT FROM FROM ORDNANCE SURVEY IRELAND  
DISCOVERY SERIES SHEET NO. 82

2. ORDNANCE SURVEY IRELAND LICENCE NO. CYAL50167032  
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**LEGEND**

	ROADSTONE LAND INTEREST (C. 58.9 HA)
	PLANNING APPLICATION AREA (C. 18.2 HA)
	Inner Protection Area
	Outer Protection Area

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NUMBER

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**SOURCE PROTECTION AREAS**

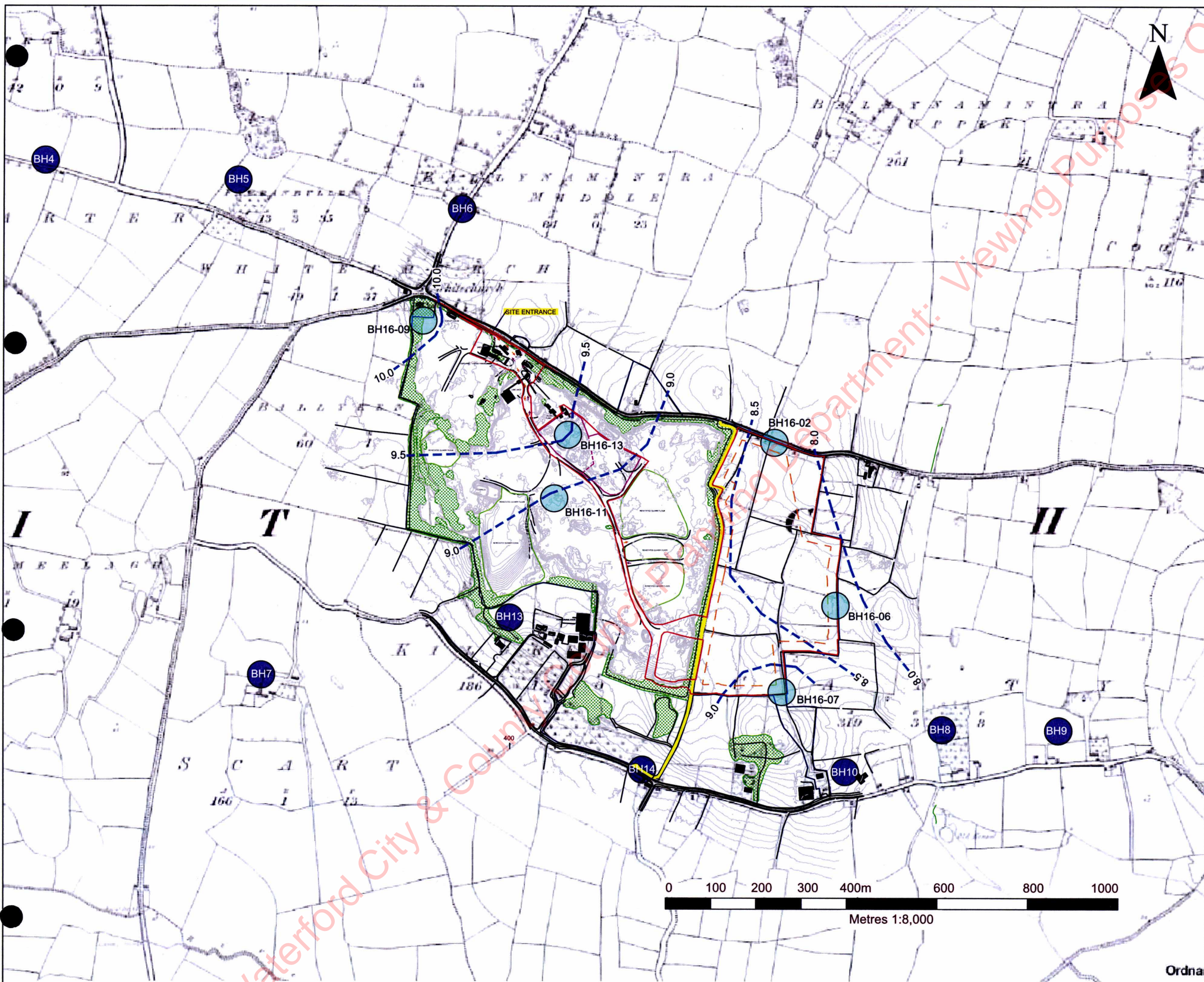
**FIGURE 7-5**

Scale 1:50,000 @ A3 Date JULY 2021

00180.00264.0.16 Fig7-5.R0.Source Protection Areas.dwg



00180.00264.0.16.Fig7-6.R01.Borehole Locations.dwg



**NOTES**  
1. VECTOR SURVEY EXTRACT FROM ORDNANCE SURVEY IRELAND  
2. ORDNANCE SURVEY IRELAND LICENCE NO. CYAL50167032 (C) ORDNANCE SURVEY IRELAND/GOVERNMENT OF IRELAND  
3. SURVEY COMPLETED ON 2ND FEBRUARY 2018 BY ASM IRELAND

**LEGEND**  

- ROADSTONE LAND INTEREST (C.58.9 HA)
- PLANNING APPLICATION AREA (C. 18.2 HA)
- PROPOSED EXTRACTION AREA (C. 9.7 HA)
- PROPOSED CONCRETE PLANT & STOCKPILE STORAGE AREA (C. 1.9 HA)
- EXISTING PASSAGEWAY
- EXISTING GROUND CONTOUR (mOD)
- BUILDINGS
- BOREHOLES / WELLS WITHIN 1KM OF SITE (WELL SURVEY 2019)
- SITE BOREHOLES
- INTERPOLATED GROUNDWATER LEVEL CONTOUR - MAXIMUM IDENTIFIED GROUNDWATER LEVEL IN APRIL 2019 (MONITORING PERIOD JANUARY 2019 TO NOVEMBER 2020)

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SLR CONSULTING IRELAND  
7 DUNDUM BUSINESS PARK  
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DUBLIN 14  
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www.slrconsulting.com

**SLR**

ROADSTONE LTD.  
ENVIRONMENTAL IMPACT ASSESSMENT REPORT  
EASTERN SATELLITE QUARRY AND  
NEW CONCRETE PLANT  
CAPPAGH QUARRY, COUNTY WATERFORD  
BOREHOLE / WELL LOCATIONS

**FIGURE 7-6**

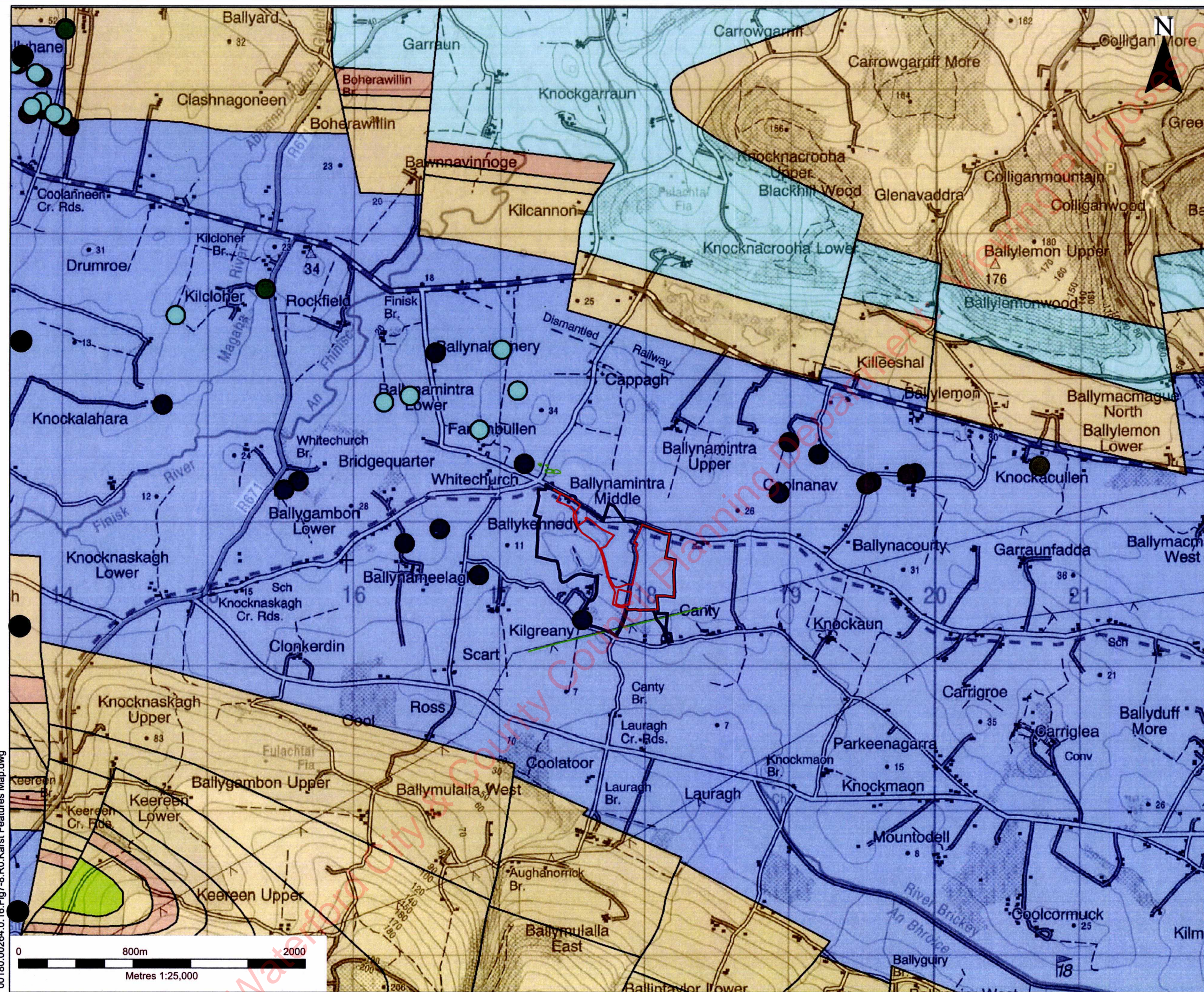
Scale 1:8,000 @ A3  
Date JULY 2021







00180.00264.0.16.Fig7-8.R0.Karst Features Map.dwg



**NOTES**  
1. EXTRACT FROM FROM ORDNANCE SURVEY IRELAND  
DISCOVERY SERIES SHEET NO. 82  
2. ORDNANCE SURVEY IRELAND LICENCE NO. CYAL50167032  
(C) ORDNANCE SURVEY IRELAND/ GOVERNMENT OF IRELAND

**LEGEND**  

ROADSTONE LAND INTEREST  
(C. 58.9 HA)

PLANNING APPLICATION AREA  
(C. 18.2 HA)

**Karst Features**  
Source: GSI Karst Database  

BOREHOLE

CAVE

ENCLOSED DEPRESSION

SPRING

SWALLOW HOLE

TURLOUGH

**Bedrock Aquifer**  
Source: GSI  

Regionally Important Aquifer - Karstified Diffuse (Rkd)

Regionally Important Aquifer - Fissured Bedrock (Rf)

Locally Important Aquifer - Karstified Lk

Locally Important Aquifer (LI)

Poor Aquifer (PI)

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**Roadstone**

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ROADSTONE LTD.

ENVIRONMENTAL IMPACT ASSESSMENT REPORT

EASTERN SATELLITE QUARRY AND  
NEW CONCRETE PLANT  
CAPPAGH QUARRY, COUNTY WATERFORD

KARST FEATURES MAP

FIGURE 7-8

Scale 1:25,000 @ A3

Date JULY 2021



APPENDICES

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## APPENDIX 7-A Legislation, Guidelines and Standards



# WATER (HYDROLOGY AND HYDROGEOLOGY) 7

## 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;
- S.I. No. 457 of 2008 European Communities (Environmental Liability) Regulations which bring into force the European Liability Directive (2004/35/EC);
- 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);

# WATER (HYDROLOGY AND HYDROGEOLOGY) 7

## Guidelines

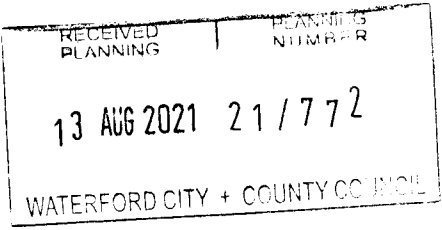
- CIS (2007). Common Implementation Strategy (CIS) for the Water Framework Directive (2000/60/EC) Guidance on preventing or limiting direct and indirect inputs in the context of the Groundwater Directive 2006/118/EC. Guidance Document No. 17.
- CIS (2010). Common Implementation Strategy (CIS) for the Water Framework Directive (2000/60/EC). Guidance on risk assessment and the use of conceptual models for groundwater. Guidance document No. 26.
- DEHLG (2004). National Urban Waste Water Study. National Report.
- DEHLG (2009). Appropriate Assessment of Plans and Projects in Ireland. Guidance for Planning Authorities.
- 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 (Draft May 2017) 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.
- EPA (2011). Guidance on the Authorisation of Discharges to Groundwater. Version 1, December 2011.
- EPA (2003). Towards Setting Guideline Values for the Protection of groundwater in Ireland. Interim Report.
- EPA (2006). Ireland Water Framework Directive Monitoring Programme.
- 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. 1 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 – Where Applicable

- British Standards (2015). Code of Practice for Ground Investigations BS5930:2015;.
- CIRIA (2007). The SuDS Manual. (C697). CIRIA publication, February 2007.

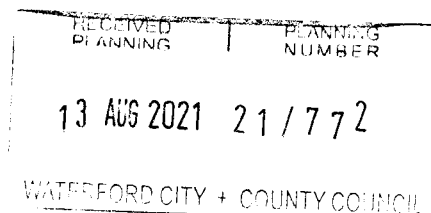


APPENDIX 7-B  
Initial Characterisation of Groundwater Body (GSI)



## Dungarvan GWB: Summary of Initial Characterisation.

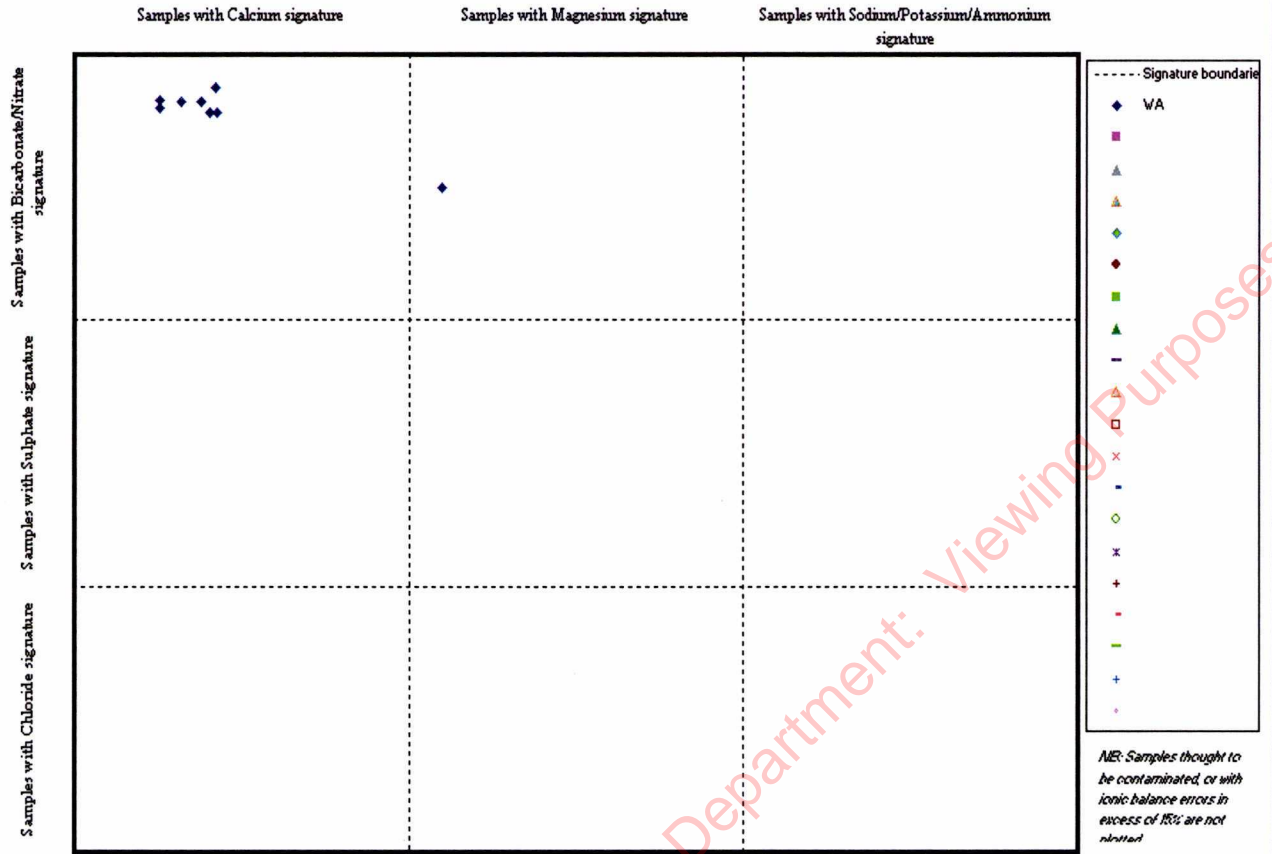
Hydrometric Area Local Authority	Associated surface water bodies	Associated terrestrial ecosystems	Area (km <sup>2</sup> )
17 – Coastal Area Waterford Co. Co.	Brickey, Colligan	Dungarvan Harbour	58.6
Topography	Dungarvan is located in a broad east-west trending steep sided valley. The valley floor descends at a very low gradient from west to east to the sea at Dungarvan. The highest elevations in this body are about 40m OD. In general drainage density is very low in the limestone valley. The soils and subsoils are relatively free draining. The land is grassland dominated and is largely used for grazing. There is little tillage in the area.		
Geology and Aquifers	Aquifer type(s)	<b>Rk:</b> Regionally Important Karstified Aquifer. There is a small lens of poorer aquifer contained within this body. <b>WA:</b> Waulsortian Limestone - Massive unbedded limestone. <b>BA :</b> Ballysteen Limestone - Dark-grey fossiliferous shaly limestone	
	Main aquifer lithologies		
	Key structures.	<u>Lismore-Dungarvan syncline:</u> Folding during the Variscan mountain building event has deformed the rocks around Dungarvan, compressing them from north and south to produce an east-west trend to the current rock distribution and ultimately to the topography of the Dungarvan area. Commonly associated with folding is jointing and faulting – there are several faults to the north of Dungarvan which have a north-south trend.	
	Key properties	Transmissivity estimated in the area of the supply boreholes at Dungarvan is 900 - 13,000 m <sup>2</sup> /d. The central area of the syncline has a higher permeability (15-180 m/d) than the limestones to the north and south (15-70 m/d). This is attributed to a higher degree of fracturing and faulting associated with a minor anticlinal axis. It is estimated that storage in these aquifers can be as high as 5%, but as low as 1% at depth. The effective porosity of the Waulsortian Limestone is estimated to be 2.5% and about 1% for the Ballysteen Limestone.	
	Thickness	The majority of groundwater flow occurs in the top 30-40 metres of the limestones.	
Overlying Strata	Lithologies	Sandy limestone-derived tills are the most extensive deposits in the Dungarvan area. They are best observed in ditches and field cuttings, and contain small limestone and sandstone clasts. The matrix is predominately sandy but also contains some silt and clay.	
	Thickness	Quaternary mapping in the general area suggests that the sandy till is often greater than 10m thick in the valley floor.	
	% area aquifer near surface	5%	
	Vulnerability	The sandy tills are considered moderately permeable and range from 0->10 m thickness in the valley floor which leads to a variable vulnerability. Areas of HIGH vulnerability bound this to the north and south.	
Recharge	Main recharge mechanisms	Recharge to the limestone synclines is likely to be increased as a result of surface water running off the surrounding less permeable and topographically higher Old Red Sandstone rocks onto the more permeable limestones. The sandy till probably allows significant recharge in most areas.	
	Est. recharge rates	[Recharge estimates will be added at a later date]	





<b>Discharge</b>	Springs and large known abstractions	The public supply at Ballynamuck is capable of producing at least 7300 m <sup>3</sup> /d; the largest recorded well yield in the Republic of Ireland. Current abstraction is approximately 5450 m <sup>3</sup> /d.
	Main Discharge Mechanisms	Groundwater generally discharges in a narrow zone along major rivers; this may be in the form of general baseflow, via springs or through sand and gravels that are in continuity with the rivers. Significant quantities of groundwater from the limestones of the Lismore-Dungarvan syncline are believed to discharge into the Blackwater, Brickley, and lower Finisk and Colligan Rivers in addition to Dungarvan Harbour.
	Hydrochemical Signature	Moderately hard (212 - 244 mg/l CaCO <sub>3</sub> ). Conductivities are in the range of 471 - 512 µS/cm. Chloride levels are slightly elevated, probably due to proximity to the sea. The groundwater has a Calcium Bicarbonate signature, which implies a relatively rapid flow system. The bedrock strata are <b>Calcareous</b> .
<b>Groundwater Flow Paths</b>	The upper weathered and fractured zone of bedrock acts as a zone of high permeability; large fissures or karstic conduits are often present within the bedrock, through which a large proportion of groundwater flow takes place; and where sand and gravel is present above the bedrock (e.g. at Ballynamuck), increased groundwater storage will be available to the well. The groundwater gradient is flatter in the more permeable limestone (0.0015) and flow direction in the vicinity of Ballynamuck is eastward toward the sea. A groundwater divide is present to the west of the public supply well in the Whitechurch area. Water to the west of the divide flows toward the River Blackwater and water to the east flows toward Dungarvan Harbour.	
<b>Groundwater and Surface water interactions.</b>	The large abstractions at Dungarvan may have caused some saline intrusion from the Harbour. Drainage density in this area is quite low.	
<b>Conceptual model</b>	This groundwater body is defined to the north and south by the extent of the Waulsortian Limestone near Dungarvan. To the east the boundary is defined by the coast and to the west by the catchment divide between the SERBD and SWRBD. The limestone is unconfined, with the water table generally less than 10 metres below the surface and with an average annual fluctuation of 5 metres. Permeability is entirely secondary, as a result of faulting, dolomitisation and karstification. However at Ballynamuck, the static water level lies within an upper alluvial unit, which semi-confines the groundwater at the well site. Groundwater flow is in large conduits. Substantial recharge comes from north and south sides of the valley, enters the limestone at the geological contact and travels underground until it discharges at Dungarvan Harbour.	
<b>Attachments</b>	(Figure 1) Durov plot.	
<b>Instrumentation</b>	Stream gauge: 17010, 17007 Borehole Hydrograph: none EPA Representative Monitoring boreholes: Dungarvan WS (2 boreholes) (No.41 & 121 - X236948)	
<b>Information Sources</b>	Hudson M., Daly D., Duffy S., & Johnston P., 1997. County Waterford Groundwater Protection Scheme. Cronin C., Daly D., Meehan R. & Johnston P (1997) Dungarvan Public Supply Groundwater Source Protection Zones.	
<b>Disclaimer</b>	Note that all calculation and interpretations presented in this report represent estimations based on the information sources described above and established hydrogeological formulae	

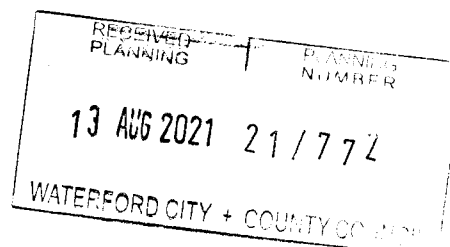
# Chemical Signature of Relatively Uncontaminated Waters (expanded Durov Plot)



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## APPENDIX 7-C Well Survey Results (March 2019)



SLR Consulting Ireland  
7 Dundrum Business Park  
Windy Arbour  
Dublin 14  
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Fax: +353 (0)1 296 4676  
www.slrconsulting.com

## WATER WELL (SURVEY) DATA SHEET



<b>SITE:</b> Cappagh quarry	<b>JOB No:</b>
-----------------------------	----------------

<b>Location:</b>	
Well ID: 13	Date & Time: 28/03.19
Owner: Robert Howel	Grid Ref.: 217759, 094218
Address: Tir na nOg, Kilgreany, Cappagh, Co Waterford	
Weather: Sunny	

<b>Well Details:</b>	
Well Type: (bored / dug / screened well / open hole)	Bored, don't know whether screened or o
Well Location:	
Supply Type: (i.e. domestic/commercial/farm)	Domestic
Number of persons supplied:	1
Water Quality: (i.e. taste/colour etc.)	Very good, very pure, clear
Current Status of Well (i.e. in use etc):	In use
Elevation of well cover above ground:	m
Elevation of inner casing pipe above ground:	m
Depth to water (from top of pipe) (RWL):	m
Depth of well (from top of pipe):	60-90ft (18-27m) m

<b>Well Construction Details:</b>		
Diameter of pipe:		m
Borehole Diameter:	RECEIVED PLANNING	PLANNING NUMBER
Depth to top of Screen (ftp):		m
Screen Length:	13 AUG 2021 21/772	m
Slot Size:		m
Screen + casing Material:	WATERFORD CITY + COUNTY COUNCIL	m
Gravel Pack Details:		m
Well Yield:		m <sup>3</sup> /day
Dynamic water level:		m
Depth of Pump (ftp):		
Pump type:	Submersible pump	
Pump Rate:		
Pump Use (Hours per day - All the time)		
Driller: Seery	Date Drilled:	Long time ago

<b>Comments:</b> (i.e. Potential sources of pollution, septic tanks or adjacent farmyard)



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## WATER WELL (SURVEY) DATA SHEET



<b>SITE:</b> Cappagh Quarry	<b>JOB No:</b>
-----------------------------	----------------

<b>Location:</b>	
Well ID: 14	Date & Time: 28/03/2019
Owner: Laurence and Elaine Looby	Grid Ref.:
Address: Kilgreany, Cappagh.	
Weather:	


<b>Well Details:</b>	
Well Type: (bored / dug / screened well / open hole)	Bored
Well Location:	Approx 100m from dwelling
Supply Type: (i.e. domestic/commercial/farm)	Domestic and farm Supply
Number of persons supplied:	Two families
Water Quality: (i.e. taste/colour etc.)	E.Coli <1 per 100 ml, Enterococci Neg. (16.03.2019)
Current Status of Well (i.e. in use etc):	In use
Elevation of well cover above ground:	Yes m
Elevation of inner casing pipe above ground:	No m
Depth to water (from top of pipe) (RWL):	30m m
Depth of well (from top of pipe):	m

<b>Well Construction Details:</b>	
Diameter of pipe:	m
Borehole Diameter:	m
Depth to top of Screen (ftp):	m
Screen Length:	m
Slot Size:	m
Screen + casing Material:	m
Gravel Pack Details:	m
Well Yield:	m <sup>3</sup> /day
Dynamic water level:	m
Depth of Pump (ftp):	
Pump type:	Submersible pump
Pump Rate:	
Pump Use (Hours per day - All the time)	
Driller:	Seery
Date Drilled:	Approx. 1989

<b>Comments:</b> (i.e. Potential sources of pollution, septic tanks or adjacent farmyard)

### APPENDIX 7-D Groundwater Sampling Field Record Sheets



SLR Consulting Ireland, Unit 7, Dundrum Business Park, Windy Arbour, Dublin 14.	<b>Groundwater Sampling Field Record Sheet</b>	<b>SLR</b> 
Site Location: Cappagh quarry, Co. Waterford	SLR Job No.: 501.00180.00264	
Date: 27 <sup>th</sup> & 28 <sup>th</sup> March 2019	Time: All day both days	
Staff: CG	Purging Equipment: Wattera pump	

	Borehole Number					
	BH16-02	BH16-06	BH16-07	BH16-09	BH16-11	BH16-13
<b>Groundwater Monitoring</b>						
Depth from ToC to static water level (m)	22.09	17.70	16.02	7.69	1.55	2.62
Total well depth from GL (m)	34.5	30	30	19.5	11	14.3
well volume in Well & Sandpack (L)	70	70	79	67	54	66

<b>Water Quality Measurements</b>	
Temp (°C)	YSI not working
pH	
Dissolved Oxygen (mg/l)	
Specific Conductivity (uS/cm)	

<b>Sample Observations</b>						
Colour	Mostly clear, slightly cloudy white	Opaque-ish & lightly brown	Medium brown	Opaque-ish & lightly brown	Opaque-ish & lightly yellow	Opaque-ish & lightly brown
Odour Present	No					
Sediment/Precipitate	Minor	Moderate	High	Moderate	Moderate	Moderate
Free Product	No					

Hydrocarbon Sheen	No
Well Purged Dry	No

<b>Additional Field observations</b>	BH16-02: field beside being sprayed with slurry during pumping
--------------------------------------	--

<b>ONE WELL VOLUME (50mm diameter casing)</b>	<b>BS 10175</b>
Terrier Borehole with 50mm Pipe	4l/m
6" Borehole with 50mm Pipe	5.5l/m
6" Borehole with 100mm Pipe	11.5l/m
8" Borehole with 50mm Pipe	8.25l/m
8" Borehole with 100mm Pipe	14.25l/m
<b>Note :</b> Purging should continue until Removal of at least three well volumes, or pH, conductivity and temperature readings have stabilised (any two successive reading are within 10% of eachother). If well is not recovering and it is not possible to meet these criteria then a grab sample should be obtained.	



# GROUNDWATER SAMPLING FIELD RECORD SHEET

**Site location:** Cappagh Quarry  
**SLR job number:** 501.00180.00264  
**Date:** 3<sup>rd</sup> & 4<sup>th</sup> November 2020  
**Time:** 3<sup>rd</sup>: 11.30-17.00, 4<sup>th</sup>: 8.15-12.00  
**Staff:** Clodagh Gillen, Jake Shiel  
**Equipment:** Wattera pump

	BH16-02	BH16-06	BH16-07	BH16-09	BH16-11	BH16-13
Groundwater level (m bgl)	21.67	17.02	15.42	8.40	1.49	2.76
Total depth (m)	34.5	30	30	19.5	11	14.3
Volume of water in borehole (litres)	55	55	65	65	60	60

Temperature (°C)	10.7	11	10.8	10.9	11.4	12.6
Dissolved oxygen (%)	58.5	63.7	53.8	78.6	69.5	84.0
Dissolved oxygen (mg/l)	6.42	7.03	5.93	8.67	7.58	8.93
Specific conductivity (µS/cm)	613.3	596.6	839	608.6	639.3	248.6
Conductivity (µS/cm)	445.8	437.4	611	444.9	474.0	189.7
pH	7.03	7.14	6.81	6.95	7.05	7.64
pHmv	-26.2	-32.6	-14.3	-21.5	-27.5	-60.1

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 PLANNING NUMBER

## Groundwater Field Record Sheet

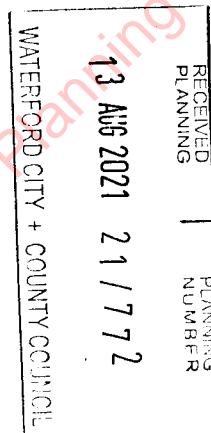
	BH16-02	BH16-06	BH16-07	BH16-09	BH16-11	BH16-13
Odour	No	No	No	No	No	No
Sheen	No	No	No	No	No	No
Silt	Mod	None	Mod	Mod	Minor	Mod
Colour	Opaque, medium brown	Transparent	Translucent	Opaque, medium brown	Opaque, white to very light grey	Opaque, white to very light grey
Free product	No	No	No	No	No	No
Well purged dry	No	No	No	No	No	No

**Additional field observations:**

- BH16-02: ~38m tubing cut and used. Filled pump with petrol at jeep ~50m from borehole, before pumping. Cows in field.
- BH16-06: 25m tubing odour in general. Manure odour in general.
- BH16-07: 25m tubing used. Filled pump with petrol at jeep >100m from borehole, before pumping.
- BH16-09: 19m tubing used. Filled pump with petrol at jeep ~7m from borehole, before pumping.
- BH16-11: Manure odour in general. Old machinery and small tank immediately adjacent to borehole. 19m tubing used. Filled pump with petrol at jeep ~5m from borehole, before pumping.
- BH16-13: Manure odour in general. 19m tubing used.



ONE WELL VOLUME (50mm diameter casing)	BS 10175
Terrier Borehole with 50mm Pipe	4l/m
6" Borehole with 50mm Pipe	5.5l/m
6" Borehole with 100mm Pipe	11.5l/m
8" Borehole with 50mm Pipe	8.25l/m
8" Borehole with 100mm Pipe	14.25l/m
<b>Note :</b> <i>Purging should continue until Removal of at least three well volumes, or pH, conductivity and temperature readings have stabilised (any two successive reading are within 10% of eachother). If well is not recovering and it is not possible to meet these criteria then a grab sample should be obtained.</i>	



## APPENDIX 7-E Laboratory Reports

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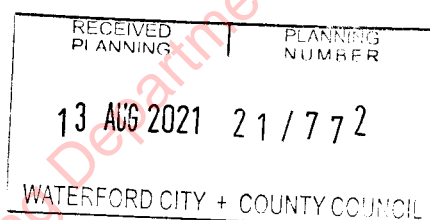
**Customer**

Clodagh Gillen  
SLR Consulting Ireland  
7 Dundrum Business Park  
Windy Arbour  
Dublin 14  
Dublin

**Certificate Of Analysis**

**Job Number:** 19-54336  
**Issue Number:** 1  
**Report Date:** 8 April 2019

**Site:** Cappagh Quarry  
**PO Number:** 5097  
**Date Samples Received:** 29/03/2019



Please find attached the results for the samples received at our laboratory on 29/03/2019.

Should you have any queries regarding the report or require any further services, we would be happy to discuss your requirements. For additional information about the company please log-on to our website at the above address.

Thank you for choosing City Analysts Limited. We look forward to assisting you again.

**Authorised By:**



Shane Reynolds  
Laboratory Manager

**Authorised Date:** 8 April 2019

**Notes:**

Results relate only to the items tested.  
Information on methods of analysis and performance characteristics is available on request.  
Any opinions or interpretations indicated are outside the scope of our INAB accreditation.  
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## Certificate Of Analysis

### Customer

Clodagh Gillen  
SLR Consulting Ireland  
7 Dundrum Business Park  
Windy Arbour  
Dublin 14  
Dublin

Report Reference: 19-54336

Report Version: 1

Site: Cappagh Quarry

Sample Description: BH 16-02

Date of Sampling: 27/03/2019

Sample Type: Ground

Date Sample Received: 29/03/2019

Lab Reference Number: 433668

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
*U	-	EPH (DRO) Range >C10-C40	< 100.00	ug/l	-
D/D3000#	01/04/2019	Alkalinity CaCO <sub>3</sub>	252.959	mg/l	-
D/D3000#	01/04/2019	Ammonia as NH <sub>4</sub>	0.032	mg/l	-
D/D3000#	01/04/2019	Chloride	24.024	mg/l	-
D/D3011#	29/03/2019	Conductivity @ 20°C	543.0	uS/cm @20°C	-
D/D3015#	01/04/2019	Fluoride	0.1	mg/l	-
D/D3000#	01/04/2019	Nitrite as NO <sub>2</sub>	0.109	mg/l	-
D/D3000#	01/04/2019	Nitrate as NO <sub>3</sub>	41.716	mg/l	-
EW188#*	-	Cadmium-Dissolved	0.1	ug/l	-
EW188#*	-	Zinc-Dissolved	7.6	ug/l	-
EW188#*	-	Mercury-Dissolved	< 0.02	ug/l	-
EW188#*	-	Boron-Dissolved	0.02	mg/l	-
EW188#*	-	Molybdenum-Dissolved	< 1.0	ug/l	-
EW188#*	-	Chromium-Dissolved	1.5	ug/l	-
EW188#*	-	Nickel-Dissolved	2.0	ug/l	-
EW188#*	-	Antimony-Dissolved	0.2	ug/L	-
EW188#*	-	Copper-Dissolved	< 0.003	mg/l	-
EW188#*	-	Barium-Dissolved	25.2	ug/L	-

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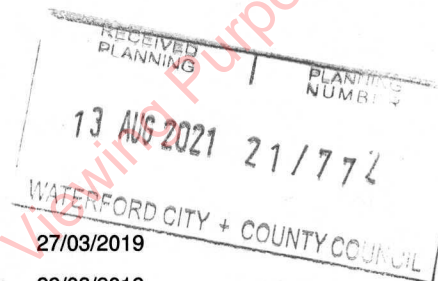
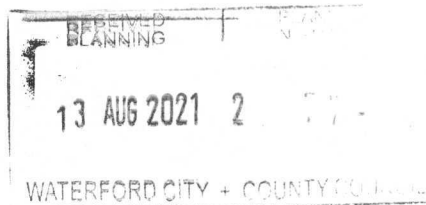
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Report Reference: 19-54336

Report Version: 1



Site: Cappagh Quarry

Sample Description: BH 16-02

Date of Sampling: 27/03/2019

Sample Type: Ground

Date Sample Received: 29/03/2019

Lab Reference Number: 433668

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
EW188#*	-	Lead-Dissolved	< 0.3	ug/l	-
EW188#*	-	Selenium-Dissolved	1.2	ug/l	-
EW188#*	-	Arsenic-Dissolved	0.2	ug/L	-
EW188#*	-	Cobalt-Dissolved	< 1.0	ug/l	-
D/D3000#	01/04/2019	Orthophosphate as P	< 0.025	mg/l	-
D/D3000#	01/04/2019	Orthophosphate as P04	< 0.025	mg/l	-
D/D1041#	29/03/2019	PH	7.38	pH Unit	-
D/D3000	04/04/2019	Phosphorus, Soluble	< 0.050	mg/l	-
D/D3000#	01/04/2019	Sulphate	< 20.000	mg/l	-
<b>VOC</b>					
*U	-	1,1,1,2-Tetrachloroethane	< 1.00	ug/l	-
*U	-	1,1,2-2 - Tetrachloroethane	< 5.00	ug/l	-
*U	-	1,1,1-Trichloroethane	< 1.00	ug/l	-
*U	-	1,1,2-Trichloroethane	< 2.00	ug/l	-
*U	-	1,1-Dichloroethane	< 1.00	ug/l	-
*U	-	1,1-Dichloroethene	< 1.00	ug/l	-
*U	-	1,1-Dichloropropene	< 1.00	ug/l	-
*U	-	1,2,3-Trichlorobenzene	< 3.00	ug/l	-

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Sample Description: BH 16-02

Date of Sampling: 27/03/2019

Sample Type: Ground

Date Sample Received: 29/03/2019

Lab Reference Number: 433668

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
*U	-	1,2,3-Trichloropropane	< 8.00	ug/l	-
*U	-	1,2,4-Trichlorobenzene	< 2.00	ug/l	-
*U	-	1,2,4-Trimethylbenzene	< 2.00	ug/l	-
*	-	1,2-Dibromo-3-chloropropane	< 10.00	ug/l	-
*U	-	1,2-Dibromoethane	< 2.00	ug/l	-
*	-	1,2-Dichlorobenzene	< 4.00	ug/l	-
*U	-	1,2-Dichloroethane	< 3.00	ug/l	-
*U	-	1,2-Dichloropropane	< 3.00	ug/l	-
*U	-	1,3,5-Trimethylbenzene	< 2.00	ug/l	-
*	-	1,3,5-Trichlorobenzene	< 10.00	ug/l	-
*U	-	1,3-Dichlorobenzene	< 2.00	ug/l	-
*U	-	1,3-Dichloropropane	< 2.00	ug/l	-
*U	-	1,4-Dichlorobenzene	< 3.00	ug/l	-
*U	-	2,2-Dichloropropane	< 4.00	ug/l	-
*U	-	2-Chlorotoluene	< 2.00	ug/l	-
*U	-	4-Chlorotoluene	< 2.00	ug/l	-
*U	-	4-Isopropyltoluene	< 4.00	ug/l	-
*U	-	Benzene	< 1.00	ug/l	-

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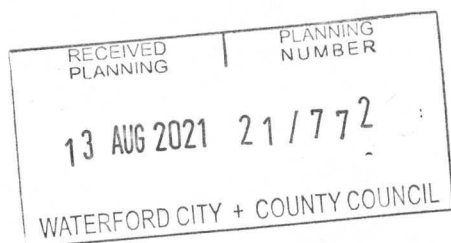
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Report Version: 1



Site: Cappagh Quarry

Sample Description: BH 16-02

Date of Sampling: 27/03/2019

Sample Type: Ground

Date Sample Received: 29/03/2019

Lab Reference Number: 433668

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
*U	-	Bromobenzene	< 2.00	ug/l	-
*U	-	Bromochloromethane	< 2.00	ug/l	-
*U	-	Bromodichloromethane	< 1.00	ug/l	-
*U	-	Bromoform	< 3.00	ug/l	-
*U	-	Bromomethane	< 2.00	ug/l	-
*U	-	Carbon Disulphide	< 1.00	ug/l	-
*U	-	Carbontetrachloride	< 1.00	ug/l	-
*U	-	Chlorobenzene	< 4.00	ug/l	-
*U	-	Chloroethane	< 3.00	ug/l	-
*U	-	Chloroform	< 2.00	ug/l	-
*U	-	Chloromethane	< 9.00	ug/l	-
*U	-	1,2-Dichloroethene cis (Z)	< 2.00	ug/l	-
*U	-	1,3-Dichloropropene cis (Z)	< 2.00	ug/l	-
*U	-	Dibromochloromethane	< 2.00	ug/l	-
*U	-	Dibromomethane	< 3.00	ug/l	-
*U	-	Dichlorodifluoromethane	< 7.00	ug/l	-
*U	-	Dichloromethane	< 3.00	ug/l	-
*U	-	Ethylbenzene	< 3.00	ug/l	-

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Site: Cappagh Quarry

Sample Description: BH 16-02

Date of Sampling: 27/03/2019

Sample Type: Ground

Date Sample Received: 29/03/2019

Lab Reference Number: 433668

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
*U	-	Hexachlorobutadiene	< 3.00	ug/l	-
*U	-	Isopropylbenzene	< 1.00	ug/l	-
*U	-	Methyl Tertiary Butyl Ether	< 2.00	ug/l	-
*U	-	Napthalene	< 4.00	ug/l	-
*U	-	n-Butylbenzene	< 2.00	ug/l	-
*U	-	O-Xylene	< 1.00	ug/l	-
*U	-	M&P-Xylene	< 3.00	ug/l	-
*U	-	Propylbenzene	< 3.00	ug/l	-
*U	-	sec-Butylbenzene	< 2.00	ug/l	-
*U	-	Styrene	< 1.00	ug/l	-
*U	-	tert-Butylbenzene	< 2.00	ug/l	-
*U	-	Tetrachloroethene	< 2.00	ug/l	-
*U	-	Tert-amyl methyl ether	< 1.00	ug/l	-
*U	-	Toluene	< 1.00	ug/l	-
*U	-	1,2-Dichloroethene Trans (E)	< 2.00	ug/l	-
*U	-	1,3-Dichloropropene Trans (E)	< 4.00	ug/l	-
*U	-	Trichloroethene	< 3.00	ug/l	-
*U	-	Trichlorofluoromethane	< 1.00	ug/l	-

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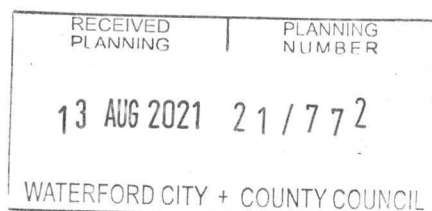
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Site: Cappagh Quarry

Sample Description: BH 16-02

Date of Sampling: 27/03/2019

Sample Type: Ground

Date Sample Received: 29/03/2019

Lab Reference Number: 433668

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
*U	-	Vinyl Chloride	< 1.00	ug/l	-

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Report Reference: 19-54336

Report Version: 1

Site: Cappagh Quarry

Sample Description: BH 16-06

Date of Sampling: 28/03/2019

Sample Type: Ground

Date Sample Received: 29/03/2019

Lab Reference Number: 433669

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
*U	-	EPH (DRO) Range >C10-C40	< 100.00	ug/l	-
D/D3000#	01/04/2019	Alkalinity CaCO3	249.830	mg/l	-
D/D3000#	01/04/2019	Ammonia as NH4	< 0.013	mg/l	-
D/D3000#	01/04/2019	Chloride	26.892	mg/l	-
D/D3011#	29/03/2019	Conductivity @ 20°C	538.0	uS/cm @20°C	-
D/D3015#	01/04/2019	Fluoride	< 0.1	mg/l	-
D/D3000#	01/04/2019	Nitrite as N02	< 0.066	mg/l	-
D/D3000#	01/04/2019	Nitrate as N03	44.512	mg/l	-
EW188#*	-	Boron-Dissolved	0.02	mg/l	-
EW188#*	-	Lead-Dissolved	0.8	ug/l	-
EW188#*	-	Antimony-Dissolved	0.2	ug/L	-
EW188#*	-	Chromium-Dissolved	1.8	ug/l	-
EW188#*	-	Arsenic-Dissolved	0.3	ug/L	-
EW188#*	-	Selenium-Dissolved	1.7	ug/l	-
EW188#*	-	Mercury-Dissolved	0.04	ug/l	-
EW188#*	-	Molybdenum-Dissolved	< 1.0	ug/l	-
EW188#*	-	Zinc-Dissolved	26.0	ug/l	-
EW188#*	-	Cobalt-Dissolved	< 1.0	ug/l	-

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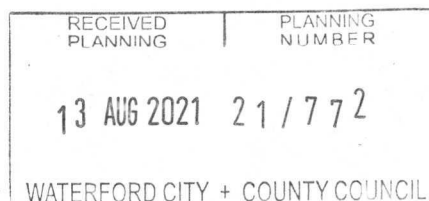
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Site: Cappagh Quarry

Sample Description: BH 16-06

Date of Sampling: 28/03/2019

Sample Type: Ground

Date Sample Received: 29/03/2019

Lab Reference Number: 433669

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
EW188#*	-	Cadmium-Dissolved	0.3	ug/l	-
EW188#*	-	Copper-Dissolved	0.005	mg/l	-
EW188#*	-	Barium-Dissolved	27.0	ug/L	-
EW188#*	-	Nickel-Dissolved	2.2	ug/l	-
D/D3000#	01/04/2019	Orthophosphate as P	0.025	mg/l	-
D/D3000#	01/04/2019	Orthophosphate as P04	0.075	mg/l	-
D/D1041#	29/03/2019	PH	7.37	pH Unit	-
D/D3000	04/04/2019	Phosphorus, Soluble	< 0.050	mg/l	-
D/D3000#	01/04/2019	Sulphate	< 20.000	mg/l	-
<b>VOC</b>					
*U	-	1,1,1,2-Tetrachloroethane	< 1.00	ug/l	-
*U	-	1,1,2-2 - Tetrachloroethane	< 5.00	ug/l	-
*U	-	1,1,1-Trichloroethane	< 1.00	ug/l	-
*U	-	1,1,2-Trichloroethane	< 2.00	ug/l	-
*U	-	1,1-Dichloroethane	< 1.00	ug/l	-
*U	-	1,1-Dichloroethene	< 1.00	ug/l	-
*U	-	1,1-Dichloropropene	< 1.00	ug/l	-
*U	-	1,2,3-Trichlorobenzene	< 3.00	ug/l	-

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Sample Type: Ground

Date Sample Received: 29/03/2019

Lab Reference Number: 433669

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
*U	-	1,2,3-Trichloropropane	< 8.00	ug/l	-
*U	-	1,2,4-Trichlorobenzene	< 2.00	ug/l	-
*U	-	1,2,4-Trimethylbenzene	< 2.00	ug/l	-
*	-	1,2-Dibromo-3-chloropropane	< 10.00	ug/l	-
*U	-	1,2-Dibromoethane	< 2.00	ug/l	-
*	-	1,2-Dichlorobenzene	< 4.00	ug/l	-
*U	-	1,2-Dichloroethane	< 3.00	ug/l	-
*U	-	1,2-Dichloropropane	< 3.00	ug/l	-
*U	-	1,3,5-Trimethylbenzene	< 2.00	ug/l	-
*	-	1,3,5-Trichlorobenzene	< 10.00	ug/l	-
*U	-	1,3-Dichlorobenzene	< 2.00	ug/l	-
*U	-	1,3-Dichloropropane	< 2.00	ug/l	-
*U	-	1,4-Dichlorobenzene	< 3.00	ug/l	-
*U	-	2,2-Dichloropropane	< 4.00	ug/l	-
*U	-	2-Chlorotoluene	< 2.00	ug/l	-
*U	-	4-Chlorotoluene	< 2.00	ug/l	-
*U	-	4-Isopropyltoluene	< 4.00	ug/l	-
*U	-	Benzene	< 1.00	ug/l	-

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Site: Cappagh Quarry

Sample Description: BH 16-06

Date of Sampling: 28/03/2019

Sample Type: Ground

Date Sample Received: 29/03/2019

Lab Reference Number: 433669

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
*U	-	Bromobenzene	< 2.00	ug/l	-
*U	-	Bromochloromethane	< 2.00	ug/l	-
*U	-	Bromodichloromethane	< 1.00	ug/l	-
*U	-	Bromoform	< 3.00	ug/l	-
*U	-	Bromomethane	< 2.00	ug/l	-
*U	-	Carbon Disulphide	< 1.00	ug/l	-
*U	-	Carbontetrachloride	< 1.00	ug/l	-
*U	-	Chlorobenzene	< 4.00	ug/l	-
*U	-	Chloroethane	< 3.00	ug/l	-
*U	-	Chloroform	< 2.00	ug/l	-
*U	-	Chloromethane	< 9.00	ug/l	-
*U	-	1,2-Dichloroethene cis (Z)	< 2.00	ug/l	-
*U	-	1,3-Dichloropropene cis (Z)	< 2.00	ug/l	-
*U	-	Dibromochloromethane	< 2.00	ug/l	-
*U	-	Dibromomethane	< 3.00	ug/l	-
*U	-	Dichlorodifluoromethane	< 7.00	ug/l	-
*U	-	Dichloromethane	< 3.00	ug/l	-
*U	-	Ethylbenzene	< 3.00	ug/l	-

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Report Version: 1

Site: Cappagh Quarry

Sample Description: BH 16-06

Date of Sampling: 28/03/2019

Sample Type: Ground

Date Sample Received: 29/03/2019

Lab Reference Number: 433669

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
*U	-	Hexachlorobutadiene	< 3.00	ug/l	-
*U	-	Isopropylbenzene	< 1.00	ug/l	-
*U	-	Methyl Tertiary Butyl Ether	< 2.00	ug/l	-
*U	-	Napthalene	< 4.00	ug/l	-
*U	-	n-Butylbenzene	< 2.00	ug/l	-
*U	-	O-Xylene	< 1.00	ug/l	-
*U	-	M&P-Xylene	< 3.00	ug/l	-
*U	-	Propylbenzene	< 3.00	ug/l	-
*U	-	sec-Butylbenzene	< 2.00	ug/l	-
*U	-	Styrene	< 1.00	ug/l	-
*U	-	tert-Butylbenzene	< 2.00	ug/l	-
*U	-	Tetrachloroethene	< 2.00	ug/l	-
*U	-	Tert-amyl methyl ether	< 1.00	ug/l	-
*U	-	Toluene	< 1.00	ug/l	-
*U	-	1,2-Dichloroethene Trans (E)	< 2.00	ug/l	-
*U	-	1,3-Dichloropropene Trans (E)	< 4.00	ug/l	-
*U	-	Trichloroethene	< 3.00	ug/l	-
*U	-	Trichlorofluoromethane	< 1.00	ug/l	-

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#### Note:

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## Certificate Of Analysis

### Customer

Clodagh Gillen  
SLR Consulting Ireland  
7 Dundrum Business Park  
Windy Arbour  
Dublin 14  
Dublin

Report Reference: 19-54336

Report Version: 1



Site: Cappagh Quarry

Sample Description: BH 16-06

Sample Type: Ground

Lab Reference Number: 433669

Date of Sampling: 28/03/2019

Date Sample Received: 29/03/2019

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
*U	-	Vinyl Chloride	< 1.00	ug/l	-

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Note:  
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SLR Consulting Ireland  
7 Dundrum Business Park  
Windy Arbour  
Dublin 14  
Dublin

Report Reference: 19-54336

Report Version: 1

Site: Cappagh Quarry

Sample Description: BH 16-07

Date of Sampling: 28/03/2019

Sample Type: Ground

Date Sample Received: 29/03/2019

Lab Reference Number: 433670

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
*U	-	EPH (DRO) Range >C10-C40	< 100.00	ug/l	-
D/D3000#	01/04/2019	Alkalinity CaCO <sub>3</sub>	326.012	mg/l	-
D/D3000#	01/04/2019	Ammonia as NH <sub>4</sub>	< 0.013	mg/l	-
D/D3000#	01/04/2019	Chloride	31.301	mg/l	-
D/D3011#	29/03/2019	Conductivity @ 20 °C	773.0	uS/cm @20 °C	-
D/D3015#	01/04/2019	Fluoride	< 0.1	mg/l	-
D/D3000#	01/04/2019	Nitrite as N <sub>02</sub>	< 0.066	mg/l	-
D/D3000#	01/04/2019	Nitrate as N <sub>03</sub>	82.457	mg/l	-
EW188#*	-	Barium-Dissolved	45.3	ug/L	-
EW188#*	-	Nickel-Dissolved	2.0	ug/l	-
EW188#*	-	Selenium-Dissolved	1.4	ug/l	-
EW188#*	-	Boron-Dissolved	0.03	mg/l	-
EW188#*	-	Molybdenum-Dissolved	< 1.0	ug/l	-
EW188#*	-	Copper-Dissolved	< 0.003	mg/l	-
EW188#*	-	Antimony-Dissolved	0.3	ug/L	-
EW188#*	-	Cadmium-Dissolved	0.4	ug/l	-
EW188#*	-	Arsenic-Dissolved	1.0	ug/L	-
EW188#*	-	Lead-Dissolved	< 0.3	ug/l	-

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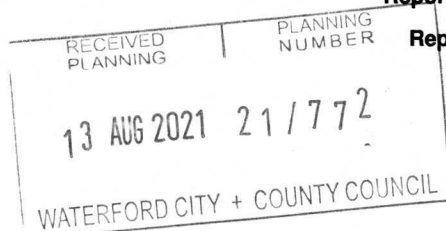
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SLR Consulting Ireland  
7 Dundrum Business Park  
Windy Arbour  
Dublin 14  
Dublin

Report Reference: 19-54336

Report Version: 1



Site: Cappagh Quarry

Sample Description: BH 16-07

Date of Sampling: 28/03/2019

Sample Type: Ground

Date Sample Received: 29/03/2019

Lab Reference Number: 433670

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
EW188#*	-	Mercury-Dissolved	0.15	ug/l	-
EW188#*	-	Chromium-Dissolved	< 1.0	ug/l	-
EW188#*	-	Zinc-Dissolved	13.0	ug/l	-
EW188#*	-	Cobalt-Dissolved	< 1.0	ug/l	-
D/D3000#	01/04/2019	Orthophosphate as P	0.032	mg/l	-
D/D3000#	01/04/2019	Orthophosphate as P04	0.097	mg/l	-
D/D1041#	29/03/2019	PH	7.15	pH Unit	-
D/D3000	04/04/2019	Phosphorus, Soluble	< 0.050	mg/l	-
D/D3000#	01/04/2019	Sulphate	< 20.000	mg/l	-
<b>VOC</b>					
*U	-	1,1,1,2-Tetrachloroethane	< 1.00	ug/l	-
*U	-	1,1,2-2 - Tetrachloroethane	< 5.00	ug/l	-
*U	-	1,1,1-Trichloroethane	< 1.00	ug/l	-
*U	-	1,1,2-Trichloroethane	< 2.00	ug/l	-
*U	-	1,1-Dichloroethane	< 1.00	ug/l	-
*U	-	1,1-Dichloroethene	< 1.00	ug/l	-
*U	-	1,1-Dichloropropene	< 1.00	ug/l	-
*U	-	1,2,3-Trichlorobenzene	< 3.00	ug/l	-

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7 Dundrum Business Park  
Windy Arbour  
Dublin 14  
Dublin

**Report Reference:** 19-54336

**Report Version:** 1

**Site:** Cappagh Quarry

**Sample Description:** BH 16-07

**Date of Sampling:** 28/03/2019

**Sample Type:** Ground

**Date Sample Received:** 29/03/2019

**Lab Reference Number:** 433670

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
*U	-	1,2,3-Trichloropropane	< 8.00	ug/l	-
*U	-	1,2,4-Trichlorobenzene	< 2.00	ug/l	-
*U	-	1,2,4-Trimethylbenzene	< 2.00	ug/l	-
*	-	1,2-Dibromo-3-chloropropane	< 10.00	ug/l	-
*U	-	1,2-Dibromoethane	< 2.00	ug/l	-
*	-	1,2-Dichlorobenzene	< 4.00	ug/l	-
*U	-	1,2-Dichloroethane	< 3.00	ug/l	-
*U	-	1,2-Dichloropropane	< 3.00	ug/l	-
*U	-	1,3,5-Trimethylbenzene	< 2.00	ug/l	-
*	-	1,3,5-Trichlorobenzene	< 10.00	ug/l	-
*U	-	1,3-Dichlorobenzene	< 2.00	ug/l	-
*U	-	1,3-Dichloropropane	< 2.00	ug/l	-
*U	-	1,4-Dichlorobenzene	< 3.00	ug/l	-
*U	-	2,2-Dichloropropane	< 4.00	ug/l	-
*U	-	2-Chlorotoluene	< 2.00	ug/l	-
*U	-	4-Chlorotoluene	< 2.00	ug/l	-
*U	-	4-Isopropyltoluene	< 4.00	ug/l	-
*U	-	Benzene	< 1.00	ug/l	-

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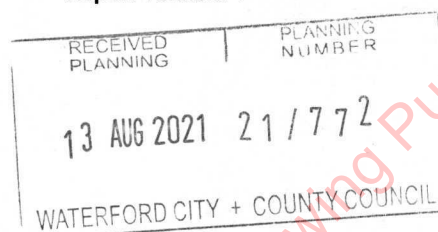
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7 Dundrum Business Park  
Windy Arbour  
Dublin 14  
Dublin

Report Reference: 19-54336

Report Version: 1



Site: Cappagh Quarry

Sample Description: BH 16-07

Sample Type: Ground

Lab Reference Number: 433670

Date of Sampling: 28/03/2019

Date Sample Received: 29/03/2019

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
*U	-	Bromobenzene	< 2.00	ug/l	-
*U	-	Bromochloromethane	< 2.00	ug/l	-
*U	-	Bromodichloromethane	< 1.00	ug/l	-
*U	-	Bromoform	< 3.00	ug/l	-
*U	-	Bromomethane	< 2.00	ug/l	-
*U	-	Carbon Disulphide	< 1.00	ug/l	-
*U	-	Carbontetrachloride	< 1.00	ug/l	-
*U	-	Chlorobenzene	< 4.00	ug/l	-
*U	-	Chloroethane	< 3.00	ug/l	-
*U	-	Chloroform	< 2.00	ug/l	-
*U	-	Chloromethane	< 9.00	ug/l	-
*U	-	1,2-Dichloroethene cis (Z)	< 2.00	ug/l	-
*U	-	1,3-Dichloropropene cis (Z)	< 2.00	ug/l	-
*U	-	Dibromochloromethane	< 2.00	ug/l	-
*U	-	Dibromomethane	< 3.00	ug/l	-
*U	-	Dichlorodifluoromethane	< 7.00	ug/l	-
*U	-	Dichloromethane	< 3.00	ug/l	-
*U	-	Ethylbenzene	< 3.00	ug/l	-

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Dublin 14  
Dublin

Report Reference: 19-54336

Report Version: 1

Site: Cappagh Quarry

Sample Description: BH 16-07

Date of Sampling: 28/03/2019

Sample Type: Ground

Date Sample Received: 29/03/2019

Lab Reference Number: 433670

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
*U	-	Hexachlorobutadiene	< 3.00	ug/l	-
*U	-	Isopropylbenzene	< 1.00	ug/l	-
*U	-	Methyl Tertiary Butyl Ether	< 2.00	ug/l	-
*U	-	Napthalene	< 4.00	ug/l	-
*U	-	n-Butylbenzene	< 2.00	ug/l	-
*U	-	O-Xylene	< 1.00	ug/l	-
*U	-	M&P-Xylene	< 3.00	ug/l	-
*U	-	Propylbenzene	< 3.00	ug/l	-
*U	-	sec-Butylbenzene	< 2.00	ug/l	-
*U	-	Styrene	< 1.00	ug/l	-
*U	-	tert-Butylbenzene	< 2.00	ug/l	-
*U	-	Tetrachloroethene	< 2.00	ug/l	-
*U	-	Tert-amyl methyl ether	< 1.00	ug/l	-
*U	-	Toluene	< 1.00	ug/l	-
*U	-	1,2-Dichloroethene Trans (E)	< 2.00	ug/l	-
*U	-	1,3-Dichloropropene Trans (E)	< 4.00	ug/l	-
*U	-	Trichloroethene	< 3.00	ug/l	-
*U	-	Trichlorofluoromethane	< 1.00	ug/l	-

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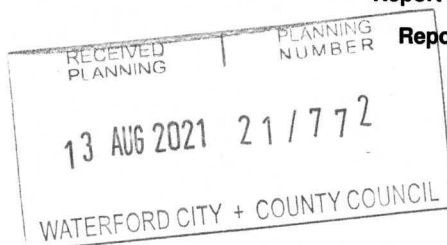
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Windy Arbour  
Dublin 14  
Dublin

Report Reference: 19-54336

Report Version: 1



Site: Cappagh Quarry

Sample Description: BH 16-07

Date of Sampling: 28/03/2019

Sample Type: Ground

Date Sample Received: 29/03/2019

Lab Reference Number: 433670

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
*U	-	Vinyl Chloride	< 1.00	ug/l	-

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Dublin 14  
Dublin

Report Reference: 19-54336

Report Version: 1

Site: Cappagh Quarry

Sample Description: BH 16-09

Date of Sampling: 27/03/2019

Sample Type: Ground

Date Sample Received: 29/03/2019

Lab Reference Number: 433671

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
*U	-	EPH (DRO) Range >C10-C40	< 100.00	ug/l	-
D/D3000#	01/04/2019	Alkalinity CaCO3	288.479	mg/l	-
D/D3000#	01/04/2019	Ammonia as NH4	< 0.013	mg/l	-
D/D3000#	01/04/2019	Chloride	29.977	mg/l	-
D/D3011#	29/03/2019	Conductivity @ 20 °C	623.0	uS/cm @20 °C	-
D/D3015#	01/04/2019	Fluoride	< 0.1	mg/l	-
D/D3000#	01/04/2019	Nitrite as N02	< 0.066	mg/l	-
D/D3000#	01/04/2019	Nitrate as N03	50.813	mg/l	-
EW188#*	-	Boron-Dissolved	0.03	mg/l	-
EW188#*	-	Nickel-Dissolved	0.9	ug/l	-
EW188#*	-	Barium-Dissolved	17.6	ug/L	-
EW188#*	-	Lead-Dissolved	0.8	ug/l	-
EW188#*	-	Cadmium-Dissolved	0.1	ug/l	-
EW188#*	-	Copper-Dissolved	0.004	mg/l	-
EW188#*	-	Selenium-Dissolved	1.4	ug/l	-
EW188#*	-	Mercury-Dissolved	0.04	ug/l	-
EW188#*	-	Antimony-Dissolved	0.2	ug/L	-
EW188#*	-	Chromium-Dissolved	< 1.0	ug/l	-

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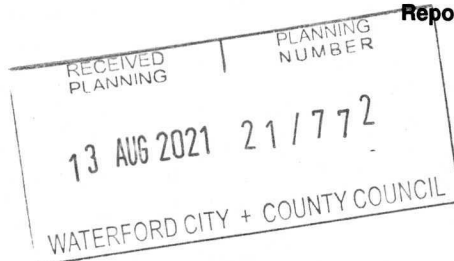
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Report Reference: 19-54336

Report Version: 1



Site: Cappagh Quarry

Sample Description: BH 16-09

Date of Sampling: 27/03/2019

Sample Type: Ground

Date Sample Received: 29/03/2019

Lab Reference Number: 433671

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
EW188#*	-	Cobalt-Dissolved	< 1.0	ug/l	-
EW188#*	-	Arsenic-Dissolved	0.2	ug/L	-
EW188#*	-	Molybdenum-Dissolved	< 1.0	ug/l	-
EW188#*	-	Zinc-Dissolved	4.7	ug/l	-
D/D3000#	01/04/2019	Orthophosphate as P	< 0.025	mg/l	-
D/D3000#	01/04/2019	Orthophosphate as P04	< 0.025	mg/l	-
D/D1041#	29/03/2019	PH	7.21	pH Unit	-
D/D3000	04/04/2019	Phosphorus, Soluble	< 0.050	mg/l	-
D/D3000#	01/04/2019	Sulphate	< 20.000	mg/l	-
<b>VOC</b>					
*U	-	1,1,1,2-Tetrachloroethane	< 1.00	ug/l	-
*U	-	1,1,2-2 - Tetrachloroethane	< 5.00	ug/l	-
*U	-	1,1,1-Trichloroethane	< 1.00	ug/l	-
*U	-	1,1,2-Trichloroethane	< 2.00	ug/l	-
*U	-	1,1-Dichloroethane	< 1.00	ug/l	-
*U	-	1,1-Dichloroethene	< 1.00	ug/l	-
*U	-	1,1-Dichloropropene	< 1.00	ug/l	-
*U	-	1,2,3-Trichlorobenzene	< 3.00	ug/l	-

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Dublin 14  
Dublin

Report Reference: 19-54336

Report Version: 1

Site: Cappagh Quarry

Sample Description: BH 16-09

Date of Sampling: 27/03/2019

Sample Type: Ground

Date Sample Received: 29/03/2019

Lab Reference Number: 433671

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
*U	-	1,2,3-Trichloropropane	< 8.00	ug/l	-
*U	-	1,2,4-Trichlorobenzene	< 2.00	ug/l	-
*U	-	1,2,4-Trimethylbenzene	< 2.00	ug/l	-
*	-	1,2-Dibromo-3-chloropropane	< 10.00	ug/l	-
*U	-	1,2-Dibromoethane	< 2.00	ug/l	-
*	-	1,2-Dichlorobenzene	< 4.00	ug/l	-
*U	-	1,2-Dichloroethane	< 3.00	ug/l	-
*U	-	1,2-Dichloropropane	< 3.00	ug/l	-
*U	-	1,3,5-Trimethylbenzene	< 2.00	ug/l	-
*	-	1,3,5-Trichlorobenzene	< 10.00	ug/l	-
*U	-	1,3-Dichlorobenzene	< 2.00	ug/l	-
*U	-	1,3-Dichloropropane	< 2.00	ug/l	-
*U	-	1,4-Dichlorobenzene	< 3.00	ug/l	-
*U	-	2,2-Dichloropropane	< 4.00	ug/l	-
*U	-	2-Chlorotoluene	< 2.00	ug/l	-
*U	-	4-Chlorotoluene	< 2.00	ug/l	-
*U	-	4-Isopropyltoluene	< 4.00	ug/l	-
*U	-	Benzene	< 1.00	ug/l	-

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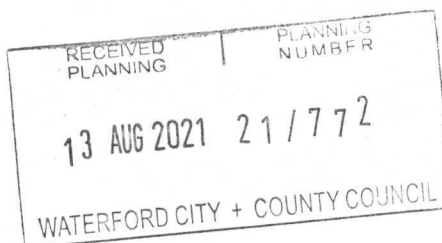
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Windy Arbour  
Dublin 14  
Dublin

Report Reference: 19-54336

Report Version: 1



Site: Cappagh Quarry

Sample Description: BH 16-09

Date of Sampling: 27/03/2019

Sample Type: Ground

Date Sample Received: 29/03/2019

Lab Reference Number: 433671

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
*U	-	Bromobenzene	< 2.00	ug/l	-
*U	-	Bromochloromethane	< 2.00	ug/l	-
*U	-	Bromodichloromethane	< 1.00	ug/l	-
*U	-	Bromoform	< 3.00	ug/l	-
*U	-	Bromomethane	< 2.00	ug/l	-
*U	-	Carbon Disulphide	< 1.00	ug/l	-
*U	-	Carbontetrachloride	< 1.00	ug/l	-
*U	-	Chlorobenzene	< 4.00	ug/l	-
*U	-	Chloroethane	< 3.00	ug/l	-
*U	-	Chloroform	< 2.00	ug/l	-
*U	-	Chloromethane	< 9.00	ug/l	-
*U	-	1,2-Dichloroethene cis (Z)	< 2.00	ug/l	-
*U	-	1,3-Dichloropropene cis (Z)	< 2.00	ug/l	-
*U	-	Dibromochloromethane	< 2.00	ug/l	-
*U	-	Dibromomethane	< 3.00	ug/l	-
*U	-	Dichlorodifluoromethane	< 7.00	ug/l	-
*U	-	Dichloromethane	< 3.00	ug/l	-
*U	-	Ethylbenzene	< 3.00	ug/l	-

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## Certificate Of Analysis

### Customer

Clodagh Gillen  
SLR Consulting Ireland  
7 Dundrum Business Park  
Windy Arbour  
Dublin 14  
Dublin

Report Reference: 19-54336

Report Version: 1

Site: Cappagh Quarry

Sample Description: BH 16-09

Date of Sampling: 27/03/2019

Sample Type: Ground

Date Sample Received: 29/03/2019

Lab Reference Number: 433671

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
*U	-	Hexachlorobutadiene	< 3.00	ug/l	-
*U	-	Isopropylbenzene	< 1.00	ug/l	-
*U	-	Methyl Tertiary Butyl Ether	< 2.00	ug/l	-
*U	-	Napthalene	< 4.00	ug/l	-
*U	-	n-Butylbenzene	< 2.00	ug/l	-
*U	-	O-Xylene	< 1.00	ug/l	-
*U	-	M&P-Xylene	< 3.00	ug/l	-
*U	-	Propylbenzene	< 3.00	ug/l	-
*U	-	sec-Butylbenzene	< 2.00	ug/l	-
*U	-	Styrene	< 1.00	ug/l	-
*U	-	tert-Butylbenzene	< 2.00	ug/l	-
*U	-	Tetrachloroethene	< 2.00	ug/l	-
*U	-	Tert-amyl methyl ether	< 1.00	ug/l	-
*U	-	Toluene	< 1.00	ug/l	-
*U	-	1,2-Dichloroethene Trans (E)	< 2.00	ug/l	-
*U	-	1,3-Dichloropropene Trans (E)	< 4.00	ug/l	-
*U	-	Trichloroethene	< 3.00	ug/l	-
*U	-	Trichlorofluoromethane	< 1.00	ug/l	-

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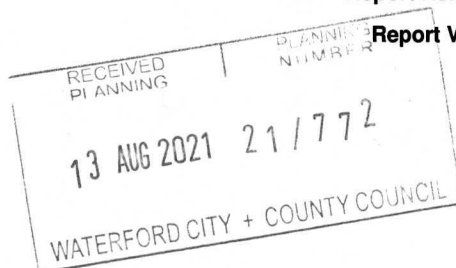
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Report Reference: 19-54336

Report Version: 1



Site: Cappagh Quarry

Sample Description: BH 16-09

Date of Sampling: 27/03/2019

Sample Type: Ground

Date Sample Received: 29/03/2019

Lab Reference Number: 433671

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
*U	-	Vinyl Chloride	< 1.00	ug/l	-

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Report Reference: 19-54336

Report Version: 1

Site: Cappagh Quarry

Sample Description: BH 16-11

Date of Sampling: 27/03/2019

Sample Type: Ground

Date Sample Received: 29/03/2019

Lab Reference Number: 433672

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
*U	-	EPH (DRO) Range >C10-C40	< 100.00	ug/l	-
D/D3000#	01/04/2019	Alkalinity CaCO3	253.382	mg/l	-
D/D3000#	01/04/2019	Ammonia as NH4	< 0.013	mg/l	-
D/D3000#	01/04/2019	Chloride	24.424	mg/l	-
D/D3011#	29/03/2019	Conductivity @ 20 °C	545.0	uS/cm @20 °C	-
D/D3015#	01/04/2019	Fluoride	< 0.1	mg/l	-
D/D3000#	01/04/2019	Nitrite as N02	< 0.066	mg/l	-
D/D3000#	01/04/2019	Nitrate as N03	42.023	mg/l	-
EW188#*	-	Cadmium-Dissolved	0.2	ug/l	-
EW188#*	-	Molybdenum-Dissolved	< 1.0	ug/l	-
EW188#*	-	Selenium-Dissolved	1.7	ug/l	-
EW188#*	-	Cobalt-Dissolved	< 1.0	ug/l	-
EW188#*	-	Nickel-Dissolved	3.5	ug/l	-
EW188#*	-	Boron-Dissolved	0.03	mg/l	-
EW188#*	-	Copper-Dissolved	0.005	mg/l	-
EW188#*	-	Chromium-Dissolved	2.3	ug/l	-
EW188#*	-	Arsenic-Dissolved	0.3	ug/L	-
EW188#*	-	Zinc-Dissolved	17.0	ug/l	-

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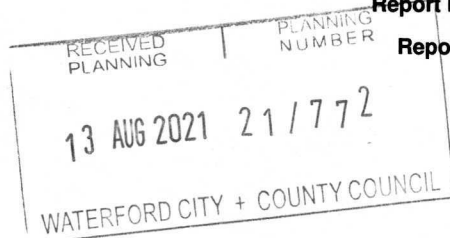
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Report Reference: 19-54336

Report Version: 1



Site: Cappagh Quarry

Sample Description: BH 16-11

Date of Sampling: 27/03/2019

Sample Type: Ground

Date Sample Received: 29/03/2019

Lab Reference Number: 433672

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
EW188#*	-	Antimony-Dissolved	0.3	ug/L	-
EW188#*	-	Lead-Dissolved	1.5	ug/l	-
EW188#*	-	Mercury-Dissolved	0.10	ug/l	-
EW188#*	-	Barium-Dissolved	20.6	ug/L	-
D/D3000#	01/04/2019	Orthophosphate as P	< 0.025	mg/l	-
D/D3000#	01/04/2019	Orthophosphate as P04	< 0.025	mg/l	-
D/D1041#	29/03/2019	PH	7.35	pH Unit	-
D/D3000	04/04/2019	Phosphorus, Soluble	< 0.050	mg/l	-
D/D3000#	01/04/2019	Sulphate	< 20.000	mg/l	-
<b>VOC</b>					
*U	-	1,1,1,2-Tetrachloroethane	< 1.00	ug/l	-
*U	-	1,1,2-2 - Tetrachloroethane	< 5.00	ug/l	-
*U	-	1,1,1-Trichloroethane	< 1.00	ug/l	-
*U	-	1,1,2-Trichloroethane	< 2.00	ug/l	-
*U	-	1,1-Dichloroethane	< 1.00	ug/l	-
*U	-	1,1-Dichloroethene	< 1.00	ug/l	-
*U	-	1,1-Dichloropropene	< 1.00	ug/l	-
*U	-	1,2,3-Trichlorobenzene	< 3.00	ug/l	-

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Report Reference: 19-54336

Report Version: 1

Site: Cappagh Quarry

Sample Description: BH 16-11

Date of Sampling: 27/03/2019

Sample Type: Ground

Date Sample Received: 29/03/2019

Lab Reference Number: 433672

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
*U	-	1,2,3-Trichloropropane	< 8.00	ug/l	-
*U	-	1,2,4-Trichlorobenzene	< 2.00	ug/l	-
*U	-	1,2,4-Trimethylbenzene	< 2.00	ug/l	-
*	-	1,2-Dibromo-3-chloropropane	< 10.00	ug/l	-
*U	-	1,2-Dibromoethane	< 2.00	ug/l	-
*	-	1,2-Dichlorobenzene	< 4.00	ug/l	-
*U	-	1,2-Dichloroethane	< 3.00	ug/l	-
*U	-	1,2-Dichloropropane	< 3.00	ug/l	-
*U	-	1,3,5-Trimethylbenzene	< 2.00	ug/l	-
*	-	1,3,5-Trichlorobenzene	< 10.00	ug/l	-
*U	-	1,3-Dichlorobenzene	< 2.00	ug/l	-
*U	-	1,3-Dichloropropane	< 2.00	ug/l	-
*U	-	1,4-Dichlorobenzene	< 3.00	ug/l	-
*U	-	2,2-Dichloropropane	< 4.00	ug/l	-
*U	-	2-Chlorotoluene	< 2.00	ug/l	-
*U	-	4-Chlorotoluene	< 2.00	ug/l	-
*U	-	4-Isopropyltoluene	< 4.00	ug/l	-
*U	-	Benzene	< 1.00	ug/l	-

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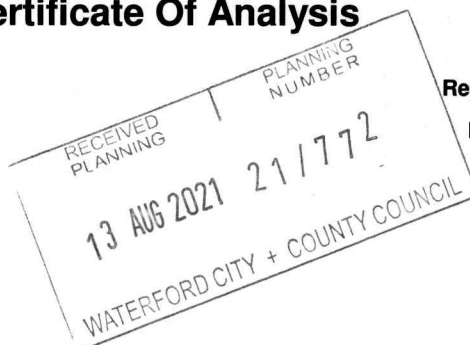
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Report Reference: 19-54336

Report Version: 1

Site: Cappagh Quarry

Sample Description: BH 16-11

Date of Sampling: 27/03/2019

Sample Type: Ground

Date Sample Received: 29/03/2019

Lab Reference Number: 433672

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
*U	-	Bromobenzene	< 2.00	ug/l	-
*U	-	Bromochloromethane	< 2.00	ug/l	-
*U	-	Bromodichloromethane	< 1.00	ug/l	-
*U	-	Bromoform	< 3.00	ug/l	-
*U	-	Bromomethane	< 2.00	ug/l	-
*U	-	Carbon Disulphide	< 1.00	ug/l	-
*U	-	Carbontetrachloride	< 1.00	ug/l	-
*U	-	Chlorobenzene	< 4.00	ug/l	-
*U	-	Chloroethane	< 3.00	ug/l	-
*U	-	Chloroform	< 2.00	ug/l	-
*U	-	Chloromethane	< 9.00	ug/l	-
*U	-	1,2-Dichloroethene cis (Z)	< 2.00	ug/l	-
*U	-	1,3-Dichloropropene cis (Z)	< 2.00	ug/l	-
*U	-	Dibromochloromethane	< 2.00	ug/l	-
*U	-	Dibromomethane	< 3.00	ug/l	-
*U	-	Dichlorodifluoromethane	< 7.00	ug/l	-
*U	-	Dichloromethane	< 3.00	ug/l	-
*U	-	Ethylbenzene	< 3.00	ug/l	-

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SLR Consulting Ireland  
7 Dundrum Business Park  
Windy Arbour  
Dublin 14  
Dublin

Report Reference: 19-54336

Report Version: 1

Site: Cappagh Quarry

Sample Description: BH 16-11

Date of Sampling: 27/03/2019

Sample Type: Ground

Date Sample Received: 29/03/2019

Lab Reference Number: 433672

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
*U	-	Hexachlorobutadiene	< 3.00	ug/l	-
*U	-	Isopropylbenzene	< 1.00	ug/l	-
*U	-	Methyl Tertiary Butyl Ether	< 2.00	ug/l	-
*U	-	Napthalene	< 4.00	ug/l	-
*U	-	n-Butylbenzene	< 2.00	ug/l	-
*U	-	O-Xylene	< 1.00	ug/l	-
*U	-	M&P-Xylene	< 3.00	ug/l	-
*U	-	Propylbenzene	< 3.00	ug/l	-
*U	-	sec-Butylbenzene	< 2.00	ug/l	-
*U	-	Styrene	< 1.00	ug/l	-
*U	-	tert-Butylbenzene	< 2.00	ug/l	-
*U	-	Tetrachloroethene	< 2.00	ug/l	-
*U	-	Tert-amyl methyl ether	< 1.00	ug/l	-
*U	-	Toluene	< 1.00	ug/l	-
*U	-	1,2-Dichloroethene Trans (E)	< 2.00	ug/l	-
*U	-	1,3-Dichloropropene Trans (E)	< 4.00	ug/l	-
*U	-	Trichloroethene	< 3.00	ug/l	-
*U	-	Trichlorofluoromethane	< 1.00	ug/l	-

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Dublin 14  
Dublin

Report Reference: 19-54336

Report Version: 1



Site: Cappagh Quarry

Sample Description: BH 16-11

Date of Sampling: 27/03/2019

Sample Type: Ground

Date Sample Received: 29/03/2019

Lab Reference Number: 433672

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
*U	-	Vinyl Chloride	< 1.00	ug/l	-

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Dublin

Report Reference: 19-54336

Report Version: 1

Site: Cappagh Quarry

Sample Description: BH 16-13

Date of Sampling: 27/03/2019

Sample Type: Ground

Date Sample Received: 29/03/2019

Lab Reference Number: 433673

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
*U	-	EPH (DRO) Range >C10-C40	< 100.00	ug/l	-
D/D3000#	01/04/2019	Alkalinity CaCO3	295.795	mg/l	-
D/D3000#	01/04/2019	Ammonia as NH4	< 0.013	mg/l	-
D/D3000#	01/04/2019	Chloride	23.463	mg/l	-
D/D3011#	29/03/2019	Conductivity @ 20°C	602.0	uS/cm @20°C	-
D/D3015#	01/04/2019	Fluoride	< 0.1	mg/l	-
D/D3000#	01/04/2019	Nitrite as N02	< 0.066	mg/l	-
D/D3000#	01/04/2019	Nitrate as N03	50.414	mg/l	-
EW188#*	-	Selenium-Dissolved	1.4	ug/l	-
EW188#*	-	Zinc-Dissolved	15.0	ug/l	-
EW188#*	-	Antimony-Dissolved	0.5	ug/L	-
EW188#*	-	Mercury-Dissolved	0.03	ug/l	-
EW188#*	-	Boron-Dissolved	0.02	mg/l	-
EW188#*	-	Chromium-Dissolved	1.4	ug/l	-
EW188#*	-	Copper-Dissolved	< 0.003	mg/l	-
EW188#*	-	Cobalt-Dissolved	< 1.0	ug/l	-
EW188#*	-	Cadmium-Dissolved	0.2	ug/l	-
EW188#*	-	Lead-Dissolved	1.2	ug/l	-

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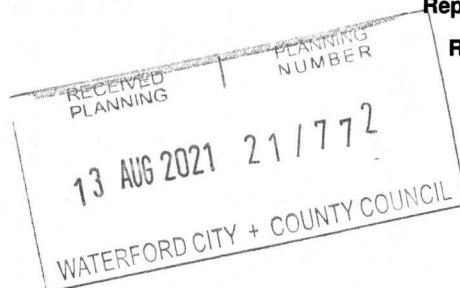
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Report Version: 1



Site: Cappagh Quarry

Sample Description: BH 16-13

Date of Sampling: 27/03/2019

Sample Type: Ground

Date Sample Received: 29/03/2019

Lab Reference Number: 433673

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
EW188#	-	Molybdenum-Dissolved	< 1.0	ug/l	-
EW188#	-	Arsenic-Dissolved	0.2	ug/L	-
EW188#	-	Barium-Dissolved	14.2	ug/L	-
EW188#	-	Nickel-Dissolved	1.1	ug/l	-
D/D3000#	01/04/2019	Orthophosphate as P	< 0.025	mg/l	-
D/D3000#	01/04/2019	Orthophosphate as P04	< 0.025	mg/l	-
D/D1041#	29/03/2019	PH	7.32	pH Unit	-
D/D3000	04/04/2019	Phosphorus, Soluble	< 0.050	mg/l	-
D/D3000#	01/04/2019	Sulphate	< 20.000	mg/l	-
<b>VOC</b>					
*U	-	1,1,1,2-Tetrachloroethane	< 1.00	ug/l	-
*U	-	1,1,2,2 - Tetrachloroethane	< 5.00	ug/l	-
*U	-	1,1,1-Trichloroethane	< 1.00	ug/l	-
*U	-	1,1,2-Trichloroethane	< 2.00	ug/l	-
*U	-	1,1-Dichloroethane	< 1.00	ug/l	-
*U	-	1,1-Dichloroethene	< 1.00	ug/l	-
*U	-	1,1-Dichloropropene	< 1.00	ug/l	-
*U	-	1,2,3-Trichlorobenzene	< 3.00	ug/l	-

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Site: Cappagh Quarry

Sample Description: BH 16-13

Date of Sampling: 27/03/2019

Sample Type: Ground

Date Sample Received: 29/03/2019

Lab Reference Number: 433673

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
*U	-	1,2,3-Trichloropropane	< 8.00	ug/l	-
*U	-	1,2,4-Trichlorobenzene	< 2.00	ug/l	-
*U	-	1,2,4-Trimethylbenzene	< 2.00	ug/l	-
*	-	1,2-Dibromo-3-chloropropane	< 10.00	ug/l	-
*U	-	1,2-Dibromoethane	< 2.00	ug/l	-
*	-	1,2-Dichlorobenzene	< 4.00	ug/l	-
*U	-	1,2-Dichloroethane	< 3.00	ug/l	-
*U	-	1,2-Dichloropropane	< 3.00	ug/l	-
*U	-	1,3,5-Trimethylbenzene	< 2.00	ug/l	-
*	-	1,3,5-Trichlorobenzene	< 10.00	ug/l	-
*U	-	1,3-Dichlorobenzene	< 2.00	ug/l	-
*U	-	1,3-Dichloropropane	< 2.00	ug/l	-
*U	-	1,4-Dichlorobenzene	< 3.00	ug/l	-
*U	-	2,2-Dichloropropane	< 4.00	ug/l	-
*U	-	2-Chlorotoluene	< 2.00	ug/l	-
*U	-	4-Chlorotoluene	< 2.00	ug/l	-
*U	-	4-Isopropyltoluene	< 4.00	ug/l	-
*U	-	Benzene	< 1.00	ug/l	-

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TVC - Total viable count

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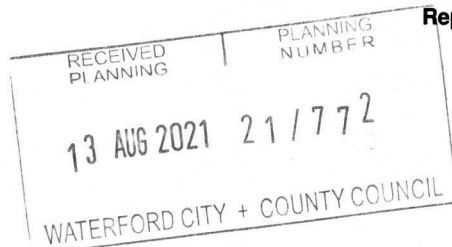
## Certificate Of Analysis

### Customer

Clodagh Gillen  
SLR Consulting Ireland  
7 Dundrum Business Park  
Windy Arbour  
Dublin 14  
Dublin

Report Reference: 19-54336

Report Version: 1



Site: Cappagh Quarry

Sample Description: BH 16-13

Date of Sampling: 27/03/2019

Sample Type: Ground

Date Sample Received: 29/03/2019

Lab Reference Number: 433673

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
*U	-	Bromobenzene	< 2.00	ug/l	-
*U	-	Bromochloromethane	< 2.00	ug/l	-
*U	-	Bromodichloromethane	< 1.00	ug/l	-
*U	-	Bromoform	< 3.00	ug/l	-
*U	-	Bromomethane	< 2.00	ug/l	-
*U	-	Carbon Disulphide	< 1.00	ug/l	-
*U	-	Carbontetrachloride	< 1.00	ug/l	-
*U	-	Chlorobenzene	< 4.00	ug/l	-
*U	-	Chloroethane	< 3.00	ug/l	-
*U	-	Chloroform	< 2.00	ug/l	-
*U	-	Chloromethane	< 9.00	ug/l	-
*U	-	1,2-Dichloroethene cis (Z)	< 2.00	ug/l	-
*U	-	1,3-Dichloropropene cis (Z)	< 2.00	ug/l	-
*U	-	Dibromochloromethane	< 2.00	ug/l	-
*U	-	Dibromomethane	< 3.00	ug/l	-
*U	-	Dichlorodifluoromethane	< 7.00	ug/l	-
*U	-	Dichloromethane	< 3.00	ug/l	-
*U	-	Ethylbenzene	< 3.00	ug/l	-

# = INAB Accredited, U = UKAS Accredited, \* = Subcontracted

#### Note:

PV Value is the parametric value, taken from European Communities, (Drinking Water) Regulations, 2014. S.I. No. 122 of 2014 and relates only to drinking water samples.

For queries on results, please contact us within two weeks of the report date to ensure that we can accommodate your query as samples cannot be stored indefinitely.

NAC & ATC - No abnormal change and acceptable to customers.

TVC - Total viable count

Site D = Analysed at City Analysts Dublin. Site S = Analysed at City Analysts Shannon

## Certificate Of Analysis

### Customer

Clodagh Gillen  
SLR Consulting Ireland  
7 Dundrum Business Park  
Windy Arbour  
Dublin 14  
Dublin

Report Reference: 19-54336

Report Version: 1

Site: Cappagh Quarry

Sample Description: BH 16-13

Date of Sampling: 27/03/2019

Sample Type: Ground

Date Sample Received: 29/03/2019

Lab Reference Number: 433673

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
*U	-	Hexachlorobutadiene	< 3.00	ug/l	-
*U	-	Isopropylbenzene	< 1.00	ug/l	-
*U	-	Methyl Tertiary Butyl Ether	< 2.00	ug/l	-
*U	-	Napthalene	< 4.00	ug/l	-
*U	-	n-Butylbenzene	< 2.00	ug/l	-
*U	-	O-Xylene	< 1.00	ug/l	-
*U	-	M&P-Xylene	< 3.00	ug/l	-
*U	-	Propylbenzene	< 3.00	ug/l	-
*U	-	sec-Butylbenzene	< 2.00	ug/l	-
*U	-	Styrene	< 1.00	ug/l	-
*U	-	tert-Butylbenzene	< 2.00	ug/l	-
*U	-	Tetrachloroethene	< 2.00	ug/l	-
*U	-	Tert-amyl methyl ether	< 1.00	ug/l	-
*U	-	Toluene	< 1.00	ug/l	-
*U	-	1,2-Dichloroethene Trans (E)	< 2.00	ug/l	-
*U	-	1,3-Dichloropropene Trans (E)	< 4.00	ug/l	-
*U	-	Trichloroethene	< 3.00	ug/l	-
*U	-	Trichlorofluoromethane	< 1.00	ug/l	-

# = INAB Accredited, U = UKAS Accredited, \* = Subcontracted

### Note:

PV Value is the parametric value, taken from European Communities, (Drinking Water) Regulations, 2014. S.I. No. 122 of 2014 and relates only to drinking water samples.

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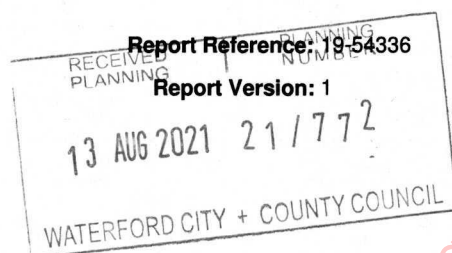
## Certificate Of Analysis

### Customer

Clodagh Gillen  
SLR Consulting Ireland  
7 Dundrum Business Park  
Windy Arbour  
Dublin 14  
Dublin

Report Reference: 19-54336

Report Version: 1



Site: Cappagh Quarry

Sample Description: BH 16-13

Date of Sampling: 27/03/2019

Sample Type: Ground

Date Sample Received: 29/03/2019

Lab Reference Number: 433673

Site / Method Ref.	Analysis Start Date	Parameter	Result	Units	PV Value (Drinking Water Only)
*U	-	Vinyl Chloride	< 1.00	ug/l	-

# = INAB Accredited, U = UKAS Accredited, \* = Subcontracted

### Note:

PV Value is the parametric value, taken from European Communities, (Drinking Water) Regulations, 2014. S.I. No. 122 of 2014 and relates only to drinking water samples.

For queries on results, please contact us within two weeks of the report date to ensure that we can accommodate your query as samples cannot be stored indefinitely.

NAC & ATC - No abnormal change and acceptable to customers.

TVC - Total viable count

Site D = Analysed at City Analysts Dublin. Site S = Analysed at City Analysts Shannon

## Raw Data

Raw data has been provided with this Certificate of Analysis as it has been specifically requested by you. Please note that raw data results are Not Accredited. Raw data can be provided only for analysis carried out in-house.

Lab Reference Number:	Parameter	Result	Units	Site / Method Ref.
433668	Alkalinity CaCO <sub>3</sub>	252.9587	mg/l	D/D3000
433668	Ammonia as NH <sub>4</sub>	0.03154	mg/l	D/D3000
433668	Chloride	24.02371	mg/l	D/D3000
433668	Conductivity @ 20 °C	543	uS/cm @20 °C	D/D3011
433668	Fluoride	0.109	mg/l	D/D3015
433668	Nitrite as N02	0.10920	mg/l	D/D3000
433668	Nitrate as N03	41.71598	mg/l	D/D3000
433668	Orthophosphate as P	0	mg/l	D/D3000
433668	Orthophosphate as P04	0.00000	mg/l	D/D3000
433668	PH	7.38	pH Unit	D/D1041
433668	Phosphorus, Soluble	0.0265336	mg/l	D/D3000
433668	Sulphate	15.00492	mg/l	D/D3000
433669	Alkalinity CaCO <sub>3</sub>	249.8295	mg/l	D/D3000
433669	Ammonia as NH <sub>4</sub>	0.00000	mg/l	D/D3000
433669	Chloride	26.89168	mg/l	D/D3000
433669	Conductivity @ 20 °C	538	uS/cm @20 °C	D/D3011
433669	Fluoride	0.0491	mg/l	D/D3015
433669	Nitrite as N02	0.00000	mg/l	D/D3000
433669	Nitrate as N03	44.51175	mg/l	D/D3000
433669	Orthophosphate as P	0.02505	mg/l	D/D3000
433669	Orthophosphate as P04	0.07515	mg/l	D/D3000
433669	PH	7.37	pH Unit	D/D1041
433669	Phosphorus, Soluble	0.0171712	mg/l	D/D3000
433669	Sulphate	14.47304	mg/l	D/D3000
433670	Alkalinity CaCO <sub>3</sub>	326.0118	mg/l	D/D3000
433670	Ammonia as NH <sub>4</sub>	0.00000	mg/l	D/D3000
433670	Chloride	31.3011	mg/l	D/D3000
433670	Conductivity @ 20 °C	773	uS/cm @20 °C	D/D3011
433670	Fluoride	0.0455	mg/l	D/D3015
433670	Nitrite as N02	0.00000	mg/l	D/D3000
433670	Nitrate as N03	82.45741	mg/l	D/D3000
433670	Orthophosphate as P	0.03228	mg/l	D/D3000
433670	Orthophosphate as P04	0.09684	mg/l	D/D3000
433670	PH	7.15	pH Unit	D/D1041
433670	Phosphorus, Soluble	0.00731608	mg/l	D/D3000
433670	Sulphate	15.54096	mg/l	D/D3000
433671	Alkalinity CaCO <sub>3</sub>	288.4786	mg/l	D/D3000



## Raw Data

Raw data has been provided with this Certificate of Analysis as it has been specifically requested by you. Please note that raw data results are Not Accredited. Raw data can be provided only for analysis carried out in-house.

Lab Reference Number:	Parameter	Result	Units	Site / Method Ref.
433671	Ammonia as NH <sub>4</sub>	0.00000	mg/l	D/D3000
433671	Chloride	29.97684	mg/l	D/D3000
433671	Conductivity @ 20 °C	623	uS/cm @20 °C	D/D3011
433671	Fluoride	0.0445	mg/l	D/D3015
433671	Nitrite as N02	0.00000	mg/l	D/D3000
433671	Nitrate as N03	50.81312	mg/l	D/D3000
433671	Orthophosphate as P	0.00773	mg/l	D/D3000
433671	Orthophosphate as P04	0.02319	mg/l	D/D3000
433671	PH	7.21	pH Unit	D/D1041
433671	Phosphorus, Soluble	0.0283647	mg/l	D/D3000
433671	Sulphate	10.74619	mg/l	D/D3000
433672	Alkalinity CaCO <sub>3</sub>	253.3821	mg/l	D/D3000
433672	Ammonia as NH <sub>4</sub>	0.00000	mg/l	D/D3000
433672	Chloride	24.42399	mg/l	D/D3000
433672	Conductivity @ 20 °C	545	uS/cm @20 °C	D/D3011
433672	Fluoride	0.0321	mg/l	D/D3015
433672	Nitrite as N02	0.00000	mg/l	D/D3000
433672	Nitrate as N03	42.02320	mg/l	D/D3000
433672	Orthophosphate as P	0	mg/l	D/D3000
433672	Orthophosphate as P04	0.00000	mg/l	D/D3000
433672	PH	7.35	pH Unit	D/D1041
433672	Phosphorus, Soluble	0.00741698	mg/l	D/D3000
433672	Sulphate	17.91866	mg/l	D/D3000
433673	Alkalinity CaCO <sub>3</sub>	295.795	mg/l	D/D3000
433673	Ammonia as NH <sub>4</sub>	0.00000	mg/l	D/D3000
433673	Chloride	23.46253	mg/l	D/D3000
433673	Conductivity @ 20 °C	602	uS/cm @20 °C	D/D3011
433673	Fluoride	0.0333	mg/l	D/D3015
433673	Nitrite as N02	0.00000	mg/l	D/D3000
433673	Nitrate as N03	50.41375	mg/l	D/D3000
433673	Orthophosphate as P	0	mg/l	D/D3000
433673	Orthophosphate as P04	0.00000	mg/l	D/D3000
433673	PH	7.32	pH Unit	D/D1041
433673	Phosphorus, Soluble	0.00529719	mg/l	D/D3000
433673	Sulphate	7.27612	mg/l	D/D3000



Unit 7-8 Hawarden Business Park  
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Deeside  
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Website: www.alsenvironmental.co.uk

SLR Consulting Ireland  
CSA House  
Unit 7  
Dundrum Business Park  
Windy Harbour  
Dublin  
Dublin14

Attention: Clodagh Gillen

## CERTIFICATE OF ANALYSIS

**Date of report Generation:** 20 November 2020  
**Customer:** SLR Consulting Ireland  
**Sample Delivery Group (SDG):** 201107-80  
**Your Reference:** Cappagh Quarry  
**Location:** Cappagh Quarry  
**Report No:** 576437

We received 6 samples on Saturday November 07, 2020 and 6 of these samples were scheduled for analysis which was completed on Friday November 20, 2020. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.

Incorrect sampling dates and/or sample information will affect the validity of results.

The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

**Sonia McWhan**

Operations Manager







# CERTIFICATE OF ANALYSIS

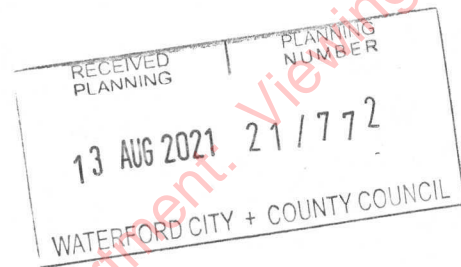
Validated

SDG: 201107-80 Client Reference: Cappagh Quarry Report Number: 576437  
Location: Cappagh Quarry Order Number: 5995 Superseded Report:

## Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
23200793	BH16-02		0.00 - 0.00	03/11/2020
23200805	BH16-06		0.00 - 0.00	04/11/2020
23200818	BH16-07		0.00 - 0.00	04/11/2020
23200833	BH16-09		0.00 - 0.00	03/11/2020
23200844	BH16-11		0.00 - 0.00	03/11/2020
23200870	BH16-13		0.00 - 0.00	03/11/2020

Only received samples which have had analysis scheduled will be shown on the following pages.





# CERTIFICATE OF ANALYSIS

Validated

SDG: 201107-80  
Location: Cappagh Quarry

Client Reference: Cappagh Quarry  
Order Number: 5995

Report Number: 576437  
Superseded Report:

## Results Legend



Test



No Determination Possible

## Sample Types -

S - Soil/Solid  
UNS - Unspecified Solid  
GW - Ground Water  
SW - Surface Water  
LE - Land Leachate  
PL - Prepared Leachate  
PR - Process Water  
SA - Saline Water  
TE - Trade Effluent  
TS - Treated Sewage  
US - Untreated Sewage  
RE - Recreational Water  
DW - Drinking Water Non-regulatory  
UNL - Unspecified Liquid  
SL - Sludge  
G - Gas  
OTH - Other

## Lab Sample No(s)

## Customer Sample Reference

## AGS Reference

## Depth (m)

## Container

## Sample Type

			23200793		23200805		23200818		833
			BH16-02		BH16-06		BH16-07		BH16-09
			0.00 - 0.00		0.00 - 0.00		0.00 - 0.00		0.00 - 0.00
			0.5l glass bottle (ALE227)	500ml Plastic (ALE208)	500ml Plastic (ALE208)	0.5l glass bottle (ALE227)	500ml Plastic (ALE208)	500ml Plastic (ALE208)	0.5l glass bottle (ALE227)
			GW	GW	GW	GW	GW	GW	GW
Alkalinity as CaCO <sub>3</sub>	All	NDPs: 0 Tests: 6	X		X		X		
Ammoniacal Nitrogen	All	NDPs: 0 Tests: 6		X		X		X	
Anions by Kone (w)	All	NDPs: 0 Tests: 6	X		X		X		
Conductivity (at 20 deg.C)	All	NDPs: 0 Tests: 6	X		X		X		
Dissolved Metals by ICP-MS	All	NDPs: 0 Tests: 6		X		X		X	
EPH (DRO) (C10-C40) Aqueous (W)	All	NDPs: 0 Tests: 6	X		X		X		X
Fluoride	All	NDPs: 0 Tests: 6	X		X		X		
Mercury Dissolved	All	NDPs: 0 Tests: 6		X		X		X	
Nitrite by Kone (w)	All	NDPs: 0 Tests: 6		X		X		X	
pH Value	All	NDPs: 0 Tests: 6	X		X		X		
Phosphate by Kone (w)	All	NDPs: 0 Tests: 6	X		X		X		
VOC MS (W)	All	NDPs: 0 Tests: 6		X		X		X	













## CERTIFICATE OF ANALYSIS

SDG: 201107-80  
Location: Cappagh QuarryClient Reference: Cappagh Quarry  
Order Number: 5995Report Number: 576437  
Superseded Report:

## VOC MS (W)

Results Legend			Customer Sample Ref.		BH16-02	BH16-06	BH16-07	BH16-09	BH16-11	BH16-13
#	ISO17025 accredited.		Depth (m) Sample Type Date Sampled Sample Time Date Received SDG Ref Lab Sample No.(s) AGS Reference		0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
M	mCERTS accredited.				Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)	Ground Water (GW)
aq	Aqueous / settled sample.				03/11/2020	04/11/2020	04/11/2020	03/11/2020	03/11/2020	03/11/2020
dis.filt	Disolved / filtered sample.				07/11/2020	07/11/2020	07/11/2020	07/11/2020	07/11/2020	07/11/2020
tot.unfilt	Total / unfiltered sample.				201107-80	201107-80	201107-80	201107-80	201107-80	201107-80
+	Subcontracted - refer to subcontractor report for accreditation status.				23200793	23200805	23200818	23200833	23200844	23200870
..	% recovery of the surrogate standard to check the efficiency of the method. The results of individual compounds within samples aren't corrected for the recovery									
(F)	Trigger breach confirmed									
1-4+5@	Sample deviation (see appendix)									
Component	LOD/Units	Method								
Tetrachloroethene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Dibromochloromethane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
1,2-Dibromoethane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Chlorobenzene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
1,1,1,2-Tetrachloroethane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Ethylbenzene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
m,p-Xylene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
o-Xylene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Styrene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Bromofom	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Isopropylbenzene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
1,2,3-Trichloropropane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Bromobenzene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Propylbenzene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
2-Chlorotoluene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
4-Chlorotoluene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
tert-Butylbenzene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
sec-Butylbenzene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
4-iso-Propyltoluene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
1,4-Dichlorobenzene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
n-Butylbenzene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Hexachlorobutadiene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
tert-Amyl methyl ether (TAME)	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
Naphthalene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1
1,3,5-Trichlorobenzene	<1 µg/l	TM208			<1	<1	<1	<1	<1	<1





# CERTIFICATE OF ANALYSIS

Validated

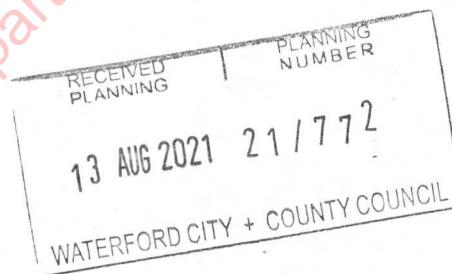
SDG: 201107-80 Client Reference: Cappagh Quarry Report Number: 576437  
Location: Cappagh Quarry Order Number: 5995 Superseded Report:

## Table of Results - Appendix

Method No	Reference	Description
TM043	Method 2320B, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part109 1984	Determination of alkalinity in aqueous samples
TM099	BS 2690: Part 7:1968 / BS 6068: Part2.11:1984	Determination of Ammonium in Water Samples using the Kone Analyser
TM104	Method 4500F, AWWA/APHA, 20th Ed., 1999	Determination of Fluoride using the Kone Analyser
TM120	Method 2510B, AWWA/APHA, 20th Ed., 1999 / BS 2690: Part 9:1970	Determination of Electrical Conductivity using a Conductivity Meter
TM152	Method 3125B, AWWA/APHA, 20th Ed., 1999	Analysis of Aqueous Samples by ICP-MS
TM172	Analysis of Petroleum Hydrocarbons in Environmental Media - Total Petroleum Hydrocarbon Criteria	EPH in Waters
TM183	BS EN 23506:2002, (BS 6068-2.74:2002) ISBN 0 580 38924 3	Determination of Trace Level Mercury in Waters and Leachates by PSA Cold Vapour Atomic Fluorescence Spectrometry
TM184	EPA Methods 325.1 & 325.2,	The Determination of Anions in Aqueous Matrices using the Kone Spectrophotometric Analysers
TM208	Modified: US EPA Method 8260b & 624	Determination of Volatile Organic Compounds by Headspace / GC-MS in Waters
TM256	The measurement of Electrical Conductivity and the Laboratory determination of pH Value of Natural, Treated and Wastewaters. HMSO, 1978. ISBN 011 751428 4.	Determination of pH in Water and Leachate using the GLpH pH Meter

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Life Sciences Ltd Hawarden (Method codes TM) or ALS Life Sciences Ltd Aberdeen (Method codes S).





## CERTIFICATE OF ANALYSIS

SDG: 201107-80  
Location: Cappagh QuarryClient Reference: Cappagh Quarry  
Order Number: 5995Report Number: 576437  
Superseded Report:

## Test Completion Dates

Lab Sample No(s)	23200793	23200805	23200818	23200833	23200844	23200870
Customer Sample Ref.	BH16-02	BH16-06	BH16-07	BH16-09	BH16-11	BH16-13
AGS Ref.						
Depth	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00	0.00 - 0.00
Type	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water	Ground Water
Alkalinity as CaCO <sub>3</sub>	17-Nov-2020	16-Nov-2020	17-Nov-2020	17-Nov-2020	17-Nov-2020	17-Nov-2020
Ammoniacal Nitrogen	16-Nov-2020	16-Nov-2020	16-Nov-2020	16-Nov-2020	16-Nov-2020	16-Nov-2020
Anions by Kone (w)	18-Nov-2020	18-Nov-2020	18-Nov-2020	18-Nov-2020	18-Nov-2020	18-Nov-2020
Conductivity (at 20 deg.C)	13-Nov-2020	13-Nov-2020	13-Nov-2020	13-Nov-2020	13-Nov-2020	13-Nov-2020
Dissolved Metals by ICP-MS	20-Nov-2020	20-Nov-2020	20-Nov-2020	20-Nov-2020	20-Nov-2020	20-Nov-2020
EPH (DRO) (C10-C40) Aqueous (W)	14-Nov-2020	14-Nov-2020	14-Nov-2020	14-Nov-2020	14-Nov-2020	14-Nov-2020
Fluoride	13-Nov-2020	13-Nov-2020	13-Nov-2020	13-Nov-2020	13-Nov-2020	13-Nov-2020
Mercury Dissolved	18-Nov-2020	18-Nov-2020	18-Nov-2020	18-Nov-2020	18-Nov-2020	18-Nov-2020
Nitrite by Kone (w)	13-Nov-2020	13-Nov-2020	13-Nov-2020	13-Nov-2020	13-Nov-2020	13-Nov-2020
pH Value	13-Nov-2020	13-Nov-2020	13-Nov-2020	13-Nov-2020	13-Nov-2020	13-Nov-2020
Phosphate by Kone (w)	13-Nov-2020	13-Nov-2020	13-Nov-2020	13-Nov-2020	13-Nov-2020	13-Nov-2020
VOC MS (W)	10-Nov-2020	10-Nov-2020	10-Nov-2020	11-Nov-2020	10-Nov-2020	11-Nov-2020





# CERTIFICATE OF ANALYSIS

SDG: 201107-80  
Location: Cappagh Quarry

Client Reference: Cappagh Quarry  
Order Number: 5995

Report Number: 576437  
Superseded Report:

## Appendix

## General

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH<sub>4</sub> by the BRE method, VOC TICs and SVOC TICs.

2. If sufficient sample is received a sub sample will be retained free of charge for 30 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of one month after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

3. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

4. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

10. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

11. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

12. Mercury results quoted on soils will not include volatile mercury as the analysis is performed on a dried and crushed sample.

13. Leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

14. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GC/FID/GCMS and all subcontracted analysis.

15. Analysis and identification of specific compounds using GC/FID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTEX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

16. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

17. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

### 18. Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Matrix interference
♦	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to late arrival of instructions or samples
§	Sampled on date not provided

### 19. Asbestos

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2005), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

#### Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials are obtained from supplied bulk materials which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2005).

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anorthophyllite	-
Fibrous Tremolite	-

#### Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

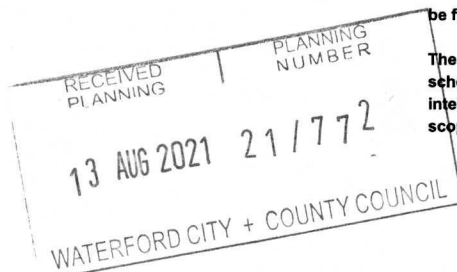
#### Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

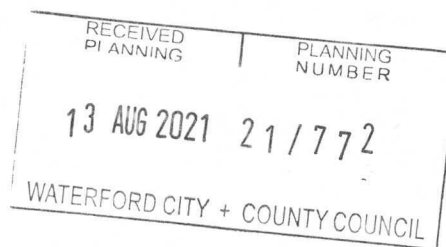
Standing Committee of Analysts, *The Quantification of Asbestos in Soil* (2017).

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.



## APPENDIX 7-F Impact Assessment Guidelines

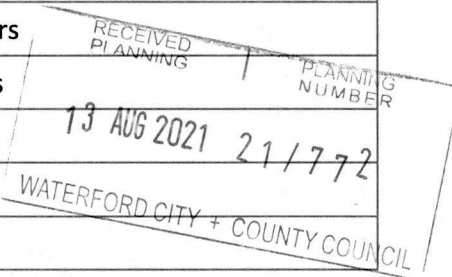




# WATER (HYDROLOGY AND HYDROGEOLOGY) 7

## Impact Classification Terminology (EPA, 2017)

Impact Characteristic	Term	Description
<b>Quality</b>	Positive	A change which improves the quality of the environment
	Neutral	No effects or effects that are imperceptible
	Negative	A change which reduces the quality of the environment
<b>Significance</b>	Imperceptible	An effect capable of measurement but without significant consequences
	Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities
	Moderate	An effect that alters the character of the environment in a manner consistent with existing and emerging trends
	Significant	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment
	Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment
<b>Extent and Context</b>	Profound	An effect which obliterates sensitive characteristics
	Extent	Size of the area, number of sites, proportion of a population affected by an effect
<b>Probability</b>	Context	Extent, duration of frequency conforming or contrasting with established (baseline) conditions
	Likely Effects	The effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented.
<b>Duration</b>	Unlikely Effects	The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.
	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	Impact lasting one to seven years
	Medium-term	Impact lasting seven to fifteen years
	Long-term	Impact lasting fifteen to sixty years
	Permanent	Impact lasting over sixty years
	Reversible	Impact lasting for one year or less
	Frequency	How often the effect will occur



## WATER (HYDROLOGY AND HYDROGEOLOGY) 7

Impact Characteristic	Term	Description
<b>Type</b>	Indirect	Impacts on the environment, which are note a direct result of the project, often produced away from the project site or because of a complex pathway.
	Cumulative	The addition of many minor or significant effects, including effects of other projects, to create larger, more significant effects.
	'Do Nothing'	The environment as it would be in the future should the subject project not be carried out.
	'Worst case'	The effects arising from a project in the case where mitigation measures substantially fail.
	Indeterminable	When the full consequences of a change in the environment cannot be described.
	Irreversible	When the character, distinctiveness, diversity, or reproductive capacity of an environment is permanently lost.
	Residual	Degree of environmental change that will occur after the proposed mitigation measures have taken effect.
	Synergistic	Where the resultant impact is of greater significance than the sum of its constituents.

### Rating of Significant Environmental Impacts at EIA Stage (after IGI Guidelines, 2013)

Importance of Attribute	Magnitude of Impact			
	Negligible	Small Adverse	Moderate Adverse	Large Adverse
<b>Extremely High</b>	Imperceptible	Significant	Profound	Profound
<b>Very High</b>	Imperceptible	Significant / Moderate	Profound / Significant	Profound
<b>High</b>	Imperceptible	Moderate / Slight	Significant / Moderate	Profound / Significant
<b>Medium</b>	Imperceptible	Slight	Moderate	Significant
<b>Low</b>	Imperceptible	Imperceptible	Slight	Slight / Moderate



# WATER (HYDROLOGY AND HYDROGEOLOGY) 7

## Criteria for Rating Site Importance of Hydrogeology Attributes (after IGI Guidelines, 2013)

Importance	Criteria	Typical Example
<b>Extremely High</b>	Attribute has a high quality or value on an international scale	Groundwater supports river, wetland or surface water body ecosystem protected by EU legislation e.g. SAC or SPA status
<b>Very High</b>	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.
<b>High</b>	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.
<b>Medium</b>	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.
<b>Low</b>	Attribute has a low quality or value on a local scale	Poor Bedrock Aquifer. Potable water source supplying <50 homes.



## Criteria for Rating Impact Significance at EIS Stage Estimation of Magnitude of Impact on Hydrogeology Attribute (after IGI Guidelines, 2013)

Magnitude of Impact	Criteria	Typical Example
<b>Large Adverse</b>	Results in loss of attribute and /or quality and integrity of attribute	Removal of large proportion of aquifer. Changes to aquifer or unsaturated zone resulting in extensive change to existing water supply springs and wells, river baseflow or ecosystems. Potential high risk of pollution to groundwater from routine run-off. Calculated risk of serious pollution incident >2% annually
<b>Moderate Adverse</b>	Results in impact on integrity of attribute or loss of part of attribute	Removal of moderate proportion of aquifer. Changes to aquifer or unsaturated zone resulting in moderate change to existing water supply springs and wells, river baseflow or ecosystems. Potential medium risk of pollution to groundwater from routine run-off. Calculated risk of serious pollution incident >1% annually
<b>Small Adverse</b>	Results in minor impact on integrity of attribute or loss of small part of attribute	Removal of small proportion of aquifer. Changes to aquifer or unsaturated zone resulting in minor change to water supply springs and wells, river baseflow or ecosystems. Potential low risk of pollution to groundwater from routine run-off. Calculated risk of serious pollution incident >0.5% annually.
<b>Negligible</b>	Results in an impact on attribute but of insufficient magnitude to aspect either use or integrity	Calculated risk of serious pollution incident <0.5% annually



# WATER (HYDROLOGY AND HYDROGEOLOGY) 7

## Criteria for Rating Impact Significance at EIS Stage Estimation of Magnitude of Impact on Hydrology Attribute (after IGI Guidelines, 2013)

Magnitude of Impact	Criteria	Typical Example
<b>Large Adverse</b>	Results in loss of attribute and /or quality and integrity of attribute	Loss or extensive change to a water body or water dependent habitat Increase in predicted peak flood level >100mm Extensive loss of fishery Calculated risk of serious pollution incident >2% annually Extensive reduction in amenity value
<b>Moderate Adverse</b>	Results in impact on integrity of attribute or loss of part of attribute	Increase in predicted peak flood level >50mm Partial loss of fishery Calculated risk of serious pollution incident >1% annually Partial reduction in amenity value
<b>Small Adverse</b>	Results in minor impact on integrity of attribute or loss of small part of attribute	Increase in predicted peak flood level >10mm Minor loss of fishery Calculated risk of serious pollution incident >0.5% annually Slight reduction in amenity value
<b>Negligible</b>	Results in an impact on attribute but of insufficient magnitude to affect either use or integrity	Negligible change in predicted peak flood level Calculated risk of serious pollution incident <0.5% annually
<b>Minor Beneficial</b>	Results in minor improvement of attribute quality	Reduction in predicted peak flood level >10mm Calculated reduction in pollution risk of 50% or more where existing risk is <1% annually
<b>Moderate Beneficial</b>	Results in moderate improvement of attribute quality	Reduction in predicted peak flood level >50mm Calculated reduction in pollution risk of 50% or more where existing risk is >1% annually
<b>Major Beneficial</b>	Results in major improvement of attribute quality	Reduction in predicted peak flood level >100mm

